A Guide to Visual Design for the Muskwa-Kechika Management Area

Information and Guidelines for the Oil and Gas Sector

Integrated Land Management Bureau

January 2007

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1.0 INTRODUCTION

This guide is intended to be a non-technical document describing the use of visual design in maintaining the visual quality and wilderness characteristics for the *Muskwa-Kechika Management Area (M-KMA).* The management intent of the M-KMA is to "ensure wilderness characteristics, wildlife and its habitat are maintained over time while allowing resource development and use". As well, the long-term objective is to return the lands to their natural state as promptly as possible upon completion of the development.

Visual characteristics are an important measure of wilderness and should be used as a driver for selection and design of resource development activities.

These guidelines were developed for use by those planning for visual management including oil and gas industry planners, consultants, OGC staff, and ILMB staff.

This guide is divided into 3 sections:

- An overview of visual landscape management concepts;
- The methodology of developing a visual impact assessment; and
- Best management practices to address visual values.

2.0 VISUAL LANDSCAPE MANAGEMENT

Visual landscape management is the identification, assessment, design, and manipulation of the visual features or values of a landscape.

In British Columbia visual landscape management was originally developed by the Ministry of Forests to identify visual resources on public lands and to provide a process for their management.

Although within the M-KMA the oil and gas industry may be working outside of the provincial forest and the industry may operate on a focused portion of the landscape the same concepts of managing for visual resources still apply.

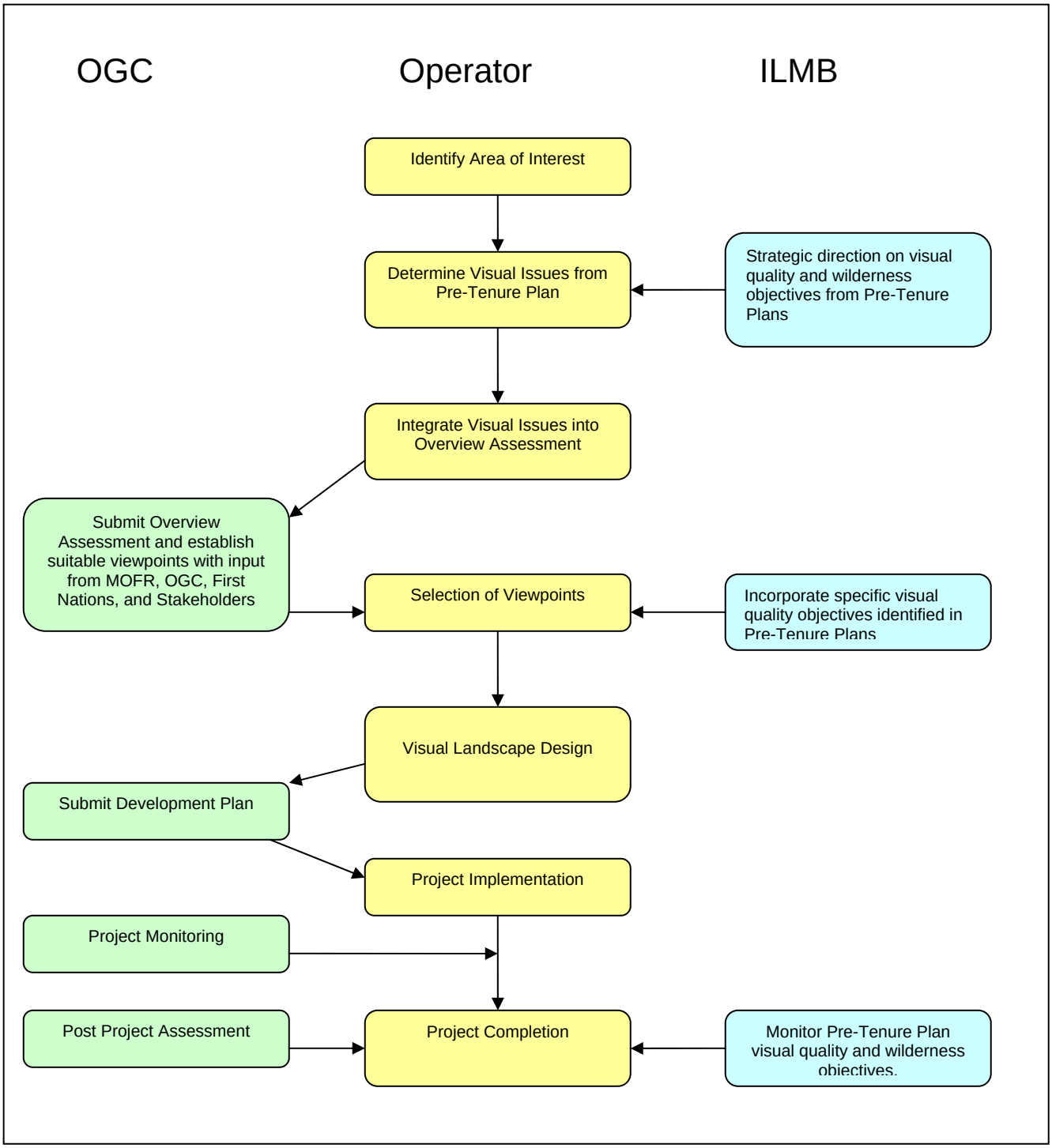
Table 1 – Comparison of Forestry and Oil and Gas Applications

Issue	Forestry Applications	Oil and Gas Applications
Scale of Openings	Small, medium and large ranging from 1 to more than 50 ha	Drill sites normally 1- 2 ha
Corridors	Roads	Roads ,seismic lines and pipelines
Vegetation disturbed	Mature and older mature coniferous and deciduous forest	Variable - from alpine to mature forest
Development season	All seasons	All seasons
Vegetation recovery	Visually effective green-up of forest cover	Dependant on vegetation cover, construction method and season of development.
Operating areas	Provincial Forest	Potentially any crown land except Parks and Protected areas.
Length of operation	Weeks to months for harvesting; years until green-up.	Weeks to years. Longer durations occur if a discovery is made

In BC resource inventories are the responsibility of government. To facilitate visual management the BC Ministry of Forests (MOFR) has conducted visual inventories, including the selection of viewpoints, for much of the Provincial Forest in British Columbia. Much of the oil and gas sector operates outside of areas where inventories have not occurred. In these cases the industry will be required to identify the necessary viewpoints.

Figure 1 shows the proposed visual approval process for the oil and gas sector.

Figure 1 – Visual Approval Process



2.1 Identify Area of Interest

The area of interest is of course driven by the requirements of the project proponent. Normally this will include the proposed drill sites and identification of access corridors to the proposed drill sites.

2.2 Determine Visual Issues

Once the area of interest has been identified the appropriate pre-tenure plan (PTP) must be referred to. Each PTP requires visual impact assessments as part of the development plan process.

In addition the project proponent will need to review the PTP to determine if specific visual issues were identified in the PTP. These visual issues may include visual impacts along major rivers, existing trails and other specific features.

2.3 Overview Assessment

An overview assessment is required to provide background on the project area and will be reviewed by the Oil and Gas Commission (OGC). The overview assessment will include:

- Identification of the visual issues within the area of interest.
- A summary of all of the proposed assessments required including visual impact assessments.
- Review and comment by OGC.

2.4 Selection of Viewpoints

The proponent first needs to determine if viewpoints have already been identified for the proposed area.

If this is in a Provincial Forest then the BC Ministry of Forests may have conducted a visual landscape inventory and their visual quality objectives or visual sensitivity class. If either of these have been identified then the viewpoints identified through this inventory process may be suitable.

Recreation Inventory staff develop, co-ordinate, and maintain an inventory of the Provincial recreation resources including visual landscapes, recreation features, recreation opportunities, and recreation viewpoints.

Here you can view and download Recreation Resource Inventory and related data for any Forest District in British Columbia.

http://srmapps.gov.bc.ca/apps/rec/

The reader should be cautioned that all available visual data has yet to be added to the preceding website and that data which has been posted may be out of date.

Scenic areas are any visually sensitive area or scenic landscape identified through a visual landscape inventory.

Visual quality objectives are either established by the MOFR district manager or are identified in a higher level plan such as an LRMP. These objectives reflect the desired level of visual quality based on the physical characteristics of terrain and vegetative cover and social concern for the area.

In the Fort Nelson, Mackenzie and former Fort St. John (now part of Peace) forest districts, a total of 133 scenic areas have been recommended in LRMPs. As of June 2004, 61 of these areas had been mapped and made known under the Forest Practices Code, 31 had not been mapped yet, and the remaining 41 areas (all in the Mackenzie District) had been mapped but not officially made known.

In addition to the 61 known scenic areas recommended by the LRMPS, the districts had previously made known an additional 38 scenic areas for a grand total of 99 known scenic areas. As of June 2004, only 4 of the known scenic areas had established VQOs in place. The rest were managed under non-legally binding recommended visual quality classes.

However, with the *Forest and Range Practices Act* that came into force in December 2004, any scenic areas that were in place and known prior to October 24, 2002 have been grand parented with de facto objectives, be they established VQOs or default objectives set by government. Consequently, as of June 2005, all of the 99 currently known scenic areas have visual quality objectives in place.

Areas Without Viewpoints

If the area of interest does not as yet have identified viewpoints then the project proponent will need to propose suitable viewpoints. Proposed viewpoints should be selected on the basis of:

- Requirements of the PTP;
- Current use in the vicinity of the project area; and
- Other values being managed in the vicinity of the project area (e.g. parks and protected areas).

The selection of viewpoints will require consultation with government agencies, First Nations and stakeholders. Existing map products, aerial photos, orthophotos and satellite imagery can be used to help select appropriate viewpoints.

2.5 Visual Landscape Design

Once viewpoints have been identified the proponent will be required to conduct a visual impact assessment. This assessment is based upon visual landscape design and is one of the most important visual tools for the oil and gas industry.

Visual landscape design is a creative process that works with patterns and the existing terrain features with the primary intent being to minimize (or reduce) imposing manmade unnatural shapes on the landscape. It is not expected that the visual objectives are to be met from an infinite number of viewpoints but should be met from all key ones.

Good visual design will minimize unnatural characteristics including:

- Right angles;
- Straight edges cutting at or near right angles to the contour;
- Opening edges following contours;
- Minimizing visual contrast between the existing landscape and infrastructure;
- Parallel sided shapes;
- Symmetrical shapes; and
- Long, straight lines.

In topography with minimal relief, openings may be well screened by the existing vegetation and only seen from their interior. As the terrain becomes steeper or the height of the existing vegetation lessens the opening will be more visible form the selected viewpoint. The more diverse the terrain and the vegetation the easier it will be to develop a design that works.

A detailed explanation of visual landscape design is provided in Section 3.0 of this document.

Development Plan

Upon completion of the visual landscape design and visual impact assessment the development plan will be submitted to OGC for review and approval.

2.6 Monitoring

Monitoring provides an opportunity to assess the impact of the actual development against the projection in the visual landscape design. During this phase oblique photographs will indicate whether the planning targets, as identified in the visual simulation, were achieved. When necessary and practical, development plan amendments can be made to ensure the visual quality objectives are being achieved.

2.7 Post Development Assessments

It is anticipated that upon completion of the project the OGC will conduct a post project assessment. This assessment will compare the proposed visuals as identified in the approved development plan to what was achieved on-site.

The Integrated Land Management Bureau will also undertake post development assessments as part of the Pre-Tenure Plan implementation and monitoring process. These assessments will evaluate the effectiveness of completed projects in achieving the visual quality and wilderness objectives of the Pre-Tenure Plans.

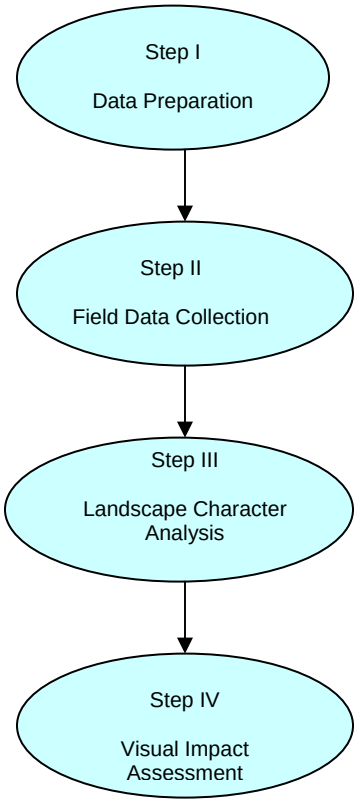
3.0 VISUAL LANDSCAPE DESIGN – METHODOLOGY

When the Ministry of Forests first considered the management of visual resources in the provincial forest in the 1980's techniques included the use of panoramic photographs, artistic renderings, video and digital wire frame draping.

Today sophisticated computer-based imaging software allows development proponents to see what proposed developments may look like and to change proposals to minimize visual impacts. This software provides photo realistic images for both landscape analysis and public display.

Figure 2 below shows the four major steps in conducting visual landscape design.

Figure 2 – Visual Design Steps



3.1 Data Preparation

In BC there already exists a wealth of digital data that can form the basis for developing a visual landscape design.

Digital Terrain Models

The province of British Columbia has developed a series of Terrain Resource Information Management (TRIM) data files for the 7,027 mapsheets in the province. These TRIM maps contain 20 metre contour intervals, and planimetric detail such as roads, lakes, rivers and creeks.

These digital files are used to develop three dimensional terrain models (DTM) and form the base upon which additional information can be added.

Digital Forest Cover

The province of British Columbia has also developed a data base which includes tree species composition and average stand height for the entire province.

These files also contain planimetric detail including roads, lakes, rivers and creeks. This vegetative layer is then draped over the DTM to produce a digital representation of terrain and vegetation.

Preliminary Locations of Infrastructure

After the terrain and forest cover data are merged then the preliminary proposed locations of roads, seismic lines, for pipeline rights-of-way and drill sites can be added to the digital model.

(See Figure 1a in Appendix I)

3.2 Field Data Collection

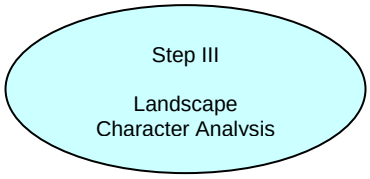
Although computer rendering will provide a detailed approximation of the terrain, vegetation and proposed development, there are often inadequacies or anomalies in the data.

Photographs from the selected viewpoints will be invaluable tools when developing the visual design. These photographs should be stitched together to provide a panorama that will replicate panoramas generated through visual simulations.

Site photographs also provide a level of confidence for the viewer especially for the public that the computer rendering is a reasonable representation of the proposed development.

Photos should be at the same scale as the computer rendering but also offer a range of shadows, daylight and possibly seasonal change. A range of photos are particularly valuable if there is a need for development options.

3.3 Landscape Character Analysis



Where large openings are created on the landscape, character analysis is an important tool to determine how to modify the opening in order to blend it in with the natural character of the landscape. Since the oil and gas industry does not normally create large, single openings it is anticipated that landscape character analysis will not normally be required.

In order to maintain visual quality in M-KMA the ideal solution is to hide proposed development using the local landforms and timber types. However, this may not always be possible and the strategy will then be to blend into the surrounding environment. In this case landscape character analysis may be considered.

Landscape character is composed of landforms and the features which occur within those landforms. Analysis provides us with a better understanding of the landscape. Landscape character analysis has been developed to ensure that large developments blend in to the surrounding terrain and vegetative matrix.

Landscape character analysis consists of two analysis subsets:

- Landform analysis; and
- Land feature analysis.

Landform Analysis

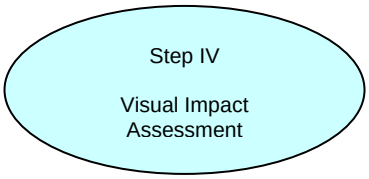
Interpreting the digital terrain model, in conjunction with the oblique site photos a series of flow lines are mapped onto the landscape. These “lines of force” are an attempt to interpret human’s view landscapes. In general the human eye tends to follow ridges from upper elevations to lower elevations and follow draws and valleys from low points to high points.

This analysis identifies ridges and hollows where the strength of the visual “pull” is related to the intensity of the ridge or hollow. These ridges and hollows are identified within both plan and perspective view as lines of force with red arrows identifying ridges and green arrows identifying hollows. Varying widths of these lines of force indicate their relative “pull”. The lines of force are used to guide the creation of discrete units that appear as natural as possible.

After identifying and mapping these lines of force on the terrain future developments can be amended so that they work with these lines of force. This might include organic shapes or the movement to a different site not as readily noted by the eye.

This process is explained in detail in *"Visual Landscape Training Manual"* published by BC Ministry of Forests in 1994.

3.4 Visual Impact Assessment



Visual impact assessments (VIA) were originally developed by the MOFR. A visual impact assessment simulates, in perspective view, the visual effects on the landscape of proposed development. The MOFR process requires the completion of a detailed VIA form upon which is noted the type of camera lens used, the level of current visual disturbance, the proposed level of disturbance and the visual quality objective for the specific landscape.

A VIA report is a requirement for all Pre-Tenure Planning areas in the M-KMA and will consist of:

1. Pre-operations colour photograph(s) from important viewpoints
2. Visual simulations showing:
    - Visible areas as seen from viewpoints.
    - Existing developments, if any.
    - Proposed new developments
    - Alternate scenarios
3. Visual simulation product showing revegetation into the future until the disturbed site achieves the pre-existing "wilderness character" as required in the M-KMA Act.

Visual Simulations

Visual simulations have become the standard for visual landscape design in BC. They are extremely useful in their ability to predict visual impact and can also predict vegetation development over an entire rotation period.

Visual simulation offers planners the ability to make major or subtle changes to proposed development in order to meet the visual needs of the site. If the initial proposed location of infrastructure does not meet the proposed visual goal then modifications can be considered using the visual simulations. Simulations will also allow operators to evaluate adjustments to proposed development locations or changing the size and shape of the developments to better blend in with the landscape character including meeting visual needs through the appropriate use of colour on structures.

Visual simulations are used in visual design to show oblique views of the development area from the accepted viewpoints. A series of iterations may be required between plan view and oblique view to minimize impact.

The simulation software now available is able to populate scenes with vegetative cover matching trees species and species mixes that will accurately portray real scenes on the ground.

Aerial photography, orthophotos and satellite imagery can be used to confirm and modify the vegetative cover generated by the software to more closely reflect real life situations.

The MOFR Visual Impact Assessment Guidebook can be found at:

http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/visual/httoc.htm#cont

Appendix I of this report provides samples of visual simulation products.

4.0 BEST MANAGEMENT PRACTICES FOR VISUALS

For the purposes of this guidebook best management practices (BMP) are known techniques used to minimize visual impact. BMPs are not intended to be minimum standards but are intended to be cost effective means to address visual impacts while balancing other values.

BMPs should be adapted to meet the needs of the site specific situation and should be selected in consideration of:

- Effectiveness
- Cost
- Resource protection
- Other values being managed
- Site maintenance
- Monitoring

BMP #1: Reduce the Visual Impact of Corridors
Goal/Issue #1A: Minimize the visibility of road, pipeline corridors by taking advantage of the inherent terrain.
Solutions: • Consider the restoration objectives in the design of developments. Adequate consideration of restoration prior to construction will minimize restoration costs. • Locate road and pipeline corridors to make as much use of landform as possible taking advantage of non-visible areas, hollows, benches, and vegetative screening. • Locate switchback roads on benches or in hollows to minimize road excavation. • Avoid locating roads and pipeline corridors that follow the viewers' line of sight on gentle foreground slopes; they should curve away or cross at another angle. • Locate corridors along the base of slopes. • Consider heliportable techniques to reduce road construction and disturbance in sensitive areas. • Construct winter roads along the edge of swamp and scrub complexes to minimize cutting of corridors in treed areas. This footprint will disappear in the summer. • Construct snow or ice fill roads with minimal clearing widths. • Consider boring pipeline through slopes and across streams if cost-effective

BMP #1: Reduce the Visual Impact of Corridors

Goal/Issue #1B: Where the terrain will not allow for the complete hiding of the corridor design the corridor to be less obtrusive.

Solutions:

- Curve the corridor across the landscape.
- Vary the width and character of the corridor.
- Feather opening edges to reduce the sharp contrasting line between opening boundary and vegetation edge.
- Change direction of corridors to provide visual variety.
- Retain clumps or groups of trees along road corridors.

BMP #1: Reduce the Visual Impact of Corridors

Goal/Issue #1C: Use construction techniques to minimize visual impact of corridors.

Solution:

- Reduce the size of cut-and-fill slopes to decrease contrast between a road and the landscape.
- Use techniques such as end-hauling to mitigate the visual effects of road construction on steep, visually sensitive slopes.
- Winter construction and drilling where timber is not removed minimizes impact to soils and vegetation. This will result in a more rapid revegetation of the site.
- Use heliportible techniques.

BMP #1: Reduce the Visual Impact of Corridors

Goal/Issue #1D: Use Vegetation to Minimize Visual Impact of Corridors

Solutions:

- Leave healthy, undamaged and windfirm trees and mature shrub cover in well-designed clumps or in sufficient densities to reduce the apparent length of corridors.
- Rapid re-establishment of vegetation will reduce the contrast of exposed soils against native vegetation
- Remove damaged, leaning, or poor-quality, residual trees in foreground views to avoid a scruffy appearance.
- Winter construction and drilling where timber is not removed minimizes impact to soils and vegetation. This will result in a more rapid revegetation of the site.
- Hydro-seed exposed mineral soil created by road construction or modification to reduce visual impacts. (Use native seed or short lived domestics to ensure the establishment of native vegetation are not impeded.)
- Plant native shrubs and trees to speed up site recovery.

4.1 Drill Sites

Typical drill site area is 1.44 ha. This size was determined by minimum safety distances. Using irregular shapes and still meeting minimum safety requirements means that drill sites will approach 2.0 ha in size. In the M-KMA operators will need to consider the visual impacts of drill sites at the planning stage. The minimizing of soil and vegetative disturbance will make the sites less discernable immediately after use, and allow sites to recover more promptly. Operators should also consider post-drilling activities including what on-site structures and area is needed for production and safety.

BMP #2: Reduce the Visual Impact of Drill Sites
Goals/Issues #2A: Design Drill Sites to be Less Visually Obtrusive
Solutions: • Design the shape of drill sites to reflect the nature of those shapes found in the adjacent natural landscape. Irregular shapes are generally more compatible with the natural landscape than geometric shapes. • Avoid jagged edges, right angles, and straight lines when designing opening boundaries. • Feather opening edges to reduce the sharp contrasting line between opening boundary and vegetation edge. • Site location can be amended to make site less visible. • Avoid drill sites along ridge tops. • Avoid drill sites on steep slopes. • Minimize the size while trying to meet the visual objectives. • Locate development facilities at the base of slopes. • Move facilities back from roads, river, and trails to reduce their apparent size. • Avoid locating sites near permanent features such as peaks. • Use natural features such as topography and vegetation as screening • Locating multiple drill sites on the same site will reduce roads, total site area and surface disturbance.

BMP #2: Reduce the Visual Impact of Drill Sites

Goals/Issues #2B: Use Construction Techniques to Minimize Visual Impact of Drill Sites

Solutions:

- Berming and landscaping can decrease the visual impacts that result from contrasts in colour, line, texture of newly disturbed sites.
- Reduce the size of cut-and-fill slopes to decrease contrast between a road and the landscape.
- Reshape cuts and fills to minimize erosion and encourage re-vegetation.
- Re-contouring may require lesser grade to assist in re-vegetation.
- Schedule development for winter to reduce disturbance to existing vegetation.
- Reduce the amount of bare soil that is exposed and that will require reseeding and planting.
- Minimize soil removal.
- Consider that drill sites on steep slopes will be more noticeable when vegetation is removed than on less steep slopes.

BMP #2: Reduce the Visual Impact of Drill Sites

Goal/Issue #2C: Use Vegetation to Minimize Visual Impact of Drill Sites

Solutions:

- Screening drill sites using topography and natural vegetation can lessen the cost of post development visual mitigation.
- Leave healthy, undamaged and windfirm trees and mature shrub cover in well-designed clumps or in sufficient densities to reduce the apparent size of drill sites.
- Remove damaged, leaning, or poor-quality, residual trees in foreground views to avoid a scruffy appearance.
- Schedule development for winter to reduce disturbance to existing vegetation.
- Hydro-seed exposed mineral soil created by road construction or modification. (Use native seed or short lived domestics to ensure the establishment of native vegetation are not impeded.)
- Plant native shrubs and trees to speed up site recovery
- Re-vegetation will result in a colour contrast in short term. Using native seed and plants will result in lower contrast.
- Choose natural openings where vegetation disturbance will be minimized.

BMP #2: Reduce the Visual Impact of Drill Sites
Goals/Issues #2D: Modify Structures to be Less Visually Obtrusive
Solutions: • Colour can be the least expensive measure to reduce visual contrast. • Paint as much of the equipment as possible with a uniform non-contrasting colour matched to but slightly darker than the surrounding landscape. • Consider primary season of viewing but avoid painting white. • Don't compromise safety for colour. • Painting needs to include all parts, roof, doors, walls etc. • Use low profile equipment and structures. • Shield lighting on drill rigs and production facilities. • Bury well heads. • Keep drill location free of debris. • Consider transplanting shrubs and trees to screen structures.

4.2 Foreground

Foreground views are of a concern along travel corridors and where topographic relief is minimal. In the M-KMA these travel corridors are access roads and major rivers. Screening developments from view will be an important aspect of maintaining wilderness attributes in the M-KMA.

BMP #3: Reduce Visual Impacts of Foregrounds
Goals/Issues #3A: Reduce visual impact along roadways.
Solutions: • Consider viewscapes from travel in both directions along rivers and roads. • Vegetative screens need an adequate width to function properly • Consider the season in order to determine the vegetation to be retained. Coniferous and deciduous forest cover have different visual screening effects which change seasonally; • Berms can add additional screening where vegetation is insufficient. • Screening may also reduce noise impact.

BMP #3: Reduce Visual Impacts of Foregrounds
Goals/Issues #3B: Reduce visual impact along trails
Solutions: • Lower speed of traveller means that more details will be noted. • Keep site debris away from trail. • Denser vegetation or wider buffers may be required for visuals and sound control.

BMP #3: Reduce Visual Impacts of Foregrounds
Goals/Issues #3C: Reduce visual impact along river ways
Solutions: • River travelers have more contact with surroundings that along roadways. • Many on river are there for the wilderness experience • Nature and depth of screening is dependant upon relief of shore bank and location of the development. • Screening may be impossible in some cases.

4.3 Restoration

Eventually drill sites and corridors will be deactivated as their life expectancy comes to an end. Restoration is an important aspect of maintaining wilderness attributes in the M-KMA.

BMP #4: Restoration of Sites and Corridors
Goals/Issues #4A: Restoration of wilderness attributes
Solutions: • Consider the restoration objectives in the design of developments. Adequate consideration of restoration prior to construction will minimize restoration costs • Re-contour sites to their original slope angle. • Redistribute coarse woody debris through out restored sites. • Hydro seed exposed mineral soil. (Use native seed or short lived domestics to ensure the establishment of native vegetation are not impeded.) • Transplant local vegetation onto restored sites. • Plant native shrub and trees species.

5.0 REFERENCES

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Appendix 1 – Visual Simulations

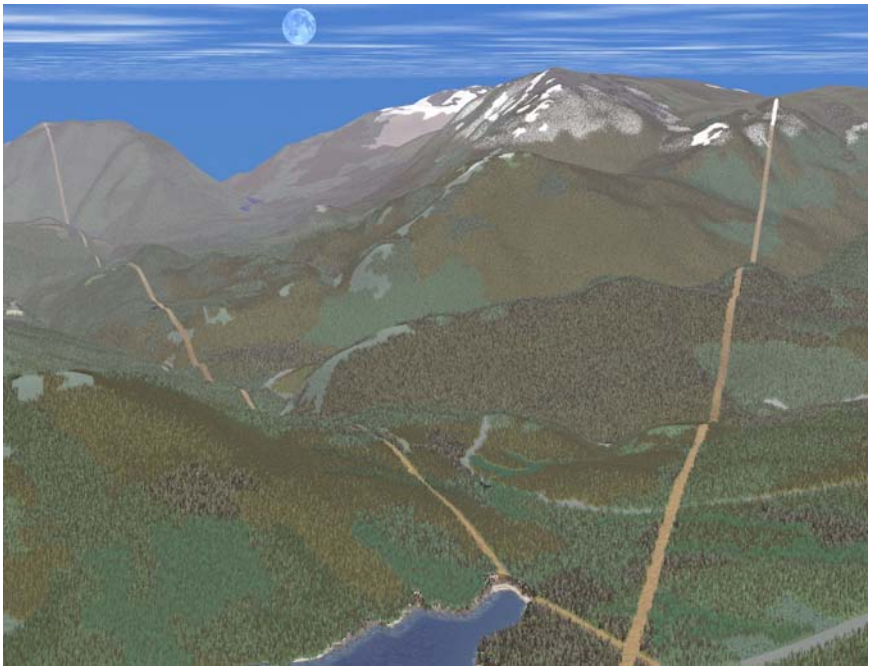


Figure 1a - This computer simulation relies on TRIM data for terrain features and vegetation types and heights from MoF vegetation inventory data. Vegetation colours and texture have been interpreted by the software operator. This is the preliminary development proposal with a right-of-way of 20m width.

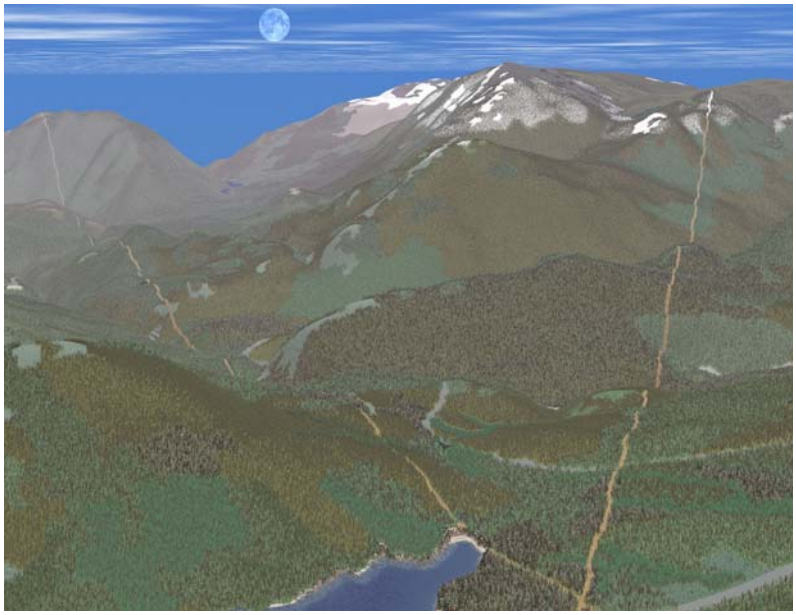


Figure 1b – Based on the results of figure 1a the right-of-way corridors have been reduced to 10m width to try to reduce their visual impact.

Figure 1c – In this visual simulation seismic lines have been set to a width of 2.5m. Note that the seismic line that travels from left to right has almost disappeared while the line directly opposite the viewer is still visible.

Figure 2 – This photo indicates that wandering seismic lines can blend in extremely effectively.

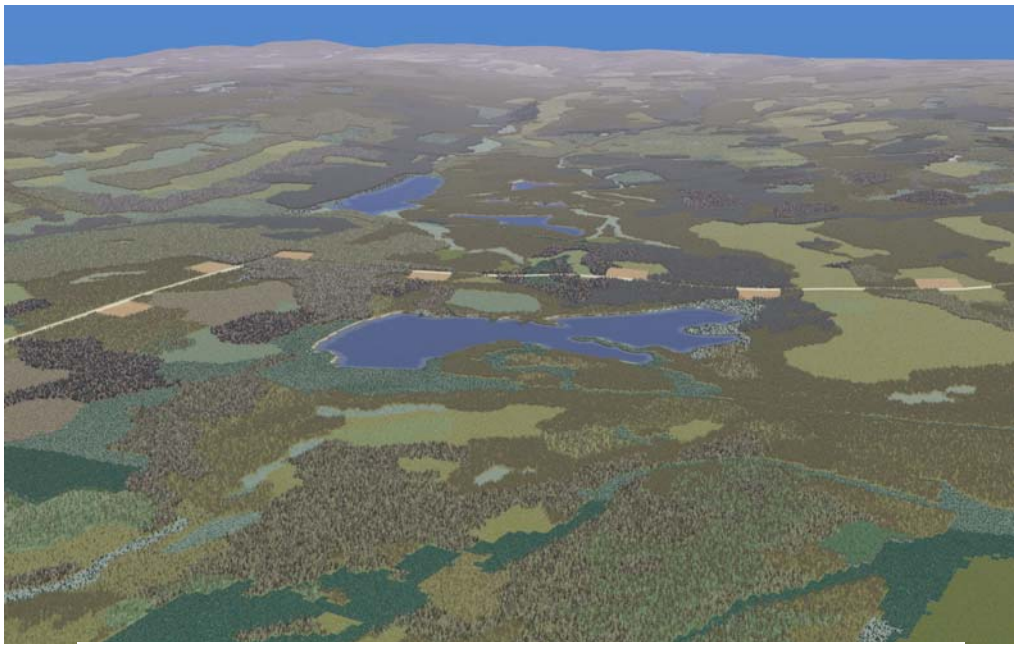


Figure 3a – This initial proposal for drill sites assumed a traditional square shape.

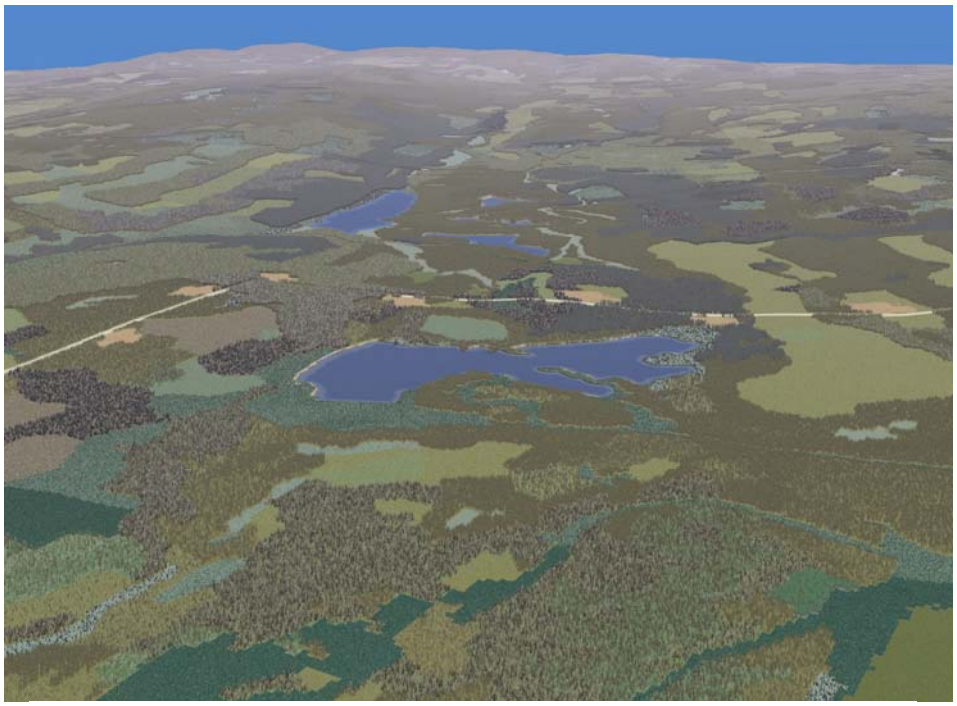


Figure 3b - Drill sites can be modified to more organic shapes consistent with the surrounding terrain and vegetative features.

Figure 4 - Organic shaped drill site compared with traditional square. When organic shapes are used the total area disturbed is normally larger than for square or rectangular sites due to safety requirements.

The road in this image is visually intrusive. Adding screening along the road edge and curving the road will improve these visual attributes.

Appendix II - Resources

Land Information BC, a division within the BC Integrated Land Management Bureau, provides a single window to a diverse set of data and information products and services from across the natural resource sector.
http://www.gov.bc.ca/bvprd/

Land & Resource Data Warehouse Catalogue This catalogue provides a view of all spatial layers currently available in the Land and Resource Data Warehouse. Using this map service you can browse spatial data by subject and get a view of the spatial geometry currently contained in the warehouse.

http://lrdw.ca/

Aerial Photos:

The Integrated Land Management Bureau now offers an *"Air photo Inventory web mapping application".* This application allows any user to identify available aerial photography for a specific area.
http://srmwww.gov.bc.ca/bmgs/airphoto/IMF/Index.htm

TRIM

LandData BC lets you purchase map products (paper and electronic) and air Photos offered by the province of BC. http://www.landdata.gov.bc.ca/

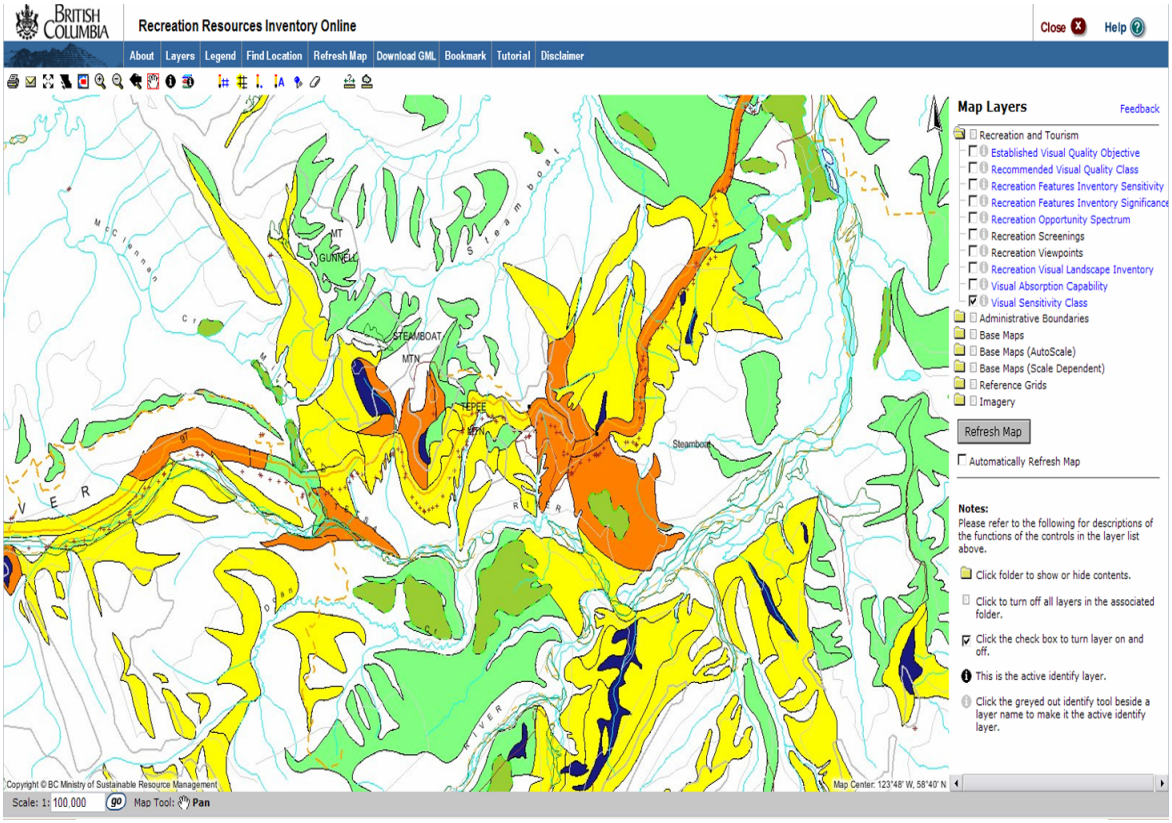
Forest Cover/Vegetation Resource Maps

LandData BC lets you purchase map products (paper and electronic) and air Photos offered by the province of BC. http://www.landdata.gov.bc.ca/

Visual Landscape Inventories

VLI files can be viewed and downloaded for each district directly from Integrated Land Management Bureau web site at the following address:
http://srmapps.gov.bc.ca/apps/rec/

This resource will indicate if the proposed area of interest has been assigned VQOs or VSCs.



This screen shot is from the ILMB recreation website showing visual sensitivity classes near Steamboat Creek along the Alaska Highway.

Appendix III – Visual Design By The Oil and Gas Industry in Other Jurisdictions

In 2003 the Alberta Energy and Utilities Board funded a literature review to identify existing requirements or recommendations regarding visual and psychological impacts of industrial activity. The review indicated that there are very few references specifically applicable to visual impacts of industrial facilities including the oil and gas industry.

Where assessment methodologies for visual impacts were discussed these normally referred to prominence of structures including drill rigs, contrast with the character of the surrounding area, conflict with adjacent land uses and consultations with communities. Mitigation measures often included design measures to reduce contrast with the landscape or buffers to hide the impact.

The LaPlata County, Bureau of Land Management and Evergreen Resources references are the only examples with meaningful visual management implications identified in the Alberta report.

La Plata County Colorado

In October of 2002 La Plata County, Colorado published *"La Plata County Impact Report".* This document was prepared to identify the potential impacts and mitigation procedures for specific resources in anticipation of development of coal bed methane resources.

Potential visual impacts identified included the introduction of solid geometric shapes such as meter houses, pump jacks and storage facilities. Also of concern were the introduction of linear elements such as pipe lines, roads and drill beds which require the clearing of existing vegetation and possible construction on steep slopes.

The report identified two primary approaches to visual mitigation:

Strategically Location of Facilities – locating structures at the base of hills instead of mid-slope and the use terrain to hide corridors.

Post Construction and Operational Measures – Use of low profile equipment and if equipment cannot be entirely hidden then the use of earth tone paint to aid in blending in structures with the surrounding terrain and vegetation.

Bureau of Land Management, New Mexico

In 1987 the Federal Bureau of Land Management (BLM) published a notice (NTL 87-1) regarding the requirement to paint oil field equipment and structures. This was recognized as a means to protect visual resources on Federal and Indian lands within New Mexico, Oklahoma, Texas and Kansas.

Painting of facilities may be required by a BLM authorized officer as a condition for approval for a lease operation based upon a regional or site specific assessment. The notice addressed:

- Structures to remain on-site more than 90 days after the completion of a drill will be painted in a uniform, non contrasting paint;
- Colour selection will be determined by the dominant colour or combination of colours ins a particular landscape;
- The colour will be chosen from local earth or vegetative tones or will appear slightly darker than the surrounding terrain;
- Non-reflective paint will be use; and
- No effort will be made to implement military camouflage techniques.

Evergreen Resources

Evergreen Resources is an operator of oil and gas wells in southern Colorado. In 2001 Evergreen won an award from the Colorado Oil and Gas Conservation Commission, an arm of the Colorado Department of Natural Resources, for visual impact mitigation recognizing their work in visual impact mitigation.

Evergreen utilized ideas provided by landowners to enhance visual appearances including:

- Creative use of landscaping; and
- Decreasing the footprint of drill sites.