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6.0 VISUAL RESOURCE PROTECTION

6.1 INTRODUCTION

The Project will develop, establish, and maintain a Visual Resource Protection (VRP) Program. The purpose of the VRP Program is to establish the criteria and methodologies to manage visual resource protection measures during the design, construction, and operation of the Project. The VRP Program will be implemented through the Project's Environmental Management Program (EMP), discussed in Section 1. The structure of the VRP Program is shown in Figure 6.1.

While this portion of ANGTS is located within existing transportation and utility corridors, the visual resources of these corridors are outstanding, including vistas of North Slope tundra, limestone hills, and vast river floodplains, and the Brooks Range, including Atigun Pass, Sukakpak Mountain, Castle Mountain, and Galbraith Lake. Along the Alaska Highway segment there are beautiful views of the Alaska Range rising above the vast forests and wetlands of Interior Alaska.

Views from established communities, public roads and highways, and campgrounds, trails or rivers used for recreation are particularly important. If visible, the pipeline right-of-way and related facilities could have adverse impacts on these views. Visual resource considerations will be incorporated into system design, construction, maintenance, and rehabilitation to ensure that such adverse impacts are prevented whenever possible, and are reduced by design mitigation and rehabilitation.

This section presents the criteria and methodologies for considering and minimizing the potential visual impacts of the pipeline and related facilities, whether temporary or permanent. These facilities include features and structures within the pipeline right-of-way, such as the work-pad, highway crossings, river crossings, compressor stations, and valve stations. They also include features and structures, which may be located outside the permanent right-of-way, such as access roads, material sites, storage yards, disposal sites, and work camps.

Site-specific measures will be developed to achieve these objectives. These measures will be based on qualitative site analysis, assisted by field reconnaissance, photography, and use of topographic maps and/or 3-dimensional mapping that will identify the existing visual context and that will establish actual viewing conditions.

The first strategy in developing site-specific measures will be to restrict or prevent views of the pipeline right-of-way and related facilities from nearby communities, recreation areas, and surface travel-ways.

When this is not possible, a second and related strategy will be to reduce visual contrast by blending the site or facility with existing natural visual patterns.

A third strategy will be employed when this in turn is not practical--for example, at aerial river crossings. Here the strategy will be to incorporate the architectural theme, form, color, and texture with visual design principles of order and simplicity to achieve facility designs that appear functional, well crafted, and subordinate to the natural Alaskan landscape. Since future actions by other parties may expose pipeline facilities to view, this third strategy will also guide the development of visual considerations for portions of the project on which one or both of the preceding strategies have been successfully employed.

A fourth strategy will be to create safe places for visitors to have an understanding (education / interpretation) of the project and natural resources impacts and mitigation through road-side pullouts and informational signs or plaques.

Construction and operations of the Alaska segment of ANGTS will likely be adverse to the extent that they simultaneously:

- Are directly visible from surface travel ways or from areas used for residence, or recreation.
- Exhibit strong visual contrast with the appearance of surrounding areas.
- Are located in the portions of the pipeline corridor that are perceived as most scenic.

The objectives of the pipeline VRP program are to prevent adverse visual impacts whenever possible, to reduce the severity and extent of the adverse impacts that cannot be prevented and to rehabilitate the adverse effects that do occur during construction. Site-specific measures to achieve these objectives will, of course, also be subject to the test of other environmental, economic and operational considerations.

The procedures for developing site-specific measures to prevent, reduce, or rehabilitate adverse visual impacts will involve these steps:

- Baseline assessment of visual characteristics and visual quality along the entire pipeline corridor.
- Review of measures used to mitigate and rehabilitate visual impacts along the Trans-Alaska Pipeline System (TAPS).
- Participation of VRP Program in planning, site selection, design and construction for the pipeline and related facilities.
- Participation of VRP Program in development of site plans for rehabilitation and permanent maintenance facilities.

Throughout the VRP program, emphasis will be placed on establishing the actual visibility of sites and the extent of visual contrast introduced by construction of the pipeline or related facilities. The visual design principles of order and simplicity will also be emphasized throughout the program, to achieve facility designs that appear functional and subordinate to the natural Alaskan landscape.

6.2 CRITERIA

6.2.1 Basic Project Criteria

- Prevention of adverse visual impacts, whenever possible, by means of pre-construction planning and design particularly in the selection of facility locations.
- Reduction of adverse visual impacts that cannot be completely prevented, by means of pre-construction planning and design.
- Rehabilitation of adverse visual impacts that occur during construction, by means of post-construction rehabilitation design.

Quality control during construction and rehabilitation to insure that the preceding objectives are achieved.

6.2.2 Statutes, Regulations and Other Applicable Authorities

- 18 CFR 380.12, "FERC's Environmental Reports for Natural Gas Act Applications," and FERC environmental policy guidelines thereunder;
- Federal Right-of-Way Grant for the Alaska Natural Gas Transportation System Alaska Segment, Serial No. F-24538 (December 1, 1980), as such may be updated and/or amended from time to time.
- Federal Energy Regulatory Commission conditional certificate of public convenience and necessity, issued on December 16, 1977, as such is finalized.

6.3 METHODOLOGIES

The Visual Resource Protection (VRP) procedures for the planning and design, construction, and operation phases of the project are described in this section.

The purpose of these procedures is not to provide a quantitative prediction of visual impacts, but to integrate visual resource considerations with other project considerations on a mile-by-mile and site-by-site basis during each project phase. These procedures emphasize qualitative analysis and the use of general design criteria (Attachment A).

6.3.1 Planning and Design

To ensure that site-specific VRP recommendations will be appropriate to the overall visual context of the utility corridor, an initial field survey of corridor landscapes has been completed, to determine baseline visual quality. In addition, the effectiveness of TAPS visual impact rehabilitation measures has been evaluated, and BLM visual assessments of the corridor have been reviewed (Jones and Jones, 1980). The results are summarized here and are followed by the procedures for integrating visual resource considerations with project design.

6.3.1.1 Baseline Assessment

The initial step in the VRM Program is a baseline assessment of the landscape regions traversed by the project. The purpose of the baseline assessment is to document the broad visual characteristics of landscapes along the project corridor, evaluate pre-construction visual quality, and identify areas of significant visual resources.

Landscape Classification

The baseline assessment identified eight major landscape regions along the corridor. These are based on the physiographic provinces, sections, and sub-sections defined in *The Physiographic Divisions of Alaska* (Waharhaftlg, 1965). This widely used reference divides Alaska into areas of homogenous topography and geomorphology, which are distinct in appearance. The eight landscape regions traversed by the project are the Arctic Plains, Arctic Foothills, Brooks Range, Koyukuk Lowlands, Central Highlands, Livengood Uplands, Delta Junction Lowlands and the Tok Lowlands.

These regions are subdivided into a series of landscape units, which are spatially defined by enclosing landforms, vegetation and/or structures. The 55 landscape units mapped along the NWA pipeline corridor vary considerably in size and configuration. The common characteristic of these units is that each is spatially distinct and consistent in visual character. The landscape units provide the framework for the visual quality evaluation carried out during the summer of 1980.

Pre-construction Visual Quality

The visual quality of the landscape units along the pipeline corridor has significance for project planning and design. Existing visual quality helps to indicate the potential magnitude of visual impacts and the importance of efforts to prevent, reduce, or rehabilitate these impacts in specific places. Facilities, which are most likely to produce visual impacts, can be concentrated and sited in landscape units, which already have visual disturbances. When adverse visual effects cannot be avoided during construction, the baseline assessment of visual quality can assist in the selection of appropriate rehabilitation measures.

Research on public perceptions of visual quality has yielded explicit criteria, which can be used to perform reliable expert assessments of visual quality. This research shows that it is possible to establish broad public consensus on the relative visual quality of landscapes that are predominantly natural in character. In general, visual quality is highest in those landscape units, which most clearly or dramatically exhibit the natural processes characteristic of the region. An established procedure, including the BLM Visual Resource Management System, (Bureau of Land Management, 1978) was previously used to make quantitative baseline assessments of existing visual quality along the project corridor. Analysis of the results of both procedures indicates close agreement. The baseline assessment identifies those landscape units with quality ratings more than one standard deviation above the mean as areas of significant visual resources that merit special consideration during project planning, design, and construction. (Jones and Jones, Phase One, 1980).

The pre-construction visual quality assessment will be updated according to the revised BLM Visual Resource Management (VRM) System guidance (BLM, 1986). The VRM system was developed to classify visual resources on public land, allowing for more effective management of visual resources, and to reduce the visual impact of developments on public land. Using the VRM system, public land can be classified into one of four management classes (Table 6.1) based on three factors: the quality of existing scenery, the distance from which that scenery is viewed, and people's sensitivity to changes in the landscape (BLM 1986).

TAPS Visual Impact Rehabilitation

A number of TAPS visual impact rehabilitation sites were also evaluated and photographed during the VRP fieldwork in July 1980. These sites were selected from those available between the Brooks Range and Delta Junction. The sites included ten road crossings two river crossings, a material site, a pump station, and a linear impact site. Many of the TAPS Visual Impact Engineering (VIE) measures were successful. Retention of wooded buffers was a particularly successful technique used at several road crossings. Revegetation and erosion control also helped to reduce TAPS visual impacts. A less successful technique included several extensive tree plantings apparently intended to partially screen views of the TAPS line at road crossings. It was noted during these observations that transplanted tree seedlings generally had little immediate or positive visual effect and exhibited low survival rates, meanwhile native seedlings have invaded many construction zones, have out competed introduced vegetation, and have softened the edges of the disturbed areas. In general, the visual success of preventive measures was deemed far greater than that of rehabilitation measures that were used.

Although it appeared that tree plantings along the TAPS sites were not effective an effective mitigation measure, it is likely that low survival was related to insufficient or inappropriate soil and moisture conditions. Since the time of TAPS construction, new techniques and information are available for cost effective and successful site rehabilitation, including tree plantings to provide vegetation screening.

6.3.1.2 Project Design

Potential Visual Impacts

Considering project engineering plans, other large-scale utility projects, and the site observations of TAPS has identified the potential visual impacts of the project.

The types of potential impacts are set out in Table 6.2. They are grouped into two generic site categories: linear impacts (buried pipeline, work pad and access roads), and point impacts (river crossings, road crossings, material sites, disposal sites, storage yards, compressor stations, valve sites, camps, and other related facilities). Linear and point visual impact sites are further divided into temporary use facilities (material sites and work caps) and permanent facilities (compressor stations and work pad, including the pipeline itself).

The viewing populations that will be exposed to the project will be primarily concentrated along surface travel-ways, particularly roads. Therefore, the types of potential visual impacts can also be defined by the relationship between the impact site and adjacent travel ways. Many of the visible sites will occur at crossings or intersections between the work pad and the public travel way. Other impact sites will occur immediately adjacent to the travel-way or isolated from it at some distance.

The type of the visual impact further defines the type of the visual impact, which is visible. The profile or skyline of the site may be the distinctive feature. The faces of cut or fill slopes, the floors of cleared and regraded areas, or facility structures may also be prominent visual features of impact sites. Finally, the ribbon-like appearance of the cleared pipeline right-of-way or of access roads across undulating topography may be the most prominent visual characteristic of the impact site.

The severity of visual impact is a function of site visibility and the extent of contrast with the surrounding landscape. Construction activities create visual contrast by modifying natural landforms, clearing vegetation, and introducing man-made structures. During and after construction, sites can contrast with their surroundings in the following specific ways: their forms are generally geometric, and are unlike the generally rounded, flat or gently tilted landlords that are usually found naturally. The LINE created by the edge of a site where the vegetation has been cleared often contrasts with the irregularly shaped and subtler ecotones around it. The COLOR of newly exposed soil or rock is usually different from the color of indigenous vegetation or weathered rock. TEXTURE is another key consideration in determining the visual contrast of a construction site. Often, smooth cut and fill slopes do not blend well with the rougher texture of natural vegetation or rock outcroppings in their vicinity. Thus, the degree of overall visual contrast is dependent on the topography and vegetation at each potential impact site and must be determined on a site-specific basis.

Visual Impact Mitigation - Prevention and Rehabilitation

Mitigation measures to minimize visible contrast of the ANGTS facility include prevention and rehabilitation. These techniques are used to mitigate visibility and reduce landscape contrast. However, rehabilitation measures are generally more costly and require more effort than prevention.

The most efficient and most effective mitigation measures can be incorporated during pre-construction planning, design and also during construction.

VRP Prevention Guidelines are utilized during the interdisciplinary design effort and are implemented on a site-specific basis. (See Guidelines in Attachment A). Additional preventive measures can also be applied in the field during actual site development. Such efforts could include modification of boundaries and slope staking to mold the site appearance to conform to surrounding conditions. Controlled siting and clearing practices can reduce or eliminate the need for costly and less successful cosmetic rehabilitation, such as vegetation screen planting. If utilized, these techniques must be integrated with other site-specific environmental, economic and operational considerations. Therefore, some ANGTS locations may still exhibit visible contrast following construction.

In these few instances, rehabilitation techniques to reduce visual contrast may be required. Rehabilitation efforts are remedial in nature, and the extent of VRP rehabilitation will be dependent upon actual site contrast, viewer position, site visibility and the character of the surrounding landscape. Mitigation measures to visually reduce site contrast include landform grading and re-establishment of native plant communities. These mitigation recommendations are incorporated into rehabilitation planning following construction activities.

Site Specific Evaluation and Design Process

The process of VRP site-specific evaluation and design has two components: a pre-construction VRP field assessment and the formulation of VRP design concepts.

This process identifies and considers those areas where construction and operation of the ANGTS facility would potentially be visible from existing viewing locations. A basic assumption in the VRP evaluation and design process is that any action which increases visibility and landscape contrast will affect the existing visual environment. Therefore, preventive mitigation strategies are provided as planning and design input to minimize or eliminate visibility. All sites are given equal consideration when developing and recommending preventive mitigation measures for design use.

Assessment

Figure 2 summarizes the VRP Planning and Design Methodology. The initial step in the VRP pre-construction process is an assessment, which gathers and documents information on potential site visibility and pre-construction conditions. Conducted in the field, this information provides baseline data to formulate design recommendations. The initial mitigation strategies are a product of the field assessment, which evaluates the extent of site visibility, the surrounding landscape character, the level of visual quality of the area, and the potential for preventive mitigation.

Planning and Design

The planning and design process includes the development of the site plan and design documents. During interdisciplinary working sessions, each site or facility is discussed to determine the requirements of the various disciplines. The synthesis of these combined requirements, results in a design plan, which meets project needs.

VRP site selection recommendations and mitigation strategies are presented as a portion of this design phase and consist of three levels of recommendations: no VRP mitigation required, open the site with prescribed or RM mitigation measures, or do not open the site.

VRP mitigation recommendations presented during these sessions are preventive in nature and include the delineation of boundary limits and shaping, buffer protection and operational phasing. (See Attachment A for design guidelines.)

VRP inputs to design for facilities such as aerial bridge crossings are generic recommendations, and basically stress the importance of light, simple appearing structures which do not dominate the landscape setting. These recommendations do not supersede structural requirements, but are provided for consideration during planning and design.

Color selection is another form of VRP facility design input. Visible compressor and metering stations can be prominent features in the Arctic landscape, and visual contrast will be mitigated with the use of exterior colors that blend with the natural coloration of the surrounding landscape. (See Attachment A for guidelines.)

The products of this iterative process are a site-specific design plans which best fit the collective concerns of the various disciplines involved. During this process VRP recommendations may be superseded by other project requirements, thus a site may still exhibit probable or potential increased visibility. Examples of such requirements include:

Construction - facility operational requirements

Economic and Engineering - haul analysis, mineral material requirements, pipeline and facility integrity, terrain stability

Environmental - restricted habitats, and other unique areas.

Any one of these parameters may affect the extent of VRP preventive mitigation in the design. When other requirements dictate site appearance, then post construction mitigation measures may be employed to reduce visual contrast. These measures are rehabilitative in nature and may include grading prior to site close out to blend visible disturbed areas with existing landforms. VRP rehabilitation recommendations are similar to preventive mitigation, in that they are also evaluated and applied on a site-specific basis. Sites or facilities located north of the Brooks Range may receive similar types of treatment when screening topography or vegetation buffers, to prevent visibility, may not exist.

The detailed site plans become part of the construction documents, which will be used by both the execution contractor(s) and QA/QI personnel. The site plans include narrative sections, which explain the visual and other environmental reasons for specific mitigation measures. This documentation provides evidence that preventive or rehabilitative design measures are incorporated during construction phase.

Design Application of Preventive Mitigation Measures

The following preventive mitigation strategies are evaluated during project planning and design, as well as during subsequent construction. Application of these measures is determined by site-specific interdisciplinary consideration.

Prevention:

- Siting Considerations
    - reduce or eliminate critically visible sites
    - concentrate sites in existing disturbed sites
    - relate alignment of edges to vegetation and landforms
- Visibility Considerations
    - locate sites out of view
    - locate to minimize duration of view

- locate to reduce extent of visibility

- Restriction of Project Limits
    - develop performance standards not uniform standards
    - develop site-specific standards for various site types

- Clearing Considerations
    - maintain vegetation and landform buffers
    - utilize selective clearing
    - align clearing edges to reflect natural vegetation edges

- Design Considerations

- form	- line	- diversity
- scale	- texture	- continuity
- color	- dominance	

- Operation Considerations
    - preserve planned buffers
    - maintenance standards
    - training and supervision of personnel
    - operational requirements

6.3.2 Construction and VRP Rehabilitation

6.3.2.1 Site Layout and Quality Control

Throughout the ANGTS construction phase, project staff experienced in the environmental disciplines will be available to support implementation of the VRP in all construction sections. The environmental teams are knowledgeable of the geographic region and are responsible for interfacing with execution contractors, design engineers, and ANGTS and agency personnel to ensure that the intent of the environmental provisions incorporated in the execution plans are followed.

Field verification of facility layout and staking will ensure that preventive VRP mitigation measures are maintained throughout the project, including critical topographic and vegetation buffers incorporated during design. Controlling the visible appearance of excavation cut and fill slopes is an important measure in reducing contrast resulting from construction. Direct environmental participation during project construction will ensure continuous response to pre-closeout grading and field design changes, which could arise due to unforeseen project requirements or altered field conditions.

6.3.2.2 Construction Impact Assessment

Assessment of actual site visibility and visual impact will occur prior to or near the time of construction completion. The assessment will include a description of the extent of site visibility resulting from construction, and a determination of the success of preventive mitigation strategies utilized during design and construction, VRP rehabilitation concepts for visible sites will be formulated during this evaluation and will be synthesized with other treatment goals for the site. Revegetation recommendations, for example, will be based on the objectives and methods described in Rehabilitation Section.

Prior to developing a site-specific rehabilitation plan, it will be necessary to determine the potential for extended use or future use of that site. Recognizing that the public lands portion of the ANGTS facility traverses a designated utility corridor, a material site for example, may be needed either for ANGTS operations and maintenance or by other industrial or public users. In these instances visual rehabilitation measures will include basic landform grading to reduce contrasting slopes and ensure slope stability. The site would then be left operational. The types of sites, which may be required for future use, include material sites, disposal sites, solid waste disposal sites, and access roads.

The post-construction field assessment will also include a recommendation of candidate sites, which appear visually suitable for ANGTS operations and maintenance in order to minimize and/or prevent adverse visual effects throughout the operations phase of the project.

6.3.2.3 VRP Rehabilitation and Maintenance

It is expected that most contrast-related ANGTS visual impacts will be remedied during design and construction. However, impacts at some sites will be unavoidable, and a few sites may require rehabilitation treatments.

Two general types of landscape treatment, or a combination of the two, will be considered at locations where a site requires additional measures to mitigate visual contrast. Based on site-specific conditions, treatment will be selected from the following:

The primary treatment objective will be the reduction of site contrast through landform grading. Visible landform contrasts can be mitigated by the following measures:

- Modify slopes final grading to reduce visibility or blend with slopes adjacent topography.
- Round top and toe of slopes transition grading to blend, cut, or fill edges with adjacent topography.
- Grading earth forms in aspect with wind and solar orientation to increase survival of transplants, creating a deposit zone and a range of soil temperatures. Create depressions to capture water.
- Consider the potential long-term visual impacts rather than creation of short-term screening.
- Use a variety of sizes of vegetation weighting heavy towards young plants with greater chance of survival.
- Introduce landforms redistribute unused material or block undesirable views with earthwork mounding.

Grading and contouring will be a basic recommendation for most visible disturbed areas. This treatment generally accelerates recovery time of a disturbed area. However, at no time will landscape grading supersede site stability, structural integrity, or operational requirements, nor will it increase critical habitat loss.

A secondary treatment objective will be the reduction of visual contrast through vegetation recovery. Color and texture are other elements to consider in reducing visual contrast and these elements can often be controlled during rehabilitation through revegetation. In some site-specific situations, vegetation can also provide screening and/or blending of a disturbed area over time. Many sites and disturbed areas will be prepared to encourage natural revegetation.

Visual contrast mitigation by revegetation will be generally accomplished by the following measure:

- Natural succession-prepare site for natural reinvasion of the local flora.
- Sites adjacent to, or in close proximity of a public roadway or a public recreation area may require induced revegetation measures to accelerate blending or screening of a disturbed area. Site-specific measures for these areas may include the following treatments:
- Seed with native plant species-seed surface areas to accelerate the appearance of established natural plant growth and surface cover.
- Cuttings, seedlings, and salvaged native plant materials install native plant cuttings and/or seedlings and salvaged plant material to establish woody plant growth within one growing season.

VRP Rehabilitation Plan - Scheduling and Maintenance

All visual rehabilitation treatments will be incorporated within the Site Rehabilitation Plan. Actual treatment for vegetation recovery, for example, will be subject to succession potential as determined through rehabilitation planning. VRP goals will be included in site documents and plans to help ensure quality inspection and assurance during field implementation.

Scheduling of materials and installation, procedures for installation, quality assurance, and maintenance will all be conducted in accordance with the criteria and methodologies described in the Rehabilitation Section.

6.3.3 Post Rehabilitation Evaluation

Following rehabilitation plan implementation, treatment success will be evaluated, determined, and addressed in accordance with the criteria and methodologies described in the Rehabilitation Section.

The post rehabilitation evaluation will provide data and information regarding the success of mitigation treatments for use during the operation and maintenance of the ANGTS project.

6.3.3.1 Design Application of Rehabilitation Mitigation Measures

The following range of techniques will be considered for each visible disturbed area to develop rehabilitation design strategies. Actual design is dependent upon site-specific conditions and other rehabilitation goals for the site.

- Rehabilitation:
  Blend Impact Site

    Vegetation

    - edge alignment
    - color
    - texture

    Landform

    - edge condition
    - skyline profile
    - cut/fill slopes

- Rehabilitate Impact Site

    Revegetation

    - natural succession
    - seed with native species
    - cuttings and seedlings
    - salvaged plant material

    Grade and contour Landform

    - modify slope
    - round top/toe of slope
    - introduce landforms
    - scarify

    Operation Considerations

- preserve planned buffers
- standards
- training and supervision of personnel

6.4 FIGURES AND TABLES

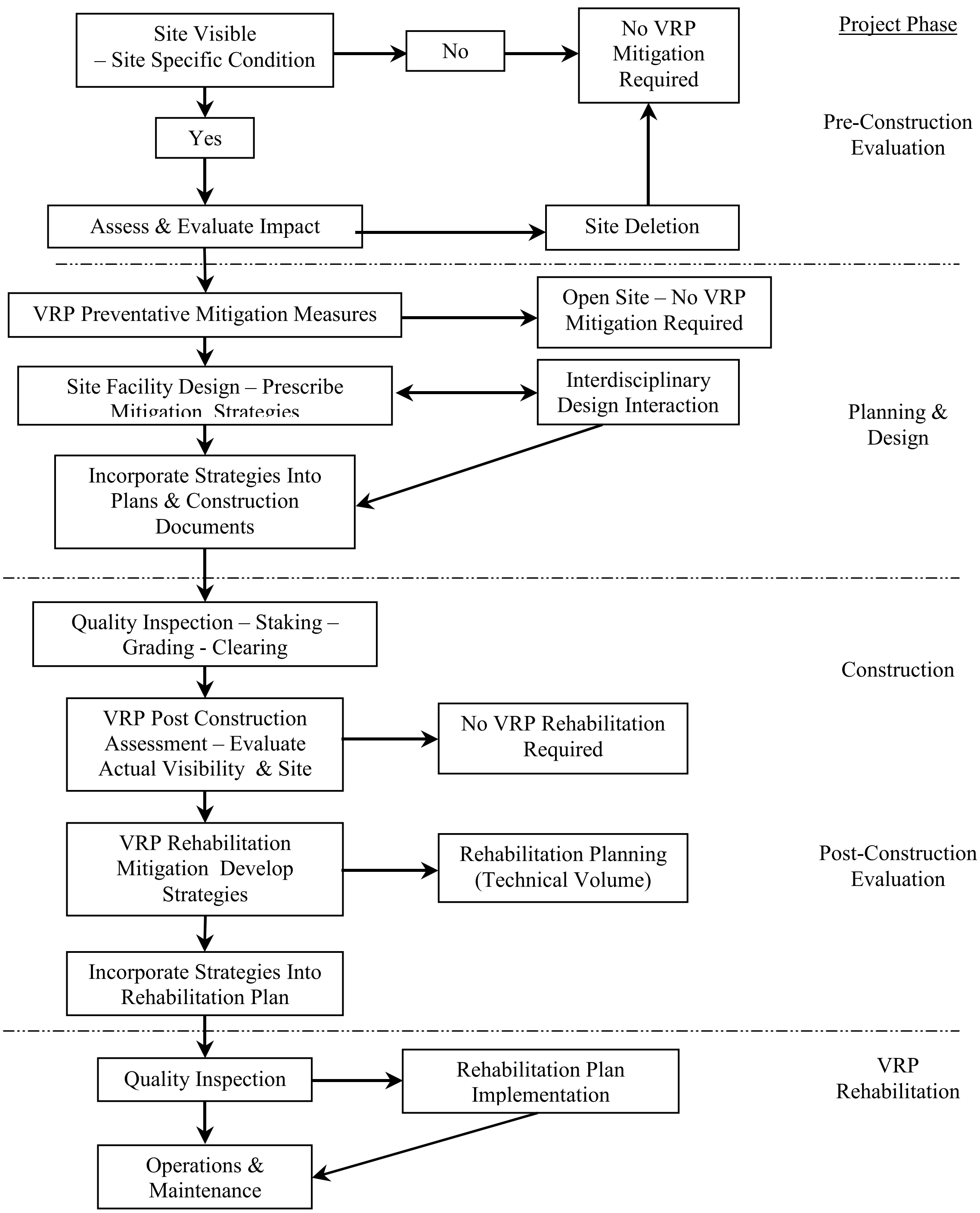

Figure 6.1
Visual Resource Protection (VRP) Planning and Design Methodology

Table 6.1
Bureau of Land Management Visual Resource Management Classes (from BLM, 1986)

Class	Description of Management Objectives
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Table 6.2
Occurrence of Visual Impact Types Per Construction Activity

OCCURRENCE OF VISUAL IMPACT TYPES PER CONSTRUCTION ACTIVITY

● high
◗ moderate
○ low

		FEATURE	LINEAR IMPACT SITE					POINT IMPACT SITE					
			Buried pipe	Work pad	Access roads	Air strips	Diversion channels/ by-pass roads	Compressor station	Remote valves	Storage yards	Work camps	Disposal sites	Material sites
ACTIVITY	Erection of Structures					●	○	●	●		●		
	Clearing and Earthwork		●	●	●	●						●	●
	Temporary				◗	◗	●			●		●	●
	Permanent		●	●	◗	◗		●	●	◗	◗	◗	◗
POTENTIAL VISUAL IMPACT	crossing		●	●									
	adjacent				●	○	●	◗		◗	◗	◗	◗
	isolated					●		●	●	●	●	●	●
	parallel		●	●									
	notch		●	●	●		●						
	ribbon		●	●	●	●							
	face		●	●	◗	○	●	◗				●	●
	floor					●		●		●	●	●	●
	structures					●		●	●	○	●		

Material Site Type					
	RIVER/ FLOODPLAIN	**ALLUVIAL FAN**	**UPLAND/ ROCK**	**OUTWASH**	**SPECIAL**
Viewer Position	Level or Above Site	Level or slightly above or site	Below or level	Level or slightly above or below site	Depends on site type
Site Character	Meander and Braided forms	Drainage form of fan and channels clumps of vegetation	Open exposed ridge line or side slope areas varied vegetation	Level, lowland sites vegetation	Depends on site type
Cut Face	-	Depends on depth of excavation	Major visible element of site	Depends on depth of excavation	-
Fill Face	-	-	Depends on placement of debris	-	-
Floor	Major visble element of Site	Major visible element of site	Depends un viewer position	Major visible element of site	-
Clearing Edge	Limited vegetation	Major visible element	Major visible element in forested areas	Major visible element in forested areas	-
Berms & Diversions	Yes	Yes	-	-	-
Ridge line	-	If total fan site is used	Depends on placement of site	-	-
Closeout Relationship Surrounding Area	River forms related to drainage pattern	Minor gravel landforms related to drainage pattern	Mimic land-forms in scale slope and material size	Minor land forms related to side slopes	-

Table 6.3
General Visual Characteristics of Material Sites

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6.5.2 Glossary

Aspect – The apparent position of an earth form or vegetation in relation to the sun and or wind direction.

Color - An objects value of reflective brightness, (light, dark) or the visual perception of its hue ({red, green, yellow).

Deposit Zone – The area that is non the lee side of an object such as an earth form, vegetation, or a structure that is protected from the wind.

Feathered – A transitional form between extremes that reduces visual impact (e.g., vegetation of varying heights between the forest and a cleared area).

Form - The visual mass, bulk or shape of an object.

Landscape Type - A visually homogeneous area formed by a combination of relatively uniform landforms and land cover, such as a steep tundra hillside or a forested valley bottom; useful for visual assessment and management, particularly of to reduce the visual contrast introduced development.

Landscape Unit - An area of distinct, but not necessarily homogeneous, visual character that is spatially enclosed at ground level; a visually identifiable place or "outdoor room"; useful for visual assessment and management, particularly of visual quality.

Line - Introduced by the edges of objects or parts of objects, composed of horizons, silhouettes, edges of areas or man-made development.

Microclimate – The smaller unit of climate that creates a change in habitat by utilizing the aspect of other features to make that change (e.g., a large log lying on the ground creates a microclimate that allows moisture to settle at the point of contact with the soil and a deposit zone for seeds to gather).

Mitigation - Measures to prevent, reduce, or offset adverse impact.

Plant Succession – The directional, cumulative change in the species which occupy a given area through time.

Regional Landscape - A large area defined by similar patterns of landform and land- cover, (such as the Arctic plains or the Livengood Uplands).

Texture - The apparent roughness or coarseness of a visual Surface.

VIE (Visual Impact Engineering) - The planning, design and implementation program developed by Alyeska Pipeline Service Company, to meet visual resource management objectives during the development of the TAPS project.

Visibility - The existence of an unobstructed line of sight between a viewing position, such as a public road, and all or part of a developed construction feature, such as a material site.

Visual Character - The visual character of a landscape is formed by the order of the patterns composing it; the visual elements of these patterns are the form, line, color and texture of the landscape's components; their interrelationships can be described in terms of dominance, scale, diversity, and continuity.

Visual Contrast - The relative difference between the visual character of a man-made feature and the surrounding landscape, in terms of specific visual pattern elements, or combination of elements such as form, line, color and texture. Or in terms of visual pattern relation- ships such as dominance, scale, diversity and continuity.

Visual Impact - The extent of visible change and contrast in visual resources resulting from a development project.

Visual Quality - An evaluative appraisal of the relative excellence of a view or a sequence of views; individual judgments of quality are affected by the values and activity of the viewer; nevertheless, broad consensus can be established on the relative quality of different landscapes within a geographic region.

Visual Resources - The presence or existence of scenic resources based on aesthetic appreciation of visual perception. The appearance of the features that make up the visible landscape.

VRP (Visual Resource Protection) - The planning, design and implementation of structures, sites and construction-related activities to minimize and reduce the visibility and visual contrast of the ANGTS facility in Alaska.

6.6 ATTACHMENT A – TECHNICAL SUMMARY FROM PHASE I NWA VISUAL RESOURCE MANAGEMENT PROGRAM

Four major concerns of the Visual Resource Protection (VRP) Program (this was originally referred to as the Visual Resource Management or VRM Program) for the ANGTS project are: (a) consideration of the visual character and quality of the existing landscape; (b) awareness of the final appearance of the various elements of the proposed ANGTS facility (work pad, access roads, material sites, storage and disposal sites, camps, compressor stations, airstrips and other related elements); (c) the degree to which those elements are visible to viewers; and (d) t. he probable viewer response to such facilities. Careful attention paid to each major concern will produce location and design decisions, which successfully prevent or diminish potential visual impacts, thus protecting visual resource character and visual quality. Where impacts are unavoidable, knowledge of specific problems can lead to successful accomplishment of the VRP goal of visual impact mitigation, which includes such measures as landscape rehabilitation and screening.

The purpose of Phase 1 of the VRP Program is to provide baseline information on the visual resources of the Alaskan landscapes traversed by the facility, including a documentation of their visual character and an evaluation of their visual quality prior to construction. This information will be used in later phases of the program to assess the potential degree of change in landscape character and quality which will result from facility construction and operation, to prioritize planning and design alternatives for prevention of adverse effects on landscape character and quality, to identify areas where landscape alteration will be severe, to recommend design standards which will diminish the visual contrast of those alterations, and to provide detailed information for the successful mitigation of unavoidable landscape alterations and their associated visual impacts.

6.6.1 Landscape Regions

Along its corridor the Alaska segment of ANGTS will cross eight distinct Landscape Regions:

I Arctic Plains

II Arctic Foothills

III Brooks Range

IV Koyukuk Lowlands

V Central Highlands

VI Livengood Uplands

VII Delta Junction Lowlands

VIII Tok Lowlands

These eight Landscape Regions correspond closely to the physiographic sections described by Clyde Wahrhaftig in the Physiographic Provinces of Alaska. This widely used reference divides

Alaska into areas of homogeneous topography, which are distinct in geomorphology and appearance from adjacent areas.

6.6.2 Landscape Units

The landscape is seen and perceived by viewers as a series of "places" or Landscape Units which are spatially defined by enclosing landforms, vegetation and/or structures. These Landscape Units are bounded (or partially bounded) spaces or large "outdoor rooms" whose sloping walls extend outward toward the skyline divides in hilly or mountainous regions. Hence, Landscape Units in the Arctic Foothills, Brooks Range, Koyukuk Lowlands, Central Highlands, and Livengood Uplands Landscape Regions correspond closely to portions of watershed basins and river corridors, where ridgelines clearly define spatial boundaries. In flatter Landscape Regions, including the Arctic Plains, Delta Junction Lowlands and Tok Lowlands, the topographic boundaries of the Landscape Units are often more subtle and spatially less clearly defined. Here distinct patterns of vegetation, lakes and river corridors and settlement patterns may take the place of topography in defining Landscape Unit boundaries.

The 55 Landscape Units mapped along the Alaska segment ROW vary considerably in size and configuration. The common characteristic of these units is that each is experienced spatially as a distinct place with consistent visual character. The Landscape Units provide the framework for visual quality evaluation. Each of the Landscape Units is named after a significant landform, river, stream, lake or settlement located within it.

6.6.3 Landscape Groups

While the eight Landscape Regions are subdivided into 55 spatially distinct Landscape Unit for visual quality evaluation, some of these individual units cluster together into intermediate Landscape Groups because of similar or related patterns of land form, vegetation, water forms, or man-made elements. Twenty-six Landscape Groups were identified along the pipeline corridor.

6.6.4 Visual Resource Assessment Techniques

Having established a framework for classifying and subdividing the landscape traversed by the ANGTS facility, the next step was the development of appropriate techniques to assess the visual resources of these landscapes. The project study team drew upon their experience in developing and employing various VRP techniques to inventory the supply of Visual Resources. An each Landscape Unit, to assess the Visual Character of these resources as they interrelate, and to evaluate the resulting overall Visual Quality of each Landscape Unit.

6.6.5 Visual Resource Inventory

Visual Resources include all the visible elements of a given landscape unit-landforms, vegetation, water forms, wildlife, man-made elements, and spatial character. The basic supply of these various resources can be inventoried by documenting the specific type of resource present, as well as its visible quantity within the context of the Landscape Unit.

6.6.6 Visual Character Assessment

While the visual resource inventory documents the supply of specific visual elements of the landscape, Visual Character results from the visual interrelationships of these elements as they combine to create larger landscape patterns. Visual patterns in the landscape are created by .the overlapping forms, lines, colors, and textures of the individual components of land, vegetation, water and man-made elements. The *Visual Character* of a Landscape Unit can be assessed by observing and documenting these patterns and the relative prominence scale, diversity, and continuity. The Visual Character assessment provides valuable information for reducing the contrast of landscape alterations and mitigating unavoidable impacts.

6.6.7 Visual Quality Evaluation

The Visual Quality of each Landscape Unit will be an important and useful factor in determining the priority of visual resource management efforts along different sections oft he pipeline. For example, if two pipeline segments were equal in visibility and in the amount of visual contrast with their landscape setting, it would be logical to put more effort into rehabilitating the landscape that originally had higher visual quality.

A number of approaches to evaluating the visual quality of landscapes have been developed and widely applied. Several of he federal land-managing agencies, including the Bureau of Land Management (BLM), use methods that look at the Landscape Region for specific resource indicators of visual quality. High visual Quality is postulated for those landscape units, which most clearly or dramatically exhibit the natural processes characteristic of the physiographic region. Resource indicators of visual quality may be on the level of visual information (e.g., rock faces, avalanche cones) or of visual character (e.g., variety). A second approach to the evaluation of visual quality looks for indicators concerned with visual relationships rather than with landscape components. Evaluative appraisals are judgments of the relative visual quality of specific resources or landscape based on explicit criteria derived from research on public perceptions. These evaluative criteria can be used within different regional landscapes, as long as direct comparisons of visual quality are kept within the same region.

The study team employed both approaches to evaluating the visual quality of each Landscape Unit. The BLM system was used for the first approach, and a set of criteria (vividness, intactness, and unity) that the project study team has used on numerous visual studies was missed for the second approach. The results of the second approach have been reported in this study because the first approach tends to presume a region-wide visual analysis as a starting point and can be difficult to implement on a protect-by-project basis. In actuality, the two approaches resulted in very similar evaluations of relative visual quality for all the Landscape Units surveyed.

6.6.8 Field Survey

A project study team performed the initial field survey for the VRP Program during 8 July and 17 July 1980. This field study may be partially outdated due to vegetation growth, human activities that have altered views in the project area, and road alignment changes since 1980. Despite these changes, the findings reported from this survey are considered valid for purposes of characterizing visual resources along the route.

The study teams, which consisted of two members each, began surveying and inventorying the visual resources of landscape units north and south of the Yukon River. The northern team drove the Dalton Highway between the Yukon River and Prudhoe Bay, while the southern team drove the Dalton Highway south from the Yukon River to its termination near Livengood and then drove the Elliot and Steese Highways to Fairbanks and the Richardson and Alaska Highways to the Canadian border. Both teams drove back to Fairbanks for debriefing. Thus the landscapes of the entire pipeline route were seen and inventoried by at least one team traveling in both directions.

The primary goal for the initial VRP Program field survey was the completion of the visual inventor, assessment, and evaluation of pipeline landscapes. Since the spatially determined Landscape Unit provided the survey framework; the actual boundaries of these units were carefully mapped, checked and corrected in the field. Landscape unit boundary mapping was done at scales of 1" = 1 mile and 1:250,000, using USGS maps.

The visual resource assessment techniques were primarily applied to each Landscape Unit as viewed from the road, rather than to the landscape as a whole. This presented no problem in evaluating Landscape Units 1-10, where low tundra beside the elevated roadway allows clear visibility of most of the landscape features resent in these units. Landscape visibility in units 11-37 is intermittently blocked by shrubs and trees, but the rolling topography provides many overlooks and vistas within these units, allowing overall visual resources to be readily surveyed from the road.

However, limited visibility from the road in the lowland land-scope Units 38-55 presented a special problem, since the view from the road through most of these units is screened by dense trees. The road traverses flat topography much have the way and gives travelers relatively infrequent opportunities to see the full range of visual resources in these Landscape units. Because these landscape units along the Alaska Highway are subject to development pressures, and roadside clearing and improved accessibility is likely in the future, the visual resources of the overall units were inventoried, assessed, and evaluated.

6.6.9 Landscape Descriptions and Visual Quality Evaluations

Detailed descriptions of the 55 landscape units traversed by the NWA facility have been included in the main body of this report. These summarize the visual character of the landforms, spatial character, vegetation, water forms, and man-made elements of each unit and report its visual quality.

The visual quality evaluations for all 55 Landscape Units along the pipeline corridor are summarized in the table below. A universal numeric scale was used in the field evaluations; it ranged from very low to very high visual quality. As one might expect in Alaska, the average visual quality was moderately high. The visual quality of individual landscape units ranged from moderate (near Fairbanks and Tok) to very high (Sukakpak Mountain).

However, the purpose of evaluating the visual quality of these landscapes was not to compare their quality to that of other American landscapes, but to help determine priorities for visual resource management along the Alaska segment To facilitate comparisons of relative visual quality along the pipelines, the raw visual quality scores were converted to standard T-scores. On this standard statistical scale, 50 represent the average or mean score of all landscape units and each increment of 10 represents one standard deviation. Thus, a score of 70 represents a visual quality evaluation two standard deviations above the quality of the average landscape unit.

One of the basic steps in determining VRP classes within the BLM system is the allocation of landscape units into three classes on the basis of their visual quality. The definition of these classes has an important influence on management priorities, although other factors, such as viewer sensitivity, are also considered. As noted, the average visual quality of the landscape units along the pipeline corridor is moderately high. However, it will still be necessary to distinguish among these units to help assign priorities. It is therefore proposed to divide the units into three groups on the basis of their visual quality T-scores, with the break point at one standard deviation above and below the mean score (i.e., at T-scores 40 and 60). These three groups, A, B, and C, then correspond to relative visual quality levels (higher, average, and lower) along the pipeline corridor.

VRP Program – Landscape Units

VRP LANDSCAPE UNIT	LANDSCAPE CLASS	PIPELINE MILEPOST (Approximate) BEGIN	END
1. Prudhoe Bay	C	0	8.5
2. Sag River Plains	B	8.5	28.0
3. Franklin Bluffs	B	28.0	70.3
4. Happy Valley	B	70.3	97.5
5. K. Bluffs/Slope Mtn.	A	97.5	122.9
6. Upper Toolik River	B	122.9	130,3
7. Kuparuk River	B	130.3	141.3
8. Galbraith Lake	B	141.3	154.7
9. Upper Atigun	A	154.7	172.9
10. Chandalar Camp	B	172.9	180.5
11. Upper Dietrich	A	180.5	202.2
12. Sukakpak Mtn.	A	202.2	218.6
13. Wiseman	B	218.6	243.4
14. Coldfoot	A	243.4	253.6
15. South Cathedral Mtn.	B	253.6	261.5
16. S. Fork Koyukuk.	B	261.5	265.5
17. Grayling Lake	B	265.5	274.0
18. Prospect Creek	B	274.0	288.3
19. Bonanza Creek	B	288.3	300.2
20. Fish Creek.	C	300.2	307.2
21. Olson's Lake	B	307.2	316.2
22. West Fork Dall River	B	316.5	328.3
23. No Name Creek	B	328.3	339.7
24. Upper Ray River	C	339.7	343.3
25. Fort Hamlin Hills	B	343.3	347.0
26. Seven Mile	B	347.0	356.5
27. Yukon River	B	356.5	368.4
28. Isom Creek	B	368.4	373.0
29. Ness Creek	B	373.0	389.2
30. Erickson Creek	B	389.2	398.7
31. Lost Creek	B	398.7	404.8
32. Livengood	B	404.8	411.4
33. Upper Tolovana	B	411.4	414.2
34. Tatalina River	B	414.2	430.9
35. Washington Creek	B	430.9	436.4
36. Chatanika River	B	436.4	453.3
37. Goldstream Creek	C	453.3	460.6
38. Chena Flats	C	460.6	478.2
39. Eielson Flats	C	478.2	495.3
40. Little Salcha	B	495.3	501.7
41. Lower Salcha	C	501.7	519.5

42. Richardson Flats	B	Not within pipeline corridor	
43. Shaw Creek Flats	C	519.5	537.4
44. Delta Junction	B	537.4	554.9
45. Granite Mtn. Fan	B	554.9	575.8
46. Johnson Confluence	B	575.8	590.5
47. Dot Lake Flats	C	590.5	622.2
48. Robertson Flats	B	622.2	629.0
49. Cathedral Rapids	A	629.0	639.7
50. Tok Basin	C	639.7	664.3
51. Tetlin Junction	B	664.3	677.8
52. Kalutna. Flats	B	677.8	702.2
5'3. Northway Lakes	B	702.2	721.5
54. Gardiner Flats	B	711.5	734.1
55. Island Lake	B	734.1	743.4

These standard scores provide a comparative baseline evaluation for the development of site-specific priorities in subsequent phases of the VRP Program. With the addition of considerations such as visibility and viewer sensitivity, VRP classes can be established and maximum acceptable levels of visual change can be proposed. If the VRP goal of prevention of excessive adverse visual change cannot be achieved by pre-construction location and design, appropriate rehabilitation techniques can be identified during the construction period to achieve mitigation goals.

6.6.10 Evaluation of TAPS Visual Impact Rehabilitation Sites

A number of TAPS visual impact rehabilitation sites were evaluated and photographed during July 1980. These sites were selected from those available between the Brooks Range and Delta Junction and included both Point and Linear Impact Sites. Among the sites were ten road crossings, a material site, two river crossings, a pump station and a linear impact site. All sites surveyed are located in areas vegetated by spruce, aspen, alder or willow and are w/thin view of traveled highways.

The field survey teams photographed these sites and completed BLM "contrast rating" evaluations for several in an attempt to identify the effectiveness of TAPS visual impact mitigation measures. One finding was that the contrast rating procedure appeared to overstate the visual impact of some sites because it does not include any consideration of the relative size of the facility being rated. For example, the brightly painted access control gates along the TAPS line would receive high contrast rating, although these gates are not major visual elements in pipeline views.

Many of the TAPS visual impact mitigation techniques were successful. Retention of existing vegetation was a particularly successful technique and was used at several road crossings. Revegetation and erosion control using grasses also helped re- duce TAPS visual impacts significantly; this was particularly noticeable by comparison to areas where access roads were not seeded.

The less successful treatments included several extensive tree plantings intended to screen views of the TAPS line at road crossings. The survey teams were not familiar with the history of these sites and there may well have been compelling reasons for the plantings. However, in several cases, the trees do not block views effectively because of topographic relationships. Moreover, the number of dead trees appeared to indicate that the choice of species (generally birch) may not have been appropriate for some of the sites or the transplant and maintenance techniques were not well employed.

6.6.11 Areas of Interest and Key Observation Points

Since the numbers and sensitivity of potential Alaska segment viewers will be a consideration in assigning VRP priorities, a preliminary list of "areas of interest" along the pipeline corridor was compiled. These are sites at which viewers may be concentrated in the future or at which viewers may be expected to have heightened interest in the surrounding scenery. These areas were mapped for reference during the field survey. A number were visited by the survey teams and evaluated for possible utilization as Key Observation Points (KOPS), from which the visual impact of the pipeline might be assessed.

The areas of interest were identified by reviewing documents obtained from the Alaska Department of Natural Resources and BLM. Both agencies have targeted an array of sites and linear zones as areas of significant scenery or potential tourist centers. The BLM areas include locations along the Dalton Highway that were designated as Development Nodes for tourist activity in the BLM’s March 1980 Utility Corridor Report. BLM also identified a number of visual impact problem areas in its June 1977 assessment of the TAPS line. Several of these sites are also proposed locations for ANGTS facilities or activities.

The state areas include existing parks and waysides, and sites identified for future tourist activity. Several Native sites are also included, which relate to two Native allotment sites (alignment sheets 40 and 55) that are bisected by the Dalton Highway. These sites have the potential of becoming tourist activity nodes. The tourist center locations and magnitude of travelway use for recreation will play an important role in later phases of the VRP Program.

6.6.12 Typical Visual Impacts

Potential impacts of ANGTS construction disturbances have been identified by considering the visual characteristics of the TAPS facility, as well as those of other large-scale utility construction projects.

The visual impacts can be grouped into two generic categories; linear impacts (buried pipeline, workpad and access roads), and point impacts (material sites, disposal sites, storage yards, compressor stations, valve sites, camp sites and other ancillary Facilities). Linear and point visual impact sites can be further divided into temporary facilities (material sites, work camps) and permanent facilities (compressor station, work pad).

Much of the visual impact of the pipeline will be controlled by two conditions: first, the extent of the site and whether it is visible from public travelways; second, the degree of visual contrast that exists between the construction site facility and the surrounding landscape. This contrast can be described and analyzed in terms of form, line, color, and texture and is the result of a complex mix of construction activities, facility characteristics and the unique blend of landform and land cover within each Landscape Unit.

Major construction activities develop visual contrast because of the vegetation clearing sure of cut and fill slopes and placement of facilities within view. Construction sites contrast with their surroundings in many ways: their FORMS are generally geometric, tailored to the bucket and blade hat create them, and are unlike the generally rounded, flat or gently tilted landforms that are normally found in their vicinity. The LINE created by the edge of a site where the vegetation has been cleared often contrasts with the more subtle ecotones around it. The COLOR of newly exposed soil or rock is usually very different from the color of indigenous vegetation or weathered rock; this soil-vegetation color contrast can be severe. TEXTURE is another key consideration in evaluating the visual contrast of a construction site. Often, smooth cut and fill slopes do not blend well with rough vegetation or craggy rock outcroppings in their vicinity.

Construction sites may also DOMINATE their surroundings, contrast in visual SCALE, add to (or subtract from) the DIVERSITY of the setting, or reduce the CONTINUITY of existing patterns of land- form, vegetation, water, or human development.

6.6.13 Typical Mitigation Measures

Potential mitigation measures for the possible visual impacts of the Alaska segment included prevention, view diversion and rehabilitation techniques. All of these techniques can be used to mitigate visual impacts, but some will be more costly and require more effort than others.

The easiest and most effective mitigation actions can be taken during pre-construction planning and design. Siting and clearing practices can reduce or eliminate the need for costly after-the-fact rehabilitation measures.

View diversion measures can control or direct a traveler's view away from a site. This can be done by screening views or selectively opening other views with controlled clearing. View diversion measures generally occur close to the viewer and do not have to be on the impact site. Rehabilitation efforts are immediately in nature. The magnitude of theme efforts will be dependent upon impact magnitude, the Management Class of the Landscape Unit, ANGTS policy and the desires of managing agencies.

6.7 ATTACHMENT B – GENERAL CRITERIA FOR VISUAL RESOURCE PLANNING

The following guidelines have been developed for use during ANGTS facility planning and design. The consideration of these factors during this phase will help to develop visual mitigation alternatives for site-specific situations.

This information is presented in guideline form as opposed to standard design criteria. Each site or facility generally presents a different set of physical conditions that must be considered during the design analysis. Guidelines or criteria which are applicable to one location may not be applicable to another location. Thus guidelines serve as a checklist of potential preventive visual impact mitigation strategies, to be evaluated with other requirements during the planning and design process.

The first section, General Project Guidelines consists of general design considerations. This section is generally applicable to all of the various facility types being developed for the ANGTS project and addresses site selection, design and construction and operation considerations.

The Site Specific Guidelines section of this Attachment addresses the facility by site type. Different facility types may exhibit design considerations which are particular to that facility. This section is intended to present the designer with guidelines for the type of facility being designed. Due to the site specific nature of this section, additional or new parameters may arise when actually developing detail site designs. Any new parameters are added as detailed design progresses.

Other guidelines which represent site development techniques can be found in the ANGTS Design Criteria Manual.

6.7.1 General Project Guidelines

The following planning and design guidelines present general visual resource management concepts to be considered during site selection and design of ANGTS facilities. Visual resource considerations are to be combined with other design criteria (environ- mental, geotechnical, economic operational) during facility planning and design, and are general guidelines which can be modified on a site specific basis during the planning and design process. The guidelines are impact preventive in nature, and through design application may reduce the extent or eliminate the need for extensive rehabilitation work at site close out.

- Siting
  Location or placement of a facility to minimize or eliminate visual, contacts from public travelways.
    - Eliminate or reduce number of sites in critical areas (Class A landscapes and other sensitive areas) and consider alternate locations more suited to limiting visibility or with greater potential for meeting design criteria.
    - Concentrate facilities within existing disturbed areas except when the disturbance is minor and the landscape value high.

  - Reduce visible portion of sites. Generally sites which parallel contours will be less visible than sites perpendicular to the contours.
  - Locate sites to create least difference in elevation between the viewer and the site.
  - Limit potential of views down to site.
  - Consider distances of visibility - generally, in- creasing distance reduces visual contrast. This factor must be considered against the impact of increased view duration, where applicable.
  - In areas of low topographic relief and low growing vegetation (e.g., the North Slope), siting will stress simplicity of design and the integration of structures with terrain features.

- Visibility

  Use existing vegetation and/or topographic buffers to reduce or eliminate site visibility.
  - Utilize topography and/or vegetation to screen view of site from public travelways.
  - Locate site outside of view from public travelways.
  - If site must be visible, locate site so it is visible from public travelways in one direction only. The least prominent view or traveled direction is generally the most appropriate site view.
  - Locate and align site to reduce site visibility from the principal views (longest duration, most prominent, viewer above or below) from public travelways, and key observation points.
  - Locate site to minimize the duration of views from public travelways.

- Project Limits

  Restriction of project limits to the minimum required.
  - Restrict site "foot print" or limits to minimum size required for construction, operation and rehabilitation.
  - Utilize the least visible portions of phased sites first.
  - Reflect natural features of the area, i.e., drain- age patterns, water bodies, topography, vegetation, in shaping the configuration of project limits. Natural features influence site design and provide naturally-shaped boundaries.

- Design

  Detailed site design activities to reduce visibility of the facility.
  - Relate resultant landform and vegetation shapes to surrounding vegetation and landform patterns.
  - Relate exposed material to surrounding landforms in scale, slope and size of material. Wherever possible, mimic surrounding landforms at site close-out.
  - Consider future use or re-use potential (recreation, tourist turnout, disposal site, permanent material site) in design.
  - Consider potential for natural succession revegetation of site in design.

- Clearing and Grading

  Clearing and earthwork operations to minimize or eliminate visual impact.
  - Protect existing topographic and vegetation buffers.

- Protect integrity of ridgelines. Generally do not "daylight" the site from one side of the ridgeline to the other.
- Utilize and protect buffers of existing vegetation to reduce magnitude of the visible portion of the site.
- Relate site shape, size and orientation to surrounding topographic and vegetation patterns.
- Utilize an undulating and irregular edge rather than geometric edge to clearing.
- Utilize selective thinning of trees along an edge of a newly cleared forest to feather the edge. This will allow light to penetrate the forest edge to develop an natural succession of edge plants.
- Reduce the length of individual edges. Break long edges, into a series of undulating tangents.
- Clear lower portion of site first, (assuming the viewer is below the site), move up-slope as necessary by phases.
- Keep the height of cut and fill slopes to a minimum.
- Provide transition grading with the surrounding landscape. This would include but not be limited to, rounding the top and toe of slopes.

- Operations

  Ongoing consideration of visual resources during the operation of the facility and pipeline system.
  - Reflect operational requirements in design.
  - Preserve vegetation and topographic buffers during operation of the site.
  - Consider visibility in establishing top elevation of facility elements in permanent use sites.
  - Place permanent facilities (processing sites, stock- piles, material storage) in least visible portion of the site.
  - Consider reuse potential of sites, for other operational activities or public use.

6.7.2 Site Specific Planning and Design Guidelines

Each element of the pipeline facility possesses unique visual characteristics, which require specific visual resource planning and design considerations. The following guidelines address specific conditions reflected by the type of facility being constructed.

- Material Sites

  General
  - Reduce, minimize and/or eliminate site visibility, in order to reduce the need for visual rehabilitation of material sites.
  - Reduce number of sites required by the following methods:
    1. Reduce material, requirements.
    2. Deepen and/or expand sites which are not visible or are not major visual impact sites.
  - Utilize existing TAPS and highway Sites where possible, unless already considered an impact site.
  - Minimize site "footprint", or area disturbance.

    - Phase aliquot use from least to most visible.
    - Protect vegetation buffers during operation.
    - Grade to match and mimic surrounding topography at close-out.

- River/Flood Plain Sites
    - Locate site as close to screening bluff or terrace edge as possible to screen views of site.
    - Orient site perpendicular to view direction where possible.
    - Utilize bluff or terrace edge adjacent to viewer screen views of site.
    - Reflect the orientation and scale of river/stream flow forms in site boundaries. Irregular, undulating site shape is desired. Minimize depth of excavation to retain gravel bar configuration and natural shape.
    - Diversion berms should be removed at close-out, if not required for drainage or erosion control. Care should be taken to locate berms in a manner which will reduce environmental impact and minimize the quantity of material required.

- Alluvial Fan Sites
    - Locate site in old channel where possible.
    - Identify fan ridge line and locate site on the least visually significant side. Where possible protect the integrity of the ridgeline. If forested, protect vegetation buffer at roadway.
    - Site size, shape, and orientation should reflect alluvial fan shape and vegetation pattern.
    - Limit clearing to protect vegetation buffer and minimize site "footprint" and area of disturbances.
    - Reflect size of surrounding material (rocks, etc.) at close-out. Do not leave contrasting material visible.
    - Diversion berms, not necessary for erosion control, should be removed at close-out. Care should be taken to locate berms in a manner which will reduce environmental impact and minimize the quantity of material required.
    - Maintain vegetation and landform buffers during operation.
    - Grade to match surrounding topography at close- out. Whenever possible, mimic surrounding land- forms at site close-out.
    - Develop design to mimic alluvial fan shape.

- Upland/Rock Sites
    - Orient site parallel to and not perpendicular to contours to reduce visibility.
    - Generally, the greater the difference in elevation between the site and the viewer the greater the site visibility.
    - Locate site on non-visible side of ridge line.
    - If site must be on the viewer's side of the ridge line, place site so that it is visible from one direction only.
    - Protect integrity of ridge lines.
    - If vertical cuts in rock outcrops are visible, evaluate different methods of rehabilitation of the cuts to blend the cut into the surrounding rock slopes or terrain to reduce the appearance of a manmade cut. This can be accomplished

by over blasting and laying the slope back to an angle that is the same as the surrounding area.
  - Relate shape of site to surrounding topography and vegetation patterns. Irregular, undulating site shape is desired.
  - Utilize buffers of protected existing vegetation to reduce magnitude of the visible portion of the site. The spacing of buffers should depend on view angle, vegetation height and degree of screening desired.
  - Utilize topographic berms to screen view of working face of site.
  - Consider re-use potential (scenic turnouts, recreation sites) in close-out design of exhausted material sites.
  - Operate lower portions of site first.
  - Alignment of access roads is a critical factor for upland sites.
  - Relate scale, slope and size exposed material to surrounding landforms and material. Wherever possible mimic surrounding landforms at site close-out.

- Outwash Sites
  - Orient site parallel to and not perpendicular to contours to reduce visibility.
  - Generally, the greater the difference in elevation between site and viewer, the greater the site visibility.
  - Relate shape of site to surrounding topography and vegetation patterns.. Irregular, undulating site shape is desired.
  - Minimize site "footprint", and area of site disturbance.
  - Utilize buffers of protected existing vegetation to reduce view magnitude of the visible portion of the site. The spacing of buffers will depend on view angle, vegetation height and degree of screening des/red.
  - Maintain vegetation/landform screening between site and viewer.
  - Consider re-use potential (scenic turnouts, re- creation sites) in close-out design of exhausted material sites.
  - Operate lower portions of sit first.
  - Alignment of access roads at intersection of travelways is critical.
  - Transition grade at close out.
  - Relate exposed material to surrounding landforms in Scale, slope and size of material. Wherever possible mimic surrounding landforms at site close-out.

- Special Sites
  - Criteria depends on specific site type.

Table 6.2 identifies general visual characteristics of the five material site type categories.

6.7.3 Disposal Sites

Unsuitable materials (spoils) resulting from clearing operations should be evaluated and stockpiled for reuse in rehabilitation and as screening material, including soil, vegetation (rootstock), rocks, gravels, timbers and root wads.

- General Siting Criteria
  - Minimize number of sites
    1. Utilize larger, least visible sites to place additional spoil.

2. Minimize quantity of spoil where possible.
- Storage of useable 'spoil for rehabilitation
  1. Material sites adjacent to work areas
  2. Adjacent to workpad
- Disposal in exhausted aliquots of ANGTS sites
  1. Utilize mined areas for spoil disposal
- Use existing TAPS or ADOT exhausted material sites and disposal sites
  1. Expand least visible sites if required
  2. Open new, not visible locations

- Site Design Criteria
  - Site configuration must reflect operational requirements of spoil disposal.
  - Reflect natural vegetation and topographic patterns in shaping the configuration of site work limits. Provide irregular edge where possible.
  - Protect and utilize existing topography and/or vegetation buffers to limit visibility of disposal area from roadways.
  - Limit top elevation of spoil piles to general elevation of surrounding topography (natural or human made), and blend the shape with the surrounding topography.
  - Long axis of site should parallel contours.

6.7.4 Access Roads

- General
  - Minimize access points (with Alaska Highway) and other roadways as much as possible.
  - Utilize existing TAPS, highway, and other existing roads for access to ANGTS Project.
- Site Design Criteria
  - Provide "dogleg" in horizontal alignment near intersection with highways and roads in areas with the majority of vegetation higher than three feet tall. Minimize vegetation clearing at these locations while maintaining proper sight distances for safety.
  - Parallel contours where possible.
  - Minimize cut and fill slopes and keep width of clearing to a minimum.
  - Consider re-use potential in design.
  - Use existing vegetation and/or landforms screening.

6.7.5 Pipeline ROW and Workpad

- General Criteria
  - Minimize clearing width of ROW consistent with construction needs.
  - Parallel contours where possible
  - Utilize topography and/or vegetation to screen views of workpad from public travelways

  - Minimize duration of view of the workpad. Provide offset in ROW alignment on road curves where the ROW and road adjacent to eliminate appearance of extended road tangent
  - At highway crossings consider the existing pedestrian use patterns and the potential for the crossing to become an attraction itself. Consider the architecture of the crossing and potential future facilities for visitors to view the crossing area.
  - Maintain vegetation buffer between ordinary high water and staging area, with a minimum 30-foot setback. Consult with Alaska Department of Fish and Game (ADFG) policies for establishing riparian buffers.
  - Provide areas adjacent to ROW for storage of organics.
  - Provide "feathered" or undulated edge in clearing of ROW in highly visible locations while not increasing clearing width.

- Pipeline River Crossings - Evaluate on site-specific basis.
  - Locate staging areas in least visible portion of ROW. Configuration and location must reflect operational requirements.
  - Provide buffer at edge of river or stream to limit visibility of staging area and minimize width of clearing on bank of river or stream.
  - Minimize excavation and/or cut slopes at river banks.

- Pipeline Highway and Road Crossings.
  - Evaluate on a site-specific basis.
  - Reduce standard workpad width at intersection with highways and roads.
  - Reduce standard clearing width at intersection with highways and roads.
  - Minimize width of clearing required for bypass road.
  - Protect and retain vegetation between roadway and bypass road during construction.
  - Eliminate workpad where possible, at intersection with highways and roads.

- Compressor stations
  - Evaluate on a site-specific basis
  - Minimize clearing for station pad and associated temporary facilities.
  - Locate permanent facilities in least visible portion of site.
  - Blend permanent facilities in size, scale, color, and height with adjacent topography and vegetation.
  - Match relative height of permanent facilities to adjacent topography.
  - Minimize clearing for temporary camp facility at compressor station.
  - Consider visual form of facility massing to reduce visual contrast.
  - Utilize topography and/or vegetation to screen and blend the facility.
  - Utilize existing topography and landforms in pad configuration and layout of facilities.
  - Design consideration should occur on access road, entry structures, security fencing and facility graphics.

- Remote Valves and Metering Stations
  - Evaluate on site-specific basis.
  - Locate in non-visible or least visible parts of ROW, consistent with pipeline flow needs.

- Utilize topography and or vegetation to screen and blend facility.
- Design consideration should occur for access roads, entry structures and security fencing.

- Temporary Facilities

- Storage Yards
  - Utilize existing cleared areas and exhausted material sites for storage
  - Minimize clearing and disturbance
  - Utilize existing topography and landforms to shape site boundaries
  - Orient long axis of site parallel to contours
  - If visible, locate site so it is viewed from one direction only
  - Locate site as close as possible to level with viewer positions
  - Consider future use potential in design
  - Utilize existing topography and/or vegetation buffers to screen or blend site

- Camps
  - Construct temporary camp facilities in least visible portion of cleared area
  - Consider future use in design.
  - Minimize clearing end size of disturbance.
  - Reflect surrounding landforms and vegetation patterns in site layout.
  - Utilize existing topography and vegetation to screen and blend site from roadway.
  - Blend temporary camp facilities in size, scale, color, and height with adjacent topography and vegetation.

6.7.6 Exterior Color Selection Guidelines

A coating, paint, or stain modifies the color of a surface by modifying the way that it reflects incident light. The color of the light that is reflected from a surface is called "object color" and has three types of characteristics:

- Reflectance, value, or lightness is the attribute by which the surface reflects more or less of the incident light and is often expressed as a percentage figure.
- Hue, is the attribute that permits a surface to be classified as red, yellow, green, blue, or an intermediate shade between these; it often refers to that portion of the visible spectrum to which the reflected light appears to correspond.
- Saturation, is the chromatic purity of a color; reflected colors that correspond closely to a single hue in the visible spectrum are said to be highly saturated; color mixtures such as brown or gray have low saturation.

Our basic strategies for reducing the visual impact of pipeline facilities, including buildings, are to keep them out of view or to reduce their contrast with the surrounding environment. From this standpoint, reflectance is the most important aspect of color selection.

In general, it is difficult to distinguish an object if its reflectance is less than 1.5 times that of its surrounding environment. The average reflectance of the environment is about 18% (the reflectance of a photographer's "gray card"). Therefore, reflectance should not exceed 27% for colors chosen to minimize visual contrast.

Hues of surface colors can also be chosen to minimize contrast. Several hues are usually present in the natural environment along the pipeline corridor: browns and deep greens in forested settings; greens, browns, reds and tans in tundra setting; bright yellow-greens are characteristic of non-native grasses and often contrast sharp with surrounding vegetation. The saturation of natural colors is usually low.

If reflectance is controlled, hue and saturation are less important and can be manipulated to improve the appearance of facilities for workers end visitors who will see them at close range. Nevertheless, earth tones (red-browns), dark greens, and grays are .the most likely to blend with the pipeline environment.

6.7.7 Exterior Lighting Considerations

The primary visual resource consideration for the use of exterior lighting is to not use excessive light sources that distract from the natural lighting. Consider having the lights directed away from roadways.