

# Walk the Walk :

An Evaluation of Sydney's Metropolitan Recreational Trails.



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## **Abstract**

Recreational walking is a highly accessible and popular activity which supports healthy communities. A growing body of studies has identified that various perceived and objective factors in the built environment both support and encourage recreational walking. The importance of recreational walking has been recognised by the New South Wales State Government through policy and recreational trail infrastructure. This thesis draws upon a wide body of literature to develop an environmental evaluation tool to assess perceived and objective factors which determine the walkability of recreational trails. The evaluation tool was used to examine existing regional recreational trails identified in the Sydney Metropolitan Regional Recreational Trails Framework. Thirty eight regional recreational trails totalling over 180 kilometres in distance and of different classifications were evaluated using the tool. The majority of the trails support and encourage recreational walking. The main weakness found through the evaluation was a lack of legibility to connect the individual trails with the larger regional walking network established in the Framework. This study contributes to our knowledge of the quality of regional recreational trails in Sydney. Further, it provides a practical and tested evaluation tool which can be used by planners and landscape architects to assess other recreational trails.

## **Acknowledgements**

My sincere thanks to my thesis advisor Susan Thompson for shining her light on what was at times a dark and winding trail.

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**ABBREVIATIONS**

<b>DIPNR</b>	Department of Infrastructure, Planning and Natural Resources
<b>SMMRTF 2005</b>	The Sydney Metropolitan Regional Recreational Trails Framework 2005
<b>SMRRTF 2010</b>	The Sydney Metropolitan Regional Recreational Trails Framework 2010



## **CHAPTER ONE Introduction**

### **1.1 Introduction**

This chapter provides an overview and scope for this thesis. For the purposes of this thesis it is noted that the aim is to identify the physical and perceived environmental factors which support and encourage the use of recreational walking trails through an extensive review of the existing literature and studies. The chapter firstly reviews health concerns of modern cities to provide problem setting for the thesis, which will be the basis for a broad theoretical framework. Both these elements are used to derive the thesis statement and objectives. This will be followed by a discussion on the methodology used to meet the thesis objectives. The chapter will conclude with the structure of the thesis. The consolidation of this information is then used in conjunction with the Sydney Metropolitan Regional Recreation Trails Framework to establish an evaluation audit tool specific to regional recreational trails in Metropolitan Sydney.

### **1.2 Problem Setting**

Chronic disease and mental illness have been established by the World Health Organisation as the leading cause of death in many cities worldwide (World Health Organisation 2008).

These high mortality rates are not the only concern as many of these ailments are prolonged in nature and associated with reduced quality of life due to functional impairment or disability. The growing numbers of people with these prolonged diseases place an immense strain on public expenditure in providing treatment (Wang et al. 2004). Therefore, it is important that preventative initiatives are undertaken to reduce the incidence of these diseases (Barton and Tsourou 2000).

Health is defined as complete physical, mental and social wellbeing which should not be determined by race, religion, political belief, economic or social condition (World Health Organisation 1946). Various determinants of health are established in the literature one of which is the built environment (Barton 2009; Barton et al. 2010; Whitehead and Dahlgren 1991). This is because land use patterns, transport systems and urban design affect how people move within the built environment and what facilities they can access (Kent et al 2012). The design of modern cities has been described as 'obsesogenic' as it encourages the overconsumption of food and makes it easier for people to be sedentary, rather than physically active (Gebel et al. 2005). Therefore, built environments which provide opportunities for physical activity, social interaction and access to healthy food are important to reduce the risk factors of health conditions in populations (Barton and Tsourou 2000).

The World Health Organisation states that healthy communities should not only be a matter for health care professionals, but also urban planning. This can be achieved through healthy urban planning, "which highlights the importance of recognising the health implications of policy and practice in urban planning and the need to go one step further, by pursuing health objectives as a central part of urban planning work" (Barton and Tsourou 2000). These principles are to be the foundation of the social, physical and economic environments for urban planning's influence to ensure accessible health benefits for all.

### **1.3 Theoretical Framework**

Urban planning can influence the built environment for a range of uses including recreational. Accessible recreational facilities in urban and rural environments increase



physical activity and encourage social interaction (Addy et al. 2004; Ball et al. 2001; Bedimo-Rung et al. 2005; Booth et al. 2000; Brownson et al. 2000; Brownson et al. 2001; Chad et al. 2005; De Bourdeaudhuij et al. 2003; Eyster et al. 2003; Fisher et al. 2004; Giles-Corti et al. 2003; Giles-Corti, R. J. 2003; Hoehner et al. 2005; Hovell et al. 1989b; Humpel et al. 2004; Huston et al. 2003; Kaczynski et al. 2008; King et al. 2003; Kirtland et al. 2003; Merom et al. 2003; Reed et al. 2004 ; Sallis et al. 1990; Troped et al. 2003; Wilson et al. 2004). One common recreational facility in the built environment is walking trails, which commonly also provide access to other recreational facilities such as open spaces, parks and beaches (Sallis et al 2011). The provision of walking infrastructure such as walking trails is particularly important as walking is a highly accessible physical activity. This is because most people can walk all their lives, there is no cost associated with the activity and it does not require any special skills or particular equipment (Centers for Disease Control and Prevention 2012). The high accessibility of walking is reflected in Australian physical activity statistics. The Australian Bureau of Statistics (2010) noted that walking is the most popular physical activity, which is supported by popular recreational areas such as walking trails, parks and beaches.

The provision of recreational walking trails can support walking, but design must be considered to encourage people to use them (Sallis et al 2011). Various studies have been undertaken to understand the perceived and objective impacts of environmental features which encourage recreational walking on trails. These features can be categorised as accessibility, safety, pedestrian comfort, pleurability, destinations and awareness. All these factors are determined by key determinants of the built environment on health including land use patterns, transport system and urban design.

To support and encourage recreational walking it is important governments establish policy and programmes to guide the construction of well designed recreational trails. The New South Wales State Government responds to this via the Sydney Metropolitan Regional Recreational Trails Framework 2010. This framework provides a strategic overview identifying the network of existing and proposed recreational trails throughout Metropolitan Sydney. This project is funded through the Metropolitan Greenspace Program, and is recognised as a key initiative of the Metropolitan Plan for Sydney 2036 (SMRRTF

2010). The framework is an important tool as it guides the construction of connected trails within Local Government Areas and provides a tool for urban planning for the implementation and design of functional recreational trails.

#### **1.4 Thesis Statement and Objectives**

This thesis identifies physical and perceived environmental factors which support and encourage the use of recreational walking trails. These factors are then used to assess whether the walking trails in the Sydney Metropolitan Area support and encourage a healthy population.

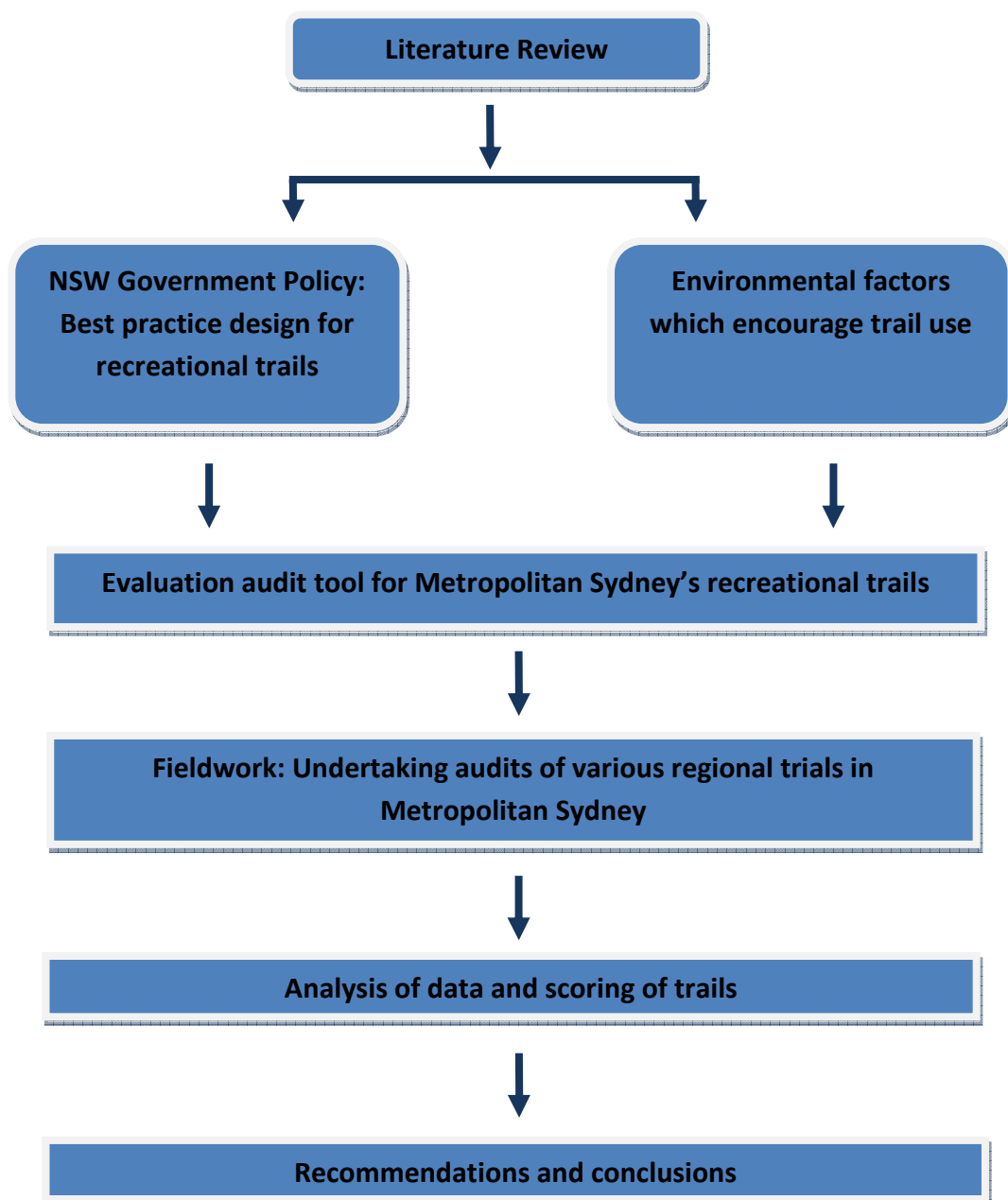
The fundamental objectives of this thesis are to:

- Demonstrate the importance of healthy planning initiatives to improve the population's health in modern cities.
- Understand the health and broader benefits of walking infrastructure.
- Establish the importance of recreational opportunities, such as walking trails, in modern cities to support physical activity.
- Consolidate the existing literature and research on the perceived and physical environmental features to support and encourage people to use recreational walking trails.
- Understand the New South Wales response to the provision of recreational walking trails and framework which planners work within to provide these facilities.
- Create and use an evaluation audit tool for recreational walking trails.
- Audit existing recreational trails identified in the Sydney Metropolitan Regional Recreational Trails framework.
- Provide recommendations to improve the recreational trails in the Sydney Metropolitan Region.

## 1.5 Research Methodology

The research methodology for this thesis included a broad review of the existing body of literature and research. This became the basis for the creation of an evaluation audit tool, which was subsequently used to evaluate the walkability of recreational trails in Metropolitan Sydney. The methodological approach to this thesis is summarised in figure 1 below.

Figure 1: Methodological Approach (Source: Author, 2012)



### *Literature Review*

To establish a broad conceptual framework and direction for this thesis, a review of the existing literature and research was undertaken. The review of the literature was related to healthy planning principles and how the design of the built environment influences the health of communities. The key contributors to this body of research were from varying disciplines including urban planning, public health and transport. The initial review of the literature determined that the built environment is a key determinant of people's health and the design of existing modern cities is detrimental to people's health. Environments which support recreational, transport and utilitarian walking are one way to address these health concerns in modern cities.

As determined in the conceptual framework, environments which support recreational walking are important to promote healthy communities. The following extensive literature review was undertaken to understand the importance, benefits and issues of recreational walking trails. The key contributors to this body of research were from varying disciplines including recreation, leisure, urban planning, and public health and landscape architects. This review of the literature established that recreational walking is a popular activity, which can provide access to other recreational facilities which promotes healthy communities. The review also established that the provision and design of recreational trail is essential to encourage people to use such facilities.

### *Evaluation Audit Tool*

To complete the key objectives of the thesis, an evaluation audit tool was required to assess environmental factors which encourage and support the use of recreational trails (attached Appendix A). Day et al (2006) noted that to measure the impact of the built environment on physical activity a reliable audit tool is essential to ensure only relevant environmental features are observed. Therefore, an extensive search to locate an existing and tested evaluation tool of recreational walking trails was undertaken. It was found that only one specific audit tool exists, Path Environmental Audit Tool (PEAT). As this tool requires training and specific computer software to log the scores and audit results it could not be used for



this thesis. Accordingly, an observational audit tool to evaluate Metropolitan Sydney's recreational trails was developed by the writer.

To ensure the creation of a reliable audit tool the methodology used in Kaczynski and Henderson's study (2007) was adopted. This method required an extensive review of existing peer reviewed empirical studies to determine significant environmental correlations that encourage the use of recreational spaces. Therefore this method was used to identify significant studies that made positive correlations between various perceived and objective environmental factors which encourage recreational walking and the use of walking trails. It is noted that some empirical studies were also chosen that demonstrate a correlation between recreational walking and recreational facilities through which trails pass. The findings drawn from these studies were consolidated to common environmental features which encourage and support the use of recreational walking trails. These common features were then used as the main categories of the evaluation audit tool, with various environmental features listed which contribute to the overall environmental factor.

Audit categories are also based on best practice design established in Appendix C of Sydney Metropolitan Regional Recreation Trails Framework 2010. This is in response to section four of the framework which states, "Given that many of these trails pre- date SMRRTF 2005, the quality of the existing trails in the regional network should be reviewed against the Regional Trail Examples in Appendix C, to ensure facilities provided are of a high standard and the quality befitting a regional trail facility" (SMRRTF, 2010, p 19). The incorporation also ensured the audit tool is relevant to the context, which is noted as important by Brownson et al (2009).

The resulting audit from this process was reliable, practical and easy to use which are all important elements of an audit tool indicated by Pikora et al (2002).

### *Evaluation of Sydney Metropolitan Regional Recreational Trails*

The Sydney Metropolitan Regional Recreation Trails Framework 2010 maps existing and proposed regional and subregional trails in the Sydney Metropolitan Area. The regional trail

network in the SMRRTF 2010 is depicted in four regions, the Central Coast, Northern Sydney, Southern Sydney and Western Sydney. This document was used to identify the existing recreational trails in Sydney Metropolitan Region.

Recreational trails classified as regionally significant were chosen to be the subject of the thesis audits because they attract people from within and outside the local area (SMRRTF 2010 p 19). Accordingly, these trails have the potential to support the most users. It should be noted that the importance or role of regional trails as part of a network in Sydney is not the focus of the thesis. To locate the existing regional recreational trails, the maps in the SMRRTF 2010 are used as a reference to identify the specific location trails on satellite images, using Google maps. During this process, various trail names were identified which make up the length of various regional trails. These trails were put into a chart which clearly identified the name of the regional trail, location and classification. Classifications are based on SMRRTF 2010 Appendix C and included foreshore trails, foreshore promenades, urban trails, nature trails, rail trails, tourist trails, hike and special use trails.

During this process many of the existing regional trails were found not to be continuously linked as stated in as the SMRRTF 2010 maps which only provide an indication of existing trails. Many of the trails indicated in the SMRRTF 2010 were restricted by residential and other land uses. Therefore, different trails which complete the regional trail often are connected through large distances of residential streets. In these cases, recreational trails which make up the regional link were audited as the focus of the thesis is recreational trails, not pedestrian use of residential areas or the role of regional recreational trail networks.

Regional trails classified as hikes were omitted from the study due to time constraints. The Warrimoo Track in the Southern Sydney Region could not be audited to closure from fire damage. Trails which are located further than 700 metres from residential areas are also excluded as existing research identifies this to be the maximum distance people are willing to walk to access a trail (Powell et al. 2003; Sugiyama et al. 2008). Further, the focus of the thesis was to audit highly accessible trails which support large numbers of people.

Owing to time constraints the longest regional trails could not be audited in entirety. Therefore, three sections of these trails (top, middle and end) were audited to give an indication on the complete trail. In total, 39 trails were selected for the walking audit which covered in excess of 180 kilometres.

Field work was then undertaken, and the selected trails were evaluated using the audit tool. The trail being audited was split up into kilometre segments, in which the audit evaluation tool was used to assess the quality of the segment. Photos were also taken to document the quality of the trail, facilities along the route, and other points of interest.

To present the results a scoring system was devised in which one point was assigned to each environmental element on the audit tool. If a certain environmental element was not applicable on a trail segment score, a point was given i.e if lighting was not present for surveillance due to inappropriate trail setting for night use. The scoring range was adapted from the Heart Foundation's Walkability Checklist and is as follows: 22- 30 (excellent) indicates a very walkable trail; 15-21 (good) indicates a walkable trail but with room for improvement; 8-14 (satisfactory) trail is in need of attention to encourage trail use; and 0- 7 (poor) not a very walkable trail which does not encourage recreational walking. To calculate the score of each trail the audits from the different segments of the trails were gathered and if more than half of the audits assigned a point to an environmental feature the whole trail was given the point.

Due to the plethora of data gained from the individual trail audits the results are presented collectively in the four Sydney Metropolitan Regions indicated in the SMMRTF 2010. The data within the four regions is broken up into if: the trails in the region were accessible; safe; comfortable for pedestrians use; pleasurable; accesses various destinations. To present specific data about individual trails the rating of the trails is also presented in the results. Awareness of trails which is another factor which can encourage use, was also reported on in this section and data was found through searches on primarily Council websites, National Parks and Wildlife Service Website and through Google to see if trails were promoted. Observations were also made through field work and analysis of SMRRTF (2010) regional network about the links between audited trails and the wider regional

network. It should also be noted that all photos in the results section were taken by the writer whilst undertaking the walking audits.

## **1.6 Significance of Research**

Healthy planning principles are developing into policy, plans and programs to combat the rise of non communicable diseases. It is important that healthy planning initiatives be applied to a range of environments to ensure healthy communities, including recreational facilities. Walking trails support a highly accessible physical activity which can reduce risk factors of non communicable diseases. In New South Wales the SMRRTF 2010 is the government's response to the importance of the provision of high quality walking trails. Therefore the main implications of this research will be:

- Consolidation of significant environmental factors which specifically encourage the use of recreational trails.
- A recreational trail audit tool which is specific to Metropolitan Sydney.
- An evaluation on the quality of regional recreational trails in Metropolitan Sydney. This was noted to be important in SMRRTF 2010 as many of the trails were constructed prior to the release of design consideration which ensure quality trails in Appendix C of SMRRTF 2005.

## **1.7 Thesis Structure**

### **Chapter One: Introduction**

This chapter gives scope to the thesis by establishing the problem setting and theoretical framework of the study. The thesis statement and objectives are responsive to the theoretical framework and problem established. The chapter then sets out the methodological framework in which the thesis statement and objectives are fulfilled.

### **Chapter Two: Conceptual Framework**

This chapter reviews the existing literature and studies to identify the importance of environments which are designed to support healthy communities. Town planning's



response to the problem is also established with a focus on the health, social, economic and environmental benefits of walking.

### **Chapter Three: Recreational Walking Trails**

This chapter identifies the importance of recreational walking trails in modern cities to increase physical activity and social interaction. Studies highlighting the environmental elements which support and encourage the use of recreational trails are also consolidated in this chapter, which are the makings of the recreational trail evaluation audit tool used to assess recreational trails in the Sydney Metropolitan Area. The New South Wales Government's policy, programme and funding response to the importance of recreational trails is also established in this chapter.

### **Chapter Four: Evaluation of Metropolitan Sydney's Recreational Trails**

This chapter presents the results of the audits of regional recreational trails in Sydney. The results are presented in the four regions established in the SMRRTF 2010, being the Central Coast, Northern Sydney Region, Southern Sydney region and Western Sydney region under the six factors established by the consolidation of existing studies which support and encourage recreational walking.

### **Chapter Five: Recommendations and Conclusion**

This chapter offers various recommendations to improve the quality of recreational trails in Sydney, which could promote and encourage more walking on the trails. Finally, the chapter details the conclusions drawn from the various objectives set for this thesis.



## **CHAPTER TWO Conceptual Framework**

### **2.1 Introduction**

This chapter establishes a broad conceptual framework for the thesis. This is achieved through a concise review of the existing literature on the relationship between the built environment and health. Structurally, this chapter consists of four sections. The first section lays a foundation by reviewing the individual, lifestyle, social and environmental determinants of health. This is followed by an examination of the impact of the built environment on health, starting with the historical links of urban environments and health. The next section then investigates how the layout and design of modern cities impacts the population's health. This chapter concludes with a review of town planning's response to unhealthy urban environments, with particular focus on increasing physical activity through walking.

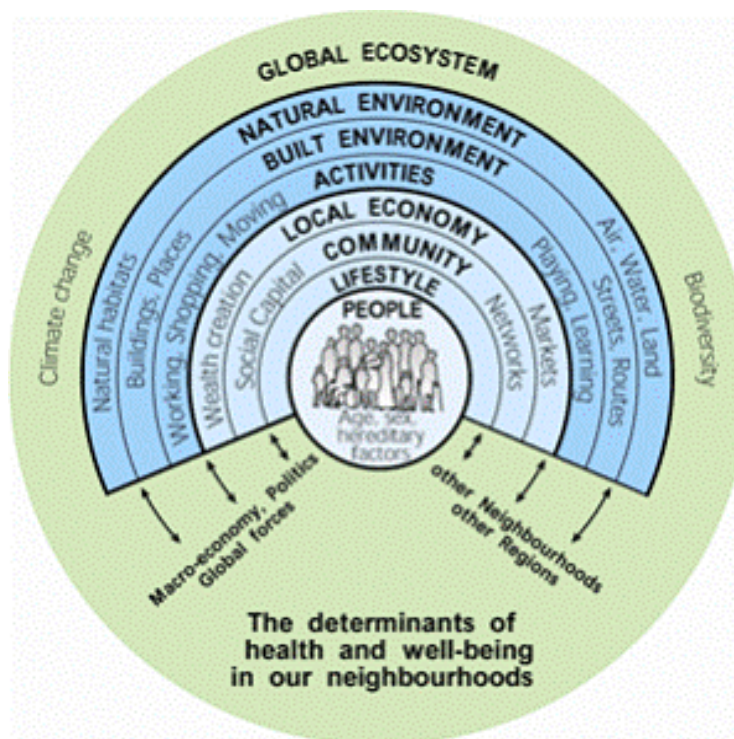
### **2.2 Health Determinants**

Health is defined as complete physical, mental and social wellbeing which should not be determined by race, religion, political belief, economic or social condition (World Health

Organisation 1946). These components of health are recognised in the literature to be determined by various individual, lifestyle, social, and community and environmental factors (Barton 2009; Barton et al. 2010; Whitehead and Dahlgren 1991) .

The following health model shown in figure 1 details the specific determinants of health and the interrelationship therein, which will now be explored. In the centre is the individual whose age, gender and genetics are the founding determinate as they impart a predisposition for an individual’s health outcome. It is noted that these predispositions (positive or negative) can be greatly influenced by the other determinants eg. unhealthy habits can result in an individual developing diabetes without a predisposition. Accordingly, the other health determinants (lifestyle, social, community and environment) will now be reviewed in light of the fact that they are well placed to deliver good health outcomes for society as they can be manipulated.

Figure 2: Social Determinants of Health Model. (Source: Barton and Grant, 2006)



Lifestyle is a key determinant of health based both on direct and indirect individual choices. Direct individual choices can include smoking, alcohol consumption, poor diet and physical inactivity. It is important to note that social, economic and political factors have the potential influence direct choices and indirect choices for those individuals who lack access to fresh food, education, open space and medical facilities (Marmot 2005). Poor lifestyle choices by an individual can be owing to existing health problems that restrict them from accessing facilities and social networks. A lack of social networks may also lead to social isolation, which can result in decreasing wellbeing, and mental illness such as depression (Wilkinson and Marmot 2003). This is why community and social capital are seen as key determinants of health. These key determinants of health can be fostered through local structural conditions that give people opportunities to interact or participate in various activities (Barton and Tsourou 2000).

Local structural conditions directly affect an individual's lifestyle choices through facilities and activities offered in the surrounding built and natural environment. Urban policy and the resulting environmental form can improve accessibility to recreational and health facilities, education and employment opportunities, fresh food and housing (Barton and Tsourou 2000). Improved accessibility to various activities and facilities are important to encourage healthy lifestyles and reduce social exclusion of vulnerable groups. The built and natural environment can also affect health through large scale impacts such as air and water pollution and the emission of greenhouse gases. This is of rising concern due to climate change and the devastating intragenerational and intergenerational health impacts across the globe (Green and Minchin 2010).

### **2.3 Health in Early Cities**

The design of the built environment directly affects health through the environments to which people are exposed, accessibility to healthy lifestyle choices and social networks. The relationship between these environmental qualities and health can be traced back to the industrialisation era in the 19<sup>th</sup> century. Industrialisation saw the rapid and uncoordinated growth of cities. Overcrowding, conflicting land uses and poor sanitation were marked by widespread infectious disease due to air and water pollution, lack of access to fresh food



and inferior housing stock (Butterworth 2000). These inhumane living conditions and resulting infectious diseases led to high mortality rates and low quality of life (Goudie 2001). It is due to these conditions that public health and land use planning evolved and are historically linked (Barton 2009).

A collaboration between land use planning and health initiatives produced a number of schemes to combat infectious disease in 19<sup>th</sup> century cities. Early master planning exercises were undertaken to coordinate the rapid growth of early industrial cities. Haussmann's master plan of Paris in the 1860s designed the layout of the city to enhance air flows and sanitation to improve the health of the city's population (Frank and Engelke 2001). Public works were also established to improve sanitation, access to clean water and fresh food (Ashton 1992). Other initiatives such as the Garden City Movement, aimed to move people out of the cities. This was inspired by the writing of Ebenezer Howard which aimed to reconnect town and country and escape the 'evils' of the industrialised city (Livesey 2011). By the end of the 19th century, many of these initiatives had developed into the emergence of land use zoning, which removed residential areas away from industrial uses to provide better living standards and health (Schiling 2005).

Despite the close association between public health and town planning a divide between the disciplines was noted at the end of the 19<sup>th</sup> century. This is largely owing to the public health profession's focus on the treatment of infectious diseases through medicine and vaccines (Butterworth 2000). At this time, the town planning movement pursued the separation of land uses through zoning, which ultimately resulted in the creation of suburbs. Both town planning ideals and public health programs led to the prevention and control of infectious disease in developed nations (Armelagos and Dewey 1970).

## **2.4 Health in Modern Cities**

Many cities have evolved using early town planning principals including single land use planning and the creation of suburbs. This has led to the sprawl of many modern cities with insufficient infrastructure and facilities to support the health benefits once central to their charter. Figure 2 (see page 13) recognises that land use patterns, transportation systems

and urban design are the key factors of built environments which determine activity patterns, thus public health (Booth 2005; Frank and Engelke 2001; Handy 2002).

Land use patterns form the foundation of urban environments through density and land use mix. Density is a measure of population or employment per square unit and land use mix is the proximity of different land uses in a particular area (Handy 2002). Both these factors are interrelated and determine the availability, arrangement and accessibility of structures and facilities in modern environments (Frank et al. 2003). In modern cities, availability of various structures and facilities is restricted due to low density suburbs which do not support or encourage a high land use mix.

This is a result of the continuation of single use land zoning used in the 19<sup>th</sup> century to separate housing and polluting industry (Schilling and Linton 2005; Thompson 2007). The impacts of this are evident in many suburbs wherein significant distances exist between housing and various employment, educational, recreational, health and retail opportunities. These distances in many cases are not supported by public transport or active transport networks such as pedestrian paths and cycleways (Frank et al. 2003; Stega and Gifford 2005). This has led to car dependency in many modern cities, which is a fundamental determinant of a population's activity patterns and health concerns (Frank et al. 2004; Lawrence et al. 2007; McConville et al. 2011).

The prioritisation of the motor vehicle in many modern cities transport systems has led to various environmental and health consequences (Frank et al. 2003). It is widely held that the main health consequences of car dependency are caused by reduced physical activity, increased stress levels related to frequent and long car trips and air pollution (Frank et al. 2004; Frank et al. 2007; Mason 2000; Wen et al. 2006). This prioritisation of the motor vehicle is due to actual and perceived time efficiency and convenience associated with cars, as opposed to public and active transport networks that are seen as inconvenient alternatives (Banister 2008; Beirao and Cabral; Sarsfield 2007 ).

Various factors of the built environment contribute to car dependency including land use mix, lack of infrastructure, poor integration of different modes in transport networks, street

layouts and aesthetics (Bresciani et al. 2002; Frank et al. 2003; Woodcock et al. 2007). Another deterrent of public and active transport alternatives is the negative social perceptions associated with the transport modes (Banister 2008; Cass et al. 2005). Therefore, built environment design and marketing are essential to encourage the use of public and active transport networks. This will address health concerns related to car dependency and enhance accessibility to various recreational, education, fresh food and health opportunities in the built environment (Barton and Tsourou 2000).

Land use mix and transport networks are also important to ensure accessibility of open space in urban areas (Frank et al. 2003; Butterworth 2000). It is also important that these spaces are aesthetically pleasing and functional to encourage their use. Urban design features such as street trees, street furniture and points of interest can create pleasant environments which encourage people to walk for recreation and transport (Ball et al. 2001). Further, high quality designed public spaces and parks are also essential in encouraging people to become more physically active. This is supported by Baum and Palmer (2002) who note that pleasant streets, parks and public spaces are also important in creating social capital in communities by encouraging people to be out in the public domain and interact with each other. Therefore, both social interaction and physical activity are essential in supporting healthy communities.

## **2.5 Health and the Built Environment**

As noted earlier, transferable infectious diseases related to the design of industrial cities have been eradicated through public health programs and planning initiatives. Although, owing to existing land use patterns, transport systems and urban design of modern cities non communicable lifestyle diseases (chronic disease and mental illness) are rising (Kent et al 2012). Chronic disease are defined by the Australian Institute of Health and Welfare as diseases that are “prolonged in duration, do not often resolve spontaneously, and are rarely cured completely” (Australian Institute of Health and Welfare 2011: 1). These diseases are related to various individual and lifestyle factors. Many lifestyle risk factors of chronic diseases including low physical activity levels and unhealthy diets can be prevented through land use patterns, transportation systems and urban design. However, built environments

which support healthy communities could not be prevalent considering the World Health Organisation's findings in 2008 that nine out of ten leading causes of death in middle to high income countries were owing to chronic diseases.

These chronic diseases include ischemic heart disease, stroke, cancers, diabetes and other heart conditions. The prevalence of chronic disease in low to high income countries is also reflected in 2008 mortality statistics which state that 36 million (63%) of deaths worldwide were attributed to chronic diseases. This sobering figure is predicted to rise to 55 million per annum by 2030 (World Health Organisation 2011).

In Australia the leading causes of death mirror those of high income countries established by the World Health Organisation. A national health survey in 2005 showed that seven million Australians had at least one chronic disease which is likely to increase to two or more (Australian Institute of Health and Welfare 2012). The prolonged and incurable nature of chronic disease becomes not only a burden to an individual's quality of life, but a strain on public expenditure. The rising rate of people with chronic disease in Australia is costing the Australian economy an estimated \$13.8 billion per annum in direct and indirect costs (Medibank Private 2008).

With an ageing population, increasing government expenditure will be required to continue the supply of quality of health care. The writer notes that this will reduce the government funding available in areas such as education and infrastructure which have been noted earlier to impact upon health. This is acknowledged by Government and medical bodies that are shifting their medical model from treatment to prevention (Barton and Tsourou 2000). The National Partnership Agreement on Preventative Health saw the investment of \$872 million over six years from 2010 to educate and address various lifestyle risk factors to reduce Chronic disease (Department of Health and Aging 2012). Mental illness is also increasing in populations, with an estimated 45% of Australians aged over 16 experiencing a mental disorder over their lifetime (Australian Bureau of Statistics 2008).

The Australian Institute of Health and Welfare has identified that the major risk factors of chronic disease and mental illness to be: daily smoking; physical inactivity; social isolation;

alcohol consumption; insufficient consumption of fruit and vegetables; obesity; high blood pressure (Australian Institute of Health and Welfare 2012). These risk factors are influenced by individual, social, lifestyle and environmental determinants of health (Rippe et al. 1998). Therefore, prevention policy and programs focused on various individual, social and environmental changes are crucial to changing behaviour and improving health in modern cities.

## **2.6 Town Planning's Response**

Due to its influence on physical, social and economic environments, town planning plays a key role in addressing rising health concerns related to the design of modern cities (Barton and Tsourou 2000). An extensive review by the Healthy Built Environments Program in 2011 (Kent et al 2012) recognised three areas in which town planning can be most influential in creating healthy communities. These areas are providing environments that encourage physical activity, creating a sense of community through the provision and design of the public domain and access to fresh food. The importance of increased physical activity and sense of community to prevent various chronic diseases and mental illness will be explored below to establish the importance of recreational walking infrastructure to ensure healthy communities

### **2.6.1 Physical activity**

Physical activity is defined as, 'any movement produced by the contraction of skeletal muscles that increases energy expenditure above a basal level' (Centres for Disease Control and Prevention 2012). Further, to reduce the likelihood of developing various chronic diseases, a minimum of 30 minutes of moderate physical activity must be undertaken each day. The 2000 National Physical Activity Survey indicated that 54% of Australians between 18 and 75 did not meet this minimum requirement. Of these people, 15% reported being sedentary which means they do not participate in any physical activity. Accordingly, with such a high number of physically inactive and sedentary individuals it is essential that built environments are designed to support physical activity through recreational, active transport and utilitarian movement.

## *Walking*

A fundamental physical activity is walking as it is highly accessible. This is because most people walk all their lives, there is no cost associated with the activity and it does not require any special skills or particular equipment (Centers for Disease Control and Prevention 2012). Therefore infrastructure which supports walking for transport, recreation and utilitarian movement has the potential to affect a large number of people (Lee and Buchner 2008). This in turn has various health, environmental, social and economic implications.

## *Health Implications*

Walking is important for both physical and mental health (Ball 2001; Sallis 2011). The benefits to physical health include strengthening muscles, enhancing cardiovascular function and fitness, controlling weight, increasing bone density and improving the regulation of lipids, insulin, and glucose (Hart 2009). Weight control, cardiovascular function and the regulation of lipids, insulin and glucose are particularly important as they are risk factors to multiple chronic diseases (Australian Institute of Health and Welfare 2012). These physical health benefits also have the potential to improve mobility of vulnerable groups including the elderly and those burdened with disease, thereby preventing other diseases and social isolation (Yen and Anderson 2012).

Walking also has the potential to prevent, or in some cases, treat mental illness. This is supported by a review of existing studies by Penedo and Dahn (2005) who established that walking can prevent and reduce symptoms of common mental illnesses including depression and anxiety. This was found to be associated with the positive impact physical activity has on mood and stress levels. Studies have also found that walking in mid to later life is especially important for men and women in order to increase cognitive function, reducing the risk of dementia (Rovio et al. 2005; Weuve et al. 2004). Studies have also shown that walking has the potential to aid in the treatment of various mental illness due to impacts on mood, relief of stress and mental fatigue especially when undertaken in green spaces (Roe and Aspinall 2011).

### *Environmental Implications*

The provision of walking infrastructure can also positively impact the environment. This is apparent when walking infrastructure supports alternative transport options by providing separated pedestrian paths, connects different land uses and transport modes to reduce car dependency in modern cities (Frank 2001; Kent 2011). The writer notes that dependency on the car is of increasing concern due to greenhouse gas emissions, peak oil and pollution. This is supported by the Australian Bureau of Statistics (2010) who asserted that in 2007 the transport sector was a major contributor to greenhouse emissions, whose total emissions from the burning of fossil fuels was 13 per cent. Further, of this 13 per cent, 11.5 per cent was related to roads with the majority being passenger cars. If the need to decrease emissions to reduce greenhouse gases and pollution does not see alternative transport infrastructure arise the increasing prices of commodities will. This is because the prices of many commodities, including oil have increased in the 21<sup>st</sup> century in such a way as to indicate scarcity and the need to utilise more complicated ways of extraction and possible externalities factored into costs (World Bank 2011). Further, that due to the heavy reliance on this energy source, peak oil is looming wherein the maximum production level is reached due to depletion of reserves. This has already been seen in over 60 nations and the growing scarcity of the resource is apparent as evidences by the minimal new field discovered (Fantazzini et al. 2011).

Due to increasing environmental concerns related to car usage, it is important for governments and town planners to curb dependency on the car. This can be achieved by providing alternative transport networks including active and public transport. Active transport is of particular interest as the activities have zero emissions and can be easily integrated with public transport (Mason 2000).

### *Economic Implications*

Walking infrastructure in modern cities can also have a range of economic benefits. As previously discussed, increased physical health and wellbeing associated with walking provide preventative health measures to improve the rates of chronic and mental illness.

Cost benefits analysis has shown that the cost of recreational and transport walking infrastructure is highly economical as it significantly reduces public expenditure on health care due the prevention of chronic diseases and mental illness common in cities (Sælensminde 2004; Wang et al. 2004). The writer notes that active transport modes, which are integrated with public transport systems, can hold economic benefits for individuals due to less reliance on cars. Further, that well designed and integrated active transport networks with public transport could also in the long term save governments large amount of expenditure due to reduced demand for road infrastructure. Another economic benefit that could arise from walking infrastructure is the potential from walking tourism on recreational trails.

### *Social Implications*

A sense of community is defined as a sense of belonging, care and commitment to a particular group or area (Butterworth 2000). This sense can be beneficial to both physical and mental health as people feel comfortable and safe to engage with the public domain (Kent et al. 2011). The design and layout of the built environment is the foundation in which a sense of place and community can be facilitated or hindered (Butterworth 2000). This is due to the provision of well designed public domains in the urban environment.

The literature establishes that both the provision and design of public spaces are vital to encourage social interaction. Common spaces which are associated with social interaction include plazas, streets, open space, parks, and malls. If these spaces are poorly designed, only minimal activity takes place in the area as people are not inclined to spend time in the space (Gehl 2001). The literature highlights that key considerations for the design of public spaces include functionality, safety and aesthetics (Wood et al. 2010). Spaces which encourage engagement are particular important to prevent social isolation of vulnerable group as, "isolation from human interaction and friendship networks contribute to depressive conditions and separation of communities" (Thompson 2007: 158). Accordingly, well designed, active and aesthetically pleasing public domains can also encourage increased walking and therefore potential for social interaction (Lund 2003).



## 2.7 Conclusion

The extensive review of the broad body of research and literature clearly found that the layout and design of the built environment can profoundly impact the escalating rates of chronic disease and mental illness in modern cities. Further, that a focus on the broader determinants of health established that it is important to understand interactions between individuals and the social and physical environment to maximise the, 'person-environment fit' (Stokols 1996). Therefore, considerations of all the health determinants are essential when designing modern cities to ensure systems which support differing group's needs. Accordingly, town planners with the support of governments have the role to create built environments which encourage physical activity, a sense of community and access to fresh food.

It was concluded that modern city designs must evolve from low density sprawling suburbs with low land use mix to areas supported by various transport modes, together with public domains designed to encourage people to engage in physical activity to address the escalating rates of chronic disease and mental illness. Further, that these goals can be well met with environments that encourage and promote walking owing to this activities low entry requirements and cost.

These findings provide a conceptual framework on the importance of healthy communities. This framework will be used as a foundation to chapter three which explores the importance of recreational walking infrastructure to support walking in communities.



## **CHAPTER THREE Recreational Walking Trails**

### **3.1 Introduction**

This chapter recognises the importance of accessible and well designed walking trails to support healthy communities. The chapter is divided into four sections. Firstly, this chapter provides an overview of recreational trails focusing on the implications of the infrastructure. Secondly, the chapter establishes six environmental factors which support and encourage walking on recreational trails through a review and consolidation of existing studies. This information provide the basis for an evaluation audit tool which is used in the thesis to assess the walkability of recreational trails in the Sydney Metropolitan Area. Thirdly, the chapter recognises the importance of the provision and design of walking trails as they are identified in government policy and programs. It is noted that various policy and programs in New South Wales will be focused on to provide a framework for discussion in the results chapter. This chapter then concludes with a brief summary of the major findings and the importance of policy, programming and management to deliver functional recreational trails to support healthy communities.

## 3.2 Recreational Walking Trails

Recreational walking trails support healthy communities by providing opportunities for physical activity and social interaction. Due to the differing nature and location of recreational trails no common definition could be sourced in the existing literature. However, common characteristics of recreational trails were noted as being a path, corridor, trail or track, which passes through a variety of urban and natural environments. These trails can be multifunctional and support various recreational users. Recreational trails can also be a part of a local or regional network linking various open spaces and land uses.

Recreational walking trails and networks are commonly located within greenway systems. Greenway systems are defined as, “networks of land containing linear elements that are planned, designed and managed for multiple purposes including ecological, recreational, cultural, aesthetic, or other purposes compatible with the concept of sustainable land use” (Ahern 1995: 134). Further noting, that greenways located in urban and rural areas serve as a land conservation tool as they can be connected by corridor to other greenways and open spaces allowing the movement of species within the natural environment. Another important function of greenways is they can support a range of human activities while promoting sustainable land use by a sensitive balance between the environmental and human use. To ensure this balance, activities within greenways need to be chosen and designed for the specific conditions of the local environment and overall network. Promoting human activities in these areas also increases the awareness and appreciation of biodiversity through exposure and education of the population (Bryant 2006). Therefore, the location of recreational trails within these greenways can be ideal to support biodiversity in modern cities and promote human activity. This is supported by Saelens et al. (2003) who asserts that sensitive design considerations must be taken into account such as: the surface of the trail being suitable for both the environment and function; locating the path along natural contours to reduce impact and erosion; boardwalk design to preserve sensitive environments within the greenway.

### **3.2.1 Benefits of Recreational Walking Trails**

Walking trail infrastructure is generally a relatively low cost intervention with a wide range of positive implications (Brownson et al. 2000). Once constructed, and with fairly minimal maintenance, walking trails become a permanent facility which benefits the community. Walking trails are predominantly classified as a recreational facility, which supports various recreational and exercise activities. It is widely held that many walking trails also provide access to various parks, open spaces or water bodies which can be used for recreational purposes (Addy et al. 2004; Hoehner et al. 2005; Sallis 2011). Depending on the location and design of the recreational walking trail, the route can also be used for active transport or walking tourism (Davies 2012). Tracks which attract high volumes of people have to be designed to reduce environmental disturbance such as vegetation trampling (Pickering and Hill 2007). Without this protection, environmental preservation which greenways and recreational trails encourage will be compromised. These various benefits of recreational trails all encourage physical activity.

Accessible recreational facilities such as walking trails and the open spaces they connect, encourage walking and physical activity in surrounding communities. Various studies have found that people who live within close proximity to recreational facilities are more likely to be sufficiently active (Addy et al. 2004; Brownson et al. 2009; Giles and Donovan 2002; Sallis 2011; Sallis 1998). The design and size of recreational facilities also encourages people to use the space and increases the distance people are willing to travel to access the area (Kaczynski et al. 2008; Sugiyama et al. 2010). A review of existing studies by McCormack et al (2010) recognised that the design of recreational facilities in urban areas was important to provide opportunities for both structured and unstructured activities. The function of a recreational area was found to be determined through various design and infrastructure provisions including landscaping, walking trails, fields, pedestrian facilities, playgrounds and gym equipment. A mix of facilities in public open spaces was also noted as important to draw various demographic groups to use the space.

Recreational facilities such as trails are also important to promote wellbeing and good mental health in communities (Francis et al. 2012; Sugiyama et al. 2008). This can be achieved through social interaction and exposure to greenspace (Kent et al. 2011). This is

supported by Kent et al. (2011) who assert that well designed facilities attract various users from different demographics which encourages community contact and social interaction. This is supported by Brueckner (2000) who notes that recreational facilities throughout urban environments are increasingly important as sprawling suburbs with low land use mix restrict the opportunities for planned and spontaneous interaction. This is of particular concern for less mobile individual such as the elderly, low socio economic demographics and people burdened with disease as they cannot travel as far to engage in activities.

Accessible recreational opportunities in cities which are well designed are also important to create a sense of community. This is achieved by people using the facilities develop a sense of place which fosters opportunities for social interaction and passive surveillance (Francis et al. 2012). A sense of community also improves perceived and actual safety which encourages more people to use the spaces, and a greater potential for social interaction.

Exposure to greenspace can also improve wellbeing and decrease the chances of mental illness (Kent et al. 2011). A review of prominent studies by Maller et al (2005) found exposure to greenspace resulted in relief from mental fatigue and stress and improved general wellbeing which have been identified as risk factors for various mental illnesses. Therefore accessible recreational trails which pass through natural environments and provide access to various open spaces can improve wellbeing and help to prevent mental illness.

### **3.2.2 *Recreational Trail Issues***

The New South Wales Planning Guidelines for Walking and Cycling released in 2004 identified various issues which were associated with walking trails. These were established through various case studies of walking trails in NSW. The issues were identified as standards in design and construction, user conflicts, safety/security, environmental impacts, links to surrounding facilities, optimising usage, funding/maintenance, access and liability. It was also noted that low standards of design and construction were most likely associated with trails that were built before development standards, or if the estimated volume of users was exceeded causing cracks or erosion of the trail. User conflicts are noted to be most common on shared paths between cyclist and pedestrians. Also, safety and security

issues are most likely due to a lack of passive surveillance which can be improved by increasing usage and through a sense of ownership.

Environmental impacts such as erosion, vegetation trampling, pollution, litter or other disturbance to the natural habitat can also arise from trail development if the surrounding environment is not considered. Poorly planned trails may also restrict linkages to a wider trail network or recreational facilities. This can also be due to poor legibility owing to a lack of signage and unclear trails. Trails may also be underutilised due to their location which can be greatly improved if linked to public transport, schools and other significant destinations in support of recreation and active transport. However, to establish recreational trails and integrated networks funding must be provided otherwise essential linkages between trails are not completed. Public liability is another issue which may restrict trail infrastructure, though it is noted that incidents and claims are relatively low in NSW. Many of these issues are also noted in the literature as potential barriers that can be overcome with appropriate design, maintenance and funding.

### ***3.2.3 Population Demand of Recreational Trails***

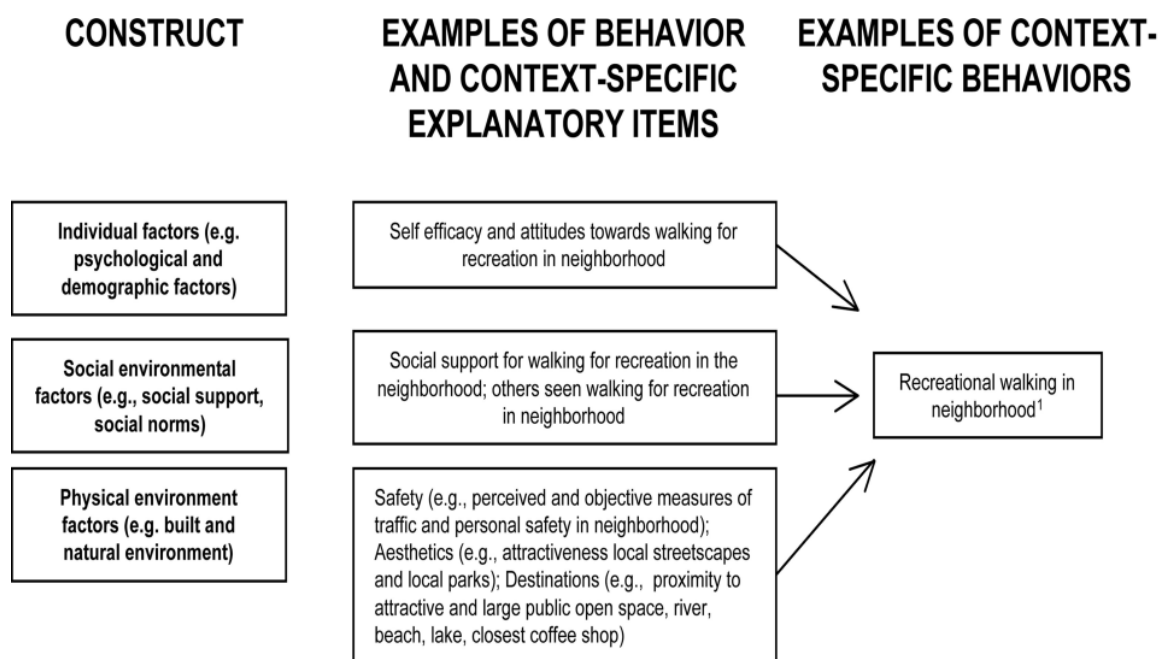
The popularity of walking on walking trails, and in open spaces, mirrors the high accessibility of walking and the various benefits (Giles-Corti and Donovan 2003; Li et al. 2004). A survey into the Participation in Sport and Physical Recreation by the Australian Bureau of Statistics found that between 2009 and 2010 walking was the most popular physical activity in Australia. Further, these popular facilities for physical activity also reflected the popularity of walking in parks and beaches with walking trails the most used facility. This was noted in all age groups except 15 to 17 year olds who preferred structured facilities such as gyms and swimming pools. It is therefore important that recreational trail facilities are provided and designed to support walking.

### **3.3 Encouraging walking on recreational trails**

Walking trails are a popular recreational facility which supports healthy communities. Many studies have found a positive association between increased physical activity and wellbeing of populations living around walking trails (Francis et al. 2012; Owen et al. 2004). In addition, studies have shown that users of walking trails not only report higher levels of

physical activity but are more likely to meet recommended physical activity requirements (Addy et al. 2004). These findings are the foundation of a large body of research from various fields including planning, public health, recreation and landscape architecture which identify factors that promote and encourage recreational walking. The existing studies have also identified individual, social and physical environment factors as the key determinates of recreational walking (B. Giles-Corti et al. 2005a) as demonstrated in figure 3.3.1.

Figure 3: Environmental impacts which affect walking. (Source: Giles- Corti et al., 2002)



The existing body of studies recognises the importance of the provision and design of physical environments which encourage and support recreational walking. Various subjective and objective methods have been employed over many cross-sectional and longitudinal studies, establishing the environmental influences on recreational walking (Cauwenberga et al. 2011; Gebel et al. 2005; Humpel et al. 2002; Kahn et al. 2002; Kent et al. 2011; Saelens, S. 2008; Wendel-Vos. et al. 2007). Six main categories were common throughout the studies in which the physical environment can be adapted to support and encourage walking: accessibility; safety; pedestrian comfort; pleasurable; destinations; awareness. These categories will now be reviewed.

### **3.3.1 Accessibility**

The first category of accessibility is a measurement of the spatial distribution of activities which is adjusted for the ability or desire of people to overcome the spatial separation (Hansen 1959). This measurement of accessibility is important when assessing trails as the design, length, facilities or recreational opportunities along the route can increase the distance an individual is willing to travel to access the trail. This is important as studies have found the proximity to walking trails is a key determinant of the use of the facility (Frank et al. 2003).

#### **3.3.1.1 Proximity**

It is widely held that walking trails within close proximity of people's houses are associated with higher levels of physical activity (Addy et al. 2004; Ball et al. 2001; Booth et al. 2000; Brownson et al. 2000; Brownson et al. 2001; Chad et al. 2005; De Bourdeaudhuij et al. 2003; Eyster et al. 2003; Fisher et al. 2004; Giles-Corti et al. 2003; Giles-Corti 2003; Hoehner et al. 2005; Hovell et al. 1989; Humpel et al. 2004; Huston et al. 2003; Kaczynski et al. 2008; King et al. 2003; Kirtland et al. 2003; Merom et al. 2003; Reed et al. 2004 ; Sallis et al. 1990; Troped et al. 2003; Wilson et al. 2004). This has been identified through various studies which applied both subjective and objective methods and measures. The majority of studies used questionnaires and self reporting surveys, in which participants indicated if a recreational facility was located within a convenient distance from their home. This data was then analysed with reported physical activity levels concluding that facilities within close proximity of one's residence increase physical activity. Various studies in the United States indicate that a 400 metre radius around walking trail entrances defines close proximity to a trail and encouraged people to use the facility (Abildso et al. 2007; Hoehner et al. 2005; Troped et al. 2001). Interestingly, Australian studies have found a 700 metre radius in this regard (Powell et al 2003; Sugiyama et al. 2008). Variance in these distances may be related to different perceptions due to social, individual and environmental barriers. Both these measures should be considered when establishing a comfortable distance to trail entrances. The literature increasingly recognises the need to discern perceived and actual differences to calculate proximity. This can be achieved through objective measures such as



geographic information system analysis on self reported data or surveys (McCormack et al. 2007).

### 3.3.1.2 *Barriers*

The accessibility of walking trails can also be determined via physical and psychological barriers. These barriers are reported in studies as actual or perceived social, individual, economic or environmental factors which restrict access to recreational facilities (Alfonzo 2005). The two prominent barriers which restrict access to walking trails are busy roads with no crossings (Brownson et al. 2001; Merom et al. 2003; Troped et al. 2001) and street patterns which reduce street connectivity (Huston et al. 2003; Lindsey et al. 2001; Lindsey et al. 2006). These elements of the built environment were noted in studies to be barriers as they restrict the proximity and connectivity between land uses. These physical obstructions also create and reinforce perceived barriers which restrict the use of walking trails. These perceptions of inconvenient access to trails are time constraints, distance to facility and safety (Abildso et al. 2007; Addy et al. 2004; Brownson et al. 2001; McCormack et al. 2007; Troped et al. 2001). These studies also note that barriers can also be perceived differently by different demographic groups which may cause inequalities in accessing recreational facilities.

### 3.3.1.3 *Alternate modes of transport*

Studies have also identified that trails within a 20 minute drive are considered accessible by car or public transport (Addy et al. 2004; Reed et al. 2004 ; Wilson et al. 2004). Therefore, car parking facilities and public transport stops are important at recreational facilities to make trails more accessible to a wider range of people (Lindsey et al. 2006). These provisions can improve accessibility for low socio economic groups in which reduced physical activity is due to a lack of recreational infrastructure such as walking trails in close proximity to their houses (Cauley et al. 1991; Giles-Corti and Donovan 2002; Parks et al. 2003; Wilson et al. 2004; Yen 1998) . This is particularly important as studies have shown that these groups are more likely to use trail infrastructure if accessible, and accordingly, meet physical activity requirements (Brownson et al. 2000; Wilson et al. 2004). This is of

particular note when considering that the higher socio economic groups have greater access to various recreational facilities including paid facilities to meet physical activity requirements.

### **3.3.2 Safety**

Even if recreational parks and trails are in close proximity to people's homes, the quality and perception of safety may mean it is underutilised (Frank et al. 2001). Personal safety has been indicated in various studies to influence recreational walking and the use of recreational trails (Bird 2011;Hovell et al. 1989; Reynolds et al. 2007; Wilson et al. 2004). Existing studies relating to safety and the use of trails although limited, highlight the main concerns to be related to traffic, legibility and surveillance which will now be reviewed.

#### **3.3.2.1 Traffic**

The impacts of traffic on recreational walking note the importance of pedestrian separation from the road. (Brownson et al. 2001; Hoehner et al. 2005; Saelens et al. 2003; Shafer et al. 2000). This can be achieved through design measures such as verge widths to improve actual and perceived safety of recreational walkers (Giles-Corti et al. 2003). However, most walking trails are segregated from the road making them preferable for recreational walking (Shafer et al. 2000). Important elements to make people feel safe and engage in recreational walking when pedestrian and traffic sections join include limiting vehicle access, installing calming devices and the provision of kerbside parking (Hoehner et al. 2005; Holman et al. 1996).

#### **3.3.2.2 Surveillance**

Surveillance has also been associated in various studies as an important correlation for the use of trails. The lack of lighting, passive surveillance and sightlines are noted to reduce perceived safety and use of walking trails (Luymes and Tamming 1995; Reynolds et al. 2007). It is noted in these studies that these design features along various recreational trails are not viable as it would compromise the character of the trail. Therefore, design measures undertaken to reduce safety concerns must be assessed in context to the location and function of each trail.

Passive surveillance and sightlines are recognised to increase actual and perceived safety (Pikora 2003). Due to the segregated nature of many recreational trails from surrounding land uses, passive surveillance cannot be achieved. Therefore, sightlines have been indicated as important in improving surveillance along trails (Luymes and Tamminga 1995) which can be improved with the pruning of vegetation. Lighting has also been found to encourage recreational walking on trails that are suitable for night usage (Abildso et al. 2007; Addy et al. 2004; Brownson et al. 2000; Holman et al. 1996; Huston et al. 2003). Therefore, lighting is optimal along recreational trails such as foreshore walks and promenades which are designed to be accessible at night. Studies have also shown that graffiti is an indicator of low passive surveillance, which can discourage recreational trail use due to perceived safety concerns (Ellaway et al. 2005).

### 3.3.2.3 *Legibility*

A study by Luymes and Tamming (1995) also indicated that safety concerns may be related to poor legibility (lack of signage and unclear tracks). This is of particular concern on nature trails which sometimes are not clearly defined. Therefore, signage indicating intersecting trails, trail length, required physical fitness level, entrances and facilities are important to ensure perceived and actual safety for trail users. Also, clear and well maintained continuous paths are also essential to ensure good legibility.

## 3.3.3 *Pedestrian Comfort*

### 3.3.3.1 *Quality of Paths*

The material used to surface recreational trails is dependent on the location and intended function of the trail (Shafer et al. 2000), therefore the trail determines the user. Regardless of intended function it is important for all trails to be even and well maintained to encourage maximum use (Brownson et al. 2000; Gobster 1995; Reynolds et al. 2007). This is because uneven paths can arise from soil erosion of soft surface tracks (Marion and Leung 2001) or cracks in concrete or asphalt due to poor maintenance (Brownson et al. 2000). Minimising uneven paths is especially important to increase trail accessibility to vulnerable groups especially the elderly and those burdened with disease due to reduced trip hazards

and increased safety perceptions (Booth et al. 2000; Bruce et al. 2002). Studies have also established that it is important that trails have no missing segments to ensure users do not enter unsafe areas (Merom et al. 2003). The length of recreational trails has also been found to encourage recreational walking, as studies have shown that usage is higher on longer trails (Gobster 1995; Troped et al. 2001).

#### **3.3.3.2**      *Pedestrian facilities*

Seating along trails and in open spaces is important as it provides rest stops and the opportunity for social interaction (Kent et al. 2011). This is noted as particularly important by Bird (2011) to make environments more accessible to less mobile people. Other pedestrian facilities such as restrooms, bins and water fountains are also preferable along walking trails but are not significant enough to deter people from using the facility. The provision of these facilities have been highlighted in studies to be best provided in groups for trails, parks and open areas (Gobster 1995; Reynolds et al. 2007).

#### **3.3.3.3**      *Shade*

Pedestrian comfort can also be enhanced through trees along recreational trails and paths. Studies have highlighted that shaded paths are important to encourage people to participate in recreation walking in hotter climates (Giles-Corti et al. 2005b; Pikora 2003; Sugiyama et al. 2008).

### **3.3.4**    *Pleasurability*

#### **3.3.4.1**      *Aesthetics Attributes*

Aesthetically pleasing environments are recognised to encourage recreational walking (Ball et al. 2001; Brownson et al. 2001; Humpel et al. 2004) and increase the time spent walking (Troped et al. 2003). Aesthetics associated with walking trails are attributed scenery including natural, educational or historic and view opportunities, which can draw people to use a particular area (Brownson et al. 2000; Gobster 1995; Pikora 2003; Reynolds et al. 2007). Studies have found that aesthetics of walking trails can be diminished through litter and pollution which deter people using the trails (Ellaway et al. 2005; Gobster 1995; Gobster and Westphal 2004; Hoehner et al. 2005).

#### 3.3.4.2 *Company*

Company is beneficial to encourage people to walk on trails, particularly for women and older people (Booth et al. 2000; Brownson et al. 2001). These authors note that this can be achieved through the creation of walking groups in communities. Studies have also shown that a positive correlation exists between dog ownership and people meeting physical activity requirements (Ball et al. 2001; B. Giles-Corti and Donovan 2003). Therefore, it is important to allow leashed dogs on recreational trails with supporting infrastructure (water bowls, waste bags, bins) to encourage people to walk their dog more frequently.

#### 3.3.5 *Destinations*

An extensive body of studies also highlight the importance of destinations to encourage walking and increase physical activity. Nature trails, parks and beaches have been identified in various empirical studies as key destinations which increase walking (Ball et al. 2001; Brownson et al. 2001; Floyd et al. 2008; Foster et al. 2004; Giles-Corti and Donovan 2003; Giles-Corti et al. 2005b; Giles-Corti et al. 2005a; Holman et al. 1996; Humpel et al. 2004). Also, the attractiveness and size of parks encourages walking although this is offset by the distance required to walk to access the space (Giles-Corti et al. 2005b; Sugiyama et al. 2010). Attractiveness and quality of open spaces have been found to be associated with landscaping, water features and the provision of walking paths, fields, playground, gym equipment, seating and other pedestrian facilities (Addy et al. 2004; Floyd et al. 2008; Kirtland et al. 2003). A mix of these facilities in open spaces is identified as important to facilitate people from differing demographic groups to use the area (Carnegie et al. 2002; Li et al. 2004; Roemmich et al. 2006). Studies also indicated that trail networks linking smaller parks can encourage people to walk further distances (Giles-Corti et al. 2005b).

#### 3.3.6 *Awareness*

Awareness of recreational trails is also important to encourage use as supported by a study in the United States of a community within close proximity to a walking trail which found that a lack of awareness was associated with low usage (Reed et al. 2004). Therefore,

promotion of recreational trails is needed to make people aware of the facility and connections it may have to open spaces or other trails (Brownson et al. 2000; Kahn et al. 2002; Li et al. 2004). Promotion of the benefits of brisk walking can also increase the health benefits gained from the physical activity (Brownson et al. 2001).

### **3.4 Policy response**

State and Local Governments in New South Wales recognise the importance of providing well designed recreational walking trails to meet demand and support healthy communities. In response, various policy, programs and funding have been established to provide new, well designed recreational trails. In the Sydney Metropolitan area the provision of new walking trail infrastructure is part of a regional recreational trail network, which is fed by various sub regional and local feeder trails.

#### **3.4.1 State Government**

The Sydney Metropolitan Regional Recreation Trails Framework 2005 (herewith referred to as SMRRTF 2005) is the guiding document for recreational trails in the Sydney Metropolitan area. The document is the result of an initiative between the Department of Infrastructure, Planning and Natural Resources (herewith referred to as DIPNR) and other state and local agencies to establish a regional recreation trail network which provides access and links between Sydney's greenspace (SMRRTF 2005). Further, Sydney's greenspace was identified as a vital asset in the Open Space Inventory by DIPNR, which found 545,000 hectares of parks, sporting fields, bushland, riverina and coastal greenspace located in the Sydney Metropolitan area. This resulted in DIPNR commissioning HASSEL, a planning consultant agency, to provide a comprehensive summary of: existing and proposed trails; key links and missing connections; opportunities for a network of regional recreational trails across Sydney; funding opportunities and partnerships between state and local Government. These findings were used to create a targeted framework and strategic plan for the general location and implementation of a recreational trail network across Sydney.

### *3.4.1.1 Classifications*

Regional recreation trails are defined by SMRRTF as “a corridor, trail, track or pathway used for recreational walking, cycling or horse riding that passes through or connects landscapes, facilities or sites of metropolitan significance” (SMRRTF 2010: pp 19).

These trails are predominantly off-road and can be multi use through design provisions which make them a shared pedestrian and cycle path. The regional trail network is made up of regional trails, subregional trails and local feeder trails. Regional trails are usually located in open space, green space or nature corridors. The trails usually attract users from a wide region and across local government boundaries. The trails and amenities are of high quality, and commonly provide opportunities to experience aesthetically pleasing qualities or landmarks along the routes. These trails also connect to public transport interchanges to increase accessibility. Subregional trails have the potential to attract users within the region and offer connections to and between regional trails. Also, local feeder trails are smaller in scale and offer connections to subregional and regional trails.

SMRRTF (2010) also states that regional recreational trails are classified by their location and setting. Foreshore trails are trails along rivers, creeks and coastlines. Foreshore promenades are larger trails along foreshores including popular beaches which accommodate high usage. Urban trails run through the urban environment where parklands are not available. Nature trails are located in parklands, bushland and national parks, which provide opportunity for exposure to the natural environment. Rail trails run along disused rail corridors. Tourist trails are situated close to major tourist attractions such as, prominent landmarks and destinations. Hikes are longer trails , generally through the bush which can require an overnight usage. Finally, special use trails include trails for horse riding and mountain biking.

### *3.4.1.2 Strategic network*

A demand study was conducted as a foundation of the framework which found that the demand for recreational walking trails was high in all regions, especially in the Western Sydney Region. The SMRRTF 2005 mapped the existing regional and subregional trails in these regions and proposed a network of potential trails based on demand, and potential

links between the existing routes. An update of the SMRRTF in 2010 did not change the strategic network of trails or the framework objectives. The update was undertaken to report changes in the funding and government programs which support the development of recreational trails. This document also recorded new trail infrastructure between 2005 and 2009 and revised priorities for future trail infrastructure.

The following map (shown as figure 4) of the Sydney Metropolitan Area is divided into the Central Coast, Northern Sydney, Southern Sydney and Western Sydney.

Figure 4: Framework for Sydney’s Regional Trails Network (Source: SMMRTF, 2010: 18)

**Sydney Metropolitan Trails Framework**

- 1.1 The Great River Walk (Hawkesbury -Nepean River)
- 1.2 The Great North Walk
- 1.3 Cattal Creek
- 1.4 Western Parklands and Eastern Creek Corridor
- 1.5 South Creek
- 1.6 Sydney Harbour and Parramatta River Foreshores
- 1.7 Coastal Trails
- 1.8 The Georges River (Kal’ Mia)
- 1.9 Lake Burragarang - Picton –  
Georges River (link to Bicentennial Trail)
- 1.10 Cooks River

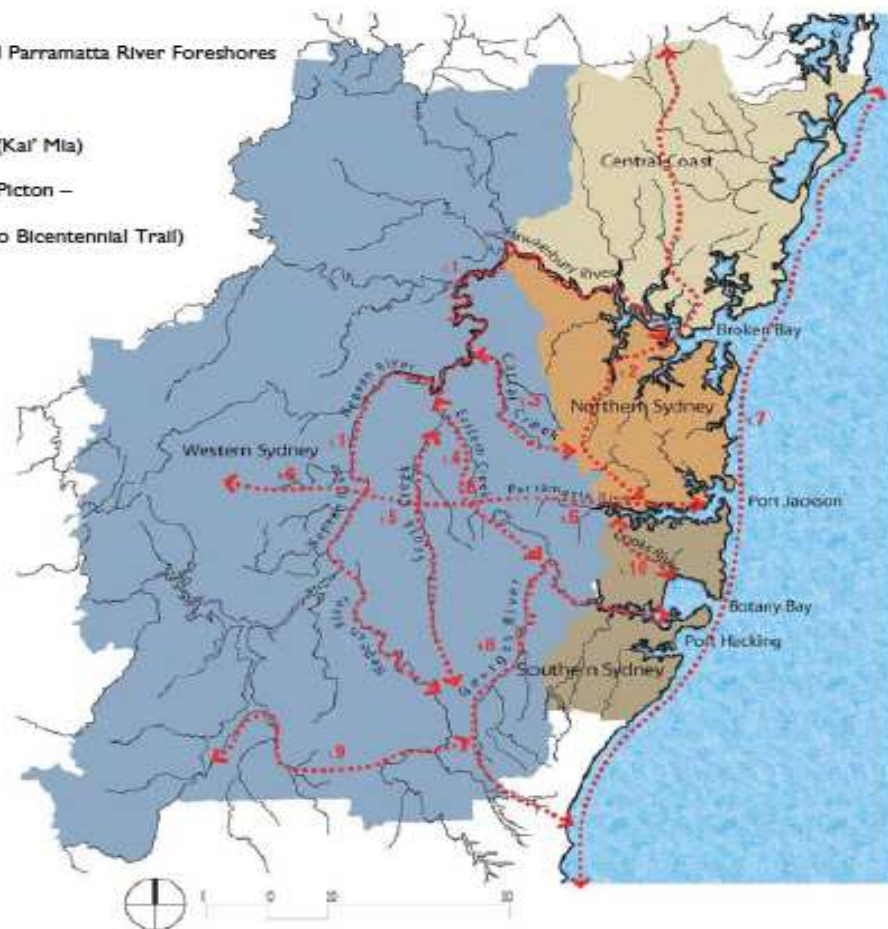


Figure 3.1 Framework for Sydney’s Regional Trails Network (2005)



This map represents the core routes of the regional network, which are to be made up of various regional and subregional recreational trails. The more detailed routes are mapped out on more specific regional maps within the framework.

#### Central Coast Region

The Central Coast has fourteen regional and five subregional existing and proposed trails. These trails are predominantly foreshore and nature trails which link the Northern and Western Sydney precincts.

#### Northern Sydney Region

The Northern Sydney region has fourteen regional and ten subregional existing and proposed trails. These trails are predominantly foreshore and nature walks, taking advantage of the coastline, water bodies and various national parks and reserves in the region.

#### Southern Sydney Region

The Southern Sydney region has twenty four regional and sixteen subregional existing and proposed walks which predominantly consist of foreshore and nature walks. These walks attract tourists due to landmarks and destinations such as Sydney Harbour and Bondi Beach. Various urban trails also exist and are proposed for the region to connect regional trails separated by urban areas with no connecting parkland.

#### Western Sydney Region

The Western Sydney region has twenty four regional and nine subregional trails. The area is noted to have a large potential for walking trails due to expansive nature corridors along rivers, creeks and parkland.

It is noted that all regions have accessible hikes due to expansive national park located throughout the Sydney Metropolitan Region.

#### *3.4.1.3 Design Considerations*

The SMRRTF report also provides various best practice design considerations for the maintenance and construction of new trails drawn from Australian Standards and best

practice established. These considerations support the six environments factors previously discussed to support and encourage recreational walking. The location, classification and function of trails determine the best practice design features of trails, together with the type of users intended for the pathway which will affect path width and coverage. The widths indicated in the SMRTTF are 3.0-4.0 meters for shared paths, 2.4 metres for high volume pedestrian access, 1.2 metres for general pedestrian access and 0.9 metres as an absolute minimum in intimate settings. The intended use and location of trails also dictate the appropriate surface treatments as follow: cement or asphalt are suggested for shared paths and/or high pedestrian use that can be coloured or textured for visual aesthetics; soft surface paths (fine crushed rock, decomposed granite or loose gravel) are appropriate in natural settings to even the surface. These paths are usually high maintenance, and without drainage measures result in erosion. Boardwalks are also common in trail systems and are used to leave vegetation undisturbed. As timber boardwalk can be high maintenance other materials such as steel mesh board walks are becoming common.

Pedestrian facilities including toilets, water fountains and seating to be provided should be factored early into design considerations, although they are not essential. Australian standard 2156 states class one and two trails may provide pedestrian facilities such as seats. This standard usually applies to trails along the foreshore or in parks. Other pedestrian facilities are decided upon depending on the volume of people using the trail. Signage is another design element for walking trails with considerations for implementations noted in the Australian Standard 2156.1 (2001), Walking tracks: Part 1: Classification and signage. Signs along trails can include locations, regulation of activities, warning or educational. Barriers are also important along some trails which are assessed by fall height factors calculated by provisions in Australian Standard 2156.2. It is also noted that ecological sustainability principals lay the foundation of design and planning of all trails to protect natural systems intersected by trails.

### **3.4.2 Local Government Response**

SMRRTT (2005) asserts that Local Governments are responsible for the planning and construction of walking trails, offering a strategic framework for Councils to guide the

general location of recreational trails to link up with existing networks of significant open space. Further that trails which are constructed in local areas that are of regional or in some cases subregional classification can be eligible for joint funding from the State Government. This framework also helps guide the development of trails across local government borders which is sometimes difficult.

### **3.4.3 Funding**

The Metropolitan Greenspace Program provides funding for recreational trails. The program is a State Government initiative which is identified in the Metropolitan Plan for Sydney 2036. The program promotes partnerships between various Local Governments and the State Government to provide regionally significant recreational trails and open spaces. The main aim of the program is to coordinate the creation of a regional network linking urban centres, bushland, open spaces, parks and waterways. The program offers \$2.5 million annually in support of various Council projects on a dollar for dollar basis.

### **3.4.4 Interagency Government Bodies**

The Premier's Council for Active Living was established in 2004, following on from the NSW Physical activity Taskforce which ran between 1992 and 2002 (Premiers Council for Active Living 2012). Their aim is to provide physical and social environments which support and encourage increased physical activity, such as walking to improve the communities' health. This is underway as evidenced by the New South Wales Walking and Cycling Strategy being identified as a deliverable in the Metropolitan Plan for Sydney 2036, Action C 5.9 Work with the Premier's Council on Active Living to deliver a walking strategy (Department of Planning and Infrastructure 2012a). The Strategy is currently in draft stage but identifies broad policy principles and a guide for Government investment in walking infrastructure. The policy and infrastructure aims to promote higher levels of active transport and increase the accessibility to recreational facilities such as walking trails and parks.

### **3.4.5 Other Influential Groups**

The Heart Foundation is a non government organisation which promotes the importance of walking to reduce heart disease (The Heart Foundation 2012). They provide various online tools and studies for professionals to encourage walkable environments. These documents

include 'Healthy by Design: a Planners Guide for Active Living', 'Creating Healthy Neighbourhoods: consumer preference for healthy development' and a Position Statement on the Built Environment and Walking. Accessibility and the design of recreational facilities such as walking trails are recognised in these documents to promote walking in communities. A 'Neighbourhood Walking Checklist' is also on the website which allows the public to audit the walkability of their local areas, which can be sent to Councils to identify walkability problems which make the environment less walkable. The Heart Foundation also promotes the creation of community walking groups to encourage walking.

Another important group in the development of Recreational trails is the Walking Volunteers who are supported by various local governments and state government agencies through the walking Coastal Sydney's Project (Sydney Coastal Councils Group 2012). They support active groups of individuals focused on promoting public access of Sydney's coastline, harbour and estuaries by providing information and maps of various walks in Sydney, many being classified as regional walks. The group has helped establish partnerships with Northern Sydney Councils, the NSW National Parks and Wildlife service's and Sydney Harbour Trust to establish local feeder and district connections to regional and subregional trails.

### **3.5 Conclusion**

It was found that a recreational trail is a path, corridor, trail or track, which passes through a variety of urban and natural environments. These trails can exist in various locations, although they are mostly found in greenways within urban and rural environments with some forming part of a wider network connecting different open spaces and recreational opportunities. Further, the provision of recreational trails can have many benefits to physical and mental health outcomes for both individuals, and associated health cost savings for governments. These benefits are recognised by Local and State Government in New South Wales as evidenced through policy and programs to ensure the provision of integrated infrastructure to support accessible and well designed walking trails. The health benefits associated with walking trails and importance of infrastructure are also promoted in New South Wales through inter agency groups, non-government organisations and interest groups.

It is concluded, that to obtain these benefits, various issues must be overcome to ensure the construction and use of trails to support walking which is the most popular form of physical activity in Australia. Further, that to be fully utilised it is important that walking trails are accessible, safe, comfortable, pleasurable, access various destinations and recreational open spaces and their existence promoted. In summary, it is important recreational walking trails are designed, managed and programmed to deliver health benefits to surrounding communities.



## **CHAPTER FOUR Evaluation of Metropolitan Sydney's Recreational Trails**

### **4.1 Introduction**

This chapter presents the results from the evaluation of regional recreational trails in the Sydney Metropolitan Area. A total of 38 trails, totally over 180 kilometres, were selected for audit using the criteria detailed in the methodology in chapter one. The trails audited were predominately foreshore and nature trails which utilised rivers, coastlines, national parks, reserves and open spaces in the Sydney Metropolitan area. Many of these trails were located within the natural environment, that promote sustainable land use.

Due to the plethora of data gained from the audits, the results are consolidated into the four regions of Metropolitan Sydney as defined in the Sydney Metropolitan Regional Recreational Trails Framework 2010: Central Coast, Northern Sydney, Southern Sydney and Western Sydney. Each regions results section begins with a summary table, listing the trail names, length, council area, trail audit score and if the trail is promoted.

The scoring system was adapted from the Heart Foundation's walkability checklist with 22-30 (excellent) indicates a very walkable trail; 15-21 (very good) indicates a walkable trail but with room for improvement; 8-14 (satisfactory) trail needs various improvement to encourage trail use; and 0- 7 (poor) not a very walkable trail which does not encourage recreational walking.

The summary table of trails also indicates if a regional trail identified in the SMRRTF 2010 has been split into individual trails. This was indicated in the methodology in chapter one owing to regional trail length or separation in the regional trail due to other land uses.

The summary table is followed by detailed results wherein the findings of the audit categories of accessibility, safety, pedestrian comfort, pleasurability and destinations are presented.

The individual audit results are then followed on by a summary of the promotion of the recreational trails audited. Some observations are also presented on the regional network of which the trails are part. The chapter then concludes with an overview of the strengths and weakness of trails within the Sydney Metropolitan Region.

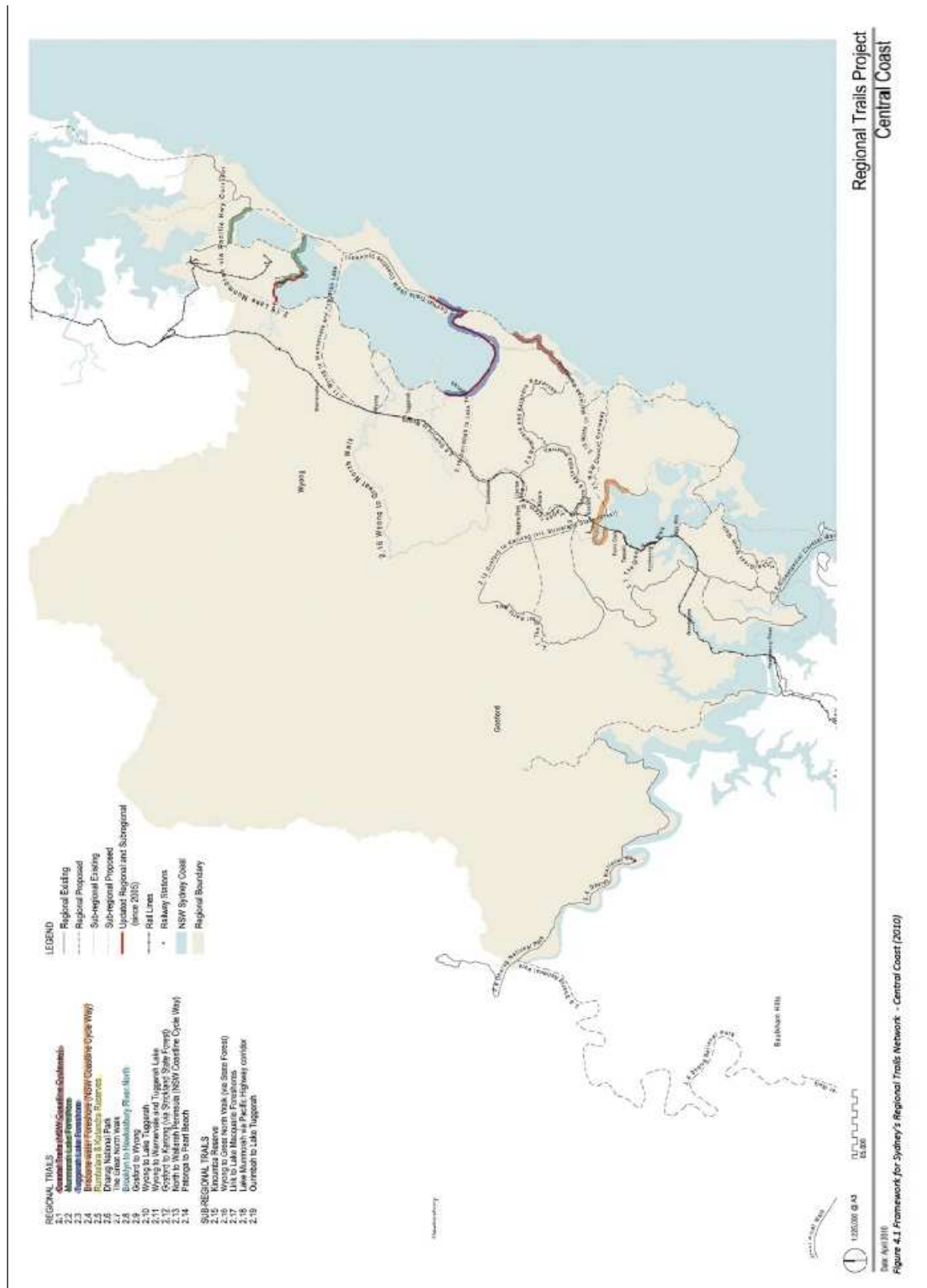
## 4.2 Central Coast Results

Table 1: Central Coast Regional Recreational Trails

Name	Classification	Council Area	Distance	Rating	Promotion
2.1 Coastal Trails The Coast Track	Nature Trail (NP)	Wyong Shire Council	3km	20/30 Good	NPWS website
2.2 Munmorah Lake Foreshore					
Lake Munmorah Foreshore	Foreshore Trail	Wyong Shire Council	2.6km	23/30 Good	
Elizabeth Bay Park – Lake Munmorah Recreation Area	Nature Trail	Wyong Shire Council	2.5km	7/30 Poor	
North Foreshore of Tuggerah Lake	Foreshore Trail	Wyong Shire Council	9km	23/30 Good	
2.3 Tuggerah Lake Foreshore	Foreshore Trail	Wyong Shire Council	12km	27/30 Excellent	Council Website
2.4 Brisbane Water Foreshore (Goodawang reserve to Gosford Olympic Swimming Pool)	Foreshore Trail	Gosford Council	5.5km	20/30 Good	Council + tourism website
2.5 Rumbalara Reserve and Katandra Reserve	Nature Trail	Gosford Council	5km	15/30 Good	Council + hike website
2.8 Brooklyn to Hawkesbury River North	Nature Trail	Karin-gai Chase National Park	6km	15/30 Good	NPWS website



Figure 5: Indicative map of Central Coast trails (Source: SMRRTF 2010)



### 4.2.1 Accessibility

Foreshore trails are highly accessible from the surrounding residential areas, as the majority of audited segments report at least one residential access point. Nature trails are less accessible from a wide range of residential areas as they only have access points at the start and the end of the trail, except for the coast track which has a residential access point in the middle of the trail. This limited accessibility is due to the tracks running through national parks and reserves, where opportunity for multiple access points to the track is not achievable. None of the trail access points are near busy roads, which is potentially restricting access from surrounding residential areas.

Figure 6: Residential Accessibility Central Coast Trails (Source: Author)



All of the trails are accessible by car with either street parking or car parks. Car parking lots are commonly located at main access points of the trails or near playgrounds. The foreshore trails are also accessible by bus as various trails access points have bus stops nearby on parallel roads. Although the majority of the nature trails are not directly accessible by bus, the entrance of Rumbalara Reserve at Brady Gullys Road has a bus stop. Brisbane Water Foreshore Trail is also accessible by train. Two nature trails, Rumbalara Reserve and Brooklyn to Hawkesbury River North are also accessible by other trails as they are part of a trail network.

Figure 7: Accessibility Central Coast Trails



#### 4.2.2 Safety

The majority of the trails are completely separated from the road, therefore reducing any danger from traffic. Trails most commonly coincide with roads at car parks, which is seen as a traffic calming device through ensuring reduced car speed. Segments of trails which follow the road are not common, but where they do exist, a barrier, verge or parked cars sufficiently separate pedestrians from the road.

Figure 8: Traffic Safety Central Coast Trails



The foreshore trails in the central coast are all easy to follow as they are continuous cement trails. As these trails do not come to any intersections no trail markers or signs are required to ensure legibility. The majority of the nature trails are clear cut through the bushland. Rumbalara Reserve and Katandra Reserve, and Brooklyn to Hawkesbury River North trails both connect to a wider trail network and trail markers and signs are used to ensure legibility. Legibility of a directional sign indicating a Graves Walk trail entrance from Mouat Walk in the Katandra Reserve was compromised due to overgrown vegetation. The nature and location of the trails do not require any pedestrian warning signs, though shared paths have signs making pedestrians aware of bike use and informing bike riders of etiquette around walkers.

Figure 9: Legibility Central Coast Trails





Due to the open nature of the foreshore trails, passive surveillance from people using the trail, parks and the surrounding residential areas is optimal. Along the trails, sightlines are also improved through well maintained vegetation. Only a few instances of overgrown vegetation are observed along nature trails. The only lighting along the trails is along The Entrance Promenade which is part of Tuggerah Lake Foreshore. Lighting along this section is necessary to support use of the area at night as it is near restaurants and medium density residential area. The potential for lighting to be installed exists along the Brisbane Water Foreshore Trail and north and south foreshore of Tuggerah Lake. This is because paths are well maintained, which could make them accessible and usable at night. Objection to this may be raised by adjacent residents through due to close proximity of trails to houses. Adequate surveillance of the paths was also noted through the lack of graffiti, with four minor instances observed.

Figure 10: Surveillance Central Coast Trails



Barriers are present on both The Coast track and the north foreshore of Tuggerah Lake. These barriers are in response to potential hazardous fall heights and impact of surface. Barriers are a minimum of 1.5 metres and have gaps no wider than 125mm vertically, compliant with requirements of Section 3 of *Australian Standard 2156.2-2001 Walking tracks – infrastructure design*.

Figure 11: Barriers and Warning Signs Central Coast Trails



### 4.2.3 Pedestrian comfort

Concrete is used to seal the foreshore trails to support the high volume of pedestrians and cyclists frequently using the paths. These concrete paths are even and well maintained, with only a few instances of uneven concrete noted along the Tuggerah Lake Foreshore Trail. The nature trails cut through bushland and are not covered by additional crushed stone. Many segments of these trails have an uneven surface with exposed roots and rocks. The Coast Track and the trail from Elizabeth Bay Park also have segments with bad erosion, as deep trenches are gouged in the middle of the trails. The trails through the Rumbalara Reserve and Katandra Reserves have many instances of loose rock cover which is potentially dangerous walking downhill. The Brooklyn to Hawkesbury River North trail was noted as the most even nature trail. The gradient of the foreshore trails is mostly flat, accommodating all users. However, the nature trails have sections of steep gradients and stairs which restricts access for some users.

Figure 12: Path Quality Central Coast Trails



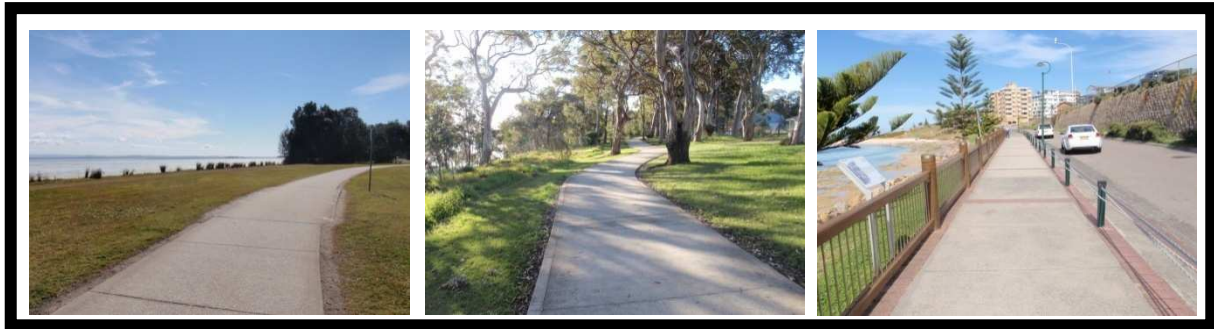
The width of the trails are all compliant with the SMRRTF (2010) design guide which allows for a comfortable and enjoyable passage through the environment. The vegetation around the trail is also well maintained for a comfortable height clearance, with only three segments along nature trails having insufficient height clearance.

Figure 13: Pedestrian clearance Central Coast Trails



The surrounding vegetation on the foreshore and nature trails also provides shaded areas for pedestrian comfort. Only two trails have insufficient shade. Various segments along the Tuggerah Lake Foreshore trail do not have shade, especially towards The Entrance, and the majority of the trail from Elizabeth Bay Park does not offer any shade.

Figure 14: Shade Central Coast Trails



Seating is located along all foreshore trails, with the majority of segments audited having at least one seat. Seating along most of the trails is most commonly concentrated in parks, playgrounds and picnic areas. Seating is not provided along nature trails, however is provided at the main access points of the Coast Trail and the trail through the Rumbalara Reserve and Katandra Reserve. Seating along The Coast Track was also provided at lookouts.

Signs are not common along the Central Coast walks. The only signs apparent are an initial map of the route network at the main access of Graves Walk in the Katandra Reserve, signs indicating distances between particular points along the Coast Track, connections to other trails and distances along the Brooklyn to Hawkesbury River North and location and educational signs along the Tuggerah Lake Trail. Signs could potentially be installed along longer foreshore walks to indicate where parks, playground and facilities are located. Signs linking various trails in the regional network would also be useful at the main access point of each trail.

Figure 15: Seating and signage Central Coast Trails





#### 4.2.4 Pleasureability

The foreshore walks all have an unobstructed view over various water bodies including Lake Munmorah, Tuggerah Lake, The Entrance Beach and Brisbane Waters. Lookouts are also situated on the Coast Track and in Rumbalara Reserve. Vegetation and trees alongside the trails enhances the aesthetics of the foreshore trials through exposure to natural scenery. The trails and surrounding water are free from pollution and rubbish. Pollution control devices were noted in Lake Munmorah and Tuggerah Lake. Two segments of Brisbane Water Foreshore pass along busy roads to connect parks which take away from the aesthetics of the trail.

The natural trails are also aesthetically pleasing due to their location in national parks and nature reserves, with the exception of the trail from Elizabeth Bay Park which is surrounded by dry grass and unmaintained vegetation. No litter is noticeable around nature trails.

Figure 16: Aesthetics Central Coast Trails



Dogs on leashes are permitted on all foreshore walks, however no dog litter bins or water bowls near bubblers are provided. Dogs are not permitted on many of the nature walks and coastal tracks as they are national parks. The other nature trails do not specify if dogs are allowed.

Figure 17: Dogs Allowance Central Coast Trail



Although many of the trails are alongside the water, only three areas are identified as swimming areas. The only beach accessible is at The Entrance, which is located at the end of the Tuggerah Lake Foreshore Trail. Many of the foreshore trails have access to open spaces which are used for playground and sporting fields. Playgrounds are accessible along all the foreshore trails. The majority of playgrounds are found along Tuggerah Lake Foreshore Trail, of which there are eight. Sporting fields are located on the Brisbane Water Foreshore and Lake Munmorah Foreshore trail, and along with playgrounds are often found coupled with pedestrian facilities such as toilets, drinking fountains, seats and bins. Other areas of open space along the foreshore trails are often used for seating.

Figure 18: Destinations Central Coast Trails



Historical and educational points of interest along the trails are captured through signs. Signs along Tuggerah Lake Foreshore Trail provide information about the marshes to which the trail end is in close proximity. The trail also provides a range of signs detailing the history of The Entrance.

Figure 19: Historical and Educational Points of Interest Central Coast Trails





### 4.3 Northern Sydney Results

Table 2: Northern Sydney Regional Recreational Trails

Name	Classification	Council Area	Distance	Rating	Promotion
3.4 Narrabeen Lagoon Multi-Use Trail	Foreshore Trail	Warringah Council	9km	26/30 Excellent	Council website
3.5 Bicentennial Coastal Walkway					
Bangalley Headland Walking Track	Nature Trail	Pittwater Council	1.5km	23/30 Good	Council website
Trail from Long Reef to Surf Reserve -Dee Why	Foreshore Trail Nature Trail	Pittwater Council and Warringah Council	4.8km	21/30 Good	Council Website + Walking Coastal Sydney Website
Shelly Beach Promenade	Foreshore Promenade	Manly Council	1.8km	30/30 Excellent	Council Website + Walking Coastal Sydney Website
3.6 Wollstonecraft to Manly					
Trail from Milsons Point to Lavender Bay	Foreshore trail Tourist Trail	North Shore Council	1.2km	23/30 Good	Council website + Walking Coastal Sydney Website
Trail from Taronga Zoo to Clifton Gardens Reserve (Sydney Harbour National Park)	Nature Trail (NP)	Sydney Harbour National Park + Mosman Municipal Council	4 km	25/30 Excellent	NPWS website +Council website + Sydney Tourism websites
Manly Scenic Walk	Nature Trail Foreshore trail	Manly Council + Sydney Harbour National Park	9km	24/30 Excellent	NPWS + Council + Walking Coastal Sydney website +Sydney tourism websites
3.9 Benowie Track	Nature Trail	Hornsby Council	2.5km	21/30 Good	Council + hiking website

Figure 20: Indicative map of Northern Sydney trails (Source: SMRRTF 2010)



### 4.3.1 Accessibility

The foreshore trails are all very accessible from surrounding residential areas due to multiple access points being prevalent on most segments of the trails, although the nature trails have limited access points. The Benowie Track and Bangalley Headland Walking Track both have limited access points at the start and end of the trails. Busy roads intersect a few access points along the Narrabeen Lagoon Multi-Use Trail, Manly Scenic Walk, Shelly Beach Promenade and trail from Long Reef to Surf Reserve -Dee Why, but pedestrian crossings mean that access is not restricted.

Figure 21: Residential Accessibility Northern Sydney Trails (Source: Author)



All the trails are accessible by car with on street parking, parking lots or parking stations available within close proximity. Parking lots and stations are located in close proximity to main entrances of the trail or open spaces and parks. Within the Pittwater Council, Manly Council and North Sydney Council areas, the majority of car parking situated around parks, beaches and main entrance to trails is paid parking. The trails are mostly all accessible via means of public transport, including train, bus and ferry, with the exception of the Narrabeen Lagoon Multi-Use Trail and the Benowie Track. Otherwise, all the trails have public transport options at either end. The Benowie Track is also accessible by other trails as it is part of a walking network.

Figure 22: Accessibility Northern Sydney Trails





### 4.3.2 Safety

The majority of trail segments in northern Sydney are segregated from the road. Various trail segments along Dee Why Beach and Manly Scenic Walk are separated by car parking or a verge. There are only two instances along the Narrabeen Lagoon Multi-Use Trail where the path is only separated by the road shoulder and a one metre high metal barrier. One of these instances is due to a detour as the construction of the trail is not yet fully completed. The Narrabeen Lagoon Multi-Use Trail, Sydney Harbour National Park Trail and Manly Scenic Walk all cross through car parks, which are seen as traffic calming due to reducing vehicle speeds. Manly Scenic Walk trail also uses existing residential streets to link parks and segments of the trail, and due to the absence of a footpath and small nature strips pedestrians must use the road.

Figure 23: Traffic Northern Sydney Trails



Many of the trails are in reserves and national parks. These trails are generally clear cut, with trail markers to indicate directions. Only two instances are noted where the track is not defined and no trail marker is present, which is in Sydney Harbour National Park and Surf Reserve, Dee Why. The Benowie Track also has signs which identify links to other trails. Directional signs are also used in residential streets to navigate through them between some parks on the Manly Scenic Walk.

Figure 24: Accessibility Northern Sydney Trails



Most of the trails are surrounded by bushland; therefore passive surveillance from residential areas and open spaces is limited. Vegetation alongside the trails is fairly well maintained, which improves sightlines. Overgrown vegetation which reduces sightlines is noted in Surf Reserve, Dee Why and sections of the trail from Taronga Zoo to Clifton Gardens. Lighting is observed only along Manly Cove Promenade, Shelly Beach Promenade, Milsons Point and Dee Why Beach Promenade, which is appropriate as they can be accessed at night. Lighting of other segments of trails is not needed as they are nature trails and would not be usable at night. No graffiti is noted along the trails which suggests good surveillance and increases perceived safety.

Figure 25: Surveillance Northern Sydney Trails



Various signs are located along the trails which warn pedestrians of potential dangers such as wildlife, cliffs and cyclists. No instances are seen in which pedestrians are not warned about obvious danger. Barriers are also located along various walks such as Bangalley Headland Walking Track, Surf reserve and Sydney Harbour National Park. These barriers are primarily located at lookouts to prevent people falling. Barriers are also located where the trail follows a headland. All barrier heights are consistent with Section 3 of *AS 2156.2-2001 Walking tracks – infrastructure design*, and do not have any gaps greater than 125mm.

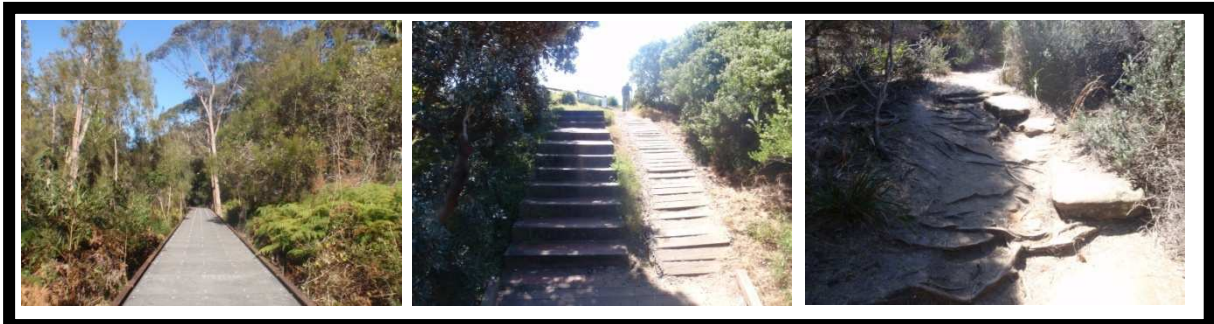
Figure 26: Barriers and Warning Signs Northern Sydney Trails



### 4.3.3 Pedestrian Comfort

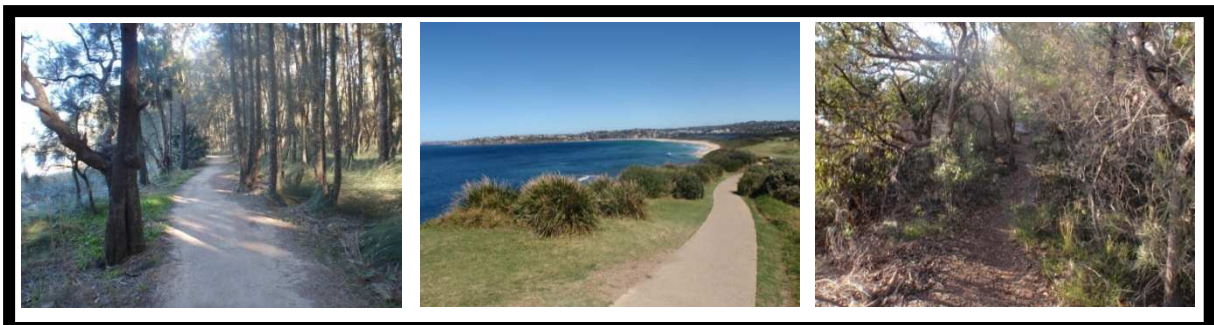
The majority of Northern Sydney trails are soft surfaced as they cut through reserves and national parks. Most of the trails have instances of exposed roots and rocks, making the trail uneven and restricting access to some parts. The Bangalley Headland Walking Track, Surf Reserve and segments through Sydney Harbour National park are particularly uneven. The soft surface segments of the Narrabeen Lagoon Multi-Use Trail are very even, which is most likely due to it being a new trail. Concrete cover is also common from the foreshore walks and along promenades to support high volume pedestrian and cycle use. Asphalt is also used on some trails near car parking areas. Most uneven paths exist in asphalted sections, although some significant uneven concrete is also noteworthy between Taronga Zoo and Clifton Gardens Reserve. Shelly Beach Promenade and Dee Why Promenade are paved, which is well maintained with no significant instances of uneven path. Boardwalks are present in Sydney Harbour National Park, Milsons Point and Narrabeen Lagoon Multi-Use Trail, and are all well maintained. All the nature trails have segments of medium to steep gradients which are negotiated by stairs.

Figure 27: Path Quality Northern Sydney Trails



Most the trail segments are surrounded by vegetation with only a few instances of insufficient height clearance along the Bangalley Headland Walking Track. This vegetation along paths offers access to shade along the majority of the trails.

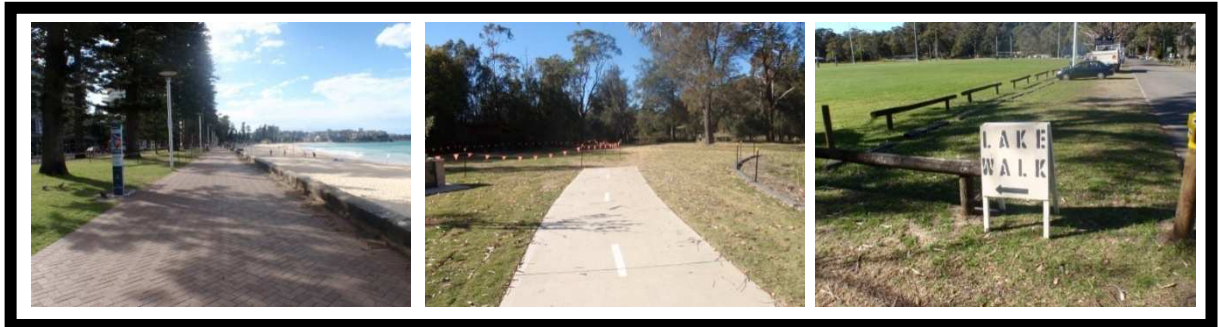
Figure 28: Shade Northern Sydney Trails





All the trails widths are sufficient to accommodate all users as set in the SMRRTF (2010). The promenades are a minimum of five metres wide, which accommodates the large volume of people using the space. The majority of the trails are continuous with the exception of the Manly Scenic Walk which requires users to use residential roads to link parks, and the Narrabeen Lagoon Multi-Use Trail, which is to be completed in 2014. Here an alternate route is provided to link the existing sections.

Figure 29: Pedestrian clearance Northern Sydney Trails



Seating is available along all of the walks. Walks along the foreshore including Narrabeen Lakes, Milsons Point, Dee Why Promenade, Shelly Beach Promenade and segments of Manly Scenic Walk have many seats along the route. Shelly beach promenade meets SMRRTF ideal requirements of seating every sixty metres. These seats are also concentrated around parks, playgrounds and beaches. Seats are also available throughout the nature walks and are usually associated with lookouts along the routes.

Manly Scenic Walk is particularly good with signage with most segments having signs illustrating maps, facilities, distances and point of interest along walk. Walks that pass through national parks also have signs identifying locations and distances to other areas. The Narrabeen Lagoon Multi-Use Trail also has signs indicating current location in the loop, facilities and distances.

Figure 30: Seating and Signage Northern Sydney Trails



#### 4.3.4 Pleasureability

All the trails have elements which were aesthetically pleasing. They all have segments passing through bushland, which exposes walkers to natural scenery. Many of the trails also followed water bodies which offer views of the beach, ocean, lagoons and the harbour. Lookouts over the ocean are also located along the trail from Long Reef to Surf Reserve, the Bangalley Headland Walking Track and the Manly Scenic Walk. Vistas of the harbour are also seen from Milsons Point and the trail from Taronga Zoo to Clifton Reserve. Lookouts are situated along the latter so pedestrians can enjoy the views of Sydney Harbour. Trails and water bodies are free from litter and pollution which adds to the aesthetics of the trails.

Figure 31: Aesthetics Northern Sydney Trails



Dogs are permitted on a leash on the Narrabeen Lagoon Multi-Use Trail, Shelly Beach Promenade, Milsons Point and some sections of Manly Scenic Walk and the Dee Why Track. Dog litter bags and dog bowls next to water fountains are found on Manly Scenic Walk, Narrabeen Lagoon Multi-Use Trail, Shelly Beach Promenade and Dee Why beach. Dogs are not permitted on trails that pass through National Parks.

Figure 32: Dogs Allowance Northern Sydney Trail

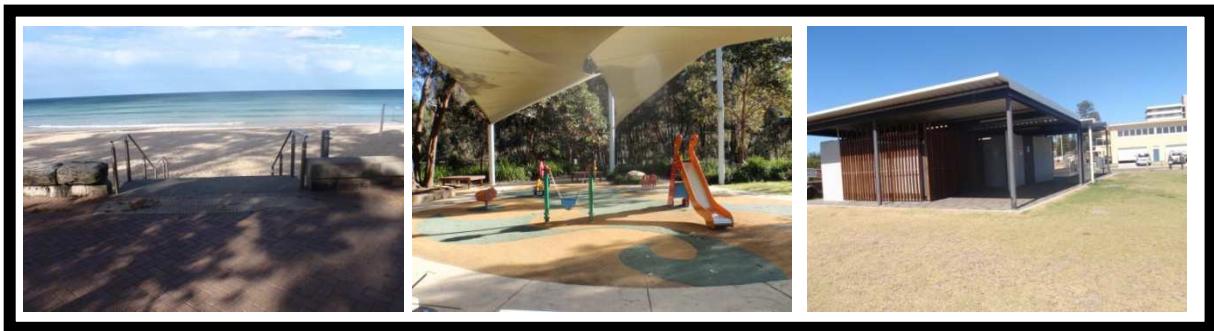




### 4.3.5 Destinations

The Northern Sydney trails have good access to a range of locations. Four of the trails have multiple access points to beaches. Other trails also have access to rivers and lagoons. Only one of the trails does not have access to open space. Six of the trails have at least one well maintained playground along the route, with the Narrabeen Lagoon Multi-Use Trail having four playgrounds around the trail. Open spaces include well designed public spaces around beaches and promenades. Parks and public space are usually accompanied by pedestrian facilities including water fountains, restrooms and seats.

Figure 33: Destinations Northern Sydney Trails



The trails have various historic and educational points of interest. A navy memorial is located at Bradleys Head along the Taronga Zoo to Clifton Gardens Reserve Trail. The Trail also has signs with the history of Sydney such as the Japanese Midget Submarines which attempted to attack Sydney Harbour. Historical and educational signs about the British Army and past wars are located along the Narrabeen Lagoon Multi-Use Trail. The history of Manly and the Norfolk Pines is seen in signs along Manly Cove and Shelly Beach promenade.

Figure 34: Historical and Educational Points of Interest Northern Sydney Trails



#### 4.4 Southern Sydney Region Results

Table 3: Central Coast Regional Recreational Trails

Name	Classification	Council Area	Distance	Audit Rating	Promotion
<b>4.1 Homebush to Central Business District (CBD) Foreshore Trail</b>					
The Kokoda Track Memorial Walkway + The Foreshore Trail	Foreshore Trail	City of Canada Bay	5km	22/30 Excellent	Council Website + Kokoda Memorial Tack Website
The Esplanade Five Dock	Foreshore Trail	City of Canada Bay	1.3km	20/30 Good	Council Website
Circular Quay to Entertainment Centre to Sydney CBD	Foreshore Trail Tourist Trail	City of Sydney Council	4.5km	24/30 Excellent	Tourism websites
<b>4.2 Sydney CBD to Gap Foreshore</b>					
Lynee Park and Foreshore	Foreshore Trail	Woollahra Municipal Council	1.5km	22/30 Good	Council Website
Hermitage Foreshore track	Nature Trail	Woollahra Municipal Council	2km	23/30 Good	Council Website
Yarranabbe Park	Foreshore Trail	Woollahra Municipal Council	700m	24/30 Excellent	Council Website
<b>4.3 Waverly Cliff Top Walk and Eastern Beaches</b>					
La Perouse	Nature	Randwick City Council	2km	21/30 Good	Council Website
The Eastern Beaches Walk - Maroubra to Bondi beach	Foreshore Trail Tourist	Randwick City Council and Waverly Council	12km	25/30 Excellent	Council Website Tourism Websites
South Head Heritage Trail	Foreshore Trail	Sydney Harbour National Park	2km (return)	23/30 Good	NPWS Website
4.4 Cronulla Coastal Walkway	Foreshore Trail	Sutherland Council	5km	27/30 Excellent	Council Website
4.6 The Botany Bay Trail and Variations	Foreshore Trail	Rockdale City Council	8km	25/30 Excellent	Council Website
4.7 Cooks river Foreshore and Tributaries	Foreshore Trail	Rockdale City Council + Canterbury City	10km	20/30 Good	Council Website

		+Burwood Council + Marrickville Council + Strathfield Council			
4.8 Kia’Mia Track	Nature and Foreshore Trail	George’s River National Park	2.2km		NPWS Website
4.11 Federation Track	Foreshore and Urban Trail	City of Sydney Woollahra Municipal Council Waverly Council	10.5km	23/30	Walking Coastal Sydney Website

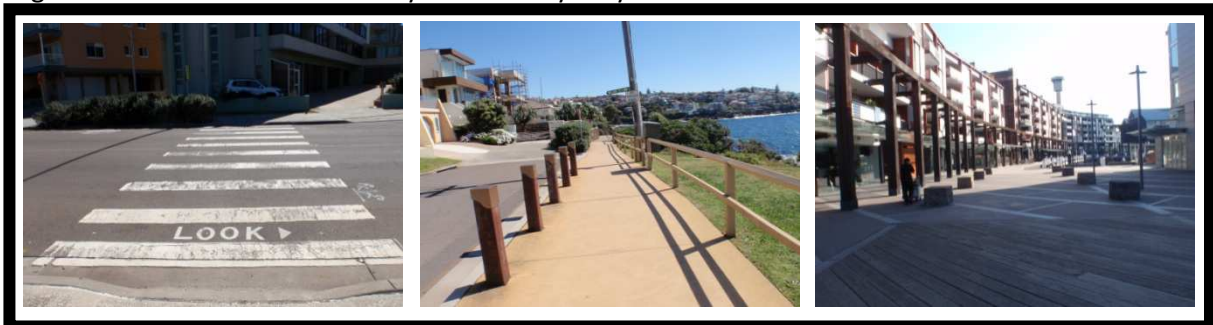
Figure 35: Indicative map of Central Coast trails (Source: SMRRTF 2010)



#### 4.4.1 Accessibility

All of the trails are highly accessible from surrounding residential areas due to the existence of multiple access points. The Hermitage Foreshore Walking Track and the trail in La Perouse do not have multiple access points as they pass through nature reserves and no direct surrounding residential areas. The Kokoda Memorial Walking Track also has limited residential access points as it passes through hospital grounds and other large private properties. Busy roads separate various residential and commercial areas from trails in the Southern Sydney Regions, however the crossings enable access to all the trails.

Figure 36: Residential Accessibility Southern Sydney Trails



All the trails in the region are accessible by car due to the provision of street parking and car parking lots, although parking along the trails some trails was paid parking. Public transport networks support access to all the trails, except the Kia’Mia Trail in Georges River National Park. Bus networks are the most common public transport which allows access to the various trails but the trails in the CBD and in Cronulla are accessible by train. The South Head Trail is accessible by ferry. Various trails in the region are also accessible via other regional trails, for example the Botany Bay Trail connects with the Cooks River Foreshore and Tributaries Trails, and the Federation Trails connect with the Eastern Beaches Coastal Walkway, the trail from Circular Quay to the Entertainment Centre and the Sydney CBD to Gap Foreshore link.

Figure 37: Accessibility Southern Sydney Trails





#### 4.4.2 Safety

All of the trails are predominantly segregated from the road, although the trail from Circular Quay to the Entertainment Quarter, The Eastern Beaches Coastal Walkway and the Federation Track all have sections which pass along the road. All these trails have footpaths and parked cars which separate pedestrians from the road. However, footpaths along the road on the Eastern Beaches Coastal Walkway are narrow and do not support the volume of pedestrians using the area. This results in the necessity for pedestrians to walk on the road, thus presenting a safety issue. A section of the Eastern Beaches Walkway also shares the road to link sections of the trail, though due to sufficient trail width and minimal traffic this does not pose a safety concern.

Figure 38: Traffic Safety Southern Sydney Trails



The majority of the trails are continuous cement or soft surface trails which are easy to follow. The Foreshore Trail is in need of better connection between paths separated by a car park, as lack of signage and overgrown vegetation surrounding the entrance to path compromises legibility. The Eastern Beaches Coastal Walkway also has a section in South Coogee near Lurline Bay where residential streets connect to the trail but has inadequate signage to direct pedestrians. The Federation Track which is known for connecting the CBD with Clovelly (Eastern Beaches Coastal Walkway) also has no directional signs or maps to connect various green spaces by urban links, with the only indication of the trail on a map in Centennial Park. The trails along Cooks River Foreshore and Tributaries are also connected via residential areas and do not have indication of connections.

Figure 39: Legibility Southern Sydney Trails



All of the foreshore trails in Southern Sydney Region have good passive surveillance and unobstructed sightlines from the surrounding residential and commercial buildings which overlook the area. This is also achieved through the high volume of users of the trails and surrounding recreational areas. Sightlines along the foreshore trails and the surrounding areas are not restricted by dense vegetation, with the vegetation along the nature trails well maintained so as not to compromise the charter of the trails. Open spaces and beach access along nature trails also offer opportunities for passive surveillance. Only one segment of The Foreshore Trail is noted to have overgrown vegetation which compromises sightlines and passive surveillance. Most of the foreshore trails have lighting, which supports the appropriate design and location of the trails for use at night. Along the Eastern Beaches Coastal Walkway only promenades along beaches have sufficient lighting, most likely due to the fact that lighting could cause disturbance on other parts of the trail near houses. The Cook River Foreshore and Tributaries also does not have lighting. Lighting along the nature trails is also not present as the design and location of these settings are not appropriate for use at night.

Figure 40: Surveillance Southern Sydney Trails



All the foreshore trails have barriers compliant with Section 3 of AS 2156.2-2001 *Walking tracks – infrastructure design* to prevent people from falling from the trail. Warning signs are located to make people aware of certain dangers including cliffs.

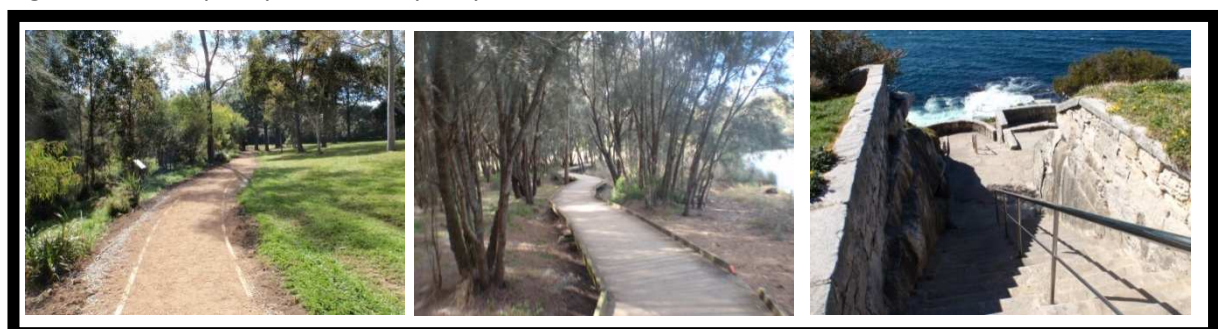
Figure 41: Barriers and Warning Signs Southern Sydney Trails



#### 4.4.3 Pedestrian Comfort

The majority of the trails are covered by asphalt or cement, which supports the high volumes of people who use them along the popular foreshore locations. All cement trails are even and well maintained with only the Kokoda Track Memorial Walkway and residential links on the Federation Track having recurring instances of uneven cement and asphalt. The soft surface segments of trails are also well maintained, with measures such as stone and cement borders to stop erosion noted along many of them. The trails in La Perouse and the Hermitage Foreshore Walking Track both have exposed tree roots and rocks which may present trip hazards. Boardwalks are also common along the trails to protect sensitive environments on the Eastern Beaches Coastal Walkway, The Kokoda Track Memorial Walkways and Kia’Mia Track. All foreshore trails are predominately of a flat gradient, but stairs and inclines are present along the Eastern Beaches Coastal Walkway, South Head Heritage Trail and The Esplanade in Cronulla. The nature trails also present some uphill segments which reduce accessibility to less mobile people.

Figure 42: Path quality Southern Sydney Trails





The widths of all the trails in the Southern Sydney Region are compliant with recommendations in the SMRRTF and allow for comfortable pedestrian access. The vegetation around trails is also well maintained with only one instance noted of insufficient height clearance for pedestrians. The trails are continuous, with missing sections accounted for by residential roads. The Trail from Circular Quay to the Entertainment Quarter is also continuous around the Barangaroo work site, which allows for pedestrian access.

Figure 43: Pedestrian clearance Southern Sydney Trails



The foreshore trails which pass along the South Sydney coastline have limited access to shade. This is due to minimal planting alongside trails to maintain ocean vistas, with planting along these trails present mainly in parks and open spaces. The trails along the Cook River Foreshore and Tributaries does not have access to shade due to lack of planting. All the other trails predominately pass through areas in which vegetation exists alongside the path, thus providing shade for walkers.

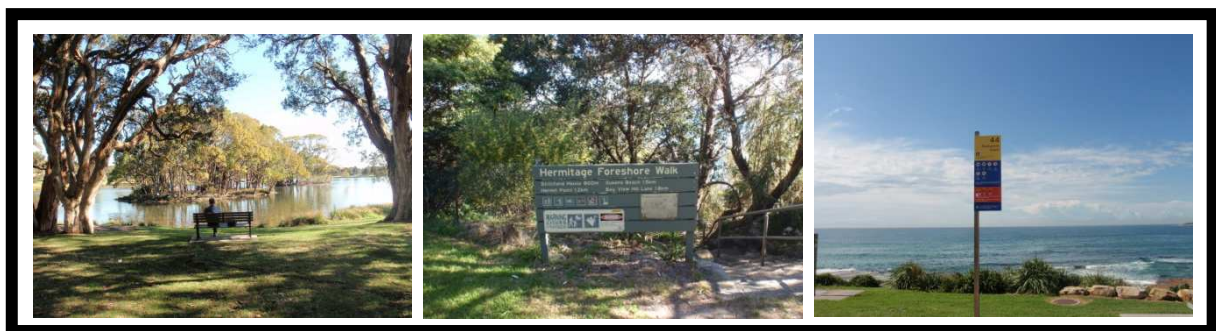
Figure 44: Shade Southern Sydney Trails



Seating is common along all foreshore trails, concentrated in open spaces through which the trails pass. Seating along the coastline trails and alongside the harbour are located to capture views. Seating along other foreshore and urban trails does exist but is more commonly located in parks and open spaces. The nature trails have minimal seating along the route but seats are provided alongside other pedestrian facilities in parks and in open spaces. None of the trails meet the ideal 60 metre intervals between seating as recognised as ideal in the Millennium Parklands Concept Design Report.

Location signs are common along the trails. The Eastern Beaches Coastal Walkway and the Esplanade in Cronulla both have signs marking different beaches and facilities along the routes, and the Eastern Beaches Coastal Walkways also have signs indicating distances between beaches. The Botany Bay Trail has signs indicating the continuation of the shared path to connect with the airport and Cooks River Foreshore trails. Trail names and distances are also indicated on signs at the main entrances of the National Park Trails.

Figure 45: Seating and Signage Southern Sydney Trails



#### **4.4.4 Pleasurability**

The location of all the Southern Sydney walks has elements which make them aesthetically pleasing. All the trails along the Southern Sydney coastline have unobstructed views of the ocean. The trails located in the City of Sydney Council area and Woollahra Municipal Council have views of Sydney Harbour. The other foreshore trails have water views as they pass along various bays and rivers. The trails which run along Cooks River Foreshore and Tributaries also have water views, however surrounding industrial land uses of some sections detracts from the amenity of the area. Trails in the region also pass through National Parks and open spaces. The Foreshore Trail and Kokoda Track Memorial Walkway

also pass along the border of hospital grounds which have gardens and large historic buildings which adds to the amenity of the walk. Historic buildings are also situated along Sydney Harbour. Public sculptures also add to the amenity along trails in the CBD and the Eastern Beaches Coastal Walkway.

Figure 46: Aesthetics Southern Sydney Trails



Dogs on a lead are permitted on all trails, with the exception of trails which pass through National Parks. Many of the trails also support dog use by providing water bowls near bubblers and dog waste bins and bags.

Figure 47: Dogs Allowance Southern Sydney Trails



#### **4.4.5 Destinations**

All of the trails in the Sydney Region pass through open spaces in which parks, beaches, playgrounds and sporting fields are present. Seven of the trails have at least one playground along their routes. Four of the trails also have gym equipment along the trail or concentrated in parks, which draws people to the area and promotes physical activity and health. Sporting fields are also accessible along three trails, with multiple fields existing along the Cooks River Foreshore and Tributaries route. Access to beaches is common along



the trails, with six trails having access to at least one beach. Other destinations include landmarks and different commercial precincts in Sydney Harbour, whereby trails provide access to and between. A memorial for Australian and New Zealand Soldiers who fought on the Kokoda Track in WWII is also a popular site along the Kokoda Track Memorial Walkway. Many of the trails provide access to more than one destination, creating different incentives for people to use the trails. Pedestrian facilities are also common near large parks, playgrounds and beaches, such as toilets, bins and bubblers. Bubblers are also noted along the routes.

Figure 48: Destinations Southern Sydney Trails



The trails have different historical and educational points of interest. The South Head Heritage trail has Lightkeepers Cottage and the Hornby Light along the trail from 1858. The Kokoda Track Memorial Walkway has various educational signs about the ANZACs in Gallipoli, as well as signs detailing the history of The Rocks. Other educational signs are found in national parks describing certain plants and the history of the national parks.

Figure 49: Historical and Educational Points of Interest Southern Sydney Trails

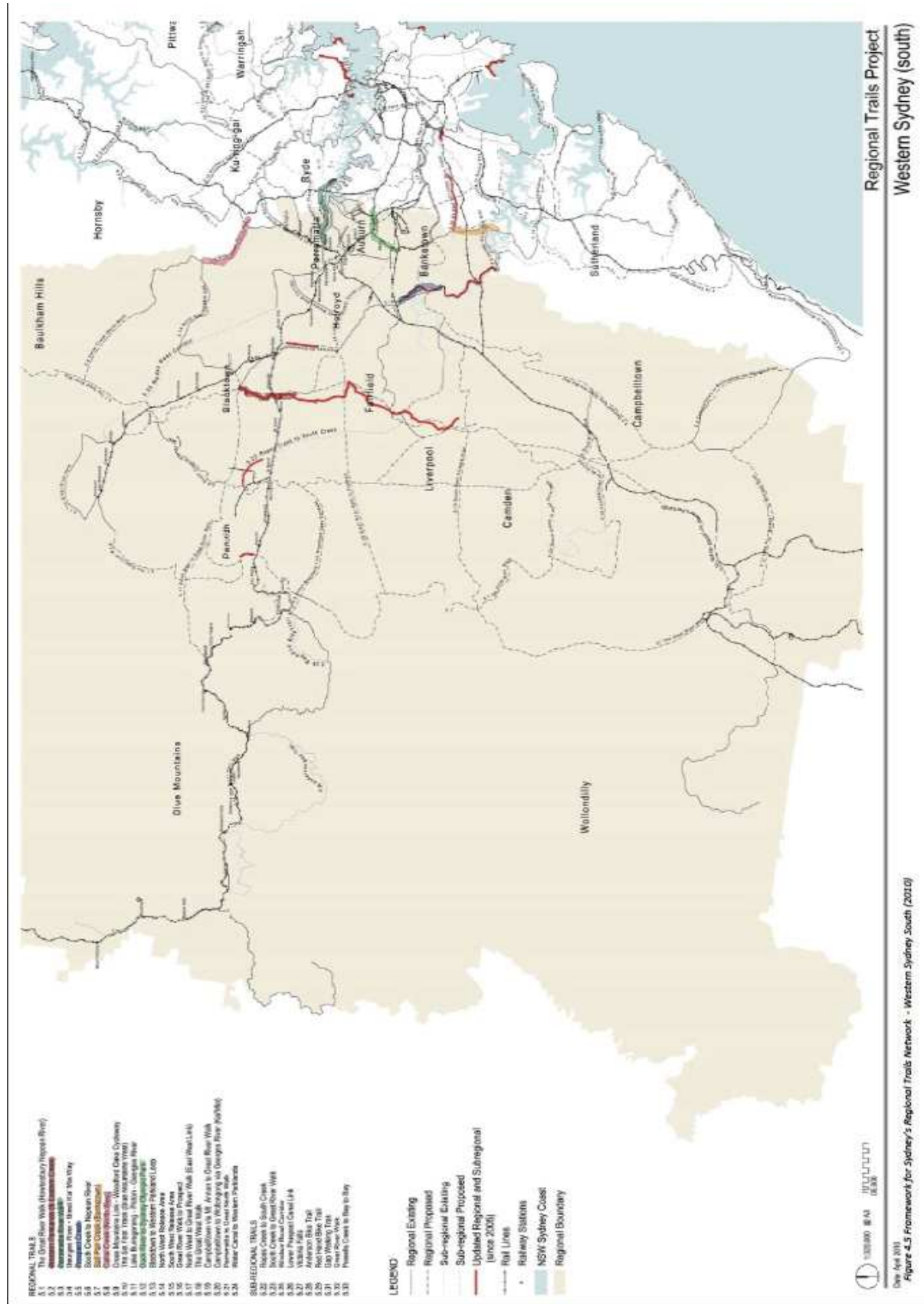


## 4.5 Western Sydney Region Results

Table 4: Western Sydney Results

Name	Classification	Council Area	Distance	Audit Rating	Promotion
5.2 Western Parklands					
Parklands Track	Nature Trail Shared Path	Blacktown City Council	3km	21/30 Good	Western Sydney Parklands + Council Website
Nurragingy Reserve	Nature Trail	Blacktown City Council	2km	25/30 Excellent	Western Sydney Parklands + Council Website
5.3 Parramatta River Walk					
Parramatta River loop	Foreshore Trail	Parramatta City Council/Ryde City Council	1.2km	25/30 Excellent	Council Website
Rydalme to Meadowbank shared path	Foreshore Trail	Parramatta City Council/Ryde City Council	6hm	24/30 Excellent	Council Website
5.5 Prospect Creek	Foreshore Trail	Fairfield City Council	6km	18/30 Good	Council Website
5.7 Salt Pan Creek	Foreshore Trail	Bankstown City Council	4km	21/20 Good	Interest group: Wildwalks.com
5.8 Cattai Creek	Nature Trail	The Hills Shire Council	1.5km	21/30 Good	No web promotion
5.12 Duck Creek to Sydney Olympic Park	Foreshore Trail Nature Trail	Auburn City Council	1.7km	19/30 Good	No web promotion

Figure 50: Indicative map of Central Coast trails (Source: SMRRTF 2010)



### 4.5.1 Accessibility

All the trails are highly accessible as many of the segments audited reported an access point from the surrounding residential area. Many of the trails also cross busy roads, however due to the existence of short and open underpasses access was not restricted, thus ensuring safety was not compromised. The trail along Duck Creek and the Parklands Track both crossed a busy road, although pedestrian islands were provided to ensure accessibility and pedestrian safety.

Figure 51 : Residential Accessibility Western Sydney Trails



All of the trails are accessible by car as the trails are supported by street parking. The Western Parkland trail in Nurragingy Reserve also has dedicated car parking lots near open spaces throughout the park. Public transport networks support most of the trails with bus routes running in parallel streets. The trails along Parramatta River are also accessible by Ferry. Some trails in the region are also accessible from other walking trails. The Parklands Track links to an internal network of trails in Nurragingy Reserve although no links were visible which continue onto the greater Western Parklands trail. The end of the shared path along Parramatta River at Meadowbank indicated the continuation of the cycle network via residential roads. The trail along Salt Pan Creek was also linked via bridge to the trail on the other side of Salt Pan Creek in the Bankstown Local Government Area.

Figure 52: Accessibility Western Sydney Trails

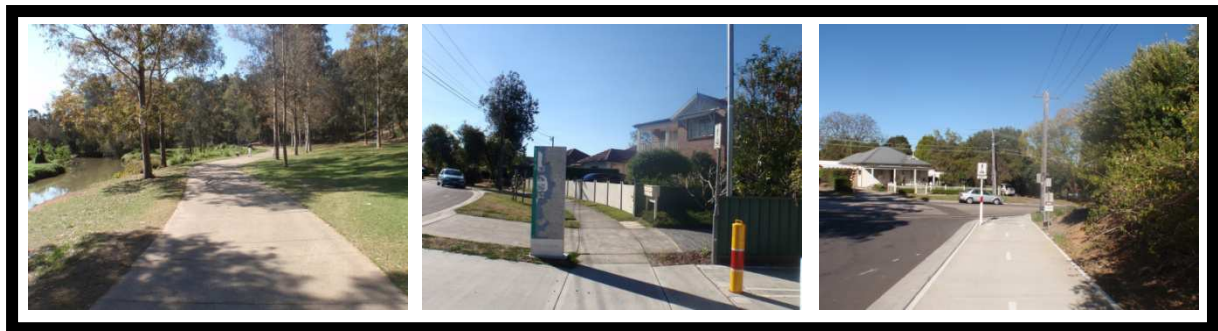




#### 4.5.2 Safety

All the trails are segregated from the road as they run along river foreshores and through open space. Along the Rydalmere to Meadowbank shared path, the trail did meet the road to link segments of trail, however a footpath has been provided along the road for pedestrians. Further separation of pedestrians from the road is achieved through car parks on the street.

Figure 53: Traffic Safety Western Sydney Trails



The trails in the Western Sydney Region are all easy to follow. The majority of the trails are continuous cement or soft surface trails that had clear intersections. The internal network of trails in the Nurranginy Reserve in the Western Sydney Parklands has many intersections, and legibility is not compromised as a result of clear directional markers, location signs and maps in open spaces. Signs within the reserve clearly mark the link to the regional Parkland Track which connects the Reserve to residential areas in Glendenning. The shared path from Rydalmere to Meadowbank also promotes good legibility through various signs indicating distances between suburbs and small signs to guide users through residential roads which are used to connect segments of the trail.

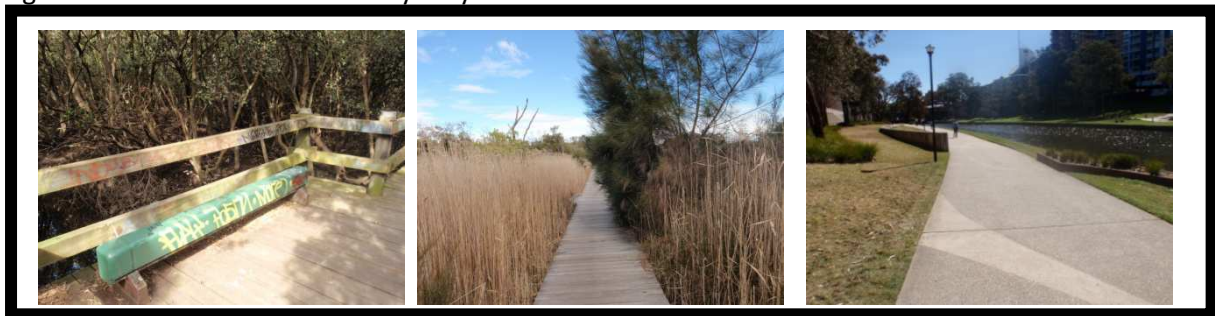
Figure 54: Legibility Western Sydney Trails





Many of the trails are located in open spaces, which allows for good sightlines and passive surveillance from other users of the trail, parks and residential areas. Salt Pan Creek trail has various instances of no passive surveillance and overgrown mangroves which compromises sightlines. This was also evident with the existence of graffiti along the boardwalk and under bridges along the trail. Only two of the trails have lighting; the loop trail around Parramatta River and open spaces around ferry wharves along the shared path between Rydalmere and Meadowbank. The lighting in these areas is important as they support people connecting residential areas to Parramatta commercial centre and promote the use of public transport at night. Other trails do not support use at night as many of the segments run through secluded areas which are not ideal for walking at night.

Figure 55: Surveillance Western Sydney Trails



Barriers are not required along many of the trails as there is no risk to people to fall from those trails. The boardwalk along Salt Pan Creek did have barriers to stop people falling into the Creek or accessing the Mangroves. Due to potential fall height being less than half a metre the barriers did not require vertical or horizontal rails at a maximum distance of 125mm apart, although two rails are incorporated into the design of the barriers to restrict access. The barriers along one segment of the trail were missing which presents a safety issue. Warning signs are not common along trails as no threats are present, however shared paths have signs to remind pedestrians and cyclists.

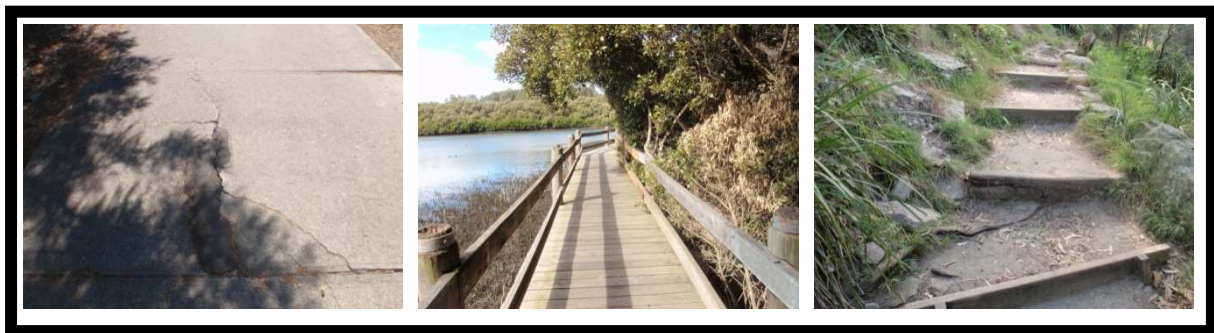
Figure 56: Barriers and Warning Signs Western Sydney Trails



### 4.5.3 Pedestrian Comfort

All the trails, apart from the Cattai Creek trail, have segments which are sealed by concrete. The trails along Parramatta River are completely sealed by concrete to support high volume use and cyclists. The trails along Prospect Creek and Duck Creek are also sealed with concrete. Concrete segments along the other trails are around high use areas such as open spaces and parks. These concrete paths are all well maintained, with the exception of the trail along Duck Creek which has many cracks in the path. Soft surface cover is common along trails that pass through natural environments, such as the trails in Nurragingy Reserve, Salt Pan Creek and Cattai Creek. The southern end of the Salt Pan Creek trail is fairly uneven, however the other trails are all well maintained. The Parklands Track is made from crushed stone, which is even. A boardwalk makes up the majority of the Salt Pan Creek trail, which is fairly well maintained with no trip hazards. The gradient of all trails is flat with the exception of one segment through bushland towards the end of the Salt Pan Creek trail. This may restrict the access of some users wishing to use the trail.

Figure 57: Path Quality Western Sydney Trails



All the trails in the Western Sydney Region are of sufficient width to support the location and function. This allows for comfortable pedestrian movement along the trail. The vegetation surrounding most trails is well maintained, allowing sufficient height clearance; the exception being one segment of the Salt Pan Creek trail, in which the vegetation is overgrown and restricts height clearance which could be a barrier for pedestrians.

Figure 58: Pedestrian clearance Western Sydney Trails



The lack of vegetation along the Parklands Track and the shared path between Rydalmere and Meadowbank means there is limited shade along the paths. This is also the case on trail segments along Duck Creek and Prospect Creek which pass through sporting fields. Vegetation surrounding the other trails means that shade is accessible along those trails.

Figure 59: Shade Western Sydney Trails



Seating is available along all trails, but not at 60 metre intervals (as recognised by the Millennium Parklands Concept Design Report as ideal), except for the Parramatta River loop which has sufficient seating to support the high volume recreational use associated with the area. Seating along the trails is most commonly located and concentrated in open spaces and parks through which the trails pass. Seats are common along the Rydalmere to Meadowbank shared path near ferry wharves. Seating along Salt Pan Creek and the Rydalmere to Meadowbank shared path area exists for users to enjoy vistas over the water.

Signs are not common along the Western Sydney Walks, with only the Western Parkland trails and the Rydalmere to Meadowbank track having maps, directional, location and distance signs on route to indicate distance between facilities and suburbs. Both of these

trails are shared paths that are part of a large wider network, so direction and distance signs are necessary for the efficient use of paths for both recreation and active transport. The link between the trails on the west and east side Salt Pan Creek is not indicated by signs, and as a result can be missed by pedestrians. The Parramatta River loop walk also has directional signs to surrounding transport and commercial precincts.

Figure 60: Seating and Signage Western Sydney Trails



#### **4.5.4 Pleasurability**

Various trails in the Western Sydney Region have water views and pass through the natural environment. The Rydalmere to Meadowbank shared path and the Salt Pan Creek trail both have segments which run alongside the water. Trails along Duck Creek and Prospect Creek also have segments which run alongside flowing creeks, although both of these creeks are polluted with rubbish along the banks, detracting from the amenity. Burnt out cars and trucks are prevalent along the Prospect Creek trail. The shared paths, Parklands Track and the Rydalmere to Meadowbank track, both have various segments with low amenity as they pass through bare open spaces and sporting fields. The Rydalmere to Meadowbank trail and Prospect Creek trail looks onto industrial areas. The trail along Salt Pan Creek, Cattai Creek and the internal trail network in the Nurragingy Reserve are all exposed to the natural environment in which it is pleasant to walk. The Parramatta River loop is also an aesthetically pleasing pedestrian environment due to water features, landscaping and a coloured concert depicting Aboriginal history and artwork. A public sculpture is located on the Prospect Creek trail.



Figure 61: Aesthetics Western Sydney Trails



Dogs are allowed on leashes on all trails, with the exception of the Parramatta River loop. Supporting dog infrastructure, such as dog waste bags and bins and water bowls, exists on the Rydalmere to Meadowbank trail and Salt Pan Creek trail.

Figure 62: Dogs Allowance Western Sydney Trails



#### **4.5.5 Destinations**

The Western Sydney Region trails provide access to various recreational facilities. All the trails, apart from the Parramatta River Loop and the Cattai Creek trail, pass at least two playgrounds. Well designed and landscaped open spaces are also accessible along the Rydalmere to Meadowbank shared path, which is situated near ferry terminals. The Parkland Track provides access from surrounding residential areas to the nature trails and opens spaces in the Nurragingy Reserve. The Prospect Creek trail, Rydalmere to Meadowbank shared path and the Duck Creek trail all access sporting fields. Pedestrian facilities such as bubblers and bins are mostly located near sporting fields or playgrounds. Toilets are associated with open spaces and are provided along the Duck Creek trail, Salt Pan Creek trail, nearby the Parramatta River walks and in Nurragingy Reserve.

Figure 63: Destinations Western Sydney Trails



Educational and historical points of interest are found along different trails in the Western Sydney Region. The trails in the Nurragingy Reserve have various signs educating people on various environmental systems and historical information Australia’s colonial history such as a replica of a blacksmith’s shed. The Parramatta River Loop also has educational opportunities through signs and accompanying illustrations on the concrete about Aboriginal history and artwork.

Figure 59: Historical and Educational Points of Interest Western Sydney Trails



#### 4.6 Promotion of Regional Recreational Trails and Connections within the Network

##### Promotion of trails

Most trails are promoted on Council websites. The trails are found in the recreation section of Council websites and note the location and directions to access the trails. Some Council websites also noted facilities and points of interest along the trail. Some Councils such as Pittwater Council, also had a section on the website which detailed walking groups in the area that people can join.



Trails in National Parks were located on the National Park and Wildlife Service's website under 'things to do' in different National Parks. The website details the location, facilities and points of interest along the track.

Many of the trails along the coast were found on the walking coastal Sydney website, which is associated with Walking Volunteers, a prominent recreational walking trail interest group. This website includes detailed maps of the walks, connections to other walks and facilities along the way.

Trails around landmarks such as Sydney Harbour and Bondi Beach are promoted on various tourism sites as things to do in Sydney. Other trails are listed on specific interest websites such as hiking. These sites include maps and forums which detail and discuss various walks.

The aim of the thesis is to evaluate if recreational trails in Metropolitan Sydney support and encourage walking. Therefore, as many of the regional trails audited require residential streets to connect different trails to complete the route, the importance of regional trails as part of a network was not a part of the study. Though the linkages between individual trails in the regional network were observed during field work through the audit question 'is the trail accessible via another trail'. It is therefore noted that regional connections are limited with only trails directly linking to other regional trails. It is also further noted that no indication is given at the end of trails whether the trail is either part of a bigger regional trail or nearby to a regional link.

#### **4.7 Conclusion**

The design, facilities and maintenance of the regional recreational trails in Metropolitan Sydney support and encourage walking. Most of the trails are very good in supporting walking with a few elements which could be improved to encourage walking.

##### *Accessibility*

The trails in the Metropolitan area are highly accessible from the surrounding residential areas as many trails have multiple access points on route. Some trails through National Parks and nature reserves are less accessible due to distance of surrounding residential areas and sensitive land use that limit trails. It was found that no busy roads acted as a

barrier for trail access and use of crossings and open under passes allowed pedestrian access.

All the trails were found to be accessible for people outside the surrounding residential area as they were accessible by car. Some paid parking was noted which could deter some although in these cases public transport alternatives were available. It is noted that public transport supported the majority of trails, with bus networks being most common to access residential areas leading to trails. Eight trails were also directly accessible by other trails, many of these being other regional recreational trails.

### *Safety*

All the trails were safe from traffic as they are segregated from the road, and where trails meet the road suitable measures were taken to separate pedestrians from the road. The trails are also legible as they are clear cut soft surface trails or cement trails with signs which indicate directions at trail intersections. Although, the Federation Track needed more signage to better direct pedestrians along the route. Passive surveillance opportunities and clear sightlines were noted on all trails except on nature trails which pass through the bush, though vegetation was pruned on most trails to allow sightlines. Lighting on trails which would support night use, paths which were of high quality but had no lighting would not be recommended for lighting due to proximity of surrounding residential homes or secluded location of trails. Trails which had low surveillance (lack of lighting or surveillance from surrounding land) were evident in some cases due to graffiti and burnt out cars. This reduced perceived safety of the areas. Sufficient barriers and warning signs were also observed on all trails when needed.

### *Pedestrian Comfort*

Trails in Metropolitan Sydney supported pedestrian use. Cement, asphalt and soft surface trails are the common covers of regional trails in Metropolitan Sydney. The majority of cement and asphalt trails are even and well maintained, with only one trail displaying many instances of uneven paths. The soft surface trails were fairly even, though many trails had roots and rocks exposed, which presents a trip hazard. Erosion on some trails also makes trail uncomfortable to use. This coupled with steeper gradients may restrict the use of the

trails for less mobile people. Boardwalks are also common to minimise pedestrian disturbance of the environment.

The widths of all the trails are also comply with recommendations of SMRRTF (2010) Appendix C, which allowed for pedestrians and cyclists to move along the trails. Many of the trails are surrounded by vegetation or planting which offered shade and relief from the sun, which can encourage pedestrian use. This vegetation was also pruned to ensure height clearance and easy movement within the areas. Trails which lacked shade are along the coastline and along the Parramatta River shared path. More planting is not viable along the coastline walks due to surrounding residential lots views. Some more planting should be undertaken to make the shared path along Parramatta River shaded and aesthetically pleasing.

Only a few of the trail segments audited had seating positioned within 60 metre intervals of each other as recommended as ideal in the SMRRTF 2010 Appendix C. Though most trails did have seating along the route or at trails entrances, lookouts, parks and other open spaces to provided rest stops for people. Trails through the national park were least likely to have seating along the route, though the location of these trails usually restrict less mobile people who require rest stops are most important for to encourage recreational walking.

Signage indicating initial map, facilities along the trail, and points of interest and fitness level required were not common along the trails. Longer trails were more likely to have signage indicating on a map the length, facilities and points of interest along the trail.

### *Pleasurability*

Most of the regional recreational trails are aesthetically pleasing which encourages use as they have water views or are exposed to nature. Some trails in the Western Sydney Region are not aesthetically pleasing as they pass through large open spaces which have no planting or engaging features. To this, litter, pollution and burnt out cars were apparent on some of these trails which detract from amenity of the environment and perceived safety.

Walking is also encouraged on trails by allowing leashed dogs excluding National Parks and reserves due to nature conservation. Dog bowls, waste bags and bins were located along some trails to support dog use.

### *Destinations*

Most trails have access to one or more destinations which encourage participation in recreational walking or facilitate other physical activity. Playgrounds are the most common facility along trails which encourages physical activity of adults and children. Beach access is also common as many trails were situated along Sydney's coastline. Sporting fields are accessible via trails, which can facilitate structured and unstructured physical activity. Many of these spaces are also supported by pedestrian facilities such as seats, bubblers and toilets to a lesser extent. These elements can contribute to the use of recreational walking trails and provide areas for social interaction. Historical and educational points of interest are also found predominantly along the Southern and Northern Sydney region highlighting destinations or points of interest to encourage usage.

### *Awareness*

Many of the trails are listed on various web pages which contribute to the population's awareness of trails by undertaking specific searches on the subject. No advertisements were found on homepages which could publicise and inform the use of trails to those not actively seeking them. Also, some websites had links to walking groups in the area, which may influence some people to walk with a group which is good for physical activity levels and social interaction. No websites had additional information on the benefits of brisk walking which could inform people of additional health benefits associated with moderate pace walking.



## **CHAPTER FIVE Recommendations and Conclusion**

### **5.1 Introduction**

The thesis identifies physical and perceived environmental factors which support and encourage the use of recreational walking trails. These are used to assess if the regional recreational trails in the Metropolitan Sydney Area support and encourage a healthy population.

The final chapter will provide an overview and conclusion of the thesis. Recommendations will be made in relation to how the regional recreational trails in Metropolitan Sydney can be improved to support and encourage a healthy population. This will be followed by an overview of the thesis objectives identified in chapter one to illustrate how perceived environmental factors of recreational trails impact health of communities. Lastly, the chapter concludes with a discussion for future directions and study for encouraging the use of recreational walking trails.

## 5.2 Recommendations

Through the analysis of the data collected from the trail audits, various recommendations can be made from these results. The following is a list of recommendations on how Metropolitan Sydney regional recreational trails can be improved to support and encourage recreational walking:

- **Increased promotion of walking trails and walking groups**

Although the majority of the trails were noted on websites no advertisements for specific trails were found on council home pages which may make someone not looking for trail related information aware of trail infrastructure. Therefore it is recommended that council websites have links in homepages to walking trails in the area or walking groups, as people using the Council website for something else may see the link and become aware of the walking trail in the area. This should be supplemented with advertisement campaigns to be run in local communities for those who do not access the internet. To this, community consultation should be undertaken when new trails are being built to increase public awareness. It is also important that information is added to Council websites to inform and motivate people about the physical benefits of brisk walking.

- **Signage along regional routes between regional trails**

It is noted that various regional trails in Metropolitan Sydney are made up by multiple trails due to residential and other land uses not allowing continuous paths. It is therefore recommended that signs are placed at the end of trails to make people aware of continuation of trails, and how to access the trail. This legibility could encourage people to walk further. It is also recommended that recreational trails are promoted as a continuous route through urban environment to connect various greenspace such as the Federation Track through better signage. This could include maps in parks which direct people to the next area and signs on telegraph poles to direct people through urban areas. This use of



signage is demonstrated on the Spit Bridge to Manly walk, making the walk more legible through indication of route to following greenspace through residential streets.

- **Targeted Community Surveys**

Once trails are promoted and signs are established governments should run surveys of the surrounding community to see if these measures encouraged more people to walk. The analysis of this data could also seek to assess associated cost saving to governments by reduced health expenditure against trail infrastructure. This data could support increased funding for other trail projects to encourage physical activity and social interaction.

- **Audit tool be reviewed by governments and interest group to improve communication on the condition of walking trails**

Adoption of the audit tool used in this thesis by government, intergovernmental groups and non government groups to provide better information transfer through common reporting measure that is easy to use. This could greatly reduce monitoring costs for governments and better targeting of the maintenance budgets.

### **5.3 Research Outcomes**

To support the thesis statement, the key objective established have been met. The relevant findings relating to each objective are as follows:

*OBJECTIVE ONE: Demonstrate the importance of healthy planning initiatives to improve the populations health in modern cities.*

Chapter two of the thesis is an extensive literature review which demonstrates that the built environment is a key determinant of health. The rising rate of non communicable diseases in modern cities is attributed to low physical activity, social isolation and poor diet. The built environment can reduce these risk factors through accessibility through land use mix, transport systems and urban design. Therefore urban planning plays a key role in providing

environments which promote healthy lifestyles through influence on the physical, social and economic environments.

*OBJECTIVE TWO: Understand the health and broader benefits of walking infrastructure.*

The literature review in chapter two also provides a sound understanding that walking infrastructure benefits health through increased physical activity and social interactions. Other implications of walking infrastructure are also highlighted in the thesis and include environmental and economic benefits. Environmental benefits are the potential of walking infrastructure to reduce car dependency in cities through active transport networks that reduce greenhouse gases and pollution. Environmental benefits of walking infrastructure also include biodiversity conservation and sustainable land use associated with recreational walking trails in greenways. Economic benefits are also associated with walking infrastructure which includes individual and government savings on health care and costs associated with car dependency.

**OBJECTIVE THREE:** Establish the importance of recreational opportunities, such as walking trails, in modern cities to support physical activity.

Chapter three of the thesis establishes that recreational opportunities are important in cities as they support and encourage physical activity and social interaction. Recreational trails are seen as an important recreational facility as they support walking which is a highly accessible physical activity as most people walk for the extent of their life, no costs associated with it and no special equipment is needed. Recreational trails are also recognised as important recreational facilities as they provide access to various open spaces which also encourage physical activity. The accessibility of walking and associated demand for walking trails is represented in physical activity statistics which show that walking is the most popular form of physical activity predominantly undertaken on walking trails, in parks and along beaches.

*OBJECTIVE FOUR: Consolidate the existing literature and research on the perceived and physical environmental features to support and encourage people to use recreational walking trails.*

Chapter three consolidates existing peer reviewed empirical studies which relate specifically to environmental influences of recreational walking and the use of walking trails. This process established six broad environmental elements which support and encourage recreational walking and the use of trails. These are accessibility of the trail, actual and perceived safety, pedestrian comfort, pleasurable destinations and awareness. These broad environmental elements are made up of specific environmental factors which encourage recreational walking and the use of walking trails.

*OBJECTIVE FIVE: Understand the New South Wales response to the provision of recreational walking trails and framework which planning work within to provide these facilities.*

An understanding of the New South Wales state and local government's response is contained in chapter three. The Sydney Metropolitan Regional Recreational Trails Framework 2005 was established to provide a strategic plan to guide the development of a high quality regional network of trails. This framework was updated in 2005 to reflect changes in government objectives and funding programs, but the strategic network and design considerations did not change. The Sydney Metropolitan Regional Recreational Trails Framework 2010 Appendix C, sets out various design considerations which ensure trails are of high quality and standards to encourage use. These design considerations are to be applied to a network of regional, sub regional and feeder trails.

Local governments are responsible for the construction and maintenance of recreational trails in Council areas using the Sydney Metropolitan Regional Recreational Trails Framework 2010 as a guide for the location and design. These trails are partly funded through the State Government Metropolitan Greenspace Program.

*OBJECTIVE SIX: Create and use an evaluation audit tool for recreational walking*

The consolidated environmental features which support and encourage recreational walking and the use of trails were used to create a reliable audit tool for the Metropolitan Sydney regional recreational walking trails. Design features in Appendix C of the SMRRTF 2010 were also incorporated into the audit to contextualise the audit and assess the quality of trails as “many of these trails pre- date SMRRTF 2005, the quality of the existing trails in the regional network should be reviewed against the Regional Trail Examples in Appendix C, to ensure facilities provided are of high standard and the quality befitting a regional trail facility” (SMRRTF, 2010, p 19). The main objective of the resulting audit is to evaluate if regional recreational trails in Metropolitan Sydney encourage and support healthy communities through increased physical activity and opportunities for social interaction.

*OBJECTIVE SEVEN: Audit existing recreational trails identified in the Sydney Metropolitan Regional Recreational Trails framework.*

Walking trails which were classified as regional recreational trails in the SMRRTF were chosen to be the subject of the audits as they have the potential to draw people from the local area and outer areas. Therefore they have the potential to support the most usage if the trail is of high quality. A total of 39 trails were selected to be audited which covered 180 kilometres. Certain trails were omitted from the study due to location, length and classification. Chapter four presented the result from the trail audits from the Central coast, Northern Sydney, Southern Sydney and Western Sydney regions.

*OBJECTIVE EIGHT: Provide recommendations to improve the recreational trails in the Sydney Metropolitan Region.*

Chapter five presents a series of recommendations for how regional trails in Metropolitan Sydney could be improved to support and encourage recreational walking. These recommendations are a result of analysis of the strengths and weaknesses of trails drawn from the data collected from the audits of recreational trails. The resulting recommendations pertain to increasing awareness of recreational trails, and improving with

prominent bodies to audit trails. This would alter Councils with a cost effective alert system to better direct maintenance budgets.

#### **5.4 Limitations and Future Research**

The current field of studies relating to environmental features and the use of recreational trails is still fairly small compared to environmental impacts on walking for transport. This presented a limitation to this study and potential for future research. Further, a broad range of studies are limited regarding documenting perceived and physical environmental factors which encourage the use of walking trails. Therefore, future research could be undertaken to better understand the impacts of environmental factors on encouraging and supporting the use of recreational trails. It is important that these studies address both perceived and physical environmental features which may influence recreational walking. A mix of subjective and objective study measures are also required to ensure studies reflect true environmental impacts on the use of recreational walking trails.

Further studies could also be done on recreational walking trails in Sydney. The evaluation audit tool created and tested in the thesis could be used to evaluate if subregional and other trails support and encourage walking. Further developments could also be made to the tool to assess the accessibility of recreational trails for less mobile or disabled people.

#### **5.5 Conclusion**

This thesis has confirmed that physical and perceived environmental factors support and encourage the use of recreational walking trails. This is owing to the fact that well designed built environments which support physical activity and social interaction are essential to reduce the rising rate of non communicable diseases in modern cities. To this end, access to well designed recreational walking trails is one way the built environment can support healthy communities. Further, to encourage people to use recreational trails it is important that these facilities are accessible, safe, designed for pedestrian comfort, pleasurable and access various destinations.

These factors underpinned the audit tool used. The audit conducted on the existing trails in the regional network as reviewed against the Regional Trail Examples in Appendix C,

concluded that these facilities were of a high standard and quality befitting the regional trail facility in most cases. Therefore, that the regional recreational walking trails in Metropolitan Sydney are well placed to encourage and support good health outcomes and associated health cost savings for both individuals and the wider community.

It was recommended that these good health outcomes and associated cost savings could be greatly enhanced through targeted advertising campaigns to increase people's awareness on the existence of regional trails, and the health benefits of brisk walking. Together with recommendations for the adoption of an audit tool for governments and other groups to better direct monitoring/maintenance budgets, improved signage on interrupted trails, and targeted surveys to quantify corresponding health outcomes of increased walking.



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## Appendix A Recreational Trail Audit Tool

This audit tool evaluates various reliable environmental features which support and encourage recreational walking. To ensure reliable results the trail being audited should be split up into one kilometre segments and evaluated separately. An average of resulting score for each environmental feature should be taken to establish the score and walkability of the trail.

Every feature is assigned one point. If the audit category is not applicable, a score is to be assigned to the category. This rating of scores is as follows is as follows 22- 30 (excellent) indicates a very walkable trail; 15-21 (good) indicates a walkable trial but with room for improvement; 8-14 (satisfactory) trail is in need of attention to encourage trail use; and 0- 7 (poor) not a very walkable trail which does not encourage recreational walking.

<b>Accessibility</b>	Yes	No	N/A	Observations
Is there an access point from surrounding land uses to the trail?				
Is there a busy road at the access point? If yes is there a crossing?				
Has the trail got any car parking?				
Is the trail accessible by public transport?				
Is the trail accessible via another trail?				
				Score /5

<b>Safety</b>	Yes	No	N/A	Observations
Is the trail separated from road?				
Is there lighting along trail?				(only if trail is a main path which is intended for night use)
Is the vegetation alongside the trail well maintained?				
Is the surrounding area free of graffiti?				
Are there warning signs when needed?				
Are any barriers provided when needed with gaps n wider than 125mm (Australian Standard 2156.2 – 2001 3.4				
Is the trail clear cut or have directional signs or track markers?				
				Score / 7

<b>Pedestrian Comfort</b>	Yes	No	N/A	Observations
Is the trail even and well maintained? (using standards in Appendix C of SMRRTF 2009)				

Is the trail wide enough for all users?							
General Use	Minor paths/intimate settings	High use areas	Shared paths				
1.8m	0.9m	3m	3-4 m				
Does the trail go all the way with no missing sections?							
Is there appropriate height clearance (1.8m?)							
Are there any seats along the trail?							
Is there signs indicating: (SMRRTF) Initial map illustrating routes Facilities along track Trail rating – fitness level Points of interest							
Is there access to shade along the trail?							
Does the gradient support use for most users? (N/A for hikes/nature trails)							
							Score /8

Pleasurability	Yes	No	N/A	Observations
Is the trail natural or other scenery?				
Is there any view opportunities?				
Is the trail free from litter and pollution?				
Are dogs permitted on the trail?				
				Score /4

Destinations	Yes	No	N/A	Observations
Does the trail access to water?				
Does the trail access open space?  1 - Landscaped 1 - Pedestrian facilities 1 - Playground/gym equipment				
Are there any educational or historic points of interest along the trail?				
				Score /6