

Manual of Aesthetic Design Practice



**BRITISH
COLUMBIA**

Ministry of Transportation

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Visual Resource Management

Visual Resource Management

Introduction

Visual factors are important to highways in two ways:

- the view **from** the road
- the view **toward** the road

The view **from** the road may either be pleasant, or unattractive and monotonous. In both situations the finished product can be improved through visual resource analysis techniques.

The view **toward** the road is often associated with negative reactions from adjacent landusers and the general public. The role of the highway designer is to minimize the negative impact of the road on the physical landscape and on the scenic beauty of that landscape.

Highway engineers must respond to these two issues in order to create a highway which can offer an enjoyable experience to the driver, and at the same time minimize the negative visual impact on the landscape as seen from off the highway.

Aesthetic highway design must therefore continuously manage design alternatives from these two points of view.

Recommended Practices

The following pages outline recommended practices to be applied to all highways in B.C., as summarized below:

1.0 Visual Resource Management techniques as outlined in this document will be applied to all new highway projects in B.C.

2.0 Visual resource inventory will be completed during the corridor and/or alignment selection stage.

3.0 Visual landmarks seen from the potential highway area will be mapped and considered during corridor and/or alignment selection.

4.0 Significant views affected by the proposed highway, and potential viewpoints to be created by the highway, will be mapped and evaluated during corridor and/or alignment selection.

5.0 Assessment of relative visual quality of landscape units will be performed during corridor and/or alignment selection

6.0 Assessments of Visual Absorption Capability for the landscape units will be evaluated during corridor and/or alignment selection.

7.0 Preliminary corridor assessment and alignment selection will include an evaluation of the visual interest provided for the driver.

8.0 Visual Resource Management considerations will be integrated into the highway design process in parallel with other considerations, from the time of project identification through to completion of construction.

1.0 Scope of Visual Resource Management

Visual Resource Management techniques as outlined in this document will be applied to all new highway projects in B.C.

Visual Resource Management recognizes that "the visual environment is a resource; one needful of as much recognition, identification, classification and management as other resources. It is important that it be assessed at all planning levels to include its sensitivity, possible deterioration and/or its capability for recovery from visual impacts generated by development activities." (Yeomans, 1983)

The scope of Visual Resource Management for highway development should include everything that is seen in the view **from** the road, or in the view **toward** the road. This comprehensive scope means that the visual aspects of highways planning extend throughout the highway planning process, from the project identification and corridor selection scales, through geometric alignment, right of way and detail design.

Visual resource management would follow a process of:

- Recognition of **Landscape Type**.
- Mapping of **Landscape Units** - areas of homogeneous visual character.
- Mapping of **Landmarks** - points of visual interest.
- Mapping of **Views** - both existing and potential, fleeting and panoramic.
- Assessment of **Visual Quality** - comparing the relative value of visual features.
- Assessment of **Visual Absorption Capability** - comparing the relative adaptability of various landscapes to absorb visual change.
- Assessment of **Visual Interest (Driver's Experience)** - reviewing the level of variety, interest or monotony presented by the highway to the driver and passengers.
- **Incorporation of Guidelines into Highways Design** - coordinating with other disciplines in the planning process; from concepts for route selection through to detail design and construction.

Note: Visual Resource Management should be performed by a Landscape Architect, or related professional, with training in resource analysis, aesthetics and visual assessment. This expertise should be supplemented with a public participation program to confirm or refine the professional judgments involved.

Refer to Yeomans, Visual Resource Assessment - A User Guide, B.C. Ministry of Environment, 1983 for a complete definition of terms and techniques.



Figure C-1
An attractive view from the road.



Figure C-2
View toward the road.



Figure C-3
The mountains in B.C. present both a spectacular visual opportunity, and a construction challenge.

2.0 Landscapes of British Columbia

Visual resource inventory, including a description of areas of homogeneous visual character, will be completed during corridor and/or alignment selection.

Landscape mapping should be undertaken to identify distinct visual landscapes through which proposed highway corridors will pass. At a general scale the mapping undertaken to identify 'Landscapes for B.C. Parks' by the B.C. Ministry of Parks identifies landscape types which will be visually evident. However each of these landscapes will include areas of different aspect, slope, and vegetation type and additional, more detailed information will be required for highway planning purposes.

Landscape mapping undertaken in greater detail will identify landscape units within each of the landscape types. **Landscape units** are "areas of homogeneous visual character" based on the sum of: landform, land use, vegetative cover, and water cover.

Where these factors have the same qualities and patterns over an area they will create an area of homogeneous visual character. Boundaries between landscape units will typically follow watershed boundaries. There will frequently be several landscape units within a watershed.

A further level of gradation will be appropriate for the analysis of highway corridors. **Landscape subunits** are subtle variations from the general visual character of the landscape unit. These subunits will be the sum of small scale variations in vegetation, topography, or land use which change the visual appearance of the landscape. Landscape subunits will generally be evident at a mapping scale of 1 : 50 000 to 1 : 20 000.

Visual resource mapping will also note the locations of "**edges**" between landscape units. These edges will be evident as areas of pronounced visual change.

The purpose of mapping **landscape units**, **landscape subunits** and their "**edges**" is to summarize in map form the visual character of the landscape. Also, inherent to the mapping of landscape units is that related factors such as wildlife, soils, slope and land ownership will be revealed. As-tute use of this information as applied through the following practices can lead to the creation of cost effective, safer, and more scenic highways.



Figure C-4
Landscape typical of the Cariboo interior.



Figure C-5
Landscape typical of northern B.C.



Figure C-6
Landscape 'edges' can be dramatic. Note the two distinct landscape units in this photograph.



Figure C-7
Landscapes of British Columbia.
B.C. Ministry of Parks (June 1990)

Highway design practices in response to landscape units should:

- Avoid landscape units which have high visual value and sensitivity. For example, a landscape unit with a complex mix of lakes, steep mountainsides and homogeneous coniferous forest will be both beautiful and unforgiving of major highway construction. The ideal location for a highway relating to such a landscape unit would be close to, or overlooking the unit, but not through it. By being close, visual access and secondary road access for recreation could be provided, without excessive impacts on the high value landscape unit.
- Manipulate a road corridor and alignment to cross over landscape unit edges. This technique could increase visual variety and interest, and lead to heightened awareness by drivers of their surroundings.
- Add man-made points of interest where large landscape units might lead to monotony and driver fatigue. Techniques to provide visual interest in an otherwise nondescript setting include:
 - location of rest areas
 - changes in alignment from tangents to curves
 - changes in median cross section
 - special attention to structures like bridges and overpasses
 - vegetation management by leaving treed areas within the right of way or adding plantings.
- Create a roadway which responds to the landscape unit in alignment and cross section details, by use of split level medians or separate one-way alignments.
- Mitigate visual impacts on the landscape unit, by careful selective clearing, leave strips, slope retaining devices, careful grading and revegetation.

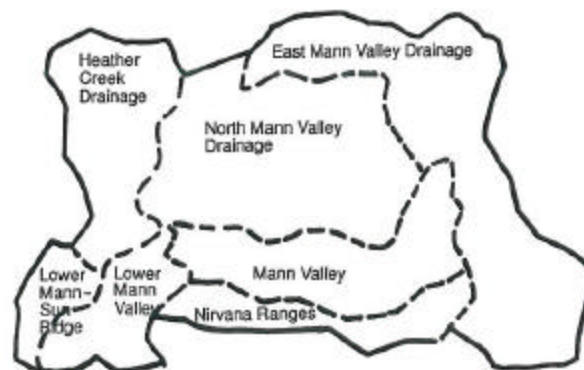


Figure C-8
Sample mapping of landscape units.

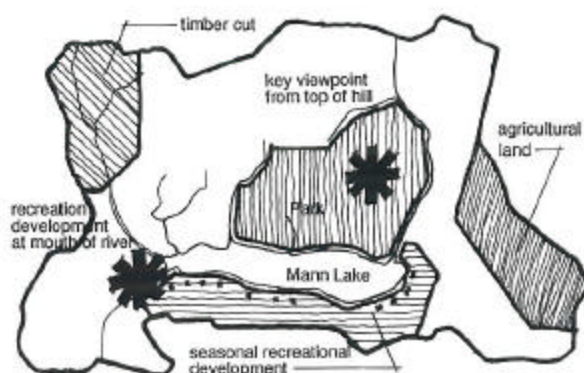


Figure C-9
Typical mapping of visible land use and cultural modifications.



Figure C-10
Aerial view of rural location showing various land use impacts and cultural modifications.

Methods for mapping landscape units include:

- Review other mapping units currently produced. Landscapes for B.C. Parks will be useful in identifying general landscape types. For mapping of smaller units undertake a process to map, first, the components of the visual landscape i.e. landform/topography, vegetation cover, water cover (density and pattern), and land use. Overlay these component maps, and identify areas of homogeneity.
- Field check boundaries of landscape units. A combination of low level flights and ground inspections should be made. Refine the boundaries accordingly.
- Document the character of each landscape unit, both in terms of the characteristics of its landform, vegetation, water cover and land use, but also by typical photographs. Use of video technology to record low level flights and field visit observations is to be encouraged.
- Map landscape units and subunits at a scale and on a base compatible with mapping by other disciplines working on the project.
- Recognize the data generated may have application to other projects, and co-ordinate data collection with the B.C. Ministry of Forests and B.C. Ministry of the Environment standards.

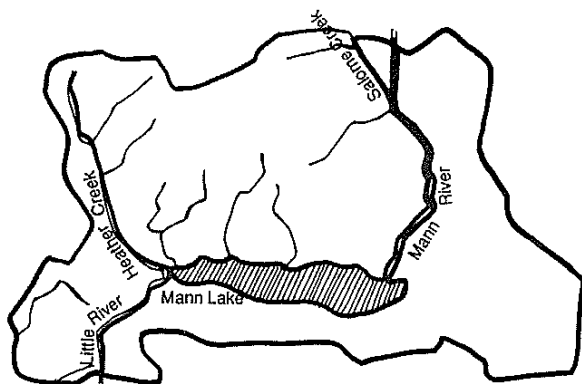


Figure C-11
Sample mapping of water cover.

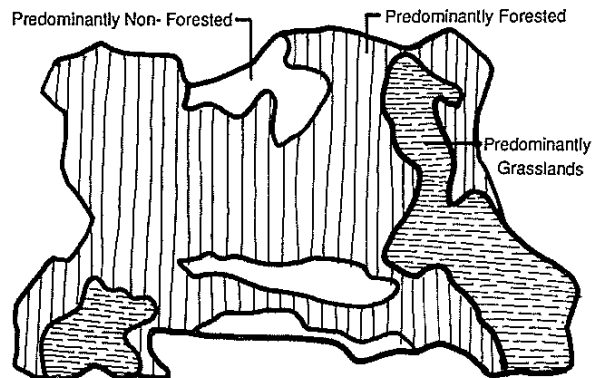


Figure C-12
Typical mapping of vegetation cover.

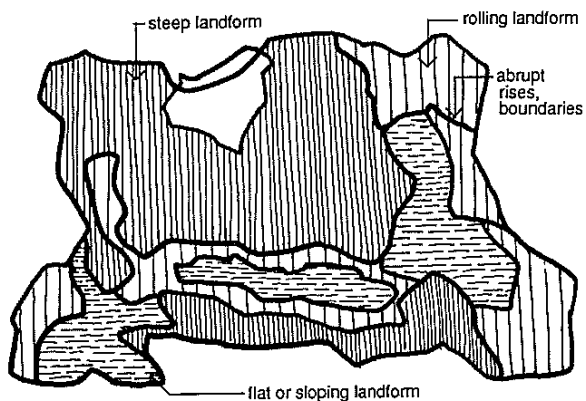


Figure C-13
Mapping of slope class and landforms.

3.0 Landmarks

Visual landmarks seen from the potential highway area will be mapped and considered during corridor and/or alignment selection.

Whereas landscape units represent **areas** of similar visual character, landmarks are **points** of visual interest. Landmarks may be attractive, or may detract from the surrounding landscape.

"Attractor" landmarks include:

- mountain peaks, ridges, or other distinctive landform.
- islands, points, or shoreline features.
- waterfalls or water features.
- ravines, hoodoos, coulees.
- distinctive vegetation or agricultural clearings.
- glaciers, snowcaps.
- man-made structures such as bridges, overpasses, religious centres, historic or architecturally significant buildings, settlements, partly exposed industrial complexes.
- designated points such as parks, recreation areas, viewpoints, and rest areas.

"Detractor" landmarks include:

- fully exposed open pit mines and quarries.
- forest clearcuts.
- fully exposed industrial complexes.
- junk yards.
- commercial businesses parking and yard operations.
- garbage dumps.



Figure C-14
Typical 'attractor' landmark.



Figure C-15
Typical 'detractor' landmark.

Design practices in response to landmarks should:

- Avoid highway alignments which obscure or come so close to attractor landmarks as to hinder their use and enjoyment. Avoid highway alignments which focus tangents or long curves on detractor landmarks.
- Manipulate highway alignments to focus tangents on attractor landmarks, for visual interest.
- Create landmarks in areas otherwise visually nondescript. Major highway structures such as bridges, overpasses, rest areas, etc. could all be attractor landmarks with careful design.
- Mitigate negative impacts on existing landmarks, by attention to detail highway alignment, vegetation or earthform buffers, or relocation/compensation for the landmark.

Methods for mapping of landmarks include:

- Field reconnaissance by the analyst is essential to identify landmarks. **Note: visual landmarks such as mountain peaks or islands may be well outside the study area used by other disciplines, but may still be very significant to the driver's experience of the highway.**
- Use of video technology for recording field observations on the ground and in low level flights would be useful.
- Solicit public input at meetings, to identify landmarks which might be known only to the local population, but which potentially could be quite significant.
- Map landmarks within the study area at the same scale as landscape units. Note that a map at a more broad scale may be required to identify significant landmarks outside the study area. Computer based mapping of these landmarks would be an asset, to allow easy transfer of scale when considering alignment alternatives and their relationship to distant landmarks.

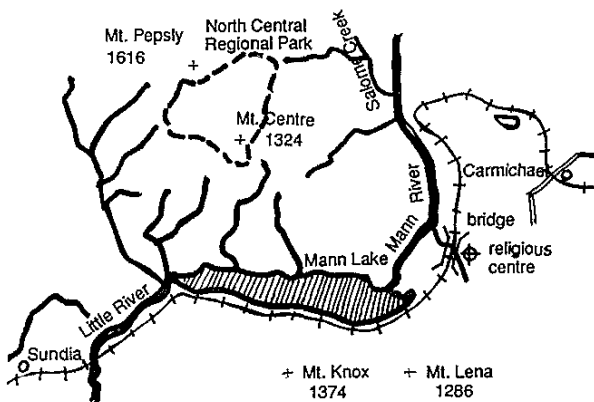


Figure C-16
Typical landmark map.

4.0 Views

Significant views affected by the proposed highway and potential viewpoints to be created by the highway will be mapped and evaluated during corridor and/or alignment selection. Views to be assessed include:

Map the view **toward** the road, from settlements or viewpoints in the surrounding landscape.

Views change depending on whether the road is being viewed from above or below and from what distance.

At preliminary planning stages, it is important for the planners to be aware of existing viewpoints, designated or otherwise, valued by the public. The future road could affect the views from:

- towns, villages, and rural residences
- tourist developments, including rest areas along existing roadways or proposed for the road being designed
- circulation routes - parks, trails, existing roadways, ferries, railways, or from other points along the road being designed
- recreational areas - ocean, lakes or rivers

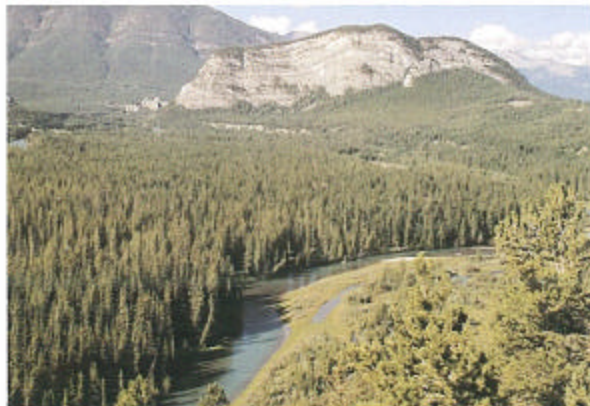


Figure C-17

A highway directly in front of this viewpoint would create a major visual impact.

Design practices in response to views **toward** the road should:

- Avoid traversing a significant viewshed. If the area must be crossed, look for a route which is least visible or of minimum detrimental affect. Generally, keep the alignment away from the viewpoint, in the background of the viewed area.
- Manipulate highway alignment to those landscape units with high visual absorption capability.
- Create a new, designated viewpoint, if the existing viewpoint will be made obsolete by the highway.
- Mitigate the effects of the highway on existing views by detailed alignment, buffer vegetation, plantings and earthform, and careful attention to colour and placement of retaining structures and revegetation.



Figure C-18

Note how the cut slope on the distant slope is distracting.

Map the view **from** the road, which determines the driver's experience. Views from the road cannot be known in detail until the alignment of the road is chosen. However, at the preliminary planning stages, potential views or viewpoints which might be accessed by the highway should be mapped. These views might occur:

- from hillsides
- from valley rims and localized breaks in grade
- at mountain passes
- at shorelines
- at the edges of agricultural and forest clearings
- from the valley floor to landmarks on the valley wall or horizon.

Design practices which respond to these potential views should:

- Adjust an alignment to focus a tangent on a landmark or view.
- Adjust an alignment to a hillside bench or valley rim to provide a view of the landscape below.
- Provide pullouts, rest areas, or access by secondary road to existing and potential viewpoint areas.
- Route the highway to the edge of a clearing or shoreline picking the side with best view potential.
- Selectively clear existing vegetation to open a view or vista.
- Screen an unpleasant view.



Figure C-19
Typical attractive view from the road.

Methods of designing views include:

- Video imagery can be used to record views in the field, taken from ground or low level flight reconnaissance. Computer software manipulates video images to superimpose changes.
- Public meetings will provide information about locally significant views.
- Computer software can create a map and perspective model of views seen from a given point.
- Map viewpoints and viewshed of existing and potential views at the same scale as Landscape Units.
- Record each major view by photograph and/or video. Use (50mm) camera lens for all photography, as wide angle or telephoto photography will distort the apparent significance of the view.



Figure C-20
Designated viewpoints or pullouts can provide for pleasant and safe appreciation of a view offered by the road.

5.0 Visual Quality Assessment

Assessment of relative visual quality of landscape units will be performed during corridor and/or alignment selection.

Visual Quality is the overall impression retained after driving through, walking through or flying over an area of land.

Some landscape units possess a higher visual quality than others. With the visual quality of landscape units categorized and mapped as high, medium or low, highway engineers and consultants can assess the visual impacts of highway developments by comparing the relative visual quality within different landscape units through which proposed alignments pass.

Note that each individual region in the Province should be acknowledged to have unique scenic attributes. Consequently, for highway design purposes, it is the relative quality among landscape units within a region or watershed which is a primary concern.

Design practices in response to visual quality assessment should:

- Avoid areas of high visual quality.
 - Routing highways through areas of medium visual quality may provide an aesthetic experience with acceptable impacts. At the same time, secondary road access to areas of high visual quality will provide recreation access.
- Create visual interest in areas of low visual quality to enrich the driver's experience.
 - Provide scenic pullouts, viewpoints, rest areas and access to recreational opportunities. Major structures such as bridges and overpasses could be attractor landmarks when carefully designed.
- Screen or avoid unsightly areas.
- Mitigate impacts of highway development on high visual quality areas.
 - Reduce visual impacts in these areas by careful detailed alignment, retaining devices, and detailed vegetation management.

Methods for assessing visual quality include:

- Review the landscape units and subunits mapped earlier.
- Application of a reasoned and supportable rating system. This should be done by a professional Landscape Architect, or related discipline, with expertise in landscape aesthetics. A sample of a numerical rating system is illustrated in Table C-1. This numerical system is a format for a complex value judgement. Assessing the relative visual quality of different landscapes is by nature subjective. Designers should make an initial ranking of high, medium and low visual quality, then confirm and refine this judgement by comparison with the assessments of public representatives. The best visual quality ranking will be developed from consultations with people from different backgrounds.
- Summarize visual quality ratings on a map at the same scale as the landscape unit mapping.
- Record the process and reasoning which led to the visual quality ratings.

Criteria Governing Scenic Quality Rating Procedures						
	Criteria For Determining Scenic Value Scale					
	High	Rating ¹	Moderate	Rating ¹	Low	Rating ¹
Landform	High vertical relief as expressed in prominent cliffs, spires or massive rock outcrops, or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers.	3 to 5	Steep canyons, mesas, buttes; or interesting erosional patterns or variety in size and shape of landform; or detail features present and interesting though not dominant or exceptional.	1 to 3	Low, rolling hills, foothills or flat valley bottoms. Interesting detail landscape features few or lacking.	-2 to 1
Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns.	3 to 5	Some variety of vegetation, but only one or two major types.	1 to 3	Little or no variety or contrast in vegetation.	-2 to 1
Water	Clear and clean appearing, still or cascading white water, any of which are a dominant factor in the landscape.	3 to 5	Flowing, or still, but not dominant in the landscape.	1 to 3	Absent, or present, but not noticeable.	-2 to 1
Colour	Rich colour combinations, variety or vivid colour; or pleasing contrasts in the soil, rock, vegetation, water of snow fields.	3 to 5	Some intensity or variety in colours and contrast of the soil, rock and vegetation, but not a dominant scenic element.	1 to 3	Subtle colour variations, contrast or interest; generally mute tones.	-1 to 1
Adjacent Scenery	Adjacent scenery greatly enhances visual quality.	3 to 5	Adjacent scenery moderately enhances overall visual quality.	1 to 3	Adjacent scenery has little or no influence on overall visual quality.	-2 to 1
Scarcity	One of a kind; or usually memorable, or very rare within a region. Consistent chance for exceptional wildlife or wildflower viewing, etc.	3 to 5	Distinctive, though somewhat similar to others within the region.	1 to 3	Interesting within its setting, but fairly common within the region.	-2 to 1
Cultural Modifications	Free from aesthetically undesirable or discordant sights and influences; or modifications add favorably to visual variety.	3 to 5	Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensive that the scenic qualities are entirely negated or modifications add little or no visual variety to the area.	1 to 2	Modifications are so extensive that scenic qualities are for the most part nullified or substantially reduced.	-3 to 1
¹ Composite Quality Rating Scores A = 21 to 35 points B = 8 to 20 points C = -14 to 7 points Note re timing : Rate for scenic quality under the most critical conditions, i.e. under highest seasonal use.						

Table C-1
Scenic Quality rating criteria.
(After Yeomans, 1983, and USDI Bureau of Land Management, 1980.)

6.0 Visual Absorption Capability

Assessment of visual absorption capability for the landscape units will be completed during corridor and/or alignment selection.

Visual Absorption Capability is defined as the capacity of the landscape to screen proposed development and still retain its inherent character.

The relative Visual Absorption Capability of each landscape unit can be assessed in order to identify those units which could accept highway construction with the least visual change to the landscape. **The higher the Visual Absorption Capability the less visual change will be caused by highway construction.**

Factors which influence Visual Absorption Capability (VAC) include:

- slope** - the steeper the slope, the lower the VAC
- soil stability and erosion potential** - the more erosion or sliding potential, the lower the VAC
- vegetation regeneration potential** - the lower potential for regeneration e.g. talus slopes or desert, the lower the VAC
- vegetation diversity** - the more vegetation diversity, the greater the VAC
- potential soil and vegetation colour contrast** - the greater the contrast, the lower the VAC

Each unit or subunit should be given a Visual Absorption Capability rating of High, Medium or Low.

Planning actions in response to the Visual Absorption Capability ratings should:

- Avoid areas with low VAC ratings. A highway is likely to create a significant scar on these landscapes. A route through medium or high VAC areas will have low visual impacts.
- Mitigate visual impacts when passing through low VAC areas. Design practices in response to visual absorption capacity might include:
 - modification of alignment and cross section to avoid steep slopes.
 - reduction of steepness of side slopes.
 - reduction of area of side slopes by retaining devices.
 - feathering edges of clearings.
 - matching revegetation and rock cut colour to adjacent natural condition.



Figure C-21

In this scene, the valley has a moderate VAC, but VAC is low in the surrounding foothills.



Figure C-22

This subalpine lake and surroundings are low in VAC, primarily because of steep slopes and low vegetation regeneration.

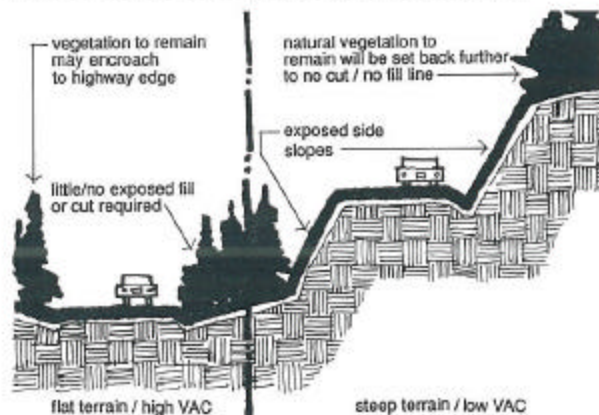


Figure C-23

The steeper the slope, the lower the VAC.

Methods of assigning Visual Absorption Capability ratings include:

- Review landscape units and subunits and identify: degree of slope, soil stability and erosion potential, vegetation regeneration potential, vegetation diversity, and potential soil and vegetation colour contrast.
- Mapping additional landscape subunits if necessary to identify areas which possess homogeneous qualities. Because factors such as vegetation diversity or vegetation/soil colour contrast may be quite localized, the VAC ratings may lead to generation of additional landscape subunits.
- Assigning a VAC rating for each subunit. A formula for use as a guide is $VAC = S \times (E+R+D+C)$, where:

- **S = Slope** - the steeper the slope, the lower the VAC in percent
- **E = Soil stability and erosion potential** - positive factors raise VAC: negative factors lower VAC
- **R = Regeneration potential** - the greater the potential, the higher the VAC
- **D = Vegetation diversity** - the greater the diversity the higher VAC
- **C = Soil and vegetation colour contrast** - the lower the contrast the higher VAC

High VAC = 29-36 points

Moderate VAC = 20 - 28 points

Low VAC = 4-19 points.

- Map VAC ratings in High, Medium and Low categories on maps at the same scale as landscape units.
- Record the assessment process.

FACTOR	CHARACTERISTICS	VAC VALUES	
		VERBAL	NUMERICAL
(S) Slope	Steep: 60%+ Moderately Steep: 30-60% Relatively Flat: 0-30%	Low Mod High	1 (multiplier) 2 (multiplier) 3 (multiplier)
(E) Soil stability and erosion potential	High constraint value derived from high erosion hazard and/or high instability hazard Moderate constraint value derived from erosion hazard and/or instability hazard Low constraint value as above	Low Mod High	1 2 3
(R) Vegetation Regeneration Potential	Low regeneration Moderate regeneration High regeneration	Low Mod High	1 2 3
(D) Vegetation diversity	Non-vegetated, grasslands or brush cover Coniferous, deciduous, cultivated Diversified (mixed open and woodlands)	Low Mod High	1 2 3
(C) Potential soil and vegetation colour contrast	High visual contrast between exposed soil and adjacent vegetation Moderate visual contrast between exposed soil and adjacent vegetation (and all bare, cultivate and diversified vegetation types) Low visual contrast between exposed soil and adjacent vegetation	Low Mod High	1 2 3

Table C-2
Relative importance of VAC factors,(adapted from Blau, *et al.*, 1979)

7.0 Visual Interest: The Driver's Experience

Preliminary corridor assessment and alignment selection will include an evaluation of the visual interest provided for the driver, with a view to avoiding lengths of highway which are both monotonous and unsafe.

Visual analysis techniques for many linear developments are similar. People travelling on highways will react to the aesthetics of the surroundings. This section deals with the view from the road by the driver - the driver's experience.

Engineers, landscape architects, and consultants must step back and imagine the experience of the driver when evaluating alignment alternatives, or detail design of highway components. Will the driver's experience be pleasant, varied and interesting?

Monotony creates unsafe drivers. It is therefore in the interest of safety, as well as aesthetics, that a varied and interesting driving experience be developed. An alert driver is more likely to be a safe driver.

As a general rule highway engineers, and designers, should provide a renewed reason for driver interest at least once every 5 to 10 minutes. These 'points of interest' should be staged to maintain the driver's attention to the surroundings, the road and its navigation. The spacing between points of interest may vary, but should always be sufficiently frequent to avoid boredom and weariness.

Table C-3 outlines an idealized driving experience. Engineers and designers should review alternative alignments, determine if there are areas of potential monotony in the routes, and assess what modifications to the alignment or design could be made to relieve the potential monotony.

Time : Distance Relationship

Design Speed	Distance Required for View	
	Fleeting (0.5sec) minimum	Panoramic (5.0sec) minimum
50 km/hr	6.90 m	69.0 m
60 km/hr	8.25 m	82.5 m
70 km/hr	9.70 m	97.0 m
80 km/hr	11.20 m	112.0 m
90 km/hr	12.50 m	125.0 m
100 km/hr	13.80 m	138.0 m

Table C-3

Driver's Experience Staging Plan

Duration (minutes)		Point of Interest
Actual	Average	
3	5	highway entrance/orientation
10	5	curvilinear alignment
2	5	views to landmarks - mtn. peaks
5	5	tangent - passing opportunity
1 to 5	5	viewpoint pullout
2	5	tangent - scenery changes
10	5	curvilinear alignment
8	5	split level median introduced
3	5	tangent focusing on landmark
1 to 7	5	rest area/viewpoint/scale
10	5	curvilinear alignment
5	5	access to commercial services
—	—	destination or repeat above

60 TO 70 MINUTES TOTAL TIME depending on stops
Note that the distance between points of interest will vary with design speed, see Table C-4.

Table C-4

Time : Distance Relationship

Time: 5 minutes	
Design Speed	Distance
50 km/hr	4.16 km
60 km/hr	5.00 km
70 km/hr	5.83 km
80 km/hr	6.67 km
90 km/hr	7.50 km
100 km/hr	8.33 km
110 km/hr	9.16 km

Table C-5



Figure C-24
Experience 1: curvilinear alignment, varying vegetation setbacks, rounded slopes



Figure C-25
Experience 2: split median, split grade, median vegetation.



Figure C-26
Experience 3: one way curvilinear alignment.



Figure C-27
Experience 4: tangent, focus on landmark.



Figure C-28
Experience 5: viewpoint/information area.



Figure C-29
Experience 6: curvilinear alignment, more open countryside.

Methods of stimulating driver interest could include:

- Varying the alignment style of the road between tangential and curvilinear alignments.
- Changing the cross section of the road, by adding a median, or by creating a split level section.
- Accessing views from the road. These may be appreciated while driving the road, or may be accessed by pullouts or rest areas. This requires careful alignment decisions, and selective vegetation removal.
- Focusing tangents on natural and created landmarks.
- Providing interpretive signage and related rest areas.
- Providing direct access to roadside trails, bikeways, parks, and picnic areas
- Providing roadside rest areas and tourist information centres.
- Providing access to commercial facilities - villages, service stations, tourist attractions and accommodations.
- Careful design of bridges, tunnels and overpasses, and means to stop to appreciate these structures.
- Aligning the road to move into a different landscape unit, thereby creating a change in scenery.
- Manipulating roadside vegetation and planting to create interest - leaving stands of trees in the median, feathering the edges of clearings, or installing accent plantings
- Accent lighting for bridges, tunnel portals, roadside waterfalls.

Methods for Assessing Visual Interest include:

- Review of potential corridor or alignment alternatives.
- Identification of points of interest along each alternative.
- Measuring the distance and determining the time interval at the design speed between such points.
- Identification of sections where the time interval will exceed 5 minutes.
- Assess what refinements or additions could be made to reduce the time interval in those sections.
- Suggestion of other alignment changes or additions which could improve the driver's experience.
- Ranking which alternatives are best in terms of driver's experience.
- Documenting recommendations and mapping points of interest at same scale as alignment alternatives.

8.0 Integration of Guidelines into Highway Design

Visual Resource Management considerations will be integrated into the highway design process in parallel with other considerations, from the time of project identification through to completion of construction.

Visual resource management is only one factor among many to be addressed in highway design. Successful design must balance factors such as highway function, economics, political and cultural jurisdictions, fisheries and wildlife, forestry, and recreation as well as aesthetics. Aesthetic considerations cannot be adequately addressed **after** a highway is designed, but must be incorporated throughout the design process.

Visual Opportunities and Constraints

To allow fair value judgments to be made, it is necessary for visual factors to be presented in a map form which is parallel with that of other factors. It is also necessary to identify at what points in the design process *visual factors are best considered*.

To allow integration with other disciplines, critical visual factors should be summarized in a Visual Opportunities and Constraints Map. This map should highlight those visual factors which would be of most significance to highway designers. These factors might include:

- areas of high visual quality and low visual absorption capability.
- dramatic edges of landscape units.
- attractor landmarks, and potential tangents which would focus on them.
- attractor landmarks which will accommodate recreational use and their access points.
- detractor landmarks, and extent of visual influence.
- significant existing viewsheds, and potential viewpoints.
- significant vegetation changes or clearings, either natural or manmade.

In general, the opportunities and constraints map should summarize those elements which the visual resource analysts suggest are important to the alignment and design of the highway. In complex cases, for purposes of clarity, it may be necessary to create a separate map for constraints, and a separate map for opportunities.

These maps should be to the same scale as the maps

being used for highway planning purposes. The opportunities and constraints maps should be supported by explanatory text, cross referenced to the supporting detailed maps and documents created in previous visual resource management steps outlined herein.

Visual Impact Simulation

Issues may arise during the course of design which would benefit from simulation of visual impacts or opportunities. Computer programs exist to create images which represent fairly the appearance of an alternative. Programs are able to plot a seen area and create a perspective image of major earthworks or clearing activities.

Combining video cameras and software allows a video image to be digitized, and then to have a second video or drawn image superimposed. This creates video images of proposed changes, and is very useful for visualizing the impact or benefits of alternatives from specific viewpoints.

Simulation as described above should be used when resolution of a specific issue is sought.

Aesthetic Design Process

Aesthetic factors should be incorporated into highway design from the inception of a project to its construction completion. The following provides a checklist for incorporating aesthetic considerations into a typical highway design process.

At Project Identification and prior to corridor selection:

- Review the general scenic quality of the landscape to be traversed.
- Assess the type of users who will predominate on the highway - tourist, recreational, commercial, or commuter.
- Assess the destinations along the highway-urban, suburban, rural, resort area, through traffic.
- Determine the Aesthetic classification of the highway or portion of the highway:
 - Baseline Highway
 - Tourway
 - Parkway

During Corridor Assessment:

- Perform a visual resource inventory, including:
 - landscape units and subunits.
 - landmarks.
 - views and viewsheds.
- Complete visual resource assessments, including:
 - visual quality assessment.
 - visual absorption capability assessment.
- Summarize visual opportunities and constraints.
- Incorporate visual factors in corridor alternatives.
- Review the visual impacts of corridor alternatives, and recommend a preferred corridor.
- Assess selected corridor, and suggest means to improve corridor boundary.
- Identify mitigating measures necessary.
- Record anticipated visual impacts of the selected corridor, and in particular ensure that directives for future planning and mitigating measures are documented and highlighted to planners at more detailed scales.

During Alignment Selection:

- Review, update and complete visual resource data base from corridor assessment. If no such data base was generated, develop one.
- Transfer visual resource data to the alignment planning scale.
- Summarize visual opportunities and constraints relevant to alignment selection.
- Incorporate visual factors in identification of alignment alternatives.
- Review the visual impacts of alignment alternatives, and recommend a preferred alignment.
- Assess selected alignment, and suggest means to improve alignment in particular concerning visual interest and driver's experience. Locate and perform preliminary design for rest areas, pullouts, and other roadside facilities.
- Identify mitigating measures necessary. Provide cost estimate of required mitigating measures, and ensure that associated budgets are allocated.
- Record anticipated visual impacts of the selected alignment, and in particular ensure that directives for future design and mitigating measures are documented and highlighted to planners and designers at detailed scales.

During Detail Design:

- Provide direction on detail design and implementation of mitigating measures.
- Monitor detail design of alignment, cross section and typical details. Consider refinements which accommodate recommended guidelines.
- Provide leadership in aesthetics of: detail design of roadside facilities, roadside clearing and grubbing, earthworks, structures, revegetation, and roadside facilities.
- Produce cost estimates of roadside development and mitigating measures. Ensure appropriate budgets are allocated, and complete working drawings and specifications.
- Ensure that aesthetic mitigating measures required as a result of one discipline's design solutions are addressed in working drawings and specifications of other appropriate disciplines.

During Construction:

- Provide field review services during clearing and grubbing, to ensure that required buffer areas remain and are protected, and that vegetation management as prescribed is performed.
- Identify minor modifications to site grading for slope rounding, rock outcrop treatment, or tree belts.
- Supervise finished grading and revegetation in the field.

After Construction:

- Develop maintenance procedures which support and develop the aesthetic intents developed in the previous stages.
- Provide the required resources to adequately maintain this visual resource.

Note: Document project successes and failures for the future information of other Ministry personnel and consultants.