

DELINEATION of IMPORTANT HABITATS of THREATENED PLANT SPECIES in SOUTH-EASTERN NEW SOUTH WALES



RESEARCH REPORT
to the
Australian Heritage Commission

J.D. Briggs & J.H. Leigh

CSIRO Division of Plant Industry
GPO Box 1600
Canberra ACT 2601

December 1990

Swainsona recta A.T. Lee

Family: Fabaceae

Conservation Status: Endangered (Code 3ECi/Nv/51C 52x 55 60x)



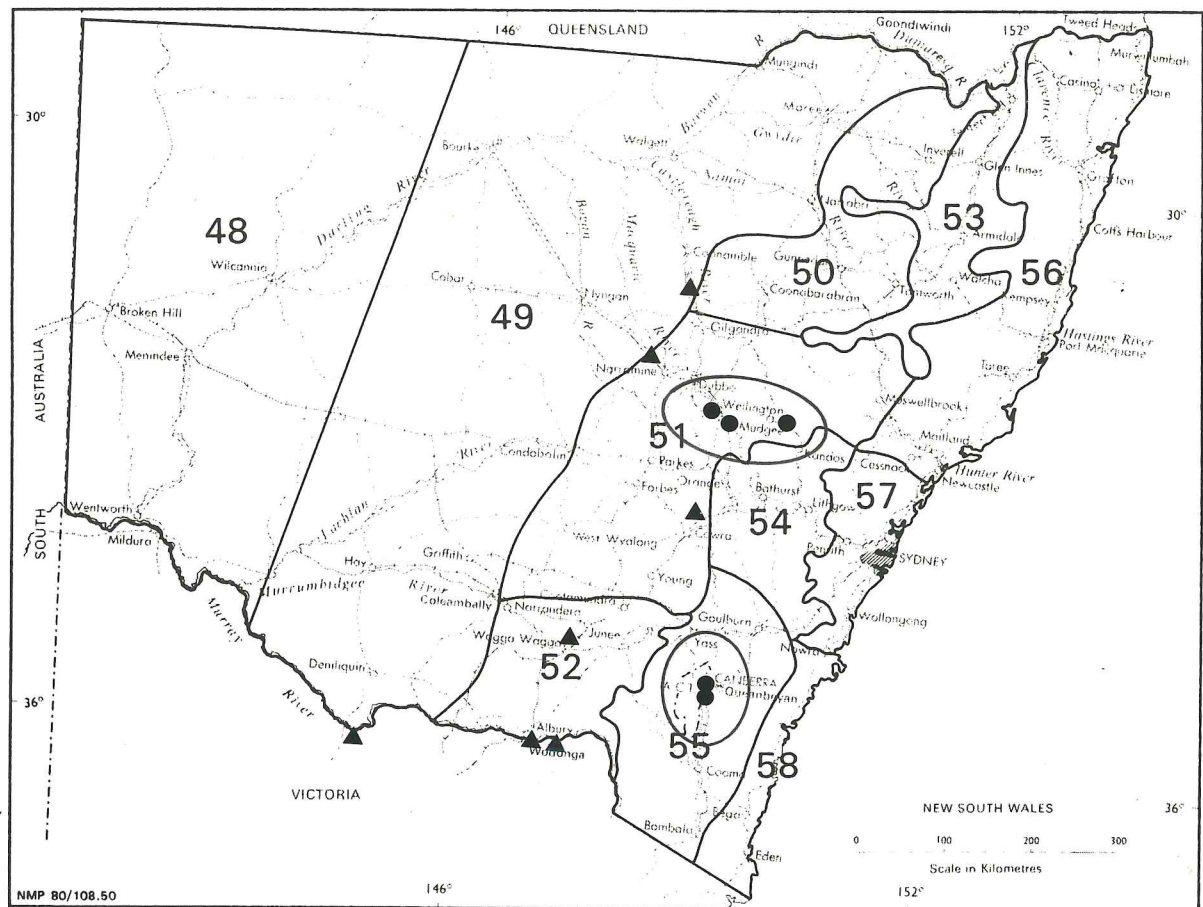
Swainsona recta in flower.



Swainsona recta in fruit.

Description

Slender, somewhat rigidly erect perennial herb with a long thin woody root. The few stems are 12-35 cm long, very sparsely hairy with short, closely appressed hairs. Leaves are pinnate, 3-9 cm long, with 5-13 narrow to very narrow-elliptical leaflets 1-1.5 cm long, the terminal leaflet distinctly larger (1.5-2.5 cm) than the others, all leaflets with a few hairs on the underside. Flowers are pea-like, purple, with 10-21 flowers arranged in the upper half of an erect raceme 10-25 cm long. Individual flowers often hang vertically along the

Distribution of *Swainsona recta* in NSW

▲ = previously recorded localities where species now presumed extinct.

raceme axis on pedicles 1-3 mm long which are curved downwards. The standard petal is 7.5-9.5 mm long and wide and the 2 wing petals are 7-8 mm long whilst the keel petal is 5-7.5 mm long. *Fruit* is a more or less oblong pod 7-11 mm long and 4-6 mm in diameter, virtually hairless and partly splitting along one side to release yellowish-brown flattened kidney-shaped seeds about 2 mm in diameter.

Flowering: September to December.

Distribution

The species has been collected in New South Wales from widely scattered localities such as Trangie, Mudgee, Wellington, Wagga, Carcoar and Culcairn (Lee, 1948). Most collections were made before 1939. Recent collections in this State have been only from near Wellington, Mudgee and Queanbeyan and also from Canberra in the Australian Capital Territory. In the Wellington area the species is known from 4 different sites with a total population of about 430 plants. Between 40 and 70 plants occur on a roadside near Mudgee. The largest known population of about 800 plants is scattered along a few kilometres of railway easement between Queanbeyan and Williamsdale. All New South Wales sites where the species is known to survive were visited during this survey and are detailed in this report.

Within the southern suburbs of Canberra is a very small population totalling 14 plants.

In Victoria *S. recta* is believed to be extinct (Scarlett, 1981). Early this century several collections were made from an area near Murchison north-eastwards to the Murray River near Wodonga (with 2 outlying collections near Echuca) but no collections have been made since 1935 and most were collected before 1900. Scarlett (1981) reported that all but one of the recorded localities was searched in the late spring of 1980 but the species could not be found and enquiries of local naturalists as to occurrences of the species were also unsuccessful (Leigh, *et al.*, 1984).

Habitat Summary

Swainsona recta grows in both red-brown and grey, gritty loams, generally in undulating terrain and occurs on all aspects. At the presently known sites *S. recta* mostly occurs near the crests of low rises, but it is unclear whether this truly reflects its habitat preference or whether it has been eliminated by competitors from adjacent, moister and now weed infested

depressions. It occurs in *Eucalyptus* and *Callitris* woodlands with open or grassy understoreys.

Threats Summary

The surviving New South Wales populations all face the continuing threats of reduced fire frequency, competition from exotic herbaceous species and further habitat loss through potential changes in land use and management.

Briggs and Leigh (1985) detailed the urban development threats which have affected the ACT populations. Efforts are currently being made to protect and manage the small ACT population.

Scarlett (1981) presumed that the destruction of *S. recta* in Victoria was caused by heavy grazing by domestic stock, land clearing and cultivation. He reported that it has hard seeds which may require a particular burning regime for regeneration so that changes to burning regimes following settlement may also be responsible for its decline. The late flowering period suggests that summer burning would destroy developing seed. The decline of the species in New South Wales appears to have been caused by factors similar to those which probably caused its extinction in Victoria (Leigh, *et al.*, 1984).

Reservation

A small colony of 37 plants occurs within the Mt Arthur Reserve at Wellington and another small colony of 28 plants occur within Burrendong State Recreation Area. 135 plants occur in Burrendong Arboretum which has recently been excised from the Burrendong State Recreation Area (managed by the NSW National Parks and Wildlife Service) and its management transferred back to the Lands Department (P. Althofer, pers. comm.). Although Althofer (pers. comm.) considers the species secure within this area under the present management arrangements the species can no longer be regarded as formally reserved within this area.

Cultivation

Although attractive during the brief flowering period, *S. recta* is unlikely to be successful in the commercial trade because of the delicate nature of the plants and their general sensitivity to environmental factors such as weed competition and predation by slugs and snails. There are 6 plants in

cultivation at the National Botanic Gardens, Canberra and 30 plants in pots at the CSIRO Division of Plant Industry. Propagation is from scarified seed.

Recommendations Summary

The Tralee-Williamsdale site is now on the Interim List of the Register of the National Estate and the, Mt Arthur Reserve, Burrendong and Mudgee-Lue road sites have been nominated for inclusion on the Register. The various management authorities responsible for these sites should be advised by the New South Wales National Parks and Wildlife Service of the occurrences of this Endangered species and appropriate strategies adopted in consultation with the Service which will assist in the conservation of the species and its habitats.

SITE DETAILS

Site 1 - Tralee-Williamsdale Railway Easement

Latitude and Longitude (range): 35° 24' 10", 149° 09' 40" to 35° 36' 20", 149° 09' 00".

Altitude: 640-800 m.

Location:: Several sections of the Goulburn-Bombala railway easement between 'Tralee' and near Williamsdale. The nominated sections of easement are between the following State Rail Authority distance-marker pegs. The corresponding 1:25,000 Tuggeranong 8727-III-S and Williamsdale 8726-IV-N map sheet grid reference points for each marker is given in brackets. 330 (968807) - 333(948786); 335.5(943765) - 339(944748); 341(939734) - 352.5(932625); 355(937600) - 360.5(958550). (See map pages 192-195).



Looking south along a section of the Goulburn-Bombala railway easement near Distance-marker-peg 343. Narrow strips of native grassland survive on both sides of the easement between the balast and graded service tracks adjacent to both boundary fences. Grazing by domestic stock and competition from exotic pasture species has eliminated *S. recta* from the adjacent farmland.

Land Status: Crown land (railway easement) vested with the State Rail Authority of New South Wales.

Area: Total area nominated is about 90 ha.

Population: An estimated 800 mature plants.

Habitat

Soil: Grey to grey-brown gritty loams.

Substrate: Metamorphosed sediments.

Topography: Occasionally flat but mostly on gentle rises in undulating terrain.

Aspect: Found on all aspects but predominantly northerly to westerly.

Vegetation: Grassland dominated by *Themeda triandra* and *Poa sieberiana* and usually including the forbs *Helichrysum apiculatum*, *Leptorhynchos squamatus*, *Wahlenbergia luteola*, *Eryngium supinum* and *Bulbine bulbosa*. Occasionally the species extends into open-heath which in addition to the above species contains low shrubs of

Pultenaea procumbens, *Melichrus urceolatus*, *Hibbertia obtusifolia*, *Cryptandra amara*, *Leucopogon* sp., *Brachyloma daphnoides* and *Lomandra multiflora*. The presence of remnant trees in the adjacent paddocks indicates that the original habitat was *Eucalyptus* woodland (various mixtures of *E. melliodora*, *E. blakelyi*, *E. nortonii* and *E. dives*) with a grassy understorey.

Threat: Clearing of the tree overstorey, annual or biennial autumn burning and exclusion of domestic stock grazing have apparently favoured *S. recta* along the railway easement in the past. The native grassland has persisted relatively intact on the rises, however in the depressions with moister, deeper soil it has generally been replaced, even in the absence of any physical disturbance, by exotic species such as *Phalaris aquatica* and *Paspalum dilatatum*. Any physical disturbance to the native grassland results in a rapid colonisation of such areas by exotic species and a loss of the native species. A number of localised disturbances caused by graders during maintenance of the service tracks/firebreaks were observed during the survey. Periodic widening of the service tracks/firebreaks has been gradually reducing the area of intact grassland. Fortunately the use of herbicides along this section of the railway line has been confined to a strip within about 1m of the ballast.

Although this section of the railway line has been unofficially closed since early 1989 survival of *S. recta* on the easement is not assured. One track alignment option currently proposed by the Very Fast Train Project uses much of the existing railway easement between Queanbeyan and Cooma and if this development were to proceed without regard to the *S. recta* occurrences, then the species and its habitat would most likely be eliminated. In view of the present closure of this section of the line there is uncertainty regarding the future management of the site. In particular, the State Rail Authority is not currently proposing to continue with their past management policy of annual or biennial burning (L. Gainey, pers. comm.). Unless periodic burning continues, there is a danger that the *Swainsona* population will decline through severe competition from the dominant native grass species.

Recommendations: No further widening or re-routing of the existing firebreak/service tracks should be undertaken and maintenance vehicles should keep to the existing tracks. The State Rail Authority, or if necessary the New South Wales National Parks and Wildlife Service, should maintain the past policy of periodically burning sections of the easement supporting *S. recta*.

Any use of herbicides should be restricted for use only within a 1m or less strip from the railway line ballast. If the Very Fast Train Project proceeds then the existing railway easement supporting populations of *S. recta* should not be used for the new track alignment unless it can be installed without significant damage to the native grassland.

Survey Dates: 17/11/86 - 25/11/86 and 2/1/87.

Voucher Specimens: J.D.B. Nos. 2116, 2117, 2127, 2128, 2173 and 2174.

Site 2 - Burrendong

Latitude and Longitude: 32°42', 149°06'.

Altitude: About 400 m.

Location: This site is near the western shore of Lake Burrendong and 5.5 km direct north-east of Mumbil. The occurrence is centred within Burrendong Arboretum where two colonies occur in its northern half and another two in the southern part. One of the southern colonies extends south for about 200 m onto adjacent private property. Four small colonies occur to the east of the Arboretum on the adjacent Burrendong State Recreation Area. (See map page 196 for precise location of colonies).

The nominated site is bounded by straight lines joining the Euchareena 1:100,000 map sheet 8732 grid reference points 976800-984800-984794-980789-976789-976786-968786-968800-964800 then north east and south along the Mumbil - 'Tara' road to the starting point.

Land Status: The main population is equally distributed between private property and Crown land dedicated for an arboretum and administered by the Lands Department. A small population (28 plants) occurs on the adjacent Burrendong State Recreation Area administered by the New South Wales National Parks and Wildlife Service.

Area: Scattered colonies over an area of about 3 ha on private property and 20 ha on the Arboretum, with most of the population concentrated in a core area of about 6 ha straddling the Arboretum/private property boundary.

Population: At the time of the survey in 1985, 173 plants were found on the private property, 135 within the Arboretum and 28 within the State Recreation Area.

Habitat

Soil: Dark-brown loam with numerous small stones.

Substrate: Finely broken metamorphosed sediments.

Topography: Found near the crests of rises and in the heads of small gullies in undulating terrain.

Aspect: Predominantly from northerly to westerly.

Vegetation: *Eucalyptus blakelyi* - *E. microcarpa* - *Callitris glaucophylla* woodland with an open, often grassy understorey including *Acacia armata*, *Dichopogon strictus*, *Wahlenbergia gracilis*, *Cheilanthes distans*, *Stackhousia monogyna*, *Swainsona oroboides* and *Poa* sp.



Eucalyptus blakelyi woodland, habitat for *S. recta*, on the southern part of Burrendong Arboretum.



Swainsona recta plants growing with scattered tussocks of *Poa* in the open understorey of the *Eucalyptus blakelyi* woodland shown in the above photo.



Callitris glaucophylla - *Eucalyptus blakelyi* grassy woodland, habitat for *S. recta* on private property adjacent to Burrendong Arboretum.

Threats: The plants on private property are in an area of partly cleared but native pasture subject to light grazing by domestic stock. Whilst the population has been able to persist under the present management regime this population would be at great risk if there were changes in management such as a pasture-improvement program or increased stocking rates.

Most of the population in Burrendong Arboretum appears to be moderately secure as the present managers of the area are aware of its presence and are sympathetic to its preservation. Some of the Arboretum population occurs within areas either planted with 'exotic' native species or infested with exotic grasses and long-term survival of some of these colonies is doubtful.



A section of Burrendong Arboretum both infested with exotic grasses and planted with exotic native species. Scattered plants of *S. recta* still survive in some areas such as this but their long-term survival is doubtful.

Recommendations: The long term survival of the private property population would be assisted through a Conservation Agreement between the National Parks and Wildlife Service and the owner similar to that possible under the Heritage Agreement Scheme operating in South Australia. It is desirable that domestic stock be excluded by fencing the area. Within Burrendong Arboretum no new plantings should occur within areas of *S. recta* habitat. These areas should be accurately mapped and clearly delineated on the ground for the benefit of future managers of the Arboretum. Occasional burning of the *S. recta* habitats should be undertaken so as to maintain and possibly increase the *S. recta* populations.

Survey Date: 2/10/85.

Voucher Specimen: J.D.B. No. 1889.

Site 3 - Mt Arthur Reserve

Latitude and Longitude: 32° 30' 27", 148° 43' 12".

Altitude: 310 m.

Location: North-eastern section of Mt Arthur Reserve, 3.0 km north of the Wellington-Mickety Mulga Hill road on Brennan's Way (1.4 km direct NNE of Mt Arthur). The nominated site is a circular area of radius 100 m centred on the Wellington 1:100,000 map sheet 8632 grid reference point 797988. (See map page 197).

Land Status: Crown land administered by the Lands Department and dedicated as Recreation Reserve No. 85000.

Area: 0.15 ha for main colony.

Population: 36 mature plants. (Also, an isolated plant was found 1 km to the south of the main colony).

Habitat

Soil: Shallow dark-brown gritty loam.

Substrate: Conglomerate.

Topography: Gently sloping ground of upper slope in range of low hills.

Aspect: Westerly.

Vegetation: *Callitris glaucophylla* - *Eucalyptus blakelyi* woodland with grassy understorey dominated by *Poa* sp. and including other native and exotic herbs.



Swainsona recta occurs in the grassy understorey of the *Callitris glaucophylla* - *Eucalyptus blakelyi* woodland at this site. Some flowering plants of *S. recta* are just visible in this photo.

Threats: Absence of fire and competition from other exotic and native species could threaten this population.

Recommendations: The population should be regularly monitored by the New South Wales National Parks and Wildlife Service and if necessary the site periodically burnt to reduce competition to *S. recta*.

Survey Date: 2/10/85.

Voucher Specimen: Not collected.

Site 4 - Mudgee - Lue Road

Latitude and Longitude: 32° 37' 15", 149° 44' 00".

Altitude: 500 m.

Location: 17.4 km from Mudgee Clocktower on the road to Lue and Rylstone (1.5 km E of the entrance to 'Mirremer' on south side of road). The site corresponds with the Mudgee 1:100,000 map sheet 8832 grid reference point 565875. The nominated site is a 200 m section of the southern road verge between the grid reference points 564875 and 566875. (See map page 198).



Looking east along the Mudgee-Lue road at Site 4. A remnant population of *Swainsona recta* extends along the southern road verge at this site. A dense patch of flowering *S. recta* plants can just be seen in this photo at the base of the large *Eucalyptus melliodora* tree (right foreground of photo) on the edge of the eroding embankment.

Land Status: Road verge.

Area: 200 m².

Population: 40 plants counted in 1988, 70 plants counted by P. Althofer (pers. comm.) in 1987.

Habitat

Soil: Deep red-brown clay loam with some quartzite stones.

Substrate: Not known.

Topography: Near crest of rise in undulating valley.

Aspect: Northerly.

Vegetation: Remnant *Eucalyptus blakelyi* - *E. melliodora* - *Angophora floribunda* woodland with grassy understorey including *Themeda triandra*, *Poa* sp., *Helichrysum apiculatum*, *Bulbine bulbosa*, *Stackhousia monogyna* and the low shrubs *Daviesia genistifolia* and *Templetonia stenophylla*.

Threat: The roadside embankment is being relatively rapidly undermined by water erosion of the roadside gutter and many *S. recta* plants will soon be lost as sections of the embankment collapse. The species does not extend into the adjacent cleared and grazed paddocks.

Recommendations: The Department of Main Roads or other relevant authority should be notified of the occurrence of the species and requested to undertake appropriate erosion control measures.

Survey Date: 17/9/88.

Voucher Specimen: J.D.B. No. 2378.

Site 5 - Mumbil-Stuart Town Railway Easement - Site A

Latitude and Longitude: 32° 45' 00", 149° 03' 20".

Altitude: 500 m.

Location: 1.4-1.5 km south of the railway crossing at Mumbil on the Mumbil-Stuart Town railway line. The site corresponds with the Euchareena 1:100,000 map sheet 8732 grid reference point 923747. (See map page 196).

Land Status: Railway easement.

Area: 0.2 ha.

Population: 9 plants on eastern easement and 9 on western easement.

Habitat

Soil: Red-brown stony clay-loam.

Substrate: Not recorded.

Topography: Crest of low rise in undulating terrain.

Aspect: East and West.

Vegetation: Remnant *Eucalyptus albens* woodland with herbaceous understorey heavily infested with exotic weeds and grasses.

Threats: Competition from exotic herbaceous species and at risk if railway service track were widened or re-routed.

Recommendations: The State Rail Authority should be alerted to the occurrence of the species and requested not to undertake activities which would further threaten the species. Because of the competition from exotic species long term survival of *S. recta* at this site is doubtful and it is not proposed to nominate the site for inclusion on the Register of the National Estate.

Survey Date: 3/10/85.

Voucher Specimen: Not collected.

Site 6 - Mumbil-Stuart Town Railway Easement - Site B

Latitude and Longitude: 32° 45' 40", 149° 03' 24".

Altitude: 510 m.

Location: 2.8-2.9 km south of the railway crossing at Mumbil on the Mumbil-Stuart Town railway line. (Centred on railway distance marker peg No. 385). The site corresponds with the Euchareena 1:100,000 map sheet 8732 grid reference point 927736. (See map page 196).



Looking south along the railway easement at this site. *Swainsona recta* plants are scattered within the narrow strip of vegetation between the service track and the railway embankment shown in this photo and also within the easement on the other side of the line at this point.

Land Status: Railway easement.

Area: 0.2 ha.

Population: 28 on western easement and 11 on the eastern easement.

Habitat: As for Site 5 except the aspect is predominantly westerly.

Threat: As for Site 5.

Recommendation: As for Site 5.

Survey Date: 3/10/85.

Voucher Specimen: J.D.B. No. 1892.

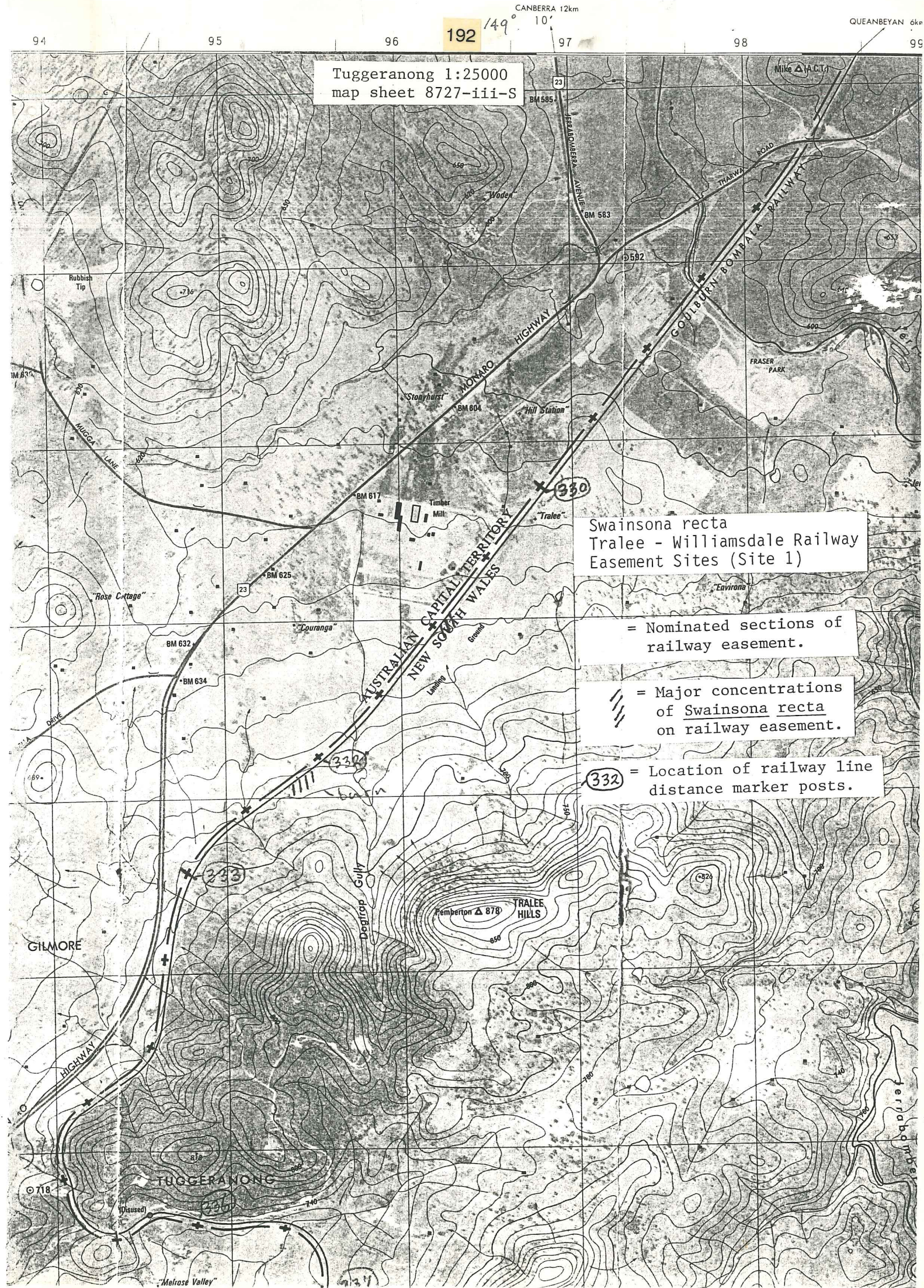
Tuggeranong 1:25000
map sheet 8727-iii-S

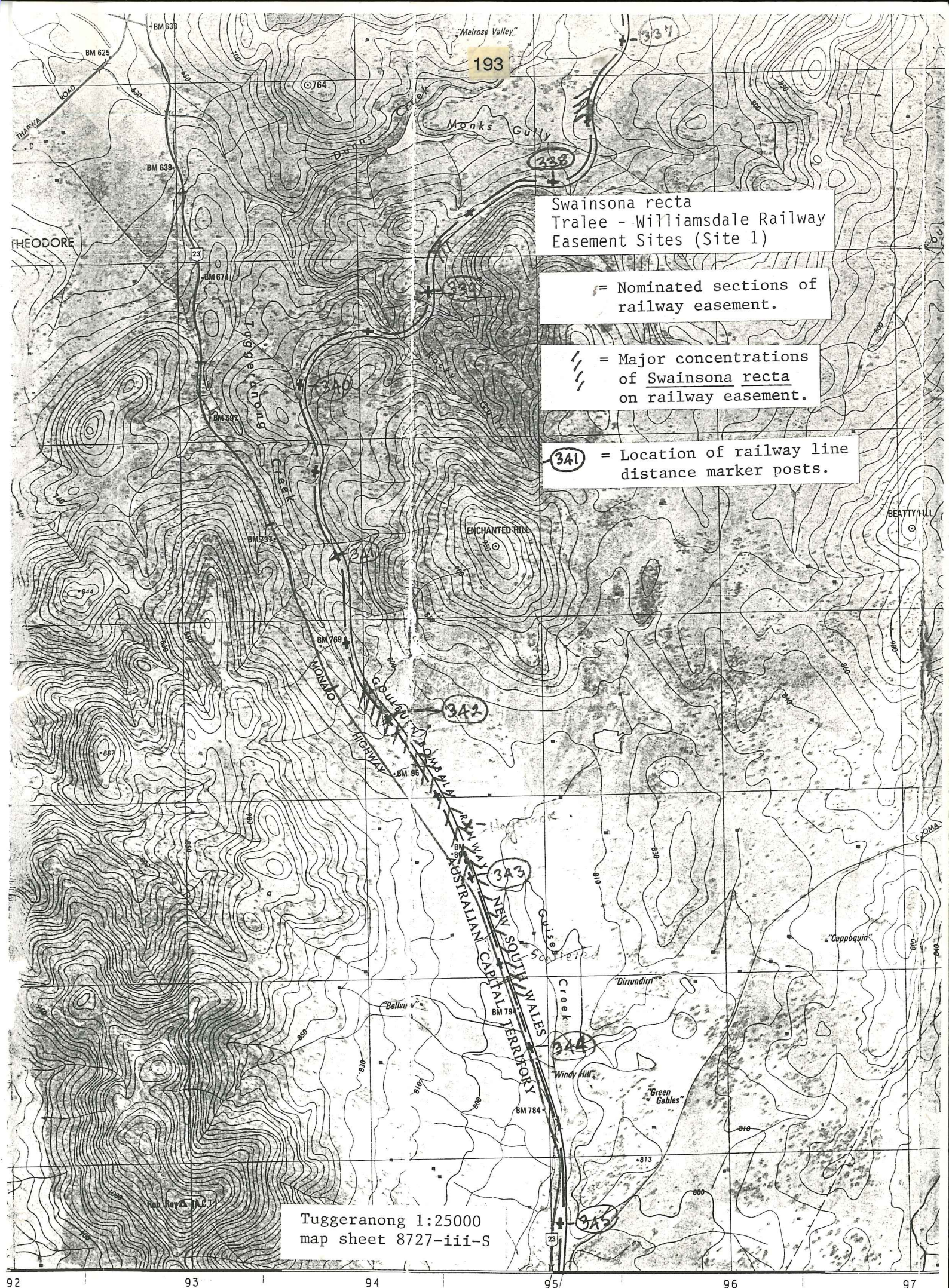
Swainsona recta
Tralee - Williamsdale Railway
Easement Sites (Site 1)

= Nominated sections of
railway easement.

// = Major concentrations
of Swainsona recta
on railway easement.

(332) = Location of railway line
distance marker posts.





193

Swainsona recta
Tralee - Williamsdale Railway
Easement Sites (Site 1)

= Nominated sections of
railway easement.

/// = Major concentrations
of Swainsona recta
on railway easement.

341 = Location of railway line
distance marker posts.

Tuggeranong 1:25000
map sheet 8727-iii-S

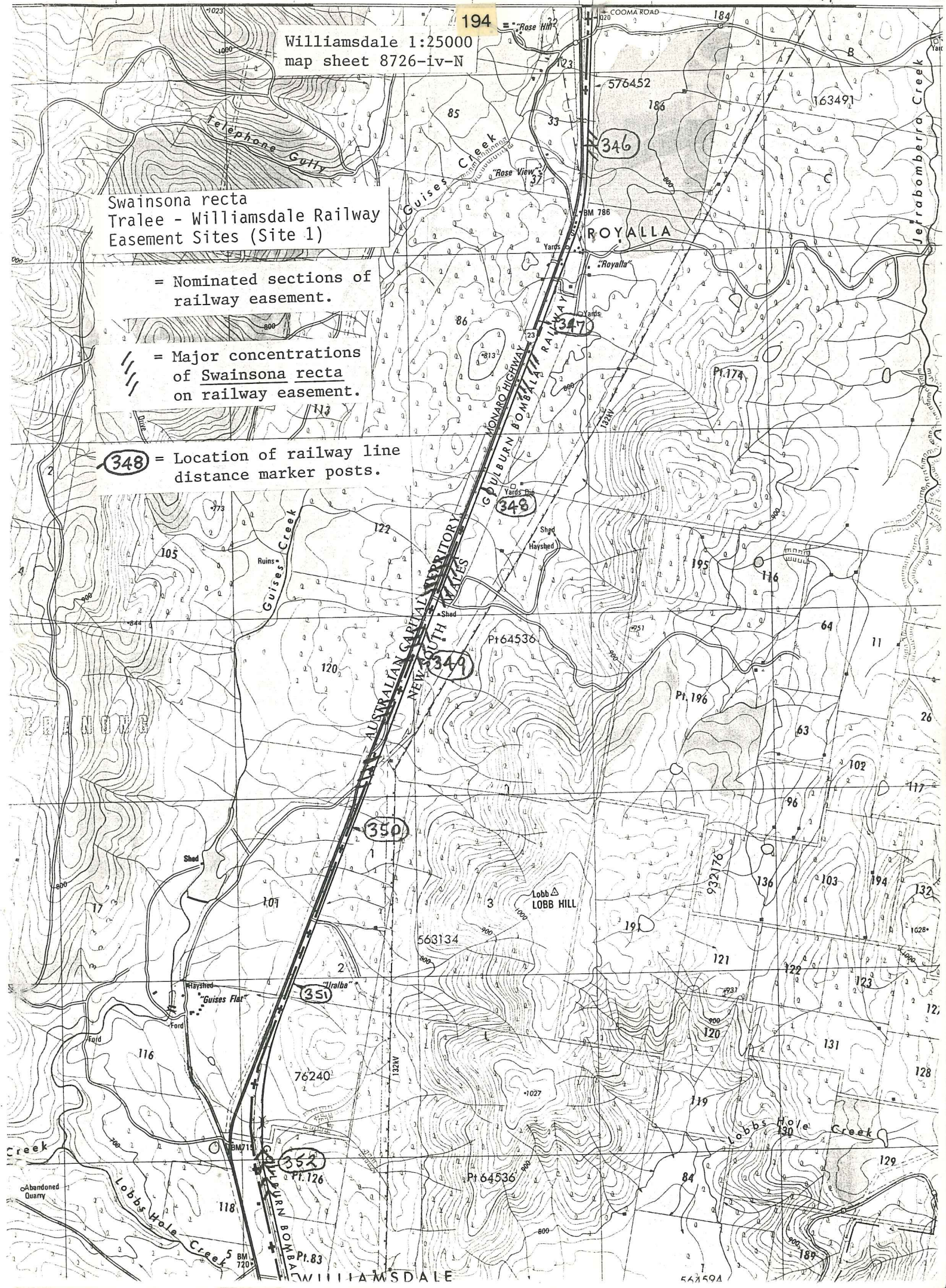
Williamsdale 1:25000
map sheet 8726-iv-N

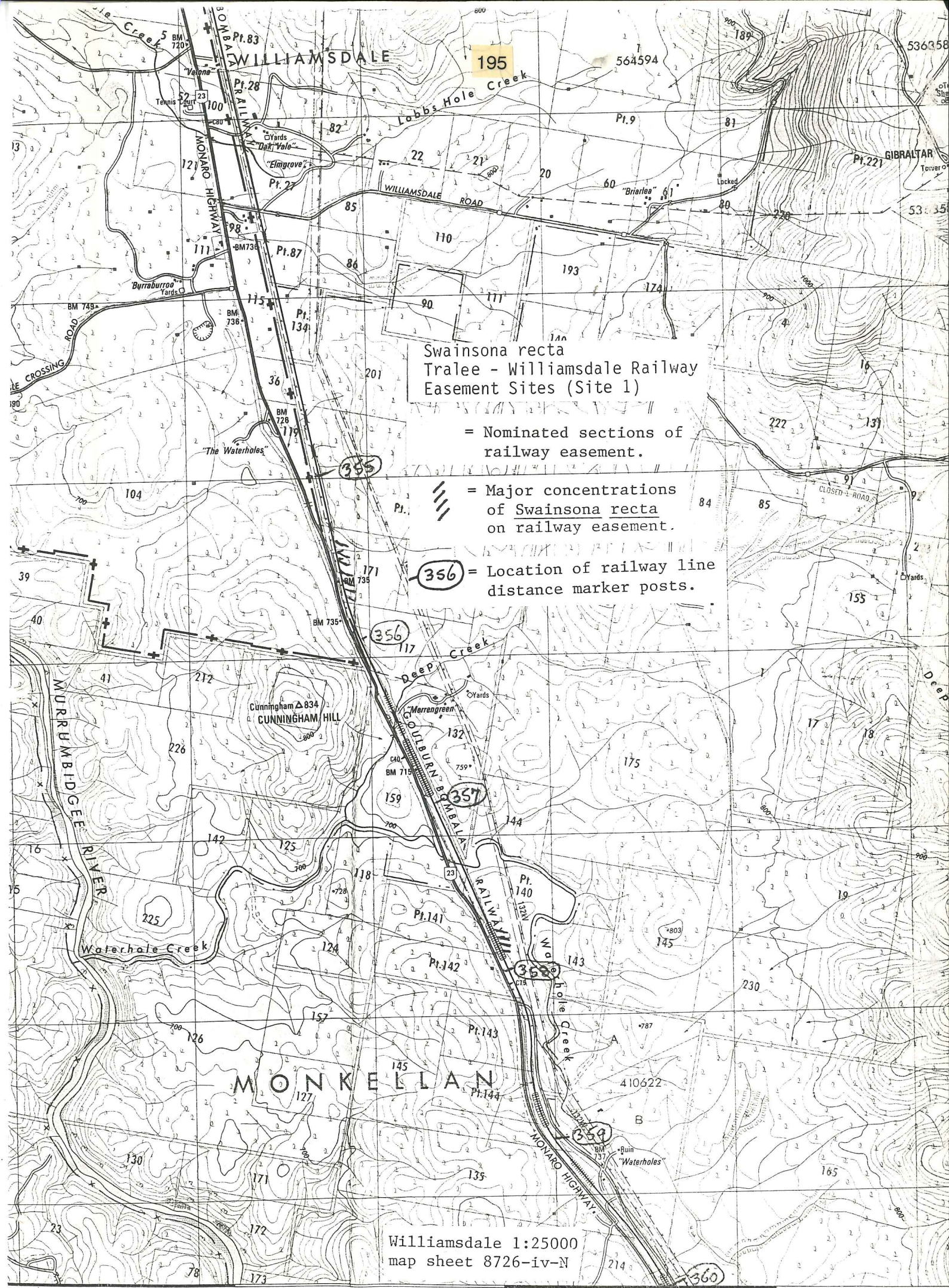
Swainsona recta
Tralee - Williamsdale Railway
Easement Sites (Site 1)

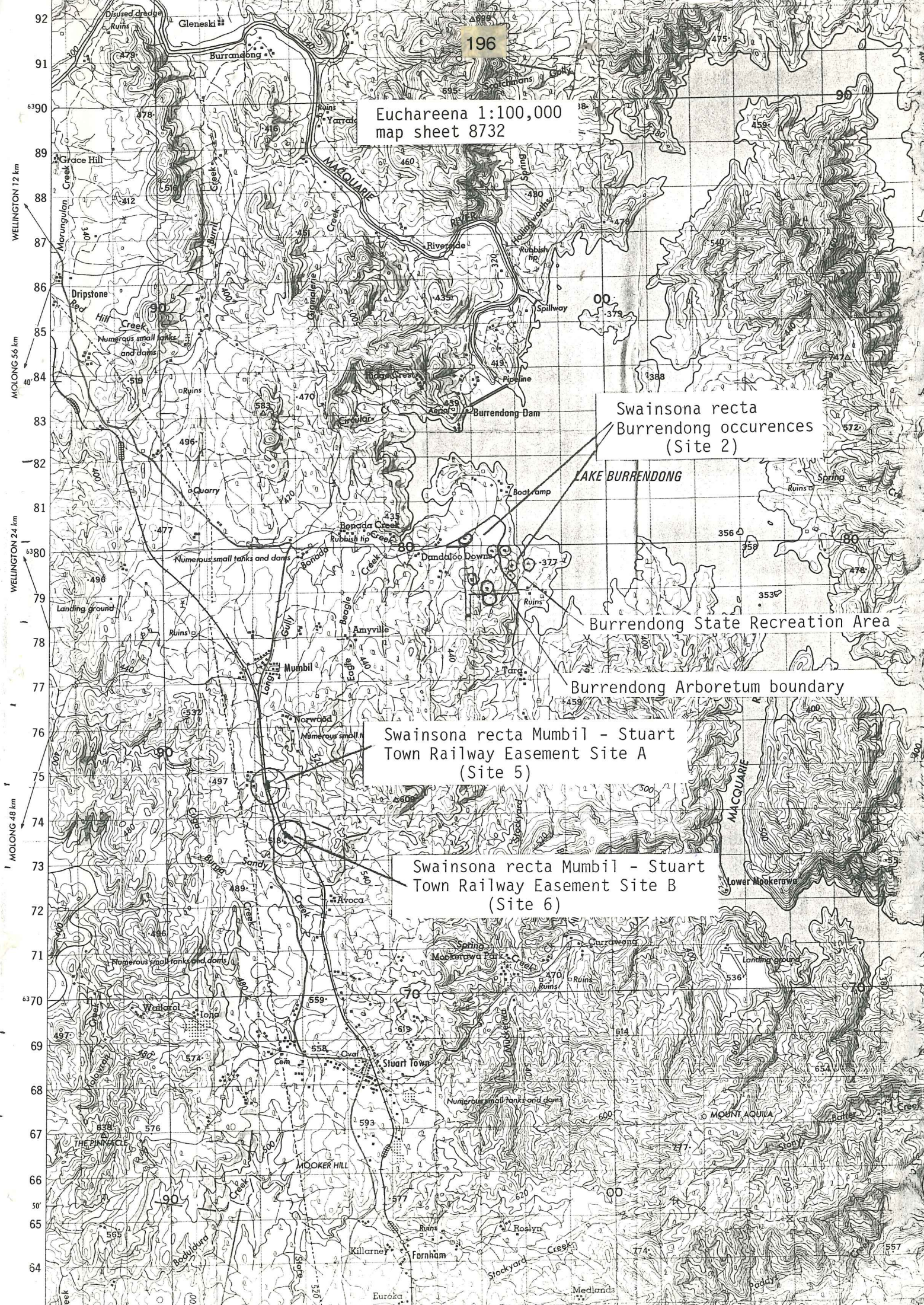
= Nominated sections of
railway easement.

/// = Major concentrations
of Swainsona recta
on railway easement.

(348) = Location of railway line
distance marker posts.





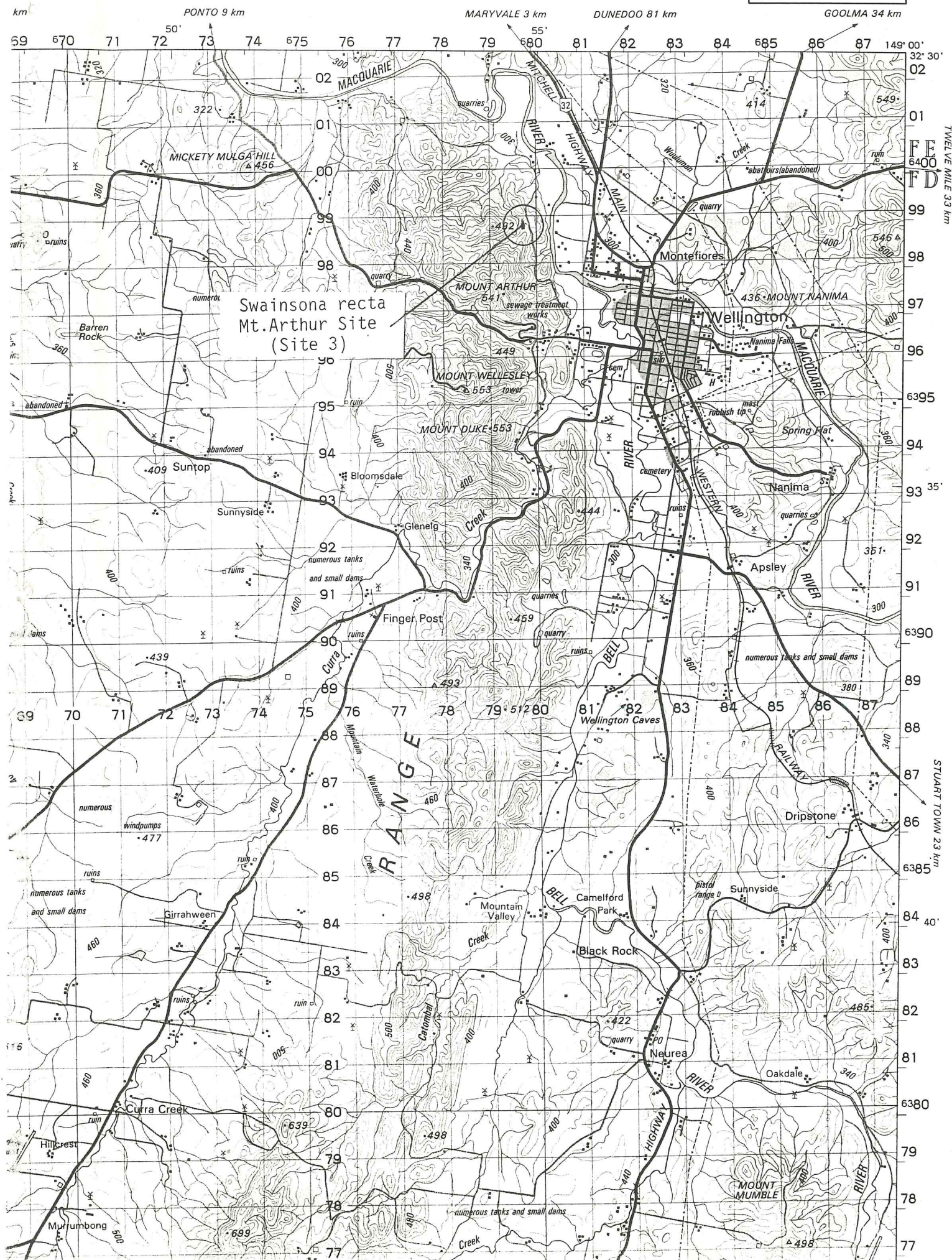


Euchareena 1:100,000
map sheet 8732

Swainsona recta
Burrendong occurrences
(Site 2)

Swainsona recta Mumbil - Stuart
Town Railway Easement Site A
(Site 5)

Swainsona recta Mumbil - Stuart
Town Railway Easement Site B
(Site 6)



Swainsona recta
Mudgee - Lue road Site
(Site 4)

Mudgee 1:100,000
map sheet 8832

