

18 Spatial Analysis

This section outlines the spatial analysis undertaken which is one of a suite of tools to identify land that is suitable for development through identifying unconstrained land according to known criteria. Recommendations for areas deemed suitable for village expansion and large lot residential development are outlined in Section 19.

It is important to note that while the spatial analysis identifies the level of constraint on rural land across the LGA, the spatial analysis does not provide a conclusive identification of areas for possible village and large lot residential expansion. The spatial analysis is one part of a suite of other tools and matters for consideration in this process.

18.1 Methodology for spatial analysis

In order to assist with the determination of potentially suitable locations for village and large lot residential expansion within the Yass Valley LGA, it is necessary to identify land that is logically unconstrained according to known criteria.

To identify the level on constraint on rural land, a spatial analysis exercise was undertaken using mapping provided by the Department of Natural Resources (DNR), Department of Environment and Conservation (DEC) and Yass Valley Council, as detailed below.

The spatial analysis considered the number of constraints associated with a given area and represented this as a graduated thematic map in GIS. The constraints were considered using two different methods to determine the influence of constraints.

The first method is referred to as “hard” constraints analysis whereby all constraints to be equal and absolute with regard to their influence over the development potential of land.

The second method is referred to as “soft” constraints analysis which in contrast awards a nominated relative weighting to each constraint before normalising between criteria so that they may be adequately compared. This provides a more accurate representation of each constraint's influence over development.

It is important to note that the thematic mapping only provides an abstract representation of the nominated constraints. As such, application of “planning” logic and analysis is required in light of the information extrapolated from the spatial analysis exercise.

18.2 Constraints

Table 18.1 outlines the various constraints used in the spatial analysis exercise along with the mapping source, an explanation of the constraint, the level of flexibility of the constraint and the weighting applied to each in the case of the “soft” constraints analysis.

Table 18.1 Criteria for constraints mapping

Constraint	Constraint rationale	Flexibility opportunity	Soft constraints weighting
Land capability classes 1, 2 and 3	This land has been identified as prime agricultural land and should be protected from further fragmentation.	Some. Agricultural production is an important industry to the Yass Valley LGA economy and requires protection. However, there may be circumstances where, irrespective of the land capability, land is suitable for development due to other factors.	100%
Land Capability classes 7 and 8	This land is identified as low-grade productive land based on soil quality and slope instability. The land is therefore unsuitable for development purposes.	None. This land is unsuitable for further development due to the physical limitations of the soils and slope (particularly in relation to the risk of erosion and difficulties associated with construction).	100%
Potential threatened species	These areas are known or predicted to contain threatened flora or fauna species.	None. Threatened species are protected under legislation and development is to be limited to the extent that threatened species may be affected.	100%
Bushfire prone land	This land has been identified as land prone to bushfire events and is therefore unsuitable or unsafe to allow further development. Bushfire prone land is also assumed to represent the extent of existing vegetation cover.	Some. In general, bushfire prone land (which is by default assumed to contain vegetation) is not suitable for development. However, there may be locations, particularly at the edges or in buffers, where minor land clearing could occur to remove the bushfire prone classification of the land. There are reasonable and appropriate mitigation measures that can be imposed to	100%
Land with slopes in excess of 18 degrees	Land with slopes greater than 18 degrees have associated erosion and land instability issues and are therefore unsuitable for development	None. Land greater than 18 degrees does not provide the necessary building foundations required for residential development.	100%
Existing land holdings greater than 80 ha	80 hectares is the current average/minimum lot size for a rural landholding to accommodate a dwelling.	Some. Agricultural production is an important industry to the Yass Valley LGA economy and requires protection. However, there may be circumstances where, irrespective of the land capability, land is suitable for development due to other factors.	100%
Land within the Yass Weir water catchment zone	Land within this catchment forms part of the drinking water catchment. Further development should be avoided to prevent interference with the natural contours of the catchment area	Some. Minimal interference with the catchment area is critical to its overall efficient function and water quality.	75%

Constraint	Constraint rationale	Flexibility opportunity	Soft constraints weighting
Land within 500 metres of an Industrial zone	Industrial and residential land conflict is a vital consideration and unless suitable mitigation measures are imposed the impacts are often irreversible. A 500 m buffer zone is considered an appropriate distance to avoid conflict.	Some. The extent of industrial / residential conflict depends on the nature of the industrial activities operating within the respective zones. Potential adverse effects can also be reduced through the application of appropriate mitigation measures.	100%
Land within Urban or Village zone	Land within existing Urban or Village zones are already designated for residential purposes.	None. This land is already designated for residential purposes therefore cannot form part of the future residential development considerations.	100%
National Parks and nature reserves	The land in national parks and nature reserves is reserved to preserve the natural qualities of the area and as such residential development will not occur in these areas.	None. National parks and nature reserves are not available for urban or rural development.	100%
Riparian zones (including a 50 m buffer either side of the water body)	These buffers provide protection to protected riparian zones have extended 40 metres either side of a water body from the top of the banks. As the exact water body widths are not defined in the available data, a 50m buffer has been imposed	Some. The 40-metre buffer was historically used to trigger the need for approval at which time a merit-based assessment is undertaken. There may be some cases where strict application of this constraint is not necessary, where the impact of development can be appropriately managed.	100%
Salinity	Land known to contain high levels of salt is unsuitable for development both in regard to building contamination and soil degradation which can affect both building foundations and gardens.	Some. Although excess salt generates a level of risk to new homes and can result in land degradation, there are reasonable and appropriate mitigation measures that can be imposed to improve the soil quality.	75%
Proximity	Proximity to existing centres and major roads is an important factor in determining appropriate locations for future settlement. The following proximity buffers have been set for the purpose of identifying areas within reasonable proximity to existing centres: <ul style="list-style-type: none"> • 2.5 km proximity buffer around existing villages; • 5 km buffer around the town of Yass; and • 25 km around the ACT border to has been imposed. 	Some. The proximity to existing towns, villages and major roads is an important factor for determining the location of new settlements in terms of logical land use planning and infrastructure provision. There is potential to give some flexibility to this constraint however proximity alone, particularly to the ACT, does not override other constraints and planning considerations.	75%

18.3 Hard constraints analysis

Upon implementing the hard constraints criteria method it was determined that 95% of land within the Yass Valley LGA was constrained. However, it is noted that the “hard” constraints analysis is a simplistic method of analysis, useful only in that it highlights the complexity of the problem of identifying constraints on land. A more flexible and representative application of constraints is required to produce a map of suitable land rather than potentially ‘unconstrained’ land that would then warrant further investigation. As such, the “soft” constraints methodology was implemented which logically allocates a weighting to certain constraints. Details of the relevant weighting afforded to each constraint are listed in Table 18.1.

18.4 Soft constraints analysis

The soft constraints model better reflects the nature of the planning problem in that not all constraints are equal when applied to the restriction of land development. For example land designated as National Park has no development flexibility by virtue of the inherent purpose of that designation. However, land within 500 metres of an industrial zone may attract some flexibility based on the application of appropriate mitigation measures, therefore inviting a lower weighting. Data sets may also have ‘internal weighting’ for example different intervals of slope may be classified and weighted separately to one another.

It is acknowledged that limitations exist with the “soft” constraints analysis in that on top of applying a weight to each layer, the total of all layers is then divided by the number of layers contributing to produce an average for any given area. This average acts as an index, which is then comparable. What is not immediately obvious is the influence adding another layer has on the result, as the total is then divided by that additional layer. So, for example, the DNR land capability layer has been divided into two separate categories with categories 1, 2 & 3 representing good quality agricultural land, and 7 and 8 denoting substandard land. They have twice as much influence individually as they would have as a single data set.

Nonetheless, the “soft” constraints analysis is considered to be one part of a suite of tools used to identify areas that may be suitable for further development. It is important to note that the “soft” constraints analysis does not form the only basis for identification of strategic areas and that full consideration of the issues identified in this study is given.

Figure 18.1 Constraints Map of Yass Valley LGA (using soft constraints analysis)

