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VISUAL LANDSCAPE RESOURCE DESIGN

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Abstract

There are numerous design techniques that can be used to reduce the reduce impacts from surface-disturbing projects. The techniques described should be used in conjunction with visual resource contrast rating process wherein both the existing landscape and the proposed development or activity are analyzed for their basic elements of form, line, color, and texture. This discussion of design techniques is broken down into two categories: design fundamentals and design strategies. **Design fundamentals** are general design principles that can be used for all forms of activity or development, regardless of the resource value being addressed. Applying these three fundamentals will help solve most visual design problems: proper siting or location, reducing unnecessary disturbance, repeating the elements of form, line, color, and texture. **Design strategies** are more specific activities that can be applied to address visual design problems. Not all of these strategies will be applicable to every proposed project or activity: color selection, earthwork, vegetative manipulation, reclamation/restoration, linear alignment design considerations. The fundamentals and strategies are all interrelated, and when used together, can help resolve visual impacts from proposed activities or developments. The techniques presented are only a portion of the many design techniques available to help reduce the visual impacts resulting from surface-disturbing activities or projects. Further research into planning and design references and/or consultation with professional designers and engineers will help to further reduce the visual impacts of any development.

Key words: visual impact, surface disturbing, landscape design.

Introduction

The public lands in our country contain many outstanding scenic landscapes. While these lands provide a place to escape and enjoy the beauty of nature, they are also used for a multitude of other activities. Any activities that occur on these lands, such as recreation, mining, timber harvesting, grazing, road development etc., have the potential to disturb the surface of the landscape and impact scenic values (Kress and Van Leeuwen 2006). Visual resource assessment and management is a system for minimizing the visual impacts of surface-disturbing activities and maintaining scenic values for the future (Crowe 1966, Forestry Commission 1994, Lyle 1999, Zube et al. 1982). The authorities should be committed to sound management of the scenic values on public lands in order to

ensure that these benefits are realized and the scenic values are protected.

In order to meet the responsibility to maintain the scenic values of the public lands, has been developed a Visual resource assessment and management system (BLM 2007) that addresses the following:

Development of an area with high scenic value might be focused on preserving the existing character of the landscape, and management of an area with little scenic value might allow for major modifications to the landscape.

Assessing scenic values and determining visual impacts can be a subjective process. Objectivity and consistency can be greatly increased by using the basic design elements of form, line, color, and texture, which have often been used to describe and evaluate landscapes, to also describe proposed projects. Projects that repeat these design elements are usually in harmony with their surroundings and those that don't create contrast. By adjusting project designs so that the elements are repeated, visual impacts can be minimized.

The visual resource assessment and management system provides a way to identify and evaluate the scenic values of landscape. It also provides a way to analyze potential visual impacts and apply visual design techniques to ensure that surface-disturbing activities are in harmony with their surroundings.

Method and Design Techniques

A site assessment is taken for granted in ascertaining soil and climatic conditions. The visual assessment is less straightforward, but equally important, if landscape values are to be conserved. A landscape analysis should cover both the general type of regional landscape and the character of an individual site (Forestry Commission 1994; Bell 1993, 2004).

The landscape analysis method involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. A visual contrast rating process is used for this analysis, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture. The analysis can then be used as a guide for resolving visual impacts. Once every attempt is made to reduce visual impacts, professionals can decide whether to accept or deny project proposals. They also have the option of attaching additional mitigation stipulations to bring the proposal into compliance.

The design techniques used are in conjunction with the visual resource assessment process where both the existing landscape and the proposed development or activity are analyzed for their basic elements of form, line, color and texture.

Discussion

This discussion of design techniques is broken down into two categories: design fundamentals and design strategies.

Design fundamentals

There are three design fundamentals which are general design principles that can be used for all forms of activity or

development, regardless of the resource value being addressed. Applying these three fundamentals helps to solve most visual design problems:

Proper Location

Choosing the proper location for a proposed project is one of the easiest design techniques to understand and apply, and one that will normally yield the most dramatic results.

Which are the considerations when choosing a project location? Design projects should be located as far away from prominent viewing locations as possible – visual contrasts or impacts decrease as the distance between the viewer and the proposed development increases, so:

• Topographic features and vegetation should be used to screen proposed development (Fig. 1a).

• Projects should not be located on or near prominent topographic features (Fig. 1b).

• The shape and placement of projects should be designed to blend with topographic forms and existing vegetation patterns (Fig. 1c).

Reducing Unnecessary Disturbance

Reducing the amount of land disturbed during the construction of a project reduces the extent of visual impact. Techniques that help reduce surface disturbance include:

• Placing underground utilities either along the edge or under the surface of an existing road;

• Establishing limits of disturbance that reflect the minimum area required for construction;

• Requiring restoration of disturbed areas no longer required after construction has been completed (Fig. 2a);

• Planning projects so that they utilize existing infrastructure whenever possible;

• Consolidation of communications facilities reduces the amount of visual sprawl (Fig. 2b);

• Maximizing slope when it is aesthetically and technically appropriate;

• Locating construction staging and administrative areas in less visually sensitive areas.

Repeating the Elements of Form, Line, Color, and Texture

Every landscape has the basic elements of form, line, color, and texture. Repeating these elements reduces contrasts between the landscape and the proposed activity or development and results in less of a visual impact.

a **b** **c**

Fig. 1. Examples of location: a) Vegetation can be used to screen development; b) Road alignment repeats the forms in the landscape and it fits easily on the natural terrain; c) Locating this electrical line in heavily wooded area causes strong contrast.

Another way of looking at this is to use the existing landforms, vegetation patterns, natural lines in the landscape, etc., to reinforce the design of the proposed activity or development. By "playing off" of these naturally occurring elements, the design of the proposed development will be in closer harmony with the natural landscape.

Examples of the proper use of form (Fig. 3a, c), line (Fig. 3b), color and texture (Fig. 3d).

a b

Fig. 2. Unnecessary disturbance and reduction of unnecessary disturbance: a) Clearcutting on this prominent feature creates strong contrasts and attracts attention from this critical viewing point; b) Consolidation of communications facilities reduces the amount of visual sprawl.

Design strategies

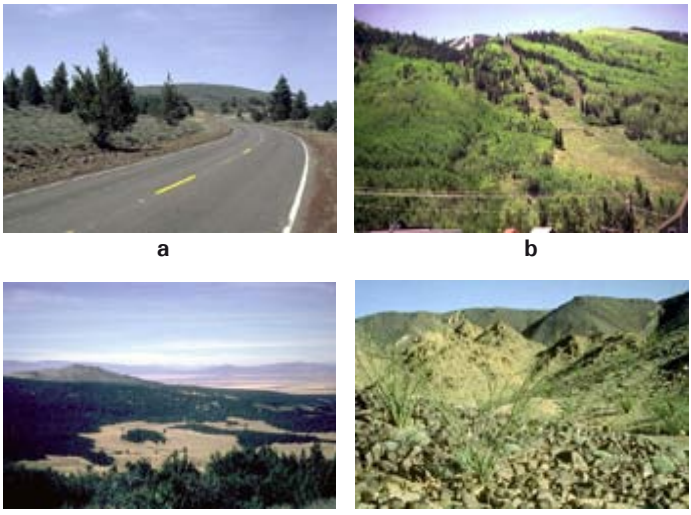
The strategies are more specific activities that can be applied to address visual design problems. Not all of these strategies are applicable to every proposed project or activity:

Color Selection

Color selection has the greatest impact on the visual success or failure of our projects. Strong contrasts in color (Fig. 4b) create easily recognizable visual conflicts in the landscape.

Making color selections, designers should consider the following:

- The color selection for all structures should be made to achieve the best blending with the surrounding landscape in both summer and winter (Fig. 4a);
- Paints should be used to help reduce glare. It is almost impossible to remove all sun glare;
- Surface disturbance of mineralized soils can result in strong color contrasts. In many situations, this suggests that



a b c d

Fig. 3. Examples of the proper use of form, line, color and texture: a) The road alignment repeats the forms of the landscape; b) The clearing of this hillside works well with the existing lines and vegetative patterns found in this landscape; c) The vegetative clearing in the photo repeats the natural forms and shapes in the landscape; d) Replacement of rock on this exploratory drilling site repeats the texture of this landscape.

a b

Fig. 4. Proper and improper color section: a) The color selected for this facility blends with the color in this landscape; b) The color selected for this tank strongly contrasts with the colors of this landscape.

the area should be avoided as a location for the proposed development, or that color selections for the manmade facilities or disturbance might need to reflect the lighter colored soil revealed by the disturbance;

• Colors should be selected from a distance that permits viewing of the entire landscape surrounding the proposed development;

• Colors that blend with or are in harmony with the existing colors of the earth, rocks, and vegetation are usually more visually pleasing and attract less attention than colors that are chosen to be in contrast (Fig. 4b).

Earthwork

The scars left by excessive cut and fill activities during construction in landscapes often leave long-lasting negative visual impacts. This is especially true of activities that disturb the highly mineralized soils of the arid west. Once the dark surface soil layer is disturbed, exposing the much lighter color of the subsurface soil, a strong contrast is created that may take many years to recover.

There are a number of ways to reduce the contrasts created by earthwork construction. Proper location and alignment are probably the most important factors. Fitting the proposed development to the existing landforms in a manner that minimizes the size of cuts and fills will greatly reduce visual impacts from earthwork. Other earthwork design techniques, such as balancing cut and fill or constructing with all fill or all cut should be considered, are appropriate as methods to reduce strong visual impacts.

Other strategies may include:

• Rounding and/or warping slopes (shaping cuts and fills to appear as natural forms) (Fig. 5a).

• Bending slopes to match existing landforms;

• Retaining existing rock formations, vegetation, drainage, etc., whenever possible;

• Split-face rock blasting (cutting rock areas so that the resulting rock forms are irregular in shape, as opposed to making uniform “highway” rock cuts) (Fig. 5b);

• Toning down freshly broken rock faces through the use of asphalt emulsions, rock stains, etc.;

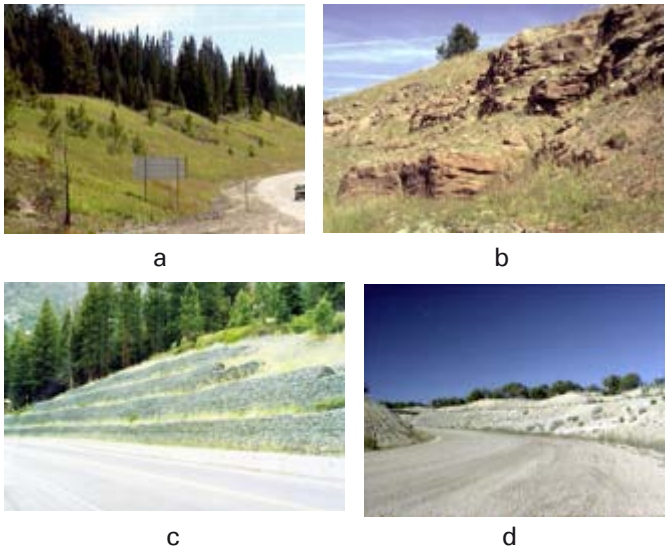
• Using retaining walls to reduce the amount and extent of earthwork;

• Retaining existing vegetation by using retaining walls, reducing surface disturbance, and protecting roots from damage during excavations.

• Avoiding construction types that will generate strong contrasts with

the surrounding landscape (Fig. 5 c, d);

• Prohibiting dumping of excess earth/rock on downhill slopes.



a b c d

Fig. 5. Proper and improper earthwork construction: a) Rounding the top and bottom of the slope and also undulating the face of the slope create a more natural-looking landscape; b) The split-face rock blasting technique used on this project creates a more natural-looking rock face; c) The rock gabion treatment of this hillside creates strong contrasts in line and color; d) This typical highway construction side slope treatment creates an unnatural form in the landscape.

Vegetative manipulation

Eeffective method of reducing the visual impact is to retain as much of the existing vegetation as possible, and where practical, to use the existing vegetation to screen the development from public viewing areas.

Some other techniques include:

• Designing vegetative openings to repeat natural openings in the landscape. Straight line edges should be avoided (Fig. 6a).

• Minimizing the impact on existing vegetation by:

– Partial clearing of the limits of construction rather than clearing the entire area – leaving islands of vegetation results in a more natural look;

– Using irregular clearing shapes (Fig. 6c);

– Feathering/thinning the edges of the cleared areas (Fig. 6b). Feathering edges reduces strong lines of contrast. To create a more natural look along an edge, a good mix of tree/shrub species and sizes should be retained.

Structures

The visual impact from new structures placed on the existing landscape can be reduced by:

• Repeating form, line, color, and texture (Fig. 7a);

• Minimizing the number of structures and combining different activities in one structure wherever possible;

• Using earth-tone paints and stains;

• Using self-weathering metals;

• Chemically treating wood so that it can be allowed to self-weather;

• Using natural stone in wall surfaces (Fig. 7b);

• Burying all or part of the structure;

• Selecting paint finishes with low levels of reflectivity;

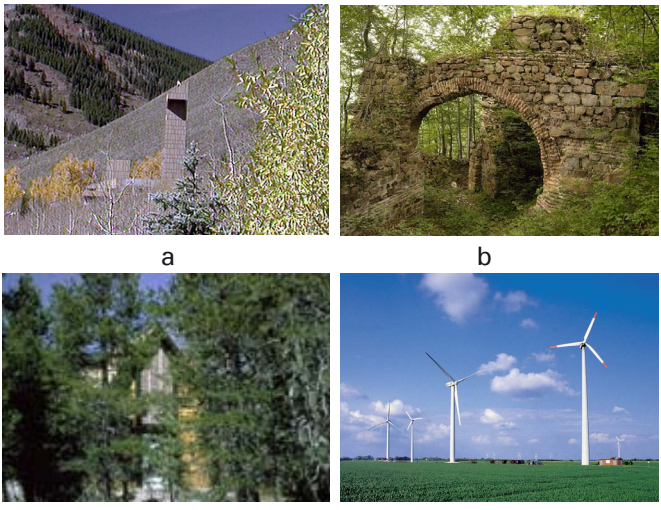
• Using rustic designs and native building materials;

a b c

Fig. 6. Eamples of proper vegetative manipulation: a) Vegetative clearings of an irregular shape blend well with the existing landscape: b) This feathered edge treatment creates a natural progression from grasses to mature trees; c) The design of this ski slope incorporates irregular shapes, but the hard, unthinned edges create a strong visual contrast.

• Using natural-appearing forms to complement landscape character, not the opposite (Fig. 7d);

• Screening the structure from view through the use of natural landforms and vegetation (Fig. 7c).



a b c d

Fig. 7. Some examples of proper and improper use of structure design: a) This structure repeats the line, color, and texture of this landscape; b) The use of native materials in this early structure; c) This structure is well-screened from the critical viewing area; d) These structures, in addition to creating strong color contrast, are not in scale with the human environment.

Restoration/reclamation

Strategies for restoration and reclamation are very much akin to the design strategies for earthwork, as well as the design fundamentals of repeating form, line, color, and texture and reducing unnecessary disturbance. The objectives of restoration and reclamation include reducing long-term visual impacts by decreasing the amount of disturbed area and blending the disturbed area into the natural environment while still providing for project operations.

Though restoration and reclamation are a separate part of project design, they should not be forgotten or ignored. All areas of disturbance that are not needed for operation and maintenance should be restored as closely as possible to previous conditions.

Several strategies that can enhance any restoration or reclamation effort include:

a b c

Fig. 8. Examples of successful restoration or reclamation efforts: a) and b) Successful restoration leaves little or no visual scaring; c) The replacement of the large rocks in this pipeline right-of-way creates a natural-looking environment.

• Striping, saving, and replacing topsoil layer on disturbed earth surfaces;

• Enhancing vegetation by:

– Mulching cleared areas;

– Furrowing slopes;

– Using planting holes on cut/fill slopes to retain water;

– Choosing native plant species;

– Fertilizing, mulching, and watering vegetation;

– Replacing soil, brush, rocks, forest debris, etc., over disturbed earth surfaces (Fig. 8c) when appropriate, thus allowing for natural regeneration (Fig. 8a, b) rather than introducing an unnatural looking grass cover;

• Minimizing the number of structures and combining different activities in one structure wherever possible.

Linear alignment

Projects and activities associated with linear alignments include roads, trails, pipeline developments, and underground and overhead utility lines. Proper location can often contribute significantly to the reduction of line and color impacts (Fig. 9a, b), making other measures either unnecessary or less costly and easier to accomplish.

There are several major considerations for determining an alignment:

• Topography is a crucial element in alignment selection. Visually, it can be used to subordinate or hide manmade changes in the landscape. Projects located at breaks in topography or behind existing tree groupings are usually of much less visual impact than projects located on steep side slopes. By taking advantage of natural topographic features, cut and fill slopes can be greatly minimized;

• Soils are especially important when selecting an alignment. They should be analyzed for stability and fertility and a revegetation program should be planned;

• Hydrological conditions can strongly affect the visual impact of buried and surface construction. The risks of surface and subsurface erosion within the corridor should be analyzed and evaluated;

• Crossings with other linear features or structures should be designed to minimize their visual impact:

– When possible, crossings should be made at a right angle;

– Structures should be set as far back from the crossing as possible;

– In areas with tree and shrub cover, the rights-of-way and structures should be screened from the crossing area.

a

b

Fig. 9. Proper linear project alignments: a) and b) Linear alignments repeat the forms and lines of the landscapes thus minimizing the visual conflict.

Determining the engineering design, landscape design, and visual considerations for a linear alignment must be accomplished together to ensure that all three are addressed and included in the final design solution.

Conclusion

The fundamentals and strategies are all interrelated, and when used together, can help resolve visual impacts from proposed activities or developments.

The techniques presented here are only a portion of the many design techniques available to help reduce the visual impacts resulting from surface-disturbing activities or projects. Further research into planning and design references and/or consultation with professional designers and engineers will help to further reduce the visual impacts of any development.

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