



1. Ecosystems Element of EnviroDevelopment

TITLE: Ecosystems

OBJECTIVE: Healthy, sustainable ecosystems based on natural processes and rich with native biodiversity

TARGET: Development that aims to protect and enhance existing native ecosystems and encourages natural systems and native biodiversity and rehabilitates degraded sites.

PRINCIPLES

- Encourage maintenance (during and after construction) of native vegetation where existing, and rehabilitation of locally native vegetation where not already in existence in a healthy state
- Encourage protection (during and after construction) of existing habitats for native animals or rehabilitation of such habitats where not already in existence in a healthy state
- Protect habitats and maintain connectivity to reduce fragmentation
- Avoid water pollution and degradation of water quality in waterways and natural systems and remediate any water quality problems occurring on-site or in neighbouring areas
- Minimise disruption to landform and natural ecosystems
- Encourage development on previously developed or degraded sites, whilst considering affordability
- Promote biodiversity awareness

POTENTIAL BENEFITS AND INCENTIVES

Benefits for Occupants

- Satisfaction that occupier is reducing ecological footprint and protecting natural ecosystems and native biodiversity
- Enhanced interaction with nature – may offer health and lifestyle benefits
- Enhanced amenity of area

Benefits for Local, State or Federal Government and Environmental Groups

- Raises awareness of need to protect ecosystems and biodiversity
- More attractive and sustainable city/shire/state
- Helps raise community awareness of government's efforts to enhance sustainability
- Increased private sector investment in ecosystem and biodiversity protection (reduced costs for council but better outcomes)
- Greater private allocation of land for native biodiversity
- Greater community commitment to ecosystems and native biodiversity
- Help to reduce the ecological footprint of communities

Benefits for Developers

- Marketing advantages through quality product and EnviroDevelopment promotion
- Enhanced product
- Visual benefits
- Potential savings in development costs and/or access to incentives
- Reduced approval/assessment times
- Improved corporate image

REQUIREMENTS

Criteria	Notes on evidence to be provided to Board of Management for approval prior to certification as an EnviroDevelopment
<p>1.1 ESSENTIAL ACTIONS</p> <p>1.1.1 As with all sections of EnviroDevelopment, developers must comply with regulatory requirements as a minimum. Of relevance to this element, this includes the Vegetation Management Act and Environmental Protection Act etc.</p> <p>1.1.2 Must conduct thorough site analysis to ascertain key features of relevance to this section, including hydrological features, flora, fauna habitats, and landforms. This report forms part of the evidence required for EnviroDevelopment certification.</p> <p>1.1.3 Achieve the requirements under each of the following sections:</p> <p>RESIDENTIAL / OTHER</p> <ul style="list-style-type: none"> • Water quality (1.2) • Land form (1.3) • Flora (1.4) • Fauna (1.5) <p>INDUSTRIAL / DEVELOPMENTS ACHIEVING DENSITIES OF GREATER THAN 30 DWELLINGS PER HECTARE</p> <ul style="list-style-type: none"> • Water quality (1.2) • Land form (1.3) • Flora and Fauna (1.6) 	<p>Statement from developer and or appropriately qualified environmental professional confirming that the development has complied with all relevant regulatory requirements and conducted thorough site analysis. Evidence of site analysis e.g. report, should also be included.</p> <p>Notice of development approval if applicable.</p>
<p>1.2 WATER QUALITY</p> <p>Must meet all the requirements of this section as outlined below.</p> <p>1.2.1 Protect natural hydrological regime including riparian zones and buffers (where relevant depending on site).</p> <p>1.2.2 Integrated water cycle management principles incorporated into development design including water sensitive urban design devices such as swales, bioretention basins and wetlands utilised as water treatment devices where appropriate. Set quantifiable water quality targets and verify design through accepted modelling (e.g. MUSIC).</p> <p>Note: may not be appropriate for high density sites. Unless very high treatment levels are to be implemented, application of water sensitive urban design to industrial sites should include the structural separation of areas likely to be contaminated, such as work areas from roofs and other less contaminated surfaces to enable standard urban stormwater treatment devices and water reuse.</p> <p>Recognition can also be given for stormwater reuse (such as in infill sites) where appropriate water treatment measures and infrastructure are to be utilised.</p> <p>1.2.3 Development should be compatible with broadly supported catchment management plans and any appropriate regulatory plans including flood protection management, river management plans etc.</p> <p>Note: for more information regarding catchment management plans and integrated catchment management, please see: http://www.regionalnrm.qld.gov.au/my_region/nrm_plans.html.</p> <p>1.2.4 Minimise use of pesticides, herbicides and artificial fertilisers (can be achieved through choice of landscaping and physical termite barriers etc.).</p> <p>1.2.5 Incorporate natural hydrological features into the development design including maintenance of natural watercourses (where relevant depending on their presence on site).</p> <p>1.2.6 Appropriate drainage to protect both water cycle and development integrity. This should include maintenance of permeable surfaces where possible, including use of permeable pavement in preference to non-permeable pavements where possible and appropriate.</p>	<p>Evidence of incorporation of Water Sensitive Urban Design principles (e.g. swales instead of concrete curbs where appropriate etc.), protection of watercourses, design encouragement of water infiltration etc. as necessary to show achievement of this requirement. Evidence could include, but is not limited to, illustrative evidence including maps, drawings etc. showing topography contours, hydrology and WSUD features. Water balance calculations or MUSIC modelling etc. authorised by developer and / or engineer is also helpful as evidence of the sufficiency of WSUD features and the impact of the development on natural hydrology, stormwater quantities and sediment loads.</p> <p>Evidence of water quality measures (and reasons where they have not been incorporated) from engineer, landscape architect (or related professional) and developer as appropriate.</p> <p>Statement and illustrative evidence including topography maps and drawings outlining compatibility with catchment plans, protection of natural hydrological features, riparian zones and buffers.</p> <p>Statement outlining steps to minimise use of pesticides, herbicides and artificial fertilisers.</p> <p>Evidence that appropriate sediment control and stormwater management plans will be in place during and after construction e.g. erosion and sediment control plan.</p>

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<p>1.2.7 Stormwater management provisions during and post construction must be adequately considered and incorporated to avoid enhanced risk of flooding and flood damage and to reduce risk of pollution entering waterways. Design and construct to limit the post-development peak one-year average recurrence interval (ARI) event discharge to the receiving waterway to the pre-development peak one-year ARI event discharge. Must also consider impact on and from adjacent sites.</p> <p>1.2.8 Effective sediment and erosion control measures in place during construction and operation. As a minimum, these should comply with relevant local and State Government requirements.</p>	
<p>1.3 LAND FORM</p> <p>1.3.1 Must conduct thorough site analysis to identify areas of prime significance for preservation and to identify areas where clearing and/or major earthworks should specifically not occur. This site analysis should also consider the suitability of the site for earthworks and construction. The development must adequately consider and preserve significant areas based on the advice of this report.</p> <p>1.3.2 Must also achieve at least four out of the following options Note: if a development is unable to achieve four of the following options and the developer shows good reason why the criteria could not be met (for example, with regards to minimising cut and fill), but can provide evidence from an appropriately qualified environmental professional confirming that the development has managed to achieve a significant net benefit to the environment and given appropriate consideration to downstream impacts (as per criteria 1.2), then the development may still be considered for EnviroDevelopment Ecosystems recognition at the discretion of the certifying board.)</p> <p>1.3.2.1 Retain local and adjacent natural landform and integrate with natural landscape and topographic features or build on brownfield site¹ rehabilitating open space areas and minimise detrimental landform-change impacts on water or sediment movement.</p> <p>1.3.2.2 Locate on a brownfield site (two points) or site that had been significantly modified² from its natural state and had little or no ecological value (one point). Site must be decontaminated and where there will be significant open space efforts must be made to rehabilitate natural ecosystems, natural resources, and native biodiversity values of the site.</p> <p>1.3.2.3 Build only on stable, non-flooding land, or if building on land prone to flooding, the site design must:</p> <ul style="list-style-type: none"> • Create a flood credit and reduce levels in flood volumes • Reduce velocity of floods coming off the site • Deliver environmental benefits (e.g. wetland) to site or adjoining land <p>1.3.2.4 Maximum cut and fill of 1.5m (i.e. total retaining wall height of 1.5 metres or 75cm cut and 75cm fill for example) including bulk earthworks (excluding those earthworks which are necessary for WSUD measures or which have been included to meet local Council requirements). Credit can not be gained for this point if there is reason to believe that builders will later increase the cut and fill. This may mean that for sloping lots some form of architectural solutions or review mechanism (e.g. for body corporates) may need to be provided.</p> <p>1.3.2.5 Cut and fill on max 30% of site. Credit can not be gained for this point if there is reason to believe that builders will later increase the cut and fill. This may mean that for sloping lots some form of architectural solutions or review mechanism (e.g. for body corporates) may need to be provided.</p> <p>1.3.2.6 Construction methods to minimise disruption to landform and natural drainage contours (e.g. elevated platforms lightweight in construction are generally encouraged on sloping sites in preference to cut and fill concrete slabs on earth, unless other significant environmental benefits can be shown from the cut and fill approach).</p>	<p>Specific information and wording in development specifications, drawings and plans and in letters of instruction to contractors and briefings to staff to indicate requirements to protect ecosystems as per options.</p> <p>Evidence or statement from engineer/planner stating how this requirement has been met.</p> <p>If building on a brownfield site or significantly modified site, provide details of use of site prior to new development in the form of a site photo prior to development and statement from environmental professional / landscape architect / related professional detailing ecological value of the site prior to development.</p> <p>Evidence that buildings have been designed so as to be considerate of existing site landforms, topography and constraints.</p> <p>Evidence could include topography maps / contour maps, site photos, site plans with an explanation of how site disturbance has been minimised.</p>

¹ Brownfield site: land within an urban area, which at the time of purchase, 50% of the site had been previously built on.

² Significantly modified: land which has previously been utilised for intensive uses and has little or no ecological value.

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<p>1.3.2.7 Minimise site disturbance during construction and limit earthworks and clearing of native vegetation to a maximum of 15 metres beyond building footprint, 2 metres beyond roadway curbs or swales, and 10 metres beyond other constructed areas (e.g. detention basins etc.), although concessions will be made where necessary for protection against bushfires.</p> <p>1.3.2.8 Street layout is designed and constructed to fit with topography with only minimal disruption.</p> <p>1.3.2.9 Site remediation and removal of contaminants from degraded sites.</p> <p>For industrial developments or developments achieving densities greater than 30 dwellings per hectare, projects must meet the criteria in 1.6. For residential subdivisions and all other projects, proceed to 1.4 and 1.5.</p>	
<p>1.4 FLORA</p> <p>1.4.1 Must conduct thorough Ecological Assessment (as outlined on page 15) to identify areas of prime significance for preservation and to identify areas where clearing and/or major earthworks should specifically not occur. The development must adequately consider and preserve significant areas based on the advice of this report.</p> <p>1.4.2 Avoid planting invasive species as per WONS (Weeds Of National Significance), weeds on the National Environmental Heritage List (Department of Environment and Heritage), and those incorporated in the relevant planning scheme.</p> <p>1.4.3 Must achieve at least 10 points out of the following options:</p> <p>1.4.3.1 Have an appropriately qualified scientific professional conduct an upfront site assessment of the site, noting areas of ecological value and ensure that the development will protect such areas to the greatest extent possible.</p> <p>1.4.3.2 Conduct thorough ecological flora survey to ascertain biodiversity and populations of vulnerable or threatened species and design development to facilitate the preservation of such species. The development should take significant additional steps over and above the standard requirements and demonstrate significant net gain to the flora and ecosystems, above the standard requirements. If the site has little existing value or no vulnerable or threatened species (as listed under the EPBC Act or IUCN Red List or State Government legislation), the ecological study should note as such.</p> <p>1.4.3.3 >40% of all plants introduced to the site for landscaping public spaces, or for landscaping private areas prior to sale, are locally native³ and >90% are native to Australia or productive.</p> <p>1.4.3.4 Designate and protect any sensitive conservation areas.</p> <p>1.4.3.5 Rehabilitate disturbed sites and degraded natural ecosystems.</p> <p>1.4.3.6 Locate on a brownfield site or site that had been significantly modified from its natural state and had little or no existing ecological value (up to three points available).</p> <p>1.4.3.7 Have a bushfire mitigation and management plan and take appropriate management actions.</p> <p>1.4.3.8 Demonstrate appropriate consideration of future maintenance of native flora and habitat, including initiating a maintenance plan and arranging means for the continuation of this beyond the development and sales stage.</p>	<p>Evidence of Ecological Assessment and its findings from an appropriately qualified scientific professional and appropriate consideration of this assessment in plans and site management and landscape plans.</p> <p>Evidence should include appropriate plans (flora/bushfire management/weed and pest etc.), landscaping schedules/lists and details of measures to protect areas, species or features of conservation value.</p> <p>Evidence from environmental science professional, landscape architect (or related professional) and developer as appropriate.</p> <p>If claiming points under 1.4.3.6 the following evidence must be provided: if building on a brownfield or significantly modified site, provide details of use of site prior to new development in the form of a site photo prior to development and statement from environmental professional / landscape architect / related professional detailing ecological value of the site prior to development.</p>

³ Locally native: native plants which are endemic to the area.

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<p>1.4.3.9 Retain at least 40% of the existing native trees above 3 metres in height.</p> <p>1.4.3.10 Encourage local native plant species and natural ecosystems through retaining them where possible on 30% or more of the site.</p> <p>1.4.3.11 Implement an appropriate weed and pest management strategy, including site rehabilitation and removal of noxious weeds.</p> <p>1.4.3.12 Encourage local native plant species through their incorporation in landscaping and encouragement of their use by purchasers and private land holders.</p> <p>1.4.3.13 Contribute green space significantly in excess of the requirements for green space (subject to acceptance by government of its suitability as either parkland or for conservation value. This area should predominantly include (i.e. >80%) native species. This requirement can be fulfilled by either provision of an appropriate area of suitable land (under secure title though not necessarily handed over to government) or monetary contribution to the relevant authority or an established not-for-profit green group for conservation or green space purposes. Points are to be allocated pro-rata for each 20% (i.e. 1 point for each 20% contribution in excess of government requirements and 5 points for 100% in excess of government requirements). This is capped at a maximum of 5 points. Stringent design guidelines⁴ or other protective measures to secure the use of private land for open space and flora and fauna purposes may also be applicable and contribute to the green space calculations for EnviroDevelopment purposes (however, if the longevity of such measures or benefits is likely to be less than through other means there may need to be a discount factor used in the calculations).</p> <p>Points under this criteria can be claimed if evidence is provided of off-site land holdings, however this land holding can only be claimed once and must have nature conservation value.</p>	<p>Note: If claiming points under this category, a statement must be made regarding the ongoing ownership and maintenance arrangements for this land to provide certainty about the longevity of its maintenance as green space.</p>
<p>1.5 FAUNA</p> <p>1.5.1 Must conduct thorough Ecological Assessment (as outlined on page 15) to identify areas of prime significance for preservation and to identify areas where clearing and/or major earthworks should specifically not occur. The development must adequately consider and preserve significant areas based on the advice of this report.</p> <p>1.5.2 Must achieve at least 10 points out of the following options:</p> <p>1.5.2.1 Conduct thorough ecological fauna survey (as outlined on page 15) to ascertain biodiversity and populations of vulnerable or threatened species and design development to facilitate the preservation of such species. Take significant additional steps over and above the standard requirements and demonstrate significant net gain to fauna above the standard requirements. If the site has little existing value or no vulnerable or threatened species (as listed under the EPBC Act or IUCN Red List or State Government legislation), the ecological study should note as such.</p> <p>1.5.2.2 Locate on a brownfield site or a site that has been significantly modified from its natural state and had little or no ecological value (up to three points available).</p>	<p>Evidence of Ecological Assessment (see Ecological Assessment Guidelines on page 15) and appropriate consideration in plans and site management and landscape plans.</p> <p>Evidence should include appropriate plans (ecological fauna survey, master plan, pest management strategy, etc.) and details of measures to protect areas, species or features of conservation value.</p> <p>Evidence from environmental science professional, landscape architect (or related professional) and developer as appropriate.</p> <p>If claiming points under 1.5.2.2 the following evidence must be provided: If building on a brownfield or significantly modified site, provide details of use of site prior to new development in the form of a site photo prior to development and statement from environmental professional / landscape architect / related professional detailing ecological value of the site prior to development.</p>

⁴References to design guidelines means an enforceable system of design and related principles whether operating under contract, deed, covenant, architectural and landscape code for body corporates or some other means satisfactory to the Board of Management. The developer may be asked to demonstrate active design guideline enforcement.

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<p>1.5.2.3 Retain and enhance ecological corridors linking vegetated and open space areas.</p> <p>1.5.2.4 Protect land and aquatic habitats for native species, with particular focus on threatened or endangered species.</p> <p>1.5.2.5 Ensure ecological corridors are not severed by road networks without provision of appropriate fauna crossings, bridges or tunnels.</p> <p>1.5.2.6 Limit fencing and other structures that restrict safe fauna movement.</p> <p>1.5.2.7 Adopt traffic management strategies to protect fauna.</p> <p>1.5.2.8 Provision of appropriate structures and policies to facilitate native fauna habitation.</p> <p>1.5.2.9 Adopt measures to protect native animals through maintenance of habitat and control of non-native predators or competing species.</p> <p>1.5.2.10 Implement a pest management strategy.</p> <p>1.5.2.11 Have dog and/or cat exclusion zones to allow safe movement of native fauna, particularly in wildlife corridors.</p> <p>1.5.2.12 Heat Island reduction - consider reduction of pavement, carparks, roofs or different materials for their construction (e.g. open-grid pavement) etc. or green (vegetated) or shaded surfaces or light coloured surfaces.</p> <p>1.5.2.13 Minimise light and noise pollution during and post-construction i.e. no direct beam light should be directed beyond the site boundaries or upwards, except where it is falling directly on a surface that it is intended to illuminate (exemptions may be made for illuminated place names).</p> <p>1.5.2.14 Contribute green space significantly in excess of the requirements for green space (subject to agreement by government of its suitability as either parkland or for conservation value – however this does not mean that the land title must be handed over to government). This area should predominantly include (i.e. >80%) native species. This requirement can be fulfilled by either provision of an appropriate area of suitable land (under secure title though not necessarily handed over to government) or monetary contribution to the relevant authority or an established not-for-profit environmental group for conservation or green space purposes. Points are to be allocated pro-rata for each 20% (i.e. 1 point for each 20% contribution in excess of government requirements and 5 points for 100% in excess of government requirements). This is capped at a maximum of 5 points. Stringent design guidelines or other protective measures to secure the use of private land for open space and flora and fauna purposes may also be applicable and contribute to the green space calculations for EnviroDevelopment purposes (however, if the longevity of such measures or benefits is likely to be less than through other means there may need to be a discount factor used in the calculations).</p> <p>Points under the criteria can be claimed if evidence is provided of off-site land holdings, however this land holding can only be claimed once and must have nature conservation value.</p>	<p>Note: If claiming points under this category, a statement must be made regarding the ongoing ownership and maintenance arrangements for this land to provide certainty about the longevity of its maintenance as green space.</p>

Notes: • Drafted with reference to THG Eco Index and LEED ND and, to a lesser extent, BRE and Melbourne Docklands ESD Guide.
• Unless otherwise stated, each option is worth one point.

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<p>1.6 FLORA AND FAUNA</p> <p>Industrial developments or developments achieving densities greater than 30 dwellings per hectare.</p> <p>Must achieve at least six points out of the following options:</p> <p>1.6.1 Locate on a brownfield site⁵ or site that had been significantly modified⁶ from its natural state and had little or no existing ecological value.</p> <p>1.6.2 Rehabilitate disturbed sites and degraded natural ecosystems.</p> <p>1.6.3 >40% of all plants introduced to the site for landscaping public spaces, or for landscaping private areas prior to sale, are locally native⁷ and >90% are native to Australia or productive.</p> <p>1.6.4 Encourage local native plant species through their incorporation in landscaping and encouragement of their use by purchasers and private land holders.</p> <p>1.6.5 Green roofs or green walls, incorporating native plant species.</p> <p>1.6.6 Encourage the incorporation of community and productive gardens including space for garden plots, communal or individual vegetable gardens, formal landscaped areas for community uses.</p> <p>1.6.7 Landscaping includes the use of mature trees (height greater than 2m).</p> <p>1.6.8 Heat Island reduction - consider reduction of pavement, carparks, roofs or different materials for their construction (e.g. open-grid pavement) etc. or green (vegetated) or shaded surfaces or light coloured surfaces.</p> <p>1.6.9 Minimise light pollution during and post-construction i.e. no direct beam light should be directed beyond the site boundaries or upwards, except where it is falling directly on a surface that it is intended to illuminate (exemptions may be made for illuminated place names).</p> <p>1.6.10 Minimise noise pollution during and post-construction.</p> <p>1.6.11 Contribute green space significantly in excess of the requirements for green space (subject to agreement by government) of its suitability as either parkland or for conservation value. This area should predominantly include (i.e. >75%) native species. This requirement can be fulfilled by either provision of an appropriate area of suitable land (under secure title though not necessarily handed over to government) or monetary contribution to the relevant authority or an established not-for-profit environmental group for conservation or green space purposes. Points are to be allocated pro-rata for each 20% (i.e. 1 point for each 20% contribution in excess of government requirements and 5 points for 100% in excess of government requirements). This is capped at a maximum of 5 points. Stringent design guidelines or other protective measures to secure the use of private land for open space and flora and fauna purposes may also be applicable and contribute to the green space calculations for EnviroDevelopment purposes (however, if the longevity of such measures is likely to be less than through other means there may need to be a discount factor used in the calculations).</p> <p>Points can be claimed if evidence is provided of off-site land holdings, however this land holding can only be claimed once and must have nature conservation value.</p>	<p>Evidence should include appropriate plans (landscape schedule/plan, master plan, etc.) and details of measures to enhance the ecological features of the development.</p> <p>Evidence to be signed by environmental science professional, landscape architect (or related professional) and developer as appropriate.</p> <p>If claiming points under 1.6.1 the following evidence must be provided: If building on a brownfield or significantly modified site, provide details of use of site prior to new development in the form of a site photo prior to development and statement from environmental professional / landscape architect / related professional detailing ecological value of the site prior to development.</p> <p>Note: If claiming points under this category, a statement must be made regarding the ongoing ownership and maintenance arrangements for this land to provide certainty about the longevity of its maintenance as green space.</p>

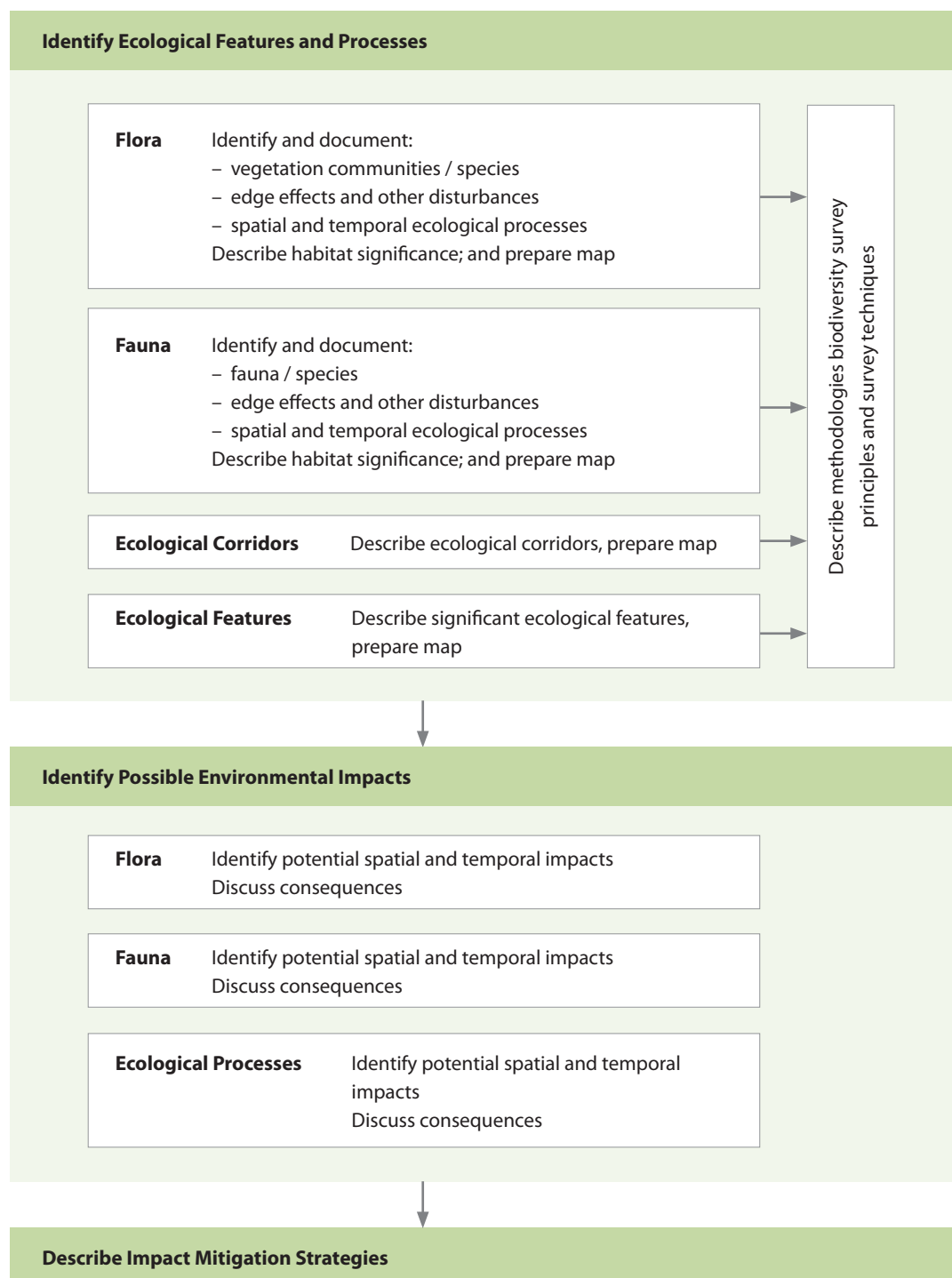
⁵Brownfield site: land within an urban area on which development has previously taken place.

⁶Significantly modified: land which has previously been utilised for intensive for intensive uses and has little or no ecological value.

⁷Locally native: native plants which are endemic to the area.

Ecological Assessment Report Guidelines

The following guidelines should be used when preparing an ecological assessment for the flora and fauna requirements.



Source: Brisbane City Council: Ecological Assessment Guidelines, Available: http://www.brisbane.qld.gov.au/BCC:STANDARD:1326879150;pc=PC_1644