DEVELOPING DESIGN GUIDELINES AND A STREET FURNITURE PALETTE TO GUIDE THE IMPLEMENTATION OF KERBSIDE INFRASTRUCTURE SUPPORTING THE GO GEORGE BUS SYSTEM, GEORGE

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ABSTRACT

Many South Africans rely on public transport to access employment, education, healthcare and other essential services. 35% of workers in South Africa rely on public transport to access employment opportunities while 22% of learners use public transport to attend a pre-school institution, school, college or any other tertiary education or training institution (Statistics South Africa, 2022). The public transport system is not only about the in-vehicle trip, but also about the walk to and from the bus stop as well as the waiting experience. This takes place in the "kerbside" or "pedestrian realm" where consistent design and application along approach pathways and at bus stops will enhance the quality of the pedestrian environment and improve the passenger experience.

Before the advent of GO GEORGE, minibus taxis and a few buses were the only forms of Public Transport operating in George. GO GEORGE is a scheduled municipal-run public transport service which evolved from an intention to improve mobility on the Sandkraal Road (now Nelson Mandela Boulevard) corridor. The GO GEORGE system was designed to allow the infrastructure requirements and responses to be adapted to the evolving system. Due to limited available funding, uncertainties about passenger uptake and to minimise wasteful expenditure, an “infrastructure light” approach was adopted. Since its implementation in 2014, the GO GEORGE system matured, grew and moved into the post roll-out phase, the focus shifted from providing the minimum infrastructure to:

- Making transfer locations safer;
- Developing the kerbside pedestrian environment to acceptable Universal Access (UA) design standards; and
- Including a pedestrian sidewalk network that begins to build travel chain continuity.

To guide this, a Draft Design Guidelines and Street Furniture Palette (Zutari Pty Ltd, 2024) was required, which offers not only guidelines but a range of design elements and combinations that can be selected for use in the furniture zone of the road reserve. The Palette offers comprehensive information to guide decision-makers, managers and contractors in the conceptualisation, placement and construction of transport infrastructure. The aim being to improve the quality of this experience and create safer pedestrian streets and public places, thereby contributing positively to a more walkable central business district (CBD) and liveable city.

This paper will discuss all the elements considered in the Draft Design Guidelines and Street Furniture Palette developed. The palette and guidelines could potentially be upscaled and used in other public transport systems across the country, helping to enhance public transport as a mode of travel.

Keywords: Public transport, Mass-transit, Pedestrian prioritisation, Accessible transport systems, Street furniture palette, Design guidelines, Road safety.

1. INTRODUCTION

The George Integrated Public Transport Network (GIPTN), incorporating the GO GEORGE bus service, is a street transit type public transport project spearheaded by the provincial Mobility Department and the Municipality of George, supported by the Department of Transport (GO GEORGE, n.d.). It is South Africa's first non-metro-integrated public transport system and has been adopted as a potential pilot for the future roll-out of other IPTNs outside of large cities (Zutari, 2019).

GO GEORGE evolved from an intention to improve societal integration along the Sandkraal Road (now Nelson Mandela Boulevard) corridor. This integration is not possible without a comprehensive understanding of how public transport should be provided to the majority of the population who do not have access to private vehicles. The GIPTN aims to recognise the catalytic role a formal public transport system can play through urban integration, the rejuvenation of blighted areas, corridor densification and the creation of more liveable environments.

The planned GIPTN network includes both the urban and rural environments in the George Municipality. The extent of the GO GEORGE network is shown in Figure 1.

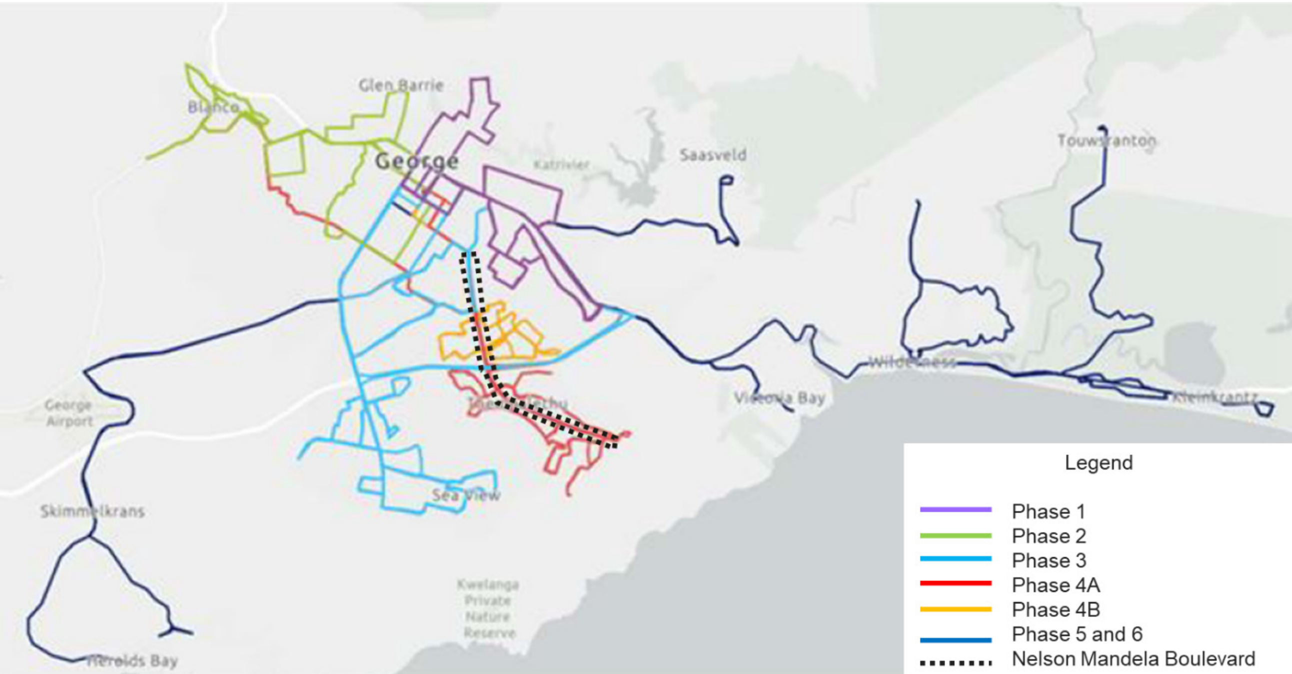


Figure 1: GO GEORGE Service

1.1 Infrastructure Light Approach

The introduction of GO GEORGE commenced with an "infrastructure light" approach to the provision of infrastructure. This approach was adapted due to uncertainties relating to passenger demand and take-up, and thus the risk of investing in infrastructure that might be unused should the operation not materialise.

The Infrastructure Provision Framework, as outlined in the Public Transport Infrastructure Guideline (PTIG) (Zutari, 2021), is summarised below:

- *"Stage 1: Deliberate "infrastructure light" start to a street transit system due to uncertainties, limited available funding and minimal wasteful expenditure (pre-operations stage).*
- *Stage 2: During the phased rollout, emphasis is placed on the required "roadside" infrastructure, with temporary shelters and facilities that effectively support the services' phased rollout.*
- *Stage 3: Post-roll-out infrastructure review to focus on making transfer locations safer and developing the "kerbside" pedestrian environment to acceptable 'universal access design' standards, inclusive of a pedestrian sidewalk network that begins to build travel chain opportunities.*
- *Stage 4: Focus on broader corridor development that begins to leverage 'value capture' and 'value capture financing' principles and opportunities associated with adjacent properties."*

This approach defined the infrastructure requirements and the responses to be tailored to the evolving system.

1.2 Problem Statement

The passenger experience of a public transit system is not only about the in-vehicle trip, but also about the experience of walking to and from, and waiting at, the bus stop. This walking and waiting experience occurs in the 'kerbside' pedestrian realm, where uniformity in the design and application of the approach pathways and bus stops can contribute positively to the quality of the pedestrian realm and passenger experience.

Previous work by the George Municipality, other consultants and contractors in George centered on the provision of Stage 1 and Stage 2 infrastructure. However, in recent years, there has been movement into Stage 3 of the Infrastructure Provision Framework (Zutari, 2021). As such, more emphasis is being placed on improving the pedestrian realm in the immediate bus stop environments and the approach pathways used by pedestrians and bus passengers.

The lack of a suitable guideline document in the George Municipality prompted the need for guidelines and a palette to ensure alignment among stakeholders to implement and maintain a consistent, unified material language across all elements associated with the mobility infrastructure.

1.3 Aim of Paper

This paper aims to showcase the process followed in developing the Draft Design Guidelines and Street Furniture Palette (Zutari, 2024) as a blueprint for planners and designers facing similar challenges when developing and implementing the infrastructure related to a public transport system. It highlights the important role of the pedestrian realm in public transport planning and it identifies the essential supporting infrastructure beyond what is located within the roadway.

1.4 Scope of the Paper

The paper discusses the key steps and methodology to develop the Draft Design Guidelines and Street Furniture Palette, as well as examples of the product and results showcasing a potential outcome of this type of approach.

2. NEED FOR A DESIGN GUIDELINES AND PALETTE

2.1 Holistic Approach

Highlighting and acknowledging the necessity for ‘kerbside’/verge focus as an integrated part of the public transport system and the pedestrian experience was an initial step towards a more holistic approach to public transport. In addition to the public transport experience being fundamentally about connection, the verge and pedestrian realms become critical components of the public transport system that enable numerous benefits to society (Global Designing Cities Initiative, 2016).These include:

- Health and Walkability: Encouraging active transportation and reduction in sedentary travel.
- Social Inclusion: Providing mobility options for all community members.
- Resource Efficiency: Minimising environmental impact and traffic congestion.
- Urban Development: Supporting sustainable, connected urban and economic growth.

To achieve these benefits and incorporate 'kerbside' development and pedestrian experience based on international best practices, the development of design guidelines was considered the most appropriate tool to achieve practical results on the ground. For example, the NATCO Global Street Design Guide (Global Designing Cities Initiative, 2016) recommends prioritising pedestrians over private vehicles, which is essential for achieving these benefits and creating safer, more accessible, and sustainable urban environments. The Global Street Design philosophy is succinctly captured in the diagram below.

Figure 2: Prioritising Pedestrians (Global Designing Cities Initiative, 2016)

2.2 Challenges

An investigation, including site visits, interviews, and meetings with George Municipal officials, was conducted to identify the main challenges of the current context and infrastructure, with the aim of better understanding the required solutions. Several challenges were identified, underscoring the need for a more cohesive and unified material language across all elements of the mobility infrastructure, including streetscapes, street furniture, bus shelters and stops. This further indicated the need for guidelines and a palette to standardise materiality choice. The following challenges were identified:

2.2.1 Inconsistency in the Public Realm

The urban landscape in George, including the GO GEORGE bus stops, reflects a varied approach to hard and soft landscaping, resulting in a public realm that feels fragmented in places. Variations in paving, level changes and the positioning of street furniture sometimes present challenges for pedestrian accessibility and limit the sense of a cohesive, user-friendly environment. A more unified design approach could enhance visual and functional continuity, ensuring that public spaces are connected, navigable and welcoming for all. Thoughtful placement of street furniture and infrastructure would further support intuitive movement and improve the overall experience of the urban environment.

2.2.2 Anti-Social Activities

Certain behaviour and activities pose challenges to maintaining the appearance, comfort and safety of public transport infrastructure, potentially making these spaces feel less welcoming. Instances such as graffiti, broken glass and minor structural damage to bus shelters in George detract from the overall quality of the public realm and highlight the need for regular maintenance. Similarly, occasional theft or damage to materials, such as pavers or landscaping elements, disrupts the intended functionality and appearance of these areas. In some cases, the use of shelters as informal resting spaces or gathering points creates a sense of discomfort for other users.

2.2.3 Bus Stop and Shelter Design

The design of bus stops and shelters serves as a crucial link between urban infrastructure and user experience, and there are opportunities in George for improvement to enhance their integration and functionality. In some areas, bus shelters are larger in scale than their surroundings, which affects the visual continuity and character of neighbourhoods. Similarly, the placement of shelters could be refined to better support pedestrian movement, respect private property access and align with the needs of nearby residential spaces. Enhancing weather protection and seating options would significantly improve user comfort, while ensuring better integration with pedestrian pathways would help reduce congestion and promote safety.

2.2.4 Unstructured Implementation

Government policy (Department of Transport, 2021), (Department of Social Development, 2016), (Seedat, 2007) as well as legislation such as the Constitution (Republic of South Africa, 1996) and the National Land Transport Act (The Presidency, 2009), reflect South Africa's commitment to the United Nations Convention on the Rights of Persons with Disabilities and Optional Protocol (UNCRPD) (United Nations, 2006).

The grant funding received for the development of the GIPTN system requires that the system be universally accessible as outlined in a Statement of Intent approved by Council in February 2016 (Municipal Management Committee, 2016).

Since 2014 a considerable amount of work has been done in terms of Universal Access and the provision of amenities such as bins, benches, shelters, etc., materials to limit and reduce the impact of vandalism; street lighting; and landscaping in George. Through GO GEORGE it was possible to both research and recommend various solutions and test these in practice.

The Draft Design Guidelines and Street Furniture Palette (Zutari, 2024) is a guiding document that encapsulates lessons learnt from the work done over the past 10 years, focusing on the provision of infrastructure at bus stops that enhances the pedestrian realm and user experience.

3. DESIGN INTENT

3.1 Need for a Shared Vision

The design intent for the GO GEORGE bus system responded to a clear need to establish alignment amongst all stakeholders to ensure a shared vision and ultimate ‘buy-in’. This vision was articulated through continuous engagement and discussions with those who had been working on the bus system for over 15 years, incorporating consultants' and officials' intrinsic and tacit knowledge, combined with international best practice and precedent.

This process further highlighted the critical importance of developing a shared vision that serves as a unifying framework to guide decision-making, align objectives, and create a sense of ownership among all parties.

3.2 The GO GEORGE Vision

The GO GEORGE bus system and associated public realm is more than just infrastructure; they play a key role in shaping how passengers move through and experience the city, and it should be designed to prioritise human dignity, accessibility, and well-being.

The goal of the system is to make moving through the city safer and more enjoyable for the users as well as for general pedestrian. It is a people-first transport network, with streets that are not only for vehicles but are also inclusive public spaces that support safe and comfortable movement for people of all ages and abilities

Inspired by human-scale design principles (National Association of City Transportation Officials and Global Designing Cities Initiative, 2016) (Zutari, 2021), the bus system is seen as a platform for social interaction, urban vitality, and community well-being.

The idea is to design the public realm and associated bus stop infrastructure to prioritise safety, accessibility and comfort, to improve transportation and the daily experience of the commuter.

3.3 Design Principles and Objectives

The following is a summary of the guiding principles underpinning the vision and a set of objectives to achieve the desired results of the Draft Design Guidelines and Street Furniture Palette.

3.3.1 People Friendly

Creating a welcoming, attractive and accessible public realm that prioritises the needs of all users to:

- Ensure access for diverse user groups, including individuals with disabilities, the elderly and families with children.
- Provide appropriate amenities to cater to diverse needs.
- Create lively hubs and multi-use spaces to support local economy and generate activity.
- Enhance visual appeal, incorporating art installations or green spaces and choosing materials that are not only durable but also visually pleasing.

3.3.2 Safe and Secure

Designing and supporting a well-activated public realm that prioritises user safety and security to:

- Minimise road hazards and pedestrian/motor vehicle conflict.
- Use Crime Prevention Through Environmental Design principles (CPTED) to reduce the likelihood of crime and enhance a sense of safety (Newman, 1972).
- Create well-activated public realms during day and night.
- Maintain clear sight lines and visibility.
- Design spaces where people feel comfortable spending time.

3.3.3 Robust and Durable

Implementing infrastructure using resistant materials that can withstand extensive use and environmental challenges to:

- Select low-maintenance, resilient materials and ensure longevity of transfer location infrastructure.
- Design elements that endure heavy use and environmental conditions while maintaining aesthetic and functional integrity.
- Design elements that require minimal replacement and repair costs.

3.3.4 Legible and Integrated

Creating a cohesive urban environment with an elegant backdrop that is easy to understand and navigate to:

- Design pedestrian pathways offering direct travel routes to bus stops or destinations.
- Ensure ease of understanding street environments and destination finding.
- Integrate bus infrastructure seamlessly with the surrounding urban context and other types of mobility.
- Create clear connections between different transport modes.
- Ensure features are consistent and easy to understand.

3.3.5 Identifiable

Developing a distinct urban identity that fosters a sense of place and community pride to:

- Utilise the unique visual language for GO GEORGE infrastructure.
- Develop design elements that reflect local character.
- Enhance user and resident connection to public spaces.
- Use consistent design language across different locations.
- Support community pride through thoughtful urban design.
- Make walking environments attractive and inviting.

3.3.6 Comfortable and Accessible

Prioritising user comfort through considerate design that addresses various environmental and physical considerations to:

- Mitigate challenges of uneven paved surfaces and weather conditions, minimising physical discomfort.
- Create inclusive environments that accommodate diverse mobility needs.
- Make walking environments accessible to and usable by as many people as possible without specialised adaptation.
- Provide sufficient space for unhindered pedestrian movement.

4. METHODOLOGY

The development of the GO GEORGE Draft Design Guidelines and Street Furniture Palette (Zutari Pty Ltd, 2024) followed a systematic approach incorporating both analytical and participatory methods. This methodology was structured to ensure a thorough and context-specific investigation of existing conditions while facilitating the development of forward-looking solutions.

4.1 Research, Review and Identification of Challenges

The initial phase involved a comprehensive review of existing infrastructure specifications, site visits to document physical conditions and an analysis of the current infrastructure. Stakeholder engagement provided valuable insights into bus system operations, maintenance patterns and user behaviour alongside the collation and documentation of work completed to date. Additionally, the work completed thus far was carefully reviewed and analysed to ensure that the guidelines and palette would be built upon and enhance the many years of effort already invested. Key ideas were incorporated to honour past contributions while ensuring that the further implementation of the GO GEORGE system would be improved without duplicating effort.

Challenges were identified through the analysis of collected data and the assessment of current conditions. The challenges faced by GO GEORGE can be categorised into three primary areas:

- Infrastructure inconsistency, which resulted from varying materials and designs across locations, leading to a fragmented visual language and complicated maintenance procedures;
- Anti-social activities, including vandalism and material theft, which persistently affect system functionality; and
- Design and implementation challenges, such as scale incompatibility with urban contexts and, in some areas, inadequate weather protection.

4.2 Framework Development

The second phase of the methodology involved a more complex, iterative process consisting of three distinct but interconnected stages:

Using the design intent outlined in Section 3, the components of the bus system were defined. This process required a delineation of spatial zones, a classification of bus stop environments, and detailed documentation of stop types. Establishing definitions was crucial for creating a shared technical vocabulary among stakeholders and team members and ensuring consistent interpretation of guidelines. Regular meetings were held to review and refine these definitions, often revealing the need for additional clarity or reconsideration of certain classifications and meanings.

Two distinct but inherently linked sets of guidelines were then developed. This dual approach was necessary to address both the specific requirements of public transport infrastructure and its integration into the broader urban environment. The first set focused on bus stops and shelters, forming the core infrastructure of the transport system, while the second set of guidelines addressed landscaping and street furniture, recognising that successful public transport infrastructure must be well-integrated into its urban context.

Throughout the development of both guideline sets, stakeholder engagement played a central role. Regular progress meetings and design review workshops created opportunities for meaningful feedback and refinement. Site visits and assessments helped ensure solutions were practical, while technical reviews confirmed implementation feasibility.

The George Municipality was a crucial stakeholder during this phase, serving as the primary developer and entity responsible for long-term maintenance. Their input and approval were essential to ensure the guidelines would be both practical and sustainable. Municipal departments provided valuable insights on maintenance capabilities, material availability, and implementation constraints.

This iterative process allowed the guidelines to evolve in response to stakeholder input while maintaining alignment with the project's core vision and principles.

5. OUTCOME

5.1 Introduction

The main output was a comprehensive document organised into six key sections, each building upon the last:

- Section 1: Introduction.
- Section 2: Issues and Challenges.
- Section 3: Design Intent.
- Section 4: Components of the Bus System.
- Section 5: Bus Stop/Shelter Palette and Guidelines.
- Section 6: Landscaping and Street Furniture Palette and Guidelines.

Sections 1, 2, and 3 of the document have been detailed earlier in this paper, while the results part of this paper focuses on illustrating sections 4, 5 and 6, which represent the core outcomes of the methodology previously outlined.

5.2 Components of Bus System

The aim and result of the components section was to establish clear and concise definitions for each component, breaking the bus system down from first principles. This made it easy to identify needs and requirements at different levels and functions of the bus components and the infrastructure within the public realm.

5.2.1 Public Environment Structure

The study focused strategically on the public realm, particularly the verge environment where bus infrastructure interfaces with pedestrian movement and urban activity. The verge is classified into three distinct functional zones, illustrated below (National Association of City Transportation Officials and Global Designing Cities Initiative, 2016; City of Portland, 1988).

- **The frontage zone** forms the transition between private property and public space, often accommodating building entrances, outdoor seating, or landscaping.
- **The effective walkway** provides a critical pedestrian movement corridor, requiring clear, unobstructed passage.
- **The furniture zone** houses bus stops, shelters, and street furniture while serving as a buffer between pedestrians and vehicular traffic.

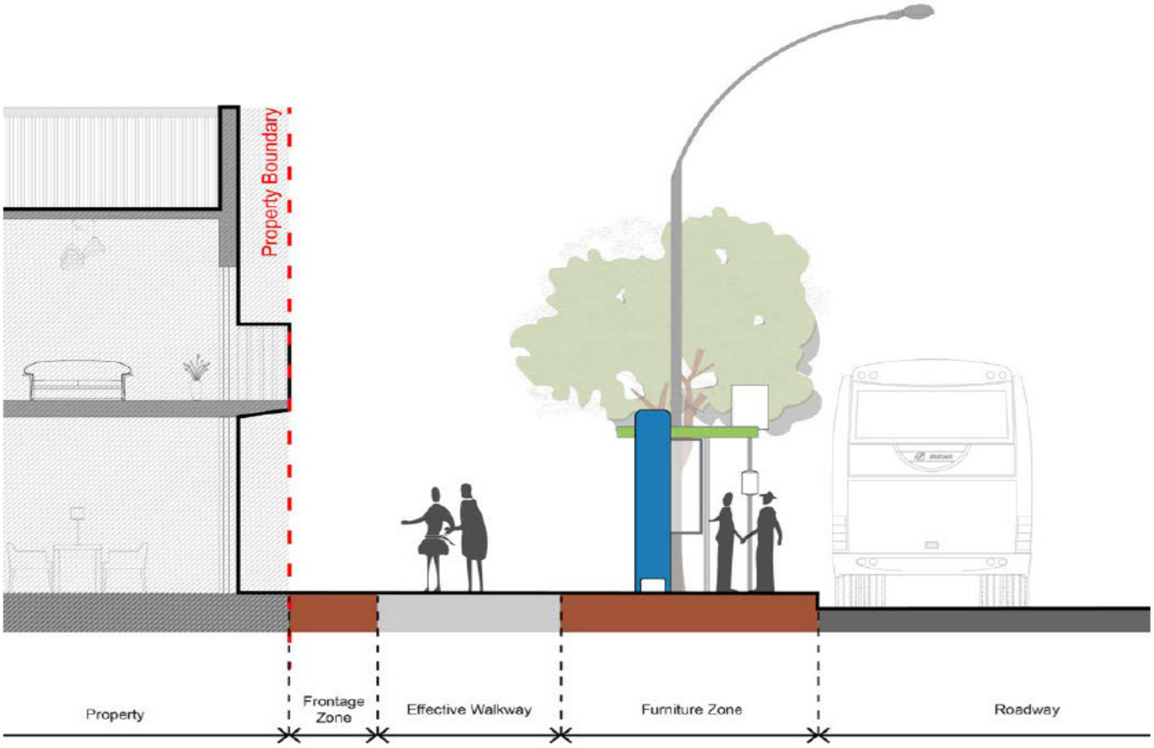


Figure 3: Verge zones (Zutari Pty Ltd., 2024)

5.2.2 The Bus Stop Typologies

In the context of public transportation, a bus system is organised around a network of stops and routes designed to provide an accessible transport service using buses within a specific geographic area. When planning an individual bus stop, various factors must be considered to ensure the design meets the needs of passengers, staff, the system and the surrounding context.

A bus stop is a designated place where buses stop for passengers to board or disembark from the vehicle along a strategically located bus route. Within George, these typically consist of a signpost and a platform. A bus stop may include various amenities (add-ons) to meet different needs, depending on its location, demand, and other contextual factors. Table 1 illustrates two different types of bus stops that occur in the GO GEORGE Bus System, en- route stops and terminal stops.

Table 1: Bus stop typologies (Zutari Pty Ltd., 2024)

Bus Stop Type	Description	Initial Considerations
En Route Stop	• Buses stop here to pick up and drop off passengers as part of their ongoing route. • These stops are characterised by shorter dwell times (the time a bus spends at a stop) • En-route stops are usually more numerous and are placed at regular intervals to serve areas along the bus route.	Given the less complex nature of these stops and the wider variety of their roll-out, their immediate context, their location within the different environments, and whether they are 'high-demand' will determine the needs for that stop.
Terminal Stop	• Terminal stops are at the start or the end of a bus route. • Buses stop here to pick up and drop off passengers as part of their ongoing route as well as provide an opportunity for driver's to change over. • These stops are characterised by and should be equipped to handle longer dwell times (holding the bus).	Same as above but in addition, given the dwelling times, facilities that cater to driver's needs, larger waiting areas, rest facilities, and sometimes maintenance or refueling capacities.

5.2.3 Bus Stop Environments

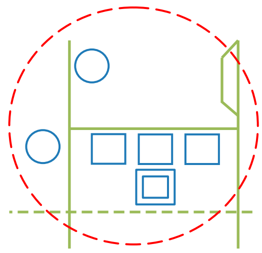
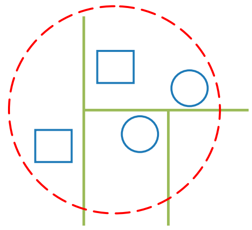
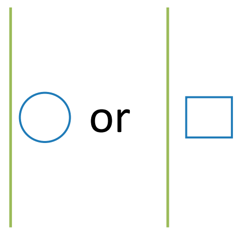
In developing the Draft Design Guidelines and Street Furniture Palette (Zutari Pty Ltd, 2024) bus stops were classified into differing typologies based on demand, route complexity and mode of transport. These classifications are also influenced by the environment in which the bus stop is located as well as its function. Three typical environments were identified in George and all bus stops can be classified into three categories in line with their receiving environments. Table 2 below illustrates the classification of bus stops according to these three identified environments, highlighting the configuration and key characteristics and requirements for each category based on their specific location and function.

5.3 Bus Stop/Shelter Guidelines

The bus stop environment and classification help with the selection of the components that make up the bus stop, including the different amenities and add-ons required to advance and support the system and public realm to cater to a people-oriented place.

A bus stop normally includes the minimum infrastructure of a paved platform, pole and sign. In addition to the standard bus stop, there are several amenities and additional facilities which can be incorporated into the space, the biggest being the bus shelter. While shelters are desirable, they are not affordable or practical in every location and special attention should be given to the selection, design and location of these shelters.

Table 2: Bus stop environments (Zutari Pty Ltd., 2024)

Classification	Environment Type/Description	Configuration
Complex • Demand: Moderate - High • Route Complexity: Multiple intersecting routes • Mode: Multiple (bus, rail, taxi, etc.)	**Multi-Modal Interchanges** Infrastructure - Dedicated infrastructure for multiple transport modes with extensive passenger facilities and amenities.	
Intermediate • Demand: Moderate – High • Route Complexity: Multiple bus routes • Mode: Primarily bus-to-bus	**Transfer Location (Can also be a Terminal Location)** Infrastructure - Dedicated infrastructure for multiple transport modes with extensive passenger facilities and amenities.	
Simple • Demand: Low - High • Route Complexity: Single or few routes • Mode: Single mode (bus only)	**Any Other Environments** Infrastructure - Typically just a signpost and/or a shelter but could also have other amenities such as: benches, bins, seating perches etc.	

Typically, bus shelters are located on arterial and urban community bus routes where the number of passengers using a bus stop is sufficient to warrant the added capital and maintenance expense of a shelter. The requirement for a shelter is determined by the Bus Shelter Warrant and Prioritisation Model (Van Straten et al., 2025). This model was developed by Zutari Pty Ltd. in 2019 to use for the warranting and prioritisation of shelters at GO GEORGE bus stops. The following criteria are used to evaluate a bus stop to determine whether a shelter is warranted:

- Passenger volumes;
- Special conditions in terms of location (e.g. outside a hospital, clinic, etc.);
- Technical feasibility of the shelter; and
- Verge space constraints.

The criteria used to prioritise the provision of shelters are:

- Location and land use;
- Exposure to elements;
- Passenger profile;
- Daily number of passengers;
- Potential to increase revenue; and
- Likelihood of vandalism.

The guidelines include selection criteria to assist users in choosing the most appropriate bus stop typology and additional features for each location. They also outline the materials pallet for each bus stop or shelter feature, along with maintenance and management recommendations to ensure the longevity of this public investment. Additionally, the design guidelines provide guidance on the shelter's composition (both flexible and fixed components), its placement within the verge and the relationship between the shelter, platform and kerb.

5.3.1 Family of Shelters

To maximise construction flexibility and minimise cost, the proposed shelters are a modular system allowing for easy customisation and expansion to meet varying needs and environments (Zutari Pty Ltd., 2024). This modular approach enables efficient installation, maintenance and adaptation to different urban environments or specific space requirements. In the case of GO GEORGE, six differing shelter typologies were proposed with varying fixed and flexible components, adding variety within the family with defined material and dimension constraints. The different typologies provide a range of shelter options to fit on a range of verge widths.

One of the main considerations that influence the shelter design and typology selection is the width of the verge within which the bus stop is located. In very narrow verges, the stop and platform are either located within a dedicated furniture zone or a combined furniture and effective walkway zone.

The shelter is located on the bus stop platform and three main elements guide the shelter location on the stop platform within the verge (Zutari Pty Ltd., 2024):

- Unimpeded pedestrian movement between the kerb face and the front of the shelter structure.
- A structure-free and overhead clearance zone, which includes a safe area for the sweep of the bus turning into and away from the platform and accommodates the bus tilt as it kneels to provide seamless access for wheelchair users.
- Space requirements for standing, sitting and wheelchair users.

Once a shelter is warranted, the most appropriate shelter must be chosen from the family of shelters. Each bus stop and shelter are located within a specific context, which has certain characteristics that make it more appropriate for one typology over another. The warrant system helps to identify whether a bus shelter is required, while the following criteria assist in identifying the most appropriate shelter typology:

- Urban grain (erf size): Fine, medium, coarse, very coarse.
- Massing (height and building footprint): Low, medium, high.
- Verge widths: Narrow, medium, wide.
- Passenger demand: (low, medium and high).
- Bus stop environment (simple, intermediate or complex).

A decision matrix was developed to facilitate quick and consistent decision-making regarding the most appropriate typology choice based on the criteria above. It includes three rating categories: recommended, optional and not recommended.

Table 3: Shelter typology decision matrix (Zutari Pty Ltd, 2024)

Criteria / Shelter typology	Verge Width			Massing (Storeys)			Urban Grain				Passenger Demand			Bus Stop Environment		
	Narrow	Medium	Wide	Fine (1-2)	Medium (3-4)	High (5 +)	Low	Medium	Coarse	Very Coarse	Low	Medium	High	Simple	Inter- mediate	Complex
Shelter One	Recommended	Optional	Not Recommended	Recommended	Optional	Optional	Recommended	Optional	Optional	Optional	Recommended	Optional	Not Recommended	Recommended	Optional	Optional
Shelter Two	Recommended	Recommended	Optional	Recommended	Optional	Optional	Optional	Recommended	Optional	Not Recommended	Recommended	Optional	Not Recommended	Recommended	Optional	Optional
Shelter Three	Not Recommended	Recommended	Optional	Optional	Optional	Optional	Optional	Recommended	Recommended	Recommended	Optional	Recommended	Optional	Optional	Optional	Optional
Shelter Four	Not Recommended	Not Recommended	Recommended	Not Recommended	Optional	Optional	Not Recommended	Optional	Optional	Optional	Not Recommended	Optional	Recommended	Not Recommended	Optional	Optional
Shelter Five	Not Recommended	Recommended	Recommended	Not Recommended	Optional	Optional	Not Recommended	Optional	Optional	Optional	Not Recommended	Optional	Recommended	Not Recommended	Optional	Optional
Shelter Six	Not Recommended	Not Recommended	Recommended	Not Recommended	Optional	Optional	Not Recommended	Optional	Recommended	Recommended	Not Recommended	Optional	Recommended	Not Recommended	Optional	Optional

Recommended	Optional	Not Recommended

5.3.2 Materiality

Designing effective bus shelters requires careful selection of materials that can endure harsh weather conditions, frequent use, and potential vandalism. Key factors in material selection include durability, safety, security, cost and ease of maintenance.

To ensure the shelters last, materials should be resistant to environmental damage, easy to clean and capable of withstanding intentional harm. The goal was to choose materials that maintain the structure's integrity whilst minimising upkeep. The guidelines intended to examine best practices and material choices for creating safe, secure and durable bus shelters, specifically addressing the concerns outlined in the issues and challenges.

Rather than detailing materials for every component of the shelter, the guidelines focus on the three main elements namely side panels, back panels and advertising/information boards which are most vulnerable to vandalism, weathering, and wear from continuous use.

5.3.3 Bus Stop Amenities

To enhance the public transportation experience, the integration of additional amenities at bus stops plays a pivotal role. While basic stops and shelters provide essential shelter and seating, a variety of supplementary features significantly improve usability, security and community. The presence of well-placed and appropriate amenities can influence passengers' perceptions and behaviours and ultimately impact ridership levels. A poorly maintained stop, devoid of amenities or activity, can foster feelings of insecurity, leading passengers to view it as a more dangerous environment than it is. Conversely, well-designed and maintained amenities can instill a sense of safety and encourage more individuals to utilise public transit.

Similar to the decision matrix illustrated in section 5.3.1, a decision matrix was developed to assist with consistent decision making around the choice of supporting amenities at each bus stop using the following criteria:

- Verge width.
- Surrounding activity/land use.
- Quality of the surrounding environment.
- Ridership.
- Proximity to public/retail facilities.
- Bus Stop environment.

5.4 Landscaping and Street Furniture Palette and Guidelines

Similar to the shelter modular approach, a select range of materials was identified for implementation within the George urban landscape. Through stakeholder consultation and site analysis, the material language was characterised by:

- Paving using red clay bricks and cast in-situ concrete in warm earth tones.
- Galvanised steel elements with clean lines for street furniture.
- Neutral concrete elements provide textural variety while supporting maintenance objectives.

The selection criteria for these materials emerged from the initial phases of challenge identification, particularly addressing issues of vandalism, maintenance difficulties and lack of universal access considerations. The material selection also tied to the design intent to create a seamless public environment and a simple elegant backdrop for the bus system to be integrated.

The choices were deliberately selected to build upon the town's existing urban character and material selection, respecting its current infrastructure while introducing thoughtful improvements and consistency.

5.4.1 Landscaping Elements

Nine key element categories were identified, and each required guidelines and was seen as critical to support the transport system. The nine distinct categories were:

- Paving.
- Seating and Public Amenities.
- Barriers and Edges.
- Lighting.
- Trees.
- Tree Rings and Grates.
- Planting.
- Trading Amenities.
- Maintenance and Management.

5.4.2 Structure and Approach

The research resulted in a systematic documentation approach consisting of guidelines and a palette table.

5.4.2.1 Guidelines
Each section begins with general guidelines that establish principles for implementation, addressing subjects including safety, universal access, contextual integration and basic maintenance requirements.

Where necessary, these are supported by detailed guidelines that provide specific requirements for a particular element, spatial placement, materials, installation and integration with other elements.

5.4.2.2 Palette Table
Each section except Maintenance and Management concludes with a palette presented in a tabular format. This palette provides element identification, detailed technical description, and specific application guidelines.

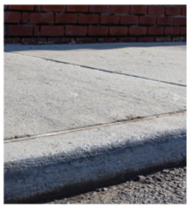
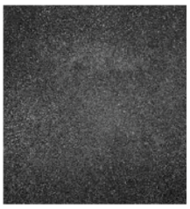
Surface Materials	**Description**	**Application**
	**Red Clay Brick Pavers** 200 x 110 x 60mm pavers laid in herringbone or stretcher bond or basketweave.	• To be used in the furniture zone and frontage zones and bus boarding platforms. • Furniture and frontage zone - Laid in Herringbone • Bus platform - Laid in Basket weave • Bus platform ramp - Laid in Herringbone
	**Cast In-situ Concrete** Brushed concrete surface for clear pathways. It is advisable to create control joints to allow for expansion and movement of the new surface and to improve the ease of application. Visible control Joints should be in line with street furniture	• Used on the effective walkway zone to ensure an even surface for movement of pedestrians and wheelchair users. • Not to be used in the effective walkway zone where the walkway runs through the a bus platform or bus platform ramp.
	**Asphalt** Durable surface for vehicular traffic.	• Exclusively used for roadways, not pedestrian areas, providing a smooth driving surface.

Figure 4: Extracted example of a materials palette from the GO GEORGE Draft Design Guidelines and Street Furniture Palette (Zutari Pty Ltd., 2024)

This consistent structure ensures that the document can easily be referenced, ensuring that those who use it are able to apply the guidelines across different contexts.

The final section on Maintenance and Management takes a different approach, focusing on:

- Routine maintenance protocols.
- Management systems and operations.

- Responsibilities and schedules.
- Material stockpiling recommendations.
- Implementation strategies.

6. CONCLUSIONS

Developing design guidelines and furniture palettes represents a significant step towards creating a cohesive public transport environment in George. The document is currently in its first draft, a living framework that will evolve through feedback from continued stakeholder engagement and practical implementation experience.

Outside of the document itself, a key outcome has been expanding the warrant system to incorporate critical factors such as:

- Verge width;
- Land use patterns; and
- Mass and building scale.

Shelter designs will evolve to better address stakeholder needs and identified challenges. Additionally, the existing infrastructure guidelines will be updated to include new definitions that better describe and address the transport and public realm components.

Ultimately, this document aims to serve as a practical decision-making tool, ensuring consistent implementation of public infrastructure across George while maintaining flexibility for future adaptation and growth. This approach not only elevates the quality of public infrastructure in George but also establishes a replicable framework that can be adapted to other districts across the country, promoting a cohesive and efficient public transport system nationwide.

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