United States
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Landscape Design in Mined Land Reclamation

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Introduction

Reclamation of mined land offers landowners the opportunity to restore drastically disturbed lands to beneficial uses. Careful management of the landscape resources on mined land can improve the quality of the environment both onsite and offsite (figs. 1 and 2). The principles of design and the techniques introduced in this technical note apply to the reclamation of mined land and other land areas that have been disturbed.

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Planning Considerations

The landscape resource of an area includes all visible features on a site: water, vegetation, rock outcroppings, landforms, and structures (figs. 3, 4, 5). Consideration of these features should help the landowner decide how to use the land. Regardless of the uses selected, decisions about landscape resources should be included in the reclamation plan.

Begin planning for landscape resource management by making a preliminray field investigation using the worksheet shown in the back of this publication. Such an investigation is useful in noting potential problems and opportunities associated with site conditions, determining priorities and alternatives, and

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deciding if more detailed planning or professional help is needed.

The extent of the investigations depends on the scope of the planned reclamation and the physical characteristics of the site.

The following is a suggested procedure for considering landscape resources throughout site-specific planning and design. This procedure can be varied to suit the required level of investigation.

1. Inventory and evaluate the landscape resource conditions (visual resource, visibility, and landscape use) at the site.

2. Identify potential problems such as disruption of established uses adjacent to a residential area (fig. 6), or opportunities such as rehabilitation of open dumps or retention of a culturally or historically significant mining structure.

3. Determine planning and design objectives such as retaining a corridor of natural vegetation or providing an opportunity for recreation.

4. Identify alternatives that would accomplish stated objectives and indicate specific landscape measures for each alternative.

5. Assess the effects of each alternative.

The detailed investigations and planning of landscape resources can be summarized in a narrative description to be included in the reclamation plan or environmental evaluation. This becomes part of the working reclamation plan and is used as a guide for final design. The data can also be used to develop landscape management sketches that are incorporated into design sheets for planting, grading, or overall site planning.

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Design Principles

The following principles should be considered in reclaiming abandoned mined lands:

• *Variety.* Landscape elements can be designed to increase variety (fig. 7) or to maintain uniformity.

• *Visual contrast.* Landscape elements can be designed to increase visual contrast or to reduce conspicuousness. (fig. 8: vegetation reduces the apparent height of a highwall.)

• *Beneficial uses.* The landscape can be designed to enhance or to limit its value for direct and indirect uses and its capacity for multiple uses (fig. g)

• *Space.* landscape elements can be designed to increase the perception of spaciousness or of enclosure (fig. A).

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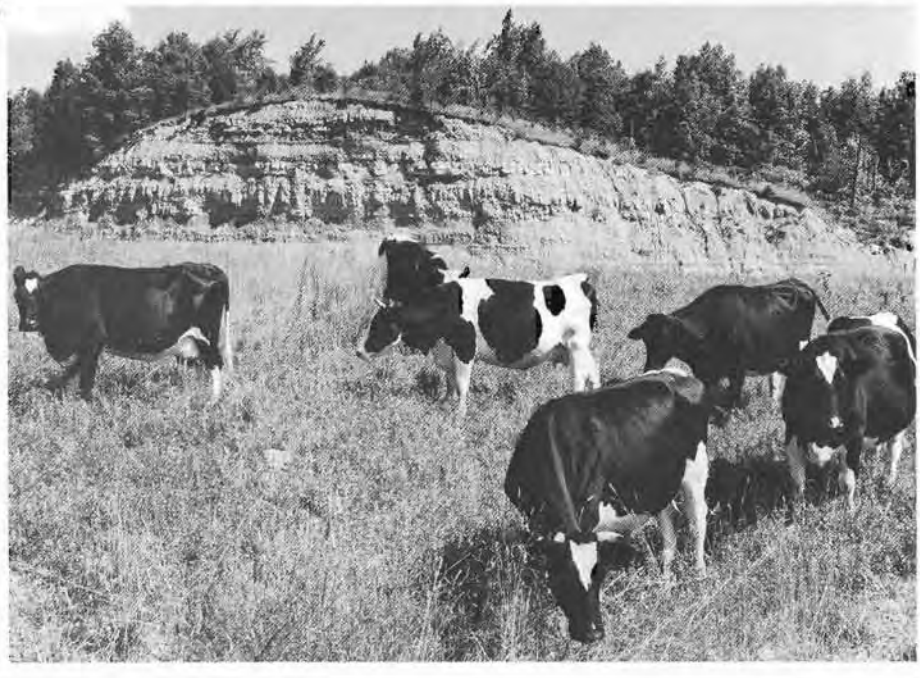

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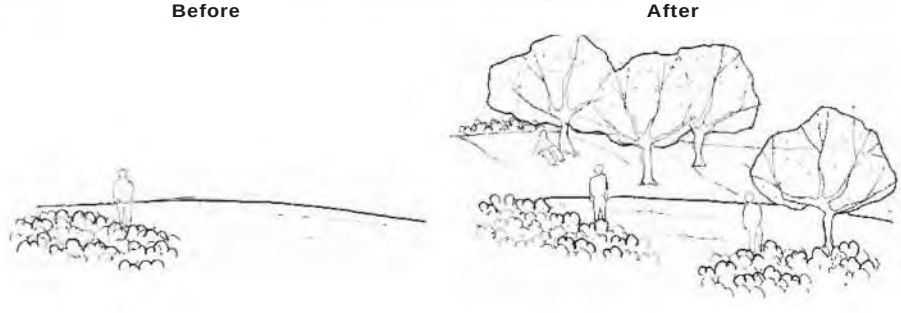

Design Alternatives

All landscapes are composed of one or more visual elements-water, landforms, vegetation, and structures. The landowner should be made aware of the possible ways these elements can be used to be compatible with each other and serve the intended land use.

Water

Two basic types of water features remain after surface mining: pools at the base of highwalls (fig. 10) and slow-moving or stagnant water in shallow, widespread drainageways (fig. **11)** These features have scenic value even if they are unsafe for contact use such as swimming or wading. Consider all opportunities for retaining or introducing water in the landscape.

Bodies of water at the base of highwalls are characteristically irregular in depth, still, isolated, and hidden from view by surrounding spoil piles. There may be windrows of spoil material at the water's edge or in the water itself. The land near the water is often harsh, steep, rugged, and unsightly. Water clarity ranges from cloudy, silt-laden water to extremely clear, acidic water. Clarity should be assessed in relation to that of other water in the surrounding countryside.

Water in drainageways is generally characterized by stagnation or intermittent flow, shallowness, and confinement to linear ditches in low areas. Drainageways generally have

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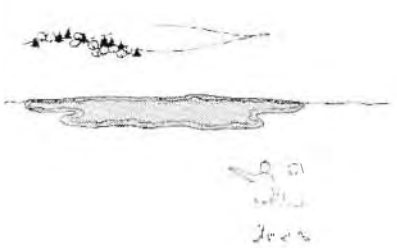

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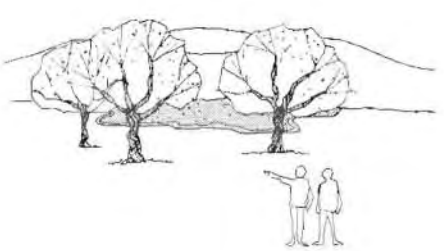

smooth side slopes and are more likely than highwall pools to be discolored from mine waste seepage.

Treatment of the areas where land and water meet is a critical factor in creaiing a visual impression. People are naturally drawn to water in the landscape. A viewing area near water is desirable even though direct access may not be encouraged for safety or health reasons.

Vegetation at the water's edge can provide interesting reflections (fig. 12), guide views toward or away from the water, enframe water as a feature (fig. B), or emphasize its length or width to create the illusion of greater surface area. The arrangement of trees and shrubs can also affect traffic patterns and furnish shade.

In western landscapes where drainageways maintain flow only during rainstorms and snowmelt, the darker, lusher appearance of vegetation near these surface drains is an important consideration. This color contrast forms distinctive patterns and should be considered when designing new drainageways or modifying existing ones (fig. 13).

Landforms adjacent to water can be manipulated to serve a variety of functions. Earth mounds, like vegetation, can guide or enframe views, create traffic patterns, and emphasize the water's edge.

Peninsulas or islands can be formed to create interest (fig. C). Irregular shapes with smooth, flowing shorelines generally are more compatible with the lines of countryside landscape.

Also important is the proportion of the water element to its surroundings (fig. D). A body of water can be reshaped to reflect sky, landform (highwalls and boulders), or vegetation.

Landforms

Landforms are usually the visual elements most drastically modified by mining. Landforms may vary

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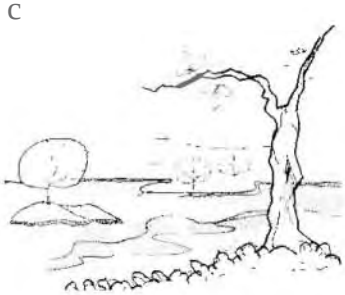
C



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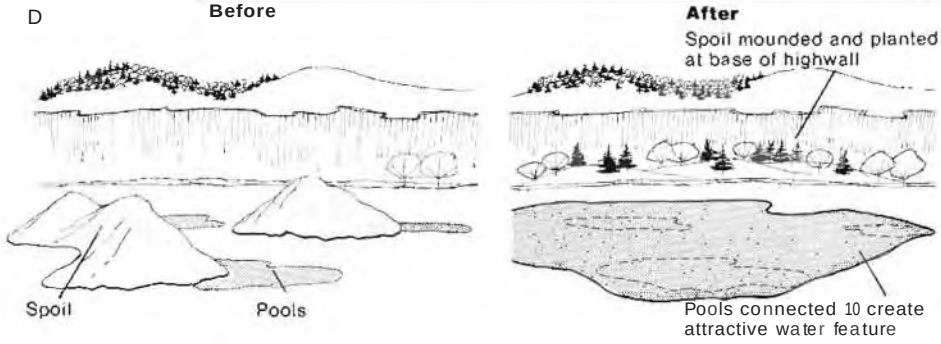

considerably, depending on the extraction process, the terrain, and the type of earthmoving equipment used. Such diversity offers a range of opportunities for improving the appearance of the site and increasing its value for the intended use.

Landforms can serve many functions: they can control the direction and intensity of surface water runoff, enframe visual features, direct movement of people and vehicles, screen undesirable views, buffer noise, deflect wind, guide views, accentuate other visual elements, provide visual diversity, and reduce the effects of drifting snow.

- *General earth shaping.* In general, three types of landforms remain after surface mining: cut slopes resulting from mineral extraction, fill areas made from overburden removal and deposition, and undisturbed land.

Earth cut slopes in surface mines often exceed 50 percent and are badly eroded (fig. 14). Such steep slopes may be incompatible with landforms in the surrounding landscape; however, it may be more desirable to retain steep slopes than to flatten them at the expense of disrupting existing vegetation. Terraces and benches can break up steep slopes and provide planting areas to introduce vertical lines in a setting otherwise dominated by horizontal lines (fig. E).

Steep cut slopes can be stabilized by retaining walls, although this is a costly alternative. The cost can be reduced by using boulders or cobble found onsite.

Areas of spoil usually contrast with natural landforms (fig. 15) and sometimes require extensive regrading. Total regrading is best to form the flatter surfaces needed for cropland or sport fields. Other land uses such as natural areas, pastureland, open space, wildlife habitat, and passive recreation are compatible with a wide range of gradients. Study the spoil piles carefully before deciding to regrade them. Where it

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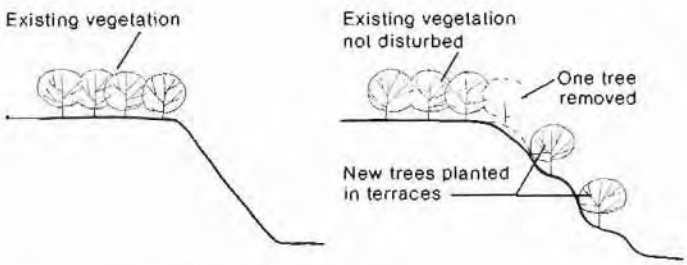
E



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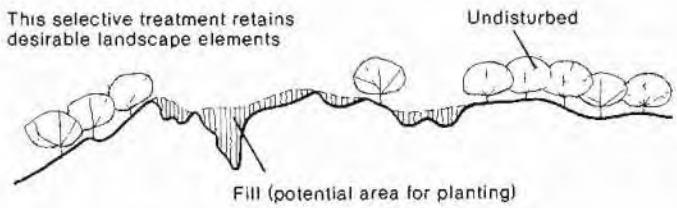

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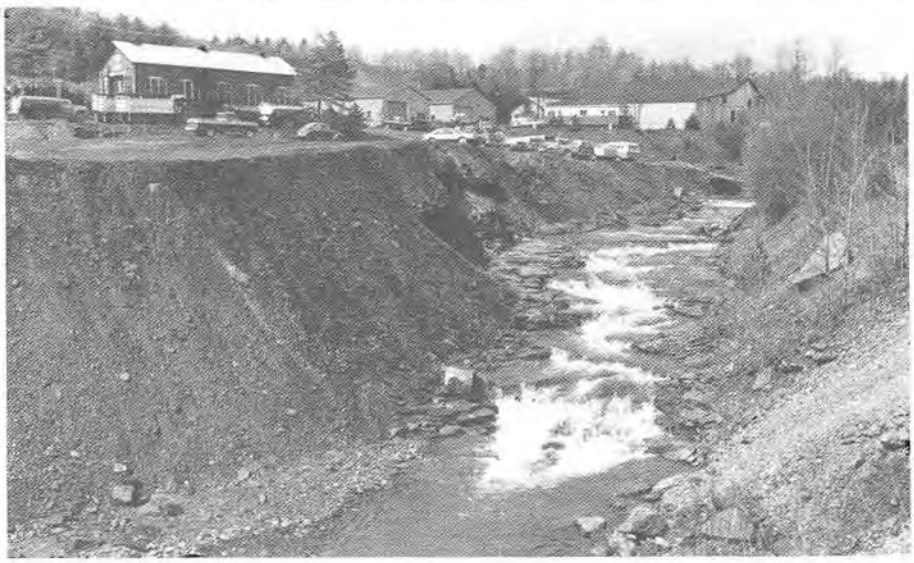

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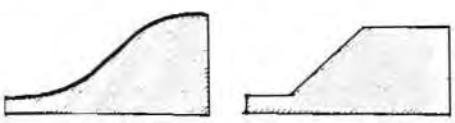
G **Slope Rounding** **Slope Warping**



Rounded form more frequently blends with surrounding topography

Angular configuration may not blend with surrounding topography

This
Varying horizontal and vertical pitch

Not this

is not desirable to disturb vegetation, selective filling may help smooth landforms by eliminating harsh edges and providing an additional growing medium for other vegetation (fig. F).

If you decide to regrade the landform, consider the variety of design opportunities available. Techniques such as rounding edges and warping or laying back slopes can all be used to achieve the desired results (figs. 16 and G). Generally, earth moving should result in landforms that blend into the surroundings, avoid sharp transitions, and are in scale with their setting (figs. 17 and 18). At some sites, however, focal points may be a part of the design and contrasting landforms could contribute to the desired effect. The earthwork should be kept to a minimum to reduce costs and minimize disruption of existing vegetation and undisturbed lands. The results of system grading (ditches, swales, etc.) should be compatible with the landscape. If possible, use natural drainageways to minimize disturbance.

Disposal of debris may be required for some land uses such as cropland. Burial of debris is not always the best solution, and some items commonly buried may be useful. For example, non-acid-producing boulders can be retained or relocated to a part of the site where they add diversity.

Onsite lands that have not been disturbed by mining activities should remain undisturbed if possible. Likewise, areas of transition from undisturbed to disturbed (both onsite and offsite) should receive special attention. Undisturbed areas are sometimes defined by contrasting edges created by both landforms and vegetation. Gradations of landforms and vegetation from tall (in undisturbed areas) to low (in transition areas) can help to blend these areas.

- *Highwalls* Highwalls remaining after surface mining vary widely, depending on the rock strata, type of mining (contour, area, open pit) and the method used to remove the rock face. Highwalls are generally

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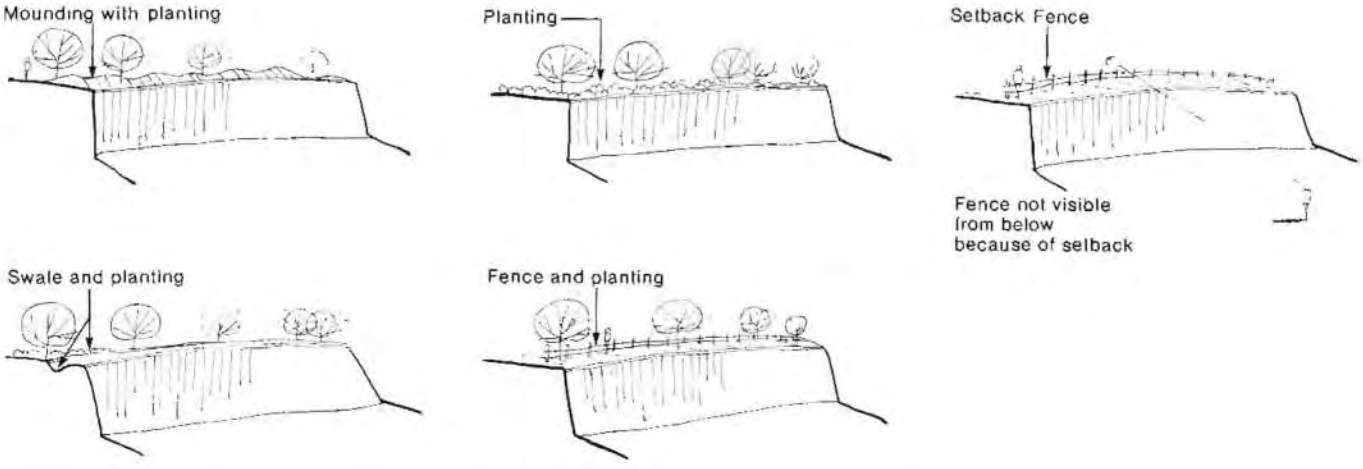
H



characterized by a variety of surface textures, weathering, various colors of rock, vertical or horizontal lines formed by rock patterns, and associated vegetation (figs. 19 and 20).

As a result of contour mining, highwalls range from several feet to about a hundred feet in height. In heavily vegetated areas they appear as a continuous, almost infinite line in the landscape when viewed from a higher position. These strong lines may be emphasized by similar lines of vegetation.

The safety and visibility of highwalls must be considered in relation to onsite and adjacent offsite land uses (fig. 21). Protection against sheer highwall drops is a more important design objective on sites with human activity than on remote sites reclaimed for open space. If safety is an objective, structural and nonstructural treatments should be considered. Structural treatments are fences, walls, guardrails, signs, or other constructed barriers. Nonstructural alternatives are earth mounding, vegetation barriers and, if drainage conditions permit, swales (fig. H). Combinations of these alternatives may be feasible. In some places a visual barrier may be as effective as a physical barrier. Any element introduced for safety will probably be elevated and highly visible and thus should be designed to fit into the surrounding landscape. (See later section on structures for specific design considerations.)

Visibility is another important factor in establishing design objectives for highwall treatment. There are two design approaches in highly visible areas: (1) reduce contrast and blend the highwall into the landscape or (2) emphasize the contrast of the highwall and create a focal point or feature.

To reduce contrast, vertical lines of vegetation planted at the highwall base can subdue the horizontal lines of the highwall. Mounding combined with vegetation can further deemphasize horizontal lines (fig. I). Vegetation is most effective where highwalls are moderate in height and major viewing is from eye level or lower positions.

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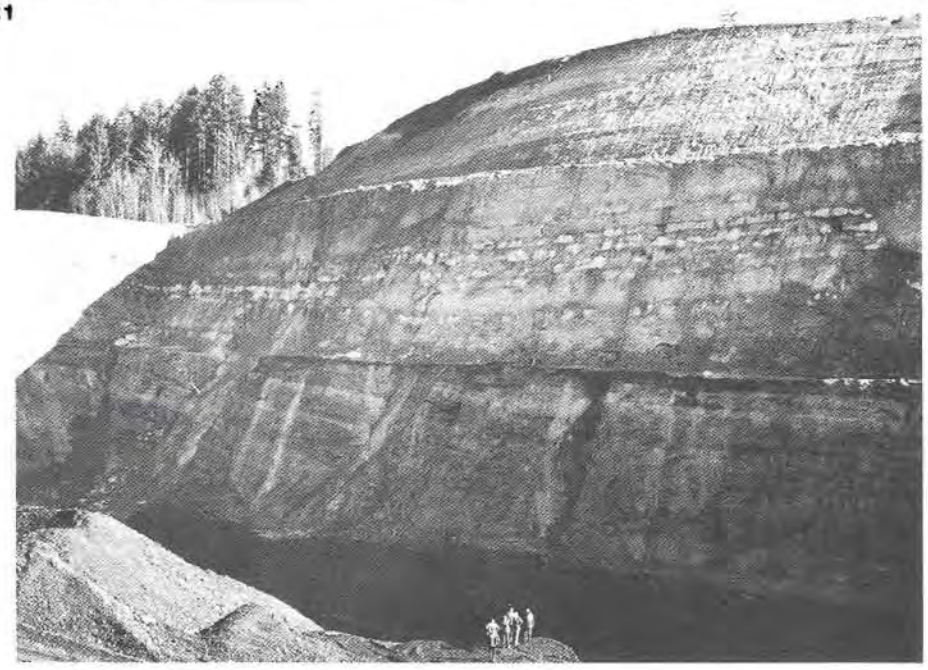

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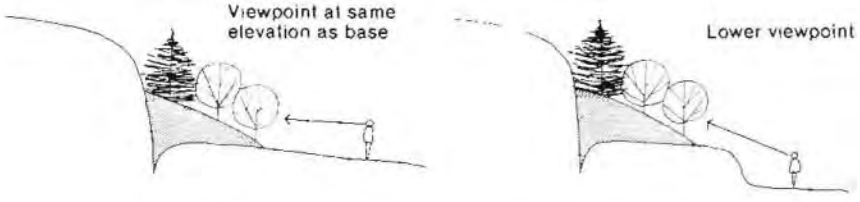

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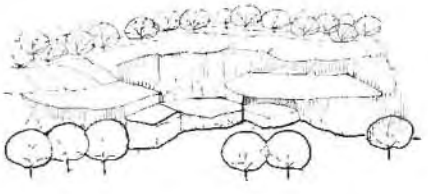

Physical reduction of the highwall itself may be desirable in some places. Benching the face or making "pockets" can visually reduce the size and serve as a platform for planting (fig. 22). A vertical highwall can be altered to a flatter angle by removing additional rock. When altering the face of a highwall, surface irregularities and staggered benches should be introduced (fig. J). Alterations to the rockface should be guided by a geologist who can place the blasting charge to achieve a nonuniform appearance and ensure stability.

A highwall can be reduced physically by placing fill against the base and covering the face. This can be done to a variety of heights and combined with boulders or vegetation. Rock faces with high reflectivity can be artificially weathered with emulsions or hydroseeded to establish vegetation and reduce contrast.

Another approach is to enhance the highwall as a focal point in the landscape. Rock faces that are weathered, moss-covered, or irregularly surfaced may be attractive in some landscape settings. Some highwalls can be modified with vegetation and earth shaping to make them desirable landscape features, or surface water can be redirected to create intermittent waterfalls.

• *Boulders and cobble.* Boulders and cobble left from past mining activities may have a variety of forms (fig. 23). Soil and rocks are indiscriminately placed during overburden removal, and boulders and cobble may be buried under or exposed on spoil piles. Boulders are usually exposed because rock is uncovered after the soil is removed. Boulders in contact with mine drainage may be discolored and unsuitable for landscape use.

Boulders and cobble can be used to direct movement of people and vehicles; stabilize slopes; construct walls for slope retention, tree wells, safety, or boundary definition; improve fish habitat in streams; and

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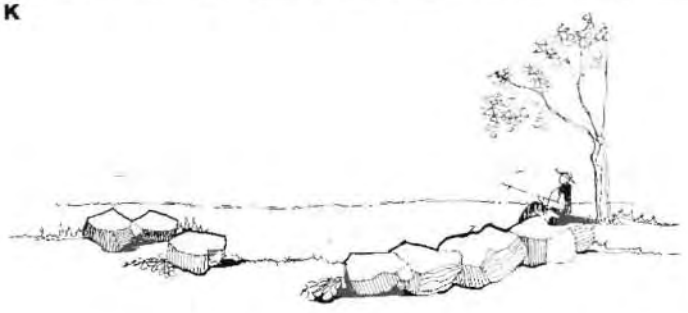

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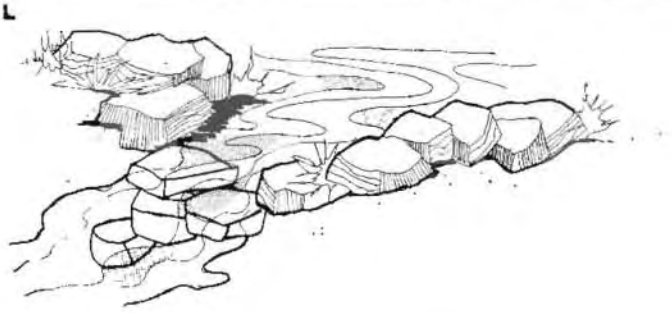

reduce water velocity and scouring in drainageways.

The use of rock should be compatible with the intended land use. For example, exposed boulders may be desirable in informal recreation or natural areas (fig. K) but undesirable for cropland or sport fields. Walls, tree wells, and boulders used for informal seating require sound, nontoxic rock. Boulders used in open space or natural areas can decompose and disintegrate with little effect on landscape uses. If the desired kinds of rock are not found onsite, consider importing rock from another site.

In designing drainageways, boulders and cobble can be integrated with water to create small waterfalls and ripples and generally add diversity (fig. L). Boulders with surface irregularities can be placed selectively at water's edge to produce reflections and shadows.

Boulders should be placed randomly, often clustered, and never spaced at regular intervals (fig. M). Most large boulders should be partially buried, with one-fourth to one-third of the boulder's mass below ground level. If partially buried boulders must be moved, the original ground line on the boulders is a good gauge for reburial.

It is often desirable to blend rock material and vegetation. Vegetation can be used to subdue reflective materials or to highlight the lines, form, color, and texture of boulders. The use and arrangement of boulders and cobble in the landscape should simulate characteristics in adjacent undisturbed surroundings.

- *Subsidence depressions and pits.* Underground mining often does not visibly disturb the overlying terrain for many years, particularly in areas where overburden depths are substantial. In areas where the overburden is shallow, however, the surface may be dotted with depressions or open pits resulting from subsidence or collapse (fig. 24). These areas detract from the landscape and, more important, are safety hazards.

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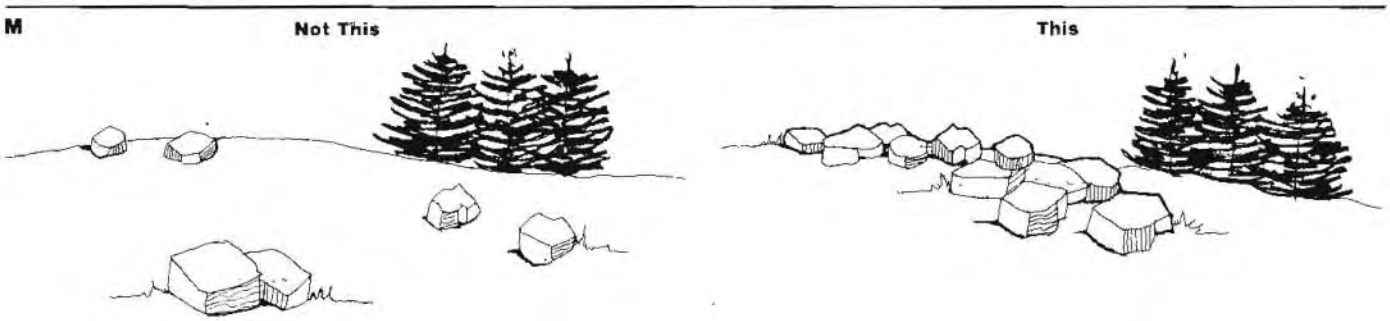

In reclaiming these areas, the primary landscape considerations are modifications of the landform, establishment of vegetation, and surface drainage. Regardless of the construction method used to reclaim subsidence pits, the final treatment is backfilling and revegetating. Generally, the area is shaped to direct surface drainage away from entering the underground mine works. The shaping should also consider the surrounding undulations and landforms in the landscape.

Vegetation

Removing vegetation during preparation for mining creates a drastic visual effect, especially in landscapes with nearly continuous cover. Introducing new vegetation can mitigate this effect, but early mining operations left the land in a disturbed state that is not always conducive to plant growth.

The growth of vegetation on mine sites is directly related to soil fertility and moisture retention, appropriate slopes, and the presence of nearby vegetation for natural regrowth (fig. 25). Some sites have these necessary elements and thus have mature grasses, understory, or trees surviving on spoil piles. Such growth, even if it is on unnatural landforms, may control erosion, stabilize slopes, and provide wildlife habitat and acceptable visual variety.

With few exceptions, naturally established vegetation on mined lands should be retained during reclamation (fig. 26). This vegetation may screen an undesirable view, reduce noise, or prevent snow or wind damage. Replacing existing vegetation is an unnecessary expense and may take years.

In areas not revegetated by natural succession, plan appropriate measures to restore the site to a condition that will sustain plant

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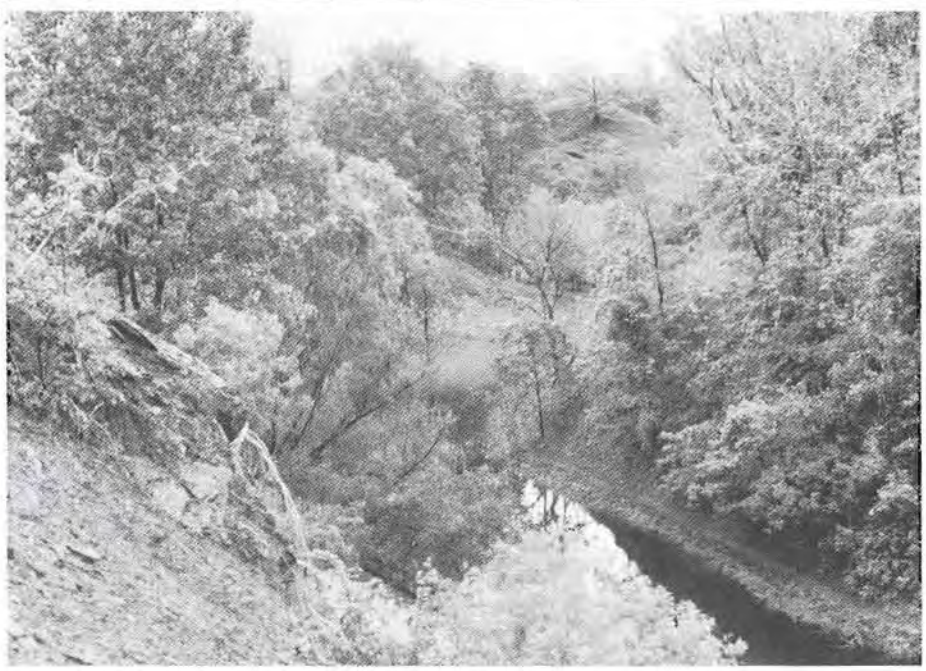

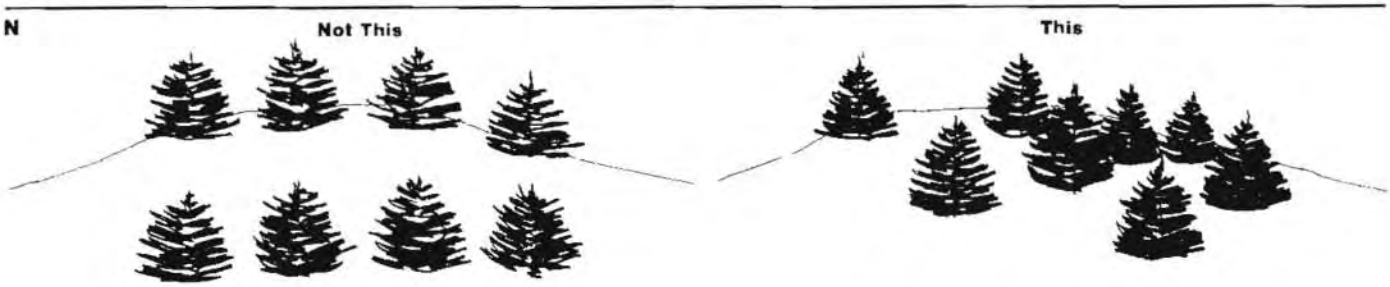

growth. Vegetation planted should be able to survive under the prevailing conditions with minimum maintenance. Varieties that grow naturally in the surrounding landscape are good choices for new plantings and will not look artificial. For example, introducing woody vegetation into a prairie landscape, which is characteristically grassland, could create an artificial, undesirable effect. For a natural appearance, install plants in groups that vary in species, density, and configuration. Do not plant them in uniform rows (fig. N).

Plantings may serve functional or scenic purposes, or both. Vegetation, often in combination with landform modification, can be used to screen derelict (abandoned) land from major viewpoints (stationary points from which to view). Masses of trees and shrubs can act as a physical enclosure, provide privacy, shade, and wildlife habitat. They can define a site boundary, collect snow, reduce glare and reflection, control foot or wheeled traffic and attenuate noise (fig. O). They can also deflect wind, filter dust, and absorb solar radiation.

A variety of visual effects can be achieved with vegetation. Plants can provide a smooth visual transition from undisturbed to reclaimed land (fig. P) and can screen changes in grade (fig. Q). Adjacent landforms can be visually related by the placement of similar forms of vegetation (fig. R).

Vegetation can be used to define outdoor space by providing a sense of enclosure. For example, an area planned for noncommercial recreation can be entirely or partially enclosed with trees to separate it from adjacent land uses.

Structures

Manmade physical elements in the landscape are often visually dominant because their line, form, color, texture, and scale were not considered in design and placement. This dominance should be recognized and evaluated in terms of compatibility with proposed land uses, safety, cultural value, or use potential.

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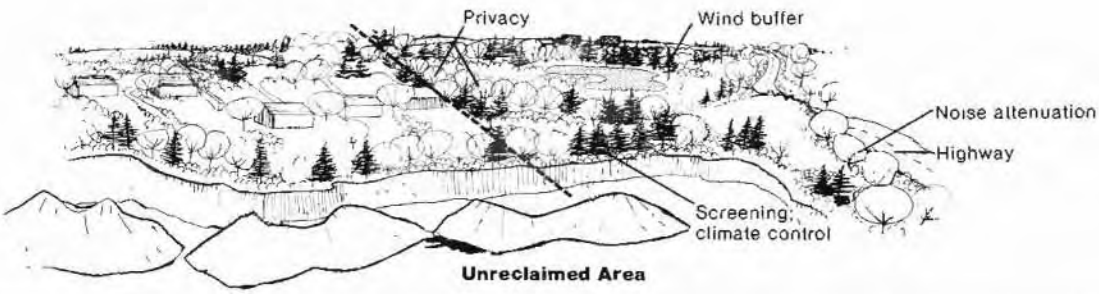
O **Existing Residential Area** **Reclaimed Recreation Area**



Structures on mine sites may include abandoned extracting and processing equipment (fig. 27). Generally, these structures are incompatible with adjacent landscape elements and must be screened or removed.

Some structures, however, have visual interest and may be valued for cultural or historical significance. For example, tipples, fan buildings, stone powder houses, and portal entrances associated with mines have been listed on many State and National Registers of Historic Places (fig. 28). Every effort should be made to preserve important cultural features.

Other structures such as fences, walls, abandoned buildings, etc., must be evaluated individually for visual compatibility and landscape use. A major factor in determining whether to remove a structure is its potential threat to the safety of site users.

Fences, gates, and livestock guards are frequently included in reclamation plans to accommodate livestock, define boundaries, control snowdrift, reduce noise, or limit access to highwalls as a safety measure. All barriers should be designed to be visually compatible with the surrounding landscape, but special attention should be given to highwall barriers because of their elevation.

After determining that a constructed barrier is needed on a highwall, consider the kind of material to be used and the height, length, and placement of the barrier. The barrier's conspicuousness can be reduced by selecting a material that blends into the surrounding landscape. For example, typical post and wire livestock fences are constructed with natural-appearing materials that are generally earthtone and blend into most countryside landscapes. This makes an effective barrier that is not highly visible to offsite viewers.

The height and length of barriers can be varied as appropriate to solve the safety problem. For example, a length of fencing may be bro-

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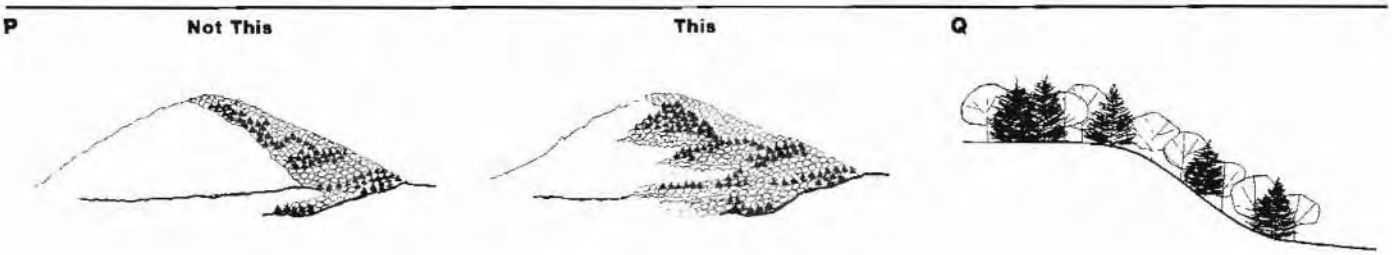

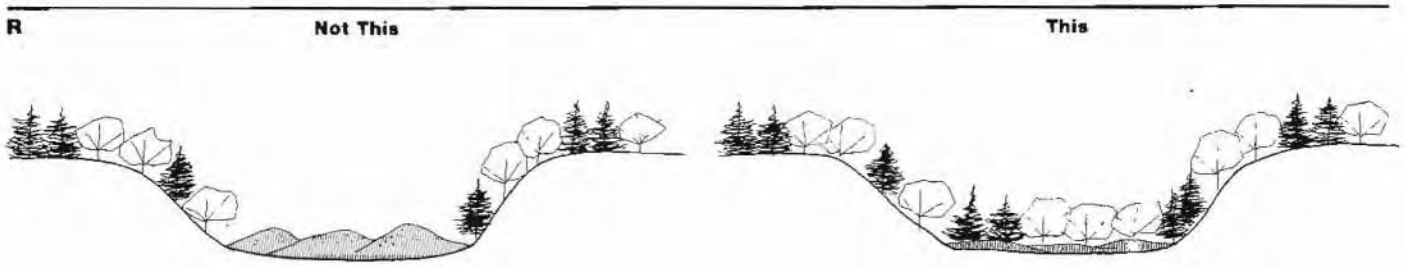

ken with occasional plantings (fig. S). In surburban settings where a more distinctive fencing may be desirable, variations in height and interrupted length can be used. In some surburban areas, more formal fencing such as solid boards, panels, board and batten, etc., may be appropriate.

Chain-link fencing is an alternative, but must be used with discretion because exposed wire mesh is extremely reflective. Vinyl-coated chain-link fence materials in black and natural colors are very effective in reducing this visual contrast. An unscreened chain-link fence at the top of a highwall would contrast significantly with surroundings and further accentuate the visually dominant horizontal lines created by highwalls.

The visibility of a highwall barrier can also be affected by its proximity to the edge of the highwall or other vegetation. A barrier does not have to be placed on the highwall edge to be effective. For example, if there is vegetation on the area beyond the highwall, fencing can be placed along this vegetated edge to reduce visibility. Fencing not associated with highwalls, such as post and wire, split rail, or other fencing, can be constructed of native or natural-appearing materials that blend into rural landscapes.

In surburban areas, signs for access roads, pedestrian trails, and other structures should be designed with visual and functional considerations. Many abandoned mine sites have existing haul roads used for removing coal. These routes should be used during reclamation and thereafter if feasible to avoid disturbing other areas.

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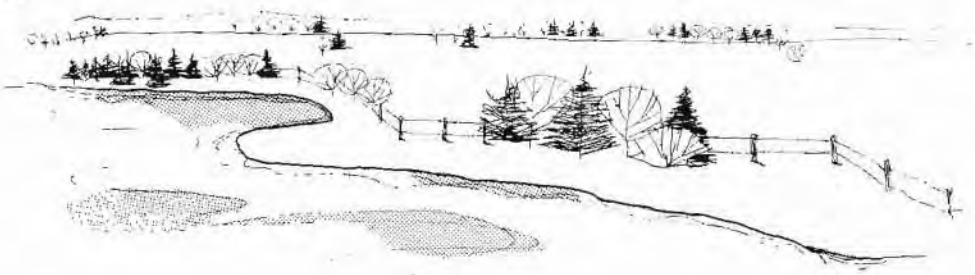

Conclusion

Surface-mined land can be reclaimed to become compatible with the surrounding landscape (fig. 29). Creative use of resources in the design of the landscape can transform abandoned mine sites into useful and attractive land for recreation, wildlife habitat, agricultural production, and many other uses (fig. T). Mined land that was once a liability to the well-being of humans and the environment can become a positive asset through careful planning and design.

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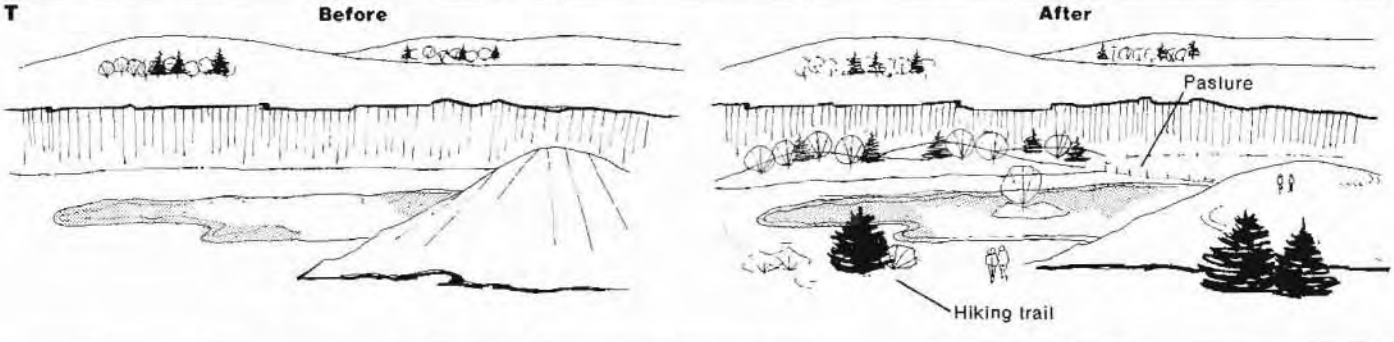

Field Worksheet: Landscape Design in Mined Land Reclamation		Reclamation alternatives to be considered after field investigation and during detailed planning and design
Planning evaluation	**Field evaluation**	**Remarks**
Questions	Responses & Design considerations	
I. Visual resources		
A. Landform on reclamation site		
Cut slopes (includes highwalls)	( ) N/A Go to question 5	
1. Established cover of vegetation	( ) Yes Disturbance can have adverse effect	
	( ) No Vegetation can screen or enhance	
2. Exposed rock with textured surfaces or other visual interest	( ) Yes Retain and/or enhance features	
	( ) No Modify by earth shaping or adding vegetation	
3. Exposed cut slopes contrast with surrounding surface colors	( ) Yes Reduce contrast with vegetation, boulders, cobble, etc.	
	( ) No Disturbance can expose contrasting soil colors	
4. Size of cut slope affects its visibility	( ) Yes Extensive grading or screening can reduce visibility; selective grading or placement of vegetation can accent slopes	
	( ) No Disturbance can increase visibility	
Spoil areas (includes gob piles)	( ) N/A Go to question 11	
5. Extensive rills or gullies	( ) Yes Shaping and grading and adding cover or vegetation can improve visual quality	
	( ) No Disturbance of spoil areas can affect existing drainage patterns and cause rills or gullies	

6.	Established cover of vegetation	( ) Yes	Disturbance can have adverse visual effects
		( ) No	Vegetation can cover or screen spoil area
7.	Boulders or cobble	( ) Yes	Retain for surface uses to maintain visual diversity
		( ) No	Import for surface uses to add visual diversity
8.	Exposed soil or coal refuse contrasts with surface colors in surrounding undisturbed areas	( ) Yes	Reduce contrast by treatment of vegetation and soil, or by other methods
		( ) No	Disturbance of spoil can expose contrasting soil colors
9.	Height of the spoil disrupts the horizon with abrupt, angular lines	( ) Yes	Regrade to provide smooth lines that blend into surrounding topography
		( ) No	Regrading can change relationship to horizon
10.	Size of spoil significantly affects its visibility	( ) Yes	Grading or screening can reduce visibility
		( ) No	Regrading can increase visibility
Subsidence or collapse areas		( ) N/A	
11.	Established cover of vegetation in surface depressions resulting from subsidence or collapse	( ) Yes	Disturbance of vegetation can have adverse visual effect
		( ) No	Reclamation can include filling, establishment of vegetation, or placement of boulders to improve visual quality

Planning evaluation Questions	Field evaluation Responses & Design considerations		Remarks
Undisturbed landforms	( ) N/A	Reclamation site does not abut undisturbed lands but is a small portion of a large disturbed area (do not respond to 12 and 13)	
12. Reclamation site contains or abuts undisturbed lands	( ) Yes	Undisturbed lands should generally be left intact	
	( ) No	Disturbed lands should ultimately blend into surrounding undisturbed landscape	
13. Smooth visual transition between disturbed and undisturbed lands	( ) Yes	Retain this characteristic	
	( ) No	Regrade landforms and introduce vegetation, water, or boulders for smooth transition	
B. Vegetation on reclamation site			
Woody species	( ) N/A	Go to question 6	
1. Site has woody vegetation	( ) Yes	Disturbance of vegetation can have adverse visual effects	
	( ) No	Introduce woody species for visual diversity or other functional uses	
2. Foliage dense or difficult to see through	( ) Yes	Dense foliage can serve as a screen	
	( ) No	Introduce evergreens for more effective screening	
3. Woody vegetation contrasts significantly in shape, size, color, or texture with native species	( ) Yes	Modify for visual compatibility or retain for accent	
	( ) No	Retain existing vegetation compatibility or introduce contrasting vegetation for accent	

4. Woody species controlling erosion or stabilizing slopes	( ) Yes	Disturbance of vegetation can have adverse effects
	( ) No	Consider installing woody vegetation to serve that purpose
5. Reclamation activities will disrupt existing vegetation	( ) Yes	Assess plant function and consider extensive disruption of vegetation
	( ) No	Minor modifications may be possible
Herbaceous species	( ) N/A	Do not respond to 6-8
6. Site is vegetated with herbaceous species	( ) Yes	Disturbance of vegetation could have adverse visual effects
	( ) No	Introduce herbaceous species for visual diversity or other functions
7. Herbaceous plants contrast in shape, size, color, or texture with other vegetation	( ) Yes	Modify for visual compatibility or retain for accent
	( ) No	Introduce contrasting vegetation for accent or retain existing vegetation for compatibility
8. Herbaceous species control erosion or stabilize slopes	( ) Yes	Disturbance of vegetation can have adverse effects
	( ) No	Consider installing herbaceous species to serve that purpose

Planning evaluation Questions	Field evaluation Responses & Design considerations		Remarks
C. Water			
Marshes (includes only allowable wetland types)	( ) N/A	Go to question 3	
1. Marshy areas make visual transition with adjacent landforms or vegetation	( ) Yes	Retain landscape elements aiding visual transition	
	( ) No	Reshape landform and introduce vegetation to provide visual transition	
2 Reclamation activities disrupt marshy areas	( ) Yes	Avoid disruption and retain marshy areas as permanent landscape features	
	( ) No	Minor modifications may be possible without loss of marshes	
Pools	( ) N/A	Go to question 10	
3. Clarity or color of the water is similar to that in nearby bodies of water not affected by mining	( ) Yes	Does not require modification for visual quality improvement	
	( ) No	Modify water color or clarity to improve visual quality	
4. Overall shape of the pool is narrow and linear with rigid configuration	( ) Yes	Reshape to provide smooth, irregular configuration	
	( ) No	Retain smooth, irregular edgelines	
5. Pool has riparian vegetation	( ) Yes	Retain or clear selectively for visual diversity	
	( ) No	Introduce vegetation for visual diversity	
6. Pool has associated landforms (islands, peninsulas)	( ) Yes	Retain or modify landforms to maintain visual diversity	
	( ) No	Introduce landforms to add visual diversity	

7.	Pool is accessible to people or livestock	( ) Yes	Retain accessibility as required for land use objectives
		( ) No	Provide accessibility if needed
8.	Land/water transition is abrupt	( ) Yes	Reshape landform and/or water and introduce vegetation to provide smooth visual transition
		( ) No	Retain landscape elements that contribute to smooth transition
9.	Size of the pool relates well to the highwall	( ) Yes	Retain overall size; shape may need modification
		( ) No	Modify size of pool for good scale with highwall
Drainageways		( ) N/A	Do not respond to 10-14
10.	Clarity or color of the water is similar to that in area drainageways not affected by mining	( ) Yes	Does not require modification for visual quality improvement
		( ) No	Modify water color or clarity to improve visual quality
11.	Drainageways have riparian vegetation	( ) Yes	Retain or clear selectively for visual diversity
		( ) No	Introduce vegetation for visual diversity
12.	Drainageways usually have standing water	( ) Yes	Retain or enhance this characteristic for visual interest
		( ) No	Introduce pools as part of modification of drainageways

Planning evaluation Questions	Field evaluation Responses & Design considerations		Remarks
13. Land/water transition is abrupt	( ) Yes	Reshape landform and/or water body and introduce vegetation for smooth visual transition	
	( ) No	Retain landscape elements that contribute to smooth transition	
14. Drainageway's alignment appears to be natural	( ) Yes	Retain this characteristic for visual interest	
	( ) No	Introduce curving or irregular alignment to new or modified drainageways	
D. Structures	( ) N/A	Do not respond to 1-3	
1. Site structures have scientific or cultural value	( ) Yes	Retain for local use; consider relocation	
	( ) No	Introduce landscape elements with scientific or cultural value	
2. Existing site structures contrast in line, form, color, or texture with the surrounding landscape	( ) Yes	Remove structures, retain structures with screening, or enframe as focal point	
	( ) No	Retain for local use; consider relocation	
3. Existing site structures are hazards to safety	( ) Yes	Remove structures or modify to reduce safety hazard	
	( ) No	Retain structures for cultural or historic value	
II. Landscape use			
A. Direct use	( ) N/A	Do not respond to 1-3	
1. Onsite direct uses of the landscape (hiking, hunting, ORV's, camping, etc.)	( ) Yes	Evaluate possibility of retaining direct-use opportunities	
	( ) No	Direct use may be desirable to some landowners	

2.	Existing uses have adverse effects on the landscape	( ) Yes	Remove or modify use opportunities through reclamation activities
		( ) No	Reclamation can provide acceptable opportunities for direct use
3.	Direct uses of the landscape are adjacent to the reclamation site	( ) Yes	Consider compatibility of reclamation results with these use patterns
		( ) No	Reclamation can provide acceptable opportunities for joint uses
B.	**Indirect use**	( ) N/A	Do not respond to 1-6
1.	Landforms or vegetation are screening views to and from the reclamation site	( ) Yes	Landscape elements may be blocking undesirable views
		( ) No	Introduce vegetation or landform elements to block undesirable views
2.	Reclamation activities will disrupt these screens	( ) Yes	Consider alternatives that will not disrupt screening
		( ) No	Minor modifications may be possible
3.	Reclamation activities will improve visual quality so that screening is not necessary	( ) Yes	Develop views into and within reclamation site
		( ) No	Avoid developing views into and within reclamation site
4.	Vegetation separates incompatible uses, abates noise, filters dust, or provides other environmental controls for onsite or adjacent uses	( ) Yes	Consider alternatives that will not disrupt these functions
		( ) No	Introduced vegetation can provide important environmental functions
5.	Landforms separate incompatible use, buffer noise, deflect wind, or provide other environmental controls for onsite or adjacent uses	( ) Yes	Consider alternatives that will not disrupt these functions
		( ) No	Landform modification can provide environmental controls

Planning evaluation Questions		Field evaluation Responses & Design considerations		Remarks
6. Existing landscape elements have scientific, cultural, or educational value		( ) Yes	Consider alternatives that preserve or relocate these elements	
		( ) No	Introduce elements that have these values	
III. Visibility				
A. Viewpoint number, position, and location				
1. Multiple viewpoints are established within and adjacent to the reclamation site		( ) Yes	Numerous viewpoints make reclamation results highly visible	
		( ) No	Few viewpoints make reclamation results relatively isolated from view	
2. Viewpoints are associated with:	Roadways	( ) Yes	The landscape can be viewed sequentially while moving	
		( ) No	Reclamation activities can create views from roadways	
	Residences	( ) Yes	The landscape can be viewed over long periods of time	
		( ) No	Reclamation activities can create views from residences	
	Community areas	( ) Yes	The landscape can be viewed by many over long periods of time	
		( ) No	Reclamation activities can create views from community areas	

3. The viewer's position relative to the site is:			
	Elevated	( ) Yes	Landscape elements are more visible
		( ) No	Reclamation activities can alter viewer positions
	Same elevation	( ) Yes	Perimeter landscape elements can be critical
		( ) No	Reclamation activities can alter viewer positions
	Depressed	( ) Yes	Consider sight lines and determine whether mined area is seen from viewpoint
		( ) No	Reclamation activities can alter viewer positions
B. Visibility of reclamation site			
1. Landscape elements within reclamation site are visible from identified viewpoints			
	Landforms	( ) Yes	Landforms should blend visually into surroundings
		( ) No	Introduce landforms to increase visual diversity
	Vegetation	( ) Yes	Vegetation should be retained or removed selectively for land use functions
		( ) No	Introduce vegetation to increase visual diversity
	Water	( ) Yes	Retain water in the landscape
		( ) No	Introduce water in the landscape to increase visual diversity
	Structures	( ) Yes	Existing structures should blend with the landscape
		( ) No	Introduced structures should blend into surroundings

Planning evaluation Questions	Field evaluation Responses & Design considerations		Remarks
2. Possible to see into the site from identified viewpoints	( ) Yes	Screen undesirable views or enframe desirable views	
	( ) No	Open desirable views into site	
3. Reclamation activities will make parts of the site more visible	( ) Yes	Screen undesirable views or enframe desirable views	
	( ) No	Open desirable views into site	
C. Visibility of adjacent areas			
1. Adjacent areas are visible from within the reclamation site	( ) Yes	Screen undesirable views or enframe desirable views	
	( ) No	Open desirable views into adjacent areas	
2. Reclamation activities will make offsite areas visible from within the reclamation site	( ) Yes	Screen undesirable views or enframe desirable views	
	( ) No	Open desirable views into adjacent areas	