Tuggeranong and Erindale Centres

Draft Background Investigations Report

Revision 1

03 February 2011

Background Report

Services Infrastructure

Prepared for

ACT Planning and Land Authority

Prepared by

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0	10-Dec-2010	Draft for Client Review	K. Howard Project Manager	
1	03-Feb-2011	Updated to address client comments	K. Howard Project Manager	Kath A. Howard

Executive Summary

The purpose of the Tuggeranong + Erindale Centres Planning Project is to deliver a Planning and Design Framework (PDF) for the Tuggeranong Town Centre, Erindale Group Centre, and the Erindale Drive corridor which connects the two centres. The first stage of developing the PDF is the Issues Paper which has already been completed. This Background Investigation is one of the initial stages of developing the PDF, which is scheduled for completion by June 2012.

AECOM Australia Pty Ltd (AECOM) was engaged by the ACT Planning and Land Authority (ACTPLA) to undertake a services infrastructure study of the project area. This study includes a review of existing utility services infrastructure (stormwater, water, sewer, gas, electricity, and telecommunications), assessment of approved and planned infrastructure, and identification of short term improvements to support potential developments. Opportunities for green infrastructure, such as water sensitive urban design (WSUD) measures will also be explored as part of this project.

This Background Investigation expands upon the findings of the Issue Paper, includes a detailed review of existing civil infrastructure, is intended to provide a sound basis on which ACTPLA will prepare the PDF, and will be used as a tool in determining potential developments as part of the PDF. The identification of approved and planned, and short term improvements will be explored during later stages of the project.

The assessment of existing services infrastructure was based upon Geographic Information System (GIS) data and infrastructure advice received from service authorities and government agencies.

Stormwater

There are no known stormwater capacity issues within the Town and Group Centres. The overall Lake Tuggeranong catchment does not meet current WSUD guidelines. Proposed developments are reviewed on a “block by block” basis rather than a “whole of catchment” basis.

Water

There are no existing water supply issues within the Town and Group Centres. Infrastructure improvements may be required for new developments located within the intermediate pressure zone (Erindale Group Centre) in order to meet fire requirements.

Sewer

Some sewers located within the Town and Group Centres are near capacity. Future development will need to be carefully evaluated to determine the impact on existing infrastructure, and whether upgrades are required.

Gas

The existing gas network should be capable of providing services to small commercial and industrial developments. The ability of the existing network to service larger developments will need to be reviewed on a case by case basis. Jemena has plans for a secondary main extension from Hume to Tuggeranong in 2012 - 2013. This proposed secondary main will connect into and augment pressure in the existing Tuggeranong system and allow future development needs to be met once the secondary main extension is completed.

Electricity

The Wanniassa Zone substation, which supplies both the Town and Group Centres, has spare capacity, and additional capacity is available with network rearrangement. It can cater for all known future development load demands until 2015.

Effects of Potential Traffic Improvements on Existing Infrastructure

The *"Ashley Drive, Monash Road Network Upgrade Feasibility Study, Draft" (*GTA Consultants, 27/10/10) and the *"Tuggeranong and Erindale Centres Planning Study – Transport"* (SMEC, 21/01/11) proposed road network treatment measures within the Town and Group Centres.

Civil infrastructure utilities are located within or adjacent to the potential areas of improvement. It does not appear that major relocation works will be required, but some minor works may be needed. The configuration of these improvements is not known; therefore the scope of relocation works is unable to be determined at this stage in the design process.

Green Infrastructure

There may be opportunities for 'green' infrastructure and water sensitive urban design (WSUD) measures within the Town and Group Centres. These opportunities, which will be explored in later stages of the project, may include the use of drought resistant vegetation in existing floodways, bioretention swales in streetscapes, and 'at source' stormwater treatment.

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1.0 Introduction

1.1 Background

This Background Investigation report is part of the Tuggeranong and Erindale Centres Planning Project. The purpose of the Planning Project is to deliver a Planning and Design Framework (PDF) for the Tuggeranong Town Centre and Erindale Group Centre.

The Tuggeranong and Erindale Centres Background Investigation expands upon the findings of the Issue Paper, includes a detailed review of existing civil and transport infrastructure and is intended to provide a sound basis on which ACTPLA will prepare the Planning and Design Framework (PDF). Following completion of the PDF, this report will be updated with recommendations for short, medium and long term initiatives and performance indicators associated with the initiatives and strategies to measure future success.

The ACT Government has made a commitment to undertake the Tuggeranong Town and Erindale Group Centre Infrastructure Study in 2010/11. This work will identify the requirements for civil infrastructure and transport infrastructure. The Tuggeranong and Erindale Centres Planning Project is being managed in parallel with the infrastructure study to provide a better outcome for both centres.

1.2 Project Area

The project area includes the Tuggeranong Town Centre, Erindale Group Centre, and the Erindale Drive corridor which connects the two centres. The project area is illustrated in Figure 1.

Tuggeranong Town Centre

Tuggeranong Town Centre, as defined in this study, is bounded by Lake Tuggeranong and Drakeford Drive on the east, Athllon Drive on the south, Lake Tuggeranong on the north and the extent of existing development between Athllon Drive and the Murrumbidgee River on the west.

Erindale Group Centre and Erindale Drive Corridor

Erindale Group Centre, as defined in this study, is bounded by McBryde Crescent and Sternberg Crescent on the north, Erindale Drive on the east and south and Traverner Street on the west. The Erindale Drive runs east-west, connecting the two centres.

Figure 1 Project location

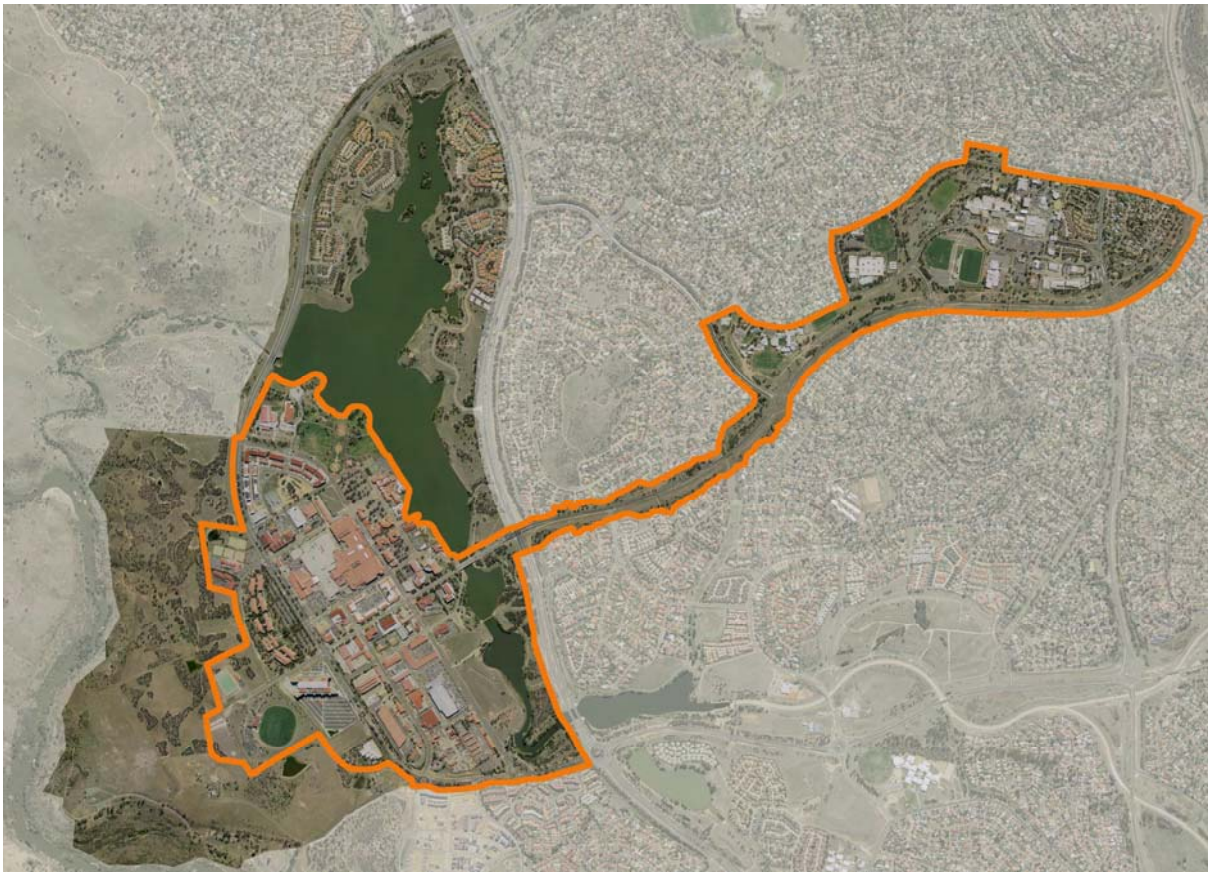


Image supplied by ACTPLA

1.3 Scope of Works

AECOM Australia Pty Ltd (AECOM) was engaged by the ACT Planning and Land Authority (ACTPLA) to undertake a background investigation of the project area. This study includes a review of existing utility services infrastructure (stormwater, water, sewer, gas, electricity, and telecommunications), assessment of approved and planned infrastructure, identification of short term, medium term and long term improvements to support potential developments and an indication of performance indicators to measure future success of servicing strategies. Opportunities for green infrastructure, such as water sensitive urban design (WSUD) measures will also be explored as part of this project.

This Background Investigation and the completed Issues Paper will be used as a tool in determining potential developments as part of the PDF.

1.4 Project Inputs and Assumptions

AECOM contacted all authorities with utility services located within the Tuggeranong and Erindale Centres regarding this study. Requests were made for the supply of both Geographic Information System (GIS) data and servicing advice for input into the Project. Table 1 lists the project inputs that were referenced within this report. This data was presumed accurate and up to date at the time it was received.

Table 1 Project inputs

Utility Service	Asset Owner	GIS	Advice
Stormwater	Territory and Municipal Services (TaMS)	√	√
Water	ActewAGL	√	√
Sewer	ActewAGL	√	√
Electricity	ActewAGL	√	
Gas	Jemena	√	√
Telecommunications	Telstra	Declined to provide GIS and detailed information due to corporate policies.	
Telecommunications	TransACT		

Telecommunications - Telstra

Telstra is unable to provide GIS or details on its network infrastructure due to corporate policies. However, they have made the following general statements:

- The Tuggeranong Town Centre is serviced by the Tuggeranong telephone exchange. There is existing infrastructure providing service to the Town Centre.
- The Erindale Group Centre is serviced by the Kambah telephone exchange. There is existing infrastructure providing service to the Group Centre.
- Telstra will be able to provide service to developments located within the Town and Group Centres. Where there is insufficient infrastructure, Telstra will upgrade its network as required.

Telecommunications - TransACT

TransACT is unable to provide GIS or details on its network infrastructure due to corporate policies. However, they have made the following general statements:

- TransACT's infrastructure within the project area consists of network Communications Fibre connecting both Residential and Commercial customers
- There are no planned improvements to the TransACT infrastructure within the project area.

2.0 Policy Context

Utility service authorities and government agencies each have their own set of design standards and guidelines that are used in planning, design and construction processes. These standards, which will be referenced in the Final Background Investigations Report following completion of the PDF, include:

- ACTEW - Water Supply and Sewerage Standards.
- TaMS - Design Standards for Urban Infrastructure
- ACTPLA – Waterways Water Sensitive Urban Design General Code.

3.0 Performance Indicators

Representatives from utility service authorities and government agencies were contacted to discuss existing infrastructure and known deficiencies within the stormwater, water, sewer, electricity and telecommunication systems in the project area. Each utility service provider has their own set of performance indicators. For the purpose of comparison, following indicators are used as part of the Background Investigations Report:

- Existing network deficiencies – i.e. are there any constraints due to capacity?
- Ability of existing infrastructure to cater for future development without the need for system wide improvements (i.e. only localised improvements required).
- The ability of utility service authority/ government agencies' master plans to foresee system wide improvements necessary to cater for future development – i.e. no unplanned significant system wide improvements.
- Complaints from the public about existing infrastructure systems, particularly stormwater.

4.0 Tuggeranong Town Centre

Civil infrastructure utility services located within the Tuggeranong Town Centre include stormwater, water, sewer, gas, electricity and telecommunications.

4.1 Stormwater

4.1.1 Existing Infrastructure

Tuggeranong Town Centre is located within the Tuggeranong Catchment which is approximately 6,500 ha in area. It includes the suburbs south of Sulwood Drive, with the exceptions of Bonython, Gordon, Banks and Condor. Stormwater in the Town Centre drains into Lake Tuggeranong via the existing open channel floodways and overland flow paths. Lake Tuggeranong outlets into Tuggeranong Creek via a spillway beneath Athllon Drive, and ultimately reaches the Murrumbidgee River just upstream of Red Rocks Gorge. The Lake Tuggeranong dam wall comprises the Athllon Drive embankment.

TaMS stormwater infrastructure is located throughout the Town Centre and includes the following assets:

- Lake Tuggeranong provides stormwater treatment and attenuation prior to discharging into the Murrumbidgee River. The overall Lake Tuggeranong catchment does not meet current WSUD guidelines. Proposed developments are reviewed on a “block by block” basis rather than a “whole of catchment” basis.
- A network of stormwater trunk and reticulation pipes, which include structures such as sumps, manholes and headwalls.
- Gross pollutant traps (GPTs) located on the outlet of most stormwater networks before entering Lake Tuggeranong are functioning as intended.
- Cut-off drains and open channel floodways.

Stormwater infrastructure located within the Tuggeranong Town Centre is included in Figure T1 (refer Appendix A).

An analysis of the strengths, weaknesses, opportunities and threats (SWOT) of the stormwater infrastructure in the Town Centre is illustrated in Figure 2.

4.1.2 Existing Infrastructure Deficiencies

Deficiencies in the existing stormwater infrastructure system include:

- Stormwater maintenance is reactive rather than proactive due to limited maintenance budget. An increased maintenance budget would provide the opportunity for a proactive infrastructure maintenance program.
- As discussed in Section 4.1.1, the overall Lake Tuggeranong catchment does not meet current WSUD guidelines. Proposed developments are reviewed on a “block by block” basis rather than a “whole of catchment” basis.
- Not all of the existing stormwater networks within the study area pass through GPTs before entering Lake Tuggeranong. The stormwater network discharging into Lake Tuggeranong near Bartlet Place does not have a GPT. Whilst GPTs remove gross pollutants, they do not remove other contaminants such as nutrients.
- There is an opportunity to provide “at source” water treatment measures (e.g. local wetlands and ponds or “street scale” bioretention rather than “at outlet” GPTs).

- Discussions with TaMS concluded that there is no known stormwater capacity issues located within the Tuggeranong Town Centre. However, increased development may put stress on existing stormwater infrastructure.

Figure 2 Stormwater SWOT Analysis – Tuggeranong Town Centre

STORMWATER

Strengths	Weaknesses
• Six (6) gross pollutant traps located at outlets to Lake Tuggeranong functioning as intended. • No problematic areas – only normal maintenance required (e.g. blocked sump, service ties, etc.). • Lake Tuggeranong provides flood attenuation.	• Maintenance is reactive rather than proactive due to limited maintenance budget. • Whilst GPTs remove gross pollutants, they do not remove nutrients.
Opportunities	**Threats**
• Provide 'at source' water treatment measures (e.g. local wetlands and ponds) rather than 'at outlet' GPTs. • Increased maintenance budget would provide the opportunity for a proactive infrastructure cleaning program.	• The overall Lake Tuggeranong catchment does not meet current WSUD guidelines. Proposed developments are reviewed on a 'block by block' basis rather than as 'whole of catchment.' • Increased development may put stress on stormwater infrastructure. • Water quality of Lake Tuggeranong will be subject to further stress as uncontrolled inflows increase.

There may be opportunities for providing 'at source' water treatment measures for future developments.

4.2 Water

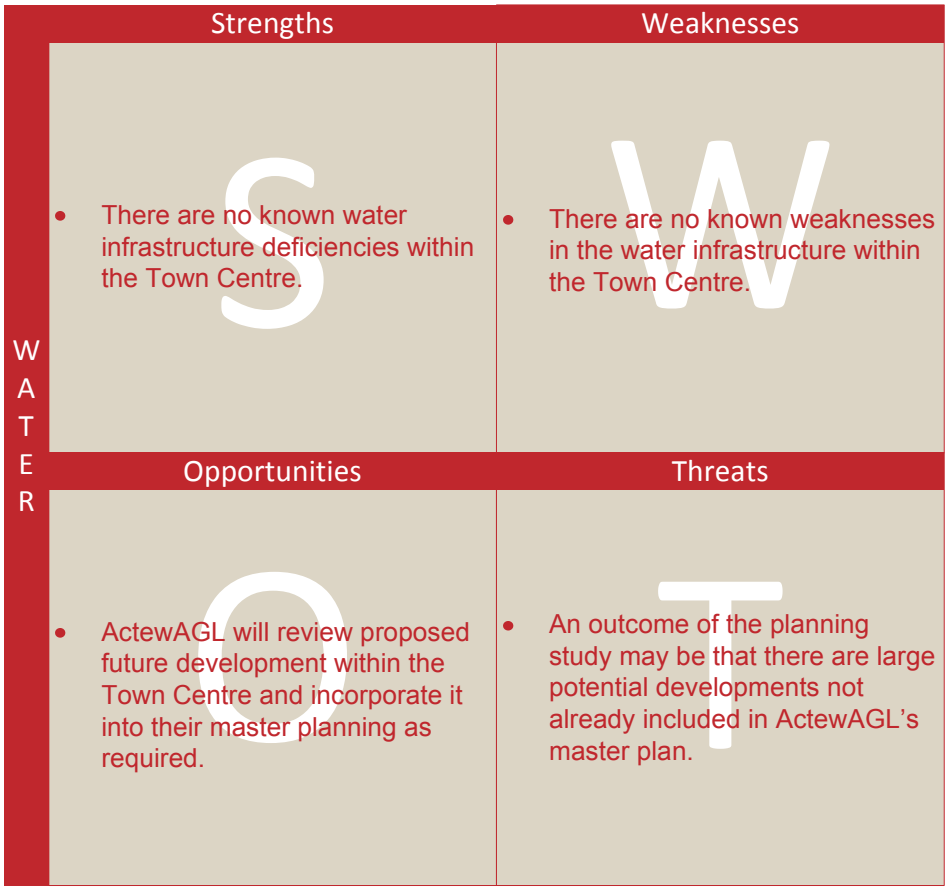
4.2.1 Existing Infrastructure

ActewAGL water infrastructure is located throughout the Town Centre. It includes a network of bulk supply mains, distribution mains, reticulation mains and structures such as hydrants and valves. Water infrastructure located within the Town Centre is illustrated in Figure T2 (refer Appendix A).

The Town Centre is contained entirely within the Tuggeranong low zone pressure zone, which is supplied by the Kambah and Stranger reservoirs. Distribution mains are located on Erindale Drive, Anketell Street and Athllon Drive.

A SWOT analysis of water infrastructure in the Town Centre is illustrated below in Figure 3.

Figure 3 Water SWOT Analysis – Tuggeranong Town Centre



There are no known water infrastructure deficiencies within the Town Centre.

4.2.2 Existing Infrastructure Deficiencies

Discussions with ActewAGL concluded that there are no known deficiencies within the existing water supply network in the Tuggeranong Town Centre. However, an outcome of the Planning Project may be that there are large potential developments not already included in ActewAGL's master plan.

4.3 Sewer

4.3.1 Existing Infrastructure

ActewAGL sewer infrastructure is located throughout the Town Centre. It includes a network of trunk mains, reticulation pipes, and structures such as manholes. Sewer infrastructure within the Town Centre drains to a 1200 mm diameter trunk main which runs along the edge of Lake Tuggeranong in the reserve of Cowlishaw Street. The sewer flow in the trunk main is ultimately conveyed to the Lower Molonglo Water Quality Control Centre (LMWQCC) via the Tuggeranong Tunnel sewer. Sewer infrastructure located within the Town Centre is included in Figure T3 (refer Appendix A).

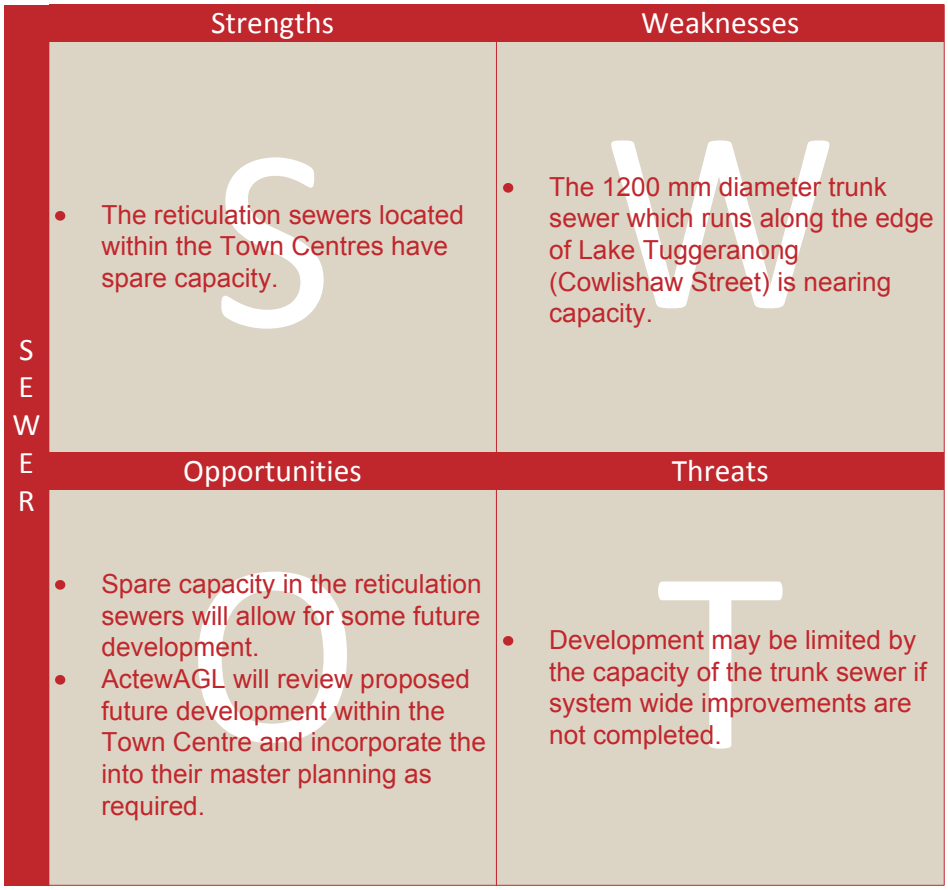
ActewAGL have advised that the existing reticulation sewers located within the Town Centre have spare capacity. The spare capacity in the reticulation sewers will allow for some future development within the Town Centre.

A SWOT analysis of sewer infrastructure in the Town Centre is illustrated in Figure 4.

4.3.2 Existing Infrastructure Deficiencies

The 1200 mm diameter trunk sewer which runs along the edge of Lake Tuggeranong (Cowlishaw Street) is nearing capacity. Future developments may be limited by the capacity of the trunk sewer main if system wide improvements are not completed.

Figure 4 Sewer SWOT Analysis – Tuggeranong Town Centre



4.4 Gas

4.4.1 Existing Infrastructure

Gas infrastructure is located throughout the Tuggeranong Town Centre. The existing network is capable of supporting infill and small industrial and commercial developments.

Jemena has plans for a secondary main extension from Hume to Tuggeranong in 2012 - 2013. This proposed secondary main will connect into and augment pressure in the existing Tuggeranong system and allow future development needs to be met once the secondary main extension is completed. Gas infrastructure located within the Town Centre is illustrated in Figure T4 (refer Appendix A).

A SWOT analysis of gas infrastructure in the Town Centre is illustrated in Figure 5.

Figure 5 Gas SWOT Analysis – Tuggeranong Town Centre

GAS

Strengths	Weaknesses
• The existing gas network has sufficient capacity to accommodate growth in the Town Centre, such as infill and small industrial and commercial developments. • There are plans (2012/ 2013) for a secondary main extension from Hume to Tuggeranong. This will connect into and augment pressure in the existing Tuggeranong system.	• Large commercial and industrial developments in the short term will need to be evaluated to determine if there is sufficient capacity in the gas network.
Opportunities	**Threats**
• The Tuggeranong gas network will be able to meet future development needs once the secondary main extension is completed.	• The existing gas network may inhibit large commercial and industrial developments in the short term (prior to completion of the secondary main extension).

The planned secondary main extension from Hume to Tuggeranong will meet the needs of future developments in the Town Centre.

4.4.2 Existing Infrastructure Deficiencies

Large commercial and industrial developments in the short term (prior to extension of the secondary main in 2012-2013) will need to be evaluated to determine if there is sufficient capacity in the gas network.

4.5 Electricity

4.5.1 Existing Infrastructure

Electricity is supplied to the Town Centre from six feeders at the Wanniassa Zone substation. The substation is located near the intersection of Athllon Drive and Sulwood Drive. ActewAGL has advised that the Wanniassa Zone substation has spare capacity to cater for all planned increases in load demand up to 2015. The feeders can supply an additional 2 MVA load, but network rearrangement is required.

Electricity infrastructure located within the Town Centre is included in Figure T5 (refer Appendix A).

A SWOT analysis of electricity infrastructure in the Town Centre is illustrated in Figure 6.

Figure 6 Electricity SWOT Analysis – Tuggeranong Town Centre

4.5.2 Existing Infrastructure Deficiencies

The feeders in the Wanniassa Zone substation can supply an additional 2 MVA load, but network rearrangement will be required.

The Planning Study may identify areas for development/re-development that are not already included in ActewAGL's forward planning.

4.6 Effect of Potential Traffic Improvements on Existing Infrastructure

The *"Tuggeranong and Erindale Centres Planning Study – Transport"* (SMEC, 21/01/11) identifies potential traffic improvements at the Soward Way/ Anketell Street intersection.

Civil infrastructure utilities (stormwater, water, sewer, gas and electricity) are located within the road reserve at the Soward Way/ Anketell Street intersection. Neither TransACT nor Telstra have provide input data into this project, therefore it is not known if they have infrastructure located within the area of potential traffic improvements.

Some minor relocation works may be required to allow for the above noted potential improvements. The configuration of these improvements is not known, therefore the scope of relocation works is unable to be determined at this stage in the design process.

4.7 Green Infrastructure

An aim of 'green' infrastructure is to improve the water quality of Lake Tuggeranong for recreational purposes by limiting pollutants and algae blooms. There may be opportunities for 'green' infrastructure and WSUD measures within the Town Centre. These opportunities (refer to Figure T1 in Appendix A), which will be explored in later stages of the project, may include:

- Provision of drought resistant vegetation in existing floodways, such as the one located within the Erindale Drive corridor.
- Treatment of stormwater through the use of 'at source' measures such as smaller stormwater ponds and wetlands. It may be possible to incorporate these measures into potential developments, such as the area located to the east of Anketell Street.
- Incorporating WSUD measures such as semi-pervious ground cover solutions and bio-retention swales within streetscapes.
- Utilising existing recreational playing fields as stormwater attenuation basins.
- Construction of a GPT at the 1200 mm diameter stormwater pipe outlet to Lake Tuggeranong, near Bartlet Place.
- Stormwater harvesting for recreational playing fields. A dedicated third pipe reticulation network could be utilised for non-potable water to reduce the potable mains use and the quantity of stormwater discharged to Lake Tuggeranong.

5.0 Erindale Group Centre and Erindale Drive Corridor

Civil infrastructure utility services located within the Erindale Group Centre and Erindale Drive corridor includes stormwater, water, sewer, gas, electricity and telecommunications.

5.1 Stormwater

5.1.1 Existing Infrastructure

TaMS stormwater infrastructure is located throughout the Group Centre and Erindale Drive corridor. It includes the following types of assets:

- A network of stormwater trunk and reticulation pipes, which includes structures such as sumps, manholes and headwalls.
- Cut-off drains
- Floodways

Stormwater infrastructure located within the Group Centre is included in Figure E1 (refer Appendix B), and a SWOT analysis is illustrated in Figure 7.

Figure 7 Stormwater SWOT Analysis – Erindale Group Centre

STORMWATER

Strengths	Weaknesses
• No problematic areas – only normal maintenance required (e.g. blocked sump, service ties, etc.).	• Maintenance is reactive rather than proactive due to limited maintenance budget.
Opportunities	**Threats**
• Provide 'at source' water treatment measures (e.g. local wetlands and ponds) rather than 'at outlet' GPTs. • Increased maintenance budget would provide the opportunity for a proactive infrastructure cleaning program. • Flood studies along the Erindale Drive corridor may provide the opportunity for additional development.	• The overall Lake Tuggeranong catchment does not meet current WSUD guidelines. Proposed developments are reviewed on a 'block by block' basis rather than as 'whole of catchment.' • Increased development may put stress on stormwater infrastructure.

There may be opportunities for providing 'at source' water treatment measures for future developments.

5.1.2 Existing Infrastructure Deficiencies

Deficiencies in the existing stormwater infrastructure system are include:

- Stormwater maintenance is reactive rather than proactive due to limited maintenance budget. An increased maintenance budget would provide the opportunity for a proactive infrastructure maintenance program.
- As discussed in Section 4.1.2, the overall Lake Tuggeranong catchment does not meet current WSUD guidelines. Proposed developments are reviewed on a “block by block” basis rather than a “whole of catchment” basis.
- Discussions with TaMS concluded that there is no known stormwater capacity issues located within the Erindale Group Centre. However, increased development may put stress on existing infrastructure.
- There is an opportunity to provide “at source” water treatment measures (e.g. local wetlands and ponds or “street scale” bioretention rather than “at outlet” GPTs).

5.2 Water

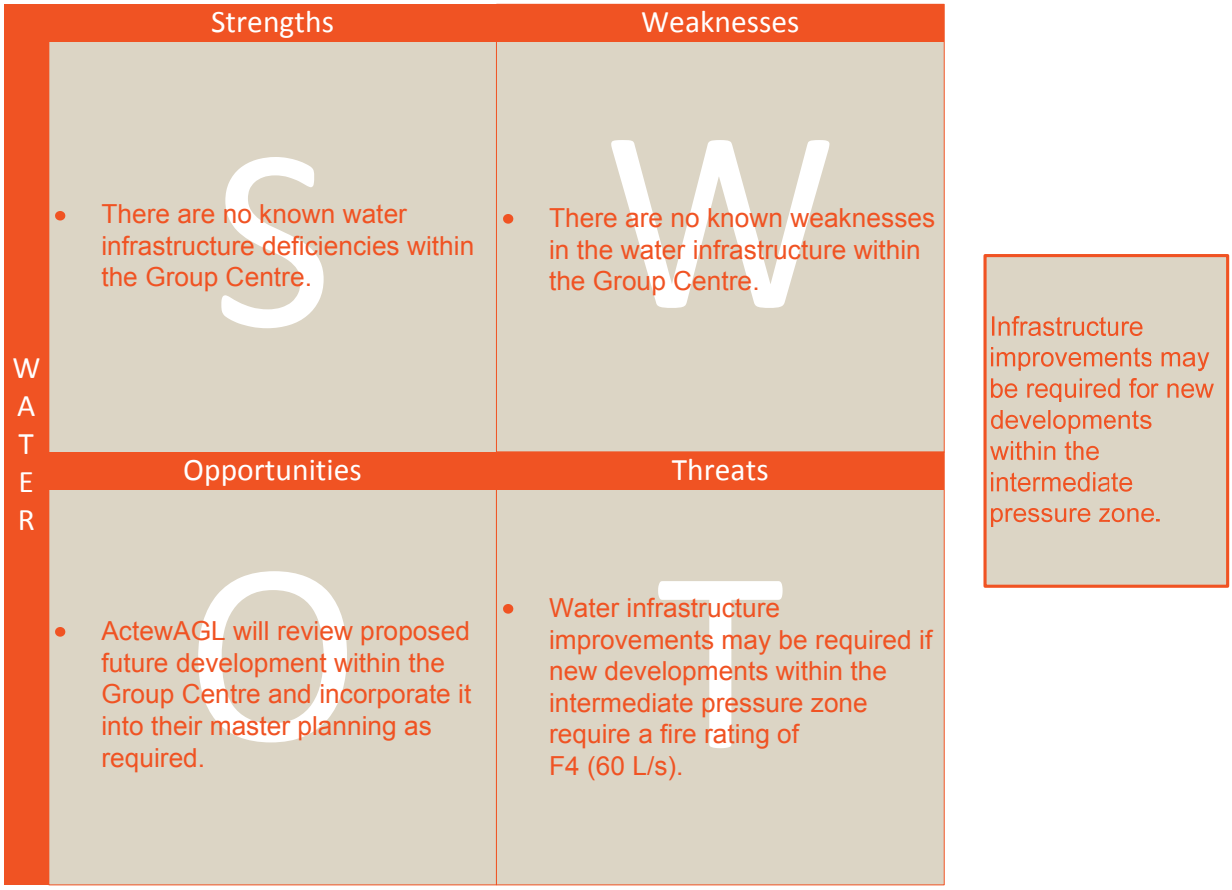
5.2.1 Existing Infrastructure

ActewAGL water infrastructure is located throughout the Group Centre and Erindale Drive corridor. It includes a network of bulk supply mains, distribution mains, reticulation mains and structures such as hydrants and valves. Water infrastructure located within the Group Centre is included in Figure E2 (refer Appendix B).

Erindale shops and the eastern residential area are located within the intermediate pressure zone, which is supplied from the Karalika and South Taylor 2 reservoirs. The remainder of the Group Centre as well as the Erindale Drive corridor are located within the low zone, which is supplied from the Kambah and Stranger reservoirs. Distribution mains are located within the Erindale Drive corridor and Ashley Drive.

A SWOT analysis of water infrastructure in the Town Centre is illustrated in Figure 8.

Figure 8 Water SWOT Analysis – Erindale Group Centre



5.2.2 Existing Infrastructure Deficiencies

Discussions with ActewAGL concluded that there are no known deficiencies within the existing water supply network in the Group Centre and Erindale Drive corridor.

Water infrastructure improvements may be required if new developments within the intermediate pressure zone require a fire rating of F4 (60 L/s).

5.3 Sewer

5.3.1 Existing Infrastructure

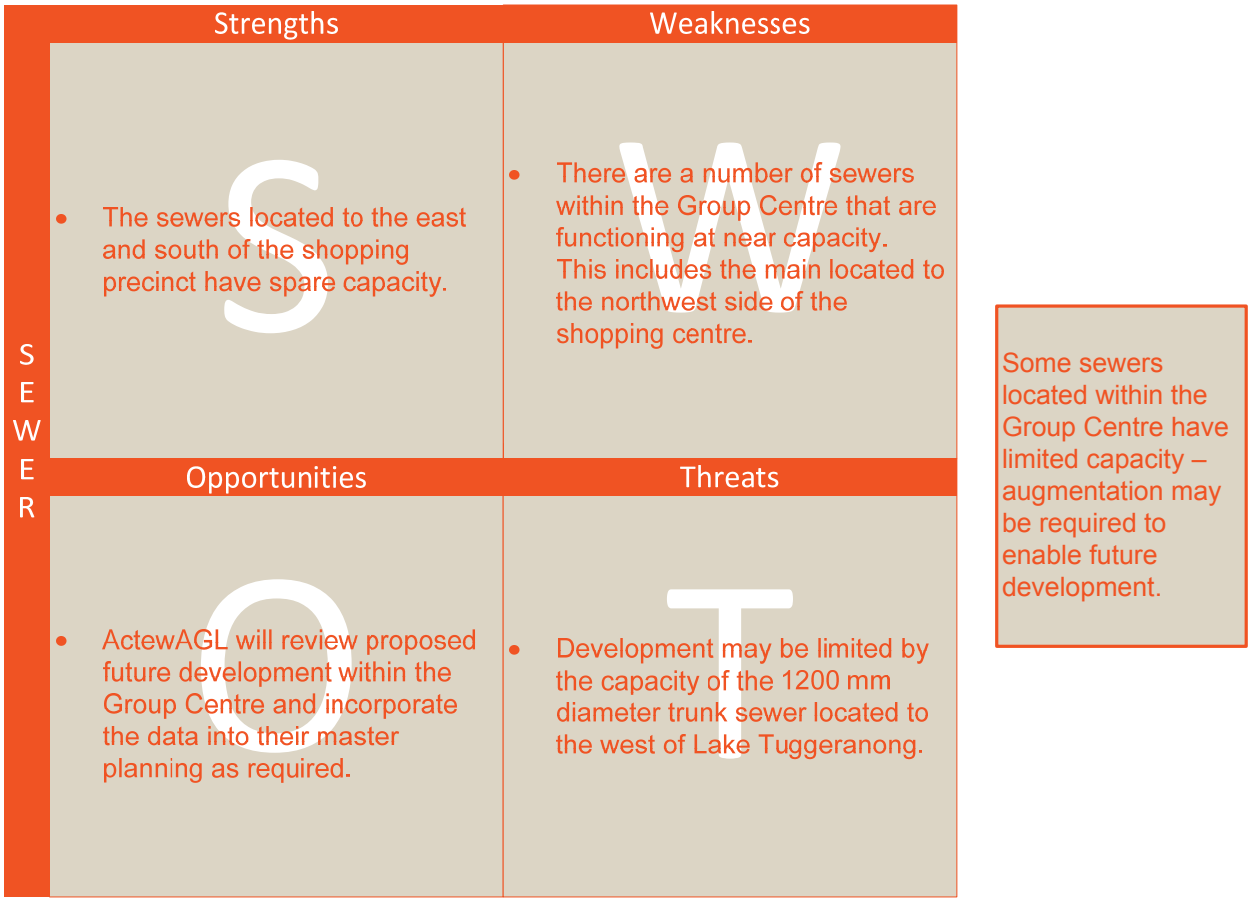
ActewAGL sewer infrastructure is located throughout the Group Centre and Erindale Drive corridor. It includes a network of trunk mains, reticulation pipes, and structures such as manholes.

Sewers within the Group Centre drain to a trunk main located in the northern verge of Erindale Drive. This main ultimately connects to the 1200 mm diameter trunk sewer (refer to Section 4.3.1) which runs along the western side of Lake Tuggeranong. Sewer infrastructure located within the Group Centre is included in Figure E3 (refer Appendix B).

ActewAGL have advised that the existing reticulation sewers located to the east and south of the shopping precinct have spare capacity however there are a number of sewer mains within the Group Centre that are functioning at near capacity. The spare capacity in the reticulation sewers will allow for some future development within the Erindale Group Centre.

A SWOT analysis sewer infrastructure in the Group Centre is illustrated below in Figure 7.

Figure 9 Sewer SWOT Analysis – Erindale Group Centre



5.3.2 Existing Infrastructure Deficiencies

ActewAGL has advised that there are a number of sewer mains within the Group Centre that are functioning at near capacity. This includes the main located to the northwest side of the shopping centre.

Future developments may be limited by the capacity of the trunk sewer main if system wide improvements are not completed.

5.4 Gas

5.4.1 Existing Infrastructure

Gas infrastructure is located throughout the Group Centre and Erindale Drive corridor. The existing network is capable of supporting infill and small industrial and commercial developments.

Jemena has plans for a secondary main extension from Hume to Tuggeranong in 2012 - 2013. This proposed secondary main will connect into and augment pressure in the existing Tuggeranong system and allow future development needs to be met.

Gas infrastructure located within the Erindale Group Centre is included Figure E4 (Appendix B).

A SWOT analysis of gas infrastructure in the Group Centre and Erindale Drive corridor is illustrated below in Figure 10.

Figure 10 Gas SWOT Analysis – Erindale Group Centre

GAS

Strengths	Weaknesses
• The existing gas network has sufficient capacity to accommodate growth, such as infill and small industrial and commercial developments, in the Group Centre. • There are plans (2012/ 2013) for a secondary main extension from Hume to Tuggeranong. This will connect into and augment pressure in the existing Tuggeranong system.	• Large commercial and industrial developments in the short term (prior to 2012/ 2013) will need to be evaluated to determine if there is sufficient capacity in the gas network.
Opportunities	**Threats**
• The Tuggeranong gas network will be able to meet future development needs once the secondary main extension is completed.	• The existing gas network may inhibit large commercial and industrial developments in the short term (prior to completion of the secondary main extension).

The planned secondary main extension from Hume to Tuggeranong will meet the needs of future developments in the Group Centre.

5.4.2 Existing Infrastructure Deficiencies

Large commercial and industrial developments in the short term (prior to extension of the secondary main) will need to be evaluated to determine if there is sufficient capacity in the gas network.

5.5 Electricity

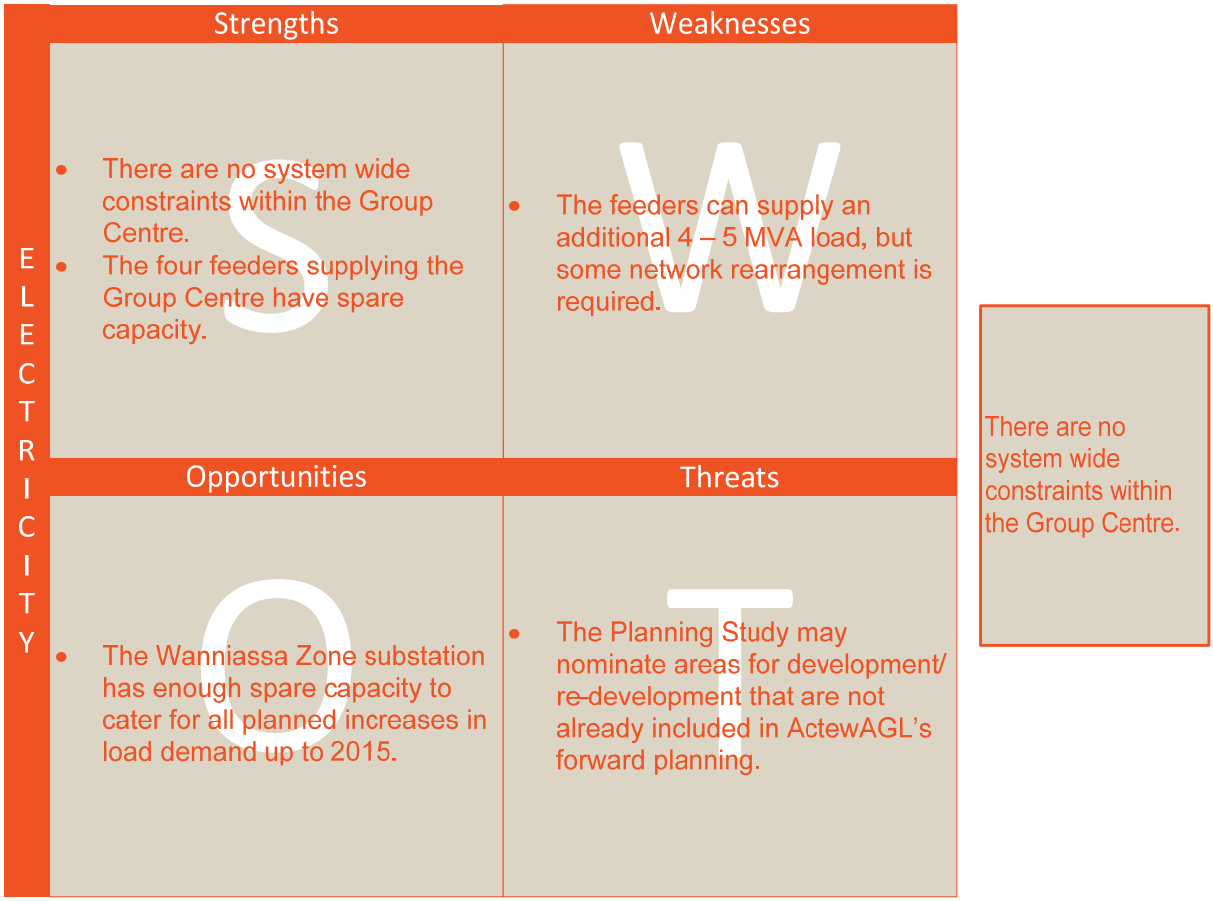
5.5.1 Existing Infrastructure

Electricity is supplied to the Group Centre and Erindale Drive corridor from four feeders at the Wanniassa Zone substation. Electricity infrastructure located within the Group Centre is included in Figure E5 (Appendix B).

ActewAGL has advised that the Wanniassa Zone substation has spare capacity to cater for all planned increases in load demand up to 2015. They have also advised that the feeders can supply an additional 4 - 5 MVA load, but network rearrangement is required.

A SWOT analysis of electricity infrastructure in the Town Centre and Erindale Drive corridor is illustrated in Figure 11.

Figure 11 Electricity SWOT Analysis – Erindale Group Centre



5.5.2 Existing Infrastructure Deficiencies

As discussed above, ActewAGL have advised that the feeders can supply an additional 4 - 5 MVA load, but network rearrangement is required.

The Planning Project may identify areas for development/re-development that are not already included in ActewAGL's forward planning.

5.6 Effects of Potential Traffic Improvements on Existing Infrastructure

The *"Ashley Drive, Monash Road Network Upgrade Feasibility Study, Draft" (*GTA Consultants, 27/10/10) proposed road network treatment measures in the following areas:

- Erindale Drive/ Sternberg Crescent – intersection upgrades
- Erindale Drive: Ashley Drive to Sternberg Crescent – corridor treatment to provide formal four-lane divided road
- Ashley Drive/ Sternberg Crescent – intersection upgrades
- Ashley Drive/ McBryde Crescent – intersection upgrades
- Sternberg Crescent: Ashley Drive to Erindale Drive – Road widening to provide formal four-lane configuration.

The *"Tuggeranong and Erindale Centres Planning Study – Transport"* (SMEC, 21/01/11) identifies McBryde Crescent as a suitable location for the new bus station, and Ricardo Street for a Park and Ride facility.

Civil infrastructure utilities are located within or adjacent to the proposed areas of improvement. It does not appear that major relocation works will be required, but some minor works may be needed to provide for the above noted improvements. The configuration of these improvements is not known; therefore the scope of relocation works is unable to be determined at this stage in the design process.

The following services are located within the proposed areas of upgrade:

- Stormwater
- Water
- Sewer
- Gas
- Electricity

Neither TransACT nor Telstra have provided input data into this project, therefore it is not known if they have infrastructure located within the area of potential traffic improvements.

5.7 Green Infrastructure

An aim of 'green' infrastructure is to improve the water quality of Lake Tuggeranong for recreational purposes by limiting pollutants and algae blooms. There may be opportunities for 'green' infrastructure and WSUD measures within the Group Centre. These opportunities (refer to Figure E1 in Appendix B), which will be explored in later stages of the project, may include:

- Provision of drought resistant vegetation in existing floodways, such as in the one located adjacent to Erindale Drive.
- Treatment of stormwater through the use of 'at source' measures such as smaller stormwater ponds and wetlands. It may be possible to incorporate these measures into new developments.
- Incorporating WSUD measures such as semi-pervious ground cover solutions and bio-retention swales within new streetscapes.
- Utilising existing recreational playing fields as stormwater attenuation basins, such as the oval located to the north of McBryde Crescent.
- Stormwater harvesting for recreational playing fields. A dedicated third pipe reticulation network could be utilised for non-potable water to reduce the potable mains use and the quantity of stormwater discharged to Lake Tuggeranong.

6.0 What Next?

This Draft Background Investigation Report is one of several deliverables in the Tuggeranong and Erindale Centres Planning Project. The project includes:

- Issues Paper – Complete.
- Draft Background Investigations Report – Complete.
- Final Background Investigations Report – The Final report will build upon the Draft report, with inclusion of the following information:
  - Documentation of the nature, location and capacity of approved and planned services infrastructure work.
  - Evaluation of approved and planned services infrastructure.
  - Assessment, prioritisation and costing of required improvements to services infrastructure to cater for expected land release in the short term (2010 – 2010 to 2013 – 2014).

7.0 References

GIS data received from government agencies and service authorities via email or on CD:

- ActewAGL. Water, sewer, gas and electricity GIS data. 18 November 2010.
- ACT Planning and Land Authority. Cadastral, aerial photo and contour GIS data. 19 October 2010.
- Territory and Municipal Services. Stormwater and roads infrastructure GIS data. 25 October 2010.

Advice received from government agencies and service authorities via email or verbal conversation:

- ActewAGL. Electricity advice received via email from Raul Tinio on 17 November 2010 at 08:40.
- ActewAGL. Water advice received via email from Bill Bencke on 23 November 2010 at 16:13.
- ActewAGL. Sewer advice received via email from Tim Elliott on 01 November 2010 at 10:01.
- Jemena. Gas advice received via email from Steve Donnelly on 02 November 2010 at 10:25.
- Territory and Municipal Services. Stormwater advice received from a verbal conversation with Karl Cloos on 25 October 2010 at 11:00.
- Territory and Municipal Services. Stormwater advice received from phone conversation with Ross Schofield on 02 November 2010 at 12:02.
- Telstra. Telecommunications advice received via email from Jacob Lai on 10 November 2010 at 15:01.
- TransACT. Telecommunications advice received via email from Rod Barrett on 18 November 2010 at 13:26, and 27 November 2010 at 15:30.

GTA, October 2010. *Ashley Drive, Monash Road Network Upgrade Feasibility Study, Draft.* GTA Consultants (NSW) Pty Ltd.

SMEC, January 2010. *Tuggeranong and Erindale Centres Draft Background Report – Transport*. SMEC Australia Pty Ltd, Canberra, ACT.

Appendix A

Tuggeranong Town Centre - Infrastructure Maps

Appendix B

Erindale Group Centre - Infrastructure Maps