

# 3GIS ACT Network Plan

## Draft Amendment

3GIS

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## **1. Introduction**

The 3GIS ACT Network Plan was approved under the Authority Guideline for Telecommunications (Mobile Phone) Networks in February 2006.

The approved Network Plan provided the means to establish an additional 24 new 3GIS mobile telecommunications facilities across the ACT. Once built these sites will integrate with other 3GIS and existing Telstra facilities to provide robust mobile telecommunications coverage across the ACT and its hinterland.

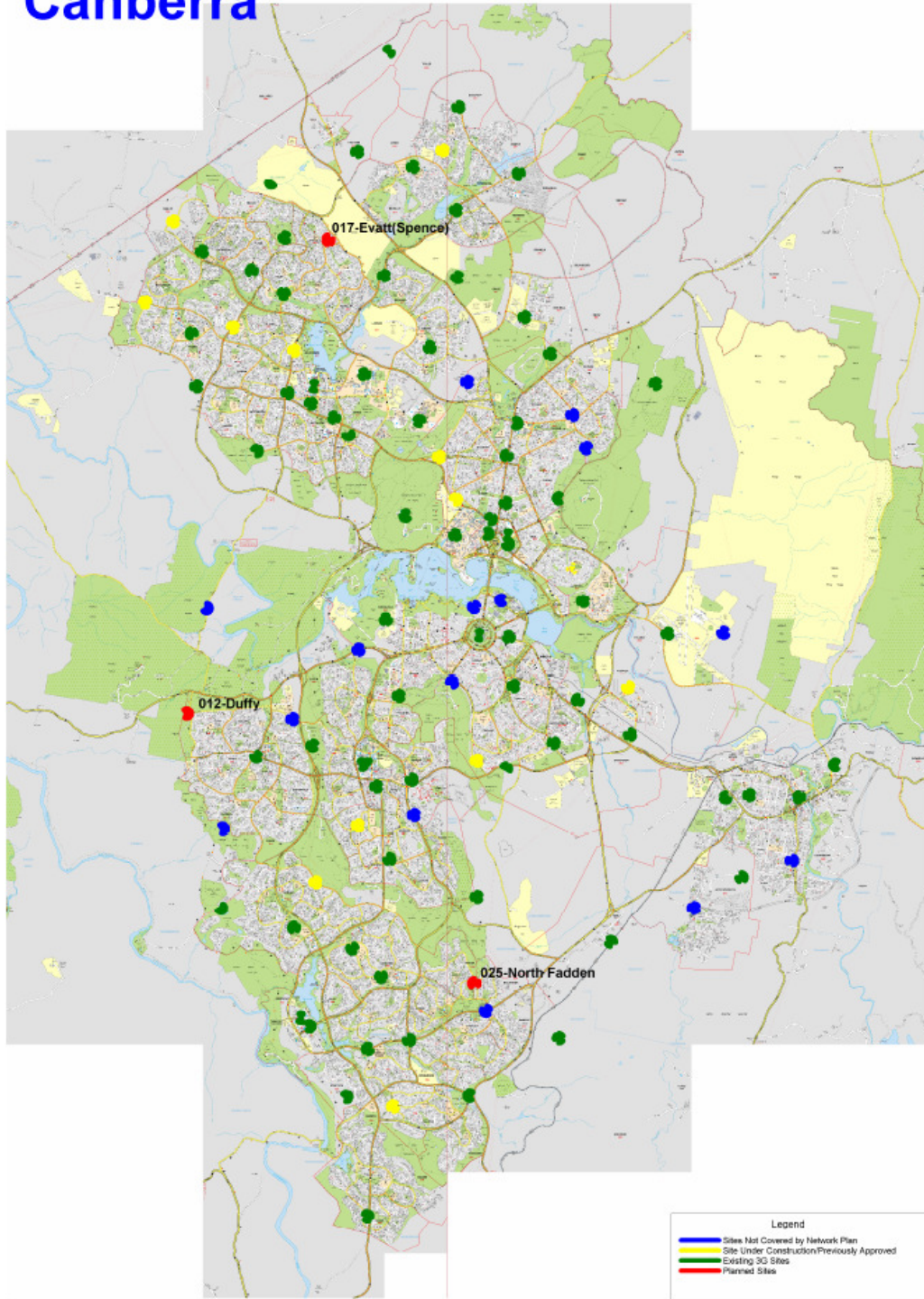
### **Update**

To meet licence requirements, customer expectation and demand 3GIS needed to establish a total number of 100 sites throughout the ACT. Forty new sites were required and fifteen of these did not require ACT Planning and Land Authority planning consent as they are regulated by other authorities or under separate legislation. These fifteen sites did not form part of the Network Plan.

97 of these sites are now considered to be existing and they include 60 existing Telstra sites, plus 37 3GIS sites. 17 of the 37 3GIS sites have been built since the adoption of the Network Plan. 16 have been approved and are under construction or still to be built and will be integrated into the network in due course. Two of the previously approved facilities, namely sites referred to as Evatt (Spence) and Duffy were relocated and a Network Plan Amendment for this alteration was approved by ACT Planning and Land Authority on 7<sup>th</sup> December 2006.

The site referred to as North Fadden which was withdrawn from the Network Master Plan is now the subject of this Network Plan Amendment. 3GIS have completed a very thorough investigation of the locality in which the facility is required and are of the opinion the proposed location will minimise impacts on the local community whilst providing benefits associated with a Third Generation wireless communication service.

# Canberra



This Network Plan Amendment Map has been updated to detail existing sites which are now approved by the Network Plan. It also highlights the sites which were part of the Network Plan Amendment September 2006 (Duffy & Evatt (Spence)) and the site which is the subject of this Amendment (North Fadden).

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This Network Plan Amendment seeks to balance 3GIS' radio coverage objectives with the requirements and expectations of Government agencies, the community and consumers.

## **2. Territory Legislative Overview**

This Network Plan Amendment has been prepared in accordance with the Authority Guideline for Telecommunications (Mobile Phone) Networks under the provisions of Schedule 2 of the Land (Planning and Environment) Regulation 1992. Once finalised it will be submitted for adoption by the Chief Planning Executive of the ACT Planning and Land Authority. If adopted, all development in accordance with this Network Plan Amendment will be exempt from Part 6 of the Land (Planning and Environment) Act 1991.

The Network Plan approach has provided the mechanism for the proposed facilities to be more appropriately and efficiently assessed and determined as an entire network rather than individually, on an ad hoc site-by-site basis. While adoption of the Network Plan and subsequent amendments negates the need for individual development applications the same level of investigation and assessment has been undertaken for each site as would occur for individual development applications.

## **3. Wider Legislative Overview**

Mobile phone network Carriers in Australia have to comply with Commonwealth, Federal, State or Territory and Local Government legislation. The existing Australian telecommunications regulatory regime relating to the Australian Capitol Territory comprises:

- A. An Act about management of the radiofrequency spectrum and other matters. The short title is Radiocommunications Act (Cth) No. 174 1992 as amended;
- B. An Act about telecommunications and for related purposes. The short title is Telecommunications Act (Cth) 1997, particularly Schedule 3 of that Act;
- C. The Telecommunications Code of Practice (Cth) 1997 issued by Richard Kenneth Robert Alston, Minister for Communications and the Arts, acting under subclause 6(3) of Schedule 3 to the

- Telecommunications Act 1997 and section 4 of the Acts Interpretation Act 1901;
- D. The Telecommunications (Low Impact Facilities) Determination (Cth) 1997 issued by Richard Kenneth Robert Alston, Minister for Communications and the Arts, acting under subclause 6(3) of Schedule 3 to the Telecommunications Act 1997 and section 4 of the Acts Interpretation Act 1901;
  - E. An Act relating to the protection of the environment and the conservation of biodiversity and for related purposes. The short title is Environmental Protection and Biodiversity Conservation (EPBC) Act 1999; and
  - F. The Land Planning and Environment Act 1991 and other laws and regulations at ACT Territory level.
  - G. Commonwealth Legislation including the ACT Planning and Land Management (PALM) Act 1988.

The above legislation and standards provide the broad framework within which telecommunications development is regulated. This demonstrates that the telecommunications industry is highly regulated at all governmental levels and within all parts of Australia.

The Radiocommunications Act (Cth) 1992 empowers the Australian Communications & Media Authority (ACMA, formerly the Australian Communications Authority (ACA)) to regulate electro-magnetic energy (EME) emissions from mobile phone facilities. This ensures that emissions do not exceed limits set by Federal Government and gives members of the public an independent body for the resolution of relevant concerns.

The Telecommunications Act (Cth) 1997 and the Telecommunications Code of Practice (Cth) 1997 both directly regulate mobile phone network Carriers. The Telecommunications Act (Cth) 1997 establishes a regime for Carriers rights and responsibilities when inspecting, maintaining or installing telecommunication facilities.

The Telecommunications Code of Practice (Cth) 1997 sets out obligations on Carriers when undertaking activities relevant to providing a mobile phone network. These activities include inspecting land, installing low impact facilities and maintaining facilities. This Code ensures Carriers notify relevant stakeholders, control noise emissions, have procedures for dealing with objections and comply with recognised industry codes and standards.

The aim of the Code is to deal with the concerns of the community about the risks of radiofrequency electromagnetic energy (RF EME) exposure by

allowing community stakeholders and councils to have greater participation in decisions made by Carriers.

Commonwealth legislation and regulations, including the PALM ACT has been appropriately considered insofar as it applies to this proposal.

A detailed précis of each of the above is provided at **Appendix 1**.

3GIS confirms that the facility included in this Network Plan Amendment is in accordance with the requirements, aims and objectives of the above regulations and legislation.

#### **4. Industry Background**

Mobile phone networks and mobile phone use have become an integral part of society's and businesses every day functioning. This Network Plan Amendment seeks to provide the means of establishing a new 3GIS mobile telecommunication facility in the ACT in order to cater for the rapidly increasing demand for mobile phone coverage and services.

As defined under the Telecommunications Act, Australia has 4 major telecommunication Carriers delivering mobile phone services across the ACT that would benefit from the establishment of the Network Plan Amendment. These carriers are:

- Telstra
- SingTel Optus
- Vodafone; and
- Hutchinson

Traditionally, Carriers have developed individual networks to suit their own purposes. Until recently these networks have delivered a range of what is known as second generation (or 2G) technology.

The mobile phone industry is rolling out a comprehensive third generation (3G) of mobile phone technology. The new 3G network is the next step in cellular network technology that enables the delivery of high speed data services as well as voice and messaging services to mobile phones and other wireless products, such as personal digital assistants, and handheld or laptop computers.

The main distinguishing feature between 2G and 3G is the increased data rates, where 3G can be thought of as an equivalent to the internet's 'broadband' for your mobile phone. 3G networks can send data up to 40 times quicker than earlier digital networks, which means that in addition to

audio, graphics and text it can also send and receive video, email, and live TV.

Additional information concerning 3G technology is provided at **Appendix 2**, which contains an information booklet titled "Third Generation Mobile Networks in Australia" published by the Mobile Carriers Forum (MCF) earlier this year.

## 5. Mobile Carrier Partnerships

The 3G network roll-out is being conducted between two sets of Carriers working together in partnership. Joint infrastructure sharing agreements have been agreed between all of the four main Carriers.

A joint partnership company named "3GIS" has been formed between Telstra and Hutchinson (H3GA) to build and deliver its proposed shared 3G network. A similar partnership agreement has been formed between Optus and Vodafone to roll-out their own shared 3G network.

The unique infrastructure sharing agreements will essentially result in two shared 3G networks as opposed to four individual networks. In effect this minimises the duplication of infrastructure, reducing the potential total number of required base stations across the ACT by half.

In order to be able to offer these new 3G networks, each Carrier will have to significantly enhance its current network of mobile phone base stations. These enhancements involve both upgrading existing sites and establishing new ones.

## 6. Contents of this Network Plan Amendment

An updated list of the 25 sites subject of the Network Plan is detailed in the table at **Figure 2 overleaf**.

The type and number of these 25 sites break down as follows:

- 5 new monopoles;
- 12 on roadside light poles;
- 4 on roundabout light poles;
- 3 on park light poles; and
- 1 on a car park light pole.

The following table provides additional details for each of the 24 sites including site name, address, block and section numbers (where applicable), type of development, and height of facility. The table can be

read in conjunction with the enclosed map at **Appendix 3**, by referring to the corresponding 'Map Site Ref' number.

**3GIS ACT Network Plan Amendment**

Map Ref:	Site Name	Address/Job Reference	Block & Section	Type of Change	Planning Authority	Land Custodian	Overall Height
001	Isabella Plains	Roundabout at junction of Clive Steele Avenue & Isabella Drive, Isabella Plains	-	Roundabout Lightpole Swap	ACTPLA	ACTPLA	23m
002	Calwell	Duggan Street, Opp Downard Street, Calwell	Block 24 Section 65, (Calwell)	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
003	Pearce	Kemsley Place, Pearce	Blocks 15 & 16 Section 27, (Pearce)	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
004	Flynn	Carpark at George Simpson Park, off Sanderson Close, Flynn	Block 6 Section 18 (Flynn)	New 20m monopole	ACTPLA	ACTPLA	20m
005	O'Connor	Belconnen Way, (near entrance to Fairfax Business Centre), O'Connor	Block 1 Section 81 (Turner)	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
006	Giralang	Roundabout at Junction of William Slim Drive & Chuculba Crescent, Giralang	Block 1 Section 103 (Giralang)	Roundabout Lightpole Swap	ACTPLA	ACTPLA	23m
007	Macgregor	Southern Cross Drive, near junction of Spofforth Street, Macgregor	-	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
008	Palmerston	Roundabout at junction of Gundaroo Drive & Ibis Street, Palmerston	-	Roundabout Lightpole Swap	ACTPLA	ACTPLA	23m
009	North Fyshwick	Gladstone (50m north of Wollongong) Street, Fyshwick	-	Roadside Lightpole	ACTPLA	ACTPLA	15m
010	North Kambah	Sulwood Drive (100m south of Inkster Street), Kambah	-	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
011	Red Hill	Mugga Way, at Zeehan Street, Red Hill	-	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
012	Duffy	Cnr Warragamba Avenue and Eucumbene Drive, Duffy	-	New Roadside Lightpole	ACTPLA	ACTPLA	15m
013	Narrabundah	Roundabout at junction of Jerrabomberra Ave & Goyder St, Narrabundah	-	Roundabout Lightpole Swap	ACTPLA	ACTPLA	23m
014	Florey (Belconnen)	Coulter Drive (50m south of entrance to Bus Lane), Belconnen	Block 15 Section 184 (Belconnen)	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
015	West Wanniasa	Wanniasa Playing Field, Sternburg Crescent (opposite Crews Place)	Block 1 Section 140 (Wanniasa)	Playing field floodlight swap	ACTPLA	ACTPLA	25m
016	North Fadden	Land to the south of Macarthur Reservoir, off Bugden Avenue, Fadden	Block 2, Section 364 (Fadden)	New 15m monopole	ACTPLA	ACTPLA	15m
017	Evatt (Spence)	Spence Reservoir, Copeland Drive, Spence	Block 2 Section 36 (Spence)	New 15m monopole	ACTPLA	ACTEW	15m
018	Nicholls	Perce Douglas Playing Fields, off Gungahlin Drive, Nicholls	Block 8 Section 78 (Nicholls)	Playing field floodlight swap	ACTPLA	ACTPLA	23m
019	Dunlop	Kerrigan Street (near bus stop between Lance Hill Ave and Traeger St), Dunlop	-	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
020	Turner	Barry Drive, 350m north-west of junction with Clunes Ross St), Turner	-	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
021	Ainslie	ACTEW City East Substation, off Canning Street, Ainslie	Block 12 Section 100 (Ainslie)	New 15m monopole	ACTPLA	ACTPLA	15m
022	Ngunnawal	Ngunnawal Shopping Centre carpark, off Jabanungga Avenue, Ngunnawal	Block 16 Section 44 (Ngunnawal)	Carpark Lightpole Swap	ACTPLA	ACTPLA	15m
023	Latham (Florey)	Kingsford Smith Drive, near pedestrian underpass, Florey	Block 1 Section 117 (Florey)	Roadside Lightpole Swap	ACTPLA	ACTPLA	15m
024	Hume	Off Arnott Street, Hume	Block 2 Section 10 (Hume)	New 15m monopole	ACTPLA	ACTPLA	15m
025	North Campbell	Near Tennis Courts, Campbell Neighbourhood Park, off Blamey Place, Campbell	Block 17 Section 49	Lightpole Swap	ACTPLA	ACTPLA	15m

**Figure 2:** Site Reference Table (also attached at **Appendix 4** for ease of reference).

## 7. Network Design Considerations

Many factors are involved in the design of a telecommunication network. The first and overriding consideration concerns the performance characteristics of the technology in question. Secondly, the particular conditions of the urban environment in which the individual facilities will be established have to be taken into account. Alongside both of the above sit a range of other factors that can have a critical impact on the feasibility and design of the network. The following, looks at each of these constraints in greater detail.

**Operational Constraints** - It should be noted that the basic role and objectives of the proposed 3G sites are somewhat different to those of the existing 2G sites. Where existing sites have laid down the foundations of the network to primarily provide coverage for calls and basic data transfer, the proposed sites are infilling areas between existing sites to provide adequate coverage and capacity handling. The basic essential requirements for 3G infill sites can be considered as three-fold:

- Firstly, 3G technology utilises a higher range of the radio frequency (RF) spectrum. Because the range of radio waves decreases as frequency increases, the propagation of each 3G base station is smaller than other typical analogue and digital technology sites. More 3G sites are therefore required to cover the same area as other existing 2G sites.
- Secondly, 3G technology, due to its role of handling and processing increased data, has a greater dependency on capacity as well as coverage. Greater numbers of base stations are therefore required to provide additional capacity and to facilitate interdependency and sharing capabilities within times of high network demand.
- Thirdly, the types of areas where people will be utilising 3G technology and services are quite different to the broad areas that people use traditional 2G call and data services. Overseas experience from countries such as the UK indicate that the greatest demand for 3G services is likely to initially come from small to medium business customers. These customers will often be working within residential areas, from premises in suburban locations or whilst travelling around commercial centres. Base stations must therefore be located in close proximity to these locations and be able to provide in-building and in-vehicle coverage.

These operational factors all influence the size of the search area within which a suitable site has to be identified. Typically, search areas for 3G facilities have averaged approximately 200-300m as opposed to around

1km for a similar 2G type facility. Similarly, the above factors combine to result in a need for sites at an average height of around 15m, as opposed to the 20-30m of existing sites.

**Geographical Constraints** – The geographical form of the surrounding environment also plays a large part in determining network design. The proposed 3G network requires sites within urban areas. Many of the urban landscapes comprise a range of buildings, structures, trees and other features that obstruct radio frequency (RF) coverage.

The number of required sites and pattern of the network design will also have to account for the particular urban landscape. This is particularly so within suburban areas, such as the locations where the proposed sites are required.

**Other Considerations** - Whilst the operational and geographical aspects of deploying new mobile base stations are primary factors, there are many other critical issues that have to be effectively resolved in parallel that also influence network design.

Some of the issues which need to be considered are:

- *Visual amenity;*  
In terms of retaining key views and vistas, natural features, landscapes, streetscapes and areas of heritage significance. Every attempt has been made to utilise existing infrastructure such as light poles so as not to cause a proliferation of structures in the landscape or to dominate the skyline. In addition considerable effort has been made to streamline the design of structures and antennas so as to minimise visual impact.
- *The availability and suitability of land and a willing site provider;*  
In most instances a commercial arrangement will have to be established with the site owner/provider. Compatible property owners need to be found;
- *Occupational health and safety;*  
Appropriate site locations and suitable facility design has to be incorporated to comply with relevant occupational health and safety regulations;
- *Construction issues – structural and loading feasibility;*  
Appropriate structures need to be found to accommodate the telecommunications equipment this includes taking account of static and imposed wind loads.
- *Access for maintenance purposes;*  
Sites need to be appropriately designed to allow access for ongoing maintenance by both the Carrier and the existing property owner/provider.

- *Topographical constraints;*  
The surrounding landform must not obstruct the specific coverage objectives to achieve the required RF coverage and performance.
- *Legislative policy constraints;*  
The relevant Territory Land Use Policies and objectives must allow the telecommunications facilities in the identified location.
- *Environmental Impacts;*  
Site selection, construction and ongoing maintenance have to have regard to potential environmental issues including ecological sensitivity and compatibility with the existing land use.

The number, type and height of facilities required to complete the 3G network are largely determined by the above operational, geographical and other factors discussed that influence final network design. These compounded factors often severely restrict the available search area within which a facility can be established.

## **8. Siting and Design**

3GIS has ensured that best practice for the siting and design of mobile phone base stations has been adopted throughout this programme of works. Sites have been selected and designed with reference to and in accordance with the Precautionary Approach principles and the requirements of Appendix VI: Telecommunications Facilities Policies of the Territory Plan.

One of the key principles has been to maintain an environmentally and socially responsible approach to this mobile phone network rollout. The main aim of this section of the Network Plan Amendment is to provide a transparent account of the site selection principles and procedures that have been incorporated to mitigate adverse visual impacts and community concern.

### **Siting**

**Site Selection** - As a matter of procedure 3GIS has operated a sequential approach to its site selection process. In the first instance the process has sought to identify the least sensitive areas, within the limited search/coverage area.

In all instances facilities have been located and designed to be as discreet as possible and as far away as possible from sensitive land uses. The policy of avoiding sensitive locations has been achieved by locating away from built-up areas wherever possible.

Preferred sites have therefore been focussed in open spaces, parks and in the public realm on road reserves and car parks and the like. Consideration has also been given to site facilities and associated equipment out of site and away from sensitive views.

Appropriate measures have been incorporated in all instances to mitigate any adverse impacts that proposed sites may have on their surrounds.

Opportunities have been investigated as a matter of course to identify and assess the potential for locating telecommunications equipment onto existing buildings and structures. Where opportunities to co-locate at existing telecommunications facilities have been available, these have been identified as the preferred candidate site.

Opportunities to co-locate at existing telecommunications facilities are often very limited in the areas where facilities are required. Where no suitable buildings, infrastructure or opportunities to co-locate exist, 3GIS has identified the next most appropriate alternative. In this respect it has been determined that the most appropriate approach and form of development would be to utilise existing street infrastructure such as roadside light poles.

Utilising existing utility structures and in particular lighting columns is supported in principle in the Territory Plan. The advantage of utilising existing light poles is that a vertical structure has already been established within the street scene. The use of a light pole for the dual purpose of providing a mobile phone base station thereby avoids the proliferation of tall pole-type structures within an area. Any additional visual impact resulting from the telecommunications extension above the light pole is considered to be favourable in comparison to establishing a purpose built pole in close proximity.

Purpose built monopoles have only been pursued when none of the above solutions have been available, or alternatively the option of a purpose built monopole has proven to be less obtrusive than all other options.

In all instances, each of the proposed sites are individually designed and tailored to ensure that any adverse impacts are reduced to an absolute minimum commensurate with the associated benefits that would result from improved 3G coverage and service.

The design and siting of associated equipment housing has been discussed throughout the pre-application stages with all ACT Planning and Land Authority stakeholders to ensure it is appropriately designed, located and where necessary, suitably screened.

**Co-location** – The term co-location means one or more facilities installed on or within an original structure that is currently used, or intended to be used, for connection to a telecommunications network, or on a public utility structure.

3GIS supports the principle of co-locating facilities on existing or purpose built telecommunications infrastructure and at existing telecommunication sites to minimise the proliferation of individual facilities. 3GIS welcomes any opportunity to co-locate facilities wherever possible and has utilised all opportunities to do so both through the development of its existing sites and through identifying opportunities when establishing proposed new sites.

Such opportunities are often low-impact type facilities, regulated under the Telecommunications (Low Impact Facilities) Determination 1997. The following provides three examples of low impact sites that have been utilised in the following areas:

- **Watson**, at the Australian Catholic University, Signadou Campus, 223 Antill Street, Watson. Proposal to co-locate on existing rooftop guyed lattice mast;
- **North Ainslie**, at the Canberra Nature Park, Phillip Avenue, Ainslie. Proposal to co-locate on the existing Crown Castle monopole; and
- **Weston**, at the ACT Parks & Testing Unit, Heysen Street, Weston. Proposal to co-locate on the existing Crown Castle monopole.

As previously outlined, all existing Telstra facilities across the ACT have been upgraded and now provide a foundation from which to build the new 3GIS network. Each of the 60 existing sites are now effectively co-located facilities being utilised by two individual telecommunication service providers. In practice the fact that the two Carriers also share transmission equipment, not just the pole, mast or supporting structure further reduces the amount of telecommunications equipment at any given site.

Approximately half of the required sites are co-located facilities in the traditional sense that they are on an existing telecommunications site or on a public utility type structure. These sites are therefore utilising existing infrastructure as opposed to new purpose built stand alone poles, masts and towers to introduce new telecommunications facilities in to an area. Where feasible, other telecommunication sites have also been utilised for 3GIS' purposes. However, other Carriers existing telecommunication sites do not always accord with 3GIS coverage requirements.

A second problem with identifying suitable buildings, structures and co-location opportunities in Canberra's suburban areas, is simply that often they do not exist. These suburban areas are predominantly residential in nature with low rise, small scale residential properties that are unsuitable hosts for telecommunications development.

Whilst co-location is recognised as the preferred way of accommodating a new facility, opportunities to co-locate are often few and far between, particularly within the types of suburban areas where many of the sites are required. For these reasons it is important to appreciate the context and restrictions in which the network is being developed.

Where appropriate and possible, proposed 3GIS sites have been designed with the potential for other Carriers to co-locate their transmission equipment. 3GIS welcomes and will facilitate any opportunities for co-location that may arise in the future.

## **Design**

### **Design Criteria –**

The following design imperatives establish the design criteria to be considered and implemented in the development of all the proposed facilities forming part of this Network Plan Amendment. Basic principles incorporated in the design of all facilities aim to achieve the required radio frequency (RF) coverage, whilst mitigating visual impact on, and ensuring the facility integrates with, the surrounding area.

Design imperatives can be considered in two categories, those for;

1. New Greenfield Sites, including, but not exclusive to, new monopoles, masts and towers; and
2. Facilities involving the replacement/replication of existing street infrastructure, including, but not exclusive to, roadside light poles, roundabout light poles and floodlight poles.

*New Greenfield Sites* – These types of facilities are predominantly located in commercial, industrial and rural locations, away from heavily populated areas. The surrounding urban and rural landscapes often facilitate the implementation of new purpose built facilities.

These sites are designed to attain the necessary elevation to clear surrounding obstructions in order to achieve the required RF coverage. The height of a facility will be reduced to the minimum required to achieve the necessary clearance. Facilities are designed to be sympathetic to their surrounds, whilst incorporating the structural integrity to allow co-location by third-parties. Facilities, and in particular their equipment housing will be coloured to match their surrounds.

*Replacement/Replica Facilities* – These types of facilities are often located in urban areas that incorporate a reasonably developed urban landscape with established features. The primary objective of facilities proposed in these areas is to sympathetically integrate with their surrounds.

The most appropriate solutions to achieve a suitable design have been to utilise and replicate existing vertical structures within the urban landscape. Various light pole structures have been found to suit this purpose and have been swapped-out and replaced with appropriately modified facilities poles that serve both the poles original function whilst accommodating the necessary telecommunications equipment. All facilities proposed to be established in this way have undergone stringent design controls to ensure they reflect, as closely as possible, the design of the original structure to be replaced. Facilities, and in particular their equipment housing will be coloured and screened as appropriate to match and integrate with their surrounds.

All roadside light pole facility type installations will be designed to incorporate appropriate design criteria in accordance with relevant regulations. In this respect, any pole located inside the pole setback zone 2 as described in AS/NZS 1158.1.2 Appendix B will be designed as a frangible pole. Certain other poles will be designed to incorporate a slip base. Guidance will be sought from the ACT Roads Department concerning installations of this nature.

**Innovation** - 3GIS is committed to push the design boundaries of design innovation to ensure all its facilities are designed to their optimum specification to best complement and integrate with their surrounds.

One such instance where state of the art design innovation has been of paramount importance has been where existing roadside light poles are being removed and replaced.

3GIS has worked closely with pole manufacturers to produce a new bespoke designed pole and custom built equipment housing.

Proposed replacement light poles, have been designed to the strictest standards to ensure they reflect the general aesthetics and perform the same lighting function as the pole being removed. The new poles will be the most advanced of their type and will integrate more effectively than ever before with minimal impact on the existing street scene.

The associated equipment housing has also been innovatively arranged and designed to ensure a compact and visually unobtrusive addition for their proposed roadside locations. Furthermore the specific location of the pole and equipment housing has been carefully chosen to capitalise on

the existing landform and landscape features to help screen the facilities from public vantage points. All equipment units will be coloured pale green and landscaped where appropriate to soften and integrate them with their surrounds.

## 9. Electro-magnetic Energy (EME)

### **Australian Regulation**

The Australian Communications and Media Authority (ACMA – formerly the Australian Communications Authority) has the regulatory responsibility to protect the health and safety of persons exposed to RF EME from radiocommunications transmitters. The ACMA exercises its regulatory powers under Section 376(2) of the *Telecommunications Act (Cth) 1997* and Section 162(3) of the *Radio Communications Act (Cth) 1992*, which sets standards that limit human exposure to Electro-magnetic Energy (EME).

In order to fulfil this regulatory responsibility the ACMA adopted the Australian Radiation and Nuclear Safety Agency (ARPANSA) standard. The limits and requirements of this standard are in turn supplemented by State and Federal Occupational Health & Safety (OH&S) authorities under relevant OH&S legislation.

ARPANSA is an agency in the Federal Government portfolio of Health and Ageing. On the 7 May 2002 ARPANSA published the standard "*Radiation Protection Standard - Maximum Exposure Levels to Radio Frequency Fields - 3 KHz to 300 Ghz*" (referred to as 'the ARPANSA Standard'). The Standard also includes requirements for protection of general public and the management of risk in occupational exposure.

Compliance with all applicable EME standards is part of 3GIS' responsible approach to EME, Radio Communications and mobile phone technology. See 3GIS endorsed Telstra fact sheet at **Appendix 5** for additional information relating to EME.

### **International Standpoint**

3GIS relies on the expert advice of national and international health authorities such as ARPANSA - an agency of the Commonwealth Department of Health, and the World Health Organisation (WHO) for overall assessments of health effects research.

3GIS understands that the World Health Organisation has recorded thousands of studies on effects of radiation in the last 30 years. The weight of national and international scientific opinion is that there is no substantiated evidence that exposure to low level radiofrequency EME

causes adverse health effects. This view has been backed by every major review panel, including the:

- Royal Society of Canada (1999),
- International Expert Group on Mobile Phones (2000),
- French Health General Directorate (2001),
- Health Council of the Netherlands (2002, 2003 and 2004),
- ARPANSA's RF Standard Working Group (2002).

All these reviews conclude there is no substantiated scientific evidence of any adverse health affect from exposure to mobile phones or their base stations below internationally accepted exposure limits such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP). For example, the report of the International Expert Group on Mobile Phones (IEGMP, the so called 'Stewart Report') concluded:

*"...the balance of evidence to date suggests that exposures to RF radiation below guidelines recommended for the UK and those recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) do not cause adverse health effects to the general population."*

The Health Council of the Netherlands also stated:

*"... the Committee concludes that there is no reason to revise its recommendations with regard to exposure limits. Since the strength of the electromagnetic fields generated by mobile phones remains below those limits, the Committee concludes that no health problems can be expected to occur as a direct result of exposure to those fields. Furthermore, the Committee feels that there are no health-based reasons for limiting the use of mobile phones by children."*

3GIS supports the need for more co-ordinated research on specific issues and the establishment of the Australian Centre for Radio Frequency Biological Effects Research (ACRBR) which will undertake a co-ordinated program of research investigating questions ranging from simple cell studies considering heat shock proteins, blood brain barrier and other mechanisms, to human population studies including self reported 'hypersensitives' and children.

Based on the advice that 3GIS and the Industry have received from these authorities to date there is no substantiated scientific evidence of adverse health effects from the EME generated by mobile phone technology that meets national and international safety guidelines.

### **Precautionary Approach to Minimising EME**

3GIS recognises and fully supports the precepts of a precautionary approach in the design, deployment and operation of its telecommunication base station facilities. The EME Precautionary Approach Checklist (see **Figure 3** at the end of this section) provides an example of the standard routine considerations applied to each site with regards to 'Site Selection' and 'Infrastructure Design'. Measures outlined therein provide demonstrable application of the precautionary principle.

### **ACMA Compliance**

As a matter of course relevant EME reports certifying compliance with the ACMA's regulations have been included for every site in Section 2 of the Network Plan Amendment. It should be noted that the EME reports provided are produced assuming a worst-case scenario. This being:

- base station transmitters operating at maximum power (no automatic power reduction);
- simultaneous telephone calls on all channels; and
- an unobstructed line of sight to the antennas.

In practice a worst-case scenario rarely occurs. There are often trees and buildings in the immediate vicinity, and cellular networks automatically adjust transmission power to suit the actual mobile traffic. For these reasons actual levels will most often be considerably lower than predicted levels.

### **Occupational Health & Safety – Safe Working**

The 2002 ARPANSA Standard "Maximum Exposure Levels to Radiofrequency Fields – 3 KHz to 300 GHz sets public and occupational limits of exposure to EME fields and is mandated for compliance by the ACMA and State and Federal OH&S bodies.

Electromagnetic Energy (EME) Site Safety Documentation is produced to provide clear detail of each site or installations compliance. EME Site Safety Documentation available to Facility or Building Managers includes:

- Radio Communications Site Management Book (RCSMB);
- Site compliance certificate;
- Environmental EME report.

RCSMB for a site contains equipment details, Carrier contact numbers and Radio Frequency (RF) Hazard drawings that detail any areas above General Public limits associated with the site concerned.

Site Compliance Certificates are issued as evidence of compliance to ARPANSA standard requirements.

Environmental EME reports are provided as a estimation of EME levels within the local site environment

All are available on line on the Radio Frequency National Site Archive at [www.rfnsa.com.au](http://www.rfnsa.com.au).

Examples of RF hazard drawings have been provided in **Appendix 8** for three types of generic installations as per below:

1. roadside light poles;
2. roundabout light poles; and
3. floodlight type facilities.

These drawings provide examples of any regions predicted as being above i) the general public limit (yellow shaded region) and ii) the occupational limit (red shaded region). The drawings are produced assuming worst case power levels for the three types of facilities discussed above.

Proposed designs supplied for the three scenarios are such that third party maintenance staff accessing the lights, while in proximity to the transmitters will be outside any general public exclusion zone. Likewise other workers such as those responsible for the maintenance of adjacent trees and the like will be some distance from and well outside any restricted areas.

Persons requiring access to the sites involved make reference to the drawings and contact details within the RCSMB. Appropriate access protocols are then followed dependant on the access required.

3GIS confirms that all sites will comply with relevant EME standards.

## **10. Community Consultation**

3GIS is committed to ensuring all stakeholders, including the local community have every opportunity to have meaningful involvement in the decision making process.

To ensure effective consultation with all those across the ACT that may be interested and affected by the proposed 3GIS Network development, the following three means of notification will be utilised:

1. *Newspaper Notice* - a public notice will be placed in the 'Canberra Times';
2. *Site Notice* - A site notice will be erected in proximity to the proposed site location; and

3. *Letter to surrounding properties* – A letter will be distributed to properties surrounding the proposed site location.

The content, structure, extent and duration of all notices have been agreed with the ACT Planning and Land Authority under the provisions of the Guideline for Telecommunications (Mobile Phone) networks. All notices will allow at least 15 business days for submissions to be made. The public is directed to make all written representations to the ACT Planning and Land Authority and to contact 3GIS for any additional information required. Relevant contact details, including telephone numbers and email addresses will be provided.

3GIS will consider all submissions received from the public and provide appropriate responses. 3GIS is committed to addressing all representations in a responsible manner and where possible will incorporate appropriate measures and amendments to address and mitigate any concerns raised. A consultation report detailing each submission, indicating how it was addressed will be provided to the ACT Planning and Land Authority once the public notification period has closed.

## **11. Future Network Development**

The entire network, including existing and proposed sites, has the potential to accommodate emerging telecommunications technologies and advancements. In a basic scenario this may be possible by transmitting additional technology through the existing or replacement antennas at these proposed sites. Another scenario, could involve the proposed replacement roadside light pole installations accommodating other Carriers micro cell installations.

The proposed network is designed as a complete network to meet present coverage and capacity requirements. Once the facilities have been built and are in operation the network may require fine tuning referred to as 'optimisation' and additional minor infilling. It is likely that any requirements for additional sites, modifications to existing sites and decommissions would be processed and controlled through regular updates to this Network Plan Amendment.

3GIS has both a commitment through its licence agreement with Government and a commercial interest to provide telecommunication coverage to new growth areas including new greenfield locations. New coverage would be dealt with on a strategic basis with relevant departments within ACT Planning and Land Authority and the Land Development Agency (LDA).

Furthermore, it is inevitable that at some point in the future, 3G technology will become outdated and superseded by a new generation of technology. It is likely that as with analogue and earlier digital services, that there will be a gradual uptake of new technology and associated migration of customers from the old to new networks. Whilst it is not possible at present to predict when this will happen, it is fair to say that when it does, it will remain 3GIS' priority where possible to accommodate future technologies at existing sites.

**Decommissioned Sites** - 3GIS licence requirements ensure that any sites that become redundant or are no longer required are decommissioned and that the site is restored to its former condition or better. 3GIS will ensure that any such sites are restored to the ACT Planning and Land Authority's satisfaction.

A redundant or decommissioned site will typically have transmitting and receiving equipment turned off. Any original infrastructure would be reinstated in its original form. Any such works would be carried out in a timely and efficient manner with the benefit of all relevant approvals. The ACT Planning and Land Authority will be notified of any significant changes within a 3 month timeframe or at the next Network Plan Amendment review.

### Site Specific Obligations on Carriers – Section 5.1

#### EME Precautionary Approach Checklist

<b>Issue Date:</b>	07/11/2005	<b>Carrier</b>	3GIS	<b>Location</b>	Australian Capital Territory
<b>Description of Infrastructure</b>	Establish 40 new sites across Canberra to provide a new 3 <sup>rd</sup> Generation network of mobile phone base stations. Each site will require the siting of antennas and associated equipment housing (as indicated on site detail information at section 2).				

5.1 Application of Precautionary Approach to Site Selection – Additional Consideration Items		
Section No	ACIF Code Requirement For each site the Carrier have regard to:	Comments
5.1.4 (a)	The reasonable service objectives of the carrier including (i) the area the planned service must cover (ii) power levels needed to provide quality of service (iii) the amount of usage the planned service must handle.	The intention of this new Network of sites is to provide the latest 3G coverage and services being introduced by 3GIS across Canberra. The transmit power settings at all facilities will be set to accomplish the desired coverage, capacity and call quality within the individual coverage areas. The Over the Air specifications provide for the ability for all facilities to reduce the transmitting power to each user based on the radio environment.
5.1.4 (b)	Minimisation of EMR exposure to public.	All facilities are designed and will be installed to restrict public access to any areas that exceed the general public EME exposure limits. The environmental EME level is minimised both through the radio network design and by reducing the transmit power to each user based on the radio environment.

5.1.4 (c)	The likelihood of an area being a community sensitive location.	All site locations have been selected with regard to the Precautionary Principles for site selection and infrastructure design. All reasonable measures have been considered and incorporated to ensure sites are located in the least sensitive location available within the required coverage area.
5.1.4 (d)	The objective of avoiding community sensitive locations.	3GIS apply a sequential process of site selection that aims to avoid community sensitive locations. In all instances, measures have been incorporated to mitigate sensitive issues with regard to the siting, design and operation of proposed facilities.
5.1.4 (e)	Relevant state and local government telecommunications planning policies.	Relevant policies have been considered throughout the site selection and design process and addressed in the content of the Network Plan Amendment. The proposed network rollout is considered to be in accordance with relevant National Capital Plan and ACT Territory Plan policies and regulations.
5.1.4 (f)	The outcomes of consultation processes with Councils and communities as set out in Section 5.5.	The proposed Network Plan Amendment will be submitted to ACTPLA for approval. Appropriate community consultation will be approved and undertaken in accordance with ACTPLA requirements. Any submissions will be taken into consideration and addressed in the appropriate manner by ACTPLA and 3GIS.
5.1.4 (g)	The heritage significance (built, cultural and natural).	Review has been undertaken of the whole Network Plan Amendment and no significant heritage implications have been identified for any of the individual sites.
5.1.4 (h)	The physical characteristics of the locality including elevation and terrain.	The physical characteristics of each site have been considered during the evaluation of the Network Plan Amendment. Factors considered include the terrain, site elevation and the height of the surrounding obstacles. Each of the proposed sites is considered to fulfil coverage requirements.

5.1.4 (i)	The availability of land and public utilities.	Opportunities for utilising existing utility services have been investigated and where possible utilised.
5.1.4 (j)	The availability of transmission to connect the radio communications infrastructure with the rest of the network, e.g. line of sight for microwave transmission.	Each 3GIS site will utilise existing Telstra optic fibre links. Fibre Optic is readily available across most urban and rural areas within Canberra and can be used at each of the proposed sites. A radio transmission dish to link sites will only be the fall back option should no optical fibre be available..
5.1.4 (k)	The radiofrequency interference the planned service may cause to other services.	Radio propagation analysis has been used to select appropriate antenna tilts to meet the requirements for coverage from each of the proposed facilities, while minimising interference to existing and other networks.
5.1.4 (l)	The radiofrequency interference the planned service could experience at that location from other services or sources of radio emissions.	Radio propagation analysis has been used to ensure each facility can be integrated with the existing network while minimising the interference to the new facility.
5.1.4 (m)	Any obligations, and opportunities, to co-locate facilities.	Opportunities for co-locating telecommunications facilities have been investigated and where possible utilised as the preferred option for establishing a new site. Alternatives have only been selected where there are no suitable opportunities to co-locate.
5.1.4 (n)	Cost factors.	3GIS has undertaken preliminary costing of this facility and are of the opinion these costs are reasonable.

**Site Specific Obligations on Carriers – Section 5.2**

**EME Precautionary Approach Checklist**

<b>5.2 Application of Precautionary Approach to Infrastructure Design – EME Precautionary Approach Checklist</b>		
<b>Section No</b>	<b>ACIF Code Requirement For each site the Carrier have regard to:</b>	<b>Comments</b>
5.2.3 (a)	The reason for the installation of the infrastructure considering – coverage, capacity and quality	The intention of this new Network of sites is to provide the latest 3G coverage and services being introduced by 3GIS across Canberra.
5.2.3 (b)	The positioning of antennas to minimise obstruction of radio signals.	Antennas and associated equipment have been configured and optimised to ensure that no obstruction or interference of radio signals.
5.2.3 (c)	The objective of restricting access to areas where RF exposure may exceed limits of the EMR standard.	All facilities are designed and will be installed to restrict public access to any areas that exceed the general public EME exposure limits.
5.2.3 (d)	The type and features of the infrastructure that are required to meet service needs including:  (i) the need for macro, micro or pico cells; and (ii) the need for directional or non-directional antennas	All facilities consist of macro cells utilising directional antennas to meet the objectives outlined in Section No 5.2.3 (a).
5.2.3 (e)	The objective of minimising power whilst meeting service objectives.	The transmit power settings of all facilities have been set to accomplish the desired coverage, capacity and call quality within the areas listed in 5.2.3 (a). The Over the Air specifications provide for the ability for the facility to reduce the transmitting power to each user based on the radio environment.
5.2.3 (f)	Whether the costs of achieving this objective are reasonable.	3GIS has undertaken preliminary costing of this facility and are of the opinion these costs are reasonable.

5.2.5	If the radiocommunications infrastructure is associated with a base station used for the supply of public mobile telecommunications services, site EMR assessments must be made in accordance with the ARPANSA prediction methodology and report format.	EMR assessment in accordance with ARPANSA standards have been completed and are provided in the individual site detail information at Section 2 of the Network Plan Amendment document.
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**Figure 3** – ACIF 5.1 & 5.2 Precautionary Approach Checklist