

# Reconnecting with Community and Nature through an accessible Sensory Trail at Binna Burra Lodge

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Supervised by Prof Karine Dupré, Melanie Roberts & Jankees van der Have



## Table of Contents

Glossary/Abbreviations.....	4
Meet the team .....	5
Acknowledgements.....	6
Executive Summary.....	7
1.0 Introduction .....	8
2.0 What is a Sensory Trail? .....	10
Sensory Trail as a Form of Occupation .....	11
3.0 Safety Considerations and Regulations .....	13
3.1 Disability Discrimination Act 1992 and Disability Service Act 2006.....	13
3.2 AS1428 Design for Access and Mobility and AS2700 Colour Standards .....	13
3.3 Disability Safety Needs.....	13
4.0 Context of Binna Burra.....	16
4.1 The Impact of Climate Change .....	16
4.2 Culture of Lamington National Park.....	16
5.0 Precedents .....	18
5.1 Gold Coast Regional Botanic Gardens – Sensory Garden & Indigenous Garden .....	19
5.2 Mt Coot-tha Botanic Gardens .....	25
5.3 Laurel Bank Park Toowoomba .....	26
5.4 Catoctin Creek Park Multi-Sensory Trail .....	29
5.5 Zugerland Sensory Trail.....	31
5.6 Riverside School, Nova Scotia – Knowledge Path .....	34
5.7 Critical Analysis .....	36
6.0 Consumer Perspectives.....	37
6.1 Survey Responses.....	37
6.2 Critical Analysis .....	41
7.0 Proposal .....	42
7.1 Proposed Locations.....	42
7.2 Final Proposal.....	52
7.2.1 Pragmatic and Safety Considerations .....	55
7.2.2 Weather Considerations .....	56
7.2.3 Entrance to Sensory Trail .....	56
7.2.4 The Stem of the Leaf .....	56
7.2.5 Hear Section.....	57

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7.2.6 Sight Section.....	59
7.2.7 Smell Section.....	61
7.2.8 Taste Section.....	63
7.2.9 Touch Section.....	64
8.0 Sustainability of Binna Burra Lodge Sensory Trail .....	66
8.1 Maintenance .....	66
8.2 Marketing.....	66
8.3 Review of Success .....	66
9.0 Conclusion.....	67
10.0 References.....	68

## Glossary/Abbreviations

**BBL** – Binna Burra Lodge.

**Leisure** – the category of occupations including those concerned with enjoying oneself and life, which the individual is usually under no obligation to engage in. Leisure occupations include, but are not limited to, play, sport and various types and forms of socialisation (Molineux, 2017).

**Occupation** – the active process of engaging in an activity that is meaningful, purposeful, and contextualised (Molineux, 2017). Occupations are separated into three categories: self-care (occupations we do to look after ourselves), leisure (occupations we do for enjoyment), and productivity (occupations we do to contribute socially and economically to society) (Townsend, 1997 as cited in Dickie, 2019).

**Occupational Therapy** – occupational therapists enable people to engage in their occupations, which are the meaningful everyday activities that we participate in (Molineux, 2017). Occupational therapists can work with individuals, groups, communities, and populations, and in a broad range of settings such as private practices, local governments, hospitals, and non-government organisations (Molineux, 2017). Occupational therapists provide a holistic approach, considering how people, their occupations, and their environments all influence each other to promote health and wellbeing (Boyt Schell et al., 2019).

**Self-Care** – the category of occupations including those concerned with looking after one's own body, physically and mentally. Self-care occupations include, but are not limited to, bathing, dressing, showering, grooming and toileting (Molineux, 2017).

**Sensation** – A physiological feeling or perception resulting from something that happens to or comes into contact with the body (Merriam-Webster, n.d.).

**Sensory Garden** – A self-contained garden area that has a central theme of appealing to some or all the senses of sight, taste, touch, hearing and smell (City of Gold Coast, n.d.; Gonzalez & Kirkevold, 2013; Sensory Trust, n.d.).

**Sensory Trail** – also called "Senses Trail". A journey that people undergo when walking through a trail, encouraging them to immerse themselves in the environment, and use their imagination to guide them through the trail (Botanic Gardens of South Australia, 2022).

## Meet the team

### **Freya Englert & Jorja Greenwood**

Freya and Jorja are third-year student occupational therapists at Griffith University on the Gold Coast, who completed a 12-week role-emerging placement with Griffith Architecture & Design and Binna Burra Lodge. Their role throughout this placement was to develop concepts for a sensory trail at Binna Burra Lodge with a unique application of the knowledge and skills from the occupational therapy profession. This included a comprehensive understanding of how the environments people interact with impact on the way they participate in their occupations.

### **Prof Karine Dupré**

Karine Dupré is a registered architect and urban designer and is a professor at Griffith University in the School of Engineering and Built Environment – Architecture and Design. She was the primary supervisor for the development of this project and provided support, feedback, and direction to Freya and Jorja throughout their work on this report during the duration of the 12-week role emerging placement.

### **Melanie Roberts**

Melanie Roberts is a Senior Lecturer in the Discipline of Occupational Therapy at Griffith University. She was the placement educator for Freya and Jorja throughout the duration of the 12-week role-emerging placement. Melanie oversaw and provided feedback to Freya and Jorja regarding all aspects of the placement, including this report.

### **Jankees van der Have**

Jankees van der Have is the Director of the Binna Burra Foundation Ltd. He coordinates the Friends of Binna Burra volunteering group, which includes members who are regular visitors of and passionate about the future of Binna Burra. The Friends of Binna Burra volunteering group complete working bees to maintain the land and structures of Binna Burra Lodge. Jankees has a Masters in Plant Physiology, and for over a decade, has also guided walking tours at Mt Coot-tha Botanical Gardens, where he shares his knowledge and repertoire of plants and nature. Jankees was a supervisor for this project, providing Freya and Jorja with guidance, resources, and feedback during the duration of the 12-week role emerging placement.

## Acknowledgements

The authors would like to thank Binna Burra Lodge for the opportunity to be a part of the project. A special thanks to Jankees van der Have and Louanne Byrnes, for their ongoing involvement in and commitment to this project, and for providing their expertise, knowledge as well as resources to aid in the development of this report.

The authors acknowledge the Yugambah Peoples who are the traditional custodians of the Binna Burra land and pay respect to the Elders, past and present, and extend that respect to other Aboriginal and Torres Strait Islander peoples.

To cite this work please use the following: Englert, F., Greenwood, J., Dupré, K., Roberts, M., van der Have, J. (2022). *Reconnecting with community and nature through an accessible sensory trail at Binna Burra Lodge* [Sensory trail proposal report]. Unpublished manuscript. Griffith University.

## Executive Summary

This project, developed with Griffith Architecture and Design, Griffith Occupational Therapy and Binna Burra Lodge, provided the opportunity for two student occupational therapists at Griffith University to undertake a 12-week placement. The purpose of this project is to provide concept options for a new sensory trail at Binna Burra Lodge for people of all abilities, after the destruction of their existing sensory trail from the 2019 bushfire. This report is the synthesis of the work undertaken by these two students.

Methodologically, the students used a mixed-mode approach to undertake their research, which includes scholarly research on what is a sensory trail, the context of Binna Burra, and disability safety considerations and standards that must be adhered to. A survey was developed and sent to various groups of individuals who may be potential consumers of the sensory trail. Questions aimed to understand the current frequency of bushwalking and visiting national parks and the reasons for this, as well as any challenges individuals may experience when bushwalking or visiting national parks. Additionally, the survey asked the individuals to explain what they pay attention to when bushwalking or visiting national parks, and how they use their senses to interact with these environments. Finally, the questions were directed at understanding what sensory experiences individuals dislike when bushwalking or visiting national parks and what they would like to see in the development of a sensory trail. Additionally, six precedents of existing sensory trails and gardens around the world were analysed. A mixed-methods approach was used to identify the strengths and weaknesses including reviews sourced from online forums, in-person visits, a visual analysis of photographs, and a review of existing literature. The main findings were that people would like to have a sensory trail at Binna Burra Lodge and there are various locations that are suitable for a sensory trail to be built. Additionally, pragmatic and safety considerations have been suggested, such as the importance of having flat and sealed pathways for wheelchair access, and benches for resting. Furthermore, an overarching theme and design of the sensory trail is proposed, following the shape of the Antarctic Beech Tree. Finally, suggestions including important elements to feature in the sensory trail have been provided, as well as a sustainability plan upon implementation of the sensory trail including maintenance, marketing, and review of success.

Visiting national parks and participating in bushwalks is an important leisure or self-care occupation that has a positive influence on health and wellbeing (Craik & Pieris, 2006; Paggi et al., 2016; Nadasen, 2008). Leisure occupations are often undervalued due to barriers such as lack of time, money, and motivation (Reichert et al., 2007). For individuals with a disability, there is reduced engagement in leisure due to stigma, discrimination and environmental, social and economic barriers (Condie, 2019). Therefore, the proposed sensory trail at Binna Burra Lodge would demonstrate and promote the importance of inclusivity and creating accessible spaces for individuals of all abilities, aligning with sustainable development goal three and 10 (increasing health and wellbeing and reducing inequalities). This increase in inclusivity through accessibility at Binna Burra Lodge will allow for the promotion of health and wellbeing for all abilities through engagement in meaningful occupations.

## 1.0 Introduction

The purpose of this report is to provide concept options for a sensory trail at Binna Burra Lodge for people of all abilities. This report will entail research on sensory trails, the Binna Burra climate, cultural considerations, relevant standards and safety considerations, precedents and input from varying stakeholders, and a final proposal of the sensory trail for Binna Burra Lodge.

Binna Burra was established in 1933 and is situated within Lamington National Park (Binna Burra Lodge, n.d.). It offers a variety of accommodation, including camping sites, safari tents, bunkhouses, and sky lodges (Binna Burra Lodge, n.d.). Activities offered at Binna Burra include astronomy nights, birdwatching, and guided or individual bushwalks (Binna Burra Lodge, n.d.). There is also the Tea House, Binna Burra's onsite restaurant. Binna Burra's mission is to provide a place for people to interact with nature and escape the stresses of everyday life (Binna Burra Lodge, n.d.).

Binna Burra is situated within the mountainous region of the Gold Coast hinterland, with a subtropical climate (Doolan, 2019). Within this climate, rainfall occurs throughout the year with most of the rainfall during the summer and autumn months (Australian Government, 2019). The hottest temperature Binna Burra has reached in 2022 has been 33.3°C and the lowest in 2022 has been 0.9°C (Australian Meteorology, 2022). Binna Burra Lodge was severely affected by the 2019 bushfires, and it destroyed part of their land, lodges and the sensory trail. Today, the Binna Burra Lodge community is still in the regeneration process of their business. Southeast Queensland (SEQ), including Binna Burra, often experiences extreme weather events such as very heavy rain leading to erosion, droughts, heatwaves, landslides, bushfires, and strong winds (Queensland Government, 2019).

It was identified that Binna Burra Lodge, and the mountainous hinterland it exists within, does not provide people with a disability the opportunity to engage in bushwalking or visiting national parks. Bushwalking or visiting national parks serves both self-care (looking after oneself) and leisure (activities for enjoyment, relaxation and contemplation) purposes. It fosters physical, mental, emotional, and spiritual engagement, by providing social and community connection, exercise and sensory experiences, mindfulness, and connection to nature. People with a disability cannot engage in bushwalking at Binna Burra Lodge which could result in a missed opportunity for a sense of belonging, and to connect with others and nature (Durocher et al., 2014; Mayer et al., 2008).

A sensory trail will be redeveloped at Binna Burra Lodge, following its destruction from the 2019 bushfire. This report provides additional information that exists for this redevelopment, specifically reconceptualising the senses trail with the aim of increasing engagement in bushwalking and visiting national parks for people of all abilities. Developing and implementing a sensory trail at Binna Burra Lodge will allow everyone, regardless of ability, to appreciate and experience the Binna Burra environment, thereby promoting inclusivity and equity for everyone. The development of this trail will ensure the Binna Burra



core values and principles of respect, safety, friendship, enjoyment, and appreciation of the educational and therapeutic benefits of nature are adhered to (Binna Burra Lodge, n.d.).

The report features the following sections:

- A summary of what a sensory trail involves and its benefits to participation in self-care and leisure occupations.
- Safety considerations and regulations specific to the needs and abilities of different individuals.
- A description of the existing geography, climate, and culture of Binna Burra.
- An analysis of five existing sensory trails and gardens worldwide. Strengths and weaknesses and a consideration of how these should be applied to the development of the sensory trail at Binna Burra.
- A summary of consumer perspectives from a survey that was sent to a variety of individuals with different abilities and a consideration of their responses for the development of sensory trail.
- The proposal including potential locations at Binna Burra Lodge, strengths and weaknesses of each, and a final recommendation of the best locations for the sensory trail.
- A final proposal including the concepts for the sensory trail at Binna Burra, including the theme, design, drawings, equipment, and features.
- A discussion of the sustainability of the sensory trail upon implementation, including recommendations for maintenance, marketing, and a suggested review of success.

## 2.0 What is a Sensory Trail?

A sensory trail provides opportunities for people to engage with nature in various ways. Sensation is defined as a physiological feeling or perception resulting from something that happens to or comes into contact with the body (Merriam-Webster, n.d.). A sensory experience is as a result of processing the sensations that the body experiences through various means including visual, auditory, tactile, olfactory and taste (Molineux, 2017).

There is a body of literature about sensory gardens. However, there is comparatively less research regarding sensory trails. Therefore, it is important to outline the difference between them to understand how the existing research on sensory gardens can be applied to sensory trails.

A sensory garden is defined as a self-contained garden area that appeals to some or all of the senses of sight, taste, touch, hearing, and smell (City of Gold Coast, n.d.; Gonzalez & Kirkevold, 2013; Sensory Trust, n.d.). These gardens can stimulate sensory experiences through fresh air, fragrances, different tastes, fauna sounds, sunshine, and warmth (Gonzalez & Kirkevold, 2013). Sensory gardens that have a specific focus on being accessible provide a safe space for people with a disability to interact with nature (City of Gold Coast, n.d.).

The benefits of sensory gardens are well documented within the literature, particularly in relation to individuals who experience Dementia, residents of nursing homes, individuals with visual impairment and people, particularly children, with Autism Spectrum Disorder (ASD) (Bourdon & Belmin, 2021; Collins et al., 2020; Gonzalez & Kirkevold, 2015; Hussein, 2010; Yusop, 2020; Zajadacz & Lubarska, 2019). The studies in relation to people who experience Dementia found improvements in well-being, quality of life, and in providing a sense of freedom (Bourdon & Belmin, 2021; Collins et al., 2020). This was from connecting with different senses and relating the associated sensory experience to past experiences or memories (Bourdon & Belmin, 2021; Collins et al., 2020). Similarly, the non-visual stimulation that sensory gardens provide are inclusive for individuals with vision impairment, promoting pleasant experiences and a sense of belonging and freedom through connectedness to the senses (Zajadacz & Lubarska, 2019). Additionally, residents of nursing homes benefit from sensory gardens, as it increases outdoor presence and offers social connectedness (Gonzalez & Kirkevold, 2015). For individuals with ASD, sensory gardens work to stimulate calmness and enjoyment, creating a pleasant environment that fosters teamwork, learning focus, and social connectedness (Hussein, 2010; Yusop, 2020).

There is limited information that exists about sensory trails, involving what they are and what they include. Adelaide Botanic Gardens features a sensory trail and defines it as a journey that people undergo when walking through it, encouraging people to immerse themselves in the environment and use their imagination to guide them through the trail (Botanic Gardens of South Australia, 2022). In sensory trails, people are encouraged to use the five different senses to learn about different plants that exist in the trail (Botanic Gardens of South Australia, 2022).

Both sensory gardens and sensory trails share a common theme of immersing individuals who use them into a sensory experience, thereby producing varying sensations targeting the five senses. However, the main difference between the two is that a sensory garden is located within a contained area and does not follow a route or journey, as a sensory trail does. Additionally, sensory gardens do not usually feature a central theme or encourage as much imagination through immersion in nature. Therefore, despite the difference between these two concepts, throughout this report, literature addressing sensory gardens will be used in addition to the limited sensory trail information as a foundation for the proposed sensory trail at Binna Burra Lodge.

The next section of the report explores sensory trails as a form of occupation, explaining the different concepts of leisure that are understood across different cultures. Additionally, the benefits of leisure occupations are explained, particularly in relation to people with a disability, as well as why people with a disability have reduced access to leisure occupations.

## Sensory Trail as a Form of Occupation

Visiting national parks and participating in bushwalks can be viewed as leisure or self-care occupations. Leisure occupations are often undervalued, partly due to barriers people face to engaging in leisure occupations, such as lack of time, money, and motivation (Reichert et al., 2007). Particularly in Western cultures, a strong value is placed on productivity (i.e., time at work), which has led to having less time and value placed on leisure occupations (Wu & Simpson, 2011). In Eastern cultures, such as Aboriginal and Torres Strait Islander cultures, the opposite value is adopted, where leisure is valued equally with productivity and is actively incorporated into their days (Hammell, 2018; Pidgeon, 2015).

Paggi et al. (2016) found that participation in leisure activities had a positive influence on health and well-being. Specific benefits included a sense of freedom, a distraction from everyday stressors and obligations, enhancing self-identity, and increased social engagement (Craik & Pieris, 2006; Nadasen, 2008).

King et al. (2014) explored the benefits of participation in leisure activities on health and wellbeing in youth with a severe disability. This study found that participating in leisure activities was enjoyable, and provided a sense of belonging, choice, control, and competency (King et al., 2014). It was clear that the participants wanted more opportunities to socialise and be in the community in order to enhance such benefits (King et al., 2014). Sensory experiences can have a significant influence on feelings experienced during an activity (King et al., 2014). Experiencing a variety of different sensations contributed to overall enjoyment of the activity (King et al., 2014). For example, by challenging the participants through movement or exercise, and providing relaxation (King et al., 2014). Another important aspect mentioned in this study was the importance of being able to choose the activities completed, as this was linked to a greater sense of independence (King et al., 2014).

These findings are similar to Hussein's (2010) study which involved observing children with special needs at school engaging in a multi-sensory environment. Hussein (2010) found that the children's educational development and social skills in their interactions had improved, as well as supporting their cognitive development. Social interaction was improved through encouraging teamwork, as the children had to identify specific features in the environment and explore together (Hussein, 2010).

Individuals with a disability can face stigma, discrimination and environmental, social and economic barriers when engaging in leisure occupations (Condie, 2019). Many public spaces are not accessible which has resulted in reduced community participation and engagement in leisure occupations for people with a disability (van der Westhuizen et al., 2022). By not having equitable opportunities to participate in leisure occupations, people with a disability can face feelings of oppression (van der Westhuizen et al., 2022).

The literature has identified benefits to people when engaging in leisure occupations (Hussein, 2010; King et al., 2014; Paggi et al., 2016). A sensory trail can be a form of leisure, and thus could offer many benefits to people with different abilities.

The next section of the report focuses on the safety considerations and standards that must be adhered to when developing a sensory trail for people with different abilities.

## 3.0 Safety Considerations and Regulations

There are a number of standards that must be adhered to when developing a sensory trail to ensure it meets safety and legal requirements. These standards are predominantly made for indoor spaces, thus careful consideration must be made when transferring these standards to an outdoor space, particularly in national parks.

### 3.1 Disability Discrimination Act 1992 and Disability Service Act 2006

It is imperative that the design of the sensory trail is accessible to all abilities in order to abide by the Disability Discrimination Act. This Act states that it is unlawful for a person to discriminate against another person on the ground of the other person's disability, including access to public premises (Disability Discrimination Act, 1992). A premise is defined as a "structure, building, aircraft, vehicle or vessel, and a place whether enclosed or built on or not" (Australian Human Rights Commission, 2014). The most recent Act highlights that people with a disability have the same human rights as other members of society and should be empowered to exercise their rights (Disability Service Act, 2006).

### 3.2 AS1428 Design for Access and Mobility and AS2700 Colour Standards

The AS1428 Standards provide great depth about how to make public spaces accessible. For example, looking at path width, height, circulation space, floor surfaces, signage, tactile ground indicators, ramps, and rails. The Disability Discrimination Act 1992 and the AS1428 are closely linked (Australian Human Rights Commission, 2014).

There are 206 colours that must be used when painting colours for pipeline identification, line marking, and other industrial purposes (Dulux Protective Coatings, n.d.). AS2700 are an important consideration in relation to how these colours may have to be implemented into the sensory trail, and how this may impact or can be used to contribute to the sensory experience. These colour standards will be of particular importance for people with a vision impairment.

### 3.3 Disability Safety Needs

In Australia, 77% of people with a disability have a physical disability (Australian Institute of Health and Welfare [AIHW], 2022). This includes conditions associated with the musculoskeletal system and connective tissue (e.g., back problems), circulatory system (e.g., heart disease), hearing, or nervous system (e.g., multiple sclerosis) (AIHW, 2022).

Key considerations when bushwalking for people with a physical disability include accessibility of entry, exits, and the track itself (gradient, steps, surface), and an evacuation plan in case of an urgent medical need (Bushwalking NSW, n.d.). For wheelchair users, it is important that the path is relatively flat with no steps (Bushwalking NSW, n.d.). Additionally, for people with chronic conditions such as arthritis, back pain, or respiratory conditions affecting their energy levels, having seats throughout the walk is essential (Bushwalking NSW, n.d.). For people with vision impairment, it is important to consider bright colours, both naturally from sunlight and artificially, as people with a vision impairment rely on

colours and reflections of light to orientate themselves (Maplesden, 2012). This may include having bright colours on either side of the trail to prevent these individuals from veering off track and being exposed to risks from the plants or unsteady ground (Maplesden, 2012). Additionally, some people with a disability may require walking canes, a sighted guide, or an assistance dog (Maplesden, 2012). It is important that there are appropriate flat and sealed pathways, and tactile indicators where necessary, so that the appropriate supports or assistive technology that these individuals may require can be utilised throughout the sensory trail.

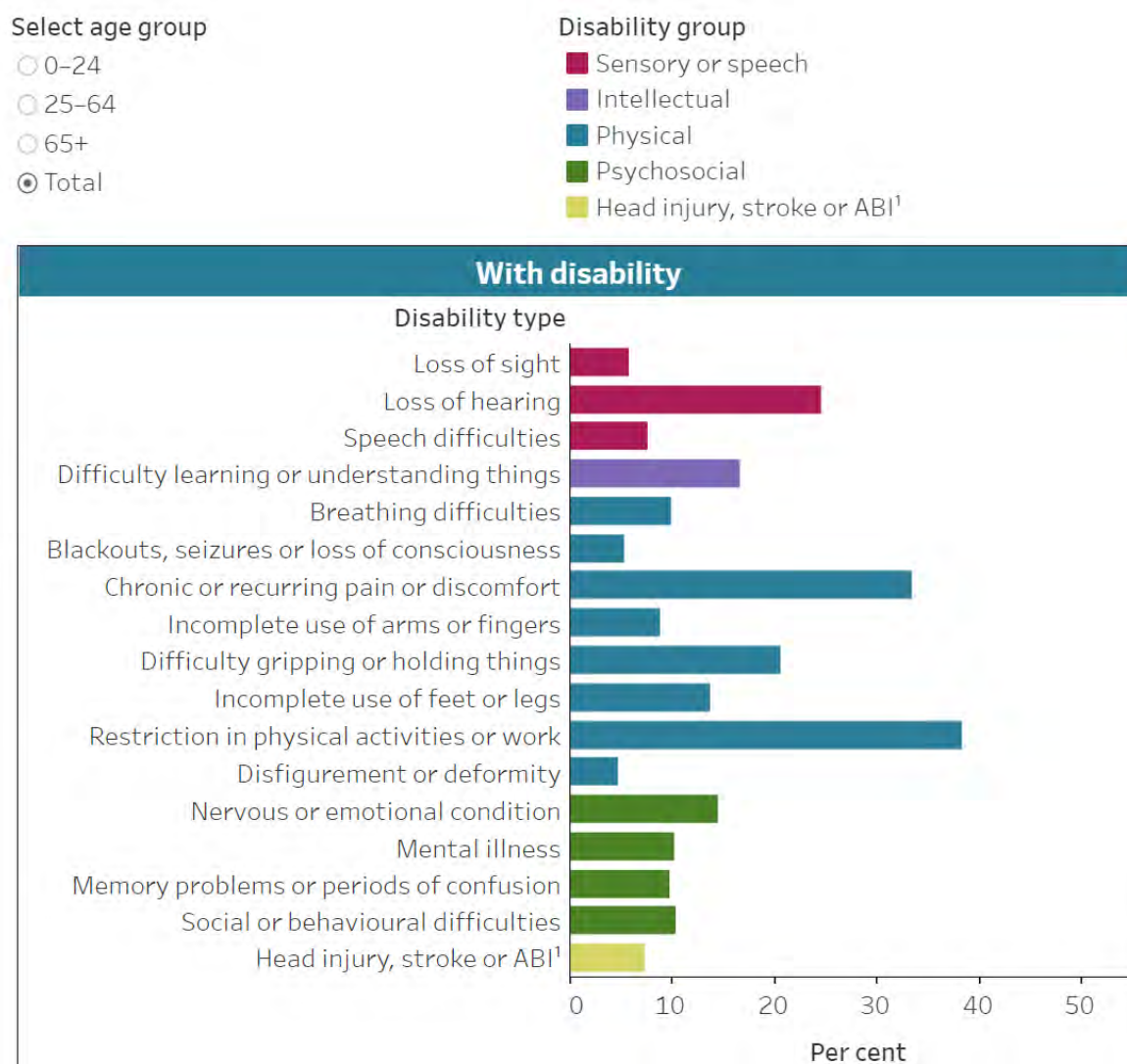
In Australia, 23% of people with a disability have a cognitive or behavioural disability (AIHW, 2022). This includes conditions regarding intellectual and developmental (e.g., ASD), mood affective disorders (e.g., depression), or Dementia and Alzheimer's (AIHW, 2022).

Key considerations for bushwalking for people with a cognitive or behavioural disability include hyposensitivity or hypersensitivity to sounds, smells, and light (McIntosh & Thomas, 2020). This can result in risks such as not realising when in pain and discomfort, or hypersensitivity causing pain and discomfort (McIntosh & Thomas, 2020). For people with ASD, they may need to stim, which is a self-soothing technique and presents in every person uniquely, such as rocking, banging on things, or flapping hands (McIntosh & Thomas, 2020). If stimming is done in an unsafe environment, accidental risks can be involved such as displaying disruptive behaviours or destroying equipment (Broder-Fingert et al., 2015 as cited in McIntosh & Thomas, 2020; McIntosh & Thomas, 2020). Unique objects, such as shiny or sharp objects, may spark interest in people with ASD, thus posing a risk of injury, particularly in a trail that may entail plants with thorns that can be toxic (McIntosh & Thomas, 2020). To address these considerations, it is important that any artificial elements and plants are catered to this and will not present any risk of injury.

People with cognitive or behavioural disabilities may also have communication difficulties and may not communicate when they are feeling in danger, or are distressed (American Psychiatric Association, 2013 as cited in McIntosh & Thomas, 2020). It is important that people with a cognitive or behavioural disability receive special instruction and attention to avoid injury to themselves or others (McIntosh & Thomas, 2020). For people with Dementia and Alzheimer's, there may be challenges with memory, executive functioning, attention, independence, agitation, and disruptive behaviours (Collins et al., 2020). This may present safety challenges such as remembering which directions to follow or forgetting where they are located. This can lead to heightened states of agitation and anxiety.

Figure 1 displays the spread of different types of disabilities in Australia, highlighting the variety of disabilities people can present with, and the type of consumers that may be expected to visit Binna Burra Lodge.

Figure 1

*The Prevalence of Types of Disability in Australia Across All Ages in 2018*

<sup>1</sup>Head injury, stroke or acquired brain injury.

*Note.* From *People with disability in Australia*, by Australian Institute of Health and Welfare, 2022 (<https://www.aihw.gov.au/reports/disability/people-with-disability-in-australia/contents/people-with-disability/prevalence-of-disability>). In the public domain.

The next section of the report focuses on the context of Binna Burra, regarding the climate and Aboriginal and Torres Strait Islander culture of the area. Considerations and implications of such contextual factors in relation to the development of a sensory trail are explained.

## 4.0 Context of Binna Burra

### 4.1 The Impact of Climate Change

With the prevalence of climate change, extreme weather events are likely to be exacerbated in frequency and severity (Queensland Government, 2019). This is a major threat to small communities, such as Binna Burra, that are primarily dependent on nature-based tourism for business and employment (Pyke et al., 2018). Additionally, major bushfires cause strong feelings of loss for small communities, but also create a powerful sense of community connectedness and support after the disaster (Novais, et al., 2022). Therefore, it is important that the sensory trail can withstand extreme weather events, particularly as they are becoming increasingly likely with climate change. It is also important to consider a bushfire evacuation plan in the sensory trail.

Bushfires are likely to be harsher in the future due to increased dryness and hot and windy conditions, therefore, protecting the ecologically rich wilderness of SEQ is important (Queensland Government, 2019). Collaboration with First Peoples may be beneficial in enhancing preparedness for potential bushfires as it is understood by the Binna Burra community that First Peoples connection to land is incredibly valuable (Novais et al., 2022). This information is applicable in the development of a sensory trail as it highlights that First Peoples' knowledge may be valuable for future bushfire prevention.

### 4.2 Culture of Lamington National Park

The Lamington region was inhabited by the Yugambeh People, including tribes of the Birinburra, Kombumerri, Wangerriburra and Migunberri People (Lamington National Park, n.d.). After European settlement, there were attacks on the Yugambeh land and People. This has resulted in Yugambeh ways of doing, such as traditional practices, being largely eradicated (Lamington National Park, n.d.). Binna Burra has developed a reconciliation action plan that outlines the actions they will take to begin decolonisation (Binna Burra Lodge, 2021). The main aim is to understand how the Yugambeh People used to occupy Lamington National Park, such as their daily activities, their knowledge of the land, and climate patterns, and reflect these in the re-establishment of their business (Binna Burra Lodge, 2021b). Binna Burra has already started actioning their reconciliation, holding a smoking and healing ceremony one year after the bushfires (Binna Burra Lodge, 2021c). Reconciliation is a high priority for Binna Burra Lodge as they rebuild their business and community (Binna Burra Lodge,



*Note.* From *Binna Burra commits to a reconciliation action plan*, by Binna Burra Lodge, 2021 (<https://www.binnaburrallodge.com.au/news/binna-burra-commits-to-a-reconciliation-action-plan/>). In the public domain.



2021b). If Binna Burra were to partner with the Yugambah Peoples of their land, it can aid in the preparation for potential bushfires through their historical and valuable knowledge on the land. Additionally, by partnering with the Yugambah Peoples, it would increase the sense of connection with community, and contribute to the regaining of Yugambah land, culture, activities, and ways of doing that have been lost and forgotten since European settlement.

Considering the above information, existing sensory trails around the world will be analysed in the next section of the report. This will include strengths and weaknesses and how different concepts could be implemented into the development of the sensory trail at Binna Burra Lodge.

## 5.0 Precedents

To analyse the following precedents, the strengths and weaknesses of each were deduced through reviews as sourced from online forums, in-person visits for some of the precedents, a visual analysis of photographs, and a review of existing literature. Finally, an overall summary of the recurring themes within both the strengths and weaknesses was produced, to determine what the primary considerations would be from the precedents to take forward into the development of the sensory trail at BBL. This information will now be provided for each precedent.

## 5.1 Gold Coast Regional Botanic Gardens – Sensory Garden & Indigenous Garden

The sensory garden situated in the Gold Coast Regional Botanic Gardens is about 200 metres in length and was developed in 2005.



Note. From *Botanical Gardens Map of Attractions*, by City of Gold Coast, n.d.

(<https://www.goldcoast.qld.gov.au/files/sharedassets/public/pdfs/brochures-amp-factsheets/botanic-garden-attraction-map.pdf>). In the public domain.

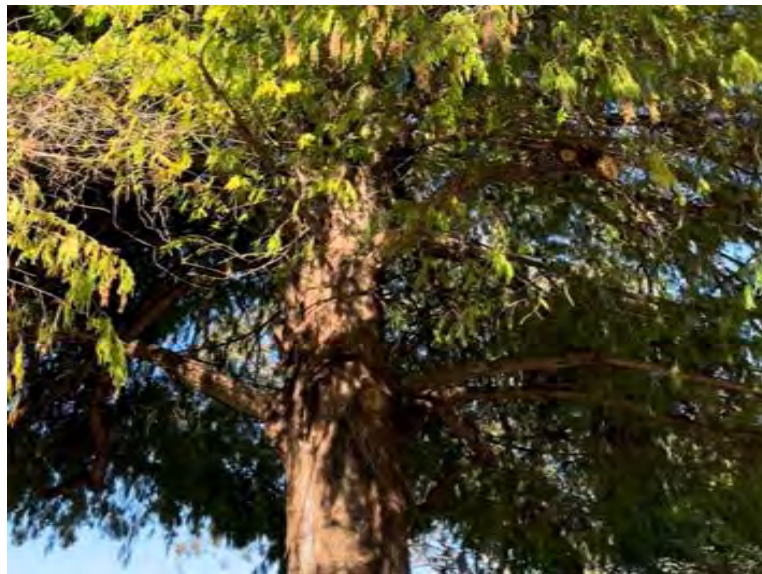
### Strengths

- Map outlining the suggested route of travel
  - Open-space plan making it easy for wheelchair access, this was frequently mentioned in reviews (Tripadvisor, n.d.-a)
  - Disabled parking right next to sensory garden – four disabled parks with ramp access
  - Interesting design and concept to engage participants
  - Lots of benches for seating and rest (10 benches approximately)
  - Flat and wide pathways to fit wheelchairs
- Peaceful place (Tripadvisor, n.d.-a)



### Weaknesses

- Lots of low-lying plants, not many big trees so not prompted to look up and explore more
  - Quite low garden beds at inconsistent heights
  - No indication of where the garden beds are – no handrails to guide through garden or tactile ground indicators
  - Some plants were better suited to sections other than the one that they were in
  - No braille signs or tactile ground indicators
- Reviews have indicated that people want to see more variety of plants such as bigger trees and wow things (Tripadvisor, n.a.-a)



### **Touch Section**

#### Strengths

- The touch aspect of garden featured different textures

#### Weaknesses

- However, the type of textures was limited and only included plant leaves (did not feature varying types of bark and petals, or types of tree trunks)

### **Sound Section**

#### Strengths

- Audio recording to guide participants on how to best experience the sensory garden

#### Weaknesses

- The sound of the wind moving through the leaves and branches was the source of sound
- This sense could have potentially been better highlighted through the use of other plants or potentially an auditory instrument section
- The sound aspect of this sensory garden was rather limited, only featuring a large tree to stimulate this sense



### **Taste Section**

#### Strengths

- The taste aspect of the garden primarily featured the herb garden as well as a nasturtium bush

#### Weaknesses

- Whilst this featured many types of herbs, this garden was limited in the types of edible plants featured



### **Sight Section**

#### Strengths

- Sight featured stimulating textures and colours and uniquely shaped plants, featuring succulents and flowers/shrubs as well as textured bark
- Vibrant colours in the flower section (yellow/purple/pink)

#### Weaknesses

- The colourful flower section only comprised a small component of the sight section, and the colours were not utilised as best they could have been





### Smell Section

#### Strengths

- The smell aspect of this sensory garden featured a lot of herbs, such as mint and basil, as well as lavender and garlic-smelling plants

#### Weaknesses

- There was a limited range of floral smelling plants
- Some plants (especially garlic plants) smelt very strong and unpleasant



### Indigenous Garden Strengths

- Clear paths with wood on each side to indicate edge of path
- Clear signage
- Featured historical and cultural information surrounding the uses of the plants and their significance in Aboriginal and Torres Strait Islander history

### Weaknesses

- Not very accessible (narrow paths, gravel paths, uneven surfaces)

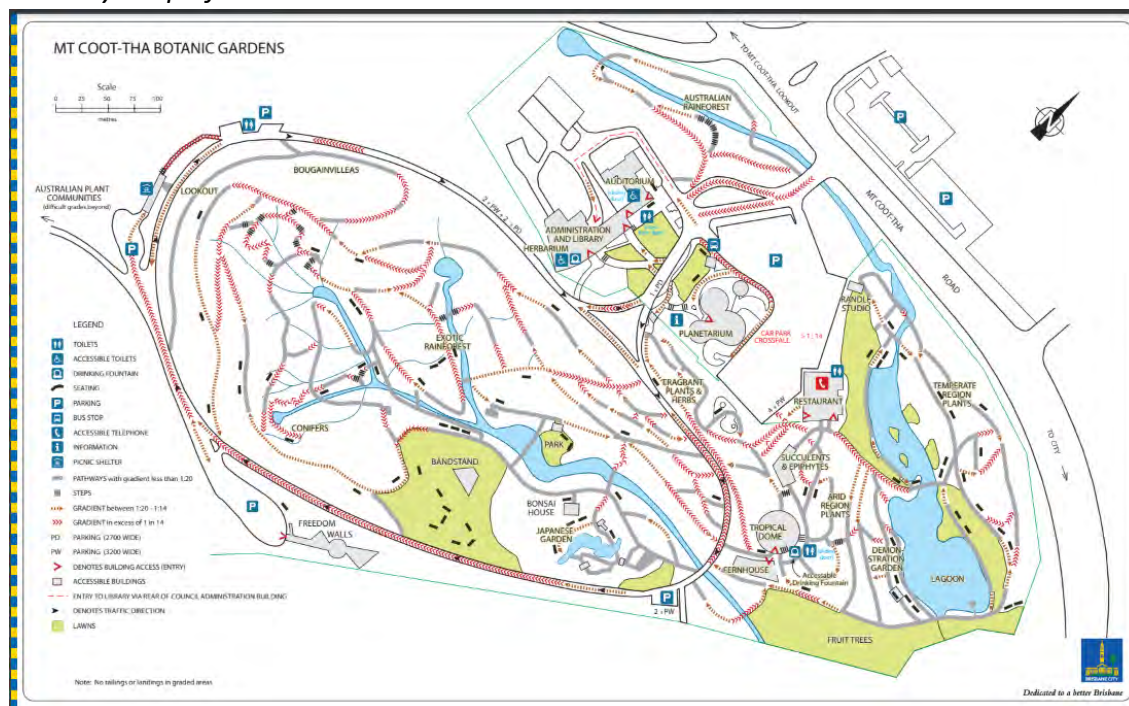




## 5.2 Mt Coot-tha Botanic Gardens

Mt Coot-tha Botanic Gardens features a fragrant garden of a range of culinary, fragrant and medicinal herbs, in addition to flowers and foliage of different scents (Brisbane City Council, 2019). The Mt Coot-tha Botanic Gardens features many opportunities to stimulate the senses. This included the textures of different leaves (rough compared to smooth), barks (flaky or rough), the scents of different shrubs and leaves and bushes, as well as the different visual experiences various shapes and textures of different plants can provide.

### Mobility Map of Mt Coot-tha Botanic Gardens



Note. From Brisbane Botanic Gardens Mobility Map, by Brisbane City Council, Year [https://www.brisbane.qld.gov.au/sites/default/files/brisbane\\_botanic\\_gardens\\_mobility\\_map.pdf](https://www.brisbane.qld.gov.au/sites/default/files/brisbane_botanic_gardens_mobility_map.pdf)). In the public domain.

### Strengths

- Huge variety of plants from various places around the world
- Most paths were sealed to allow wheelchair access
- Mobility map available to the public, outlining the gradient, garden features, and disabled facilities. This means that people can easily access what they are able to

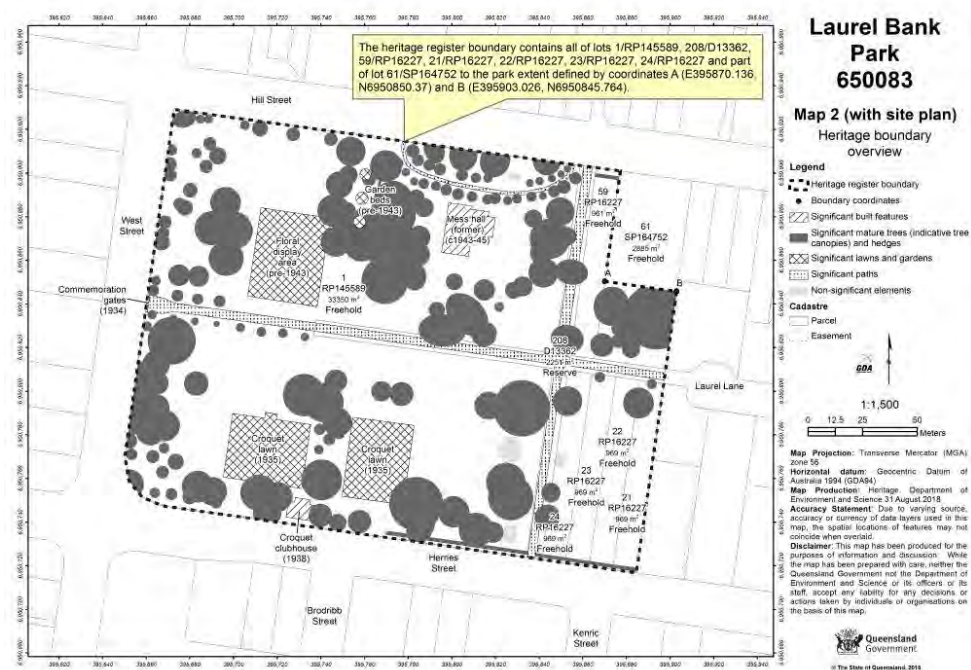
### Weaknesses

- Very sloped environment, with many uphill and downhill. This would be a challenge for people with mobility challenges to explore the whole garden, as they may not have the endurance
- Only 2 wheelchair accessible toilets, both not within proximity to the gardens

### 5.3 Laurel Bank Park Toowoomba

Laurel Bank Park, located in Toowoomba, has a scented garden that was designed for visually impaired people (Toowoomba Region, 2021). Below are some images of the scented park. The purpose of the garden is to exhilarate the senses while accommodating various needs of people (Toowoomba Region, 2021). Other features in Laurel Bank Park outside of the scented garden include uniquely shaped plants, making it inviting for children and families. It is suggested to allow 1-2 hours to explore around the whole of Laurel Bank Park (Tripadvisor, n.d.-b).

#### Images of Laurel Bank Park Scented Garden



Note. From *Laurel Bank Park Site Plan*, by Queensland Government, 2022 (<https://apps.des.qld.gov.au/heritage-register/detail/?id=650083#>). In the public domain.

*Images of Laurel Bank Park*



*Note.* From *Toowoomba CBD - Laurel Bank Park*, by Toowoomba Region, 2021 (<https://www.tr.qld.gov.au/facilities-recreation/parks-gardens/parks-by-location/toowoomba-cbd-laurel-bank-park>). In the public domain.

*Note.* From *Laurel Bank Park*, by Tripadvisor, n.d.-b ([https://www.tripadvisor.com.au/Attraction\\_Review-g255340-d3561489-Reviews-Laurel\\_Bank\\_Park-Toowoomba\\_Queensland.html](https://www.tripadvisor.com.au/Attraction_Review-g255340-d3561489-Reviews-Laurel_Bank_Park-Toowoomba_Queensland.html)). In the public domain.



Note. From *Laurel Bank Park*, by Tripadvisor, n.d.-b ([https://www.tripadvisor.com.au/Attraction\\_Review-g255340-d3561489-Reviews-Laurel\\_Bank\\_Park-Toowoomba\\_Queensland.html](https://www.tripadvisor.com.au/Attraction_Review-g255340-d3561489-Reviews-Laurel_Bank_Park-Toowoomba_Queensland.html)). In the public domain.

### Strengths

As outlined from the reviews:

- Visually appealing,
- Easy to walk around and navigate, even with a mobility aid,
- Great scented garden (Tripadvisor, n.d.-b).

Other strengths:

- Raised edges on pathways,
- Raised garden beds,
- Picnic tables designed for wheelchair access,
- Kitchen garden,
- Seating options in private, shaded areas under big feature trees (Toowoomba Region, 2021).

### Weaknesses

- When flowers were not in blooming season, Laurel Bank Park can look less appealing (Tripadvisor, n.d.-b)

## 5.4 Catoctin Creek Park Multi-Sensory Trail

Catoctin Creek Park features a Multi-Sensory Trail and is located in Maryland and is tailored for visually impaired individuals and others with physical disabilities (Nature for the Blind, n.d.). The length of this trail is approximately 300m and features 12 interactive touch and smell stations (Nature for the Blind, n.d.). There are wind chimes at the beginning of the trail and there are 'clues' for each station to encourage further engagement in the trail (Nature for the Blind, n.d.).



*Note.* From *Catoctin Sensory Trail*, by AllTrails, n.d. (<https://www.alltrails.com/explore/trail/us/maryland/catoctin-sensory-trail?mobileMap=false&ref=sidebar-static-map&u=m>). In the public domain.



### Strengths

- Interactive stations make the trail exciting, further encouraging the use of the senses
- Clear signage regarding how to use the sensory trail and what is allowed in the trail
- Man-made structures look natural and blend into the environment
- Length of the trail is suitable to individuals who may have difficulty with endurance
- Accessible from car park and is paved from the car park to the start of the trail

### Weaknesses

- Pathways are not easily accessible as they are not sealed. This makes the ground more prone to becoming unstable and uneven
- In winter it snows here, therefore it wouldn't be very accessible, especially to someone with mobility challenges

AllTrails. (n.d.) *Catoctin Sensory Trail* [image].

AllTrails.

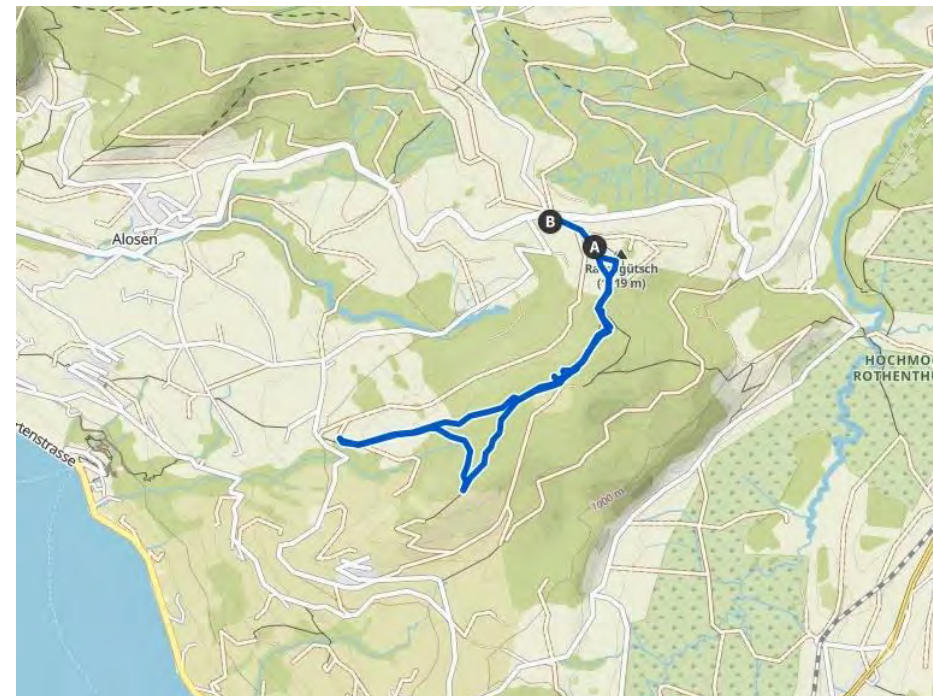
<https://www.alltrails.com/trail/us/maryland/catoctin-sensory-trail?u=m&u=m>



Note. From *Zugerland Sensory Trail*, by T. Deans, 2016 (<https://swissfamilyfun.com/zugerland-sensory-trail/>). In the public domain.

## 5.5 Zugerland Sensory Trail

Zugerland sensory trail is located in Lake Lucerne in Switzerland. The trail is 4.1 kilometres long, with 80 metres of elevation (Deans, 2016). It consists of eight play stations that relate back to the five senses, as well as picnic areas with fire pits (Deans, 2016). The paths are not sealed but are mostly free of hazards making it relatively safe to complete with a mobility aid (Deans, 2016). Below are some features of the Zugerland sensory trail.





### Zugerland Sensory Trail: Touch

Note. From *Zugerland Sensory Trail*, by T. Deans, 2016 (<https://swissfamilyfun.com/zugerland-sensory-trail/>). In the public domain.

- The board features different holes with different textures where you can guess what you are touching (e.g. fur, antler, bark etc.) (Deans, 2016).



### Zugerland Sensory Trail: Sound

Note. From *Zugerland Sensory Trail*, by T. Deans, 2016 (<https://swissfamilyfun.com/zugerland-sensory-trail/>). In the public domain.

- You can hit the wires with an attached stick which are attached between cowbells at this station to produce different pitches and tones of sound as it vibrates (Deans, 2016).
- Additionally, this sense has two drums whereby sounds can echo throughout them to stimulate auditory perception (Deans, 2016).





### Zugerland Sensory Trail: Smell

*Note.* From *Zugerland Sensory Trail*, by T. Deans, 2016 (<https://swissfamilyfun.com/zugerland-sensory-trail/>). In the public domain.

- This component of the trail features a lever where you can push it to emit smells associated with the picture (Deans, 2016).
- Some smells include mushrooms, cherries etc. (Deans, 2016).

### Zugerland Sensory Trail: Sight

- This sense features a telescope to observe the panorama of the landscape or on the flight of bird to stimulate this sense.
- Additionally, this sense features spinning circles that produce optical illusions (Deans, 2016).



*Note.* From *Zugerland Sensory Trail*, by T. Deans, 2016 (<https://swissfamilyfun.com/zugerland-sensory-trail/>). In the public domain.

### Strengths

- Very interactive and hands-on with unique activities for stimulating the senses in different ways
- Appears to incorporate recycled materials that reflect the natural environment
- Effective and engaging use of signage
- Very child friendly as heavily activity-based

### Weaknesses

- Distance is largely inaccessible for those who experience difficulty mobilising
- Many activities rely on artificial elements to engage individuals in experiencing their senses
- Path is not sealed making it harder to mobilise through with a mobility aid
- Lots of tree roots protruding from the ground which is a safety hazard
- Lacks cultural and informative elements for learning opportunities

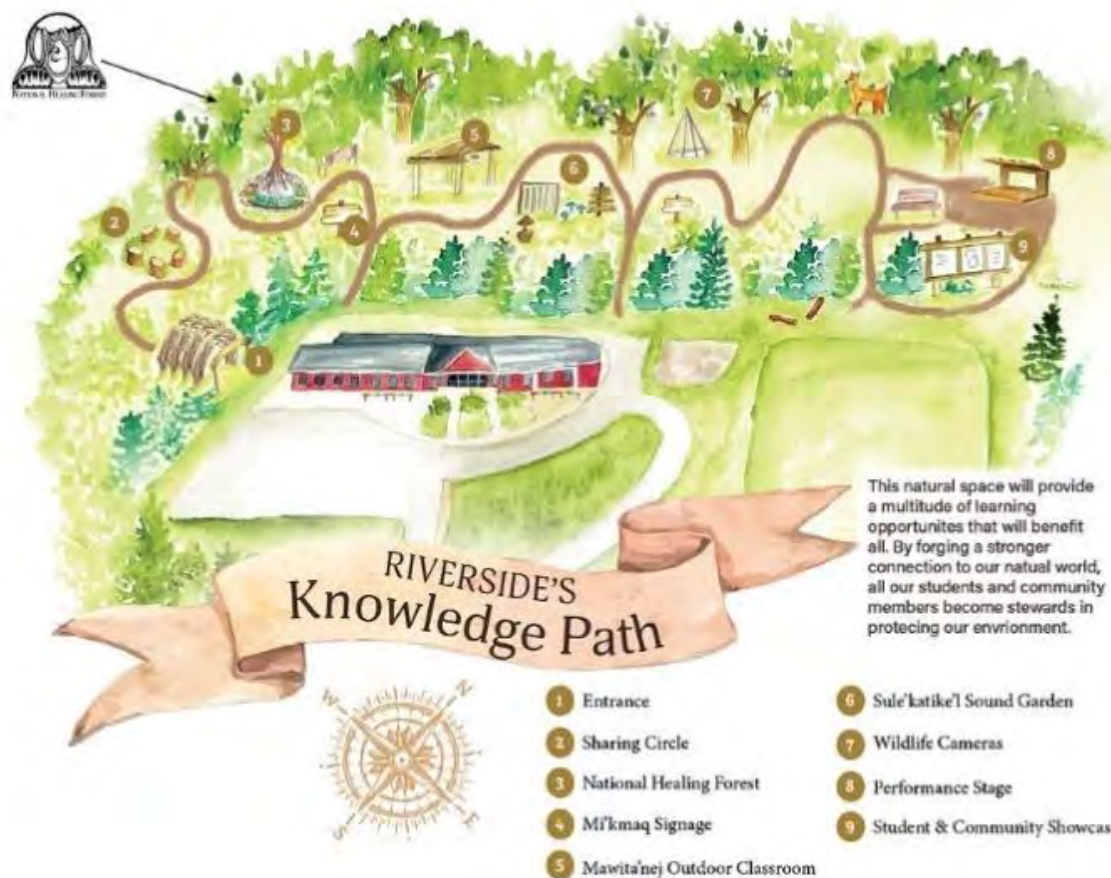
## 5.6 Riverside School, Nova Scotia – Knowledge Path

At Riverside School, located in the Albert Bridge of Nova Scotia, there is a 2-kilometre interactive path in the forest next to the school grounds (Wentzell, 2021). This track is called the 'Knowledge Path,' having a strong focus on reconciliation with Elders of the land (Wentzell, 2021).

Features of the Knowledge Path include:

- Inviting elders to come and share their stories and knowledge (Wentzell, 2021)
- National healing forest (Wentzell, 2021)
- Mindful messages reminding people to pause and reflect (Wentzell, 2021)
- Signs and picnic tables include QR codes to scan and interact further (explaining plant species) (Wentzell, 2021)
- Colourful birdhouse, flower gardens, and rock gardens (Wentzell, 2021)

*Note.*



From *Map*, by Riverside Knowledge Path, n.d. (<https://www.riversideknowledgepath.ca/map>).

In the public domain.



### Strengths

- Lots of incorporation of First Nations culture and knowledge, showing genuine effort in reconciliation
- Artificial objects implemented into the trail were created by the community, enhancing the sense of community e.g. use of colourful birdboxes
- Birdboxes encouraging more wildlife into the trail
- Overall, very informative and a trail for educational purposes
- Undercover area which is good for when it is raining
- Benches for resting
- Different mediums of interactions (electronic/in person)

### Weaknesses

- Is situated next to a school so may be exclusive to school students – how do you access it if you are from the public
- Disruption to the trail and peace from school noises (e.g., school bell and kids playing and shouting)
- Does not necessarily appear to be designed for all-abilities
- Distance does not accommodate for individuals with different levels of endurance

*Note. From Nova Scotia school fosters learning and reconciliation with forest path, by B. Wentzell, 2021 (<https://www.cbc.ca/news/canada/nova-scotia/albert-bridge-riverside-school-mi-kmaw-knowledge-path-1.6078877>). In the public domain.*

## 5.7 Critical Analysis

Positive elements identified from these precedents that could be applied to the Binna Burra context are:

- Focusing the sensory trail on a specific theme or central idea to ensure that there is purpose, meaning, and that the trail is not only an experience, but a journey.
- Ensuring that the sensory trail features elements that are interactive and activity based. This allows for both a self-directed experience as well as one that is prompted, allowing individuals to experience the sensory trail through different means.
- Prioritising accessibility within sensory trails, such as incorporating rest spots is beneficial and allows for people of all abilities the opportunity to experience sensory trails at their own pace.

To make a sensory trail more inclusive, the following aspects should be considered:

- Ensuring safety concerns are addressed to reduce risks, including having sealed pathways, and maintaining plant growth so they do not obstruct pathways as these are trip hazards.
- Designing the trail so it is exciting, as the reviews showed that when a trail lacked variety of plants, then it was boring, and people did not appreciate the space for what it was.
- Considering seasonal changes and the effect on plant growth as this can dramatically change the visual appeal and accessibility of the trail. For example, considering when flowers bloom and therefore will be bright and colourful, versus Autumn, when some plants may be shed their leaves and look bare.
- Considering the impact of undesirable smells on all sections of the trail, as it may deter people from the space and contribute negatively to the sensory experience.

In the next section of the report, an analysis is conducted on a consumer survey that was sent to regular visitors of Binna Burra Lodge, and people with different abilities. This analysis will inform what people do and don't want to see in a sensory trail at Binna Burra Lodge, ensuring that the concepts designed are meeting the requirements of its future consumers.

## 6.0 Consumer Perspectives

An important component of occupational therapy practice is to speak to and collaborate with the community, to ensure a comprehensive understanding of the community members' diverse perspectives. This ensures that service provision is meaningful and purposeful to the community.

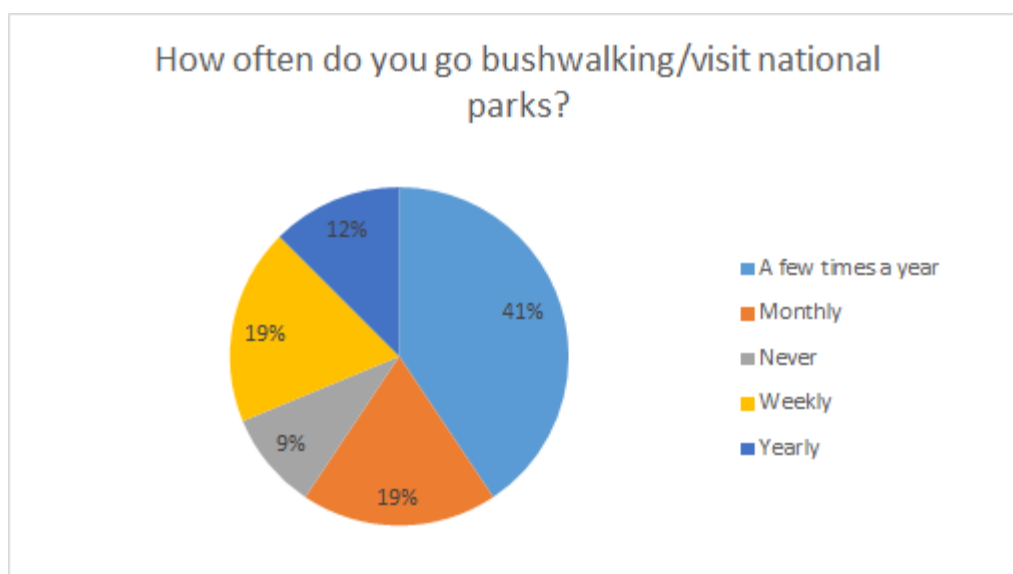
To ensure this, a survey was developed and sent to various groups of individuals who may be potential consumers of the sensory trail. Perspectives that were represented in this survey included individuals with vision impairments, individuals who are deaf, individuals who experience difficulties with mobility, individuals with sensory challenges such as Autism Spectrum Disorder, individuals who experience cognitive challenges, as well as current consumers and users of BBL. Questions aimed to understand the current frequency of bushwalking and visiting national parks and the reasons for this, as well as any challenges individuals may experience when bushwalking or visiting national parks. Additionally, the survey aimed to understand what individuals pay attention to when bushwalking or visiting national parks, and how they use their senses to interact with these environments. Finally, the questions were directed at understanding what sensory experiences individuals dislike when bushwalking or visiting national parks and what they would like to see in the development of a sensory trail.

### 6.1 Survey Responses

From the survey, 32 responses were gathered. The first question was a quantitative measure of how often the participants bushwalk or visit national parks, and this is presented in figure 1.

Figure 1

*Survey responses*



The remainder of the survey featured six qualitative questions. These questions, and the themes that emerged and quotes that reflect these themes, are presented in table 1.

**Table 1: Survey Questions, Themes, and Quotes**

Question	Theme/s	Quotes
Why do you participate/not participate in bushwalking/visiting national parks?	Participation occurs because: <ul style="list-style-type: none"> <li>• Mindfulness and rejuvenation,</li> <li>• Enjoying and experiencing nature’s beauty and quietness,</li> <li>• To be active.</li> </ul> Participation does not occur because: <ul style="list-style-type: none"> <li>• Mobility issues and physical inability,</li> <li>• Uneven surfaces,</li> <li>• Inaccessibility.</li> </ul>	<ol style="list-style-type: none"> <li>1. “It recharges the spirit to get close to the natural environment.”</li> <li>2. “I enjoy bushwalking as I enjoy all aspects of nature, the plants, wildlife ... and for the exercise.”</li> <li>3. “Trying to get over any high vines or bumps in the road can throw you out of your wheelchair, so it’s not something I do very regularly unless I know the park is completely accessible.”</li> <li>4. “I like being in the bush, but mobility issues hinder my ability to participate in long walks, on uneven surfaces and sloping surfaces.”</li> </ol>
What challenges do you experience when bushwalking/visiting national parks?	<ul style="list-style-type: none"> <li>• Physical challenges – stamina, balance, fatigue, and the area not accommodating for this,</li> <li>• Poorly maintained walks and areas,</li> <li>• Inaccessibility,</li> <li>• Lack of up-to-date information and informative signs on plants, wildlife and First Peoples culture.</li> </ul>	<ol style="list-style-type: none"> <li>1. “Overcoming my lack of fitness to go uphill! Sometimes the tracks being overgrown.”</li> <li>2. “I am getting older and need to stop and have a rest thus would appreciate a bench or two.”</li> <li>3. “I find the tracks too rough and uneven, or slippery, ... not enough places to sit down and rest. Also handrails on steps aren’t there.”</li> <li>4. “Usually, most walks are not accessible or only partially accessible for wheelchairs, due to steps or not well kept paths.”</li> <li>5. “Up-to-date information on access to the tracks and lack of good interpretive signs on the plant and wildlife species as well as the Indigenous connection and pre/post colonial history.”</li> </ol>

<p>What do you pay attention to when bushwalking/visiting national parks (If you do not go bushwalking/visiting national parks, apply this to nature broadly)?</p>	<ul style="list-style-type: none"> <li>• Birds and other animals,</li> <li>• Plants and vegetation,</li> <li>• Accessibility and available facilities,</li> <li>• Waterfalls, waterways, water courses, creeks.</li> </ul>	<ol style="list-style-type: none"> <li>1. "All the landscape and surrounding nature. I also pay attention to its accessibility and access around the national park."</li> <li>2. "I love the trees, I like to hug them and touch them if possible. I love to stop and see and hear the wildlife, especially the birds. I love waterfalls, the sound of the water is so calming. The air smells so fresh and clear"</li> <li>3. "Facilities for a range of walkers. Those who have elderly parents, smaller grandkids"</li> <li>4. "Birds, plants, other wildlife, how the rays of the sun play with the vegetation, the holistic beauty and of course, not getting lost."</li> </ol>
<p>How do you like to use your senses when bushwalking/visiting national parks (e.g. sight, touch, taste, smell, hear)?</p>	<ul style="list-style-type: none"> <li>• Feeling textures,</li> <li>• Smelling fresh air, as well as the unique scents of the bush (soil, vegetation),</li> <li>• Looking for specific things – birds, types of plants, information panels, colours,</li> <li>• Listening for bird calls, moving water, appreciating quietness.</li> </ul>	<ol style="list-style-type: none"> <li>1. "Touching different vegetation surfaces, smelling various leaves e.g. eucalyptus, lantana, celery bush etc., finding different colours, listening and identifying different bird calls."</li> <li>2. "The air smells so fresh and clear, I like to take a deep breath and breath it all in. I do love to touch and hug large trees they are so grounding. Listening to the birds is amazing, it's the pure beauty the sounds, the fresh smells that make me feel good, and I love the sound of running water and to feel the mist from a waterfall."</li> <li>3. "The smell of clean air is noticeable. I enjoy listening to the birds that are different to those in more open areas especially lyrebirds, whipbirds, bellbirds. I also enjoy the babble of water running through the forest floor."</li> <li>4. "Looking at all the nature and hearing the birds and natural sounds out in the park"</li> </ol>
<p>In relation to your senses, what aspects of bushwalking/visiting</p>	<ul style="list-style-type: none"> <li>• Poor/foreign smells,</li> </ul>	<ol style="list-style-type: none"> <li>1. "Smells of the public toilet at the entrance."</li> <li>2. "Bad smells."</li> </ol>

<p>national parks do you not like (e.g. sight, touch, taste, smell, hear)</p>	<ul style="list-style-type: none"> <li>• Touch, especially due to a lack of information on what plants are safe,</li> <li>• Taste,</li> <li>• Loud noises from crowds.</li> </ul>	<ol style="list-style-type: none"> <li>3. "Taste never, touch probably not as can damage leaves."</li> <li>4. "I tend not to touch or taste things that are unfamiliar to me. I thoroughly dislike hearing other people yahoo-ing through the forest disturbing the peace."</li> <li>5. "I don't like crowds spoiling the peace."</li> </ol>
<p>How could a sensory trail be accessible to your needs (i.e. what would you like to see in one)?</p>	<ul style="list-style-type: none"> <li>• By being safe and accessible to all abilities,</li> <li>• Stimulate all the senses,</li> <li>• Appropriate parking and toiletry facilities, as well as seating and undercover areas,</li> <li>• Information about senses trail/accessibility and challenges along the way to enhance experience.</li> </ul>	<ol style="list-style-type: none"> <li>1. "The trail would need to be able to be flat enough and wide enough and smooth enough to take a small scooter or wheelchair."</li> <li>2. "All trails are sensory but walking with someone who uses senses (because they lack one or more) in enhanced ways would be interesting to appreciate."</li> <li>3. "Having wheelchair accessible parking, wheelchair accessible toilets, having pathed trails, having lower rails to see over, having information boards about the area at the height for someone in a wheelchair. Having picnic tables with a gap for wheelchairs to drive into. Having covered areas in case it starts raining."</li> <li>4. "Less slippery walkways, I would also like to be able to touch, plants and be able to access the creeks and waterways."</li> <li>5. "I'd like a good surface, places to sit and interesting things / plants and leaves. Perhaps some challenges e.g. Find 5 different shaped leaves, or can you find a pink or orange leaf. There could be some used bird nests with a quiz, or some plants to crush the leaf and identify the smell."</li> </ol>



## 6.2 Critical Analysis

From the survey responses, the following themes will be highly considered in the development of the concepts for the sensory trail to go at Binna Burra Lodge.

- Accessibility particularly in regard to the pathways being flat and not slippery,
- A balance between artificial and natural elements
- The appeal of a water feature and the associated sensory experiences it presents,
- Touch and smell are the least favourable senses, where people are less likely to want to interact with these,
- Appropriate disability facilities and equipment,
- Up to date information on the sensory trail.

In the next section of the report, a proposal is made for a sensory trail at Binna Burra Lodge when considering the above background research, precedents, and survey responses. The potential locations for a sensory trail at Binna Burra Lodge are presented with strengths and weaknesses of each, which leads into the concepts of what could be included in the sensory trail.

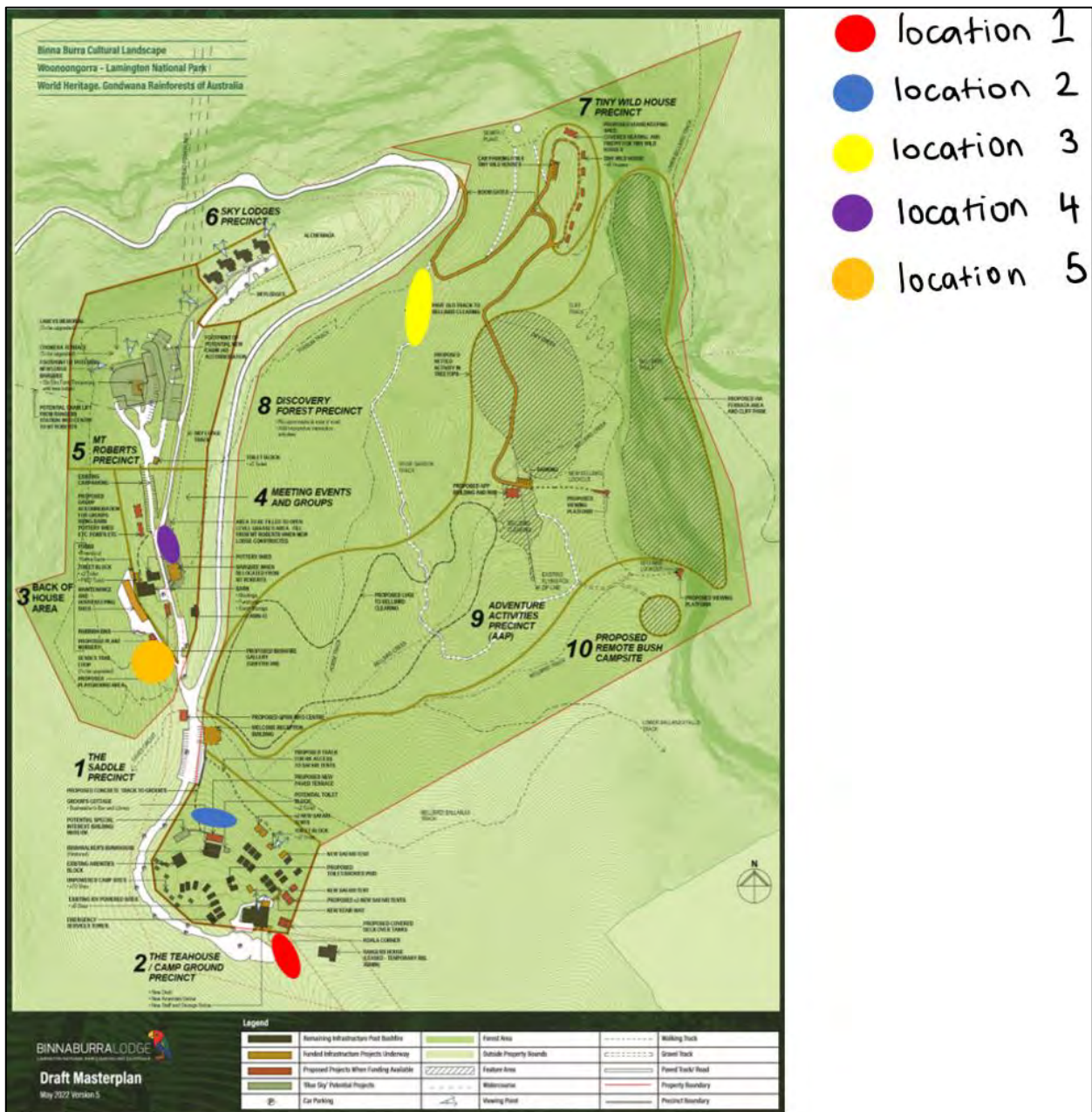
# 7.0 Proposal

## 7.1 Proposed Locations

Figure 2 displays the five potential locations where the sensory trail could be developed at Binna Burra Lodge, followed by a strengths, weaknesses, opportunities, and threat analysis of each location. After discussion with BBL stakeholders, it was concluded that there is also the opportunity for the creation of a new location for the sensory trail. This is at the discretion of BBL stakeholders, when this project further develops beyond this report.

Figure 2

Proposed Locations Superimposed onto BBL Masterplan Map



### Location 1: Outside Teahouse



**Location 2: Hill Infront of Groom's Cottage**



**Location 3: Garden's Trail**



**Location 4: Old Children's Playground (opposite conference room)**



### Location 5: Old Sensory Trail



**Table 2: Strengths, Opportunities, Weaknesses and Threats of Location 1 - Outside Teahouse**

<b>Strengths</b>	<b>Opportunities</b>	<b>Weaknesses</b>	<b>Threats</b>
Close to parking lot.	Allows for easy access and for people with mobility issues, they don't have to walk far.	Hard to integrate natural elements as quite open space and blank.	Does not allow users to fully immerse themselves in the natural environment as it is relatively artificial.
Wide pathways.	Wheelchair accessible.	Slight slope but could be made flatter.	Harder for someone in a mobility device to manoeuvre, could be unsafe if the mobility device does not have brakes.
Picnic benches already existing.	Accommodates for people who may need to take frequent breaks or are not very active but want to experience the sensory trail.	Not underneath a natural canopy.	Not as immersed in nature.
Close to Teahouse and toilet facilities.	Individuals can easily seek assistance from the staff at the Teahouse in the case of an emergency. Toilet facilities may be needed for different disability needs e.g. sanitary changes or medical needs.	Currently under the property of Queensland Main Roads Department.	Logistically, it would be very difficult to build on this land that is not owned by Binna Burra Lodge.
Relatively big area and open space.	Allows for broader creative freedom as there is more room to integrate concepts.		
Vehicle access to the path in the case of a medical emergency.	This is an important safety need, particularly for people with a physical disability who are at an increased falls risk.		
Clear visibility with lighting.	Accommodates for the safety needs of individuals who are vision impaired.		
No big roots or uneven surfaces.	Reduces falls risk and less construction required to even the ground surface.		



**Table 3: Strengths, Opportunities, Weaknesses and Threats of Location 2 - Hill Infront of Groom's Cottage**

<b>Strengths</b>	<b>Opportunities</b>	<b>Weaknesses</b>	<b>Threats</b>
Big area and open space.	Allows for broader creative freedom as there is more room to integrate concepts.	Big slope.	Harder to make accessible and flat.
Close to Teahouse and parking lot.	Allows for easy access for people with mobility issues, they don't have to walk far.	Hard to access easily due to stairs in front of Groom's cottage.	Trip and falls risk.
Central to the heart of Binna Burra.	Would be likely to attract a high volume of individuals based on its location relative to the rest of the BBL facilities.	Very open space with no canopy.	Does not allow for complete immersion into the Binna Burra surrounds and natural environment.
Direct and consistent sunlight.	Easier to establish new plants and optimal for plant growth.	Difficult to make a bigger trail and less creative freedom with shape of trail.	May limit what is achievable relating to the concepts of the trail and what can be included.
		Community members have expressed that they wouldn't want to see a sensory trail here. This is because the trail could block the Groom's cottage, which is original heritage of Binna Burra Lodge.	If we don't listen to the community's needs, there is the risk of implementing a trail that they won't like and therefore won't use. The trail may disrupt the heritage of Binna Burra Lodge and impede upon the iconic view of the cottage.
		Close to busy road.	Safety hazards particularly for children or people with poor road safety.
		Very busy area on weekends with picnics and families nearby.	Loud and crowded which could be a sensory challenge for some people.
		Would disrupt padymelon activity.	The padymelons would likely leave this space.

**Table 4: Strengths, Opportunities, Weaknesses and Threats of Location 3: Garden's Trail**

<b>Strengths</b>	<b>Opportunities</b>	<b>Weaknesses</b>	<b>Threats</b>
Location itself is quite a distance from the teahouse/main parking area.	This encourages people to explore more areas of Binna Burra Lodge, rather than congregating in one area.	Location itself is quite a distance from the teahouse/main parking area.	May discourage people from travelling to this area as it is currently somewhat hidden and unknown.
Wide pathways already existing.	Already accommodates for wheelchair access.	No nearby toilets and no parking facilities now.	Makes it difficult for seeking assistance from staff at Teahouse in the case of an emergency and the lack of toilet facilities may be a negative implication for those who have different disability needs e.g. sanitary changes or medical needs.
Existing trees and plants that could be suitable.	Binna Burra plants can be incorporated more easily with what is already existing. Less species needs to be introduced to Binna Burra which may take a long time to fully develop and grow.	Dense canopies.	Does not accommodate for the safety needs of individuals who are vision impaired.
Lots of different wildlife sounds.	This brings already existing calming aspects to the trail, in the sense of hearing.	Map shows boom gate at entrance to Tiny Houses and Garden's Trail	May discourage or make it difficult for individuals to visit location.
Relatively flat in most areas.	Less construction required to make the land flat and accessible.		
Future attraction for individuals staying in Tiny Houses and those visiting Adventure Park at Bellbird Clearing.	Opportunity for exciting trails close by to one of the accommodation areas. Encourages more use of this area which currently isn't used much.		

**Table 5: Strengths, Opportunities, Weaknesses and Threats of Location 4: Old Children's Playground (opposite conference room)**

Strengths	Opportunities	Weaknesses	Threats
Vey flat, cleared area.	Less construction is required to make the land flat and accessible.	Directly adjacent to the road.	Safety hazard particularly for children or people with poor road safety.
Existing bench.	Accommodates for people who may need to take frequent breaks or are not very active but want to experience the sensory trail.	Not underneath a natural canopy.	Not completely immersed in the Binna Burra surrounds.
Clear area.	Can easily be made into a trail as it is already flat.	Close to main area of lodge and accommodation.	Busier and louder.
Slight canopy with sufficient light.	Accommodates for the safety needs of individuals who are vision impaired.	Marquee planned to be moved into one side of this area.	Less space to incorporate sensory trail and depending what the marquee is used for, it may be very disrupting.
Adjacent parking.	Very easy access into the sensory trail from the car.		

**Table 6: Strengths, Opportunities, Weaknesses and Threats of Location 5: Old Sensory Trail**

Strengths	Opportunities	Weaknesses	Threats
Parking 100m away.	Close proximity to trail.	Dense canopies.	Does not accommodate for the safety needs of individuals who are vision impaired. Prone to humidity and mould problems. Too dark for the establishment of new plants.
		Designed specifically for individuals with vision impairment and not many considerations for other disabilities.	The proposed sensory trail must be accessible to people of all abilities.
		No toilets/facilities close by.	Makes it difficult for seeking assistance from staff at Teahouse in the case of an emergency and the lack of toilet facilities may be a negative implication for those who have different disability needs e.g. sanitary changes or medical needs.
		Skinny and winding trail.	May make manoeuvring the trail and accessibility difficult.

## 7.2 Final Proposal

***RECOMMENDATION:*** *Following a consideration of the strengths and weaknesses of the five potential locations at Binna Burra Lodge for a sensory trail, it is recommended that the Garden's Trail and the Hill Infront of Groom's Cottage are the two best locations for the new sensory trail.*

The proposed sensory trail is designed based on the Antarctic Beech Tree, which has historical and cultural significance to the Binna Burra community. The main path represents the stem of the leaf and will feature a creek running through the centre of this path to represent how water gives the plant, and nature, life. Each leaf that stems will feature one of the five senses. Throughout the trail there will be a variety of calming and stimulating experiences. Throughout each section, there will be one or more challenges presented, which was a common suggestion within the survey.

The leaf concept was selected, as this allows for people to choose the length of their journey depending on their needs for that day because it loops back to the main path. There will be clear signage for the entrance and exit points of each leaf to encourage a singular flow of traffic. The full length of the trail, going through each leaf and the stem will be approximately 400-500 metres in length. The stem will be approximately 80 metres long, with each leaf being approximately a 70-metre loop.

Figures 3, 4, 5 and 6 depict the sensory trail design if it was located at the Garden's Trail, as well as it superimposed onto the Binna Burra Lodge map to view its positioning. Please note that the drawings are not to scale.

Figures 3, 4 and 5

Sensory Trail Concepts

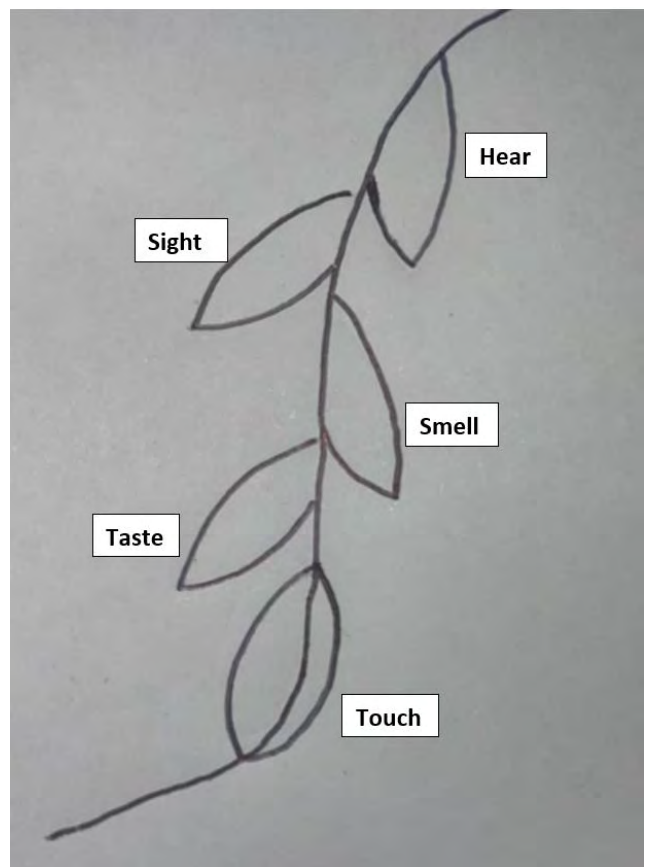
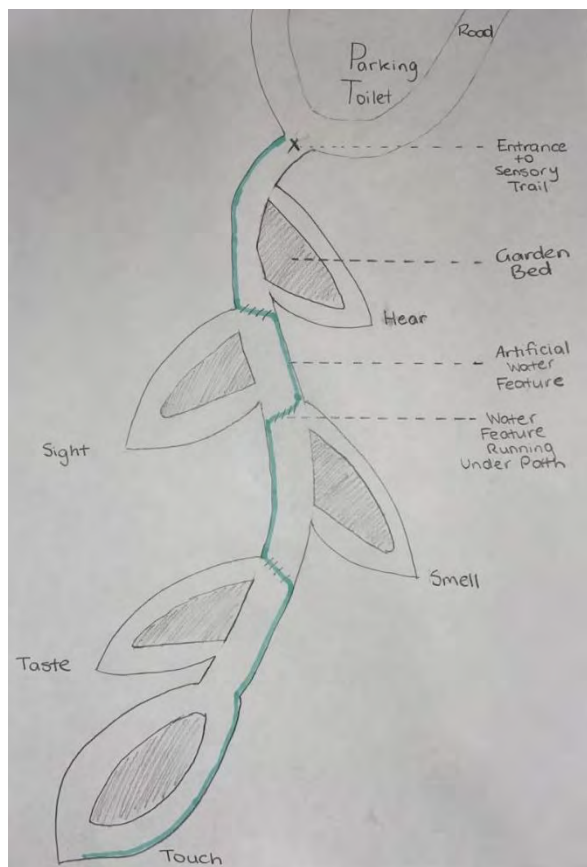
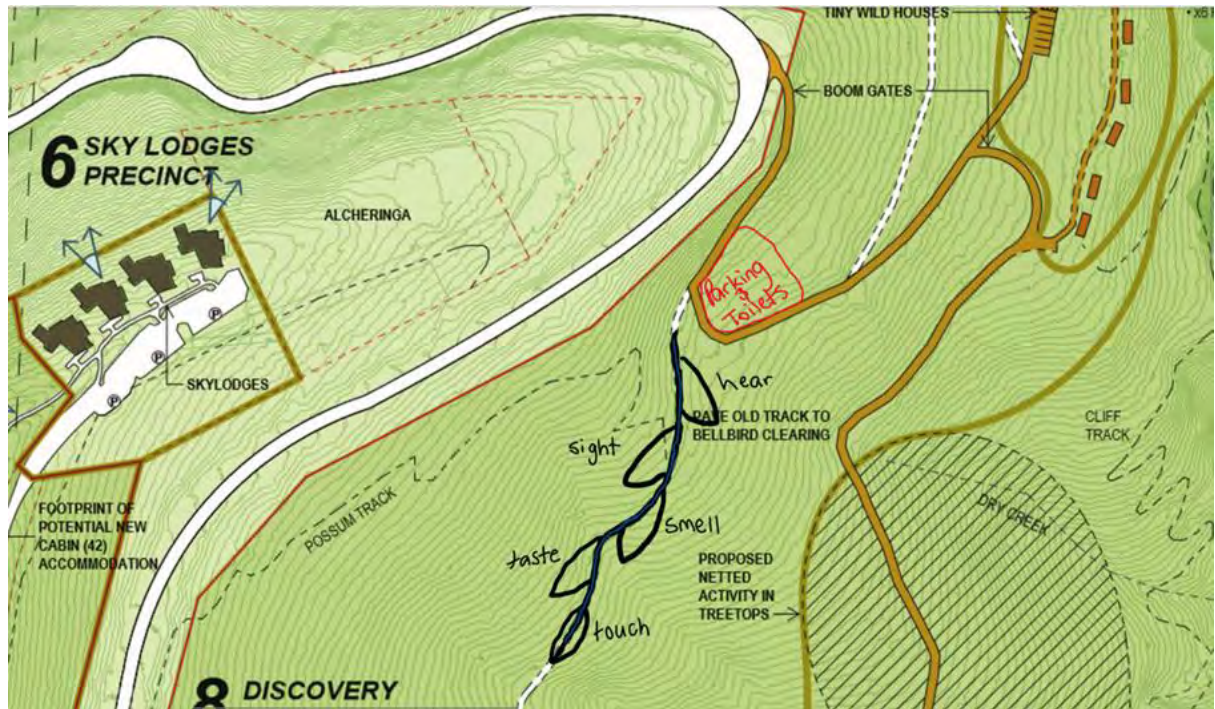
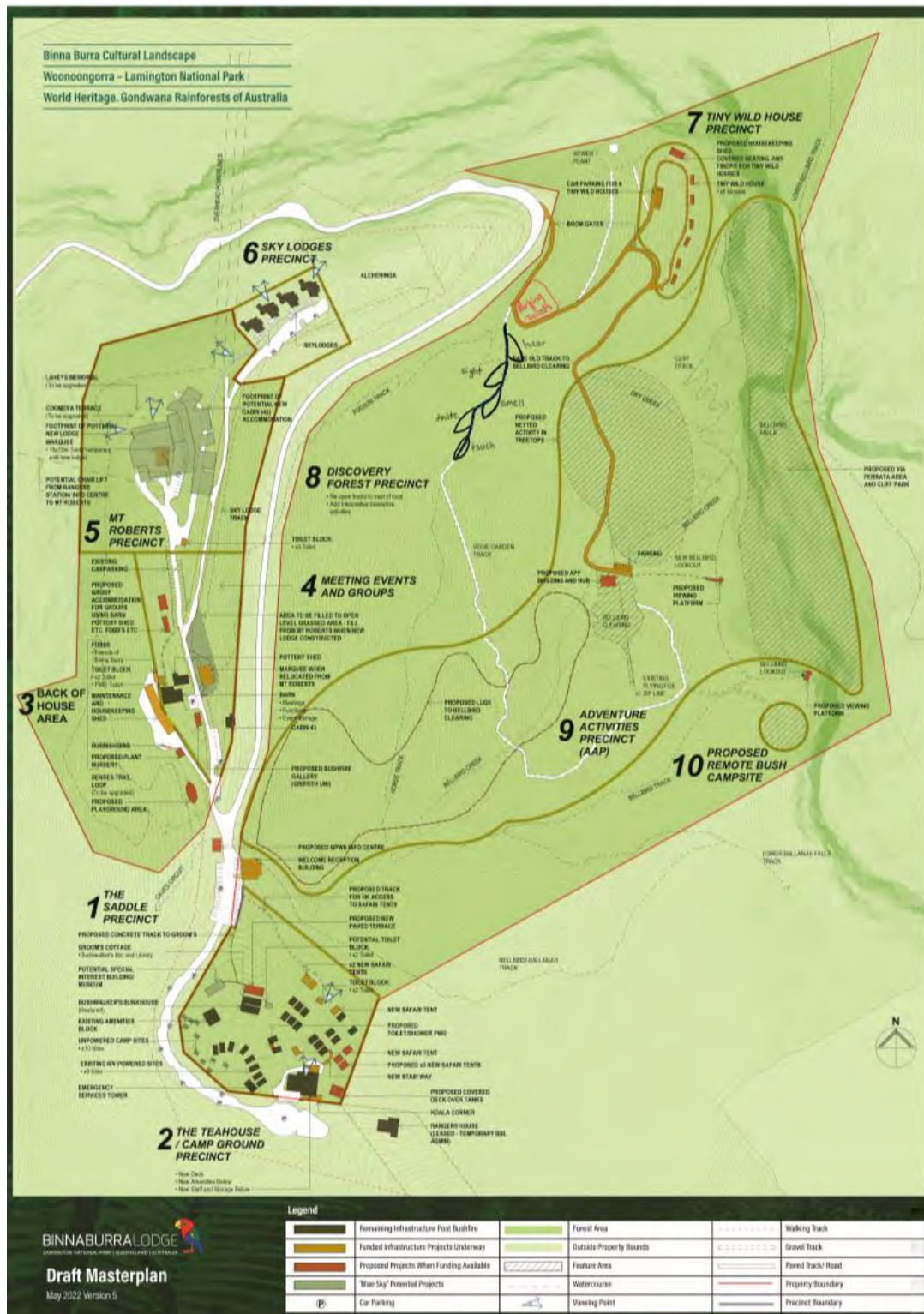


Figure 6

Proposed senses trail superimposed on BBL masterplan map



From the survey responses, the themes that emerged will work to influence and frame the proposal and concepts developed for the sensory trail so that they are responding to the wants and needs of the Binna Burra Lodge community. With consideration of this, the following safety suggestions are to be considered.

### 7.2.1 Pragmatic and Safety Considerations

It is important to consider the following pragmatic and safety elements in the sensory trail so that it can be inclusive and accessible:

- Raised garden beds at varying heights to allow wheelchair access to reach the plants. 500-800mm height is recommended for raised gardens beds that can also be accessible to wheelchair users (Zajadacz & Lubarska, 2019).
- Sealed pathways throughout the whole sensory trail with a gradient of more than 1:20 but no steeper than 1:14 (Standards Australia, 2021).
- 2000mm wide pathways, to accommodate for two persons in wheelchairs to go past each other with sufficient circulation space. This excludes any obstructions on the pathways such as benches, when the pathways will need to be wider.
  - The Australian Standards states that a pathway must remained unobstructed for a minimum width of 1000mm. Therefore, plants cannot obstruct or grow onto the pathways unless they are well above standing height (canopies).
- Disability parking and sanitary facilities at the entrance of the sensory trail.
  - The sanitary facilities must have raised and visual symbols and/or braille so that people with a vision impairment can identify where they are entering.
  - The sanitary facilities need to have appropriate hygiene measures. People may need to use the facilities for changing medical tubes and therefore will need hygiene measures in place, such as soap dispensers and sanitary disposal units, to safely perform these procedures.
- Tactile indicators around the water feature edge to warn for hazards and prevent stepping into the creek. Tactile indicators could also be placed around the benches to avoid people with a vision impairment tripping into them.
- Digital maps accessible via QR code or Binna Burra Lodge website that are consistently updated.
  - This is more environmentally sustainable and would allow people to zoom in on the map and see the trail clearly and know when it is open and closed depending on weather conditions.
  - However, it must be considered that individuals may prefer to utilise a physical paper map, which may also be necessary if there is a lack of reception for people to access a QR code link.
- A refuge/evacuation point in the case that there is an emergency (i.e., someone requires medical attention or a bushfire).
  - This shortcut could weave up through the Possum Track to the road. The shortcut can be indicated on the map.
- Braille signs in accordance with the requirements by the Australian Braille Authority (Unified English Braille Grade 1) (Standards Australia, 2021). This could be situated throughout the whole sensory trail where there are any written information boards.
- Handrails throughout the trail. These need to comply with the Australian Standards:
  - The handrails cannot encroach into the 2000mm pathway width required for wheelchair access, as it can restrict circulation space (Standards Australia, 2021).

- Handrails should be at a height of 865-1000mm above the floor (Standards Australia, 2021). The average height of eye level for a person in a wheelchair is between 1090-1295mm from the floor (Karman, 2022). Therefore, the suggested height of the handrails should be comfortably below this height, so that people in a wheelchair can see over the handrails (roughly 900mm height).
- Handrails can take away from the experience of immersing oneself into nature, however with careful placement and natural design, can act as a barrier into the deeper parts of the rainforest which may pose more risks.

### 7.2.2 Weather Considerations

- As the track will have sealed pathways, the sensory trail can be completed in the rain somewhat safely. However, the paths will need to be maintained through regular cleaning to prevent it from becoming slippery and becoming a falls hazard.
- The entrance and exit points of the sensory trail can include undercover sections, for people to refuge to in the case that it suddenly begins to rain.

### 7.2.3 Entrance to Sensory Trail

- Safety signs that would usually be at entrances to bushwalks, but with the following additional considerations;
  - Emergency meeting point,
  - All abilities accessible sign,
  - Guide and companion dogs allowed.
- Map of the sensory trail and the suggested route.
- Speaker with audio button that introduces the sensory trail;
  - The purpose of the sensory trail,
  - What is in the sensory trail that makes it accessible (handrails, benches, braille etc.),
  - Explaining the theme of the design.

### 7.2.4 The Stem of the Leaf

- Artificial water feature imitating a creek, running through the length of the trail, with bridges existing over the creek at each leaf entrance point for easy access
  - A negative aspect of this feature is that with heavy or excessive rain that BBL can experience, the water feature could become a safety hazard if it were to overflow. This would need to be considered in the design and construction of this feature, having a reticulated water system for continuous water flow, and an overflow point that directs outside the sensory trail.
- Benches situated along the stream so people can stop, watch and listen.
- Figure 7 depicts an inspiration picture for the water feature.



Figure 7  
*Water Feature Inspiration*



*Note.* From *Garden Creek*, by J. Noonan, n.d. (<https://www.bobvila.com/slideshow/10-water-features-to-make-any-backyard-landscape-complete-44512>). In the public domain.

#### 7.2.5 Hear Section

Auditory experiences can be stimulated from many different sources. This can include an auditory observation of the natural fauna, which may include birds and insects (Kopeva et al., 2020). Furthermore, listening to the wind moving nearby leaves and any nearby sources of running water, as well as the sounds associated with touching leaves and bark, can work to contribute to this sensory experience (Orr et al., 2016).

Activity A – The activity for this section of the proposed sensory trail will feature artificial drums or cowbells to encourage individuals to listen to the sound that is produced when hitting them. However, cowbells and drums could be noisy and disruptive to both other consumers in the sensory trail and the wildlife. An alternative to these materials could be wooden xylophones that could be hit with a stick. This would produce melodic and quieter sounds that may be more enjoyable. It is important that the stick is attached to the xylophone for safety reasons, to avoid it being stolen or used to hit someone else. Wear and tear of this activity could be increased in school holiday periods. Therefore, this activity would need to be constructed to withstand excessive use.

Activity B – The second activity for this section will allow individuals to hit the buttress roots of fig trees, as shown in figure 8, with a rock so the sound echoes. This activity incorporates First Peoples' culture, as this is a method of communication with historical significance. The purpose of this was to communicate, through sound, how far away people were from each other.

Activity C – The final activity of this section will include sound boxes. One sound box could include an audio recording by Yugambeh People educating on their cultural ways of being and doing. Additionally, another sound box could include audio replicating different sounds of the forest, such as bird calls, frog sounds, insect sounds, or waterfalls. This incorporates natural sounds produced from the environment, which is more calming and less disruptive than artificially created sounds. Power could be provided from solar panels in the trail, however if this option is not viable, power can be generated from the same source for the facilities at the entrance of the sensory trail.



Figure 8

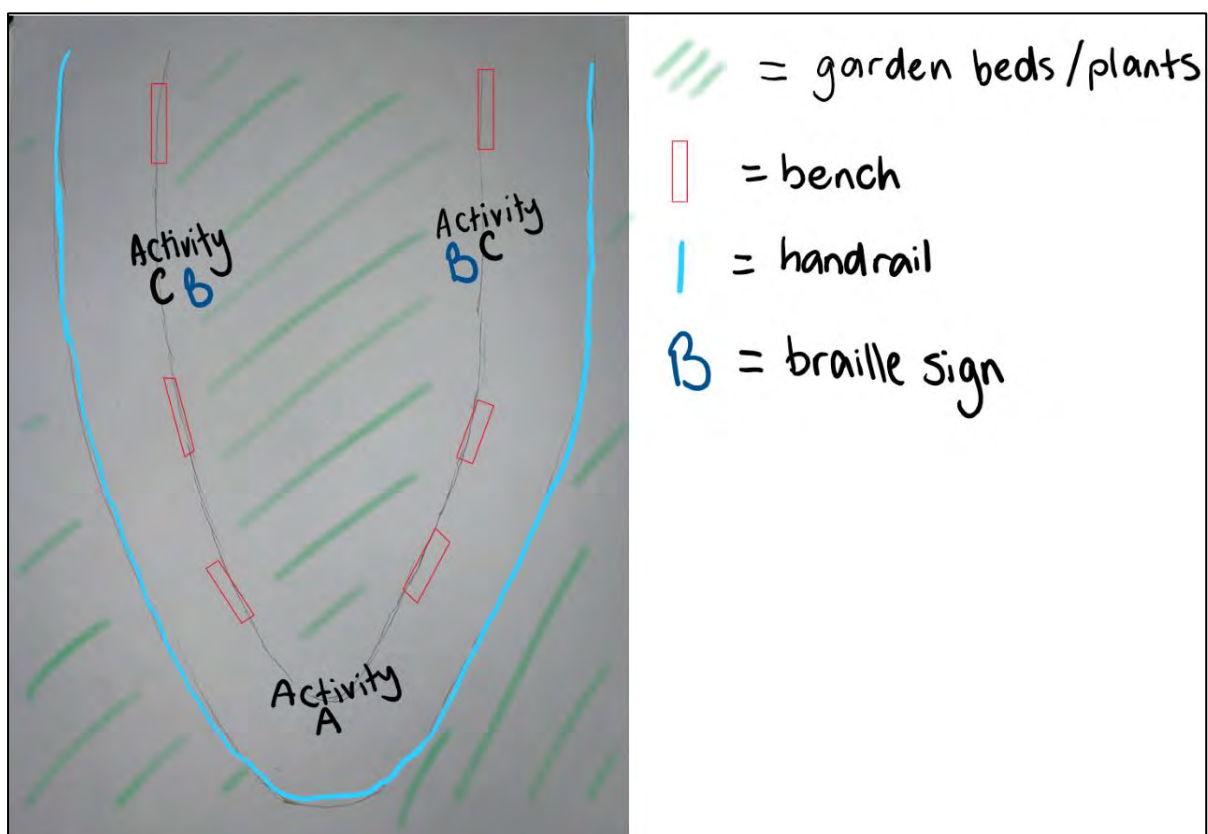
*Buttress roots of fig tree*

Figure 9 depicts a rough concept of the smell section displaying the location of the activities and artificial elements.

Figure 9

#### *Hear Section Concept*

Note: The location of the fig tree within will be dependent on where the it exists, hence why Activity B is not included in Figure 9.



### 7.2.6 Sight Section

The sense of sight can be stimulated through various flora. For example, using plants that feature different shapes and forms, as well as those that are colourful and aesthetically pleasing, works to produce a comprehensive sensory visual experience. Complex plant structures, as shown in figures 14 and 15, can provide visual stimulation. Additionally, selecting colourful and unique plants that may attract wildlife and bees, such as banksia, bottlebrush, waratah, and grevillea will allow for a visual experience of both flora and fauna (World Wildlife Foundation, 2019). See figures 10-13 below.

Activity A – The activity for this section will feature five different locations of telescopes that allow for individuals to observe the top of the canopy above them, encouraging them to observe the clouds, leaves, and how they move with the wind as well as any birds or wildlife they may see.

Activity B – The second activity will involve an information board at the entrance to this section that prompts individuals to use the sense of sight to find five different shaped leaves throughout the sight section. The information board will feature a raised outline of the types of leaves so that individuals with a vision impairment can also engage in this activity with touch, rather than sight. Additionally, people without a vision impairment can cover their eyes or utilise blindfolds to experience this activity in a different way.

To integrate more community involvement in the sensory trail, activities could be offered at Binna Burra Lodge. For example, a create your own birdbox activity could be held at varying times of the year, and these could then be placed into trees throughout the sensory trail. This would not only encourage more wildlife to come into the trail, and thus contribute to the sensory experiences, but the unique birdboxes themselves also create visual stimulation.



Figure 10

*Bottlebrush*

*Note.* From *Bottlebrush Plant*, by Treetify, n.d. (<https://treetify.in/shop/plants-and-sappling/avenue-trees-plants-and-sappling/bottle-brush/>). In the public domain.



Figure 11

*Waratah*

*Note.* From *Waratah*, by NSW National Parks and Wildlife Service, n.d. (<https://www.nationalparks.nsw.gov.au/plants-and-animals/waratah>). In the public domain.



Figure 12

*Banksia*

*Note.* From *Banksia Information – Learn How To Grow Banksia Plants*, by M. Dyer, n.d..

(<https://www.gardeningknowhow.com/ornamental/flowers/banksia/how-to->



Figure 13

*Grevillea*

*Note.* From *Winter Flowering Grevilleas*, by Yates, n.d.. (<https://www.yates.com.au/garden-hub/winter-flowering-grevilleas/>). In the public domain.

Figures 14 and 15

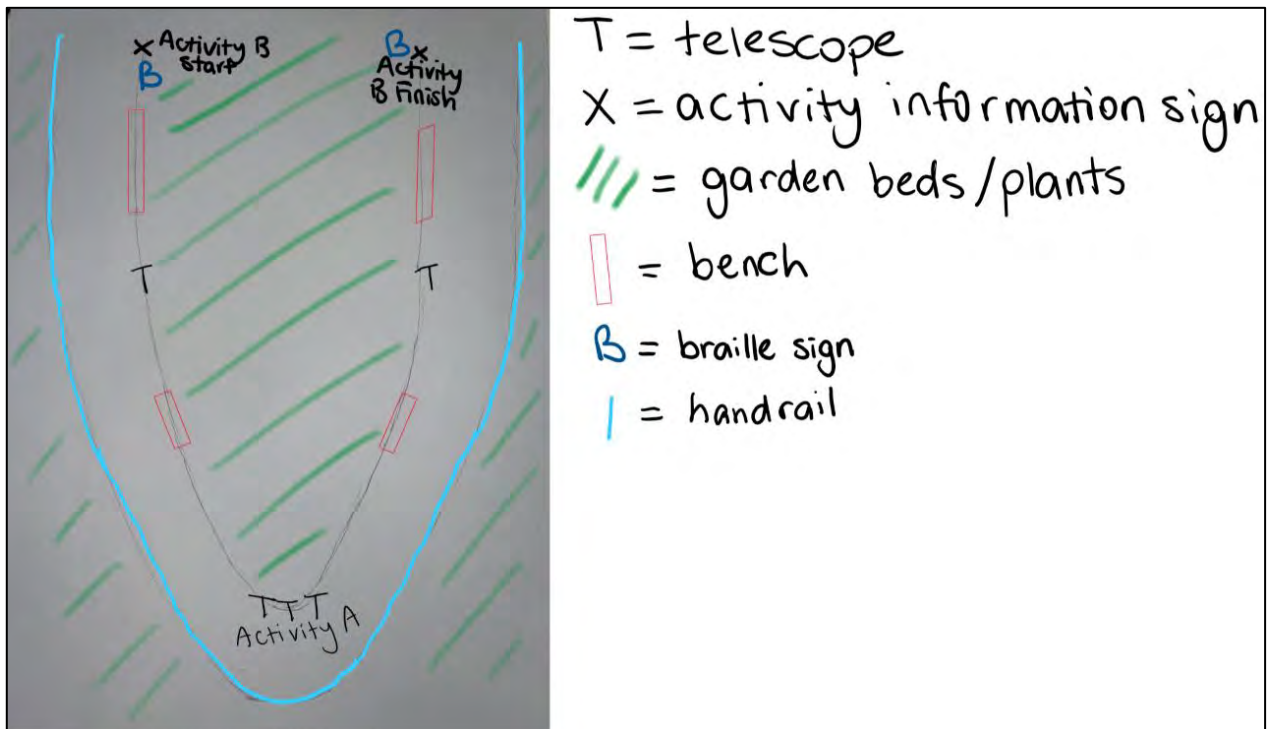
*Plants Forming Lianas*



Figure 16 depicts a rough concept of the smell section displaying the location of the activities and artificial elements.

Figure 16

*Sight Section Concept*



7.2.7 Smell Section

There exists a plethora of flora that can stimulate a sensory experience of smell. For example, the leaves of the plants of lemon myrtle and aniseed myrtle, when crushed or broken apart, can work to provide strong smells of lemon and aniseed (Mazzorana & Mazzorana, 2016a; Mazzorana & Mazzorana, 2016b). Figures 17 and 18 depicts lemon and aniseed myrtle. Throughout the smell section, the plants will feature at varying heights to encourage movement by bending down or reaching up to smell the different plants.

Activity A – The activity within this section will feature information boards throughout that ask questions of individuals to recall where they have smelt certain scents of different plants previously. For example, this could include question of, “What fruit item that you might find in your kitchen does this plant smell like?” or “What well-known lolly can you recognise from this scent?”.

Figure 19 depicts a rough concept of the smell section displaying the location of the activities and artificial elements.

Figure 17

Lemon Myrtle Tree



Note. From Lemon Myrtle Tree, by Andreasens Green, 2022 (<https://andreasengreen.com.au/product/backhousia-citriodora/>). In the public domain.

Figure 18

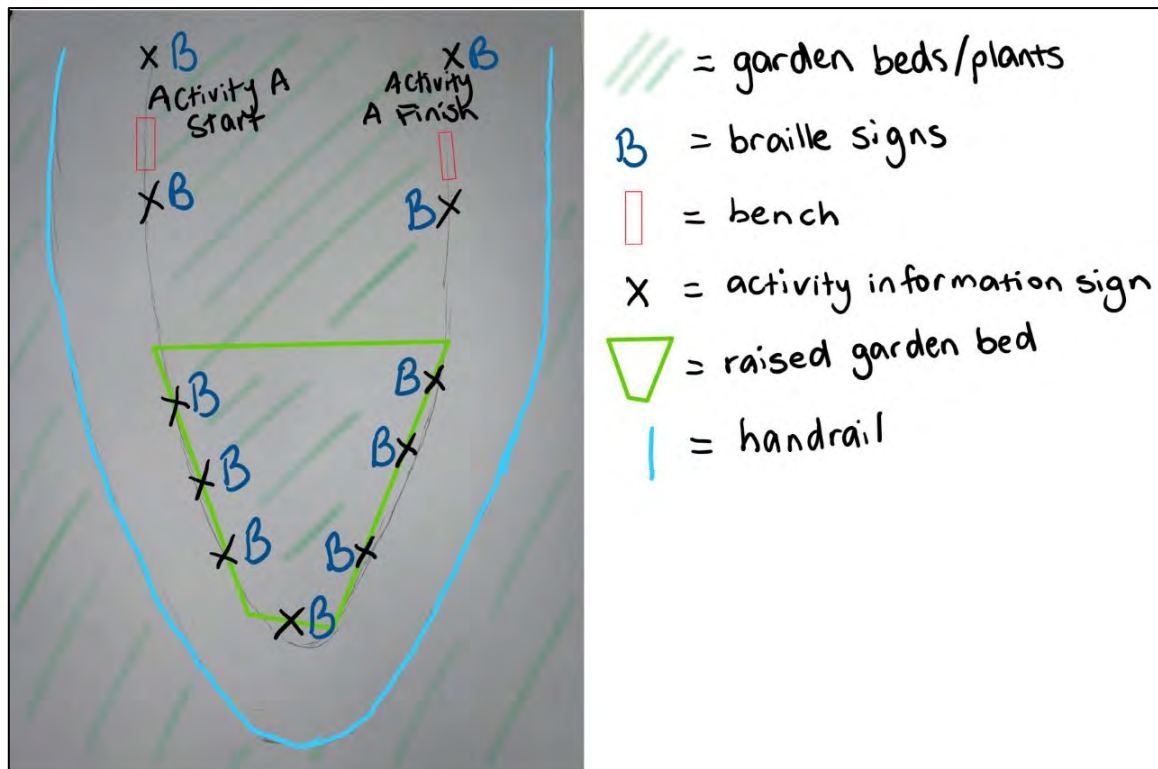
Aniseed Myrtle Tree



Note. From Aniseed Myrtle Tree, by Gardening with Angus, n.d. (<https://www.gardeningwithangus.com.au/syzygium-anisatum-aniseed-myrtle/>). In the public domain.

Figure 19

Smell Section Concept



### 7.2.8 Taste Section

Different plants and seeds can stimulate taste. Edible native Australian plants, colloquially referred to as ‘bush tucker’, have a strong history and connection to First Peoples’ ways of doing. Such plants and seeds that can be used to stimulate taste include wattle seed, lemon myrtle, and mountain pepper (White, 2014). Incorporating First Peoples’ knowledge into a sensory trail in this way can work to create a valuable sensory experience. Due to the limited number of safe activities and plants available to feature in the taste section, it will be shorter in length (about a 50-metre loop).

**Activity A** – The first activity will involve a selection of plants that will be available to taste. This will be signed very clearly in a specific section with visuals. Tasting will not be an option for plants elsewhere in the taste section, as it could be a safety hazard and disrupt the growth process and result in many plants dying from being picked at to taste too frequently. Signs can be provided to encourage individuals to limit the number of leaves they pick to eat, to prevent heavy disruption of plant growth.

**Activity B** – For the plants that won’t be available to taste, information boards on First Peoples’ uses of different plants, herbs, and bush tucker will feature. This will be incorporated throughout the trail. This area of the taste section will be barricaded by a handrail to avoid the safety hazard of consumption of non-edible plants. Additionally, this will be signed with visuals to portray a stronger message that the area is nonedible.

Figure 20 depicts a rough concept of the smell section displaying the location of the activities and artificial elements.

Figure 20

#### *Taste Section Concept*



### 7.2.9 Touch Section

The texture of different barks and leaves can provide a thorough sensory experience through touch (Kopeva et al., 2020). For example, different trees can have bark that ranges from smooth to rough, with textures of stringy, flaky, and coarse. Additionally, leaves of shrubs and trees can vary in size, shape and thickness, and can be serrated, ridged, toothed, or lobed. Furthermore, the shapes and textures of different rocks could be a feature that is incorporated.

A sign will feature at the entrance to the touch section encouraging people to touch the different plants. It will be stated that everything is safe to touch, and no plants containing spikes, thorns, or poisonous elements in them will feature in this section.

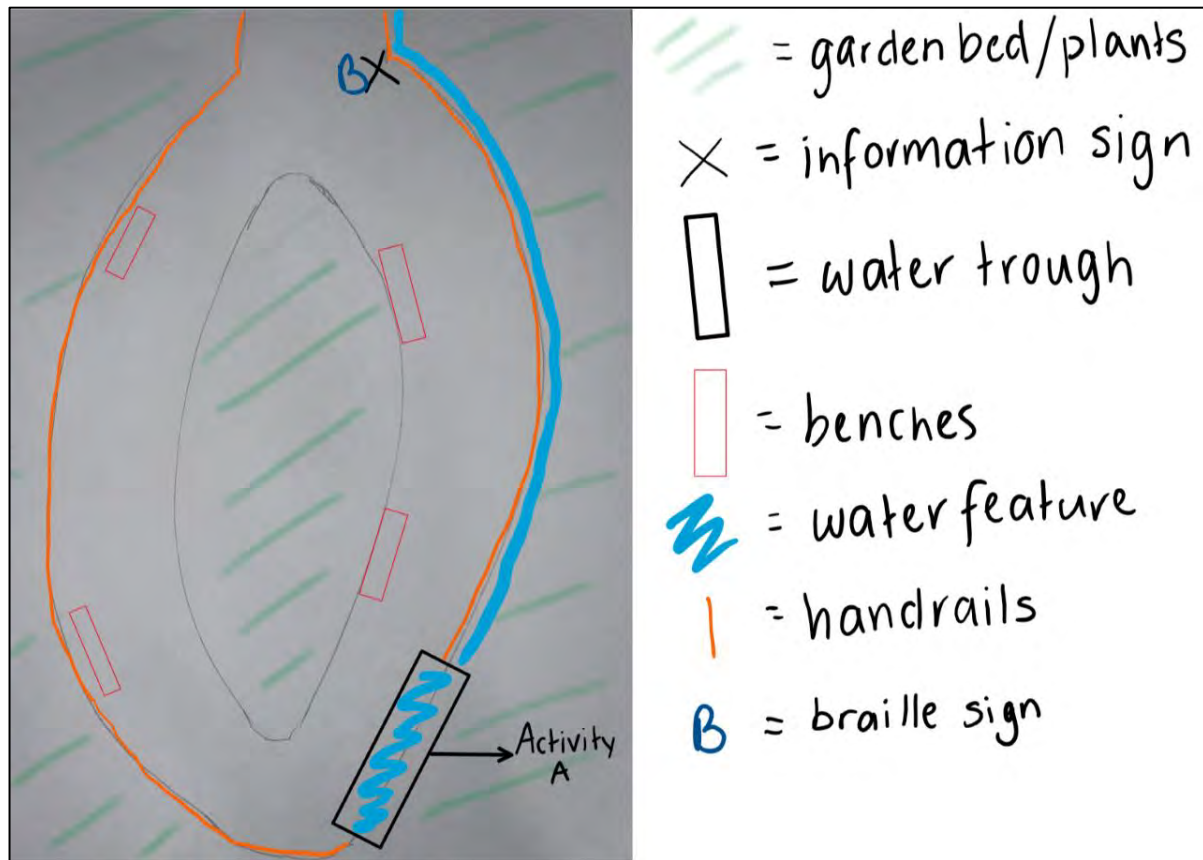
Activity A – The activity featured in the touch section will encourage individuals to experience the tactile feeling of drawing on rocks with ochre from the stream. This will also feature information boards that encourage individuals to learn about First Peoples' culture and how ochre was used. The water trough will be raised above one metre to prevent any safety hazards that can impact smaller children.

A way of incorporating touch elements into this section that are more accessible include having short lengths of real tree trunks and branches from different plants, for a tactile response. This could be placed on a bench horizontally or hanging vertically from a beam with the branches attached to rope.

Figure 21 depicts a rough concept of the smell section displaying the location of the activities and artificial elements.



Figure 21

*Touch Section Concept*

The final section of the report has suggestions regarding the sustainability of the sensory trail at Binna Burra Lodge upon implementation. This includes recommendations for maintenance, marketing, and review of the success of the sensory trail.

## 8.0 Sustainability of Binna Burra Lodge Sensory Trail

### 8.1 Maintenance

A well-rounded, comprehensive maintenance plan is required to ensure that the sensory trail is long-lasting and remains safe for all its users. Regular maintenance that will be required to ensure the sensory trail remains safe and complies with the standards are:

- Regular cleaning of the pathways to avoid slippage hazards,
- Regular pruning of the plants so that they do not obstruct the pathway,
- Regular observations and safety checks of the artificial elements and accessible features to ensure they are in working order and are not unsafe to use,
- Regular cleaning of sanitary facilities,
- Prevention of stagnant and unsafe water in the artificial stream, and
- Upkeep of plant growth and removal of weeds.

At current, there are 40 staff employed at Binna Burra Lodge, so the level of maintenance required for the sensory trail would not be feasible. However, when the new Lodge is built and more staff are hired (predicted 140 staff members), this maintenance plan could be achievable with business growth.

### 8.2 Marketing

Ensuring that the new sensory trail is marketed correctly is imperative to ensure that it reaches many demographics and individuals of all abilities. A promotion of the sensory trail could occur through the BBL Instagram or Facebook pages, which both already have thousands of followers. Additionally, these posts can be shared to online disability community forums to promote through word-of-mouth. To ensure contact is made with individuals of all abilities, different organisations such as Vision Australia, Disability Services, Spinal Life Australia, could be contacted to see if they are willing to promote the new sensory trail. Furthermore, the trail could potentially be promoted on a brief segment of a nightly news channel.

### 8.3 Review of Success

An ongoing review of the success of the sensory trail is highly important, to continually respond to the needs of the BBL community. To ensure this is achieved, monthly observations of the demographics of the consumers could occur, to determine if any particular groups of disabilities are not utilising the space. Additionally, reviewing the success of the trail could occur through surveying consumers on their satisfaction of their experiences of the trail and any suggestions for improvement. This could be done in-person, or a link to a QR code could be permanently installed, so that little labour is required. This would guarantee that the needs of the consumers can be addressed as feedback would be obtained in a consistent manner.

## 9.0 Conclusion

In conclusion, the proposed sensory trail not only allows for greater inclusivity, but on a broader scale, has significant contributions in achieving sustainable development goal three and 10, which are increasing health and wellbeing and reduced inequalities by enhancing access for all to nature. Specifically, individuals of all abilities will be able to appreciate the beauty of Binna Burra and experience the five different senses in a way that they are comfortable with and that is catered to them, thereby promoting inclusivity and equity for everyone. Furthermore, the development and promotion of this sensory trail, in light of the increasing inclusivity within the tourism sector, would demonstrate and promote the importance of creating accessible spaces for all abilities to engage in the activities that most able-bodied people take for granted. This increase in inclusivity through accessibility at Binna Burra Lodge will allow for the promotion of health and wellbeing for all abilities through engagement in meaningful occupations.

Following the finalisation of the report, a presentation to eight stakeholders from Binna Burra Lodge occurred on the 7<sup>th</sup> of October 2022, to gather feedback on the proposal. This feedback was then integrated into the report for the final handover and project conclusion on the 13<sup>th</sup> of October 2022.

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