

# Water notes

Water notes for rivers management



ADVISORY NOTES FOR LAND MANAGERS ON RIVER AND WETLAND RESTORATION

Natural Heritage Trust



## River and estuary landscape appreciation and protection

Riparian and estuarine landscapes are important places in our biophysical, visual and cultural experience. Our recognition of a river or estuary as being a pleasant or important place to be, is a first step in planning how it can be preserved and managed for the enjoyment of all people.

In the past, natural resource planners have often considered the river environment as a combination of components and processes, without detailed consideration of the aesthetics or cultural associations of the landscape and significance of the river setting for the community.

This fact sheet looks at what is landscape, and what we can do to protect those features that are important to our enjoyment of the riparian landscape. It also contains a work sheet to assist with landscape description. It is hoped that it will be a useful tool for local governments, and community groups that are interested in protecting the visual value of our waterways as part of their broader catchment or waterways management programs.



Warren River.

S. Neville

### What do we mean by 'landscape'?

'Landscape does not mean the same as the word environment, it is the environment perceived, especially visually perceived' (Appleton 1980). Unlike other aesthetic objects, such as buildings and paintings, landscape is not a discrete object. Landscape is more than physical features. It is the way a person interprets, interacts, and reacts to the natural and cultural elements of the environment.

### Landscape values of waterways and estuaries

A river or estuarine system is made up of a series of settings or a sequence of viewsheds. The landscape setting is defined by an area and its geology, landform, vegetation, built form, human activity, and climate and their influences on its processes. The values associated with landscape protection are complementary to those values traditionally attributed to environmental protection, including economic efficiency, clean air and water, species protection, availability for public enjoyment and sustainability. The community's appreciation of the landscape resource is a collection of individual perceptions, some acute, some subliminal, others based upon historical and childhood appreciations of activities and cultural values. The landscape can be appreciated at a local level or for its regional significance. Rather than competing, these overlapping parameters enhance the power of the landscape to affect individual lives and the community's environmental appreciation.

For example, limestone cliffs, such as those at Blackwall Reach on the Swan River estuary, are an important landscape element to most people who use the area, whether they have a conscious appreciation of them or not. The limestone cliffs provide a range of experiences such as a sense of nature, a place for recreation, spiritual significance and a reference point for local identity. Individual experience of the cliffs of Blackwall Reach for example will vary, but all these varied experiences depend on the protection of the cliffs and the associated features that make them conspicuous.





*Kimberley River.*

### Why is landscape protection important?

The aesthetic quality and the values placed on the environment by the community are increasingly under pressure from rapid change in land use. Awareness of those elements which make us value a landscape, can contribute to decisions on development and land use which are sympathetic to the landscape and associated heritage values. For example, a building may be designed to complement the landform and the rural landscape character, using simple design principles and suitable building materials.

As another example, the orchards of the Canning River are important features for creating a rural landscape. In areas such as Cannington, the cost of maintaining an orchard has become prohibitive, resulting in the subdivision of the land for medium density housing. However, the adjoining John Okey Davis Park, Gosnells, has retained the rural landscape adjacent to the river by keeping some orchard rows in the park.

### How can we protect our landscape?

This section outlines a process for identifying the important elements that make up our river and estuary landscapes and ideas for how to protect or enhance them.

A **landscape description** is designed to encourage and assist the protection and enhancement of the character and beauty of the environment by recognising the main landscape elements. A landscape description can be used as a resource on which sound landscape management plans and policies can be developed in conjunction with the community and local managers.

### Steps in landscape description and planning

1. Identify the **study area** in which you are interested. Depending on the size of the area you are intending to describe, it may be useful to divide your study area into smaller precincts. This will mean that you can either share the task or the study could be broken into more manageable units.
2. It is important to form a **team** of people who represent a broad cross section of your community's study area, including representatives of Aboriginal communities, local community groups, and river users. It will also be important to have people who can represent local government and land managers and owners, as many of the decisions your group may recommend will need to be endorsed by them if they are to be implemented.
3. Collect **resource information** pertaining to your study area including geology, topography, vegetation, hydrology, flooding, public access, recreational elements and nodes, as well as changes to the environment from a land use perspective. Often this information can be obtained from your local land managers, such as local government. Local history and cultural significance is also important to investigate. By interviewing local people or searching local libraries, you can discover how the river has changed and how the river is important to the local people. It is also an excellent way of raising interest in your project.



*Millstream in the Pilbara.*

4. The next step is to create **an inventory** of the landscape features. It is important that you record your method so you are consistent and the study can be updated. Table 1 of Appendix 1, is a checklist which helps identify elements that can be described. This method has been tested on the Swan and Canning Rivers (Chalmers 1997). It describes the elements of the riparian environment as if you were in a boat on the river. A list of example attributes are shown Table 2 of Appendix 1. This allows you to work out your area of influence or what can be seen from the river. This is important for planning the future use of the riparian zone. Your inventory should also provide a description of each precinct in terms of dominant landscape features, viewsapes and important elements in the environment. An example landscape description and interpretation is shown in Appendix 2. A useful way of presenting your inventory information is by preparing maps of the sites of significance and identifying where the important viewsapes are located.
5. In preparation for planning **classify your riparian landscapes** into themes such as industrial, suburban, rural, urban and natural characters, according to what is considered the dominant landscape character of the landscape. For example, a riparian landscape, which is mainly houses and gardens and possibly a small parkland foreshore reserve, may be considered a predominantly suburban landscape.
6. You will then be able to identify those landscape elements that **are conforming** and **non conforming** to the present landscape character types. For example, it might be noted that an old factory might not conform to the surrounding rural landscape, but a number of farm sheds add to the rural character. The landscape description should be objective and it is essential to not make a personal decision on what is “unattractive or attractive” as everyone is likely to have their own opinion.
7. The next step is the drafting of your **landscape protection plan**. Your team should decide on a vision and objectives based on what resource information you have gathered. For example, the Swan River Trust prepared a vision (1997): To respect the Swan River setting as a prime resource through planning and development processes:
  - maintaining a sense of place which nurtures and enhances the river’s natural, historical and cultural sites of significance;
  - improving the community’s visual and physical access to the river environment;
  - providing for expression of the local and regional context of places in the setting and acknowledging diversity of landscape character;
  - promoting sustainability in the management of the landscape; and
  - catering for the range of uses for the river.
8. Your team should then make a recommendation on whether the present landscape characters described are ones that should to be retained or enhanced. Specific actions should be recommended in your landscape plan. They may range from recommendations to weed and restore the remnant fringing vegetation in one precinct, to considering the protection of a rural character when reviewing planning proposals.





9. Your landscape plan should also identify how you intend to implement your recommendations. Some actions can proceed without approval from planning and management authorities. Other actions may recommend the incorporation of landscape protection principles into the local town planning scheme. If this is the case, you will need to identify what policies already exist and also seek support of your local government. Policies may be revised as required but the basic aim should be to protect and improve the river landscape in a way that is ecologically and socially sustainable. Your plan should also outline how you will evaluate the success of your plan.



*Frankland River, just north of State forest.*

*S.Neville*

10. The team should also make their plan available for public comment and take into consideration the comments received. Public acceptance of your plan is important for gaining support for implementation.

11. **Implementation** of your plan should be according to the actions and priorities you have set. There may be opportunities for implementation through general works, however, some actions may require the adoption of the plan by local government.

12. **Evaluation** of your plan. How successful were you in protecting or enhancing your riparian landscape? What progress have you made and what needs to be

improved? It is always beneficial to invite public comment into your assessment process as you are protecting the riparian landscape for the broad community.

## Landscape protection principles

It may be appropriate to consider the development of riparian landscape protection guidelines once a study of the present landscape has been undertaken. The guidelines should ensure that the desirable character of the landscape is reinforced and the undesirable alleviated. This will require identifying the attributes that are rewarding and pleasing to the viewer. Before developing guidelines and policies for the landscape resource there are a number of landscape principles which can be considered.

- There should be **equity of access** to the river landscape, including both physical and visual access. Physical access can vary in quality and level of accessibility and in some cases may be inappropriate due to land ownership or environmental protection issues. Visual access does not necessarily refer to 'river views', rather the experience of, for example, the fringing vegetation of the river and surrounding land uses. A dilemma arises when clearing of riparian vegetation is needed so people can view the river. To ensure 'access' to the river, policies are required to support the provision of pedestrian access, lookouts and scenic roads to gain views of the river.
- Landscape policies should be **conservation** orientated. The policies should aim to reduce inputs to air and water pollution and to maintain habitat and biodiversity. There is a high level of awareness of these goals in the scientific community and broad community, and this will need to be backed up by effective on-ground actions.
- The **landform and geology** should be respected, articulated and complemented. For example, where limestone cliffs are exposed, they should be conserved, and if adjacent buildings are considered necessary, structure and form should complement the natural forms, textures and colour of the cliffs.
- The region and local **distinctive character** should be maintained and the relationship between the natural and built environment rendered harmonious. The planting of endemic flora will enhance the local identity of the area. Buildings should be designed to relate harmoniously with their surroundings. The height and style of buildings can easily detract from the landscape form or character.



- Areas of outstanding visual importance merit stringent protection. Special vantage points and those views we encounter in everyday travel also need protection and possibly sensitive enhancement, which should be coordinated by managers.
- It is important to assess how the river environment is experienced by its users and how their experience can be made more enjoyable or rewarding. Community input is required to determine to what extent the community is satisfied with the river environment. It is the responsibility of managers to consider how the level of satisfaction can be maintained, enhanced, or diversified and the extent to which it is reasonable to expect improvement. They must also be responsible for the integration of development with the environment.
- Landscape design and management is very **location specific**. What is suitable for one location may be unsuitable for another because of visual impacts, land use patterns, existing and future human made modifications, and the perception and values of local residents. Having

identified major landscape types, planners can develop specific landscape guidelines in consultation with the community and other stakeholders. At the precinct level, the views of the local community will be especially important. However, the regional significance of any precinct must also be recognised and it is the responsibility of waterways managers to ensure that local recommendations are compatible with a regional perspective.

Riparian landscapes need to be maintained and enhanced so that all river users can enjoy the experience of being near a waterway. It is important to maintain key natural elements such as the fringing vegetation and other natural features that make our waterways unique and on which our own experiences of the landscape are based. In a rural and urban situation, waterways can be special places, by retaining some elements of the natural environment such as indigenous vegetation. The natural features allow us to recognise the river as having a local identity and they make the river a special place for all people to visit and experience.



*Orong Road Reserve on the Swan River.*

## Appendix 1: Landscape Description

To describe the landscape within the precinct, it is necessary to identify the elements in the landscape. An example below (Table 1) shows the types of landscape elements you may identify in your description. This example uses seven categories - Waterform, Riparian, Landform, Geology, Vegetation, Riparian Land Use and Cultural Land Use.

Remember to describe the landscape elements that you could see if you were in a boat in the river or estuary.

**Table 1: Checklist of Biophysical and Cultural Landscape Elements.**

BIOPHYSICAL	ELEMENTS	CULTURAL	ELEMENTS
WATERFORM	<ul style="list-style-type: none"> <li>• Open water</li> <li>• Rivers</li> <li>• Streams</li> <li>• Rapids</li> <li>• Confluences</li> </ul>	RIPARIAN LAND USE	<ul style="list-style-type: none"> <li>• Banks               <ul style="list-style-type: none"> <li>- built walls</li> <li>- levees</li> <li>- retaining structures</li> </ul> </li> <li>• Other structures               <ul style="list-style-type: none"> <li>- navigation markers</li> <li>- wharfs</li> <li>- promontories</li> <li>- boat moorings</li> <li>- jetties</li> <li>- marinas</li> <li>- overwater buildings</li> <li>- crossings</li> </ul> </li> </ul>
NATURAL RIPARIAN ZONE	<ul style="list-style-type: none"> <li>• Natural banks</li> <li>• Spits</li> <li>• Beaches</li> <li>• Islands</li> <li>• Marshes</li> <li>• Swamps</li> </ul>		
LANDFORM	<ul style="list-style-type: none"> <li>• Dunes</li> <li>• Foothills</li> <li>• Plains</li> <li>• Headlands</li> <li>• Cliffs</li> <li>• Promontories</li> <li>• Isthmuses</li> <li>• Caves</li> <li>• Hills</li> </ul>		
GEOLOGY	<ul style="list-style-type: none"> <li>• Soil type</li> <li>• Geological appearance</li> </ul>	LAND USE	<ul style="list-style-type: none"> <li>• Buildings               <ul style="list-style-type: none"> <li>- residential</li> <li>- commercial</li> <li>- rural</li> <li>- industrial</li> <li>- suburban</li> <li>- urban</li> </ul> </li> <li>• Other amenities               <ul style="list-style-type: none"> <li>- kiosks</li> <li>- toilets</li> <li>- barbecues</li> <li>- picnic areas</li> <li>- play equipment</li> </ul> </li> <li>• Formal recreation               <ul style="list-style-type: none"> <li>- parkland</li> <li>- reserves</li> <li>- buildings</li> <li>- clubs</li> <li>- ovals</li> </ul> </li> <li>• Other structures               <ul style="list-style-type: none"> <li>- signs</li> <li>- powerlines</li> <li>- railway lines</li> </ul> </li> <li>• Pedestrian access               <ul style="list-style-type: none"> <li>- water access</li> <li>- path</li> <li>- walkway</li> <li>- dual use pathway</li> </ul> </li> <li>• Vehicular access               <ul style="list-style-type: none"> <li>- barriers</li> <li>- overspill</li> <li>- roads</li> </ul> </li> <li>• Agriculture/rural               <ul style="list-style-type: none"> <li>- type of agriculture/use</li> </ul> </li> <li>• Historical artefacts</li> <li>• Significant sites</li> </ul>
VEGETATION	<ul style="list-style-type: none"> <li>• Natural               <ul style="list-style-type: none"> <li>- samphire</li> <li>- sedges and rushes</li> <li>- scrubland</li> <li>- woodland</li> <li>- forest</li> </ul> </li> <li>• Exotic               <ul style="list-style-type: none"> <li>- lawn</li> <li>- weedy field</li> <li>- agriculture</li> <li>- lawn and trees</li> <li>- formal gardens</li> <li>- residential</li> </ul> </li> </ul>		



Once you have identified the elements which make up your riparian landscape you will need to describe them. The elements can be described using four main attributes that are line, texture, colour and local form. Examples of the types of attributes for each of the element categories are shown in Table 2.

**Table 2: Example Landscape Element Attribute Descriptors.**

ELEMENTS	LINE	TEXTURE	COLOUR	LOCAL FORM
WATERFORM	<ul style="list-style-type: none"> <li>• geometric</li> <li>• elongated</li> <li>• rounded</li> <li>• meandering</li> <li>• sinuous</li> <li>• nesting</li> </ul>	<ul style="list-style-type: none"> <li>• foaming</li> <li>• rough</li> <li>• smooth</li> <li>• glassy</li> </ul>		<ul style="list-style-type: none"> <li>• broad</li> <li>• flat</li> <li>• open</li> <li>• closed</li> <li>• shallow</li> <li>• deep</li> </ul>
NATURAL RIPARIAN ZONE	<ul style="list-style-type: none"> <li>• gradual junction</li> <li>• abrupt junction</li> <li>• line of junction</li> </ul>	<ul style="list-style-type: none"> <li>• rough</li> <li>• smooth</li> </ul>		<ul style="list-style-type: none"> <li>• closed</li> <li>• shape</li> <li>• slope</li> </ul>
LANDFORM	<ul style="list-style-type: none"> <li>• horizontal</li> <li>• parallel bands</li> <li>• curved</li> <li>• ridges</li> <li>• terraced</li> <li>• nesting</li> <li>• vertical</li> </ul>	<ul style="list-style-type: none"> <li>• coarse</li> <li>• smooth</li> <li>• dusty</li> <li>• rough</li> </ul>		<ul style="list-style-type: none"> <li>• steep</li> <li>• rounded</li> <li>• flat</li> <li>• inclined</li> <li>• plains</li> <li>• dune like</li> <li>• spurs</li> </ul>
GEOLOGY	<ul style="list-style-type: none"> <li>• geometric line of dominant elements</li> </ul>	<ul style="list-style-type: none"> <li>• rough</li> <li>• smooth</li> <li>• sticky</li> <li>• clays</li> </ul>		<ul style="list-style-type: none"> <li>• form of any visually dominant elements</li> </ul>
VEGETATION	<ul style="list-style-type: none"> <li>• layers</li> <li>• vertical</li> <li>• horizontal</li> <li>• storeys</li> </ul>	<ul style="list-style-type: none"> <li>• rough</li> <li>• smooth</li> <li>• scrubby</li> <li>• prickly</li> <li>• peeling</li> <li>• bristly</li> <li>• soft</li> <li>• dusty</li> </ul>	<ul style="list-style-type: none"> <li>• unusual</li> </ul>	<ul style="list-style-type: none"> <li>• low</li> <li>• stunted</li> <li>• towering</li> <li>• clumps</li> <li>• solid</li> <li>• shrubby</li> <li>• open</li> <li>• wide</li> <li>• branching</li> </ul>
RIPARIAN LAND USE	<ul style="list-style-type: none"> <li>• geometric</li> <li>• vertical</li> <li>• horizontal</li> </ul>	<ul style="list-style-type: none"> <li>• building materials</li> <li>• rough</li> <li>• smooth</li> <li>• reflective</li> <li>• soft</li> <li>• hard</li> <li>• roof</li> <li>• fencing</li> </ul>	<ul style="list-style-type: none"> <li>• conforming</li> <li>• non conforming</li> <li>• colours</li> </ul>	<ul style="list-style-type: none"> <li>• round</li> <li>• rectangular</li> <li>• solid</li> <li>• size</li> <li>• height</li> <li>• style</li> </ul>
CULTURAL LAND USE	<ul style="list-style-type: none"> <li>• geometric</li> <li>• horizontal</li> <li>• vertical</li> </ul>	<ul style="list-style-type: none"> <li>• building materials</li> <li>• rough</li> <li>• smooth</li> <li>• reflective</li> <li>• fencing</li> </ul>	<ul style="list-style-type: none"> <li>• conforming</li> <li>• non conforming</li> <li>• colours</li> </ul>	<ul style="list-style-type: none"> <li>• round</li> <li>• solid</li> <li>• size</li> <li>• height</li> <li>• style</li> <li>• un/sealed</li> </ul>



## Appendix 2: Bells Rapid, Swan River — an example of landscape description and interpretation

### Waterform and natural riparian zone

This stretch of the Swan River is one of the most attractive precincts. In several places, the river flows over exposed granite outcrops creating small waterfalls and rapids. In high flow periods, pools and rocks form swirling eddies and currents creating attractive water patterns and eroding processes. In low flow periods, the small smooth granite boulders which line the stream channel are exposed. The irregular shapes, different colour tones, coarse rock surfaces and contrasting reflective surfaces, are particularly attractive. The fringing paperbark has a soft brushy texture which provides a pleasing contrast between the smooth river boulders. Several swamp sheoaks grow on the flat rocky floodplains and exposed gnarled roots stretch between the smooth boulders.

### Landform

The exposed laterite on the section of Walyunga National Park closest to Great Northern Highway has black and pale colours of the Ridge Hill Sandstone. The pale weathered stone often makes an attractive element highlighted by surrounding wandoo trees. The major geological formation in the area is the granite which is often typified by large exposed rock surfaces. Commonly, the granite has broken into blocky boulders which have sheared in straight plains. The edges have been smoothed and rounded by exfoliation and often the rock is mottled by lichens and mosses. Upstream at Walyunga Lookout, the topography is relatively steep with Medikal Hill and Jumperkine Hill being prominent landscape elements on the northern river bank while the lookout itself is also a prominent feature of the southern section.

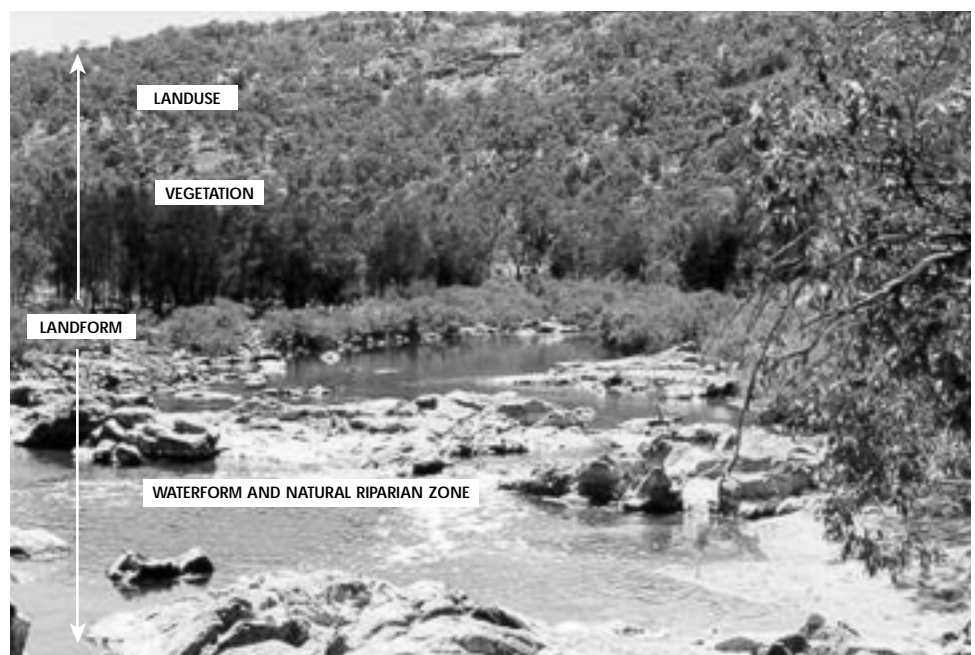
### Vegetation

In this precinct, the vegetation along the Swan and Avon Rivers is relatively undisturbed. Close to the water's edge, the paperbark and sheoak form soft brushy textures against the rocky boulders and gravelly banks. The understory is relatively sparse where the land is subject to flooding, and introduced grasses often occur. Back from the foreshore

flooded gums are found and have an attractive smooth barked and twisted branch form. The soft grey and pink light bark and loose canopies contrast with the dark green and shaded texture of the sheoak foliage.

On the higher rocky sandstone, wandoo occurs in mono specific stands and is a prominent and attractive tree, with red peeled old bark exposing a white smooth surface which is particularly attractive as a backdrop to the similarly mottled sandstone.

The dominant overstorey on the Darling Range is the marri and jarrah woodlands. The understory is particularly attractive with a range of bushes and shrubs, which have visually interesting foliage and textures, including the blackboys, grevilleas, zamia palms, sedges and banksias. In spring, the delicate flowers of myrtle and grevillea are particularly spectacular.



*Bells Rapid, Swan River.*

*S.Neville*

### Land use

There is little riparian land use infrastructure within the precinct. Although the railway is quite prominent from some points on the river, it cannot be seen from most positions on the walk trails of the National Park due to the surrounding vegetation.

Several small farms dot the Darling Range at South Chittering and Moondyne Brook. Due to the undulating terrain, these cleared and grazed properties cannot be viewed from the river valley and to the viewer it appears that most of the natural bushland remains.





### **Landscape interpretation dominant landscape character**

The precinct's dominant landscape character is the natural Darling Range landscape. It is typified by steeply sloping granitic and gneissic hills and shallow soils. The immediate riparian landscape has pools and riffles of rocky outcrops. Several limited alluvial deposits can be found along the river banks. There are several plant communities in the precinct and most areas appear to be relatively undisturbed. However, around Walyunga National Park, where there has been grazing and human influence, there are considerable areas which have weeds.

### **Significant views**

There are several attractive views in the area. The most accessible views are at Walyunga National Park and Walyunga Lookout. These panoramic views include the steep hillsides and deep valleys, with water flowing over rocks and forming pools, and vegetation which appears relatively natural.

### **Conforming and non conforming elements in the landscape**

At Walyunga National Park there has been an attempt to have recreational amenities which have minimal impact on the landscape. It is important that all picnic, parking and toilet facilities do not intrude into the relatively natural landscape.

### **Recommendations for maintenance and enhancement of the present landscape character**

- Ensure that weed communities do not form monospecific areas, eg. *Watsonia*, which detract from the appearance of natural vegetation.
- Support efforts to rehabilitate the native plant communities.
- Ensure that surrounding landuses do not encroach on the visual amenity of the natural landscape character.



*Murray River.*

*G. Olsen*



## Glossary of Terms

<b>Conforming element:</b>	Those elements, which complement or conform to the surrounding landscape character.
<b>Dominant landscape character:</b>	The overall or predominant nature or identity of the landscape.
<b>Environment:</b>	The physical attributes of an area; and is not the result of the viewers selective interpretation.
<b>Landscape character:</b>	The nature or identity of the landscape. It is the combination of the natural and cultural elements and their processes.
<b>Landscape:</b>	Landscape is not synonymous with 'environment', it is 'the environment perceived, especially visually perceived (Appleton 1980).
<b>Non conforming element:</b>	An element which detracts or is unsympathetic or discordant with the surrounding landscape character.
<b>Precinct:</b>	A section of the study area which has boundaries based on arbitrary size different than similar landscape character or municipal boundaries.
<b>River setting:</b>	The river and land which can be viewed as part of the river landscape. The area of influence as determined visually from the river.

<b>Scene:</b>	A section of the landscape which is viewed.
<b>Significant viewscape:</b>	A field of view which has local or regional significance, often containing a site of significance within the range of view.
<b>Sites of significance:</b>	Those areas which demonstrate some or all of the following characteristics: including an important emotional link for society; rareness; intactness, excellence of type; association with cultural or historical importance, reflecting a particular cultural, historical or social period; association with a significant historical personality or event; or natural features which are ecologically or intrinsically important.
<b>View:</b>	The range or portion of landscape which can be taken in by an observer from one location.
<b>Viewshed:</b>	An enclosed area of landscape which can be viewed as a single entity.



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