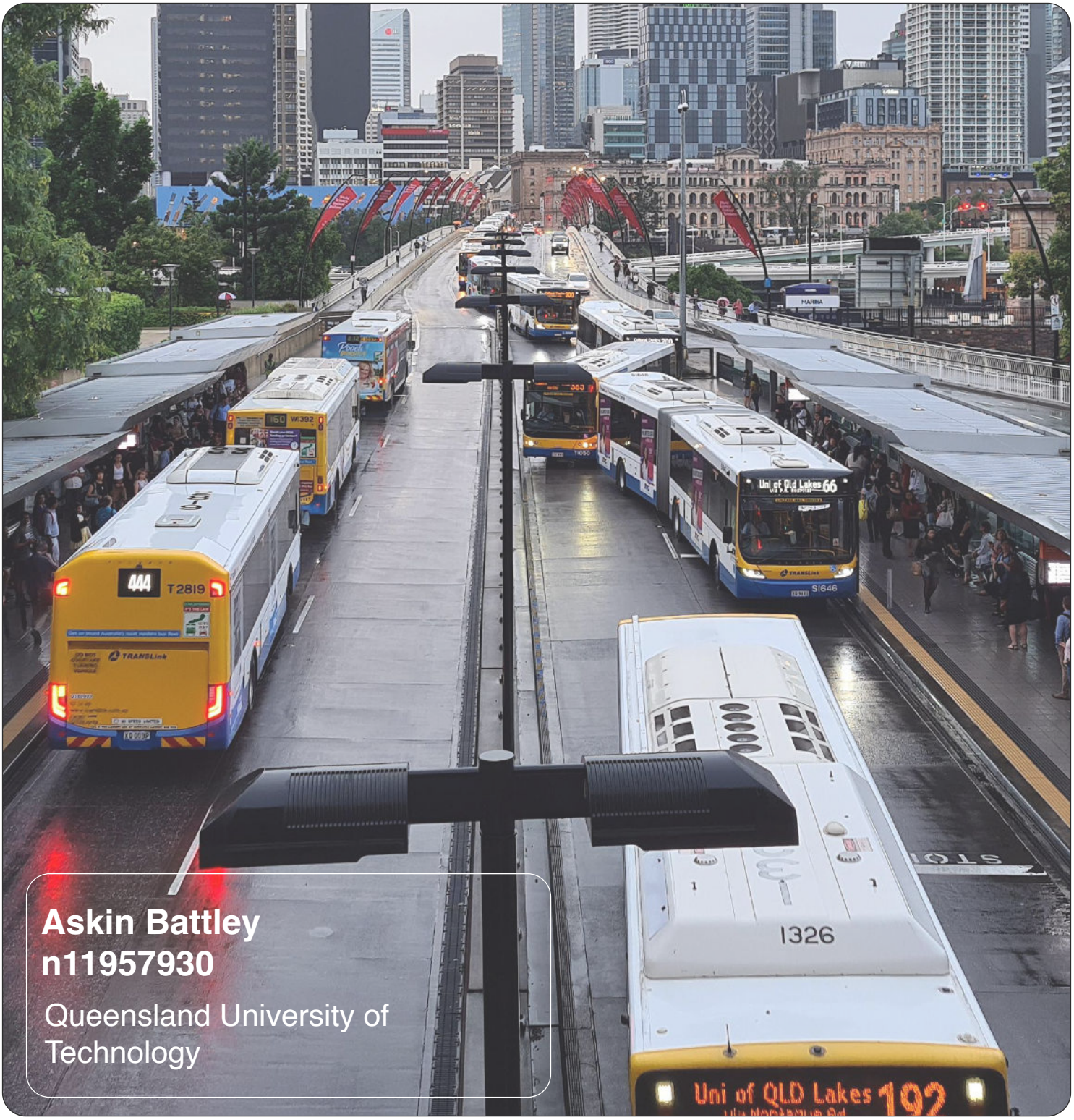
Research Report

DNB311 ID7: Capstone



Askin Battley
n11957930
Queensland University of Technology

Executive Summary

This report aims to garner a greater understanding of the kinds of requirements that older adults are seeking in seating and then applying this to public furniture infrastructure. In addition to improving the seat accessibility for older adults, the project also aims to create a solution that is more sociable and accommodating for discussion led activities. This study employed benchmarking for data collection on existing design offerings and where they proved strong and weak in the categories of intuitiveness, sociability, standards compliance and material sustainability. To deepen understanding of public transport spaces, naturalistic observations were conducted at five major locations in Brisbane, measuring frequency of use and social behaviors exhibited. A focus group of nine individuals aged 70 and above was contacted to assist in gathering further data regarding personal preferences in different types of seating designs. Assembling this data allowed for statistical and thematic analysis to identify major themes and areas for improvement, informing the design implications of the study going forward. This examination of research allowed for generation of opportunities for the project going forward.

Acknowledgements

Authenticity Statement

This is to certify that to the best of my knowledge, the content of this report is my own work. This report has not been submitted for any subject or for other purposes. I certify that the intellectual content of this report is the product of my own work and that all the assistance received in preparing this report and sources have been acknowledged.

AI Use Statement

I have utilised Generative AI using Chat GPT to assist in the coding process required for the Research and Anlysis section of the report. All data collected through the observations and focus group study were put into Chat GPT to assist in garnering a greater understanding of some potential themes and ways of creating code from the data. However, the actual coding catergories were refined myself (see the Appendix for evidence), and all the written analysis in this paper is completely my own work.

Acknowledgement of Country:

QUT and I acknowledges the Turrbal and Yugara as the First Nations owners of the lands where QUT now stands. We pay respect to their Elders, lores, customs and creation spirits. We recognise that these lands have always been places of teaching, research and learning. QUT acknowledges the important role Aboriginal and Torres Strait Islander people play within the QUT community.

Your name: Askin Battley
Student number: N11957930
Date: 12/09/2026

Word Count: 3951

Table of Contents

Page: 05 Introduction

Page: 06 Background

Page: 07 Benchmarking

Page: 10 Research & Analysis

Page: 17 Discussion

Page: 18 Design Implications

Page: 19 Conclusion

Page: 20 References

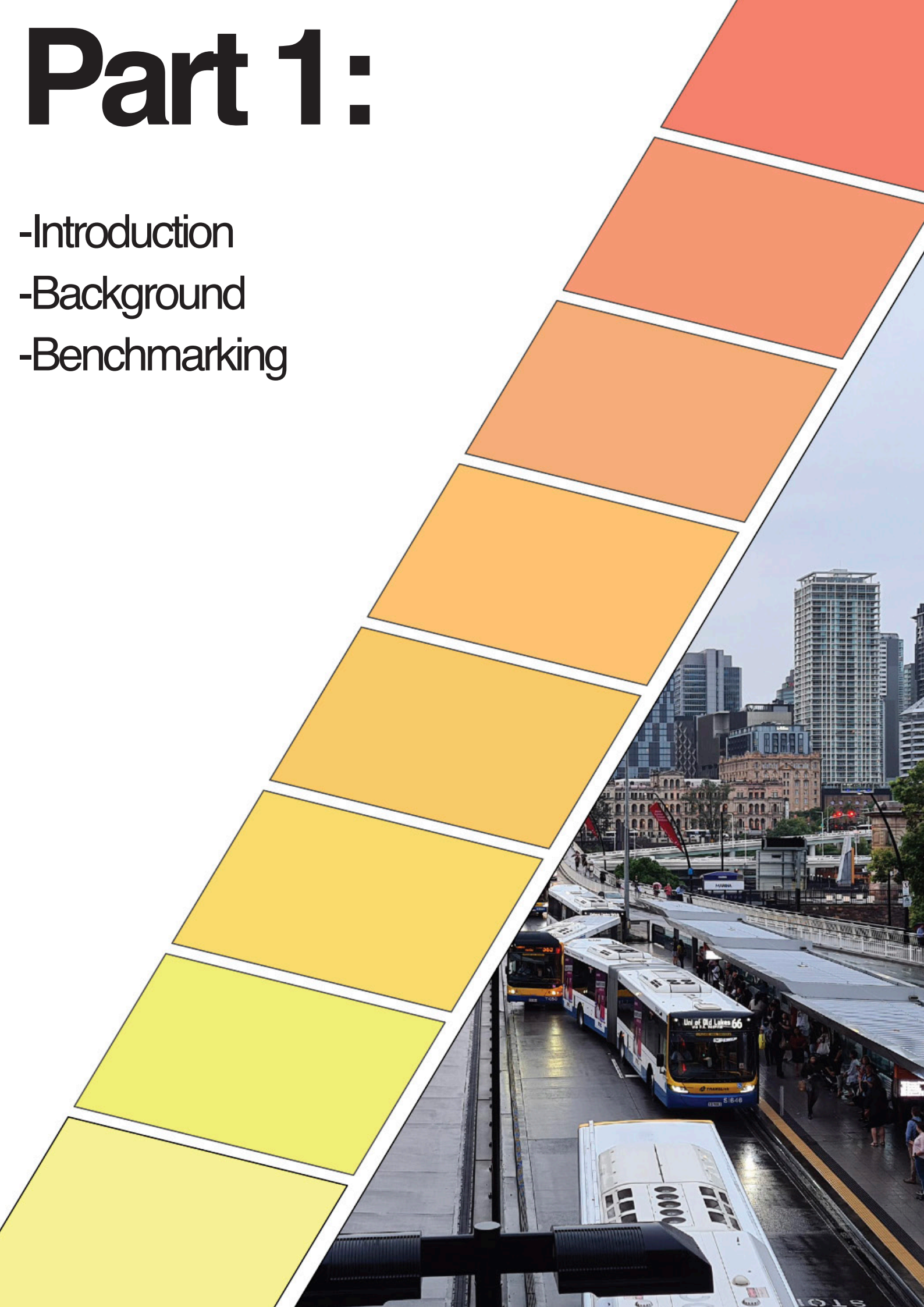
Page: 26 Appendix

Part 1:

-Introduction

-Background

-Benchmarking



Introduction

In Australia, the total population figures indicate major development in the decades to come, notably that by 2066 it is predicated that the number of Australians aged 65 and above will account for 21 to 23 percent of the entire population (AIHW, 2024). With such drastic predicted growth, aspects of cities especially public spaces and seating must be adaptable to transitioning abilities and preferences. Public spaces, specifically public transport hubs like train and bus stations are areas that are rife with opportunities to improve existing infrastructure.

In 2020 it was reported that Australian residents aged approximately 66 years and above make up 51% of the populations use of some form of public transport (Morgan, 2020). This project ultimately sets out to address two major areas found within public transport facilities. First is to ensure that the seating located in transit hubs is providing the correct amount of support for users with full consideration of ergonomically correct seating angles and height. Second is to improve the sociability of the seating, which is to be done through a design which encourages spontaneous social interaction.

FIGURE 1: *Mater Hill Station near Brisbane's Mater Hospital*



(Wheree, n.d.)

Background

To establish how this direction of study has been taken, the following is an examination of the studies that were researched in the project's initial stages. Research conducted on the paper 'Environmental Sustainability and Landscape Management' specifically focused on chapter ten written by Sema Mumcu and Serap Yilmaz in which they discussed the social value of effective public spaces, understanding its impact on community and sense of place (Mumcu & Yilmaz, 2016). It saw an examination of how various aspects of a space must be appropriate and considered if they are to see actual success and usage from the public (Mumcu & Yilmaz, 2016). Following this was the examination of paper 'Active Seating: Bridging Design and Health in Public Spaces' by Francesco Bertiatio which examined the potential long term physical health issues that can be exacerbated through public seating that doesn't promote good posture; however the tone and perspective this paper took was quite apathetic and demeaning (Bertiato, 2025).

The papers 'Sidewalk Design in Multi-Cultural Cities' and 'Integrated Design Methods for Sustainable Seating in Urban Communities' were both examined, as they both explored the regeneration of public spaces in both New Zealand and Shanghai and what was being done to improve them through design that was considerate of user ergonomics specific to their locations and also cultural symbolism (Zhang & Sun, 2024), (Lesan & Gjerde, 2020). William H. Whyte's work became a crucial discovery in the research process, specifically his book 'The Social Life of Small Urban Spaces' with chapter 2's focus on sitting spaces in the business districts of New York City. This examined how effects of factors such as aesthetics, group clustering, light, and spatial openness can impact the success of a space (H. Whyte, 1980). Notably, it compared fixed and non-fixed seating solutions, observing how users tended to gravitate to seating solutions that allowed them more autonomy and personal choice (H. Whyte, 1980).

The paper 'Seeking Safety in Sociofugal Spaces', while not being particularly relevant to the kind of direction desired for the project, with it exploring how spaces can be designed for publicly ostracised individuals, did introduce the concept of Sociofugal and Sociopetal spaces, explaining how these can be implemented into spatial layout design (Meagher & Marsh, 2016).

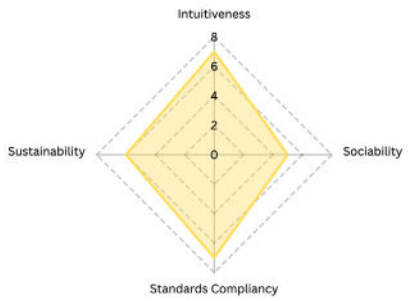
A major direction shift came with the articles 'Impact of Public Seating Design on Mobility and Independence in Older Adults' and 'Loneliness- What's urban design Got to do with it?'. Both articles addressed the issue of accessible public furniture for older adults and the loneliness epidemic that seems to not be receiving the correct amount of attention that it deserves (Coman et al., 2021) and (Xie et al., 2025). Uncovering these two papers was what led to the direction decision briefly outlined in the introduction, which then resulted in research of the Australian Standard AS1428.2 and the Disability Discrimination Act (DDA), vital factors in the project going forward (Daniel, 2025), (Street Furniture Australia, 2019), (Commercial Systems Australia, 2025).

Benchmarking

With the development of the context centring around public transport facility seating, the marking criteria for the benchmarking was developed from the Queensland Government's Inclusive Precincts Guide which mention the principles of Universal Design established by North Carolina State University (McPherson, 2026). The criteria points based off the principles were intuitiveness, sociability, standards compliance and material sustainability. These criteria points were chosen for the reason that they could be evaluated from an objective perspective.

Of the several products that were benchmarked, Figure 2 displays the designs that demonstrated the highest overall scores in the benchmarking, those being the Concourse Seat, the UNDARA, and the BCC Public Transport Seat.

FIGURE 2: *Radar charts used for visual representation of the benchmarking*

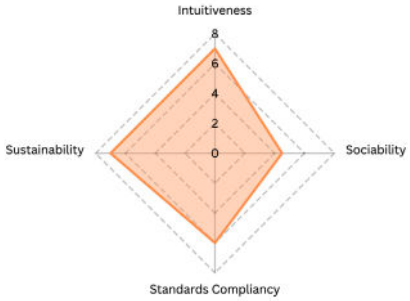


Concourse Seat

by Street Furniture Australia



(Street Furniture Australia, n.d.)

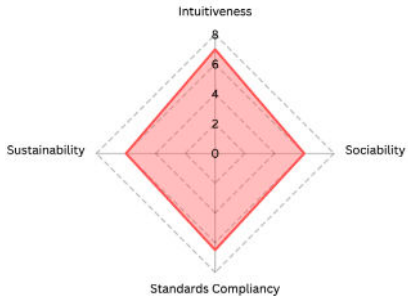


UNDARA

by Parks Funriture Australia



(Park Furniture Australia, n.d.-b)



BCC Public Transport Seat

by Urban Fountains and Furniture



(Urban Fountains & Furniture, n.d.)

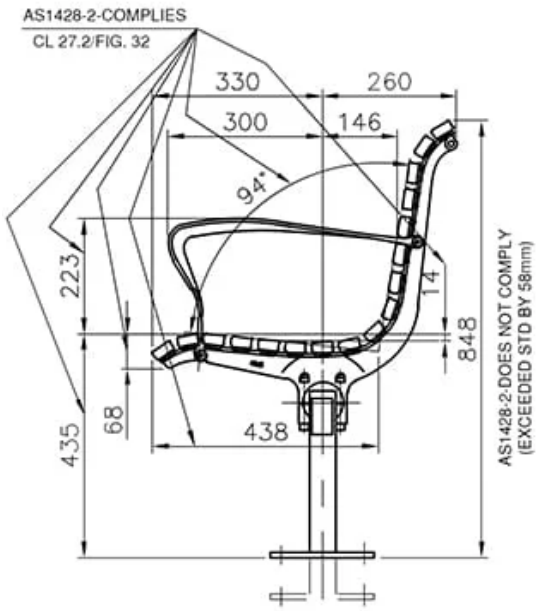
All designs displayed high intuitive scores of 7/8, indicating that they exhibit strong visibility and recognizable qualities of a bench. All three of the seating designs utilize slatting for the seating surfaces (the backrest and seating pad) which provide a clear distinction between different elements of the seat such as the frame and what surfaces are sittable. This further demonstrates that all three designs offer users an immediately understandable affordance indicated by materials that provide strong visual signifiers, such as the ECOPLASWOOD utilized in the UNDARA seat.

Benchmarking

The Concourse Seat and BCC Public Transport Seat designs also utilize differing materials for componentry to act as signifiers for the sittable portions of their respective seating designs.

The designs scored decently strong in the sociability criteria, ranging from 4.5-6/8, indicating that these seats do allow for multi-person use, however they may lack in creating a strong social layout for group discussion. The three products all allow for up to five users to share their seats simultaneously, however these bench designs feature linear layouts that purposefully face users away from one-another and could potentially make any extended period of conversing strenuous, especially for older adults who may experience neck fatigue or pain. Both the Concourse and BCC designs feature open social layouts that don't constrain users to a singular area of the bench, allowing for autonomy in seating preference and habits. The UNDARA seat features armrests that purposely break up the bench into individual arrangements meaning that users are confined to one area of the seat.

FIGURE 3: *AS1428.2 Standards*



(Street Furniture Australia, 2026a)

All offerings displayed strong compliance with the AS1428.2 standards (Figure 3), with scores ranging from 6-7/8. The Concourse exhibited high compliancy with identical dimensions for the total seat height (840mm) and the seating pad to floor height (435mm), however length of the seating pad was 65mm short (Street Furniture Australia, 2026). The UNDARA demonstrated relatively high compliancy with the total seating height (13mm short) and floor to seat heights (30mm short), and the seating pad length increased by 53mm (Park Furniture Australia, n.d.). The BCC showed high compliancy with increases to the floor to seating pad height (15mm above) and the seating surface length (15mm above) with the total height decreased (56.7mm short) (Brisbane City Council, n.d.).

Lastly, all scored in the range of 6-7/8 for their use of sustainable materials for their respective seating designs. The Concourse utilizes cast aluminum which is highly recyclable and can be repurposed into new products or components an infinite amount of time (Street Furniture Australia, 2026). The UNDARA also is constructed using aluminum and ECOPLASWOOD which utilizes recycled HDPE to create the plastic slats used for the seating pad and backrest (Park Furniture Australia, n.d.). Finally, the BCC, uses Kwila timber for the slatting which is a natural and easily recyclable material with the frame being fabricated from powder coated steel which can be recycled (Brisbane City Council, n.d.).

Part 2:

-Research
-Observation Analysis
-Focus Group Analysis



Research & Analysis

Naturalistic observations were selected as one of the methods chosen for the collection of data in this study. These involve an examination of users in a public space, where various annotations can be made on the interaction and behavior exhibited, allowing for generation of qualitative and quantitative data (IxDF, 2016). Observing natural interactions within these settings will allow valuable insights that will build knowledge beyond what was uncovered in the literature review and the benchmarking (Albudaiwi, 2018).

The observations specifically focused on monitoring the frequency of use in public transport seating infrastructure, building understanding of how often users were seated and if the design allowed for multi-person usage. Four categories were measured at each location, those being the **visibility of the seating area** (how obvious is it), **the social layout** (how many people can it approximately fit), the kinds of **the surrounding views of the area** (what's the spatial qualities), and the **materials chosen** for each seating design. At all locations written observations were made roughly every two minutes for **30 minutes per location**, recording the amount of people seated versus the number of people standing near the seat. Additional notes were made on the **behaviors** and **preferences** displayed by seated individuals, remarking if clustering or separation was occurring.

The locations chosen were **major transit facility hubs** that experience a high frequency of use across a half an hour period. The Cultural Centre, Adelaide Street bus stops, Central Station, Roma Street Station and University of Queensland bus terminal were the studied sites. Only handwritten annotations were conducted at each site, with no video or photographic capturing's taking place (Albudaiwi, 2018).

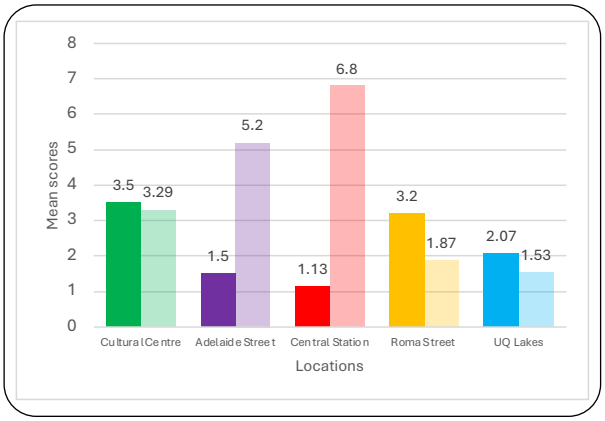
A more controlled study was conducted with a **focus group of nine individuals** who each participated in a brief semi-structured interview while interacting with three chair designs. The focus group featured six female participants and three male participants, **all aged 70 years and above**, with each carrying out the same instructed action.

Participants were asked to take a seat and across the duration of their time in each chair, were asked four questions. Each was queried on a scale of one to ten how comfortable they found the chair followed by a similar question regarding how supportive they found the chair. Participants were then asked while sitting in the chair still, what kinds of improvements they would make to the design. Lastly, each was asked to rate the overall experience of using the chair, on a scale of one to ten, and then were asked to stand up. The three different variations of chair design were a lounge chair design with arm rests and backrest, a chair with back rest and no arm rests and a backless bench design. The full duration of every participant's interaction, including their answers to the questions asked were filmed to ensure that any nuances in speech and body were accounted for. Participants consent and personal preference were discussed beforehand, with the video capturing providing vital visual data to assist in guiding the future development of the project (Joel, 2021).

Observation Analysis

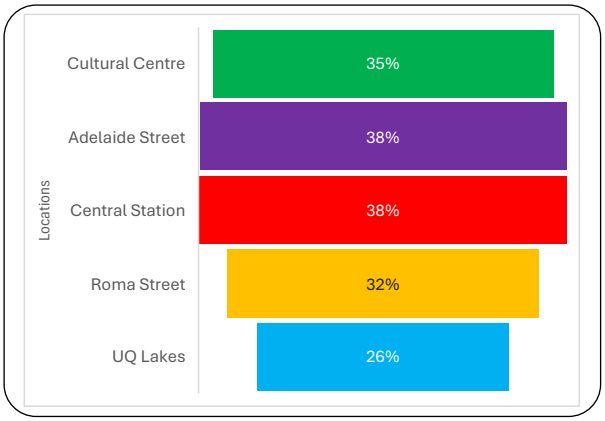
Upon concluding the observations at all five locations, **73 individual observations** were made leading to vast amounts of quantitative and qualitative data. The number of users sitting on the seat versus the amount of people standing within close proximity to a seat was measured over the 30 minutes, with the mean averages calculated once all the data had been counted.

FIGURE 4: *Mean scores for sitting and standing at the 5 locations (columns with no transparency are sitting, columns with transparency applied are standing)*



The Cultural Centre, Roma Street and UQ Lakes observed seats had estimated seating capacities of 8-10 individuals and yet all yielded mean seating scores that fell under their intended capacity. Figure 8 displays this showing that all three of these locations featured means of **3.5, 3.2 and 2.07** of those seated despite these locations featuring higher seating capacities and far more foot traffic. Additionally of note in figure 8 is the mean scores for standing at Adelaide Street and Central Station, both which featured mean scores of **5.2 and 6.8.** These means drastically contrast the mean scores for those seated **(1.5 and 1.13)**, showing that the standing in these locations was often more preferable than sitting.

FIGURE 5: *Percentage capacity use at locations*

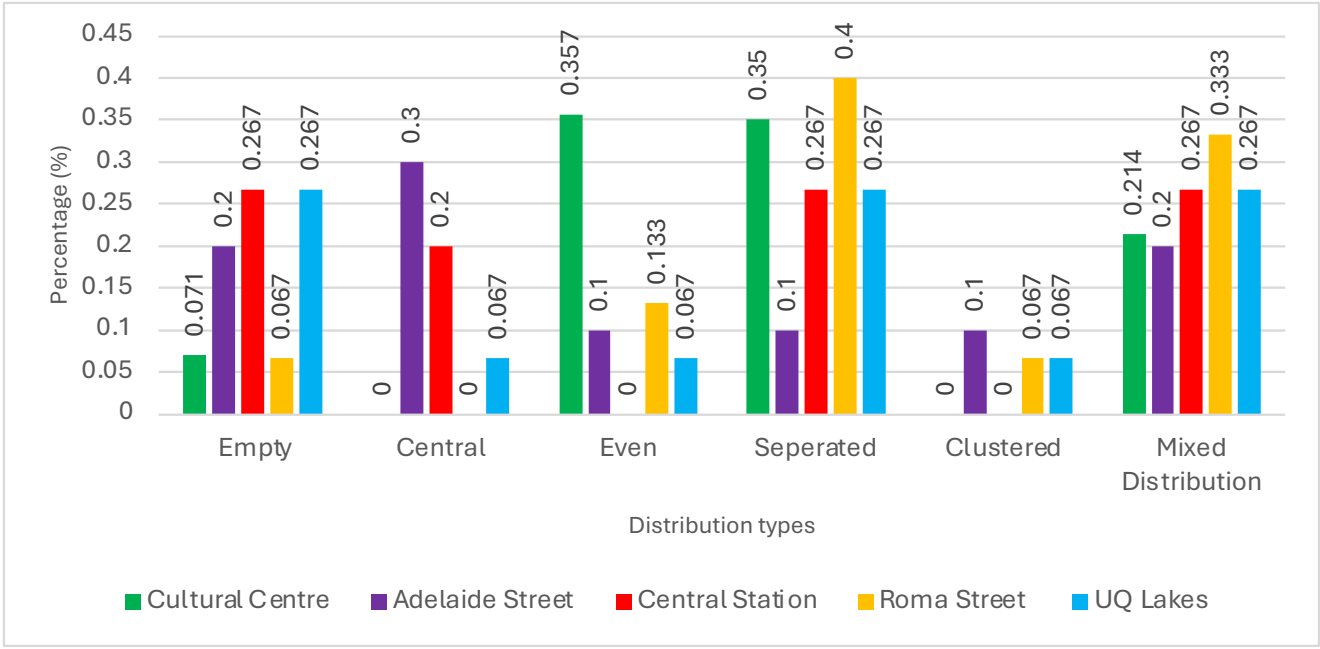


The percentage capacity use was produced through calculating how many people were seated over the estimated seating capacity of the seat. Figure 9 shows the capacity use percentages at each location, all five of which demonstrated that the seating capacity in these locations was being underutilised. Most significant is the percentages for all five locations (**35%, 38%, 38%, 32% and 26%**), demonstrating that the seats were being underused comparative to their seating capacities.

These figures are further backed up by thematic analysis of recurring themes that were identified upon conclusion of the observations. In particular, the **themes of territoriality, distribution, and seat accessibility** played major roles in the frequency and rate at which the public seating was used.

The seating capacity of these locations was greatly affected by the kinds of **distribution** occurring on the seat evidenced in Figure 6. For example, the low mean scores for sitting in the Adelaide Street and Central Station locations could be attributed to many users **opting to sit centrally** on the seats which **led to discouragement** of others sharing the seat. Additionally, the strongest recurring distribution across all locations was **separated distribution**, while the weakest was **clustering** (showing 0% at 2 locations) demonstrating that this is a common behaviour exhibited especially when sitting next to individuals who are unknown.

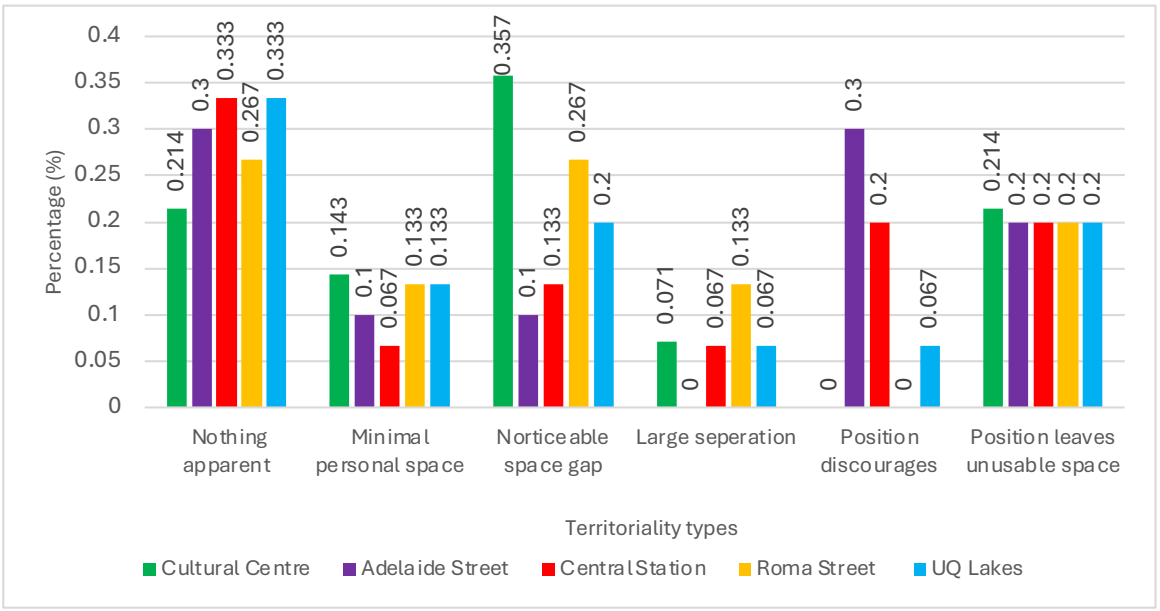
FIGURE 6: *Percentages of different distribution types at all 5 locations*



Supporting the separated distribution is that the **noticeable space gap** was the strongest recurring **territoriality** category, further demonstrating that personal distance plays a major role in the use of public seating (Figure 7). Moreover, the central distribution of users in the Adelaide Street and Central Station location directly correlates with the **position discourages** category demonstrating that especially in seating that features a smaller seating capacity, the distribution of users on a seat greatly impacts its ability to be shared by others. The high occurrence of the **nothing apparent** category is also noteworthy, indicating that there is not always territorial behaviours present within these locations.

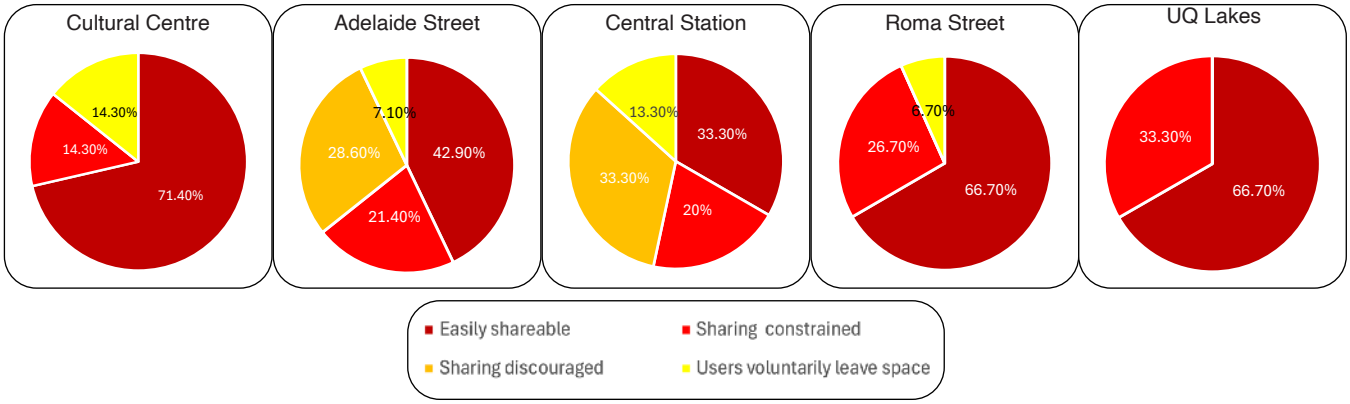
Observation Analysis

FIGURE 7: *Percentage of different territoriality types at all 5 locations*



The most noteworthy aspect of the observed accessibility (Figure 8) of the seating was that the **easily shareable** catergory showed to be the strongest recurring category in the Cultural Centre, Roma Street and UQ Lakes locations. Contrasting this result was the Adelaide Street and Central Station locations which both showed **sharing discouraged** to be the strongest catergory. This once again harkens back to how users distribute themselves and occupy different areas of the seat which directly impacts its accessibility.

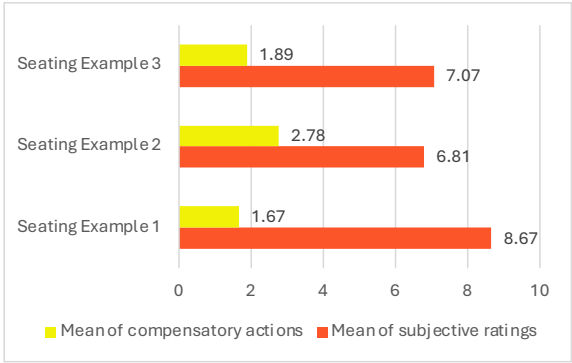
FIGURE 8: *Percentage of different accessibility types at all 5 locations*



Focus Group Analysis

Major and crucial insights were gained from the study conducted with the focus group of nine individuals which led to **108 individual responses** to the 4 questions developed as part of the study. While the data collected is far more suitable for thematic analysis since it primarily deals with qualitative data, some key statistical data points were identified.

FIGURE 9: *Comparison of means for the subjective ratings against the compensatory actions in all 3 seating examples*



Notable from the collected data was that of the differences identified in the mean score of the subjective ratings of comfort, support, and overall experience against the mean of the compensatory actions taken during the sitting duration (Figure 9). These means identified (especially with the second seating examples mean of subjective ratings **(6.81)** and mean of compensatory actions **(2.78)**), that if a participant in the study was required to make any adjustments for the seat while they were interacting with it, that this directly correlates with a lower subjective score. This is furthered by the mean scores for the first seating example which achieved the highest subjective ratings mean **(8.67)** and as result achieved the lowest compensatory actions mean **(1.67)** furthering this relationship between the comfort, support and overall experience's impact on compensatory behaviours.

FIGURE 10: *Participant of the study group Greg interacting with the Chair 1 design*



These statistical results directly relate to the theme of **physical support enabling confidence and autonomy** in users interacting with a chair design. An example like Chair 1 (Figure 10) provides necessary support and structure that allows for greater user control especially when it comes to sitting and standing transitions. Accessible seating like Chair 1, is successful because it **implements necessary support features** that **enable independence** and thus **lower any potential difficultly** that could be experienced during use. Accessibility in seating is entirely dependent on the user and their ergonomic requirements, and this was evidenced in the feedback provided by the participants especially with Chair 2 (Figure 11). Participants suggested that its comfort and support was impacted by its overall seating height being too tall, directly impacting the ability for the participants to keep their feet flat on

Focus Group Analysis

FIGURE 11: *Participant of the study group Robyn interacting with the Chair 2 design*

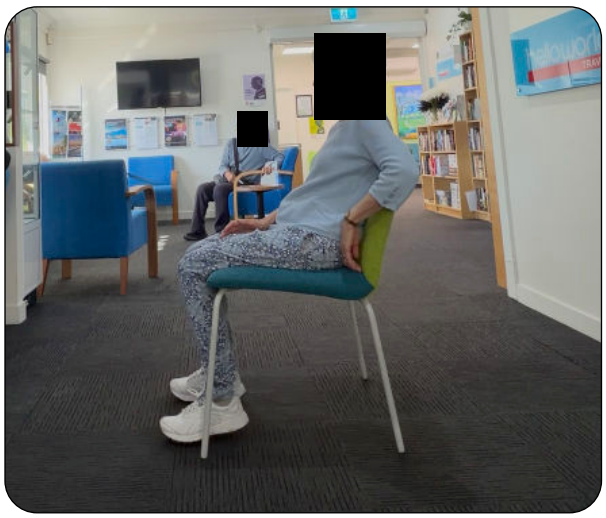


FIGURE 12: *Participant of the study group Adele interacting with the Chair 3 design*

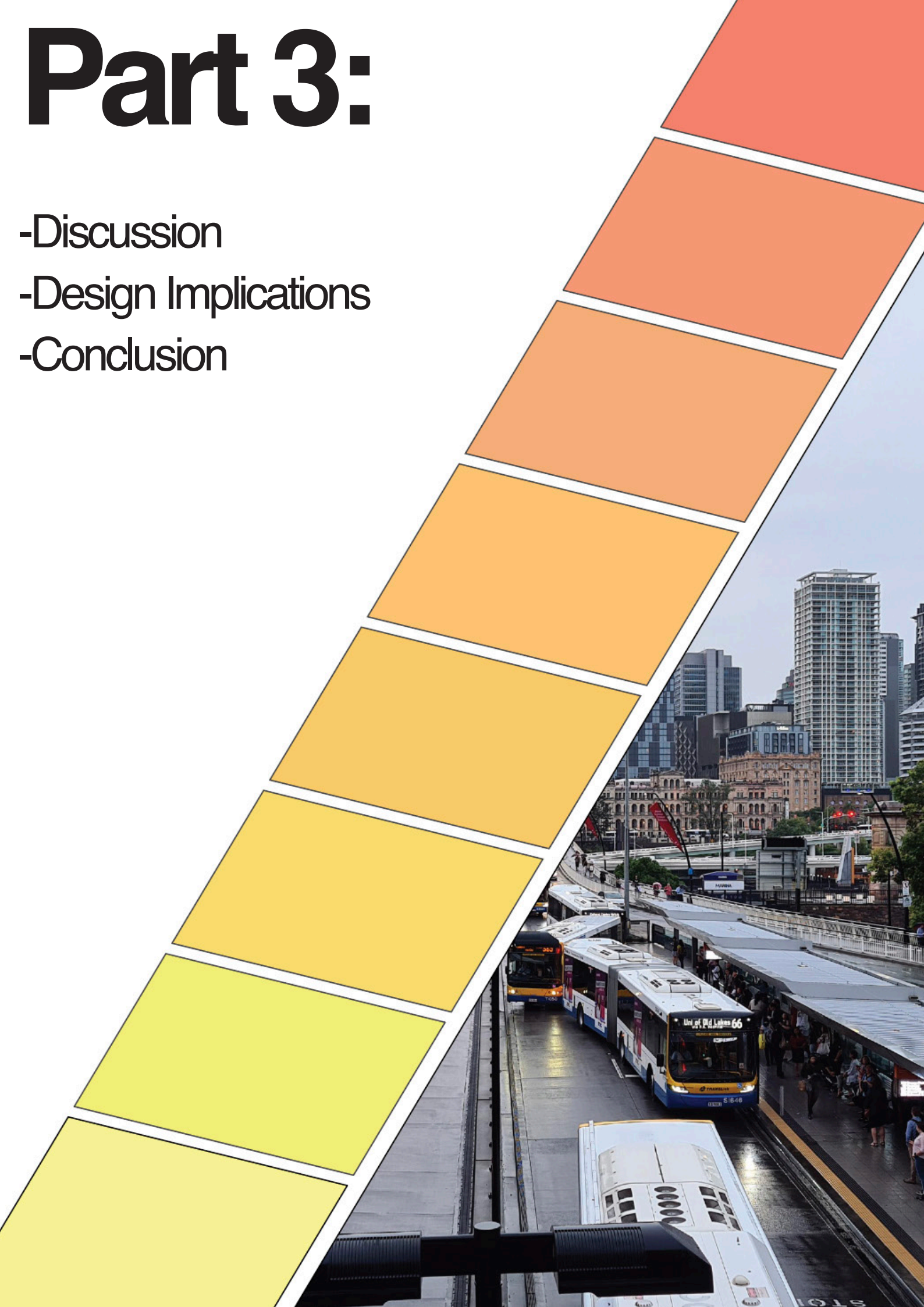


Inability to keep feet on the ground influences standing transitions out of the chair. This ties directly into the following theme and the statistical analysis results which is that **when a seat fails to provide adequate support for users, compensation is required**.

Observed actions taken during the study such as **body repositioning, multiple attempts to stand up** and **physical strain** all indicate that participants had to adopt their bodies to limitations present in the chair. Comfort and functionality with regards to accessibility are related but nonetheless distinct entities, meaning that a seating design can possess a fairly high level of comfort and yet demonstrate a lack of necessary supportive elements which would affect its use long-term. Chair 3 (Figure 12) for example received quite a strong subjective mean of (7.07) and yet it received comments from participants on its apparent lack of supportive features. A user identified early on in the study that long term seats require more than just immediate comfort to be suitable. This was in reference to Chair 1 which this participant, completely unprompted, gave 2 ratings for short-term use (9/10) and long-term use (7/10), making a clear argument that the initial perceived comfort of a seating design should not be treated as a definitive answer to a product that may be used for a longer duration of time.

Part 3:

-Discussion
-Design Implications
-Conclusion



Discussion

The data collected from these two research methods was intended to uncover aspects of seating in public spaces that had not necessarily been revealed in the literature review. From the naturalistic observations performed at the five public transport facilities, the data gathered was the frequency of use that public seating experienced in this area. In addition, the seating habits and behaviours that users undergo while seated led to the development of the themes developed around territoriality, distribution, and seat accessibility. What the data from these areas inferred is that the seating in these facilities is being **underutilised** and also at times **used incorrectly**. With examples like the chair present at the Adelaide Street and Central Station locations, multiple observations noted users would opt to sit in the middle of the chair which would lead to discouragement of others who may also want to use the seat.

This observed behaviour was echoed in the paper by William H. Whyte from the literature review which specifically spoke to the social behaviour of people in public seating spaces, and how the design of a seat can encourage or discourage users for interacting with it (H. Whyte, 1980). The observation data also spoke to the paper by Sema Mumcu and Serap Yilmaz especially in its discussion of public seating that can allow for social interaction and engagement, which the observations revealed that the seating present in many of these locations does not provide a sufficient solution for (Mumcu & Yilmaz, 2016).

The study conducted with the focus group proved just as insightful, with data collected that indicated areas of personal preference when it comes to seating directly from participants in 70 and above age range. Crucially what was uncovered during the study with the group was the **support requirements** that most benefited and impacted the experience of the use of a seat. Chair 2 as mentioned in the analysis section, had aspects that were consistently mentioned by multiple users such as its overall height dimension being too tall and the depth of seating surfaces being “too deep for purpose” (quoted from a participant), both of which impacted the experience of transitioning into and out of the chair. Contrast this with Chair 1 which demonstrated more support features like armrests and an appropriate sitting height and depth, all of which allowed for greater independence and autonomy in users during their seating experience.

The paper by Robyn L. Coman, Carlo D. Caponecchia & Vinod Gopaldasani echoed much of the same data from the study that was conducted with the focus group, specifically the third theme of seating that does not adequately support users requires them to make compensations for the seat (Coman et al., 2021). Other papers analysed that focussed on older adults’ interaction with public seating such as the aforementioned work ‘Loneliness- What’s urban designs got to do with it’ more explicitly explored the impact of public seating on engaging with socialising and physical environments, which was an area that the study with the focus group did not focus on (Xie et al., 2025). If future studies were to be conducted, a greater emphasis on gathering more data related to the socialising aspects of public furniture would be beneficial.

Design Implications

The data identified from the naturalistic observations and focus group revealed a multitude of design implications that require addressal in the design moving forward. When it comes to the physical support of seating and what users desire, features such as **reachable armrests**, that provide a stable and clear surface are vital. **Adequate backrest support** which sits at an appropriate angle and provides a comfortable seating experience while also allowing for greater confidence in sitting-to-standing transitions. Users identified that certain seating examples lacked adequate supportive features and thus led to a lower overall experience with the seat. Additionally, **anthropometric data** regarding different percentile users as well as **Australian Standards**, must guide the dimensional decisions made throughout the concept development phase, with particular attention made to the seating height and depth.

Ensuring these are implemented within the design will allow for a more reliable foot to ground transition and also ensure that a variety of body types and abilities can be accounted for as closely as possible. Utilising anthropometric data will also minimise the need for users to compensate for a design, mitigated through a consideration of seat geometry and supportive features that can provide users more independence and ease in their interaction and transferring in the seat. Consideration of suitable materials is also necessary with the product going forward, participants identified the firmness of a chair as a crucial aspect alongside postural support that facilitates sustained comfort across a variety of time durations. This is important to implement considering the time with which a user may sit on seating featured in public transport facilities will vary, with some requiring support over a longer period of time (5-10 minutes for example).

More specific to the seating found in public transport facilities, **seat widths that are sufficient** for a variety of users is integral alongside **clearly defined seating** that is highly visible and understandable. This would be best addressed through considered anthropometric data, implementation of wayfinding and material choices that indicate seating surfaces. **Variety in social layout** is also a key implementation, with the observations at these facilities revealing that users may opt for sharing a bench with a stranger while others may prefer to be separated. Additionally, seating observed in the research featured very static and linear layouts which provides another opportunity for **slight orientation** in the seating that can better accommodate for couples or groups. Seating geometry that urges users to not sit centrally but instead fill the seat from the sides will provide a greater opportunity for the intended seating capacity to actually be utilised, making it far greater for **multi-person usage**.

Conclusion

The goal from the outset of this project was **improving the sociability and accessibility** of the seating found in these facilities, and research has revealed that addressing these aspects is more complex than first perceived. The process of collecting crucial qualitative data will prove extremely beneficial with the ongoing stages of the project, especially as it becomes implemented with the knowledge garnered from the benchmarking stages of the project. The combination of this data with anthropometric data and standards compliancy will hopefully allow for a design that compensates for not just older adults but for a variety of age groups and abilities.

References

AIHW. (2024). Older australians. In *Australian Institute of Health and Welfare*. Australian Government. https://www.aihw.gov.au/reports/older-people/older-australians/contents/demographic-profile

Albudaiwi, D. (2018). The SAGE encyclopedia of communication research methods. *The SAGE Encyclopedia of Communication Research Methods*, *4*(1). Sagepub. https://doi.org/10.4135/9781483381411

Bertiato, F. (2025). Active seating: Bridging design and health in public spaces. *World Leisure Journal*, 1–9. https://doi.org/10.1080/16078055.2025.2564844

Brisbane City Council. (n.d.). *Public Transport Seat Assembly* [Technical Drawing]. Brisbane City Council. Retrieved https://docs.brisbane.qld.gov.au/standard-drawings/bsd-7202_c_public_transport_seat_-_assembly_-_sheet_1_of_10.pdf

Coman, R. L., Caponecchia, C. D, & Gopaldasani, V. (2021). Impact of public seating design on mobility and independence of older adults. *Experimental Aging Research*, *47*(3), 262–272. Taylor and Francis Online. https://doi.org/10.1080/0361073x.2021.1884445

Commercial Systems Australia. (2025). Designing for DDA - commercial systems Australia. In *Commercial Systems Australia*. https://www.commercialsystems.com.au/designing-inclusive-spaces/

Daniel, D. S. F. (2025). Accessible street and park furniture for inclusive public spaces. In *Draffin Street Furniture*. https://draffin.com.au/accessible-street-and-park-furniture-for-inclusive-public-spaces/

References

Department of Sociology. (n.d.). *S T R a T E G I E S F O R Q ua L i t a T I v e i n T E R v I E WS a few general points*. Retrieved 20 August 2026, from https://sociology.fas.harvard.edu/sites/g/files/omnuum1481/files/sociology/files/interview_strategies.pdf

Furphy Foundry . (2021, April 8). *Precinct Seat* [Technical Drawings]. Furphy Foundry Pty Ltd. https://furphyfoundry.com.au/wp-content/uploads/FFSB002500-PRECINCT-SEAT-PRELIMINARY.pdf

Furphy Foundry. (2023, February 20). *Precinct bench - furphy foundry | street & park furniture*. Furphy Foundry. https://furphyfoundry.com.au/product/precinct-seat/

H. Whyte, W. (1980). The social life of the small urban space. *Www.Academia.Edu*, 24–40. https://www.academia.edu/38809877/The_social_life_of_the_small_urban_space

IxDF. (2016). How to conduct user observations. In *The Interaction Design Foundation*. IxDF - Interaction Design Foundation. https://ixdf.org/literature/article/how-to-conduct-user-observations

Joel, T. (2021). Naturalistic observation paper. In *Medium*. https://medium.com/@teacherjoel/naturalistic-observation-paper-ecab198aad19

Kawulich, B. (2005). Participant observation as a data collection method. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *6*(2). https://doi.org/10.17169/fqs-6.2.466

References

Lesan, M., & Gjerde, M. (2020). Sidewalk design in multi-cultural settings: A study of street furniture layout and design. *URBAN DESIGN International*. Springer Nature Link. https://doi.org/10.1057/s41289-020-00121-x

McPherson, J. (2026, March). *Inclusive Precincts Guide* [Technical publication]. the State of Queensland (Department of Transport and Main Roads). https://www.tmr.qld.gov.au/business-industry/technical-standards-publications/inclusive-precincts-guide

Meagher, B. R., & Marsh, K. L. (2016). Seeking the safety of sociofugal space: Environmental design preferences following social ostracism. *Journal of Experimental Social Psychology*, *68*, 192–199. Science Direct. https://doi.org/10.1016/j.jesp.2016.07.004

Morgan, R. (2020). Australia's 12 million public transport users face a COVID19 dilemma – get back on the train or drive to work? - Roy Morgan Research. In *www.roymorgan.com*. https://www.roymorgan.com/findings/australias-12-million-public-transport-users-face-a-covid19-dilemma-get-back-on-the-train-or-drive-to-work

Mumcu, S., & Yilmaz, S. (2016). Seating Furniture in Open Spaces and Their Contribution to
the Social Life. *Environmental Sustainability and Landscape Management*, 169–188. St. Kliment Ohridski University Press. https://www.researchgate.net/profile/Recep-Efe/publication/311065048_Environmental_Sustainability_and_Landscape_Management/links/583c862f08ae502a85e3e890/Environmental-Sustainability-and-Landscape-Management.pdf#page=178

References

Park Furniture Australia. (n.d.-a). *PFA101 Undara* [Product Procure]. Park Furniture Australia. Retrieved https://parkfurnitureaustralia.com.au/wp-content/uploads/2022/09/PFA101-brochure-DIGITAL.pdf

Park Furniture Australia. (n.d.-b). UNDARA [Online image]. In *Park Furniture Australia*. Retrieved https://parkfurnitureaustralia.com.au/product/undara/?srsltid=AfmBOoqw_XbyrBL_gurmbjERXMw7-K8Klne1EO26pXkXASSpE8127_3v

Park Furniture Australia. (2026, August 21). *Undara*. Parkfurnitureaustralia.Com.Au. https://parkfurnitureaustralia.com.au/product/undara/?srsltid=AfmBOop2TcVgzTwFonOkYKL6zzNmO1WCWxMXt59hpW3wB0b3G5LmbyoL

Spark Furniture. (n.d.-a). *AGROA* [Data]. Spark Furniture. Retrieved https://www.sparkfurniture.com.au/uploads/pdf/SPARK%20Agora%20Seats%20Data%20Sheet.pdf

Spark Furniture. (n.d.-b). *TRANSIT* [Data sheet]. Spark Furniture. Retrieved https://www.sparkfurniture.com.au/uploads/pdf/SPARK%20Transit%20Seat%20Data%20Sheet.pdf

Spark Furniture. (2026a). *Spark - street/park/life*. Sparkfurniture.Com.Au. https://www.sparkfurniture.com.au/products/seats/transit-seat/

Spark Furniture. (2026b). *Spark - street/park/life*. Sparkfurniture.Com.Au. https://www.sparkfurniture.com.au/products/seats/agora-seat/

Stoddart Infrastructure. (2026). *Town & Park Station Seat STS*. Stoddart.Com.Au. https://stoddart.com.au/products/town-and-park-station-seat-sts

Stoddart, T. (2019, January 11). *STANDARD PRODUCT STATION SEAT* [Data Sheet]. Stoddart Infrastructure.

References

https://res.cloudinary.com/hyggzlxrb/raw/upload/v1719243772/media/sptp.sts.s.sp.ar1.1200.ep_a_datasheet.pdf

Street Furniture Australia. (n.d.). Concourse Seat (4-seater) wall-fixed, Sabel Brilliance panels, Palladium Silver frame [Online Image]. In *Street Furniture Australia*. Retrieved https://streetfurniture.com/product/concourse-seat/

Street Furniture Australia. (2011, January 5). *Concourse seat - street furniture Australia*. Street Furniture Australia - We Make Products for Life Outdoors. https://streetfurniture.com/product/concourse-seat/

Street Furniture Australia. (2019). How to apply DDA to street furniture: Seats and tables. In *Street Furniture Australia*. https://streetfurniture.com/how-to-apply-dda-to-street-furniture-seats-and-tables/

Street Furniture Australia. (2026a). AS1428.2, inhouse ergonomic testing and universal design principles are all combined to develop DDA products. [Online image]. In *Street Furniture Australia*. https://streetfurniture.com/how-to-apply-dda-to-street-furniture-seats-and-tables/

Street Furniture Australia. (2026b, May). *Concourse Seat* [Tech sheet]. Street Furniture Australia Pty Limited. https://streetfurniture.com/download/concourse-seat/?wpdmdl=39810&refresh=6a87ec90cb6f11787292816

Turner, D. W. (2010). *Qualitative Interview Design: A Practical Guide for Novice Investigators*. NSUWorks. Archive.Org. https://web.archive.org/web/20230519081811/https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.674.8927&rep=rep1&type=pdf

References

Urban Fountains & Furniture. (n.d.). BCC bench seat back lifestyle [Online Image]. In *Urban Fountains & Furniture*. Retrieved https://urbanff.com.au/product/bcc-bench-seat/

Urban Fountains & Furniture. (2024, January 8). *BCC bench seat*. Urban+. https://urbanff.com.au/product/bcc-bench-seat/

Wheree. (n.d.). Mater Hill photos [Online image]. In *Wheree*. Retrieved https://mater-hill.wheree.com

Xie, J., McLaughlan, R., & Woodcock, I. (2025). Loneliness – what's urban design got to do with it? Older people in transit-oriented suburban public spaces in Sydney, Australia. *Cities & Health*, 1–18. https://doi.org/10.1080/23748834.2024.2444135

Zhang, Z., & Sun, Q. (2024). Integrated design methods for sustainable public seating in urban communities—A Shanghai case study. *Sustainability*, *16*(20), 9096–9096. MDPI. https://doi.org/10.3390/su16209096