Guidance Note 2.1 : Layout Considerations

Belts

Belts are narrow, linear plantings within a broader land use system. Individual belts are separated by alleys.

Farm Machinery in Alleys: In the case of belt plantings on farms, it is recommended the alleys between belts should be at least 60 m wide to accommodate farm machinery and the competitive effects of mallee roots systems on adjacent land use.

Space for Harvesting between Rows: A minimum of 3 m between planting rows is recommended for plantings intended to be harvested. Plantings that are not intended to be harvested should also consider 3 m inter-row spacing as the use of the mallees may change to a harvested regime in the future, and closer spacing of rows will not achieve higher production per hectare of belt in the long term.

Spacing of trees within rows: for harvesting purposes a between-tree spacing of no more than 2 m is recommended to facilitate a more consistent flow of harvested material through the harvester. Closer spacing will improve harvesting efficiency but increase establishment costs per kilometre of row.

Interaction of row number and tree spacing: to reduce harvesting cost, the basic principles are to present the maximum quantity of biomass per kilometre of row to the harvester. For farm economics, shorter intervals between harvests are desirable. For example, for a kilometre of belt, two rows with 1.5 m to 2 m within-row spacing between trees will produce as much biomass per year per kilometre of belt as three rows with 2 m between trees. The number of trees per kilometre of belt is less for the two row belt, reducing establishment costs per kilometre of belt. The harvester will take less time to travel two kilometres to harvest the two row belt than it will take to travel three kilometres to harvest the three row belt. The total quantity of biomass will be approximately the same in either case, so in the two row belt the harvester will process more tonnes per hour at a lower per-tonne cost.

Density of Planting: Typical spacing for belts plantings is between 1000 and 2000 stems per hectare (within the belts and assuming a 2 m buffer on each belt edge);

Competition: Belts plantings can sustain higher productivities than block plantings, by virtue of the edge rows accessing moisture and nutrients in adjacent land in the alleys. However research has identified an important trade-off exists between increased mallee yields and production losses in adjacent crops and pastures. Within belts consisting of 3 or more rows, the internal rows generally exhibit lower productivity than the edge rows. This should be acknowledged in harvesting (lower yields and higher costs for internal rows) and carbon abatement calculations. As harvesting will occur when yields per kilometre of row are adequate, reducing competition between trees (fewer rows per belt) will reduce the interval between harvests. Very dense plantings and wide belts may take more than a decade to achieve harvestable yields per kilometre of row.

Guidance Note 2.1 : Layout Considerations

Belts (continued)

Contours and Lines: Belts can follow contours of the land, or go in straight lines across agricultural borders, but should avoid sharp bends for the sake of harvesting machinery.

Perimeter Plantings: The use of perimeter plantings (e.g. along fence lines, internal farm tracks, laneways, firebreaks, banks and drains) is a strategy to minimise competition interactions with crops and pastures. Regular access breaks should be considered for vehicle and stock movements. This may be particularly important for fire management purposes.

Blocks

A block is a planting of more than 8 rows of trees, or where there is less than 60 m between belt units.

Density of Planting: Stocking rates for block plantings intended for harvest are generally in the range of 500 to 2000 stems per hectare, but note that at higher densities, economically harvestable yields per kilometre of row may not be achieved in realistic time frames. Permanent unharvested plantings could potentially be planted at lower stocking rates without loss of per-hectare production in the long term.

Space for harvesting between Rows: A minimum of 3 m between planting rows is recommended for plantings intended to be harvested.

Buffer Zones

Buffer zones (the spaces around belts and blocks) should be wide enough to allow for maintenance, and for harvesting when intended. Buffers define land occupancy by the mallees for the purposes of covenanting and management.

Mapping Technology

Mallee harvesting systems remain under development, but are likely to utilise precision guidance technology. It will be preferable to spatially define planting layouts with a high level of accuracy to allow harvesting machinery to be controlled by autosteer; by mapping planting rows to 10 cm accuracy.

- Care should be exercised to ensure seedlings are planted precisely on a row, even if this is offset to one side of a rip line.
- A single point at each row end is not likely to be adequate; the row itself needs to be plotted for its entire length.