Blayney
Local Infrastructure
Contributions Plan 2013

Prepared by

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1.1 Overview of this Plan

The Blayney Local Government Area (**LGA**) is likely to receive development in the future that impacts on the quality and standard of Local Infrastructure provided by Blayney Shire Council (**Council**).

Local Infrastructure includes roads, recreation facilities such as parks and sportsgrounds, and community facilities such as meeting halls and libraries.

Council wishes to promote economic development of the Shire, but also considers that is important for new developments to make a reasonable contribution toward the provision of new and / or augmented Local Infrastructure to meet the demands of new housing and employment developments.

Subdivision 3 of Division 6 of Part 4 of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**) authorises a Consent Authority to grant consent to a proposed development subject to a condition requiring contributions of land and / or money for:

- the provision, extension or augmentation of Local Infrastructure in the area; or
- the recoupment of the cost of existing Local Infrastructure in the area.

These contributions are known as section 94 contributions and section 94A levies.

Where the Consent Authority is a council or an Accredited Certifier, a Local Infrastructure contribution may be imposed on a development only if it is of a kind allowed by and determined in accordance with a contributions plan, such as this Plan.

The Plan authorises Council or an Accredited Certifier to impose conditions on Development Consents or Complying Development Certificates requiring:

- section 94 contributions from Heavy Haulage Developments;
- section 94 contributions from certain types of Residential Accommodation developments; and
- section 94A levies for other types of development.

This Plan has been prepared in accordance with the EP&A Act and *Environmental Planning and Assessment Regulation 2000* (**EP&A Regulation**); and having regard to the latest development contributions Practice Notes issued by the NSW Department of Planning and Infrastructure.

This Plan sets out:

- a Local Infrastructure program for Blayney Shire that will meet both existing demands and the projected demands arising from expected development in the Shire;
- formulas used to determine section 94 contributions;
- section 94 contribution rates and section 94A levy rates for the anticipated types of development in the area;
- maps showing the location of the Local Infrastructure items proposed to be provided by Council supported by a works schedule setting out an estimate of their cost and staging; and

- administrative and accounting arrangements applying to contributions and levies.

1.2 Summary of contribution and levy rates

Table 1.1 Monetary contribution rates for development

Contribution type / Development type	Levy rate
Section 94 contributions	
Residential Accommodation development resulting in additional dwellings or lots	$5,648 per dwelling or lot
Heavy Haulage Development	$0.20 per ESA per km of regional sealed road $0.33 per ESA per km of local sealed road $0.20 per ESA per km of local gravel road
Section 94A levies	
Development that is not Type A or B, and where the proposed cost of carrying out the development:	
▪ is more than $100,000 and up to and including $200,000	0.5% of that cost
▪ is more than $200,000	1% of that cost

Notes:

(1) Also refer to development exclusions identified in clause 2.8

(2) ESA means Equivalent Standard Axle

1.3 Calculating a contribution under this Plan

Contribution rates for different development types are shown in the tables in clause 1.2 of this Plan.

A development can only be the subject of either a section 94 contribution or a section 94A levy, not both.

1.3.1 Type A development

Under this Plan, section 94 contributions shall apply to Residential Accommodation development that will or is likely to require the provision of or increase the demand for Local Infrastructure within the Blayney Shire. In practical terms, this means any Residential Accommodation development that would, if approved, result in additional dwellings or result in additional lots with a dwelling entitlement.

The total section 94 contribution levied for any individual development is the contribution calculated using the rates shown in Table 1.1, less any allowance for assumed Local Infrastructure demand arising from existing Residential Accommodation developments on the land.

For example, where it is proposed to create 5 new residential allotments out of a single existing residential allotment, the assumed infrastructure demand for the existing single allotment will be disregarded in the calculation of the section 94 contribution. That is, the contribution would be the section 94 contribution $ rate for Type A development in Table 1.1 multiplied by 4.

The section 94 contribution rates shown in Table 1.1 reflect the contribution rates at the date that the Plan commenced. These rates are regularly adjusted for inflation in accordance with the provisions of clause 2.17 of this Plan. Applicants should inquire at the Council for information on the latest contribution rates.

1.3.2 Type B development

Section 94 contributions for Heavy Haulage Development are levied on the basis of:

- the location of the development site;
- the anticipated cost of upgrading and maintaining sealed regional and rural roads;
- the periodic laden heavy vehicle movements generated by the development; and
- the length of sealed and gravel rural roads used by laden heavy vehicles generated by the development.

The formula for calculating a contribution under this Plan is included in clause 3.5.5 of this Plan.

The contribution rates values used in the examples shown in clause 3.5.6 of the Plan reflect the contribution rates at the time that the Plan commenced. Rates are regularly adjusted for inflation in accordance with the provisions of clause 2.17 of this Plan. Applicants should inquire at the Council for information on the latest contribution rates.

1.3.3 Type C development

Under this Plan, section 94A levies apply to development that is not Type A or B development, and which also has a proposed cost of development in excess of $100,000.

The total section 94A levy for any individual development is the monetary contribution determined by applying the applicable levy rate in Table 1.1 to the proposed cost of the development.

There is no allowance for assumed existing infrastructure demand in the calculation of any section 94A levy.

Further details on the calculation of section 94A levies are included in clause 2.15 of this Plan.

2. Administration and operation of this Plan

2.1 Definitions used in this Plan

In this Plan, the following words and phrases have the following meanings:

Accredited Certifier has the same meaning as in the EP&A Act.

Complying Development has the same meaning as in the EP&A Act.

Complying Development Certificate has the same meaning as in the EP&A Act.

Consent Authority has the same meaning as in the EP&A Act but also includes an Accredited Certifier responsible for issuing a Complying Development Certificate.

Council means Blayney Shire Council.

CSP means Community Strategic Plan

Development has the same meaning as in the EP&A Act.

> **development** means:
> (a) the use of land, and
> (b) the subdivision of land, and
> (c) the erection of a building, and
> (d) the carrying out of a work, and
> (e) the demolition of a building or work, and
> (f) any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument,
> but does not include any development of a class or description prescribed by the regulations for the purposes of this definition.

Development Application has the same meaning as in the EP&A Act.

Development Consent has the same meaning as in the EP&A Act.

Dwelling has the same meaning as in the Standard Instrument.

EP&A Act means the Environmental Planning and Assessment Act 1979.

EP&A Regulation means the Environmental Planning and Assessment Regulation 2000.

ESA means the Equivalent Standard Axles, which is a measure used to describe the life of a section of road.

Heavy Haulage Development means any of the following developments that are defined in the Blayney Local Environmental Plan 2012:

(a) extractive industry,

(b) forestry,

(c) landscaping material supplies,

(d) industry,

(e) mining,

(f) rural industry,

(g) timber yards, and

any other development that involves the movement of laden heavy vehicles.

LGA means local government area.

Local Infrastructure means public amenities and public services that are traditionally the responsibility of local government, excluding water supply or sewerage services.

Local Infrastructure Contribution includes a contribution imposed on a Development Consent by a Consent Authority under section 94 or section 94A of the EP&A Act.

Minister means the Minister for Planning.

Planning Agreement has the same meaning as in section 93F of the EP&A Act.

Residential Accommodation has the same meaning as in Blayney Local Environmental Plan 2012.

Self-contained Dwelling has the same meaning as in *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004*.

Seniors Housing has the same meaning as in Blayney Local Environmental Plan 2012.

Standard Instrument means the Standard Instrument – Principal Local Environmental Plan referred to in clause 3 of the *Standard Instrument (Local Environmental Plans) Order 2006* amended from time to time in accordance with section 33A of the EP&A Act.

2.2 Local Infrastructure addressed by this Plan

The types of Local Infrastructure which are covered by this Plan are as follows:

- Roads and traffic facilities, including the provision, extension and augmentation of existing roads and intersections.
- Social infrastructure, including upgraded parks, sports fields and other recreation areas; and community facilities, including community centres, amenities buildings and halls.

2.3 Name of this Plan

This Plan is called the Blayney Local Infrastructure Contributions Plan 2013.

2.4 Purposes of this Plan

The primary purpose of the Plan is to authorise:

- the Council, when granting consent to an application to carry out development to which this Plan applies; or
- an Accredited Certifier, when issuing a Complying Development Certificate for development to which this Plan applies,

to require a Local Infrastructure Contribution to be made towards:

- the provision, extension or augmentation of Local Infrastructure; or
- the recoupment of the previous costs incurred in providing existing Local Infrastructure.

Other purposes of the Plan are:

- to provide the framework for the efficient and equitable determination, collection and management of Local Infrastructure Contributions;
- to ensure that development makes a reasonable contribution toward the provision of Local Infrastructure that is required to meet the demands of that development;
- to ensure that the existing community is not unreasonably burdened by the provision of Local Infrastructure required (either partly or fully) as a result of development in the area;
- to inform other Consent Authorities' consideration of contributions requirements for development of land within or adjoining Blayney LGA and which impacts on the Local Infrastructure provided by Blayney Shire Council; and
- to ensure Council's management of Local Infrastructure Contributions complies with relevant legislation and practice notes, and achieves best practice in plan format and management.

2.5 Commencement of this Plan

This Plan commences on 12 September 2013.

2.6 Land to which this Plan applies

This Plan applies to all land within the Blayney LGA.

2.7 Development to which this Plan applies

Except as provided for by clause 2.8, this Plan applies to both:

- Type A development, being Residential Accommodation development that will or is likely to require the provision of or increase the demand for Local Infrastructure within the Blayney Shire; and
- Type B development, being Heavy Haulage Development,

insofar as the Plan authorises the imposition of a requirement for a section 94 contribution.

Except as provided by clause 2.8, this Plan also applies to Type C development - being other development that has a proposed cost of $100,000 or more - insofar as the Plan authorises the imposition of a requirement for a section 94A levy.

2.8 Development exempted from contributions under this Plan

This Plan does not apply to:

- Residential Accommodation development that does not involve the creation of an additional developable lot or an additional dwelling;
- Seniors Housing development (other than Self-contained Dwellings forming part of Seniors Housing development);
- development exempted from Local Infrastructure Contributions by way of a Direction made by the Minister for Planning under section 94E of the EP&A Act;

2.9 Relationship to other contributions plans

This Plan repeals the following Council contributions plans:

- BSC1 Rural Roads
- BSC 2 Blayney Streets
- BSC 3 Villages Streets
- BSC 7 Open Space
- BSC 9 William Street Millthorpe
- BSC 10 Community Facilities

This Plan has no effect on any other contributions plan prepared and adopted by the Council under the EP&A Act.

Clause 2.26 of this Plan contains a transitional provision consequent upon the making of this Plan.

2.10 Formulas used for determining section 94 contribution rates applicable under this Plan

Under this Plan, section 94 contributions apply to Type A and B developments described in clause 2.7.

The section 94 contribution rates for these developments have been based on the costs and demand assessments for these development types.

Formulas used to determine contribution rates are described in clauses 3.4.1 and 3.5.5 of this Plan.

2.11 Local Infrastructure Contributions may be required as a condition of Development Consent

This Plan authorises the Council or an Accredited Certifier, when determining an application for development or an application for a Complying Development Certificate relating to Type A or B development, and subject to other provisions of this Plan, to impose a condition requiring a **section 94** monetary contribution on that development to enable the provision of Local Infrastructure identified in this Plan.

This Plan also authorises the Council or an Accredited Certifier, when determining an application for development or an application for a Complying Development Certificate relating to Type C development, and subject to other provisions of this Plan, to impose a condition requiring the payment of a monetary contribution that is a **section 94A** levy.

This Plan also authorises the Council or an Accredited Certifier to require monetary contributions from development towards recouping the cost of the provision of existing Local Infrastructure that has been provided by the Council for or to facilitate the carrying out of development and which the development will benefit from.

A section 94A levy cannot be required in relation to development if a section 94 contribution is required in relation to that development.

The types of development affected by **either** section 94 contributions or section 94A levies, and the contribution rates applying to different development types, are identified in clauses 1.2, 2.7 and 2.8 of this Plan.

Accredited Certifiers should also refer to clause 2.16 of this Plan as to their obligations in assessing and determining applications subject to Local Infrastructure Contributions authorised by this Plan.

Unless otherwise specified, references to monetary contributions in this Plan include both section 94 and section 94A contribution types.

2.12 Roadworks may be required to be undertaken in addition to contributions required under this Plan

The Blayney Shire road network has been constructed and is maintained by Council as necessary to ensure an acceptable standard of service. These roads may or may not be able to accommodate additional heavy vehicle loading generated by Heavy Haulage Development at their current standard. New roads, or upgrades to sections of the existing road network may be required to accommodate the additional heavy vehicle loading. Unformed, natural material roads may also be required to be sealed in order to accommodate the extra heavy vehicles.

Where any development requires capital works to the road network to be undertaken, the requirement will be by way of a condition imposed on the development consent under section 80A(1)(f) of the EP&A Act.

Where the development is a Type B development described in clause 2.7 of this Plan, that development may also be subject to a condition requiring payment of monetary contributions under this Plan for both:

- the section(s) of any new or upgraded road constructed by the developer under a section 80A(1)(f) condition; and
- for the other sections of the road network likely to be used for haulage purposes.

2.13 Planning Agreements

Planning Agreements are an alternative means available to developers to provide Local Infrastructure Contributions or other public purposes in connection with their developments.

Nothing in this Plan prevents the Council and a developer from entering into a Planning Agreement that:

- requires the developer to make monetary contributions, undertake works or provide material public benefits for Local Infrastructure; and / or
- excludes the operation of section 94 or section 94A of the EP&A Act to the development.

A Planning Agreement for Type B developments may address, for example, a situation where the vehicle loadings in a proposed heavy haulage development can be more accurately measured by audited weighbridge receipts instead of the traffic classifier method included in this Plan.

Any Planning Agreement proposed by a developer must comply with Council's Policy on Planning Agreements available from Council's administration centre.

2.14 Cooperative approach to the impacts on Local Infrastructure

Development may be proposed in Blayney LGA that has the potential to impact on the standard and condition of Local Infrastructure that is provided in adjoining LGAs. Similarly, development may be proposed in adjoining LGAs that impact on the standard and condition of Local Infrastructure provided in Blayney LGA. An example of this in a rural area such as Blayney is the impact on road networks generated by major heavy haulage development such as mines.

Council will work cooperatively with adjoining local councils and other Consent Authorities to ensure that anticipated Local Infrastructure impacts generated by developments are satisfactorily addressed.

This may include, but not be limited to:

- imposition of consent conditions requiring monetary contributions the same as or similar to the contributions authorised by this Plan; and
- negotiation of Planning Agreements between planning authorities and developers requiring the provision of development contributions or public purposes by developers

2.15 Additional provisions for section 94A levies

This clause applies only in respect to the calculation of section 94A levies for Type C developments.

2.15.1 Determining the proposed cost of carrying out development

Section 94A levies are calculated as a percentage of the cost of development.

Clause 25J of the EP&A Regulation sets out how the proposed cost of carrying out development is determined.

2.15.2 Cost Summary Report must accompany development application

A Development Application or application for a Complying Development Certificate shall be accompanied by a Cost Summary Report, prepared at the applicant's cost, setting out an estimate of the proposed cost of carrying out the development.

The Cost Summary Report shall be in accordance with Appendix A of this Plan.

Council will validate all Cost Summary Reports before they are accepted using a standard costing guide or other generally accepted costing method. Should the costing as assessed by Council be considered inaccurate, Council may, at its sole discretion and at the applicant's cost, engage a person referred to in clause 2.15.3 to review a Cost Summary Report submitted by an applicant.

2.15.3 Who may provide a Cost Summary Report?

The following persons are approved by the Council to provide an estimate of the proposed cost of carrying out development:

- where the applicant's initial estimate of the proposed cost of carrying out the development is less than $1,000,000 – any building industry professional; or

- where the applicant's initial estimate of the proposed cost of carrying out the development is $1,000,000 or more – a quantity surveyor who is a registered member of the Australian Institute of Quantity Surveyors.

2.16 Obligations of Accredited Certifiers

2.16.1 Complying Development Certificates

This Plan requires that, in relation to an application made to an Accredited Certifier for a Complying Development Certificate:

- the Accredited Certifier must, if a Complying Development Certificate is issued, impose a condition requiring a monetary contribution, if such a contribution is authorised by this Plan;
- the amount of the monetary contribution that the Accredited Certifier must so impose is the amount determined in accordance with this clause; and
- the terms of the condition be in accordance with this clause.

Procedure for Accredited Certifier to determine the amount of the section 94 monetary contribution for Type A or B development

1. If, and only if specified in writing in the application for a Complying Development Certificate, the applicant has requested a credit under section 94(6) of the EP&A Act or an exemption of part or the whole of the development under clause 2.8 of this Plan, the Accredited Certifier must:

    (a) make a request in writing to the Council for the Council's advice on whether the request is granted, or the extent to which it is granted; and

    (b) in calculating the monetary contribution, comply with the Council's written advice or if no such advice has been received prior to the granting of the Complying Development Certificate, refuse the applicant's request.

2. Determine the unadjusted section 94 contributions in accordance with the rates included in Table 1.1 of this Plan taking into account any exempt development specified in clause 2.8 and any advice issued by the Council under paragraph 1(b) above.

3. Adjust the calculated contribution in accordance with clause 2.17 to reflect the indexed cost of the provision of infrastructure.

4. Subtract any credit advised by the Council under paragraph 1(b), or any assumed Local Infrastructure demand relating to existing Type A development.

Procedure for Accredited Certifier to determine the amount of the section 94A levy for Type C development

1. Ensure that the development is not subject to a section 94 contribution under this Plan or any other section 94 contributions plan adopted by the Council and that remains in force.

2. Determine the section 94A levy in accordance with the Cost Summary Report prepared by or on behalf of the applicant under clause 2.15.2 of this Plan; the levy rates included in Table 1.1 of this Plan; and taking into account any exempt development specified in clause 2.8.

Terms of a section 94 condition or section 94A condition

The terms of the condition required by this clause are as follows:

Contribution

The developer must make a monetary contribution to Blayney Shire Council in the amount of $ [insert amount] *for the purposes of the Balyney Local Infrastructure Contributions Plan 2012.*

Indexation

The monetary contribution must be indexed between the date of this certificate and the date of payment in accordance with the provisions of Blayney Local Infrastructure Contributions Plan 2012.

Time for payment

The timing of payments shall be in accordance with the Council's policy contained in Blayney Local Infrastructure Contributions Plan 2012. Deferred payments of contributions may be accepted in certain circumstances and will need to secured by bank guarantee. Refer to Blayney Local Infrastructure Contributions Plan 2012 for Council's policy on deferred payments.

Works in kind agreement

This condition does not need to be complied with to the extent specified in a works in kind agreement between the developer and the Council as allowed by Blayney Local Infrastructure Contributions Plan 2012.

2.16.2 Construction Certificates

It is the responsibility of an Accredited Certifier issuing a Construction Certificate for building work or subdivision work to ensure that each condition requiring the payment of a monetary contribution before work is carried out has been complied with in accordance with the Complying Development Certificate.

The Accredited Certifier must ensure that the applicant provides a receipt (or receipts) confirming that contributions have been fully paid and copies of such receipts must be included with copies of the certified plans provided to the Council in accordance with clause 142(2) of the EP&A Regulation. Failure to follow this procedure may render such a certificate invalid and expose the certifier to legal action.

The only exceptions to the requirement are where a work in kind, material public benefit, dedication of land and/or deferred payment arrangement has been agreed by the Council. In such cases the Council will issue a letter confirming that an alternative payment method has been agreed with the applicant.

2.17 Indexation of section 94 contribution rates included in this Plan

In accordance with clause 32(3)(b) of the EP&A Regulation, Council may, without the necessity of preparing a new or amending contributions plan, make changes to the section 94 contribution rates set out in this Plan to reflect annual variations to the Consumer Price Index (All Groups Index) for Sydney as provided by the Australian Bureau of Statistics.

2.18 Indexation of monetary contributions required by a condition imposed under this Plan

A monetary Local Infrastructure Contribution that is required by a condition of Development Consent imposed in accordance with this Plan will be indexed between the date of the grant of the Development Consent and the date on which the contribution is paid in accordance with the Consumer Price Index (All Groups Index) for Sydney as provided by the Australian Bureau of Statistics.

2.19 Timing of payment of monetary contributions required under this Plan

A monetary contribution required to be paid by a condition imposed in accordance with this Plan is to be paid as follows:

- For development involving subdivision – the contribution must be paid prior to the release of the subdivision certificate (linen plan).
- For development not involving subdivision, but where a Construction Certificate is required, the contribution must be paid prior to the release of the Construction Certificate.
- For other development, the contribution must be paid prior to the commencement of the use or occupation of premises.
- For Type B development, monetary contributions will be paid within 28 days of the developer's receipt of a quarterly notice from the Council stating the contribution amount pursuant to the previous quarter's heavy haulage vehicle activity.

2.20 Policy on deferred or periodic payments

The applicant or any other person entitled to act upon a Development Consent containing a monetary contribution condition imposed in accordance with this Plan may apply in writing to the Consent Authority, other than an Accredited Certifier, under section 96 of the EP&A Act to modify the condition to provide for the deferred or periodic payment of the contribution.

If it agrees to a deferred or periodic payment request, Council will require the applicant to provide a bank guarantee by a bank or a financial institution for the full amount of the contribution or the outstanding balance.

Council is mindful of the need to stimulate housing development by the efficient creation of new housing lots in the Shire. Council will therefore consider proposals to defer the payment of part or all section 94 contributions imposed on Residential Accommodation developments until the point of sale of the residential allotments in the development. Acceptance of this type of proposal shall be subject to the following, and any other condition Council thinks fit:

- The applicant providing to Council a bank guarantee by a bank or a financial institution for the full amount of the contribution or the outstanding balance.
- Payment of contributions being made to the Council on an allotment by allotment basis within 30 days of the settlement of the first sale of each allotment.
- The contribution amount paid for each allotment shall be indexed from the date of Development Consent to the date of payment to reflect quarterly variations in the Consumer Price Index (All Groups Index) for Sydney as published by the Australian Bureau of Statistics.

- Payment of the indexed, total contribution amount for all the allotments shall be made in full within 36 months of the date of release of the subdivision certificate. Where payment is not received for all of the allotments within 36 months of the date of release of the subdivision certificate, Council will call on the bank guarantee to recoup that part of the total contributions amount that has not been paid.

2.21 Material public benefits and dedication of land offered in part or full satisfaction of contributions

A person may make an offer to the Council to carry out works or provide another kind of material public benefit or dedicate land, in lieu of making a contribution in accordance with a condition imposed under this Plan.

Any offer shall be made in writing to the Council.

If the offer is made prior to the issue of a Development Consent then the offer must be made by way of a Planning Agreement, and the Council will consider the request as part of its assessment of the development application.

The Council will take into account the following matters in deciding whether to accept an offer of material public benefit:

- the overall benefit of the proposal; and
- the financial implications for cash flow and the continued implementation of this Plan's works schedule (including whether the Council would need to make up for any shortfall in contributions by its acceptance of the offer).

If Council approves the offer then it will require the applicant to enter into a written agreement for the provision of the works, land or material public benefit or in a suitable time period. If the offer is made by way of a draft Planning Agreement under the EP&A Act, the Council will require the agreement to be entered into and performed via a condition in the development consent.

The value of any works, land or material public benefit offered by the applicant may, at Council's discretion, be used to offset monetary contributions applicable to the development under this Plan.

Also, where the Council or another Consent Authority requires as a condition of Development Consent an applicant to carry out works in relation to that development, and those works are listed in this Plan's works schedule, the Council may use the value of those works to offset the monetary contributions applicable to the development.

The value of any works, land or material public benefit will be determined by a process agreed to between the Council and the applicant.

2.22 Policy on timing of provision of road infrastructure identified in this Plan

This Plan addresses the provision, upgrading and maintenance of the Shire's road network that is required as a result of Type B development.

Type B developments can be located anywhere within the Shire. Similarly, Council is responsible for the provision, upgrading and maintenance of the vast majority of roads existing in the Shire.

Council will therefore expend contributions collected, and deliver roads infrastructure, under this Plan in a manner that takes account of:

- the location of the contributing Type B developments;
- the likely impact of heavy haulage movements from those developments on specific sections of the Shire road network; and
- the requirement to provide the public amenities and services within a reasonable time.

Council will therefore plan the expenditure of funds collected from Type B developments under this Plan on an annual basis in response to these factors.

The planned expenditure program will be published in Council's draft Management Plan, which will allow for public input into proposed spending priorities.

2.23 Pooling of monetary contributions

This Plan authorises monetary contributions paid for different purposes in accordance with the conditions of various Development Consents authorised by this Plan and any other contributions plan approved by the Council from time to time (whether or not such a plan is one that is repealed by this Plan) to be pooled and applied progressively for those purposes.

The priorities for the expenditure of pooled monetary contributions under this Plan are the priorities for works as set out in the works schedule to this Plan.

2.24 Accountability and access to information

Council is responsible for the maintenance of an accurate and up-to-date register of all Local Infrastructure Contributions. This register details:

- each Development Consent which contains a Local Infrastructure Contribution condition;
- the nature and extent of the contribution required by the condition; and
- the date on which a Local Infrastructure Contribution required by any such condition was received, and its nature and extent.

The register is available for inspection by any person at Council's offices free of charge at any time during normal office hours.

The Council must also maintain accounting records that indicate:

- the various kinds of Local Infrastructure for which expenditure is authorised by the Plan;
- the monetary contributions received under the Plan, by reference to the various kinds of Local Infrastructure for which they have been received;
- in respect of monetary contributions paid for different purposes, the pooling or progressive application of the contributions for those purposes, in accordance with any requirements of the Plan or any Ministerial direction under the EP&A Act; and
- the amounts spent in accordance with this Plan, by reference to the various kinds of Local Infrastructure for which they have been spent.

2.25 Review of Plan without the need for public exhibition

Pursuant to clause 32(3) of the EP&A Regulation, Council may make certain minor adjustments or amendments to the Plan without prior public exhibition and adoption by Council. Minor adjustments could include minor typographical corrections, amendments to rates resulting from changes in the published indexes adopted by this Plan (see clause 2.15).

2.26 Savings and transitional arrangements

This Plan applies to both:

- a Development Application or application for a Complying Development Certificate submitted after the date on which this Plan took effect; and
- a Development Application or application for a Complying Development Certificate submitted, but not yet determined, on or before the date on which this Plan took effect.

3. Local Infrastructure demands

Local Infrastructure Contributions are requirements imposed on the developers of land in a council area.

Contributions of land, money or works by developers are required by a council to meet the extra demand on Local Infrastructure resulting from new development. Councils impose these requirements on developments through section 94 or section 94A conditions of consent.

Council has prepared this Plan in a way that responds to the locations, types, and scale of expected development in the Blayney LGA in the future.

This Part discusses the existing and future context for development in Blayney LGA, and describes the relationship between anticipated development and future infrastructure needs in Blayney LGA.

3.1 Expected development

3.1.1 Settlement pattern and population

The Shire of Blayney (that is, Blayney LGA) is situated about 240 kilometres from Sydney in the Central Tablelands of New South Wales. It has an area of approximately 1,600 km^2.

Blayney LGA had an estimated resident population of approximately 7,200 residents in 2011, of whom almost 40% lived in the town of Blayney.[1] Other communities in the LGA include Millthorpe, Carcoar, Mandurama, Neville, Lyndhurst, Newbridge, Hobbys Yards and Barry.

Figure 3.1 shows the relative population size and location of the main settlements in relation to each other and to the larger centres located outside of the Shire.

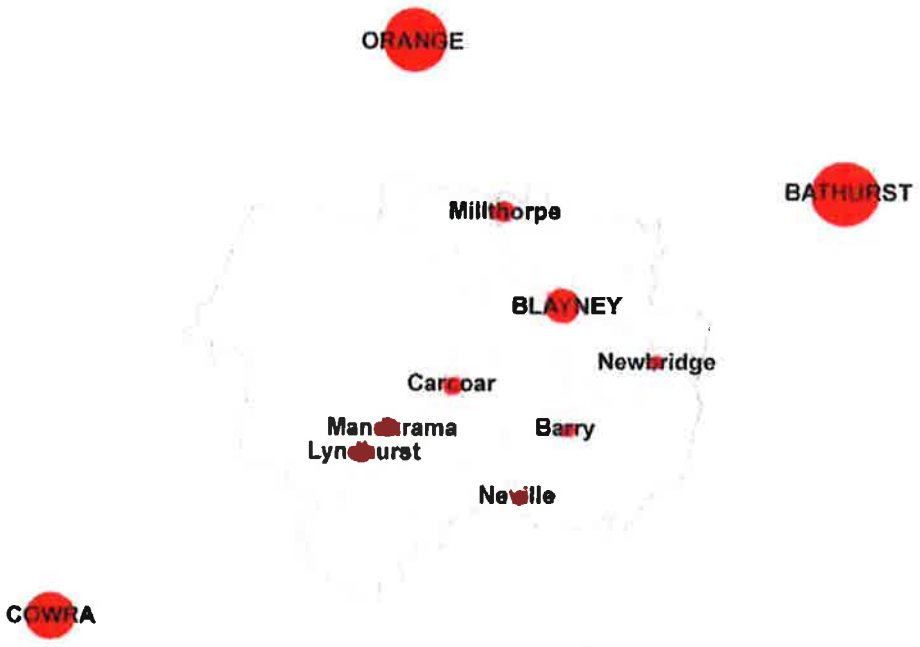


Figure 3.1 Blayney Shire settlement pattern

[1] Blayney Urban Centre / Locality had a population of 2,800 persons at the 2011 Census

The Blayney LGA estimated resident population has increased significantly in recent years, possibly reflecting the economic opportunities available in the surrounding area. The population increased 1 percent per annum between 2001 and 2011, as shown in Table 3.1.

Table 3.1 Estimated resident population, Blayney LGA 2001-2011

	Estimated resident population at 30 June				
	2001	2006	2011	Change 2001-2011	
	no.	no.	no.	%	no.
Blayney LGA	6,530	6,877	7,186	10.0	656

Source: ABS Catalogue No. 3218.0 *Regional Population Growth, Australia*. Issued 31 July 2012. Table 1. Estimated Resident Population, Local Government Areas, New South Wales

This recent population growth is compared to recent published population projections for the area by the Department of Planning (2010), Western Research Institute (2008) and Blayney Shire Council (2012). Table 3.2 shows those projections.

Table 3.2 Blayney LGA published population projections

Year	Department of Planning	Western Research Institute 'Scenario B'	Blayney Shire Council Settlement Strategy
2011	7,000	7,186	6,793
2016	7,100	7,455	6,999
2021	7,200	7,636	7,212
2026	7,200	7,714	7,431

Sources: *NSW SLA Population Projections, 2006-2036*, LGA Summary, Version 1.0, NSW Department of Planning, 2010; *CENTROC Population Projections* (Western Research Institute: Dec 2008); and *Blayney Settlement Strategy (Final)* adopted January 2012

Residential growth in the Blayney LGA is predicted to be predominantly in the eastern and northern areas of the LGA. This growth reflects these areas proximity to the major regional centres of Orange and Bathurst. This residential growth will be both in urban towns and villages and as rural residential development, and will lead to an expectation of enhanced services to service this new development. In other areas of the LGA, in both urban and rural area, there is not predicted to be significant change to existing residential trends, with existing population remaining static or with negligible population growth.[2]

The Department of Planning projections in Table 3.2 above show Blayney LGA's population of 7,200 being reached in 2021 and that population level being maintained until at least 2026. Yet the latest resident population data indicates that this level of population was already achieved in 2011. In contrast, the Western Research Institute and Blayney Settlement Strategy projections cited in Table 3.2 incorporate population growth rates of 0.7 and 0.6 percent respectively.

Assuming a continuation of a healthy local and regional economy, it would be reasonable to expect LGA annual population growth rates to be maintained at between 0.5 and 1.0 percent per annum over the next decade. If this is achieved, Blayney LGA's future population would be in excess of 7,500 persons.

For the purpose of apportioning infrastructure demand and costs, this Plan assumes a future (2021) Blayney LGA population of 7,500.

[2] Blayney Shire Council Transportation Asset Management Plan 2010, page 19

3.1.2 Development profile

Economic development in Blayney LGA is predominately rural in nature, supporting primary industries such as dairying, beef, lamb, wool, viticulture, orchards, potatoes, canola and other grains. Mining is also a key industry and the area supports other industrial activities such as manufacturing, transportation and food processing. Smaller sectors include hospitality and retail[3].

There is significant mineral potential in the geology of Blayney. The Shire is broadly located in the geological area known as the Lachlan Orogen Belt which is one of the more metallic mineral provinces in Australia. This belt has historically yielded significant amounts of gold and copper.[4]

Blayney's mineral wealth has the potential to result in the creation of large scale mining operations that increase employment, economic growth and prosperity in the Shire. Recent growth in the Central West region can be partly attributed to the large mines such as Cadia-Ridgeway. In 2003/04 the Cadia Hill and Ridgeway Mines were estimated to produce $803 million in annual direct and indirect regional business turnover. Additionally, it was estimated that this resulted in the direct and indirect employment of 2,303 persons. The operator of Cadia – Ridgeway is planning an additional two major future development projects including the Ridgeway Deeps and Cadia East Underground which has a potential mine life to approximately 2030.

More recently, there is interest from Regis Mining Resources for an open pit, gold-bearing ore mine at McPhillamy's / Kings Plains. If this project were to commence, it is expected to result in a significant increase in LGA employment.

Newer resource industries such as wind farms have already been established in Carcoar. At the time of writing this Plan, there was a proposal for a future wind farm at Flyer's Creek, with an estimated capital investment of $160-200 million.

Table 3.3 shows selected statistics on development in Blayney LGA between 2007 and 2012.

Table 3.3 Development indicators – Blayney LGA 2007-2012

Year	Total No. dwellings approved	Value of all new residential building	Value of alterations and additions	Total value of residential building	Value of non-residential building	Value of all building
	No.	$'000	$'000	$'000	$'000	$'000
2007 – 2008	43	9,183.9	2,221.4	11,405.3	2,561.0	13,966.3
2008 -2009	39	8,902.0	1,100.0	10,002.1	10,458.4	20,460.4
2009 – 2010	28	6,427.8	1,097.3	7,525.1	8,634.2	16,159.4
2010 - 2011	32	8,124.0	1,379.1	9,503.0	8,832.5	18,335.5
2011 - 2012	65	16,472.3	2,617.9	19,090.2	8,496.5	27,586.7

Source: *Building Approvals - Australia*, Australian Bureau of Statistics Catalogue No. 8731.0

Assuming economic conditions remain favourable, new industries and new or expanded mines and related industrial and supplier enterprises may be expected to establish in Blayney LGA in the future.

[3] Blayney Shire 2025 – All the pieces together 2012
[4] Blayney Settlement Strategy 2012

Housing and other development that serves or otherwise responds to local economic growth is also expected to occur in Blayney LGA in the future. Potentially this will include:

- Various types of accommodation including new dwellings.
- New and expanded tourism and visitor accommodation, including motels, serviced apartments and caravan parks.
- New and expanded industrial, retail and commercial services to support the additional population and local business needs.

3.1.3 Household occupancy rates

This Plan authorises the levying of section 94 contributions on certain Residential Accommodation development, being Type A development (refer clause 2.7).

The formula for the calculation of the contribution for Type A developments requires the per person contribution rate to be converted to a per dwelling or per lot rate.

This conversion will be based on an assumed occupancy rate for the dwellings that are to be levied a section 94 contribution. The assumed occupancy rate is the gross household occupancy rate recorded for private occupied dwellings at the 2011 Census – being 2.6 persons per dwelling.[5]

3.2 Local Infrastructure demands generated by expected development

The Blayney Shire LGA has been experiencing development and will continue to accommodate further development into the future.

Future development will impact on the need and demand for Local Infrastructure provided by the Council.

Council has identified that expected future development will generate increased demand for, and therefore a need to upgrade, the following Local Infrastructure addressed by this Plan; namely:

- Roads and traffic facilities as a result of Type A, B and C developments, specifically the accelerated depreciation costs of roads assets generated by laden heavy haulage vehicles.
- Social infrastructure, such as parks and community buildings, as a result of Type A and C developments.

More detail on the demand for Local Infrastructure, the relationship of the Local Infrastructure with the expected development, and the strategies for the delivery of the Local Infrastructure are discussed in the remainder of Part 3 of this Plan.

[5] 2011 Census QuickStats, accessed on 26 October 2012 at http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/LGA11750?opendocument&navpos=220

3.3 Council's strategic infrastructure issues, values and priorities

3.3.1 Community Strategic Plan

Council in 2011 prepared a Community Strategic Plan (**CSP**) called *Blayney 2025 – All the pieces together*. CSPs are part of the Integrated Planning and Reporting framework being rolled out throughout all NSW councils.

The purpose of the CSP is to identify the community's main priorities and aspirations for the future and to plan strategies for achieving these goals. In doing this, the planning process will consider the issues and pressures that may affect the community and the level of resources that will realistically be available to achieve its aims and aspirations.[6]

The contents of a council's Local Infrastructure Contributions plan should be informed by the values and aspirations expressed in its CSP. The anticipated revenue from this Plan informs the Resourcing Strategy. This Plan therefore integrates development funding matters into the Council's CSP and associated documents.

The CSP describes 'Develop and maintain Shire infrastructure' as one of 6 community values underpinning that plan.

Key related issues include the following:

- The need to provide well-coordinated and adequate community services and facilities to service and assist existing families and to encourage new residents to the LGA.
- Providing the necessary infrastructure to sustain and strengthen the area's key business sectors.

The CSP articulates a set of strategies and outcomes that respond to these issues, including several relating to infrastructure planning and provision, and to local governance. They include the following:

Outcomes:

- Grow the wealth of the Shire
- A centre for sports and culture
- Preserve and enhance our heritage and rural landscapes
- Develop and maintain Shire infrastructure
- Develop strong and connected communities
- Leadership

Strategies to develop and maintain Shire infrastructure:

- Adequate provision of transport, roads, rail, information and communication technologies and community social assets.
- Every village has access to water and sewerage services.
- Improved access to community and public transport between villages and centres.

[6] Planning and Reporting Guidelines for Local Government in NSW, prepared by The Division of Local Government, Department of Premier and Cabinet, January 2010, page 7

- Integrated medical and aged care facilities across the Shire.
- Preservation and continued development of rail infrastructure
- Sustainable waste management.

This Plan seeks to implement the CSP in the following ways:

- By authorising monetary contributions to be imposed on development that, when received by Council, will be directed towards the strategic Local Infrastructure priorities of the Council.
- By ensuring that developments contribute their fair share toward the cost of providing Local Infrastructure that is demanded by Blayney's communities.
- By assisting Council in achieving its Resourcing Strategy and Long Term Financial Plan targets.

3.3.2 Asset Management Plans

Asset Management Plans have been prepared for all Council's physical assets to outline the management of assets in the most cost effective manner, to monitor performance and to ensure that there is a link between the plans and Council's long term financial plans.

Council's goal in managing infrastructure assets is to meet the required level of service in the most cost effective manner for present and future consumers.

Council has prepared the following Asset Management Plans that are relevant Local Infrastructure assets:

- Transport assets (mainly roads and bridges)
- Parks and gardens assets
- Buildings and other structures assets

All of the plans show that, over the ten year plan period, the life cycle cost to provide the service category is in excess of the Council's planned life cycle expenditure for the service category.

Council's Asset Management Strategy found that:

- Council is unable to maintain current service levels over the next ten years at current funding levels.
- Council is not able to fund current infrastructure life cycle cost at current levels of service and available revenue.

Council will pursue a suite of strategies to ensure the community obtains maximum value from its limited infrastructure budget.[7] One of those strategies is to seek additional funding. Without funding from other sources, including Government grants and subsidies and development contributions, infrastructure service levels are likely to deteriorate.

This Plan supports Council's Asset Management Plans by securing a relatively minor stream of funding to ensure there is no worsening of the gap between life cycle projected costs and planned expenditure of Local Infrastructure as a consequence of future development.

[7] See, for example, pages iv and v of the Parks and Gardens Asset Management Plan

3.4 Local Infrastructure program for Type A and C developments

Parks and Gardens

Council provides the following array of parks and gardens facilities:

- Parks and Reserves: Infrastructure associated with recreation parks and reserves in Blayney and villages, including Millthorpe Skate Park, play equipment, barbeques, gardens, seating, signage, irrigation systems, monuments, paths, lawns and fencing.
- Blayney and village showgrounds: Includes trotting track, roadways, paths, seating, turf, irrigation system, signage and fencing.
- Sportsgrounds: Infrastructure associated with sporting activities, including ovals, pitches, courts, lighting, irrigation and fencing.
- Street gardens and furniture: Gardens, street furniture, signs and bins located in Blayney and villages.
- Council Buildings: Gardens, lawns, irrigation systems and car parks etc. associated with council buildings, including Council's works depot.
- Cemeteries: Landscaping, roadways, public monuments, bins and fencing in Council owned cemeteries.[8]

Through its *Parks and Gardens Asset Management Plan* Council plans to provide parks and gardens services for the following:

- Operation, maintenance, renewal and upgrade of parks, gardens, reserves, showgrounds, sportsgrounds and other recreational assets to meet service levels set by council in annual budgets.
- Upgrade or renew parks and gardens assets that can't provide the levels of service required by council within the 10 year planning period.[9]

The works schedule (which is incorporated into this Plan) includes both projected capital renewal works program and a capital upgrade / new works program.

Building and Other Structures

Council provides the following array of community buildings:

- Community Halls: Blayney community centre, Blayney Showground Hall, CWA Hall and various village halls.
- Community Facilities: Includes buildings provided by council for the operation of facilities such as the Blayney Shire Library and 'The Cottage' tourist information centre.
- Residential properties: Includes the Inala Aged Units and an obsolete residential property.
- Shelters: Including bus shelters, park picnic / BBQ shelters and the Carcoar Dam and Heritage Park viewing platforms.
- Toilet facilities: Toilet Blocks at various sporting and recreational facilities.
- Sporting facilities: Including Centre Point Leisure Centre, various kiosks / canteens, change / dressing rooms, grandstands and commentator facilities at various sporting grounds throughout the Shire.

[8] *Blayney Shire Council Parks and Gardens Asset Management Plan*, page 10
[9] Ibid., page iv

- Emergency (RFS & SES) buildings: RFS and SES sheds and buildings in Blayney and in villages and localities throughout the Shire.
- Waste management structures: Council owned structures at the Blayney Waste Management Centre.
- Administration / Operations buildings and structures: Council chambers / offices and other council buildings and structures, including office and sheds at council's works depot. [10]

Through its *Building and Other Structures Asset Management Plan* Council plans to provide the following:

- Operation, maintenance, renewal and upgrade of community halls and facilities, shelters, toilets, sporting facilities, emergency services and council administration and works facilities to meet service levels set by Council in annual budgets (which may be less than community expectations).
- Upgrade and integration of council chambers and the new community centre and the renewal of minor sporting facilities and some toilet blocks within the 10 year planning period.[11]

The works schedule (which is incorporated into this Plan) includes both projected capital renewal works program and a capital upgrade / new works program. Defect repair works identified in the Asset Management Plan are not included in the works schedule.

Roads

Council is responsible for the following transport assets:

- Regional and Local Roads: 767 kilometers
- Bridges: 7,013m^2
- Kerb & Gutter: 66 kilometers
- Footpaths: 36,753m^2

The focus of the *Transportation Asset Management Plan* capital works programs is on the management of existing aging infrastructure, with incremental improvements to existing infrastructure to meet increasing customer expectations. Strategic capital works requirements for transport assets are therefore driven by the Blayney LGA population as whole, and not just new development. It follows that the costs of these programs should be met by the projected total population.

For roads assets the focus of the program is on

- Sealing of gravel roads.
- Shoulder sealing (with possible provision of new kerb & gutter) of existing sealed roads to increase safety and load carrying ability.
- Bridge upgrades, primarily undertaken during refurbishment works.
- Upgrade or augmentation of stormwater infrastructure to ensure public safety and property protection objectives are met.[12]

[10] *Blayney Shire Council Building and Other Structures Asset Management Plan*, page 11
[11] Ibid., page iii
[12] *Blayney Shire Council Transportation Asset Management Plan*, pages 19, 20

3.4.1 Calculation of the section 94 contribution rate for Type A developments

Section 94 contributions for Council's Local Infrastructure program will be levied on Type A developments only and applied to works identified in Part 4. Section 94A levies that are collected from Type C developments will also be directed toward the works program in Part 4.

Section 94 monetary contributions for Type A development are calculated on a per person or per resident basis, then factored up to a per lot or per dwelling amount.

The monetary contribution per person in a development containing residential dwellings or lots is calculated as follows:

$$\text{Contribution per resident (\$)} = \frac{\$INF}{P}$$

Where:

$INF = the estimated total $ cost of all of the Blayney LGA Local Infrastructure items included in Part 4 ($10,189,314)

P = the estimated resident population (in persons) that will demand the Local Infrastructure - that is, the expected total future population of the Blayney LGA (7,500)

The per dwelling amount is determined by multiplying the per person contribution by the estimated increase in population as a result of the development (i.e. the assumed occupancy rate of 2.6 persons per dwelling discussed in clause 3.1 of this Plan).

The following workings show the calculation of the section 94 contribution rate:

$$\text{Contribution per resident (\$)} = \frac{\$INF}{P}$$

$$= \frac{\$16,291,900}{7,500}$$

$$= \$2,172$$

$$\text{Contribution per dwelling (\$)} = \$2,172 \times 2.6$$

$$= \$5,648$$

3.5 Contributions rationale and infrastructure program for Type B developments

3.5.1 Basis for imposing contribution requirements on Heavy Haulage Developments

The Shire of Blayney from time to time receives applications for developments that involve the haulage of material using heavy vehicles. These Heavy Haulage Developments can be located anywhere within the rural areas of the Shire.

Concentrated heavy vehicle movements generated by these developments are known to accelerate deterioration of road pavements that were designed to meet demands of rural rather than industrial development.

Councils are not generally able to impose additional fees, charges or rates to meet the extra costs associated with accelerated deterioration of roads caused by heavy vehicle movements from developments, except for development contributions imposed under the EP&A Act. Council therefore will require contributions from developments that generate significant heavy vehicle movements to meet the additional cost burden of providing and maintaining the affected roads in the Shire.

3.5.2 Public amenities and services that will be required as a result of expected Type B development

The existing Shire road network has been generally designed to accommodate the needs generated by rural uses. Blayney Shire Council maintains the rural road types identified in Table 3.4 below.

Table 3.4 Blayney Shire Road Types

Road Class category		Existing road surface	Description in Figure 3.2
1		Sealed 7m wide, 9m formation	Main Arterial
2		Sealed 7m wide, 8m formation	Shire Arterial
3		Sealed 6.5 , 7.5m formation	Collector Road
4		Sealed/unsealed 6m wide, 7m formation	Local Road
5		Sealed/unsealed 6m, 6m formation	Local Road
6		Gravel material, 6m formation	Gravel

Class '1' is part of the NSW State Highway network. These roads are maintained by Council with funding from the NSW Roads and Maritime Services and are therefore not part of this Plan (see section 3.5.4 for additional information).

Class '2' and '3' roads are Blayney Shire's regional/arterial roads. They are sealed (hereafter referred to as 'Rs' roads). Class '4' and '5' roads are local roads. They can also be sealed or

unsealed (hereafter referred to as 'Ls' and 'Lg'). Class '6' type roads are gravel/natural earth and not maintained by Council, therefore do not form part of this plan.

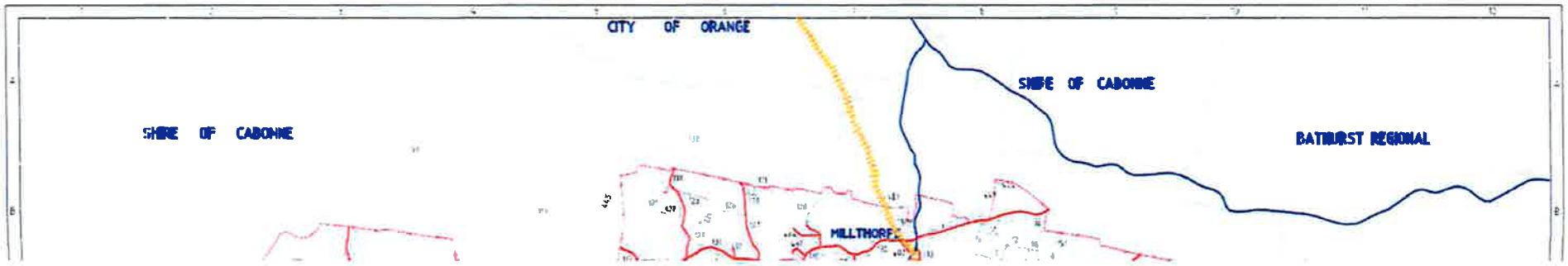
For the purposes of this Plan:

- Type R roads may be used for haulage;
- Type L roads may be used for haulage.

The existing Shire road network is shown in Figure 3.2.

Blayney Shire may accommodate development in the future that will result in accelerated deterioration of the Shire road network. Road surface deterioration is primarily caused by heavy vehicles. Higher numbers of heavy vehicles on roads means Council will need to find additional funds to meet the extra demands placed on the Shire's roads. These funds will be required to maintain the Shire's roads to an acceptable standard.

Future development of the area for the purposes of heavy haulage development can only be sustained by investment in the provision, extension and augmentation of road infrastructure. Council considers it appropriate that Heavy Haulage Developments make a reasonable contribution toward this infrastructure.


CITY OF ORANGE
SHIRE OF CABONNE
SHIRE OF CABONNE
BATHURST REGIONAL
MILLTHORPE

3.5.3 The impact of expected development on road infrastructure

Heavy vehicle use occasions greater road maintenance expenditure

Council has a responsibility to maintain the Shire's road infrastructure to an acceptable standard; i.e. to ensure roads:

- are kept to an appropriate level of safety for the road user; and
- remain trafficable for the duration of their design life.

The Austroads publication *Guide to Pavement Technology: Part 2 Pavement Structural Design* (2010) documents that the performance of road pavements is "influenced significantly by the heavy end of the traffic spectrum". This effectively means that there is little or no requirement to account for cars or light commercial traffic as far as pavement loadings is concerned. The only effect light vehicles have on the road is in terms of capacity. The performance and subsequent failure of pavements is determinate on heavy vehicle axle passes, the axle loading and the configuration of these axles.

Consequently, any additional heavy vehicle loadings on a public road that may occur due to Heavy Haulage Development will accelerate the deterioration of that road's pavement. The consequence of this additional heavy traffic is that in order for the roads authority (e.g. Council) to maintain the road pavement at its existing level of service, additional maintenance spending will be required due to the extra heavy traffic causing damage sooner.

This Plan is premised on the principle that it is reasonable to expect that additional heavy vehicle users of the road infrastructure should contribute their share of the additional upkeep.

A review of contribution plans from other NSW councils confirmed that there are various methodologies used to derive a reasonable monetary contribution from Heavy Haulage Developments towards road maintenance costs. The most common methods found are for the purposes of extractive industries and, derive a contribution that is based on the amount of material hauled per kilometre of haul route. This method works well for uses where the heavy vehicles have access to a weighbridge. A method based on laden heavy vehicle movements is used in this Plan. This is to enable Council to capture objective data on vehicles that may not require or have access to weighbridges.

Design life of a standard road

In pavement design, the damage caused by different axle groups is dependent on the axle spacing, the number of tyres / wheels per axle, the load on the group and the suspension of the vehicle (Austroads 1992, 2010). Generally, for design purposes axle groups are broken into 4 types namely:

- single axle with single wheels;
- single axle with dual wheels;
- tandem axles both with dual wheels; and
- tri-axles all with dual wheels.

For simplicity, the damage to the pavement associated with any particular axle load has been expressed as a 'standard axle'. The standard axle is a single axle with dual wheels that carries a load of 8.2 tonnes. Loads that cause similar damage to a pavement as a standard axle are shown in Table 3.5.

Table 3.5 Axle Load Configurations

Axle Configuration	Load (Kilo Newton)
Single axle, single tyre	53
Single axle, dual tyre	80
Tandem axle, dual tyre	135
Tri-axle, dual tyre	181
Quad-axle, dual tyre	221

For the purposes of design, all vehicle class configurations are converted to equivalent standard axles (**ESA**). The design life of a road pavement can also be expressed in ESA.

Appendix E of the *Austroads Pavement Design Guide* (2009) provides a methodology for the adoption of ESAs for axle group types in accordance with NSW conditions and road functional classes (A copy of the relevant sections of Austroads is provided in Appendix A of this Plan).

In order to use Austroads design tables, roads are provided with a functional class, Blayney Shire will assume a functional class 3 road that is defined as:

A road whose main function is to form an avenue of communication for movements:

- *between important centres and the Class 1 and Class 2 roads and /or key towns; or*
- *between important centres; or*
- *of an arterial nature within a town in a rural area.*

Council uses the Austroads vehicle classification system to identify heavy vehicle traffic numbers from traffic counters. A copy of the vehicle classification system information used in this Plan is in provided in Appendix A. From this classification system, ESAs for each vehicle class can be calculated using Table E4 in Appendix E of *Austroads Pavement Design Guide* (1992). The resulting total vehicle ESA for each class is provided in Table 3.6.

Table 3.6 Total Vehicle ESA per Vehicle Class

Vehicle class	Vehicle type (Austroads classification)	ESA per vehicle
1	Car	0
2	Light vehicle with towing/ commercial van	0
3	Two axle truck	1.2
4	Three axle truck	1.6
5	Four axle truck	2.2
6	Three axle articulated truck	1.8
7	Four axle articulated truck	2.2
8	Five axle articulated truck	2.8
9	Six axle articulated truck	2.8 (average)
10	Seven + axle articulated truck	3.4

For clarity, the above vehicles are assumed to be loaded. If higher order vehicle classes are used by the developer, those vehicles will be assumed to be class 10.

Using the information in Table 3.6 it can be seen that a loaded class 10 vehicle has almost three times the impact of a class 3 vehicle on a road pavement.

As mentioned above, the conversions in Table 3.6 are for the purposes of road design. *Austroads Pavement Design Guide* (1992 and 2010) provide methodologies for the design of both rigid and flexible pavements. Blayney Shire sealed roads are primarily flexible pavements with a sub-base, base and wearing surface of asphalt or bitumen.[13] The wearing surface is generally due for replacement every 10 -15 years at current traffic use.

Austroads Pavement Design Guides contain design tables where pavement design life can be expressed in accordance with design traffic loadings. Thus a standard life of pavement can be expressed as ESAs. This means that the life of a pavement can be expressed as the total number of equivalent axles that should pass over it prior to replacement.

The standard life for the haul road types in Blayney expressed as ESA are:

- Rs roads: approximately 2,000,000 ESA over 20 years
- Ls roads approximately 1,000,000 ESA over 30 years
- Lg roads: approximately 200,000 ESA over 9 years

All laden heavy vehicles on Blayney roads contribute to the deterioration of the road pavement. From the above design methodology, it is also the case that a road pavement has a finite life in terms of ESA. Due to the geographical location of Blayney Shire, there are limited haulage vehicles on the local road at present. Growth of heavy vehicle use on the local roads is limited to growth in the transportation of goods and haulage. Significant increases of heavy vehicles on Council's road network would only likely result from new or expanded heavy haulage development within or adjacent to the Blayney LGA.

Consequently, it is considered reasonable to expect heavy haulage development make a contribution per additional loaded vehicle on Shire roads.

3.5.4 Costs of maintaining rural roads over the design life

Council's objective in the maintenance of the road network is to provide a functional and efficient network that services community expectations. Regional roads are the highest order road that Council manages and form a key component of the local and wider road network. Local roads predominantly provide access to properties and supply linkages to higher order roads.[14]

A key issue facing Council's regional network is ageing infrastructure on narrow, substandard alignments that does not meet current industry or community standards, requiring progressive upgrading. This is particularly exacerbated by the requirement for these roads to carry freight that in turn deteriorates the asset further.[15]

The local road network is predominantly unsealed pavements. Many roads carry less than 50 vehicles per day but require maintenance to retain them in a serviceable condition. Additionally,

[13] Blayney Shire Council – Transportation Asset Management Plan 2011, p 45
[14] Ibid.
[15] Ibid.

unsealed roads in and near urban areas that carry greater traffic flows, generate dust nuisance close to residential development and therefore significant maintenance demand.[16]

Council maintains the entire local road network and receives funding to maintain State roads. The local road network is approximately 727 kilometres.

All regional and local roads are funded by Council. Council may apply for and receive Commonwealth Government funding from time to time for upkeep of the local road network. The State highway roads (namely Mid-Western Highway and Millthorpe Road) are maintained by Council with funding from NSW Roads and Maritime Services and are therefore exempt from this Plan.

The financial lifecycle of sealed road assets is made up of construction costs, maintenance costs and replacement of the wearing course over the period of time that the asset was designed to last. Similarly, the financial lifecycle of gravel / natural material road assets comprises of maintenance and gravel re-sheets over the life of the asset, with additional work required if there is significant adverse weather damage from time to time.

The anticipated costs for the various classes of roads are listed in Table 3.7.

Table 3.7 Total lifecycle costs for the Blayney road network

	Cost per kilometre	How often?
Regional Rs		
Rehabilitation	$264,000	At 20th year
Reseals	$30,000	At 10th year
Maintenance	$5,600	Annual for life
Local Ls		
Rehabilitation	$195,000	At 30th year
Reseals	$28,000	At 15th year
Maintenance	$4,000	Annual for life
Local Lg		
Resheet	$34,000	At 9th year
Grading	$730	Annual for life

From this information the total cost of local sealed roads and gravel roads over their respective design lives can be approximated.

[16] Blayney Shire Council TMP 2011.

The total cost per kilometre of a Rs road is:

$maintenance x 18 yrs + $reseal (@ 10th year) + $reconstruction (@20th year)

= ($5,600 x 18) + $30,000 + $264,000

= $394,800 per km

The total cost per kilometre of a Ls road is:

$maintenance x 28 yrs + $reseal (@ 15th year) + $reconstruction (@ 30th year)

= ($4,000 x 28) + $28,000 + $195,000

= $335,000 per km

The total cost per kilometre of a Lg road is:

$maintenance x 8 yrs + $resheet gravel (@ 9th year)

= ($730 x 8) + $34,000

= $39,840 per km

3.5.5 Calculation of a reasonable contribution

This Plan authorises that the monetary contributions from Type B developments should be made on a periodic (quarterly) basis and should be per ESA for the total distance of sealed and gravel roads anticipated to be travelled by the development's laden heavy vehicles.

It has been shown that the life of a road can be expressed in total ESA loads that can pass over the pavement until the pavement deteriorates to the point of needing reconstruction. As mentioned previously the life of a typical regional road in Blayney is approximately 20 years and equivalent to 2,000,000 ESA, the typical local sealed road is 30 years and 1,000,000 ESA. The life of a gravel road is 9 years and equivalent to 200,000 ESA.

Total contribution amount for any Type B development

The calculation of the periodic contribution relating to any heavy haulage development is as follows:

$$\$C_{Period} = \frac{\$Rs_{Life} \times ESA \times Rs_{Length}}{Rs_{Life}} + \frac{\$Ls_{Life} \times ESA \times Ls_{Length}}{Ls_{Life}} + \frac{\$Lg_{Life} \times ESA \times Lg_{Length}}{Lg_{Life}}$$

Where:

$\$C_{Period}$	is the monetary contribution payable by the development for the preceding period (i.e. preceding quarter) in dollars
$\$Rs_{Life}$	is the standard cost of regional road per kilometre over the design life in dollars, being $394,800
$\$Ls_{Life}$	is the standard cost of local sealed road per kilometre over the design life in dollars, being $335,000
$\$Lg_{Life}$	is the standard cost of local gravel road per kilometre over the design life in dollars, being $39,840
ESA	is the number of ESAs generated by the development in the preceding period (as recorded by the traffic classifier at the development exit)
Rs_{Life}	is the assumed design life of a sealed regional road, being 2,000,000 ESA
Ls_{Life}	is the assumed design life of a local sealed road, being 1,000,000 ESA
Lg_{Life}	is the assumed design life of a local gravel road, being 200,000 ESA
Rs_{Length}	is the total length of regional sealed road travelled by the development's laden heavy vehicles estimated at the time of the development application, in kilometres
Ls_{Length}	is the total length of local sealed road travelled by the development's laden heavy vehicles estimated at the time of the development application, in kilometres
Lg_{Length}	is the total length of local gravel road travelled by the development's laden heavy vehicles estimated at the time of the development application, in kilometres

Contribution rate for Type B development

The contribution rate - that is the contribution per ESA per kilometre of road used - can be expressed as follows.

The contributions for each road type per ESA can be expressed as:

$$\$R_{Rate} = \frac{\$R_{Life}}{R_{Life}}$$

Where

$\$R_{Rate}$ is the monetary contribution rate for each road type (sealed or gravel) per ESA per kilometre of road type in dollars, and rounded to the nearest cent

$\$R_{Life}$ is the standard cost of each road type (regional sealed, local sealed or gravel) road per kilometre in dollars, being $394,800 for Rs, $335,000 for Ls, and $39,840 for Lg respectively

R_{Life} is the assumed design life of the equivalent standard road in ESA, being 2,000,000 ESA for Rs, , 1,000,000 ESA for Ls and 200,000 ESA for Lg, respectively

Using the above formula and values:

$\$Rs_{Rate}$ = $0.20 per ESA per kilometre

$\$Ls_{Rate}$ = $0.33 per ESA per kilometre

$\$Lg_{Rate}$ = $0.20 per ESA per kilometre

3.5.6 Worked examples

Worked example for Quarry 'A'

It is proposed to extract of sandstone from a quarry (Quarry 'A') located within Blayney Shire. The development application states that the quarry will be operational for approximately 20 years. The distance travelled on Blayney roads as shown from the quarry to the nearest State road is approximately 20 km of regional sealed road (Rs); 12 km of Ls road and 5km of Lg road.

A condition requiring a section 94 contribution per ESA exiting the site consistent with the rates shown in clause 1.2 is imposed on the development consent.

A traffic classifier has been installed at a location in the vicinity of the quarry exit. This classifier is to be reviewed on a quarterly basis. The first quarter results have been extracted and are shown in Table 3.8.

Table 3.8 Quarry 'A' traffic classifier results for 1st quarter of operation

	Vehicle class				
	6	7	8	9	10
Standard ESA per vehicle	1.1	2.2	2.8	2.8	3.4
Number of vehicles for the period	7	13	40	15	0

The monetary contribution required for the quarter is calculated as follows:

$$\$Rs = \frac{394{,}800 \times \{(1.1 \times 7) + (2.2 \times 13) + (2.8 \times 40) + (2.8 \times 15)\} \times 20}{2{,}000{,}000}$$

$$= 0.20 \times 190 \times 20$$

$$= \$760.00$$

$$\$Ls = \frac{335{,}000 \times \{(1.1 \times 7) + (2.2 \times 13) + (2.8 \times 40) + (2.8 \times 15)\} \times 12}{1{,}000{,}000}$$

$$= 0.33 \times 190 \times 12$$

$$= \$752.40$$

$$\$Lg = \frac{39{,}840 \times \{(1.1 \times 7) + (2.2 \times 13) + (2.8 \times 40) + (2.8 \times 15)\} \times 5}{200{,}000}$$

$$= 0.20 \times 190 \times 5$$

$$= \$190.00$$

Total contribution for 1st quarter = $760 + $752.40 + $190

= $1702.40

Worked example for Quarry 'B'

Quarry 'B' is proposed near Shaw. The developer has advised that the extracted material is to be hauled in two directions. Half the material is to go north along local roads until it reaches the Mid Western Highway and half is to go south-east along local roads to Neville-Trunkey Rd until it is out of the Shire.

A condition requiring a section 94 contribution per ESA exiting the site consistent with the rates shown in clause 1.2 is imposed on the development consent.

A traffic classifier is again located in the vicinity of the quarry gate and shows the same result for the quarter as shown in the previous example.

In the simplest case there are two distinct routes to be used by the development. One heads north the other south-east. The total of road length and type used to haul north and south-east can be identified and traffic allocated on a 50% basis in each direction.

Thus if north, Ls = 15km along local roads ; Lg = 0 km, then

$North = (0.33 x 95 x 15) + (0.20 x 95 x 0)

= $ 470.25

Note: 95 is half the total number of ESA for the quarter

And similarly a calculation is possible for loads hauled south-east.

This proportional allocation can be used in any configuration that may arise.

3.5.7 Measures to ensure contributions are reasonable

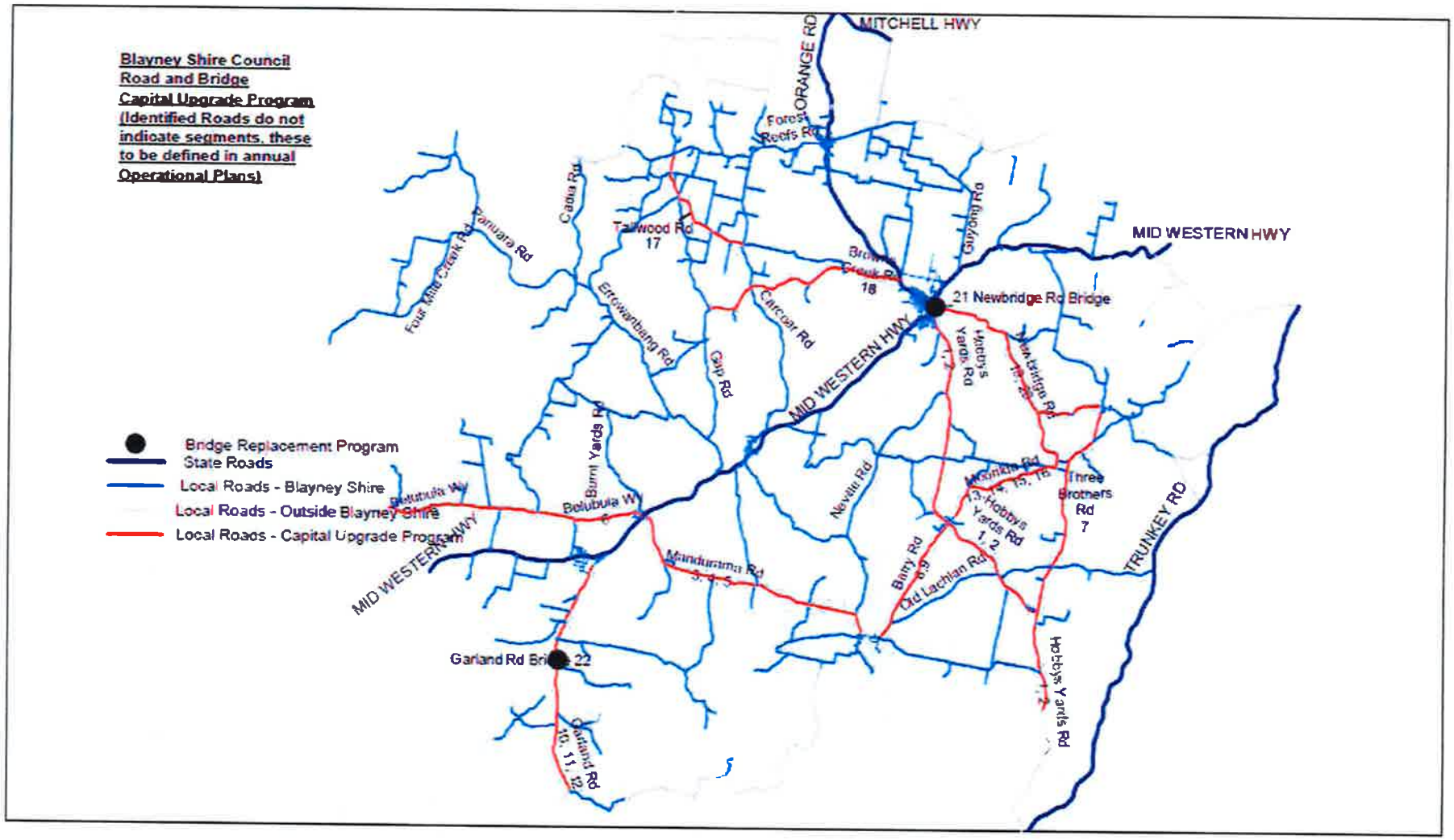
To ensure section 94 contributions on Type B developments are reasonable, the following will be undertaken:

- The heavy haulage travel route(s) from the site will be identified at the time of development application and nominated as the total distance in kilometres that laden heavy vehicles will likely travel along Rs, Ls and Lg routes within Blayney Shire.
- The following will be included as conditions of consent for Type B developments:
  - A traffic classifier to be installed (at the applicant's cost) at a suitable location to classify and count the number of loaded heavy vehicles that enter or exit the development site over a set period. The Plan assumes quarterly notices to the operators of developments. The classifier will be used to determine the number of ESAs that are subject to contributions.
  - Responsibility for keeping the traffic classifier in good working order throughout the life of the development will rest with the operator of the development.
  - Council officers are to be provided access to the traffic classifier data on a regular (i.e. at least quarterly) basis.
  - In the event of the traffic data being corrupted, then the Council at its discretion may determine the levy for the preceding period.
- There may be circumstances where the likely length or lengths of roads to be used by laden heavy vehicles related to a Type B development is difficult to quantify. In such cases Council will determine the length or lengths of road to be levied based on the information submitted with the development application. It is the duty of the applicant to provide sufficient and accurate information on likely laden heavy vehicle use at the application stage.

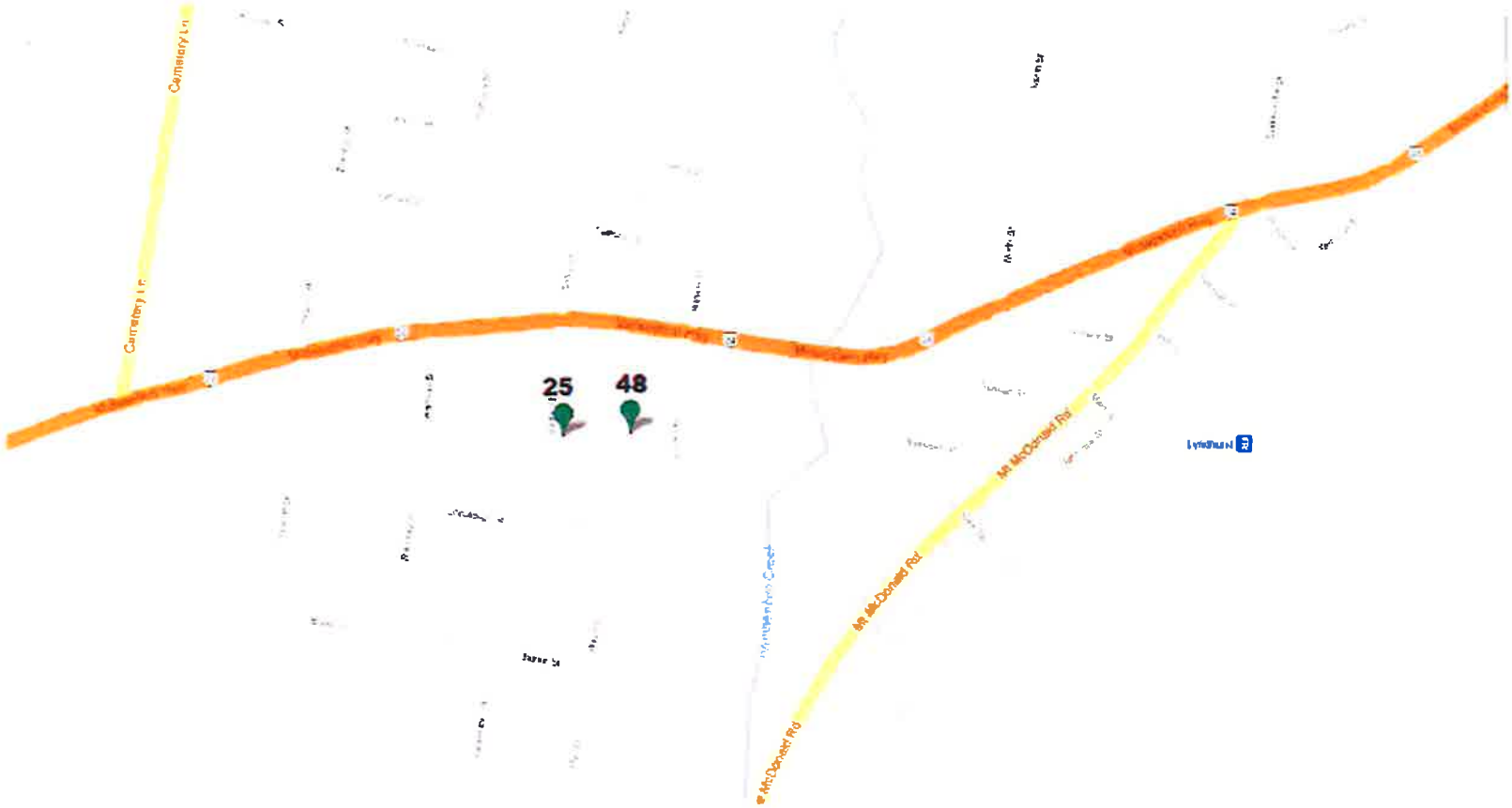
4. Local Infrastructure works program

Item	Description	Cost	Staging	Priority for funds pooling	Item No. on map
TRANSPORT					
Category 1 Rural Roads					
Hobbys Yards Road	Capital upgrade - 2.2km	$815,308	2016	A	1
	Capital upgrade - 1.2km	$484,536	2019	B	2
Mandurama Road	Capital upgrade - 2.2km	$838,951	2017	B	3
	Capital upgrade - 0.97km	$391,667	2019	B	4
	Capital upgrade - 1.4km	$615,913	2022	C	5
Belubula Way	Capital upgrade - 1.1km	$431,641	2018	B	6
Three Brothers Road	Capital upgrade - 2.2km	$914,077	2020	C	7
Category 2 Rural Roads					
Barry Road	Capital upgrade - 2.2km	$726,000	2014	A	8
	Capital upgrade - 0.8km	$271,656	2015	A	9
Garland Road	Capital upgrade - 1km	$349,418	2016	A	10
	Capital upgrade - 2.2km	$791,011	2017	B	11
	Capital upgrade - 1km	$369,978	2018	B	12
Moorilda Road	Capital upgrade - 1.2km	$443,973	2018	B	13
	Capital upgrade - 2.2km	$837,555	2019	B	14
	Capital upgrade - 2.2km	$861,844	2020	C	15
	Capital upgrade - 0.6km	$241,865	2021	C	16
Tallwood Road	Capital upgrade - 1.25km	$436,772	2016	A	17
Browns Creek Road	Capital upgrade - 2.2km	$912,556	2022	C	18
Newbridge Road	Capital upgrade - 1.4km	$475,398	2015	A	19
	Capital upgrade - 1.6km	$644,973	2021	C	20
Bridge Replacement Program					
Newbridge Road, Blayney	Reconstruct bridge	$895,309	2013	A	21
Garland Road, Garland	Reconstruct bridge	$506,776	2013	A	22
Sub total - Transport		**$13,257,176**			
BUILDINGS AND OTHER STRUCTURES					
Renewal Works					
Tennis Shed	Demolish	$5,000	2016	B	23
Toilet Block - Carcoar (Sportsground)	Drain downpipe away from building	$500	2015	A	24
Toilet Block - Lyndhurst Sportsground	Replace Septic tank	$10,000	2015	A	25
Toilet Block - Mandurama Recreation Ground	Replace septic system	$10,000	2017	B	26
Toilet Block - Neville Memorial Park	Water Pressure Pump renewal	$1,000	2015	A	27
Kiosk	Drain downpipes away from building	$500	2015	A	28
Pavilion / Kitchen	Replace Roof, Facia & Gutters	$18,000	2017	B	29

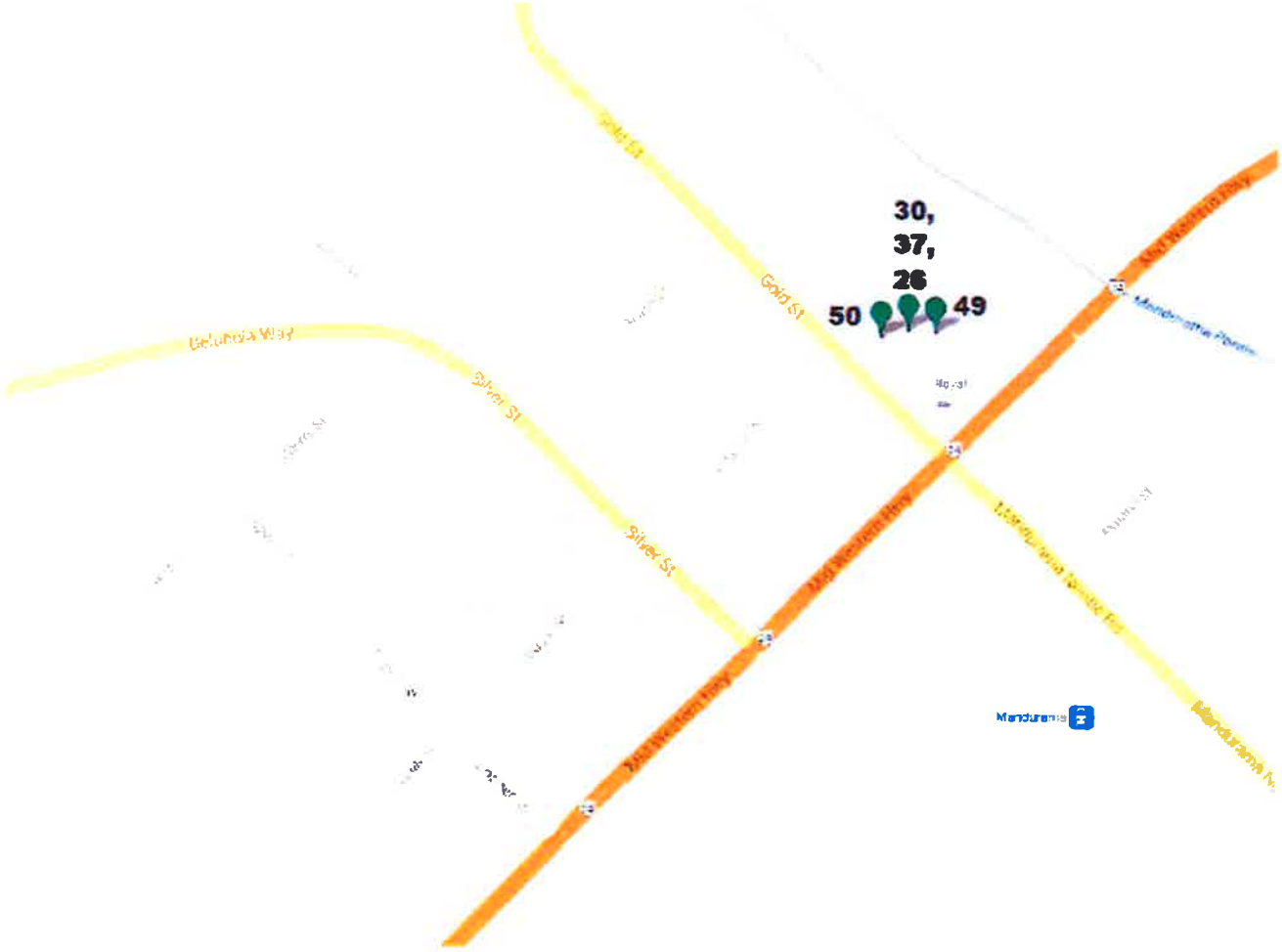
Tennis Shelter / Shed	Hand rail - rear stairs	$1,200	2017	B	30
Centrepoint Sports Centre/Pools	Various Works (Yr 1 - 4)	$60,000	2015	A	31
Change Room - Carcoar Sportsground	Repair timber floor	$2,000	2016	B	32
Council Chambers / Offices	Various Works (Yr 1 - 4)	$120,000	2015	A	33
Workshop/Store	Repairs / replace sheeting	$1,000	2015	A	34
Upgrade / New Works Program					
Blayney Shire Community Centre	New Centre	$2,053,000	2013	complete	35
Showground Hall	Bird proofing, insulation, footpath, stormwater & electrical works	$52,000	2015	A	36
Toilet Block - Mandurama Recreation Ground	Disabled toilet addition	$40,000	2025	C	37
Toilet Block - Napier Oval - NEW	New Toilet Block	$80,000	2016	B	38
Tennis Shed	New Shelter with lockable end	$12,000	2016	B	39
Change Room - Carcoar Sportsground	Stormwater - Drain away from building	$200	2016	B	40
Sub total - Buildings and Other Structures		**$2,466,400**			
PARKS AND GARDENS					
Renewal Works					
Community Centre Precinct - Blayney	Community Centre Carpark	$40,000	2014	A	41
Heritage Park & Tennis Centre - Blayney	Shadesails (4)	$174,324	2022	C	42
Naylor Street Sportsground - Carcoar	Tennis Court Surface renewal (1)	$48,000	2021	C	43
Capital Upgrade / New Works Program					
Blayney Showground	Oval irrigation scheme	$100,000	2017	B	44
Blayney Community Centre Precinct	Community Centre Carpark Upgrade works	$20,000	2016	B	45
Carcoar CBD Precinct	Overnight Caravan parking facility	$20,000	2020	C	46
Naylor Street Sportsground - Carcoar	Carcoar Sportsground Enhancement Plan (Shade trees, upgrade fencing etc)	$25,000	2021	C	47
Lyndhurst CBD Precinct	Overnight Caravan parking facility (include in Sportsground carpark)	$20,000	2015	A	48
Mandurama CBD Precinct	Overnight Caravan parking facility	$20,000	2022	C	49
Recreation Ground - Mandurama	Concrete pad for basketball hoop	$1,000	2017	B	50
Redmond Oval - Millthorpe	Tennis Court Lighting	$50,000	2023	C	51
Redmond Oval - Millthorpe	Install bubbler at Skate Park	$10,000	2016	B	52
CBD Precinct - Neville	Overnight Caravan parking facility	$20,000	2023	C	53
CBD Precinct - Newbridge	Overnight Caravan parking facility	$20,000	2021	C	54
Sub total - Parks and Gardens		**$568,324**			
TOTAL FOR ALL INFRASTRUCTURE		**$16,291,900**			


Blayney Shire Council
Road and Bridge
Capital Upgrade Program
(Identified Roads do not indicate segments, these to be defined in annual Operational Plans)
Bridge Replacement Program
State Roads
Local Roads - Blayney Shire
Local Roads - Outside Blayney Shire
Local Roads - Capital Upgrade Program
MITCHELL HWY
ORANGE RD
Forest Reefs Rd
Panuara Rd
Cadia Rd
Four Mile Creek Rd
Tallwood Rd
17
Errowanbang Rd
Gap Rd
Carcar Rd
Browns Creek Rd
18
Guyong Rd
MID WESTERN HWY
21 Newbridge Rd Bridge
Hobbys Yards Rd
1, 2
Mandurama Rd
3, 4, 5
Belubula Wy
6
Burnt Yards Rd
Newlin Rd
Barry Rd
6.9
Old Lachlan Rd
Mookin Rd
13, 14, 15, 16
Three Brothers Rd
7
TRUNKEY RD
Garland Rd Bridge 22
Garland Rd
10, 11, 12

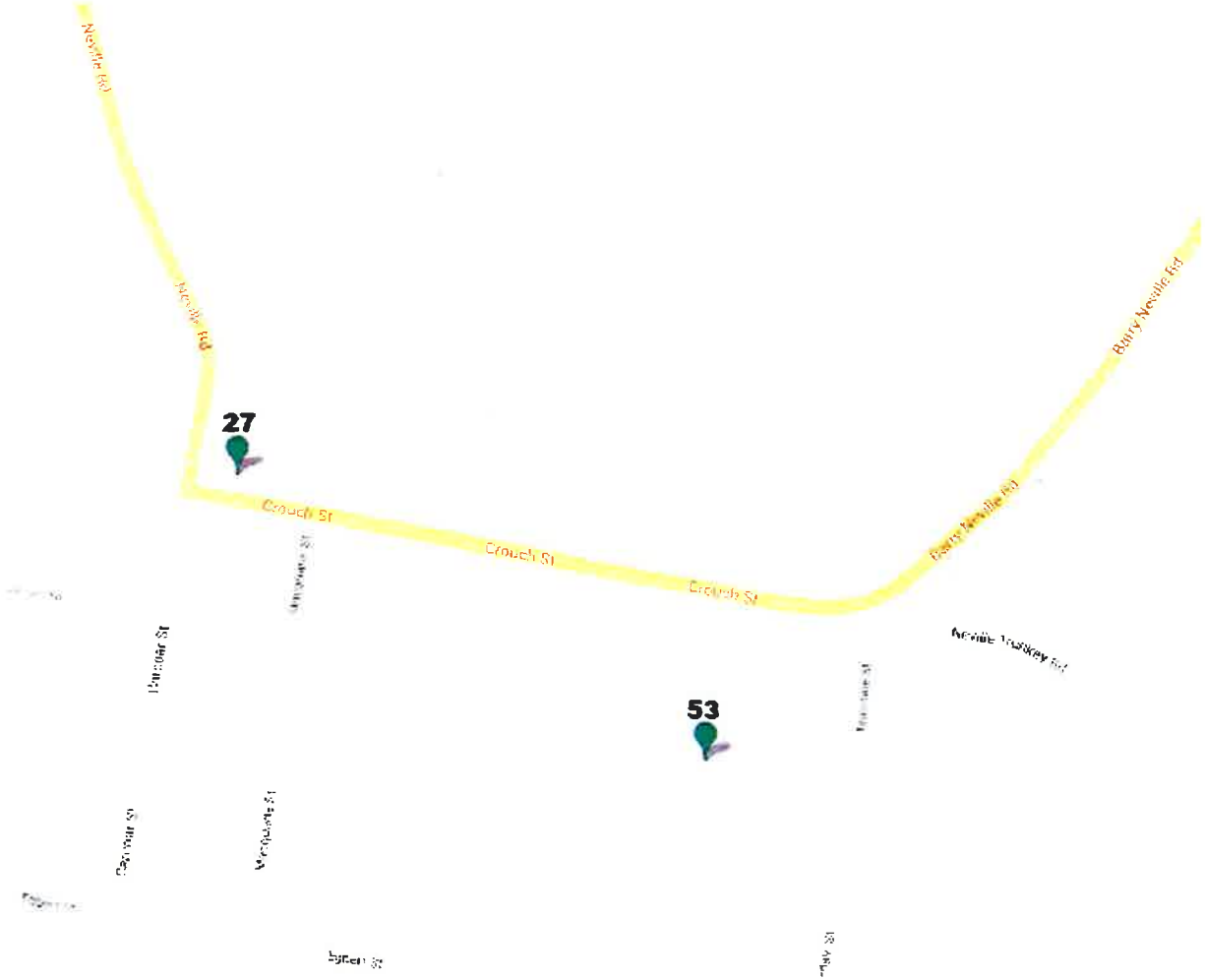
Lyndhurst Contributions Plan – Buildings & Other Structures and Parks & Gardens



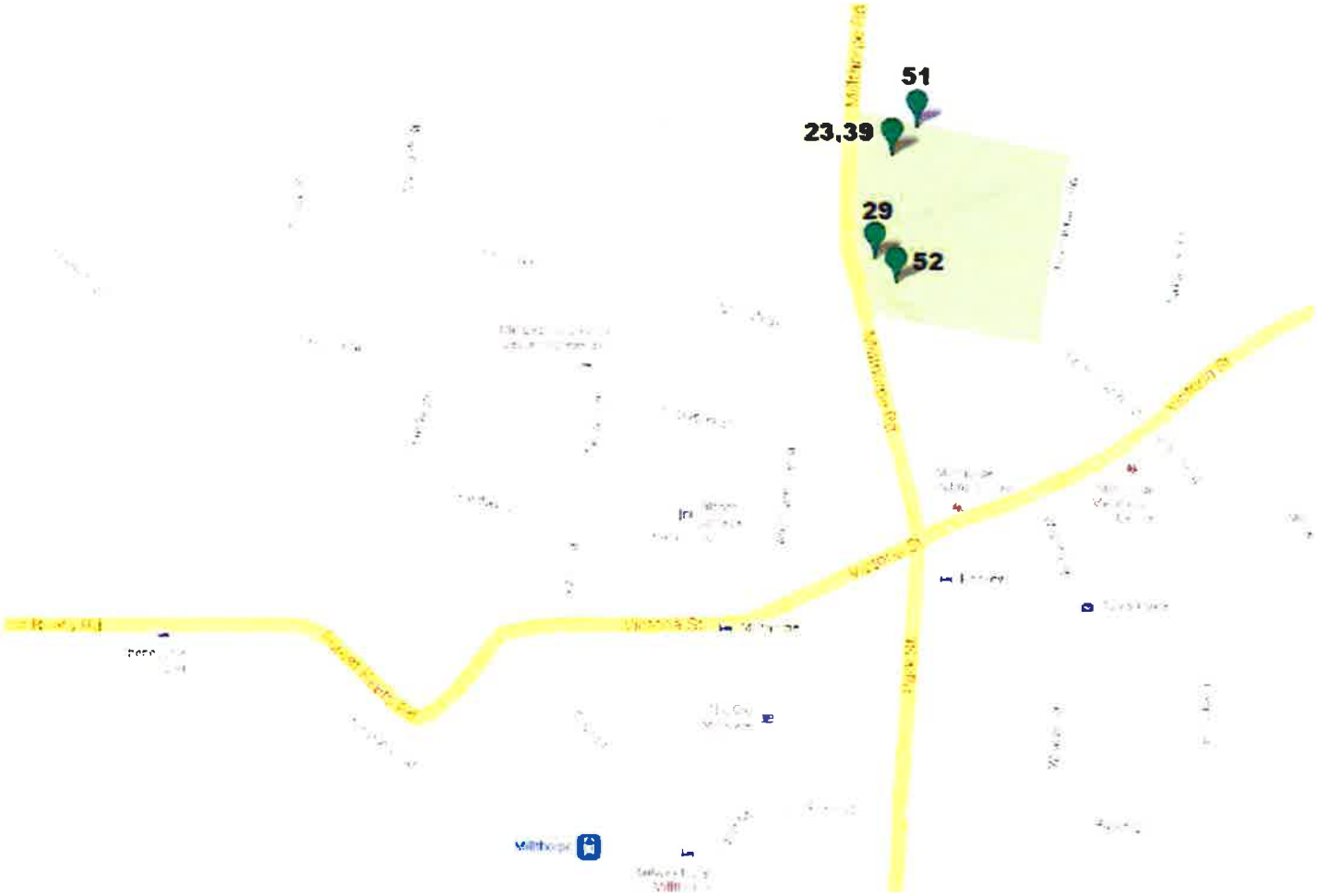
Mandurama Contributions Plan – Buildings & Other Structures and Parks & Gardens



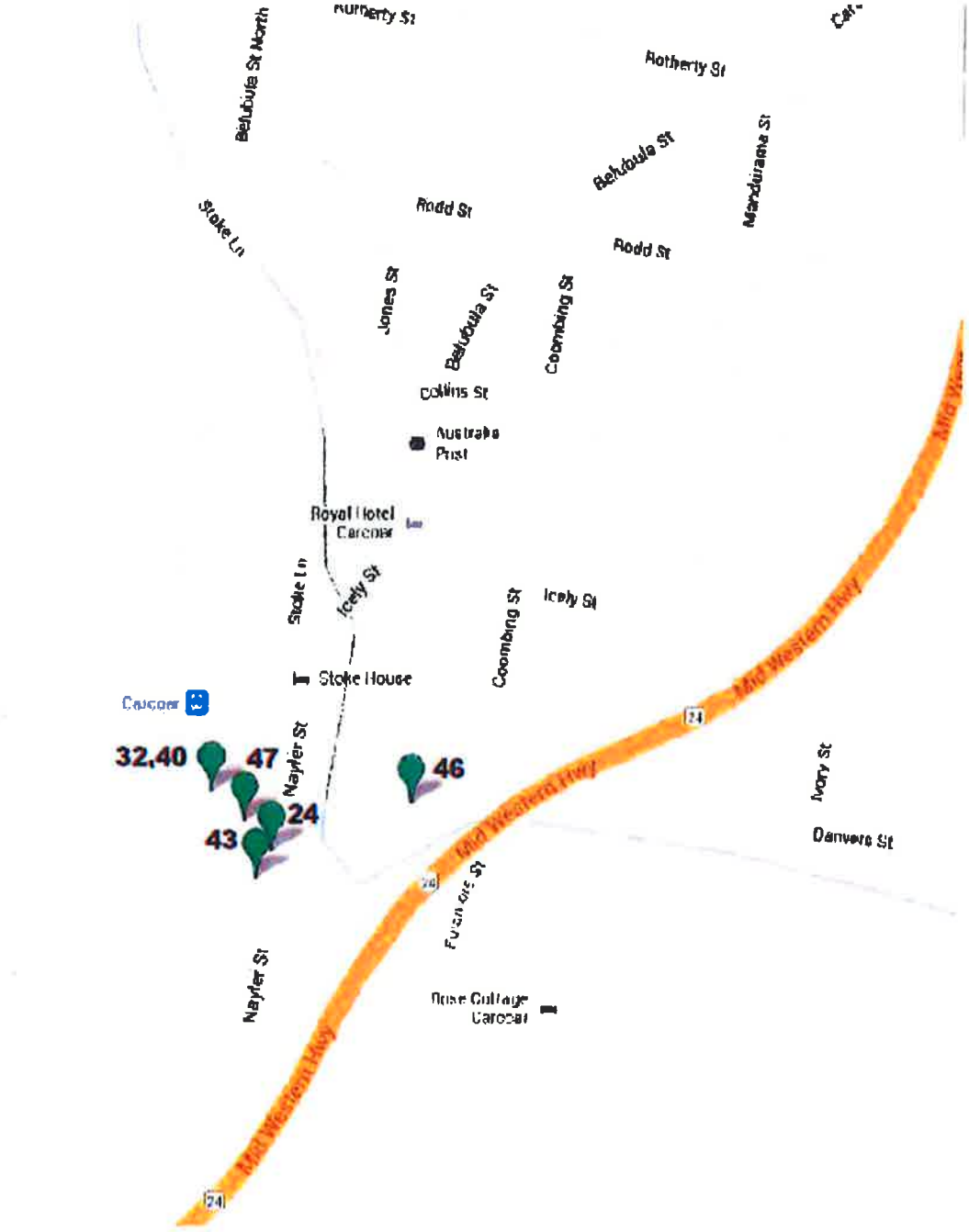
Neville Contributions Plan – Buildings & Other Structures and Parks & Gardens



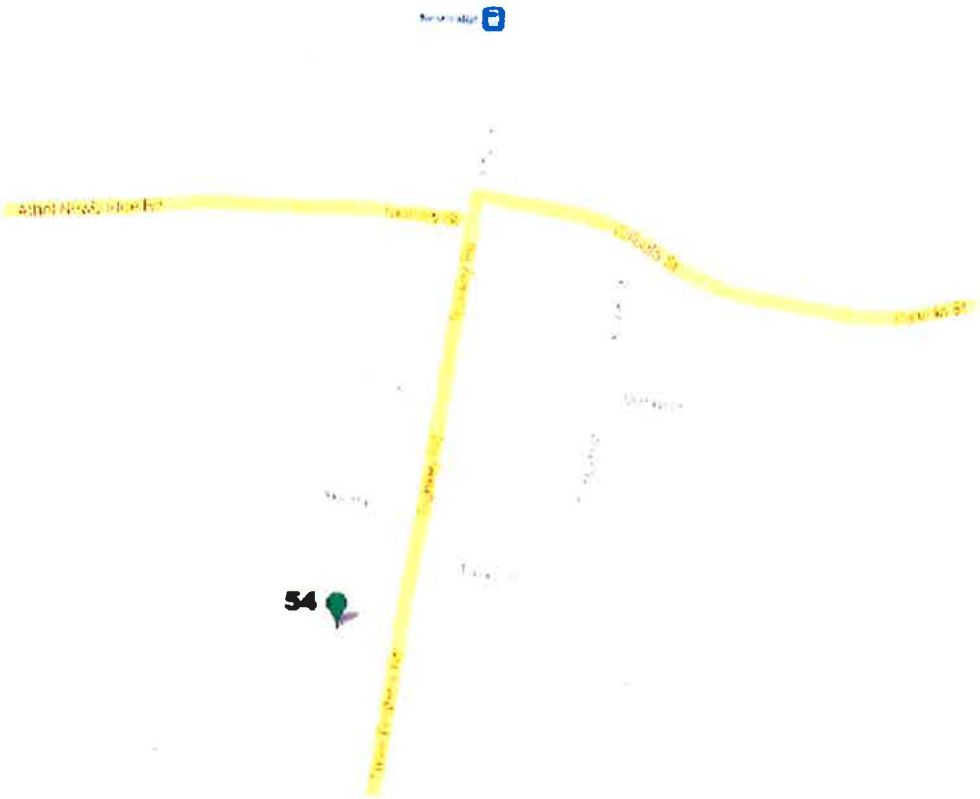
Millthorpe Contributions Plan – Buildings & Other Structures and Parks & Gardens



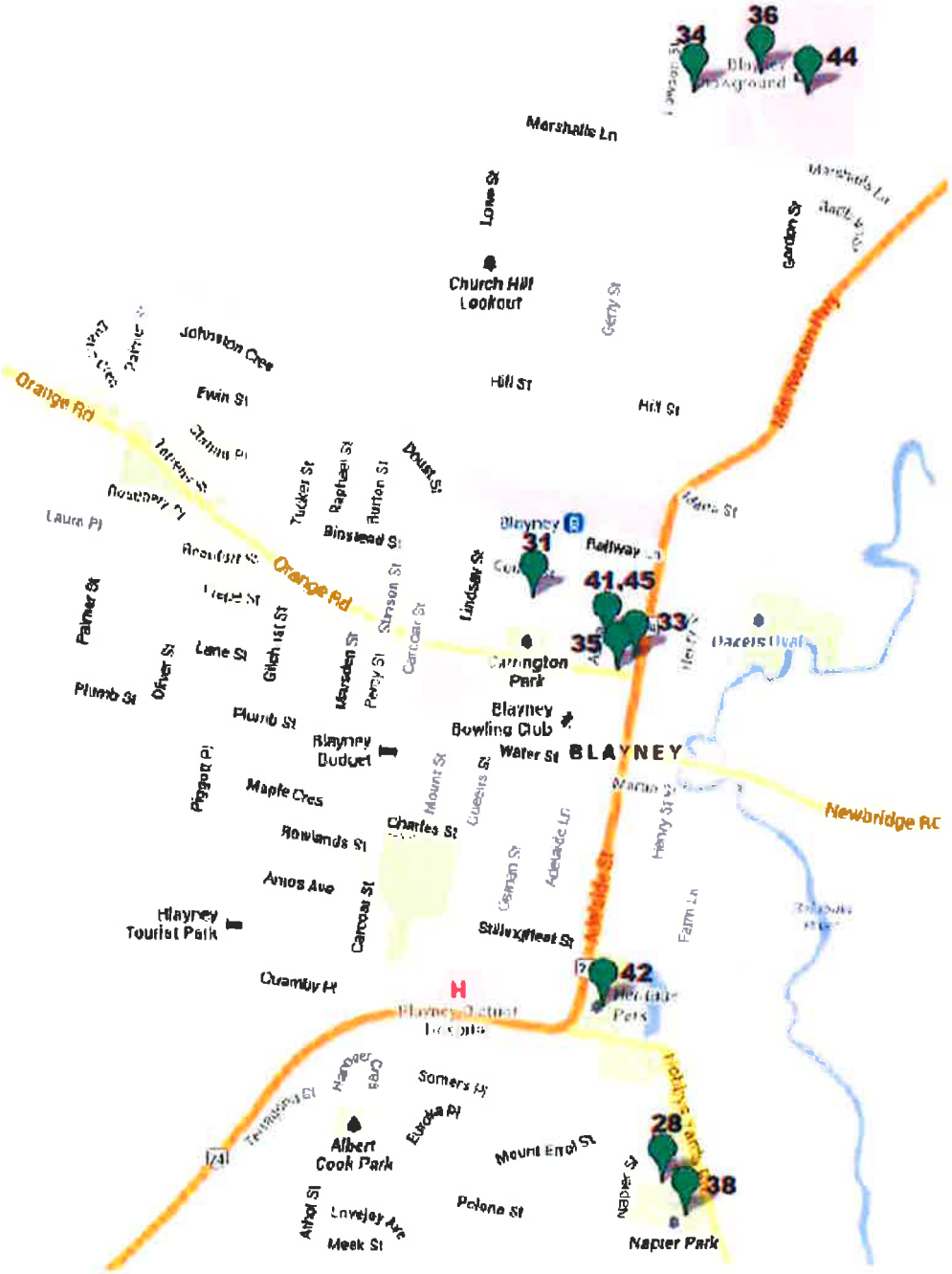
Carcoar Contributions Plan – Buildings & Other Structures and Parks & Gardens



Newbridge Contributions Plan – Buildings & Other Structures and Parks & Gardens



Blayney Contributions Plan – Buildings & Other Structures and Parks & Gardens



Appendix A

Extracts from Austroads - Pavement Design: A Guide to the Structural Design of Road Pavements (1992)

7 DESIGN TRAFFIC

7.1 GENERAL

This section contains procedures for assessing traffic loadings for the design of flexible and rigid pavements and for the design of overlays.

The general procedure used is shown in Figure 7.1. Detailed procedures depend on the type of traffic data available, the pavement type being designed and the design method adopted.

Features of traffic that largely determine performance are:

- The number of axle passes
- The axle loadings
- The axle configurations.

For all pavements, performance is influenced only by the heavy end of the traffic spectrum. No account need be taken of cars and light commercial vehicles as far as loadings are concerned though their existence may affect road capacity (Section 7.3).

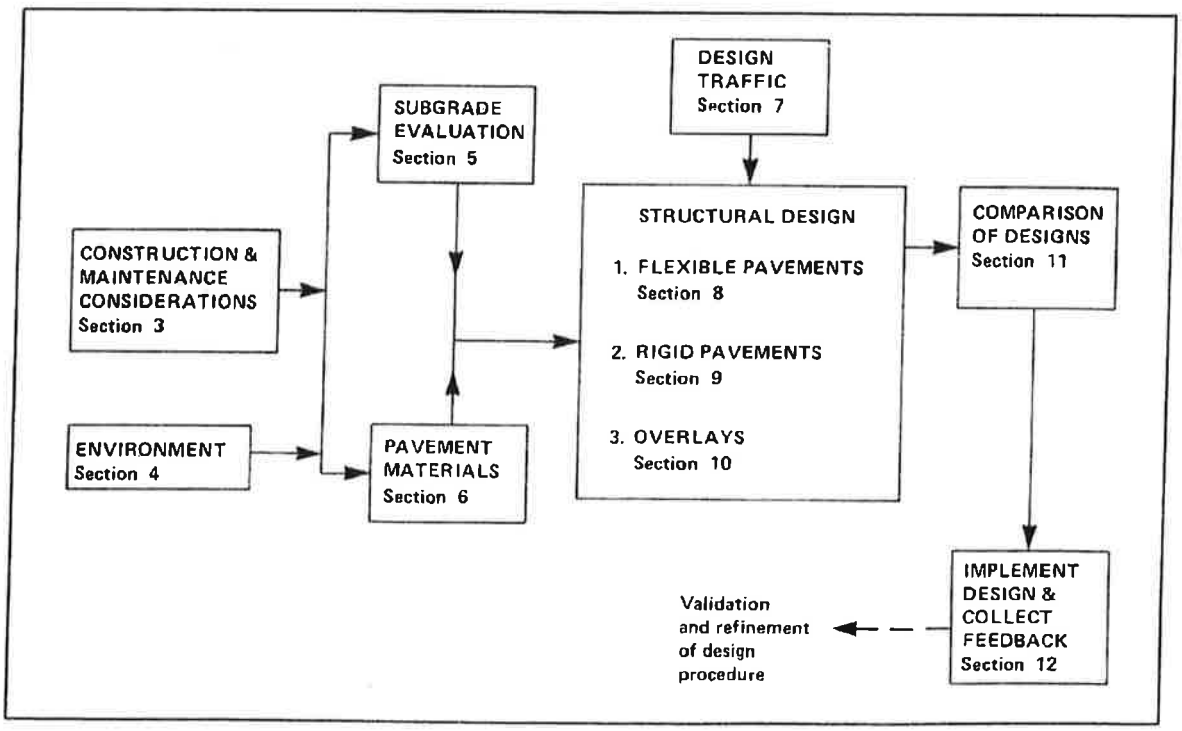
7.1.1 Axle Configurations and Equivalencies

The damage due to different axle groups is dependent on the axle spacing, the number of tyres per axle, the load on the group and the suspension. For design purposes, it is generally appropriate to consider axle groups in terms of the following four types:

- single axle with single wheels
- single axle with dual wheels
- tandem axles both with dual wheels
- tri-axles all with dual wheels

The relative damage associated with any particular axle load can be expressed in terms of relationship as shown in Table 7.1.

The standard axle is defined as a single axle with dual wheels that carries a load of 8.2 t. Loads on the axle configurations given above that cause the same amount of damage as the standard axle are given in Table 7.1.



For axle group loads other than those in Table 7.1, the damage caused is expressed as the number of standard axles which produce the same damage and is calculated as follows:

$$\text{No of standard axles for same damage} = \left[\frac{\text{Load on Axle Group}}{\text{Appropriate Load from Table 7.1}}\right]^{EXP}$$

Where the exponent EXP may vary depending on the type of pavement. Commonly a value of 4 is adopted for the exponent in which case the number of standard axles for the same damage is termed the number of equivalent standard axles (ESAs).

Tandem axles which have dual wheels on one axle and single wheels on the other may be considered to be equivalent to tandem axles (both with dual wheels), which are loaded to 1.2 times the load on the six-wheeled tandem.

Spread Tandem axles, because of their wide axle spacings, (more than 2.4m) can be regarded as two single axles with the total load on the spread tandem configuration being divided equally between the two single axles.

For the design of flexible pavements, twin steer axles may be considered to be equivalent to tandem axles (both with dual wheels) which are loaded to 1.5 times the load on the twin steer axles. For the design of rigid pavements they may be considered to be equivalent to tandem axles (both with dual wheels) which have the same load as the twin steer axles.

7.1.2 Design Lanes

Construction of new pavements and overlaying of existing pavements usually affects two or more traffic lanes. It is usual practice to adopt the same pavement design for all lanes. The design traffic should be that in the lane which carries the most commercial vehicular traffic and it is designated the design lane.

TABLE 7.1
AXLE LOADS WHICH CAUSE EQUAL DAMAGE

Axle Configuration	Single Single	Single Dual	Tandem Dual	Triaxle Dual
Load (kN)	53	80	135	181

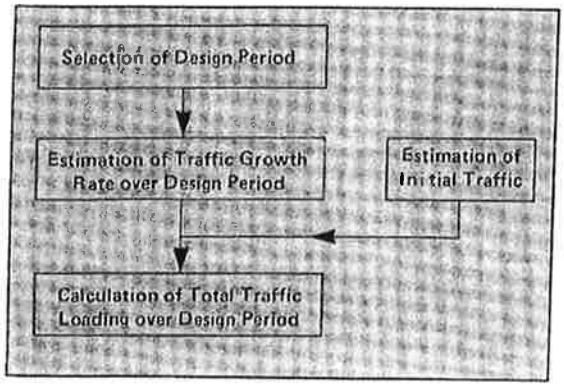


FIGURE 7.1
PROCEDURE FOR DETERMINING DESIGN TRAFFIC

7.2 DESIGN PERIOD

The design period is the length of time expressed in years before it is anticipated that rehabilitation of the pavement will be necessary to restore shape, repair other forms of distress, or to provide additional pavement strength.

Rehabilitation, which may consist of granular or asphalt overlay, major patching or improvements or removal of selected areas of pavement materials, initiates a new design period.

In this regard, resurfacing a pavement with a sprayed seal or a very thin asphalt overlay does not in itself constitute rehabilitation in the pavement design sense.

Some typical design periods are outlined below:

- New granular pavements = 20 - 25 years
- New rigid pavements = 20 - 40 years
- Asphalt overlays = 10 - 15 years
- Granular overlays = 10 - 20 years

Various factors will influence the choice of design period. They include:

- Maintenance strategies. Highly trafficked facilities will demand long periods of low maintenance.
- Funding considerations.
- Other factors, such as inadequate geometry or traffic capacity, may limit the life of the roadway and necessitate early reconstruction.

7.3 TRAFFIC GROWTH

Based on road traffic survey information, it is reasonable, in most circumstances, to assume that traffic volumes will increase geometrically either for the entire design period or up to a stage where "road capacity" is reached (in which case traffic volumes are assumed to remain constant for the remainder of the design period.

If there is an indication that "road capacity" is likely to be reached within the design period, it is recommended that the designer establish that there is no planned upgrading of the road geometry within the design period before he adopts "no growth" traffic volume for the period of "full capacity". Adoption of "no-growth" traffic volumes for a period of "saturation" will entail modification of the approach used below to aggregate daily traffic volumes for total design traffic.

For geometric traffic growth throughout the design period, total traffic over the design period is determined by multiplying the total traffic in the first year by the appropriate Cumulative Growth Factor from Table 7.2.

7.4 METHODS OF CALCULATION OF DESIGN TRAFFIC

The method to be used depends on the traffic data that are available and the design procedure to be adopted.

Ideally the traffic data should include the numbers of and loading on each axle type in the traffic stream.

TABLE 7.2 CUMULATIVE GROWTH FACTORS (GF)

Design Period (Years)	Growth Rate (% pa)					
	0	2	4	6	8	10
5	5	5.2	5.4	5.6	5.9	6.1
10	10	10.9	12.0	13.2	14.5	15.9
15	15	17.3	20.0	23.3	27.2	31.8
20	20	24.3	29.8	36.8	45.8	57.3
25	25	32.0	41.6	54.9	73.1	98.3
30	30	40.6	56.1	79.1	113.3	164.5
35	35	50.0	73.7	111.4	172.3	271.0
40	40	60.4	95.0	154.8	259.1	442.6

In many cases information at this level of detail is not available and recourse will have to be made to survey information.

This guide caters for three levels of traffic data:

(i) initial annual average daily number of axles by type and by load
(ii) initial annual average daily number of axles by type
(iii) initial annual average daily traffic (AADT) plus percent commercial vehicles.

The application of these data to the design procedures is shown in Table 7.3.

7.5 DESIGN TRAFFIC FOR FLEXIBLE PAVEMENTS CONTAINING ONE OR MORE BOUND LAYERS

7.5.1 For Traffic In Terms of Annual Average Daily Number of Axles by Type and by Load

Because asphalt, cemented materials and subgrades each have different performance relationships (allowable number of strain repetitions vs level of strain), it is necessary to determine separately for each material the number of standard axles which will cause the same level of accumulated damage as the actual traffic load spectrum. Hence the following three distinct parameters may be required:

- Number of standard axles that produce the same cumulative damage in asphalt as the design traffic (N_{SA})
- Number of standard axles that produce the same cumulative damage in the subgrade as the design traffic (N_{SS})
- Number of standard axles that produce the same cumulative damage in cemented materials as the design traffic (N_{SC}).

Initial annual average daily values of these parameters N_{SA}, N_{SS}, N_{SC} are calculated using method 1 of Appendix E.

TABLE 7.3 APPLICATION OF TRAFFIC DATA TO DESIGN PROCEDURES

Design Procedure	Traffic Data Available			
	Annual Average daily number of axles by type & load	Annual Average daily number of axles by type	AADT and percent Commercial Vehicles	Specialised Loading
Flexible pavements containing one or more bound layers	Sec 7.5.1 & Appendix E method 1	Sec 7.5.2 & Appendix E method 2	Sec 7.5.3 & Appendix E method 3	Sec 7.5.4
Flexible pavements consisting of unbound granular materials	Sec 7.6.1 & Appendix E method 4	Sec 7.6.2 & Appendix E method 2	Sec 7.6.3 & Appendix E method 3	Sec 7.6.4
Rigid Pavements	Sec 7.7.1	Sec 7.7.1	N/A	N/A
Overlays for flexible pavements	Sec 7.6.1 & Appendix E method 4	Sec 7.6.2 & Appendix E method 2	Sec 7.6.3 & Appendix E method 3	N/A

The design loading is then calculated as follows. Design number of standard axles for:

asphalt = N_{SA} x 365 x GF
subgrade = N_{SS} x 365 x GF
cemented materials = N_{SC} x 365 x GF

where GF is the cumulative growth factor from Table 7.2. These values are used as input to steps 10, 15 and 16 of the design procedure outlined in Table 8.1.

7.5.2 For Traffic in Terms of Annual Average Daily Number of Axles by Type.

The three required design parameters are as defined in Section 7.5.1. Annual average daily number of ESAs, N is calculated using method 2 of Appendix E.

N_{SA} N_{SS} and N_{SC}, as defined in Section 7.5.1, are then calculated as:

$$N_{SA} = 1.1\,N_E$$
$$N_{SS} = 1.1\,N_E$$
$$N_{SC} = 20.0\,N_E$$

These constants have been calculated using the procedure described in method 1 of Appendix E using the traffic distribution given in Table 8.3. If a different traffic distribution is to be used the method described in Section 7.5.1 should be used.

The design loading is then calculated as follows. Design number of standard axles for:

asphalt = N_{SA} x 365 x GF
subgrade = N_{SS} x 365 x GF
cemented materials = N_{SC} x 365 x GF

where GF is the cumulative growth factor from Table 7.2. These values are used as input to steps 10, 15 and 16 of the design procedure outlined in Table 8.1(a).

7.5.3 For Traffic in Terms of Annual Average Daily Traffic (AADT) and Percentage of Commercial Vehicles.

The three required design parameters are as defined in Section 7.5.1. Annual average daily number of ESAs, N_E is calculated using method 3 of Appendix E.

N_{SA}, N_{SS} and N_{SC} as defined in Section 7.5.1, are then calculated as follows:

$$N_{SA} = 1.1\,N_E$$
$$N_{SS} = 1.1\,N_E$$
$$N_{SC} = 20.0\,N_E$$

These constants have been calculated using the procedure described in method 1 of Appendix E using the traffic distrubution given in Table 8.3. If a different traffic distribution is to be used the method described in Section 7.5.1 should be used.

The design loading is then calculated as follows. Design number of standard axles for:

asphalt = N_{SA} x 365 x GF
subgrade = N_{SS} x 365 x GF
cemented materials = N_{SC} x 365 x GF

where GF is the cumulative growth factor from Table 7.2. These values are used as input to steps 10, 15 and 16 of the design procedure outlined in Table 8.1.

7.5.4 Specialised Loading

The aim is to analyse the damage caused by each axle/load configuration and to determine the total damage using Miner's Law.

7.5.4.1 Current Traffic Spectrum

For each of the axle types which will use the pavement, estimate from the available data the daily number with loads within specific load ranges. Designate these as N_{cij} where i refers to axle configuration type and j refers to the load magnitudes for configuration i.

7.5.4.2 Growth Factors

Either

(a) Assume that the growth of numbers of all axle configurations and load magnitude will be equal, and select the appropriate factor from Table 7.2, or

(b) Adopt different growth factors for the numbers of different axle configuration and/or load magnitudes depending on the assumed change in the traffic spectra during the design period, selecting appropriate values from Table 7.2.

7.5.4.3 Calculation of Design Traffic

Determine the total number of each load configuration and magnitude which will be applied to the pavement during the design period N_{ij} using the formula:

$$N_{ij} = 365.\,N_{Cij} \times GF_j$$

where GF is the adopted growth factor from Table 7.2 for load configuration i and load magnitude j.

The values of N_{ij} are then used in steps 10, 15, 16 of the mechanistic design procedure described in Table 8.1.

The load magnitudes and configurations themselves are used in steps 11a and 13a of the mechanistic design procedure described in Table 8.1.

7.6 DESIGN TRAFFIC FOR FLEXIBLE PAVEMENTS CONSISTING OF UNBOUND GRANULAR MATERIALS AND OVERLAYS FOR FLEXIBLE PAVEMENTS

7.6.1 For Traffic in Terms of Annual Average Daily Number of Axles by Type and by Load

The design parameter required is the number of ESAs. Annual average daily number of ESAs, N_E, is calculated from method 4 of Appendix E.

The design number of ESAs is then calculated as:

N_E x 365 x GF

where GF is the cumulative growth factor from Table 7.2.

This value is used as input to the design procedure

outlined in Section 8.3 for flexible pavements and Section 10.4.5 for overlays.

7.6.2 For Traffic in Terms of Annual Average Daily Number of Axles by Type

The design parameter required is the number of ESAs. Annual average daily number of ESAs, N_E, is calculated from method 2 of Appendix E.

The design number of ESAs is then calculated as:

$$N_E \times 365 \times GF$$

where GF is the cumulative growth factor from Table 7.2.

This value is used as input to the design procedure outlined in Section 8.3 for flexible pavements and Section 10.4.5 for overlays.

7.6.3 For Traffic in Terms of Annual Average Daily Traffic (AADT) and Percentage Commercial Vehicles

The design parameter required is the number of ESAs. Annual average daily number of ESAs, N_E, is calculated from method 3 of Appendix E.

The design number of ESAs is then calculated as:

$$N_E \times 365 \times GF$$

where GF is the cumulative growth factor from Table 7.2.

This value is used as input to the design procedure outlined in Section 8.3 for flexible pavements and Section 10.4.5 for overlays.

7.6.4 Specialised Loading

For the design of flexible pavements consisting of unbound granular materials for the case of specialised traffic loading, the design procedure in Section 8.3 is not appropriate. It is necessary to use the Mechanistic Procedure (Section 8.2) and hence adopt the traffic characterisations in Section 7.5.4.

7.7 DESIGN TRAFFIC FOR RIGID PAVEMENTS

7.7.1 Traffic Estimation for Thickness Design Procedure

The design traffic is characterised by the cumulative number of commercial vehicle axle groups expected in the design lane during the design period, together with the proportions of each type of axle group and the distribution of loads on each type of axle group.

Loads on an axle group type are typically grouped into 10 kN intervals. Appendix I contains examples of load distributions.

The design number of commercial vehicle axle groups over the design life of the pavement is given by:

$$C_{ag} = C_d \times 365 \times GF$$

where

C_{ag} = design number of commercial vehicle axle groups.

C_d = initial number of commercial vehicle axle groups per day.

GF = the cumulative growth factor from Table 7.2.

The design procedure in Chapter 9 caters for each of the following axle types:

- single axles with single wheels;
- single axles with dual wheels;
- tandem axles with dual wheels; and
- triaxles with dual wheels.

Other axle types are to be converted to one of the above as follows:

(i) Convert spread tandem axle loads to dual-tyred single axle loads on the basis that a spread tandem axle is equivalent to two dual tyred single axles, each of which has half of the spread tandem axle load.

(ii) Convert twin steer axles to single axles with single wheels on the basis that a twin steer axle is equivalent to two single axles with single wheels, each with half the load.

7.8 INITIAL AND TERMINAL PAVEMENT CONDITIONS

The design procedure for new flexible pavements presented in Section 8.1 is based on the premise that pavement roughness at the end of the design period will be approximately 150 counts/km, assuming that the initial roughness is approximatly 50 counts/km.

A suitable initial roughness value can be determined by measurements of recently constructed pavements. To allow flexibility in the choice of the terminal condition of the pavement, and also to allow for variations in the initial pavement condition the designer may modify the value of design traffic determined above before undertaking the pavement design.

To determine the modified value, the designer enters Figure 7.2 with the already determined design traffic and also the desired ratio of initial/final roughness. The modified design traffic is then read from the vertical axis. For example, if the design traffic as determined above is 10^6 and the designer seeks a pavement design which will result in terminal roughness being four times initial roughness, the value of the modified design traffic is 4×10^5.

This modification applies only to cases where the subgrade strain criterion governs. As a guide, suggested terminal roughnesss values for different classes of road are in Table 7.4.

7.9 MODIFICATION OF DESIGN TRAFFIC TO IMPROVE RELIABILITY OF DESIGN

While the design procedure endeavours to take cognisance of usual variabilities associated with materials and the construction process, there will always be a risk that the pavement will reach the end of its service life before the design period has elapsed. This risk is attributed to, among other things, the uncertainty associated with predictions of the traffic volume and the magnitude of axle group loads over the design period, and uncertainties associated with estimations of average values and variabilities in material properties, layer thicknesses, etc.

Situations arise where the designer may wish to reduce this risk. Examples include high traffic volume facilities where lane closures to effect repairs would cause serious disruptions to traffic flows.

Such risk can be reduced by adopting a more conservative pavement configuration.

A simple method of achieving this is to adopt in the design procedure a value for total traffic over the design period higher than that which is anticipated.

It is suggested that use of a value of up to four times anticipated traffic may be warranted in some situations.

It is to be noted that, with the adoption of conservative designs, their service lives will usually extend beyond the design period.

Often, in the design process, one significant source of uncertainty is associated with prediction of loads on axle groups. If relevant information from weigh-in-motion installations is available to the designer, that portion of risk attributable to this uncertainty is considerably reduced.

In the case of rigid pavements, specific guidance is provided in Section 9.3.6. ❑

TABLE 7.4 VALUES OF TERMINAL ROUGHNESS

NAASRA Road Functional Class[1]	Terminal Roughness NAASRA counts per km
1 and 2	110
3 and 6	150
4, 5, 7, 8 and 9	175

1 For definition of Classes see Appendix A

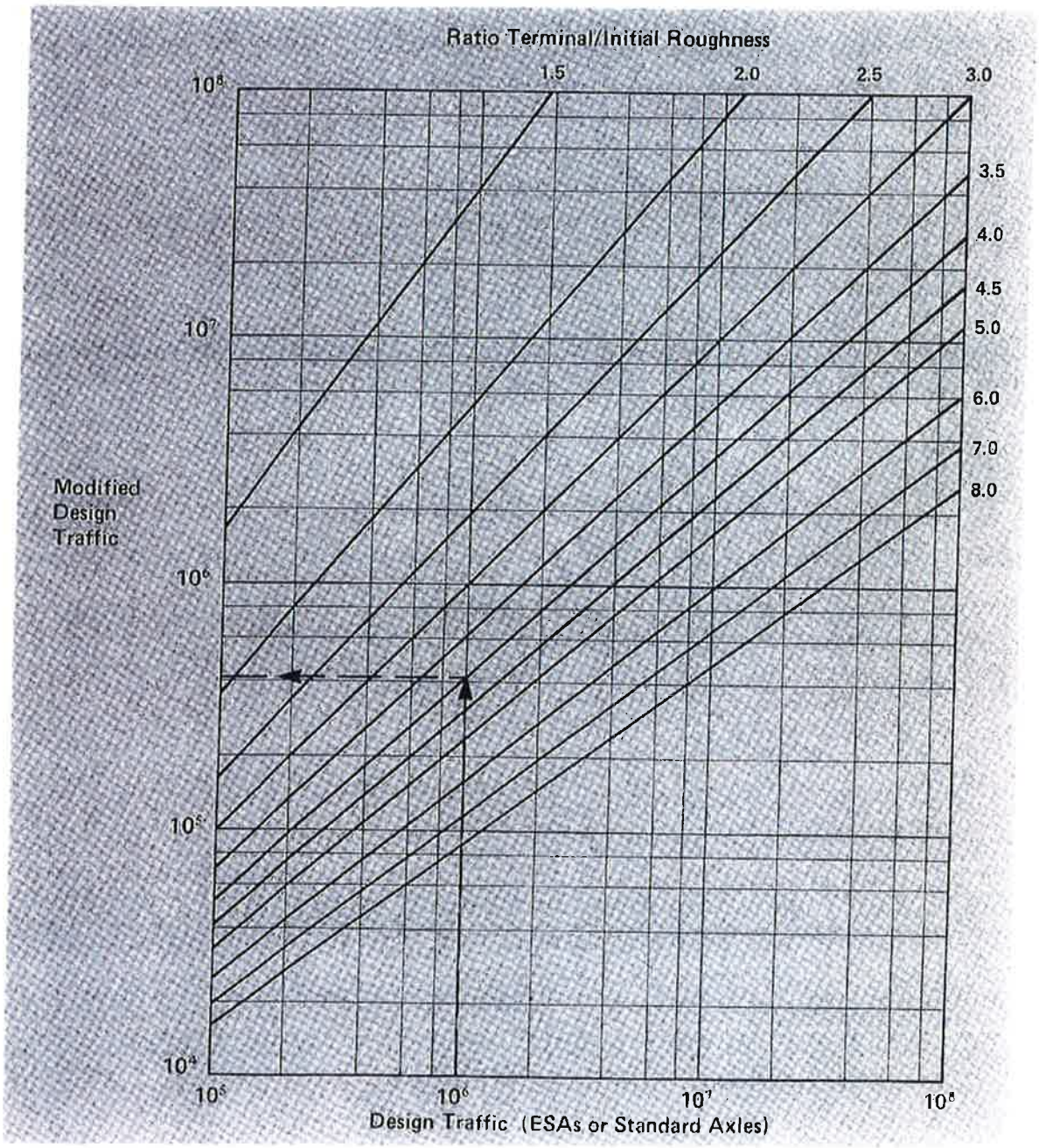


FIGURE 7.2 MODIFIED DESIGN TRAFFIC VS DESIGN TRAFFIC AND RATIO FINAL / INITIAL ROUGHNESS (FOR USE IN DESIGN OF NEW FLEXIBLE PAVEMENTS)

APPENDIX A
TERMINOLOGY

The terminology used in the Guide is basically in accordance with Australian Standard 1348.1 (1986), *Road and Traffic Engineering - Glossary of Terms, Part 1 - Road Design and Construction.* This Appendix lists and defines terms used which do not appear or differ in definition from that shown in AS 1348.1, or accord with AS 1348.1, but which are considered so important within the context of this document to warrant having them reproduced.

DEFINITION OF TERMS

Annual Average Daily Traffic (AADT)

The total yearly traffic volume divided by 365.

California Bearing Ratio (CBR)

The ratio expressed as a percentage between a test load and an arbitrarily defined standard load. This test load is that required to cause a plunger of standard dimensions to penetrate at a specified rate into a specifically prepared soil specimen.

Commercial Vehicle

A vehicle having at least one axle with dual wheels and/or having more than two axles.

Course

One or more layers of the same material within a pavement structure.

Curvature Function

Of a deflection bowl is the difference in maximum deflection at a test site and the deflection at a point 200 mm from the point at which the maximum deflection was produced (in the direction of travel).

Cemented Materials

Those produced by addition of cement, lime or other hydraulically binding agent to granular materials in sufficient quantities to produce a bound layer with significant tensile strength.

Deflection

The vertical elastic (recoverable) deformation of a pavement surface between the tyres of a standard axle.

Design Period

A period considered appropriate to the function of the road. It is used to determine the total traffic for which the pavement is designed.

Design Subgrade Level (DSL)

The level of the prepared formation after completion of stripping and excavation or filling and upon which the pavement is to be constructed. (Design Subgrade Level = Finished Surface Level-Nominated Pavement Thickness).

Layer

The portion of a pavement course placed and compacted as an entity.

Modified Materials

Granular materials to which small amounts of stabilising agent have been added to improve their performance (eg. by reducing plasticity) without causing a significant increase in structural stiffness. Modified materials are considered to behave as unbound materials.

Modulus of Subgrade Reaction

The slope of the straight line drawn from the origin to a given point on the stress deflection curve obtained from a plate bearing test.

Pavement (Structure)

The portion of the road, excluding shoulders, placed above the design subgrade level for the support of, and to form a running surface for, vehicular traffic.

Permeability Reversal

Occurs at a pavement layer interface when the coefficient of saturated permeability of the upper layer is at least 100 times greater than that of the layer below it.

Roughness

The roughness of the pavement surface in counts/km as measured by a NAASRA Roughness Meter.

Shoulder

The portion of the road contiguous and flush with the pavement.

Stabilisation

The treatment of a road pavement material to improve it or to correct a known deficiency and thus enhance its ability to perform its function in the pavement.

Standard Axle

Single axle with dual wheels loaded to a total mass of 8.2t.

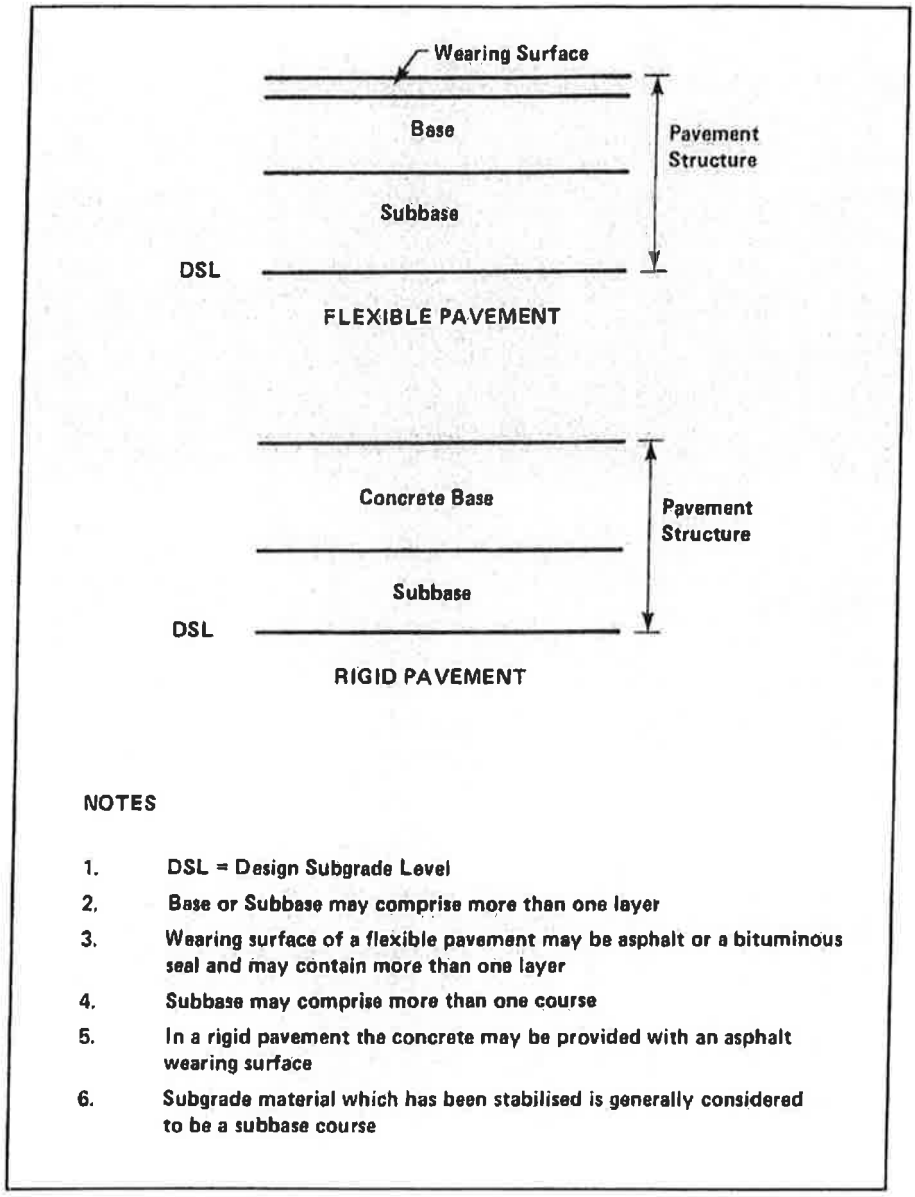
Traffic Lane

The portion of a carriageway alloted for use of a single lane of vehicles.

The components of flexible and rigid road pavement structures are shown in Figure A.1. ❑

TABLE A.1 DEFINITION OF ROAD CLASSES

RURAL AREAS	
Class 1	Those roads which form the principal avenue for communications between major regions of Australia, including direct connections between capital cities.
Class 2	Those roads, not being Class 1, whose main function is to form the principal avenue of communication for movements : • between a capital city and adjoining states and their capital cities; or • between a capital city and key towns; or • between key towns.
Class 3	Those roads, not being Class 1 or 2, whose main function is to form an avenue of communication for movements : • between important centres and the Class 1 and Class 2 roads and/or key towns; or • between important centres; or • of an arterial nature within a town in a rural area.
Class 4	Those roads, not being Class 1, 2 or 3, whose main function is to provide access to abutting property (including property within a town in a rural area).
Class 5	Those roads which provide almost exclusively for one activity or function which cannot be assigned to Classes 1, 2, 3 or 4.
URBAN AREAS	
Class 6	Those roads whose main function is to perform the principal avenue of communication for massive traffic movements.
Class 7	Those roads, not being Class 6, whose main function is to supplement the Class 6 roads in providing for traffic movements or which distribute traffic to local street systems.
Class 8	Those roads not being Class 6 or 7, whose main function is to provide access to abutting property.
Class 9	Those roads which provide almost exclusively for one activity or function and which cannot be assigned to Classes 6, 7 or 8.



NOTES

1. DSL = Design Subgrade Level
2. Base or Subbase may comprise more than one layer
3. Wearing surface of a flexible pavement may be asphalt or a bituminous seal and may contain more than one layer
4. Subbase may comprise more than one course
5. In a rigid pavement the concrete may be provided with an asphalt wearing surface
6. Subgrade material which has been stabilised is generally considered to be a subbase course

FIGURE A.1 COMPONENTS OF FLEXIBLE AND RIGID ROAD PAVEMENT STRUCTURES

APPENDIX E
METHODS FOR CHARACTERISING INITIAL DAILY TRAFFIC

Method 1

Determine, for each load range for each type of axle group, the number of Standard Axles which produce the same damage as one pass of the axle group, using the following formula :

$$F_{Aij} \ (\text{or} F_{Cij} \text{ or } F_{Sij}) = \left[\frac{L_{ij}}{L_{Si}}\right]^{EXP}$$

where

L_{ij} = jth load magnitude on axle type i

L_{Si} = magnitude of Standard Load on axle type i (Table 7.1)

EXP = exponent contained in the relation between limiting strain and strain repetitions which defines the performance of asphalt, cemented material or subgrade as applicable.

The values of F_{Aij} , F_{Cij} and F_{Sij} contained in Tables E1, E2, E3 respectively were derived using the above formula and the exponents 5, 18 and 7.14. These exponents are derived from the performance criteria in Figure 6.8, Figure 6.1 and equation 5.1 (Section 5.9).

If the designer wishes to use other performance criteria, the above formulas should be used to recalculate the entries in Tables E1, E2, and E3.

Calculate for each relevant damage mode, the number of Standard Axles (N_S) which is equivalent to the initial daily traffic, using the following equations:

For asphalt distress

$$N_{SA} = \sum_j N_{A1j} F_{A1j} + \sum_j N_{A2j} F_{A2j} + \sum_j N_{A3j} F_{A3j} + \sum_j N_{A4j} F_{A4j}$$

Where N_{Aij} is the average daily number of axles (in the first year of type i carrying a load of magnitude j.

For damage of cemented materials

$$N_{SC} = \sum_j N_{A1j} F_{C1j} + \sum_j N_{A2j} F_{C2j} + \sum_j N_{A3j} F_{C3j} + \sum_j N_{A4j} F_{C4j}$$

For subgrade damage

$$N_{SS} = \sum_j N_{A1j} F_{S1j} + \sum_j N_{A2j} F_{S2j} + \sum_j N_{A3j} F_{S3j} + \sum_j N_{A4j} F_{S4j}$$

with the summations being taken over the appropriate load ranges.

These three quantities characterise the initial daily traffic for the mechanistic procedure.

TABLE E1
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT ASPHALT DAMAGE ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{Aij})

Load on Axle Group (kN)	Number of Standard Axles for equivalent asphalt distress axle / tyres			
	Single single	Single dual	Tandem dual	Triaxle dual
20	0.01	0	0	0
30	0.06	0.01	0	0
40	0.25	0.03	0	0
50	0.75	0.10	0.01	0
60	1.9	0.24	0.02	0
70	4.0	0.51	0.04	0.01
80	7.8	1.0	0.07	0.02
90		1.8	0.13	0.03
100		3.1	0.22	0.05
110		4.9	0.36	0.08
120		7.6	0.56	0.13
130			0.83	0.19
140			1.2	0.28
150			1.7	0.39
160			2.3	0.54
170			3.2	0.73
180			4.2	0.97
190			5.5	1.3
200			7.1	1.6
210			9.1	2.1
220				2.7
230				3.3
240				4.1
250				5.0
260				6.1
270				7.4
280				8.9

TABLE E2
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT DAMAGE TO CEMENTED MATERIALS, ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{Clj})

Load on Axle Group (kN)	Number of Standard Axles for equivalent damage of cemented materials axle / tyres			
	Single single	Single dual	Tandem dual	Triaxle dual
20	0	0	0	0
30	0	0	0	0
40	0.01	0	0	0
50	0.35	0	0	0
60	9.3	0.01	0	0
70	150	0.09	0	0
80	1654	1	0	0
90		8.3	0	0
100		55.5	0.01	0
110		309	0.03	0
120		1478	0.12	0
130			0.51	0
140			1.9	0.01
150			6.7	0.03
160			21.3	0.11
170			63.4	0.32
180			177	0.91
190			469	2.4
200			1182	6.0
210			2884	14.5
220				33.5
230				74.6
240				161
250				335
260				678
270				1338
280				2574
290				4841

TABLE E3
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT SUBGRADE DAMAGE ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{Slj})

Load on Axle Group (kN)	Number of Standard Axles for equivalent subgrade damage axle / tyres			
	Single single	Single dual	Tandem dual	Triaxle dual
20	0	0	0	0
30	0.02	0	0	0
40	0.13	0.01	0	0
50	0.66	0.04	0	0
60	2.4	0.13	0	0
70	7.3	0.39	0.01	0
80	18.9	1.0	0.02	0
90		2.3	0.06	0.01
100		4.9	0.12	0.01
110		9.7	0.23	0.03
120		18.1	0.43	0.05
130			0.76	0.09
140			1.3	0.16
150			2.1	0.26
160			3.4	0.42
170			5.2	0.64
180			7.8	0.96
190			11.5	1.4
200			16.5	2.0
210			23.5	2.9
220				4.0
230				5.5
240				7.5
250				10.0
260				13.3
270				17.4
280				22.5
290				29.0

Method 2

(i) Estimate the daily number of each of the 4 types of axle groups listed in Table E4. Designate these as $N_{A1}, N_{A2}, N_{A3}, N_{A4}$

(ii) Estimate the number of ESAs for each type of axle group (F_1, F_2, F_3, F_4) from Table E4 or other relevant information

(iii) Calculate initial daily ESAs (N) as follows:

$$N_E = N_{A1} F_1 + N_{A2} F_2 + N_{A3} F_3 + N_{A4} F_4$$

Method 3

(i) Estimate AADT for the design lane and percent commercial vehicles (C%) from traffic census information

(ii) Estimate the number of ESAs per commercial vehicle (F) from Table E5 or other relevant information

(iii) Calculate initial daily ESAs (N) as follows:

$$N_E = AADT \; F \; C / 100$$

Method 4

Calculate initial daily ESAs (N_E) as follows:

$$N_E = \sum_j N_{A1j} F_{E1j} + \sum_j N_{A2j} F_{E2j} + \sum_j N_{A3j} F_{E3j} + \sum_j N_{A4j} F_{E4j}$$

where N_{Aij} is the average daily number of axles (in the first year) of type i, carrying a load of magnitude j and F_{Eij} is the number ESAs for each pass of the axle group i carrying load j with the summations being taken over the appropriate load ranges. Values for F_{Eij} are contained in Table E6.

TABLE E4
NUMBER OF ESAs PER AXLE GROUP TYPE ACCORDING TO STATE AND ROAD FUNCTIONAL CLASS (FACTOR F_i)

Road Functional Class [1]	Axle Group Type	State/Territory							
		NSW	VIC	QLD	WA	SA	TAS	ACT	NT
1	SAST	0.6	0.6	0.4	0.5	0.7	0.4	-	0.4
	SADT	0.4	0.5	0.3	0.4	0.4	0.3	-	0.2
	TADT	0.9	0.9	0.7	0.7	0.9	0.6	-	0.7
	TRDT	0.8	0.7	0.6	0.7[2]	0.6	0.4[2]	-	0.6
2	SAST	0.6	0.4	0.4	0.5	0.5	0.4	-	-
	SADT	0.5	0.3	0.3	0.4	0.3	0.3	-	-
	TADT	1.0	0.7	0.7	1.0	0.9	0.9	-	-
	TRDT	0.7	0.4	0.6	0.5	0.6[2]	0.5[2]	-	-
3	SAST	0.6	0.4	0.4	0.5	0.5	0.4	-	0.5
	SADT	0.6[2]	0.4	0.2	0.3	0.3	0.3	-	0.5
	TADT	1.0	0.7	0.7	0.8	0.7	1.1	-	0.8
	TRDT	0.8[2]	0.4[2]	0.5[2]	0.9[2]E	0.7	0.8[2]E	-	0.6
6	SAST	0.6	0.4	0.3	0.4	0.5	0.3	0.3	-
	SADT	0.4	0.3	0.2	0.3	0.2	0.2	0.2[2]	-
	TADT	1.0	0.6	0.7	1.2	0.8	0.7	0.8	-
	TRDT	0.8	0.4	0.6[2]	0.8[2]	0.6	0.5[2]	-	-
7	SAST	0.6	0.3	0.3	0.3	0.2E	0.1E	-	-
	SADT	0.6[2]	0.2	0.2	0.2	0.3E	0.4E	-	-
	TADT	1.6	0.7	0.6	1.2	0.3[2]E	1.2[2]E	-	-
	TRDT	-	-	-	-	-	-	-	-

1 Road Functional Classes are defined in Appendix A
2 Average based on a sample of between 50 and 100 axle groups
E Extrapolated from 1973 survey data

TABLE E5
NUMBER OF ESAs PER COMMERCIAL VEHICLE ACCORDING TO STATE AND ROAD FUNCTIONAL CLASS (FACTOR F)

Road Functional Class [1]	State/Territory							
	NSW	VIC	QLD	WA	SA	TAS	ACT	NT
1	1.8	1.9	1.5	1.5	2.0	1.1	-	1.9
2	2.1	1.2	1.1	2.2	1.6	1.4	-	-
3	1.9	1.2	1.2	1.6	1.5	1.6	-	2.5
6	1.9	1.0	1.1	1.5	1.5	0.9	-	-
7	2.7	0.9	0.9	1.2	0.5E	0.7E	-	-

1 Road Functional Classes are defined in Appendix A
E: Extrapolated from 1973 survey data

TABLE E6
NUMBER OF ESAs PER AXLE GROUP ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{EU})

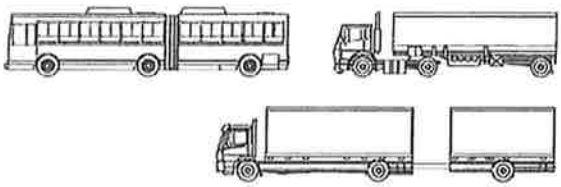
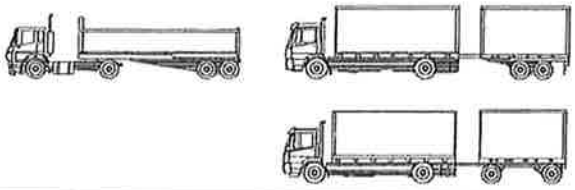
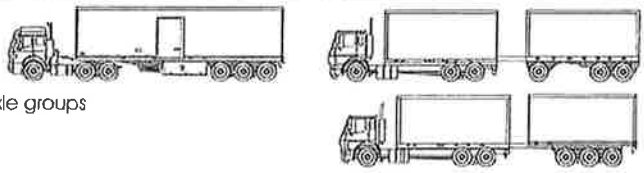
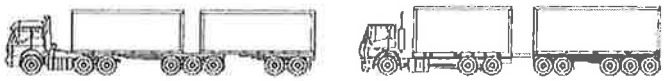
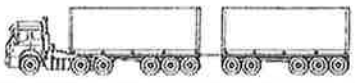
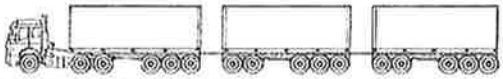
Load on Axle Group (kN)	Number of ESAs			
	axle / tyres			
	Single single	Single dual	Tandem dual	Triaxle dual
20	0.02	0	0	0
30	0.10	0.02	0	0
40	0.32	0.06	0.01	0
50	0.79	0.15	0.02	0.01
60	1.6	0.32	0.04	0.01
70	3.0	0.59	0.07	0.02
80	5.2	1.0	0.12	0.04
90		1.6	0.20	0.06
100		2.4	0.30	0.09
110		3.6	0.44	0.14
120		5.1	0.62	0.19
130			0.86	0.27
140			1.2	0.36
150			1.5	0.47
160			2.0	0.61
170			2.5	0.78
180			3.2	0.98
190			3.9	1.2
200			4.8	1.5
210			5.9	1.8
220				2.2
230				2.6
240				3.1
250				3.6
260				4.3
270				5.0
280				5.7
290				6.6

TABLE E2
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT DAMAGE TO CEMENTED MATERIALS, ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD, (FACTOR F_{CU})

Load on Axle Group (kN)	Number of Standard Axles for equivalent damage of cemented materials axle/tyres			
	Single Single	Single Dual	Tandem Dual	Triaxle Dual
20	0	0	0	0
30	0	0	0	0
40	0.03	0	0	0
50	0.50	0	0	0
60	4.43	0.03	0	0
70	28.2	0.20	0	0
80	139.9	1.00	0	0
90		4.11	0.01	0
100		14.6	0.03	0
110		45.7	0.09	0
120		129.7	0.24	0.01
130			0.64	0.02
140			1.55	0.05
150			3.54	0.10
160			7.68	0.23
170			15.9	0.47
180			31.6	0.94
190			60.4	1.79
200			111.8	3.31
210			200.7	5.95
220				10.4
230				17.7
240				29.5
250				48.2
260				77.2
270				121.4
280				187.8
290				286.2

VEHICLE CLASSIFICATION SYSTEM

AUSTROADS

CLASS	LIGHT VEHICLES
1	SHORT Car, Van, Wagon, 4WD, Utility, Bicycle, Motorcycle 
2	SHORT - TOWING Trailer, Caravan, Boat 
	HEAVY VEHICLES
3	TWO AXLE TRUCK OR BUS *2 axles 
4	THREE AXLE TRUCK OR BUS *3 axles, 2 axle groups 
5	FOUR (or FIVE) AXLE TRUCK *4 (5) axles, 2 axle groups 
6	THREE AXLE ARTICULATED *3 axles, 3 axle groups 
7	FOUR AXLE ARTICULATED *4 axles, 3 or 4 axle groups 
8	FIVE AXLE ARTICULATED *5 axles, 3+ axle groups 
9	SIX AXLE ARTICULATED *6 axles, 3+ axle groups or 7+ axles, 3 axle groups 
	LONG VEHICLES AND ROAD TRAINS
10	B DOUBLE or HEAVY TRUCK and TRAILER *7+ axles, 4 axle groups 
11	DOUBLE ROAD TRAIN *7+ axles, 5 or 6 axle groups 
12	TRIPLE ROAD TRAIN *7+ axles, 7+ axle groups 

Dwg No: 0293-009

Asset and Network Information - January 2002

Appendix B

Cost Summary Report

COST SUMMARY REPORT

DEVELOPMENT APPLICATION / COMPLYING DEVELOPMENT CERTIFICATE NO.

APPLICANT'S NAME: _____

APPLICANT'S ADDRESS: _____

_____

LOCATION OF PROPOSED DEVELOPMENT: _____

_____

ANALYSIS OF DEVELOPMENT COSTS:

Demolition and excavation	$
Decontamination and remediation	$
Site preparation	$
Building construction	$
Hydraulic, mechanical or fire services	$
External works and services	$
Sub-total carried forward	$
Preliminaries and margin	$
Sub-total	$
Consultant fees	$
Other related development costs	$
Sub-total	$
Good and Services Tax	$
TOTAL PROPOSED COST OF DEVELOPMENT	$

I CERTIFY THAT I HAVE:

- ⇨ inspected the plans the subject of the application for development consent or complying development certificate;
- ⇨ calculated the development costs in accordance with the definition of proposed cost of development in clause 25J of the Environmental Planning and Assessment Regulation 2000 at current prices; and
- ⇨ included GST in the calculation of proposed cost of development.

Signed: _____

Name: _____

Position and Qualifications: _____

Date: _____