



COS10025 Technology in an Indigenous Context Project unit

School of Science, Computing, and Engineering Technologies

Seminar Week 2: Culture and application technology in the Australian context

Shannon Kilmartin-Lynch

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Acknowledgement of Country

We respectfully acknowledge the Wurundjeri People of the Kulin Nation, who are the Traditional Owners of the land on which Swinburne's Australian campuses are located in Melbourne's east and outer-east, and pay our respect to their Elders past, present and emerging.

We are honoured to recognise our connection to Wurundjeri Country, history, culture, and spirituality through these locations, and strive to ensure that we operate in a manner that respects and honours the Elders and Ancestors of these lands.

We also respectfully acknowledge Swinburne's Aboriginal and Torres Strait Islander staff, students, alumni, partners and visitors.

We also acknowledge and respect the Traditional Owners of lands across Australia, their Elders, Ancestors, cultures, and heritage, and recognise the continuing sovereignties of all Aboriginal and Torres Strait Islander Nations.

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Culture and application technology in the Australian context

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What will be cover today?

- Indigenous Country
- Designing and Building on Country
- Indigenous infrastructure and infrastructure on Indigenous Country
- Information and Communication Technologies (ICT) and Indigenous peoples and communities
- Connecting with Country
- Issues with ICT and Cyber Security for Indigenous communities



Indigenous Country

What is Indigenous Country? And how can we understand, care for, and incorporate Country into infrastructure, building and design?

Country is a term often used by Indigenous Australians to describe the lands, waterways and seas in which they are connected. In the eyes of First Nations people, everything is connected there is no separation between people and nature.

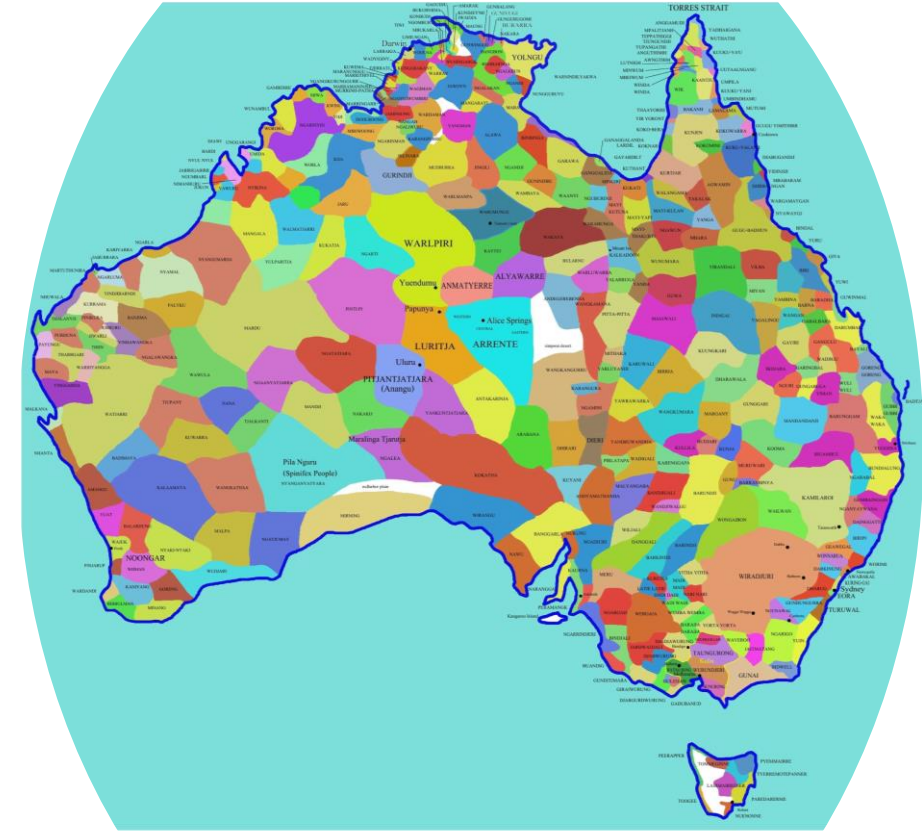
The term 'Country' often stems from complex ideologies detaining to law, place, language, spiritual belief, cultural practices, family and identity. The term encapsulates a sophisticated interconnectedness that Indigenous people have with the land which extends beyond ecology.

So, when an Indigenous person refers to 'Country' they may not be speaking of a specific place, but an identity they hold to that area.

Indigenous people care for country in many ways, it is often represented as an aim toward sustainability. However, sustainability for caring for country is not an aim but an outcome.

The practices accompanying 'Caring for Country', such as land management (i.e cultural burning, seasonal farming/migration) are the aim with the practices leading to a sustainable outcome.

Therefore, when incorporating country into infrastructure, building and design, it is important to understand the representation of country along with the aims and outcomes involved.



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Building on Country

<https://www.foreground.com.au/culture/object-and-spirituality-building-on-country/>

What does it mean to build on country?

Upon colonisation, Indigenous lands were blanketed with buildings dedicated to Britain and its values. Indigenous lands were blanketed with brick, concrete, steel and glass with no understanding of its need for care.

Prioritizing design and architecture over caring for country along with little to no understanding of what the term encapsulated saw colonial buildings fail on many fronts.

It can be seen today in the grid layouts of capital cities across Australia. Buildings with their backs to river systems, man-made parks filled with non-native flora and flooding roads. These are all examples of failing to understand 'Country'.

Indigenous people from the Woiwurrung and Boonwurrung language groups understood the country in which they inhabited.

South of the Birrarung (Yarra River) was traditional swamp lands; this was due constant flooding before the yarra-yarra (waterfall).

They understood the tidal changes of the area and knew not to have any permanent structures along the banks.



Building on Country cont.

Just as there are stories embedded throughout nature within Indigenous Culture, the design of new places such as roads, objects and systems can be designed with a purposeful extension of Country, containing deep stories within.

Doing this, we are able to continually engage with the stories of Indigenous people and reinforce the relationship to nature.

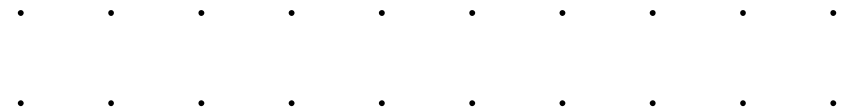
The arrangement of Indigenous knowledges within the environment, both built and grown has been achieved through the use of Songlines – a method of recording large amounts of ecological knowledge without ever having to write them down.

For example, when the design of the Sydney opera house was first conceptualised to be a physical representation of shells growing out of the ocean to be a gathering place for song and dance, it could be imagined that this was a way of connecting to Country, representing the deep roots present with Gadigal Country.

Designing with Country in mind is an attempt to strengthen knowledge systems that are embedded into the vast Australian landscape. With Country as a core focus throughout the development process we can continue to further the importance of Indigenous knowledge systems and cultural practices.

Check out the link below for further information about the importance of engaging with local Indigenous knowledge when building on country:

https://www.abc.net.au/radionational/programs/latenightlive/building-on-country_-page-and-memmott/13343178

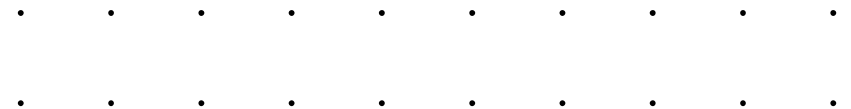


Pre-colonisation communication

It is important to gain an understanding of Indigenous knowledge and communication systems that existed pre-colonisation and continue to exist and intertwine the lives of Indigenous people today.

Some examples of communication systems pre-colonisation that were utilised to carry key knowledge about the environment, culture and lore are listed below:

- Songlines – often passed down in families, containing important knowledge and cultural values. They are foundational to the structure of the landscape, holding important values surrounding key places.
- Story – Creation stories carry fundamental knowledge about the landscape and lore, each story is diverse and unique to place and people. Some stories have been told for hundred of thousands of years, acting as a tool for communication to carry knowledge through generations
- Traditional and Ceremonial Dance – One of the major purposes on Indigenous dance was to tell stories, which have been passed down through generations. Utilising dance to bring stories of the dreaming to life.
- Corroborree – A participatory public performance of song and dance; a celebration of stories and events. A way to pass on stories and knowledge of different lands. For example, Tanderrum – A traditional ceremony of the Kulin Nations, generally initiated to allow safe passage through cultural lands was also a way for the members of the Kulin Nations to transition knowledge through different mobs.
- Art – Different styles of Indigenous Art are depicted across Australia, with each mob having different styles and techniques to tell stories. Symbols and physical representations of place are used to pass knowledge and stories through generations. Often telling stories of certain places and journeys to help guide Indigenous people on passage.



Before telecommunications

Australia's indigenous people have a very long history in this country, spanning over **60,000 years**. Throughout this time, they had many different ways of communicating. Aboriginal stories such as Dreaming and Creation stories were shared around the campfire and through artwork. These used symbols which had significance in conveying a message, whether it be telling about an event or just passing on information, such as the location of waterholes. Celebrations and meetings such as corroborees, which included song, dance and music, were also used as a means of communicating.



60,000
years ago



Permanent European settlers began arriving in **1788**. But until the mid-1800s, Australia had a communication system that relied on horses and, later on, trains to deliver messages and letters around the country. To communicate with friends and family in another country, a letter was sent by ship and could take up to 8 months to reach its destination!

1800

The First telecommunications in Australia – the telegraph, the telephone and the wireless radio

The telegraph is a communications system that transmits and receives simple electric signals from a sending instrument and a receiving instrument using a conducting wire. It was adopted in Australia and the rest of the world in the **mid-1800s**. Morse code – written as dots and dashes – was used to translate the signals to messages by representing letters of the alphabet and numbers with combinations of short and long electric signals.



1860

By **1859**, telegraph cables linked Melbourne, Adelaide, Sydney and Tasmania.

By the **mid-1860s**, all regional centres in the south east of Australia were part of this new communications network.

In **1872**, Sturt's crossing of the Northern Territory was followed by the establishment of Australia's first international telecommunications system. This was a telegraph link to Asia which helped to connect Australia with the rest of the world. Australia soon became very dependent on this new telecommunications industry. In the final years of the nineteenth century (the late 1890s), Australia sent more telegraphs per person than any other nation in the world.



1880

Telephones quickly followed the telegraph. In **1882**, the first public telephone exchange was based in Sydney. This made personal communication available to the average Australian. People would line up for hours at times to use the public phones. As demand grew, more and more local telephone exchanges were built and by **1900**, 30,000 exchanges were located around the country.



1900

The introduction of the Marconi wireless radio system to Australia in **1905**, just 10 years after its invention, marked the beginning of Australia's radio broadcasting industry, and the first time instant communication to the public at large was possible. The potential for wireless communication in a country as large and sparsely populated as Australia was obvious, and by the end of World War I, government wireless stations were established along the entire Australian coastline.



1920

In **1922**, Prime Minister Hughes made the first publicly available radio broadcast from a small hall in Bendigo, and by November **1923** the first radio services were broadcasting out of capital cities.

In **1901**, the first Post Master General (PMG) was appointed to oversee communications throughout Australia. The main focus was on modernisation, including the introduction of automatic telephone exchanges to replace cumbersome manual systems and the establishment of long-line 'trunk call' services that allowed people to more easily and quickly make personal interstate calls.

Telecommunications after World War II

The PMG's Department started the large scale rollout of their copper telecommunications network designed to connect Australians to telephone services.

People living in regional and rural areas were often left with poor and patchy connections. Many farmers constructed the lines themselves under a "part privately erected" deal that frequently involved using substandard components; like iron rather than copper, and poor layouts such as stringing the lines from trees which led to poor connections and little privacy on shared lines.

Leading up to and immediately following World War II, the communications industry worldwide entered a period of extreme activity and technological development. Microwave radio, transistors, the first rockets and even early computers began to make an appearance. True to form, Australia eagerly adopted these new developments.



By **1987**, all areas in Australia – no matter how remote – had basic telephone services.

1960

The first television broadcast was made from Sydney in **1956**, and just six years later television was available in all capital cities except Darwin.

In the meantime, Australia was also developing its international telecommunications networks, taking advantage of all available technology to improve communications links with the rest of the world.

It was becoming increasingly clear that traditional ground-based technology was not sufficient to bridge the great distances that separated Australia from the rest of the world.

1980

In **1966**, INTELSAT II was launched, providing the first satellite link between Australia and the international telecommunications network.

By **1968**, the entire Australian telecommunications system was plugged into this network.



The internet, mobile and digital technology

An early form of the Internet has been in existence since the early 1970s. However, it was not until **1990** that the international computer network began to attract popular attention, with the establishment of the World Wide Web by a server in Switzerland. This new information network was instantly linked via satellite to Australia's own new Internet system.

In the last decade of the 20th century, most Australians had basic access to the internet using the copper network and satellite system that had been built to deliver telephone services. Telecommunications had become the fastest growing industry in Australia. Australia has one of the highest levels of mobile telephone ownership in the world, and is second in Internet take-up rate after the United States.

With the introduction of the internet, the way we did different tasks was modernised.

For instance how we learnt and did our assignments - not that long ago we were reading through encyclopaedias to find out information, whereas now we are able to go online and have all that information at the click of a mouse. Or instead of looking through the yellow pages to find a number of a business, we can go online and find out the contact details that we need – you can even get directions and a map! Or instead of writing a letter to your grandmother and dropping it into the post box you were able to send her a quick email to say hello.

Then came the age of gamers and small hand held devices used to play computer games. More and more people were buying their own personal computers as they became more affordable so students were using these for assignments as well as playing online games. As usage grew, so did all the resources we could access on the Internet.

1990



2000

Around **2005**, the Internet also began to change as people started to use it as a means for uploading and sharing content they had developed themselves. People started to post their own videos on YouTube and digital photos and then their opinions and stories on social networking sites like Facebook.

All this usage and growing demand for bandwidth calls for a newer, more advanced network to ensure that people from now until many years after us can use the Internet in the ways we are using it now, and ways we haven't even thought of yet.

2010



In **2009**, the Government realised it was important to develop Australia's telecommunications system for the future, making it a world leader. The NBN will help to meet this challenge.

Essential Indigenous infrastructure

Over 130,000 people live in remote Indigenous communities across Australia, with many being poorly served by limited and unreliable infrastructure networks.

Under the Indigenous communications program, the Australian Government is set to improve access to effective and reliable ICT within remote Indigenous communities.

Essential telephone services, basic public internet access as well as computer training are set to be rolled out to Indigenous communities under the scheme.

Included within this program is:

- Mobile satellite phones to around 300 Indigenous communities
- Installation of public phones to around 550 Indigenous communities with a population <50 people

Along with ICT applications, there is also essential infrastructure being delivered across numerous sectors such as energy, and clean water supply.

Clean water supply is an ongoing issue within remote communities, as many lack the funds to maintain water supply as the government only allocates small amounts of funding.



Essential Indigenous Infrastructure

Key Indigenous infrastructure

Below is a list of key Indigenous infrastructure to research, this will assist you in gaining an understanding in the lack of infrastructure supplied to Indigenous communities:

Balnggarrawarra Land Trust - Infrastructure for improving cultural connectedness and safety on Balnggarrawarra country

Baulu-Wah Aboriginal Corporation - Installation of new bore and tank

Dhimurru Aboriginal Corporation - Improve the viability of land and cultural site protection through weed, fire and cultural heritage management for the sustainability of the Dhimurru Indigenous Protected Area

Full Diesel Pty Ltd - Replace boundary fences and improve water infrastructure through desilting dams.

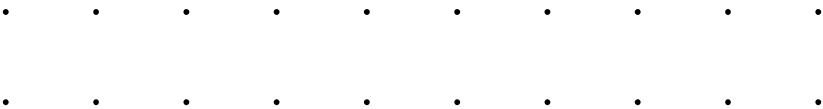
Girringun Aboriginal Corporation - Girringun Wabu Jananyu – A native plant nursery and regenerative orchard

Glen Hill Pastoral Aboriginal Corporation - Stock yard refurbishment and work safety upgrade

Gundjeihmi Aboriginal Corporation - Infrastructure to build wild harvest bushfoods operations and nursery to grow seedlings for future orchards

Indjalandji-Dhidhanu Aboriginal Corporation - Infrastructure to establish a training room and enhance land management and protect significant cultural heritage sites from cattle and campers

For more information on these infrastructure programs visit: <https://www.indigenous.gov.au/news-and-media/announcements/infrastructure-boost-remote-indigenous-communities>



Information Technology and Indigenous Communities

There has been steady growth on the ownership of personal mobile phones within Indigenous communities, however for the majority they are not used as intended.

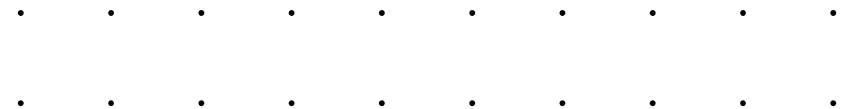
Many Indigenous communities lack the connection to use the devices to call, text and share valuable information with family that may have left their communities to seek study opportunities or work.

Poor coverage is a concern for several communities, with large areas of the population not living within the coverage network.

This poor coverage has serious implications for the livelihood of Indigenous communities.

Emergency contacts in case of accidents, health emergencies, bushfires, mechanical problems is all negated by the lack of coverage provided to Indigenous communities.

Apart from restrictive coverage, disproportional costs of mobile phone use compared to the rest of Australia. Especially when looking at basic communication services that are taken for granted.



Cross- Cultural Communication

Many Indigenous communities have ongoing issues with cross-cultural communication.

It is important to recognise the inherent cultural values that are embedded within technology itself.

Previously, we spoke briefly on the Indigenous language being an oral language. Apart of this is, some information can only be known by certain members of a community.

Knowledge is highly valued within Indigenous communities.

Being selectively conveyed based on gender, age, and status.

With internet access being based on the assumption that all information should be freely available to all people, we are at a cross roads.

There are some Indigenous communities that are concerned that access to ICT has the potential impact to reduce key cultural knowledge and the transition of that knowledge to young people.

This can present more issues with the passing down of knowledge and values orally, with the generational divide created by the rapid expansion of technological and ideological change.



Centre for Appropriate Technology Ltd (CfAT) – Technology on Country

CfAT Technology on Country program is designed to support Indigenous peoples with the appropriate technologies that help maintain the connection to country. To be able to live on country, look after country and thrive on country. As well as looking after culture and developing sustainable livelihoods.

CfAT focus in the following technology areas:

Energy and renewables

Water, Sanitation, and Hygiene

Shelter, Housing and Buildings,

ICT

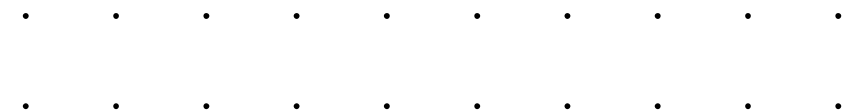
Transport and Mobility

Planning, Livelihoods and Engagement.

CfAT's Information and Communications Technology (ICT) links: <https://cfat.org.au/publications-ict>



Centre for Appropriate Technology Limited



Telecommunications on Country

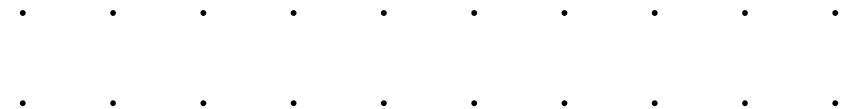
National Indigenous Infrastructure Guide

National Indigenous infrastructure guide details the importance of working with Indigenous communities when planning infrastructure development.

This is essential to the design and maintenance of the facilities.

With a focus on telecommunications the guide details that:

- Placement of public facilities so that users have ready physical access to them, but also privacy and security
- Choice of location so that other community activities are not disturbed or disrupted
- Provisions of appropriate security for the equipment
- Incorporation of the facilities in broader community plans and backup strategies for emergency
- Accounting for the special needs of disabled and/or older members of the community.



Closing the digital divide

The digital divide represents the gap between those who can access and use modern technology information such as the internet, mobile phones etc. – and those who cannot.

People without this access are deemed heavily disadvantaged in the digital age.

The digital divide is a significant issue in Australia, especially when comparing internet access of First Nations people and the rest of Australia.

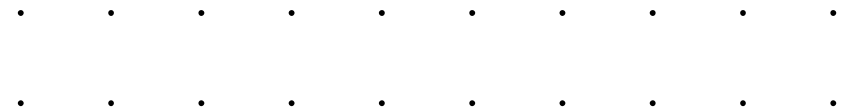
- 1 in 4 Indigenous households does not have internet access
- Indigenous families spend a greater proportion of their income on internet access when compared to non-Indigenous families

Affordability is a major obstacle for Indigenous people when accessing the internet with around 37% relying on mobile data compared to 21% of the rest of the nation.

The digital divide increases proportionally with remoteness. 83% of First nations people in metro areas access the internet compared to only 50% in very remote locations.

To get a better understanding of closing the digital divide check out the document below:

<https://www.worldvision.com.au/docs/default-source/publications/government-submissions/connecting-on-country.pdf>



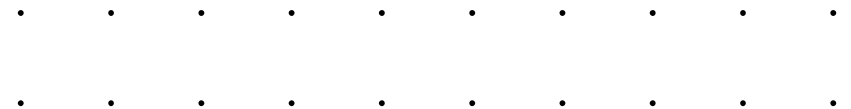
Indigenous Digital Inclusion Plan

The Indigenous digital inclusion plan outlines key enablers that could lead to numerous benefits for First Nations people being connected to the broader Australian Society.

Education – Improved digital inclusion would greatly support educational opportunities available to First Nations people. COVID-19 brought a sharp focus on the digital divide and lack of resources available for Indigenous people living in remote situations. When students were sent to school from home it became noticeable that meant First Nations people had limited to no access to the internet, which lead many students to learning over community radio or TV. With the educational divide continuing to widen with Indigenous young people having unbalanced access to online learning.

Health – In terms of the healthcare systems in place, improving digital inclusion to remote communities and allowing Indigenous peoples a wider range of access to the internet would support greater opportunities to utilise telehealth for diagnostics and treatment plans. Which in term would enhance social and emotional wellbeing for First Nations people.

Employment – When considering employment, an improved digital inclusion for First Nations people has the potential to result in greater economic impact and substantial job opportunities especially in remote areas of Australia.



Indigenous Digital Inclusion Plan

Current Initiatives that have addressed access issues to research:

- Mobile Black spot program and state government co-contributions
- Regional connectivity program
- NBN Communities in isolation program
- CAYLUS computer room program
- Community Wi-Fi in remote communities
- Interim mobile solution during COVID-19

However, as identified by the Remote Indigenous Communications Review, further solutions are required to address some of the existing barriers to Indigenous Digital Inclusion:

- Last-mile delivery to enable household or individual access,
- Quality and reliability of services,
- Demand for increased broadband speeds and data limits,
- Providing community access facilities for those without personal devices
- Timely technical support and effective response times for installation and repair of equipment
- Appropriate IT systems to address congestion and latency for remote servers,
- Digital skills and cyber-security issues,
- Accessibility of online services for people with limited English/text literacy or disability,

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Affordability

Affordability of telecom services is a concern for many people across Australia, with a high concern area involving Indigenous Australians.

Without access to affordable communication services, Indigenous peoples are left unable to access essential services.

This results in Indigenous people paying disproportionate costs to getting connected and staying connected.

The mis-selling and up-selling of unaffordable products can also lead to affordability concerns

As recently as 2020, Telstra was fined \$50 million for the irresponsible and misleading sales practices that targeted first nations community members in WA, SA and NT.

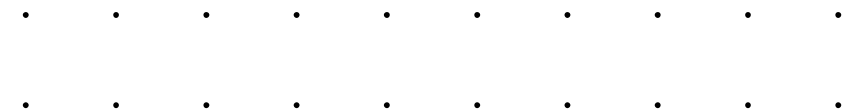
Many of these people will end up in financial hardship arrangements however, these usually involved unaffordable payment plans with unreasonable terms.

Other affordability issues can be hidden in plain sight to the consumer:

- Prepaid plans offering less GB of data in terms of monetary value
- Remote areas having less choices of service provider due to limited coverage

Limited coverage in remote communities also results in a monopoly structure, where Telstra can charge remote communities higher value plans for the same range seen in metro areas.

There are a number of things that could improve affordability of First Nations peoples. For more information check out: [idip-sub-accan.pdf \(niaa.gov.au\)](#)



Connecting with Country in Infrastructure

NSW GOV Case Study

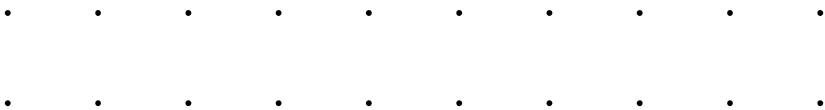
Connecting with country draft framework is a framework for developing connections with Country, this aides to inform planning, design, and the delivery of built environment projects in NSW.

The determination of the framework is that everyone involved in the development of these projects with adopt the following obligation – Commitment to supporting the health and wellbeing of Country by valuing and respecting country, whilst being guided by Indigenous people. By caring for country, country will care for us.

By committing to improving the health and well being of Country is to help understand three long-term strategic goals.

- Practicing sustainable land and water use practices to reduce the impact of natural events.
- Having Indigenous people co-leading the design and development of NSW projects to value and respect cultural knowledge.
- Ensuring country is appropriately cared for, Having sensitive sites protected by Indigenous people and maintaining their access to continue cultural practices.

This framework is intended to be the starting point to improve and inform better processes that will help achieve the goals of the framework to deliver on the commitments promised.



Designing with Country

Designing with Country is not possible without engaging with and be guided by Indigenous people.

Most importantly the knowledge held by Indigenous people should be an ongoing resource when designing with Country.

Design with Country is an important step to take – it allows us to gain a better understanding of how Indigenous culture can be respected and protected to allow culture to strengthen.

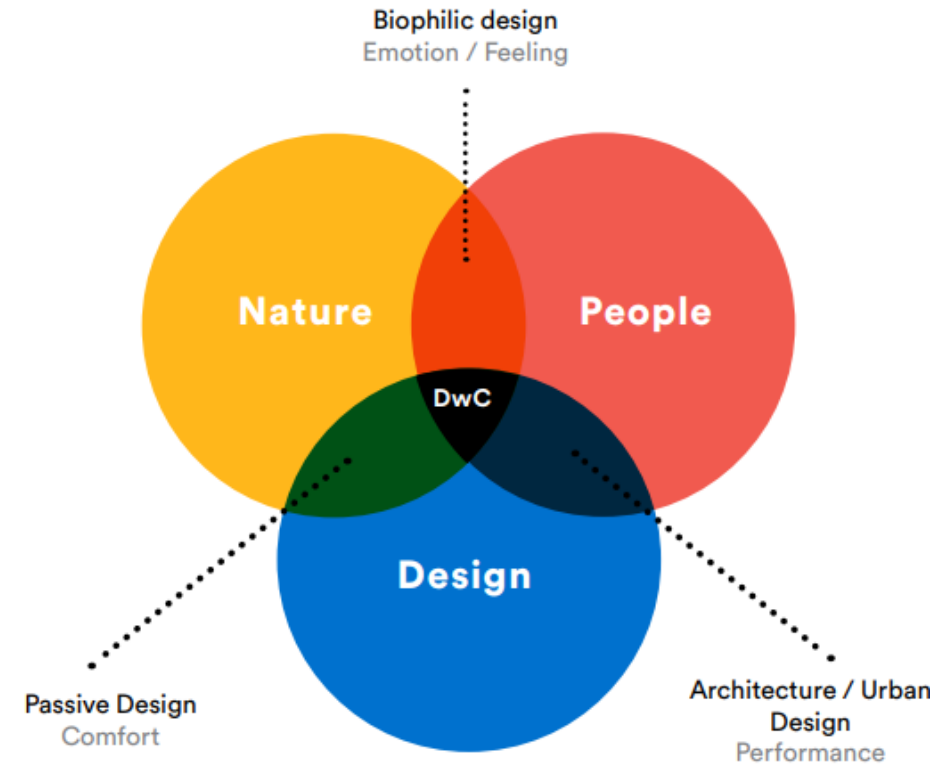
Three essential elements of design with Country – Nature, People, Design.

Three binary relationships – Architecture, Passive, Biophilic

Architecture considers design and people informed by nature

Passive considers design and nature, when utilized becomes environmental design

Biophilic design considers the essential connection between people and nature. When informed by design this specific relationship can be understood as an origin for Indigenous architecture



Human-centred Vs Country-centred design

Sometimes referred to as Ego-centric or Eco-centric design

Indigenous people are referred to as having an eco-centric world view, as the natural system involving people, plants and animals are considered when working with Country.

However, in contemporary design people and their needs are often prioritized over Country, where the landscape and nature are often reduced to second tier priorities.

By appreciating an Indigenous view of the world and incorporating people, resources, animals, waterways and plants equally we can make significant contributions and take further steps toward sustainable life.

When designing with Country, sustainability is not the aim but the outcome. By incorporating the needs of Country into the design phase of projects we can make these contributions to a sustainable future.



Ego-centric v Eco-centric diagram
adapted from Art Tawanghar, Designer, San Diego (2016)



Designing with Country

The following projects are some examples by Government Architecture NSW (GANSW)

These specific projects are able to demonstrate a genuine intent to build mutual respect between the Indigenous community and the design team. Demonstrating the meaning of Designing with Country.

- Casino Aboriginal Medical Centre – Casino NSW
- Wilcannia Health Service – Wilcannia NSW
- Kamay Botany Bay National Park – Sydney NSW



Photo: Toby Scott



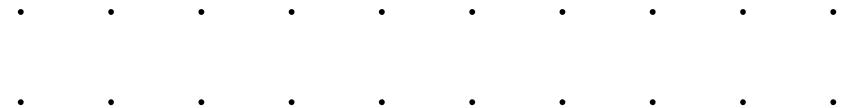
Incorporating Indigenous knowledge into infrastructure projects

Major infrastructure projects can often serve as the disconnecting barrier between people and country. However, it is becoming increasingly popular to utilize these projects to reconnect important stories with the land they belong to.

There are currently systems in place with Major Project Victoria that incentivize engaging with Aboriginal design and knowledge. Allowing traditional owners, the chance to tell stories, or communicate local knowledge.

Design architectures work with both Traditional Owners and design teams to incorporate stories and themes into blank canvas opportunities. All while ensuring it doesn't fall under the tokenistic banner.

It's a way to demonstrate a living and thriving culture that is Indigenous Australia



Aboriginal Community Infrastructure for Indigenous Communities

Aboriginal community infrastructure program is a Victorian based program ran out of First Peoples State Relations

Enables Indigenous corporations to build, repair or refurbish Infrastructure to support Indigenous Victorians. Allowing them to live a self determined and culturally rich livelihoods.

Funding is available up to \$1.6Million

However, there are similar funding opportunities available throughout Australia, such as the payment for ecosystem services model.

This was demonstrated by the Indigenous people of Kabulwarnamyo outstation. They utilized funding from the NT government as well as PES funds to build 14 dwellings after the government stopped funding.

It should be noted in this case study that the dwellings do not adhere to housing standards but do meet crucial local needs. To read more on this visit: <https://theconversation.com/caring-for-country-how-remote-communities-are-building-on-payment-for-ecosystem-services-116737>



ICT and Cyber Security issues

Digital devices are having direct impacts on the way Indigenous people of all ages are accessing the internet, creating and sharing ideas, and self driving their own image as well as their community's image to the outside world.

With the ever-growing IT access issues having a mirroring effect on the economic and social development issues already present in Indigenous communities.

The direct uptake of digital technology in Indigenous communities is still very relative to the remote locations of these communities, with internet access being predominately being mobile only.

Amongst the lingering access issues, there are several unique cyber safety issues that are predominately affecting remote Indigenous communities. With a lack of digital knowledge many phones in remote communities are open access (no passcodes) which leaves open ended security issues such as:

- Hacking social media accounts
- Data or credit theft
- Holds a risk to internet banking/financial information
- Greater implications relating to government website

Digital exclusion is a serious implication in remote communities affecting Indigenous social capital, engagement and connectivity. These issues can all be traced back to education, access issues, and security issues.



