Government of **Western Australia**
Department of **Transport**
and Major Infrastructure

Empowering a
thriving community

STIRLING SAFE ACTIVE STREET

Final Route-Level Evaluation Report

Acknowledgement of Country

The Department of Transport and Major Infrastructure acknowledges the Traditional Custodians of the land throughout Western Australia and pay our respects to Elders past and present.

We acknowledge the members of all Aboriginal communities, their cultures and continuing connection to Country throughout the State.

About this report

Alternative formats

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SAFE ACTIVE STREETS PILOT PROGRAM

The Department of Transport and Major Infrastructure (DTMI) worked with local governments between 2015 and 2023 to develop, trial and evaluate safe active streets (SASs).

SASs use local area traffic management treatments to reduce car speeds to 30 km/h and create environments that encourage more people to walk, wheel and ride in their communities.

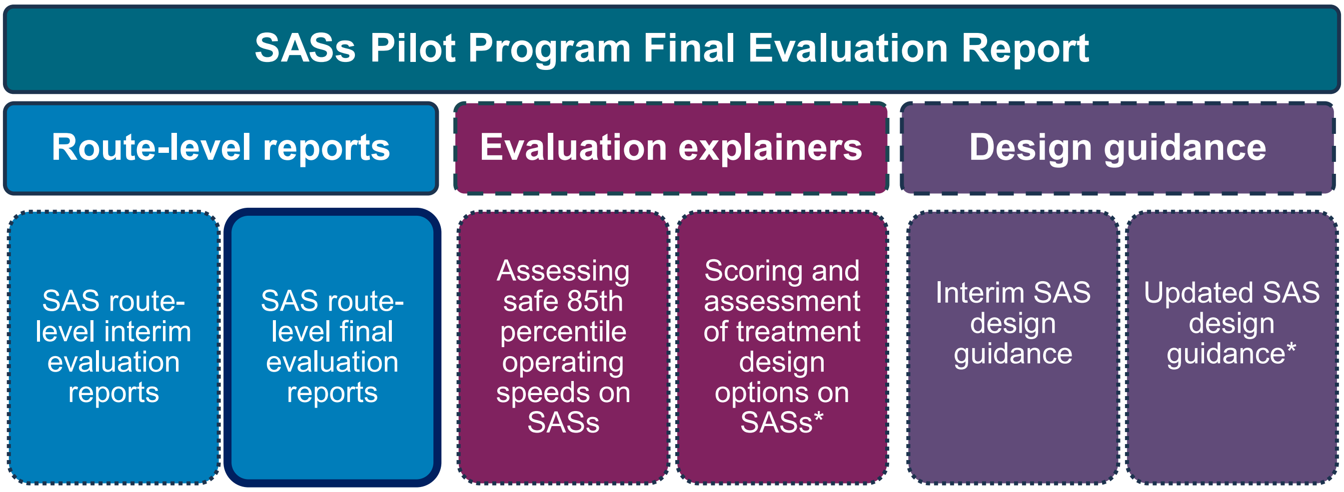
The SASs Pilot Program in Western Australia (WA) was motivated by research which showed that a fear of sharing the road with motor vehicles was a key barrier to many people riding bikes more often. Local research, including a large community-wide cycling survey undertaken in 2015 by the Royal Automobile Club of WA[1] and the 2015 Auditor General's Report into Safe and Viable Cycling,[2] highlighted the need for quieter and more comfortable local bicycle routes to remove barriers to active transport and the perceived lack of safety on local roads.

An evaluation plan and framework were established to test whether redesigning a street using traffic management treatments could reduce vehicle volumes and speeds, leading to increased active travel, and positive community sentiment towards the SAS.

Evaluation document suite

This document forms part of the SASs Pilot Program Evaluation. It provides a summary of results across three key change indicators for one of the nine evaluated projects, and a discussion of how the route performed overall.

The results outlined in this final route-level report should be read in conjunction with the SASs Pilot Program Final Evaluation Report,[3] and other supporting material including methodology explainers and SASs Design Guidelines.



Suite of interrelated documents to be read in conjunction with the Stirling SAS final route-level report

[1] RAC – WA, 2015. RAC Cycling Survey: 2015. Royal Automobile Club of WA, Perth, WA.
[2] OAG – WA, 2015. Western Australian Auditor General's Report: Safe and Viable Cycling in the Perth Metropolitan Area. Office of the Auditor General, Perth, WA.
[3] DTMI, 2026. Safe Active Streets Pilot Program – Final Evaluation Report. Prepared by the Department of Transport and Major Infrastructure. Perth, WA.
* Document to come.

CITY OF STIRLING SAFE ACTIVE STREET

Executive summary

The 4.12 km Stirling SAS route links Stirling Station to West Coast Highway and the Scarborough Beach precinct, connecting Birralee Park, Yuluma Primary School, Bradley and Abbett Park Reserve. This lengthy route was constructed across three stages. Consultation, design and delivery spanned five years between 2017 and 2021.

This SAS route generated a mix of positive and negative outcomes.

Design treatment changes that influenced vehicle and speed reductions contributed to overall increases in bike riding activity on the Stirling SAS route. However, inconsistencies in treatment application, amenity and wayfinding led to decreases in walking, negative road safety outcomes and mixed community sentiment.

Key project insights

Overall, the design treatments and measures applied on the Stirling SAS led to mixed results for user behaviour and community sentiment.

- Stage 1 of the SAS observed the best overall outcomes for safety of vulnerable road users.
  - This section observed overall increases in pedestrian and bike riding activity along with reductions in vehicle use and 85th percentile speeds.
- Stage 2 of the SAS yielded mixed results.
  - This section saw reductions in walking but increases in bike riding, and observed negative outcomes for road safety of bike riders with four incidents occurring at give way signed cross streets.
- Stage 3 of the SAS yielded mixed results.
  - This section saw large reductions in walking but increases in bike riding and observed a negative outcome for road safety of pedestrians with two incidents occurring at midblock locations away from intersections or speed reducing treatments.

Project recommendations

Recommendations to improve outcomes of this SAS project, informed by insights summarised in the SASs Pilot Program Final Evaluation Report, include:

- Lowering 85th percentile speeds consistently across all segments of the route to within the preferred operating range, by considering additional road treatments as required.
- Amenity improvements, including provision of footpaths along Moorland Street.
- Improving SAS priority and wayfinding at locations of filtered permeability and give way signed intersections.

Program insights

The SASs Pilot Program was successful in trialling a new approach to road safety and active transport on suburban streets. The program has attracted national and international interest, and the SAS concept is being taken up by local authorities in WA and across Australia.

The SASs Pilot Program Final Evaluation Report detailed the rich array of insights generated through the pilot program, which provide context and relevance to the following individual project key insights and recommendations.

Theory of change supported

- Combining comprehensive physical interventions with a posted speed limit of 30 km/h: increases active travel (walking and bike riding).
- Reduces vehicle volumes and speeds, making streets safer for all users.

Effective design features identified

- Road width narrowing and traffic calming treatments spaced every 80–100 metres: these measures physically slow vehicles and change vehicle direction, leading to:
  - lower traffic volumes and speeds
  - increased bike riding and walking.

Critical drivers of benefit realisation determined

- Route selection: must form a direct or indirect connection to key attractors (activity centres, shops, schools, stations, recreation areas) and form part of the long-term cycle network (LTCN).
- Design features: narrowed road widths and treatments 80–100 metres apart.
- Cost efficiency: projects costing $600,000 – $1.2 million per km likely achieve a benefit cost ratio (BCR) >1, if the above conditions are met.

Application of activation, consultation and evaluation (ACE) principles[4] is essential

- Activation: built infrastructure reflects social needs and the desires of people who will use it.
- Consultation: engagement integrated throughout the project lifecycle is a form of activation and enables community consultation.
- Evaluation: impact measured against anticipated outcomes.

Application of results into future program delivery

The SAS Design Guidance[5] summarises the range of measures that can be applied and the key factors that have been found through this pilot program to influence user behaviour positively. These principles and guidelines will help local governments and practitioners plan and activate routes, consult with impacted communities and evaluate outcomes, whilst considering the application of design treatments and measures appropriate to their local context.

[4] DTMI, 2023. WA Bicycle Network Grants Program: WABN Grants Program Resources - Activation, Consultation and Evaluation (ACE) Guidance. Department of Transport and Major Infrastructure. Perth, WA.
[5] DTMI, 2025. Planning and Designing for Active Transport: Safe active street design guidance. Prepared by the Department of Transport and Major Infrastructure. Perth, WA.

PROJECT OVERVIEW

The 4.12 km route begins at Odin Road/Beatrice Street and continues in a north then westerly direction along Stoner/Ambrose Street to Moorland Street and Manning Street, forming an east-west connection to Scarborough Beach and Stirling City Centre.

The SAS was completed in three stages:

- The first stage of the route starts at Beatrice Street with the intersection at Odin Road and connects past Birralee Park to Bradley Reserve past Yuluma Primary School.
- The second stage of the route continues from Bradley Reserve along Moorland Street to the intersection with Grand Promenade.
- The third stage of the route continues along Moorland Street from the intersection with Grand Promenade and connects the route to the Scarborough Beach Precinct along Manning Street.

City of Stirling SAS project map

Key route destinations

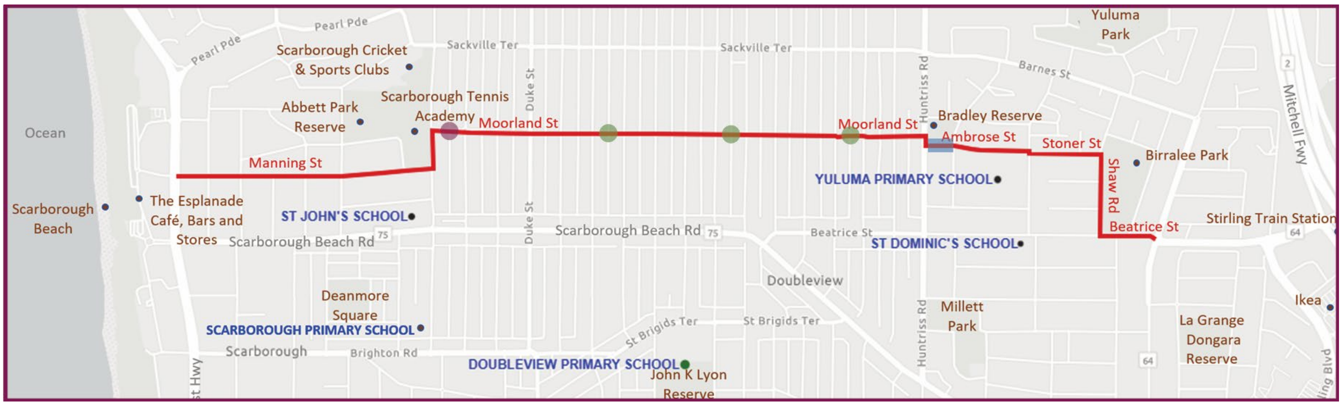
- Stirling Station
- Mitchell Freeway Principal Shared Path
- West Coast Highway
- Scarborough Beach Precinct
- Stirling City Centre
- Yuluma Primary School
- Birralee Park
- Bradley Reserve
- Abbett Park

Unique design features

- SAS line marking
- Raised plateaus
- On street parking
- Priority change at intersections
- Kerb reconstruction (with planting)
- Slow points
- Traffic filtering i.e. filtered permeability

Legend

- Slow point
- Filtered permeability
- Shared path



Stirling SAS route map

Timelines

Delivery: Stage 1

- Community consultation: 2017-18
- Construction: January-October 2018
- Lines and signs completion, and official opening: December 2018

Delivery: Stage 2

- Community consultation: 2017-18
- Construction: July 2018 – May 2019
- Lines and signs completion: November 2019
- Official opening: December 2019

Delivery: Stage 3

- Community consultation: 2017-18
- Construction: August 2020 – April 2021
- Lines and signs completion: August 2021
- Official opening: December 2021

Evaluation:[6] Stages 1, 2 and 3

- Pre-construction data collection (user behaviour): February 2018
- Post-construction data collection (user behaviour): February 2021 and February 2022
- Post-construction data collection (community sentiment): October-November 2022
- Interim evaluation report: 2023
- Final evaluation report: 2026

Segments

For monitoring and analysis, the SAS was split into 'segments' based on differences in form of the existing route and treatments applied during delivery of the SAS. This route was separated into segments as follows:

Stage 1

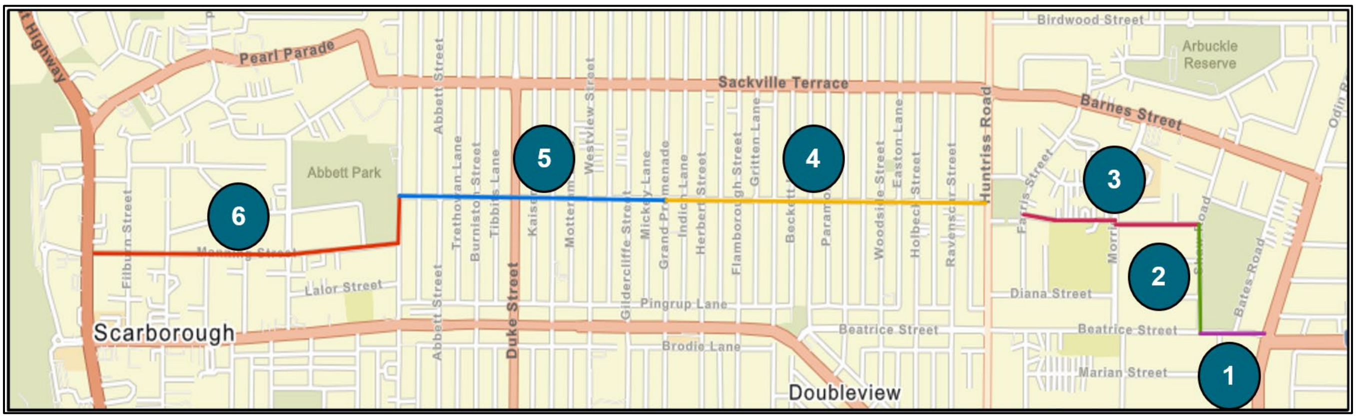
1. Beatrice Street (Odin Road to Shaw Road)
2. Shaw Road (Beatrice Street to Stoner Street)
3. Stoner Street and Ambrose Street (Shaw Road to Farris Road)

Stage 2

4. Moorland Street (Huntriss Road to Grand Promenade)

Stage 3

5. Moorland Street (Grand Promenade to Deanmore Road)
6. Manning Street (Deanmore Road to West Coast Highway



Map of the Stirling SAS route showing 'segments' used for data analysis

[6] Note: Between data collection periods, city-wide travel patterns were disrupted by COVID-19 lockdowns. The post-construction SAS data collection periods, however, were chosen because DTMI's network monitoring indicated they were much less affected by these disruptions. Any remaining impacts are expected to have influenced both the treatment (SAS) and control streets equally.

WHY WE COLLECT DATA

Evaluating a project by collecting data on people's behaviour and sentiment helps us to determine:

- whether the aims of a project have been achieved
- what combinations of interventions were most effective
- whether further improvements could still be made to improve outcomes.

These insights help to guide infrastructure investment in local communities that support the growth of active transport.

SASs Pilot Program

The SASs Pilot Program trialled unique combinations of design features that reflected local community needs and contexts, while also complementing each local government's approach to building an integrated active transport network.

Nine SAS projects, including this one, were included in the evaluation study. For more information on the evaluation methodology, theory of change, and overall program insights see the SASs Pilot Program Final Report.

Project aims

The following aims were investigated for each project included in the evaluation study, and results were compared across projects to derive program level insights that could lead to improvements in design guidelines and future SAS delivery.

1. Reduce motor vehicle numbers
2. Reduce 85th percentile speeds to within acceptable operating thresholds[7]
3. Increase the number of riding and walking trips made throughout the week
4. Increase the number of people of all ages and abilities making local trips by riding and walking
5. Influence user, resident and the wider community perceptions of SAS routes as safe and comfortable places to walk, wheel and ride.

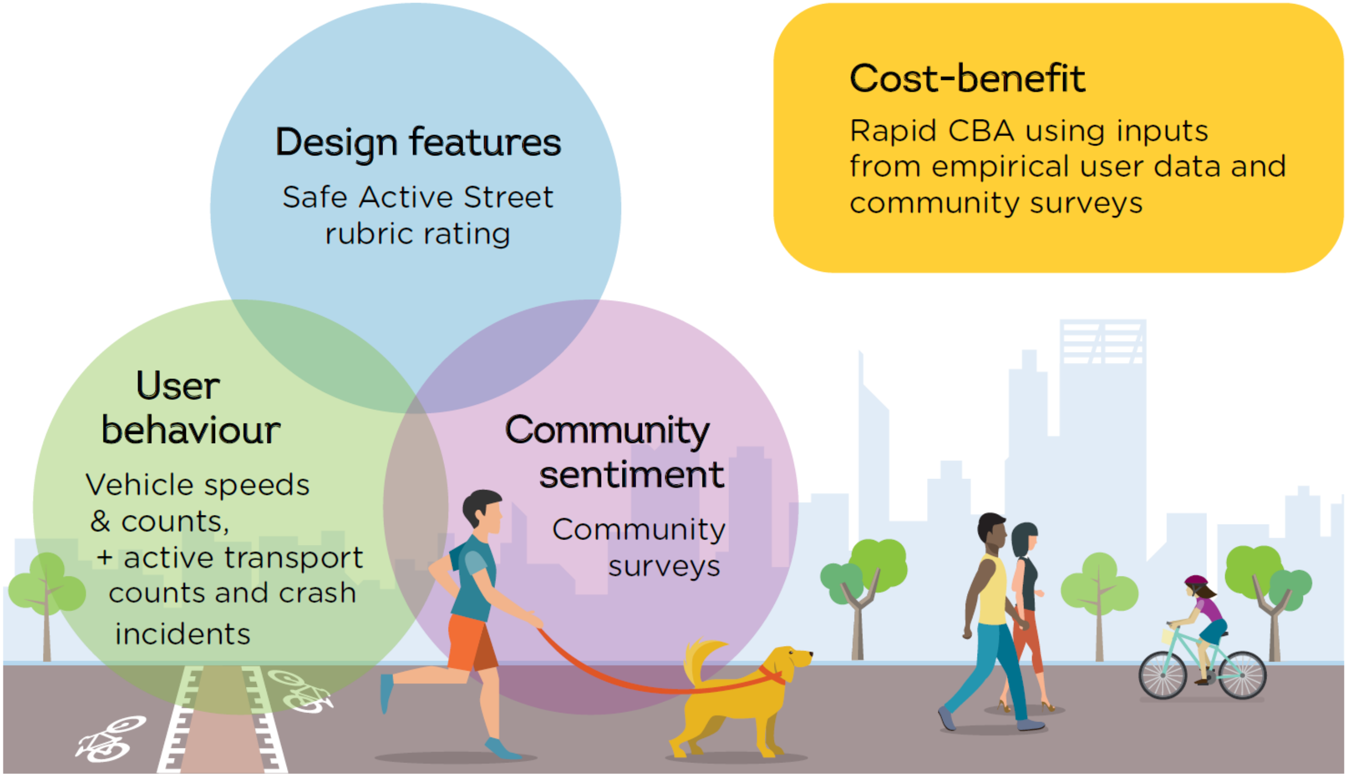
Evaluation framework

A comparative impact evaluation methodology was developed to collect and analyse data on three key change indicators for each SAS:

- **Design features** – scores to quantitatively differentiate between the types and scale of features, treatments and supporting measures applied to the route.
- **User behaviour** – vehicle counts and speeds (using pneumatic tube surveys), and active travel counts (using video surveys), collected pre- and post-construction. Small samples of available crash data were reviewed and discussed at the project level only, to aid interpretations of other data.
- **Community sentiment** – qualitative data on sentiment and perceptions, collected via community, resident and user surveys post-construction.

[7] DTMI, 2026. Planning and Designing for Active Transport: Explainers - Assessing 85th percentile speeds on safe active streets. Prepared by the Department of Transport and Major Infrastructure. Perth, WA.

At the program level, the evaluation framework included the fourth key indicator: cost benefit. The SASs Pilot Program Final Evaluation Report includes discussion of outputs from a cost benefit analysis conducted on data from each of the nine evaluated projects and provides a summary of the factors that influenced whether a project received a BCR >1, indicating a positive return on investment.



Data sources for each safe active street key indicator, illustrated to show theoretical interactions

OUTCOMES

Design features

Evaluation of the design features applied on each SAS route was a complex task due to the wide range of measures and treatments available, which could be chosen to influence different unique, yet complementary effects on user behaviour and community sentiment.

Assessment rubric

To assess the types and scale of treatments and supporting measures applied in each pilot project, a consistent scoring rubric and guidelines were developed for the SASs Pilot Program, which required a group of invited transport engineers and planners to agree on scores during focus group sessions.

Twenty-one criteria were identified across five design categories:

1. Active transport infrastructure
2. Connectivity
3. Traffic calming
4. Parking bay infrastructure
5. Placemaking and legibility.

Through facilitated consultation, design scores (0-4) were determined, where scores reflected the degree of improvement applied for each criterion per route segment assessed. Total average scores per route segment and category (grouping of criterion) could then be interpreted as:

<1 = minimal improvements	1 – 2 = moderate improvements	2 – 3 = major improvements	>3 = substantial improvements

Results

Table 1 provides a breakdown of scores per route stage, segment and design category.

Overall, the route averaged a design score of 1.76, indicating that moderate improvement was achieved across the whole route.

- The overall score was brought up by major improvements from ‘connectivity’ to key destinations, which is an indication of suitable route selection.
  - This was highest for Stage 3, with design scores improved by this category.
  - As one of the longer SAS routes, it links several key destinations including Stirling Station, Mitchell Freeway Principal Shared Path, Scarborough Beach and the Stirling city centre.
  - The SASs Pilot Program Final Evaluation Report determined that route selection is a critical driver of benefit realisation, with direct influences on current and latent demand.
- Some moderate and major improvements to ‘parking bay infrastructure’ and ‘placemaking and legibility’ were also observed across most route segments and stages.
- The overall score was brought down by minimal and moderate improvements applied to ‘active transport infrastructure’ and ‘traffic calming’.
  - Stage 2 of the route lacked footpath infrastructure, and none was provided. Other sections scored poorly, where existing footpath provision was not widened to support additional pedestrian movement.

– Very few slow points and speed humps were installed. Instead, the design along Moorland Street featured no through roads or roadblocks at several intersections, to create ‘filtered permeability’, forcing vehicles to turn off the SAS onto side streets while allowing active transport users through.

Table 1: Design scores per category, segment and overall for the Stirling SAS route*

Segment and stage	Active transport infrastructure	Connectivity	Traffic calming	Parking bay infrastructure	Place-making and legibility	Total*
Segment 1, Stage 1: Beatrice St (Odin Rd to Shaw Rd)	0.25	3.33	0.57	3	2	**1.48**
Segment 2, Stage 1: Shaw Rd (Beatrice St to Stoner St)	1.75	3	2	1.5	1.8	**2**
Segment 3, Stage 1: Stoner St and Ambrose St (Shaw Rd to Farris Rd)	3	1.33	0	0	2.2	**1.29**
Segment 4, Stage 2: Moorland St (Huntriss Rd to Grand Prom)	1	1.67	1.29	3	1.8	**1.57**
Segment 5, Stage 3: Moorland St (Grand Prom to Deanmore Rd)	1.75	2.33	2.43	3	2.2	**2.29**
Segment 6, Stage 3: Manning St (Deanmore Rd and West Coast Hwy)	1.5	3.67	0.86	3	2.2	**1.9**
Overall average route score	**1.54**	**2.56**	**1.19**	**2.25**	**2.03**	**1.76**

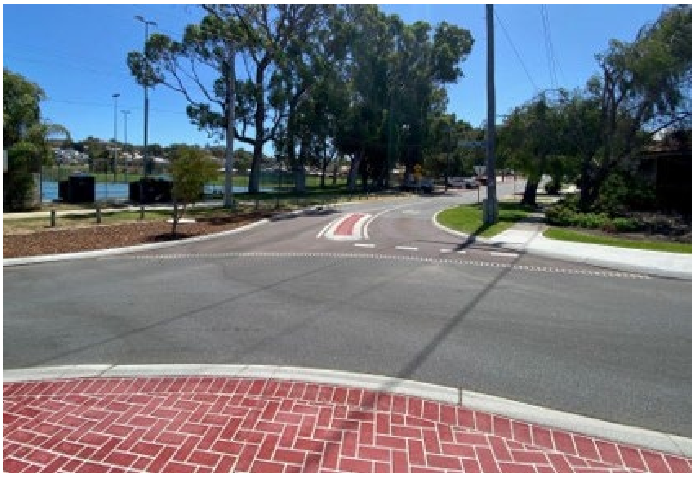
*Total average scores per segment and category can be interpreted as: <1 = minimal improvements, 1-2 = moderate improvements, 2-3 = major improvements, >3 = substantial improvements.

Examples of applied design treatments

Filtered permeability barrier

Carriageway narrowing – trafficable median

Intersection showing SAS priority



Modified T-intersection

Carriageway narrowing – planting buildouts and parking

Shared path connection, blue patch after intersection and riders in primary position

User behaviour

Evaluation of user behaviour followed a comparative impact approach, with before-after, control-intervention (BACI) data collection design.

Data collection design

A BACI data collection design was applied to differentiate between the effects of interventions applied on the treatment route and changes that may have occurred 'naturally' in the surrounding area.

Data was collected before construction at carefully selected sites on the SAS (treatment) and at comparative sites on similar nearby streets (control) and repeated at the same sites after construction at consistent times of the year to minimise influence of seasonal variation.

With a BACI design, traffic and movement flow on control streets did not need to match with treatment streets, and an appropriate an analysis of change (odds ratio) was determined.

Odds ratio analysis

To assess changes in counts of vehicles, walkers and bike riders on the treatment compared to control routes, a statistical measure of probability was applied known as an 'odds ratio', which compares the odds of an outcome occurring in one group to the odds of it occurring in another group (regardless of differences in raw counts across groups).

Odds ratios were used to estimate whether the outcomes observed on the SAS route were likely attributable to the SAS, unlikely attributable, or consistent with trends observed on the control streets.

Scores range from 0-2 and sometimes higher, with scores >1 indicating higher odds of the treatment influencing the outcome and scores <1 indicating decreased odds. It is common, however, that during interpreation of results, a middle range is determined that indicates a neutral or indeterminate result. During analysis of the SAS user behaviour data, a middle range of 0.93 and 1.08 was determined as neutral change or change on the SAS that was consistent with trends observed on the control routes.

Assessing 85th percentile speeds

It was not suitable to apply odds ratios for 85th percentile speeds because the posted speeds were intentionally reduced on the SAS route. Instead, a method was developed specifically to assess the effectiveness of the lowered speed limits and changed street conditions of SAS routes on driving behaviour, through which DTMI identified an acceptable operating range and upper bound for 85th percentile speeds. For more information, see the supporting document: Assessing Safe Operating Speeds on 30 km/h Streets.

Calculating average daily results

Vehicle counts and speeds were detected across 14 consecutive days, including weekdays and weekends, at consistent seasonal and temporal periods before and after SAS construction. Active transport counts were detected across three weekdays and one weekend day, at consistent seasonal and temporal periods before and after SAS construction.

Data collection periods were carefully selected to avoid local area events, public holidays and school holiday periods. If collection technology failed, samples were repeated immediately.

Calculations of average daily results were undertaken by:

i. averaging the available weekday and weekend data per collection period
ii. applying weightings for the number of weekday and weekend days per week
iii. adding the result to determine average weekly activity
iv. dividing by seven to achieve an average daily estimate.

This method was applied to achieve consistency across the available dataset, and smooth out any day-of-the-week fluctuations that may have occurred. In this way, data between control and treatment sites, and across SAS locations could be compared consistently.

Vehicles

Method

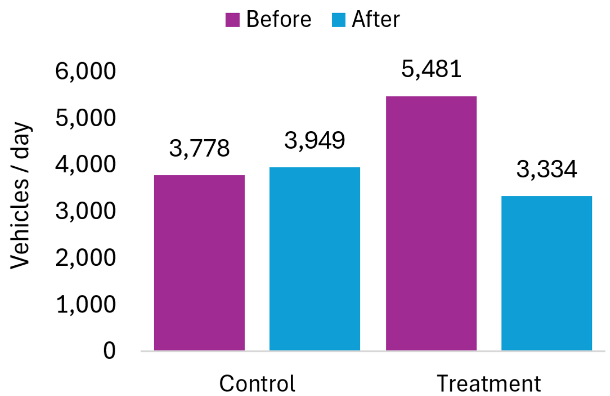
Pneumatic tube counters were used to detect vehicle traffic volumes and speeds. They were placed at strategically selected midblock locations on the SAS route (treatment) and comparable locations on adjacent streets (control). Depending on segment length, between 1 - 4 counters were placed on each.

Results

Vehicle volumes - overall

- Vehicle counts reduced greatly on the treatment route (-39 per cent) and increased slightly on the control streets (+5 per cent), indicating that the treatments were effective in encouraging drivers to switch to alternative routes, particularly as the filtered permeability barriers along Moorland Street prohibited through vehicle movement and forced drivers to turn off onto side streets.
- Comparing changes on the treatment and control routes, the odds ratio generated a high score of 1.42, **indicating the SAS was likely responsible for the decreases observed enroute**.

Figure 1: Stirling – average daily vehicles



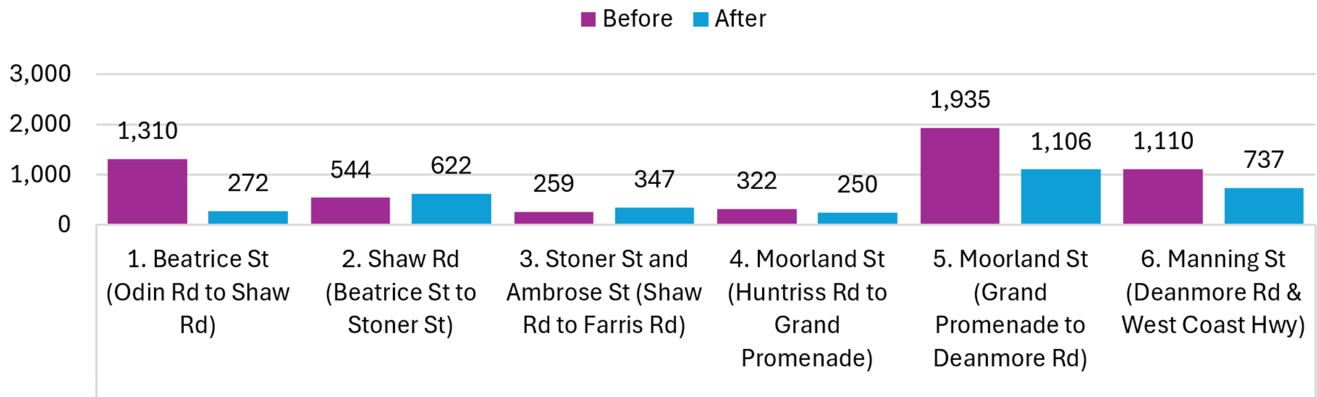
Vehicle volumes on the SAS decreased at a relatively larger proportion than control streets.

The odds ratio indicated the decrease in vehicle volumes on the SAS route after construction was likely attributable to the SAS when compared with area-wide trends

Vehicle volumes – segment comparison

- Stages 2 and 3 used barriers to create filtered permeability, prohibiting through vehicle traffic. This was likely a highly influential factor in the reduction of vehicle counts as well as speeds observed on segments 4, 5 and 6.
- Segment 1 also observed a large drop in vehicle counts, which was due to the closure of the vehicle connection from Odin Road onto Beatrice Street (shared path connection was retained).

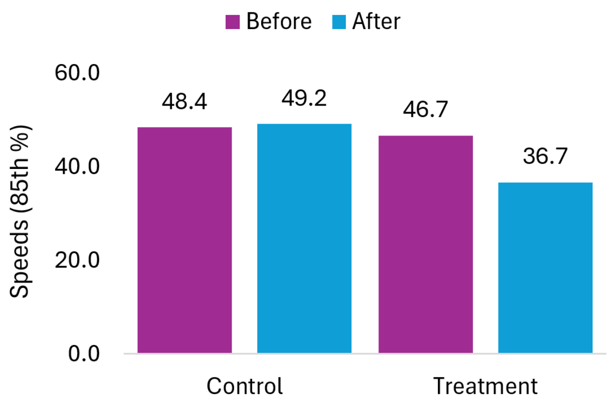
Figure 2: Stirling – average daily vehicles on SAS segments



Vehicle speeds - overall

- There was a large reduction in vehicle speeds of 10 km/h on the treatment route, **achieving an overall 85th percentile speed within the preferred operating range**: 32.1 km/h to 38.1 km/h. This was achieved through features such as alternating parking, landscaping at intersections and the filtered permeability barriers.

Figure 3: Stirling – 85th percentile speeds

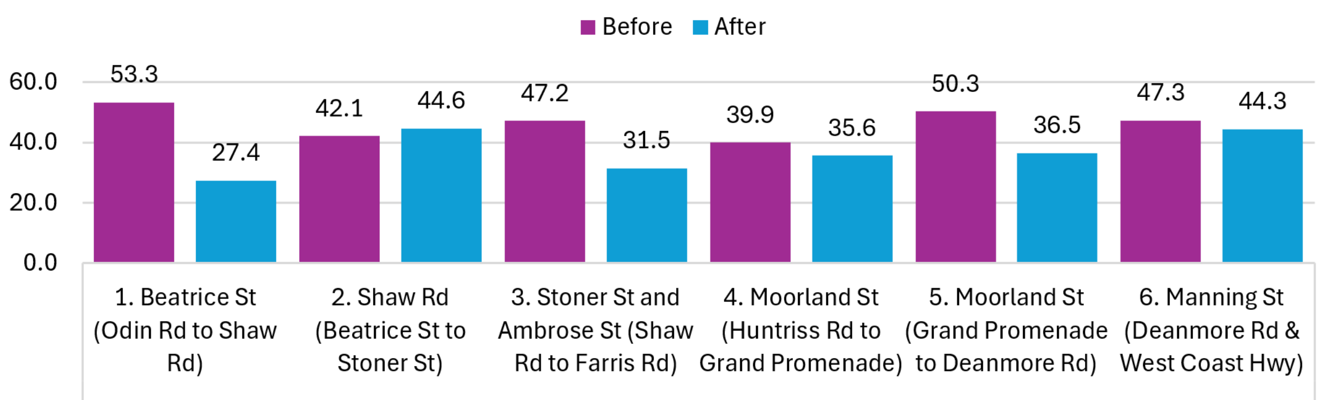


This result indicates good overall SAS performance in supporting the safety of vulnerable road users by sufficiently lowering the fastest vehicle speeds, however, this was highly variable across the route.

Vehicle speeds – segment comparison

- Segment 2 refers to a short 300 m north-south section of Shaw Road that has continuous priority with a tightened radius at the turns to/from Stoner Street at the north end and Beatrice Street at the south end.
  - This segment does not have any formal traffic calming measures installed, instead relying on alternating parking and landscaping at the end of parking stretches. However, this segment observed an increase in 85th percentile vehicle speeds, suggesting this treatment did not have the intended impact of slowing vehicles down.
- A similar design exists on Deanmore Street, a short 130 m north-south section within the eastern part of segment 6 that has no formal traffic calming measures.
  - While there was no evidence of an increase in 85th percentile vehicle speeds here, a road safety inspection found that vehicles turning from Deanmore Road to Moorland Street approached at free-flow speed. This was despite the radius of the turn having been tightened as part of the design, and therefore travelled over the centre of the road to negotiate the bend, creating a significant safety risk – contrary to the intention of the SAS.

Figure 4: Stirling – 85th percentile (fastest) speeds on SAS segments



Active transport

Method

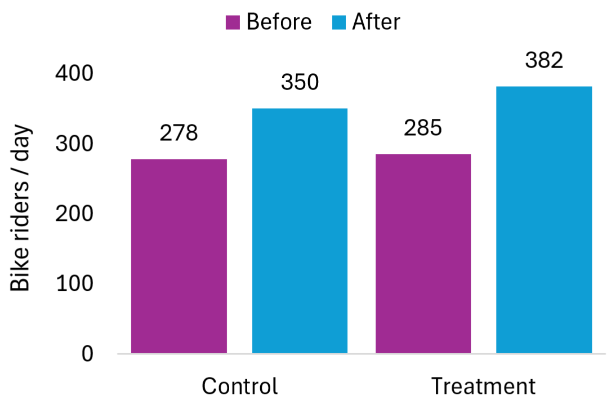
Video surveys were used to detect rates of active transport. Video cameras were placed at strategically selected intersections on the SAS route (treatment) and comparable locations on adjacent streets (control). Depending on segment length, between 1 - 4 counters were placed on each.

Results

Bike riding - overall

- Riding activity increased on the treatment route (+34 per cent) as well as on the control streets (+26 per cent), with the slightly larger increase on the route indicating a minor preference for riding on the route.
- Comparing changes on the treatment and control routes, the odds ratio generated a high score of 1.53, **indicating the SAS was likely responsible for the increases observed enroute**.

Figure 5: Stirling – average daily bike riders



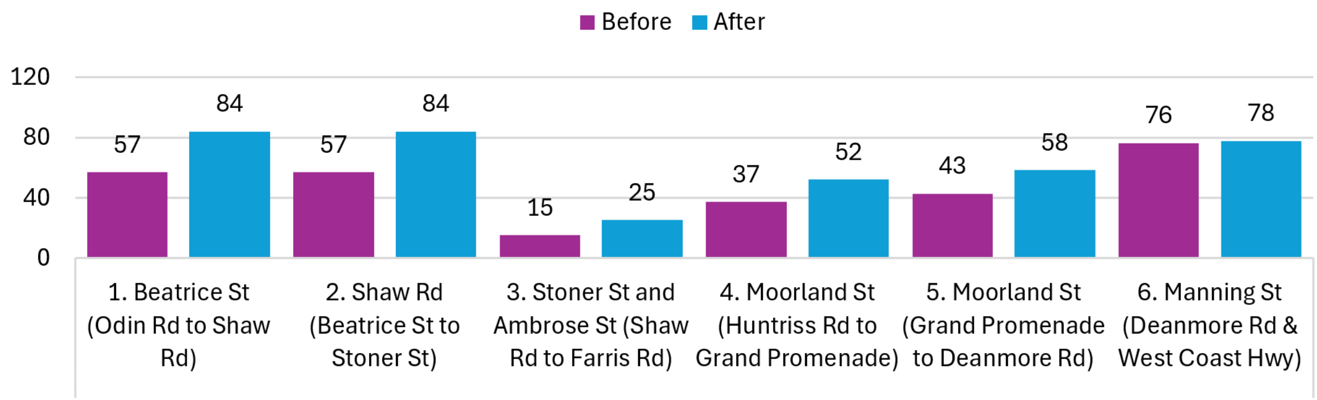
Bike riding activity increased on the SAS to a higher proportional degree than control streets, indicating it was a more attractive route for bike riders.

The odds ratio indicated the increase in bike riding on the SAS route after construction was likely attributable to the SAS when compared with area-wide trends.

Bike riding – segment comparison

- All segments recorded an increase in bike trips, while a decrease in walking trips was recorded on most segments.
- Inconsistent active transport outcomes suggest the route is not performing as intended.
  - The reduction in motor vehicle traffic likely contributed to improved safety perceptions of bike riders, and their increased use of the route overall.

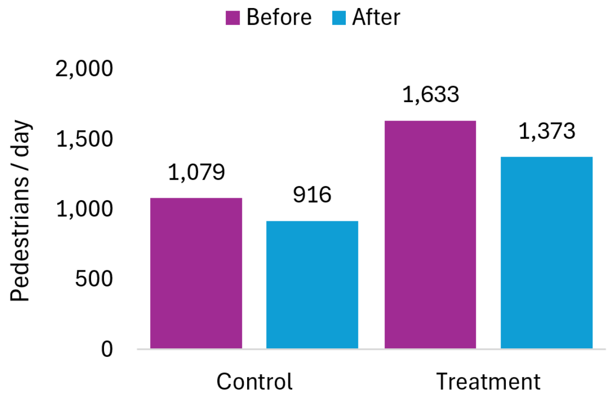
Figure 6: Stirling – Average daily bike riders on SAS segments



Walking – overall

- Walking activity on the treatment route decreased (-16 per cent), but also on control streets (-15 per cent), noting the route scored low for 'active transport infrastructure'.
- Comparing changes on the treatment and control routes, the odds ratio generated a high score of 1.36, **indicating the SAS was likely responsible for the decreases observed enroute**.

Figure 7: Stirling – average daily walkers



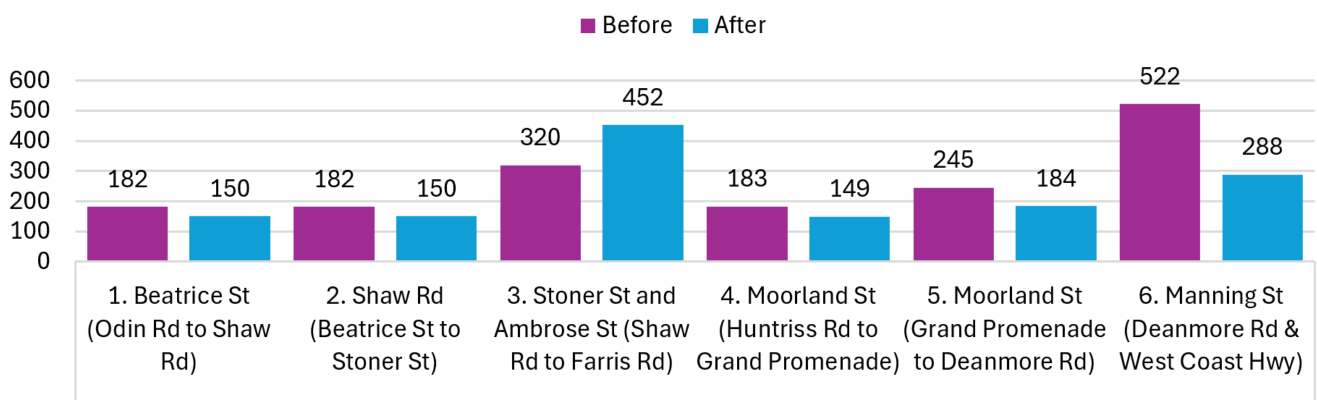
Walking activity decreased on the SAS and on control streets, but the degree of loss was higher on the SAS. This indicates that although walking activity declined in the area it was also less attractive for people to walk on the SAS route.

The odds ratio indicated the decrease in walking on the SAS route after construction was likely attributable to the SAS when compared with area-wide trends.

Walking – segment comparison

- Most segments recorded a decrease in pedestrian trips except for segment 3, which recorded an increase. Segment 3 includes the SAS section in front of Ambrose Primary School, suggesting that these increases may be associated with children and parents walking to school. This segment scored well for 'active transport infrastructure', with the highest score across the whole SAS route.
- The decreases in pedestrian activity on all other route segments could be associated with minimal and moderate scores for 'active transport infrastructure', noting the lack of footpath provision on segment 4 and part of segment 5.
  - Scores for 'traffic calming' and 'placemaking and legibility' were also minimal to moderate and variable across the route, possibly contributing to inconsistent and unclear expectations for pedestrian movement. When combined with the high 85th percentile speeds still occurring on parts of the route, this could have contributed perceptions of unsafe conditions for pedestrians.
  - For example, where intersection priority is not aligned with the SAS route at the filtered permeability intersection points where roadways are continuous (e.g. laneway that connects onto a SAS), confusion between active transport users and vehicles can occur. In these instances, clear use of roadway markings and priority changes are necessary.

Figure 8: Stirling – Average daily walkers on SAS segments



Crash incidents

Additional to the count data collected to assess user behaviour, a review of available crash data provided an indication of safety performance of the road environment before and after implementation of the SAS.

Objective evidence on the number, type and severity of crashes occurring in the area, in light of the changed user behaviour along the route, helps identify whether the SAS treatments have influenced road safety outcomes.

Method

Crash incidents were downloaded from Main Roads WA data warehouse via Data WA. Eleven years of reported incidents across the State, from 1 January 2013 to 31 December 2023,[8] were available which included midblock and intersections.

Data was filtered to anything involving bike or pedestrian, and geospatially mapped to visualise their location, type and injury severity against the SAS routes.

Sample sizes were low, which limited analysis to a simple visual count. Nevertheless, patterns were assessed alongside the design features of the route and user behaviour count results for vehicles, people walking and bike riders.

Sample sizes in active transport related crash data were typically low due to:

- frequency of incidents being generally low in the specific areas of interest
- the incident dataset only containing medical, hospital, fatal or property damage reports.

Results

Tables 2, 3 and 4 provide a summary of incidents between vehicles and bike riders or people walking, before, during or after SAS route construction, shown for each stage of the SAS route and corresponding control street locations. Notable data patterns include:

- The completed Stirling SAS route experienced four serious incidents involving a bike rider and vehicle, from a base of zero in previous years. All four incidents occurred at intersections with streets that crossed the Moorland Street (Stage 2) section of the SAS.
- The completed Stirling SAS route experienced two serious incidents involving a pedestrian and vehicle, from a base of zero in previous years. Both incidents occurred at midblock locations on the Manning Road (Stage 3) section of the SAS.
- Zero incidents were recorded on Stage 1 of the SAS route before, during or after construction.
- Several incidents involving bike riders or pedestrians were recorded on control streets before and after SAS construction.

This pattern indicates poor SAS performance in supporting the safety of vulnerable road users.

Stage 2 of the SAS (segment 4), which saw reductions in walking but increases in bike riding, observed a negative outcome for road safety of bike riders, with four incidents occurring at give way signed cross streets (Holbeck Street, Alice Street, Flamborough Street and Grand Promenade). These incidents occurred despite the reduction in vehicle volumes and 85th percentile speeds enroute, suggesting that interventions could be applied to slow the cross flow of vehicle traffic or improve driver awareness of SAS route priority.

[8] Note: At the time of analysis (late 2025), data for 2024 and 2025 was not available to download.

Stage 3 of the SAS (segments 5 and 6), which saw large reductions in walking but increases in bike riding, observed a negative outcome for road safety of pedestrians, with two incidents occurring at midblock locations on segment 6 of the route. A fatality occurred between Joyce Street and Littledale Street, and the medical incident occurred between Edgehill and Filburn Streets. This SAS segment observed reduced vehicle volumes but insufficient reduction of 85th percentile vehicle speeds. The lower overall vehicle usage may contribute to 'driver complacency' where drivers overestimate their abilities and underestimate risks,[9] increasing the likelihood of higher speed vehicles crashing with vulnerable road users. This route segment could have further speed reducing interventions applied, spaced 80-100 m apart, consistent with the SASs Pilot Program Final Evaluation Report insights.

Despite the complex road safety outcomes observed for users of the SAS route, there were reductions in the number of crashes with vulnerable road users on control streets, suggesting there may have been some overall increases in driver awareness.

Table 2: SAS Stage 1 - Incidents between vehicles and bike riders or pedestrians, before, during or after SAS route construction

Years of data reviewed[10]	SAS construction status	Crashes on SAS route – Bike	Crashes on SAS route – Pedestrian	Crashes on control street – Bike	Crashes on control street - Pedestrian
5 years	Before	Nil	Nil	1 medical	1 medical
1 year	During	Nil	Nil	Nil	Nil
5 years	After	Nil	Nil	1 medical	Nil

Table 3: SAS Stage 2 - Incidents between vehicles and bike riders or pedestrians, before, during or after SAS route construction

Years of data reviewed	SAS construction status	Crashes on SAS route – Bike	Crashes on SAS route – Pedestrian	Crashes on control street – Bike	Crashes on control street - Pedestrian
5.5 years	Before	Nil	Nil	1 medical	1 hospital
1 year	During	Nil	Nil	Nil	Nil
4.5 years	After	1 hospital 3 medical	Nil	1 hospital	Nil

Table 4: SAS Stage 3 - Incidents between vehicles and bike riders or pedestrians, before, during or after SAS route construction

Years of data reviewed	SAS construction status	Crashes on SAS route – Bike	Crashes on SAS route – Pedestrian	Crashes on control street – Bike	Crashes on control street - Pedestrian
7.5 years	Before	1 hospital 1 medical	Nil	2 hospital 2 medical	1 hospital 2 medical
1 year	During	1 hospital	Nil	1 medical	Nil
2 years	After	Nil	1 fatal 1 medical	1 medical	Nil

[9] ARSF. 2024. Changing the Narrative: Rethinking Road Safety in Australia. A position paper of the Australian Road Safety Foundation. Accessed February 2026.
[10] Years of data reviewed reflects the combined total of all available incident data analysed relative to the SAS's construction status. Due to the limited sample size and targeted location, averaging incidents per year was not suitable for this analysis.

Community sentiment

Community sentiment was collected to understand how residents and road users perceived the SAS and how they reported using the street before and after implementation. These insights provide valuable context on perceived safety, comfort and self-reported travel behaviours that cannot be captured through traffic counts alone. Incorporating community perspectives enables a more complete assessment of SAS user experience and helps to inform decisions about future refinement or expansion of the program.

Method

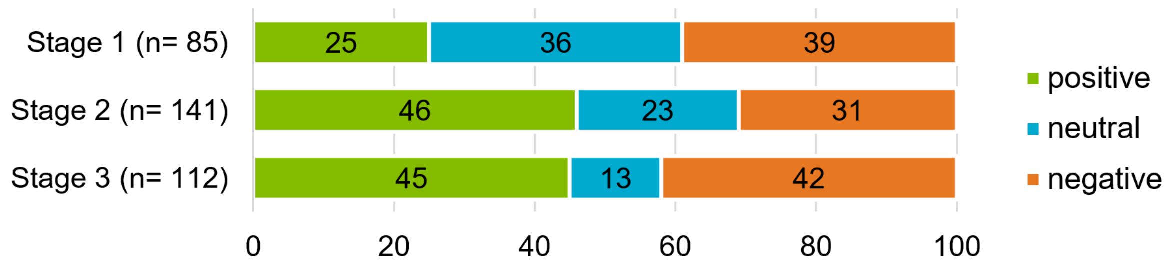
Community surveys were undertaken in 2022, four years following the opening of Stage 1 of the SAS in 2018 and one year following the opening of Stage 3 in 2021. Questions focused on the design treatments and effectiveness in delivering the project objectives, self-reported usage of the route (frequency, trip purpose) and demographics.

Results

Community sentiment and perceptions

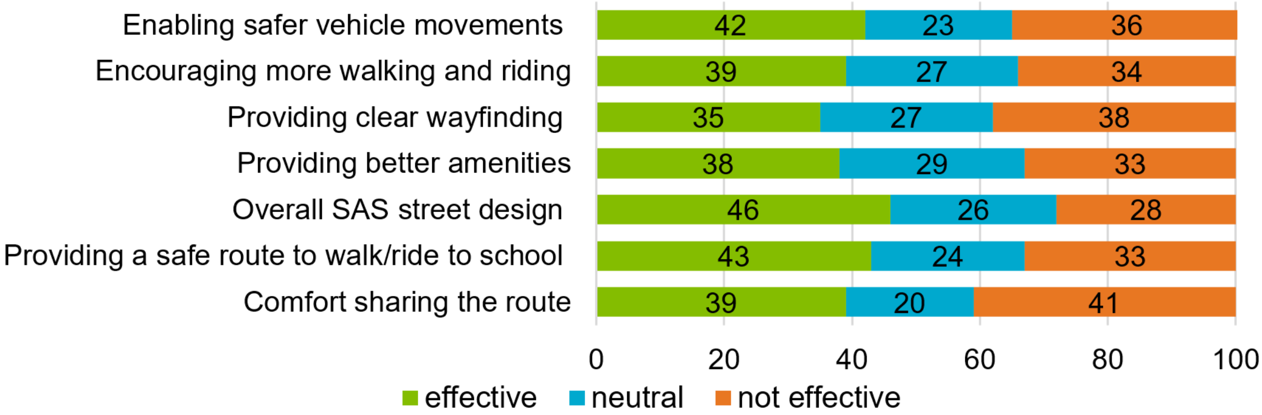
- Sentiment towards the SAS was mixed.
  - **40 per cent** of all respondents (all stages combined) reported feeling positive towards the SAS (23 per cent were neutral), but this varied across the route.
  - This is one of the lower sentiment values compared to other SAS routes.

Figure 9: Community sentiment towards the Stirling SAS (n=338)



- When asked to rate the SAS on effectiveness across several categories, responses were mixed.
  - Concerns centred around comfort sharing the route, provision of clearer wayfinding and amenities and safer vehicle movements.
  - Verbatim responses highlighted concerns around the lack of footpaths on parts of the SAS route, the speed of vehicles approaching from intersecting streets, and insufficient wayfinding signage and route legibility.

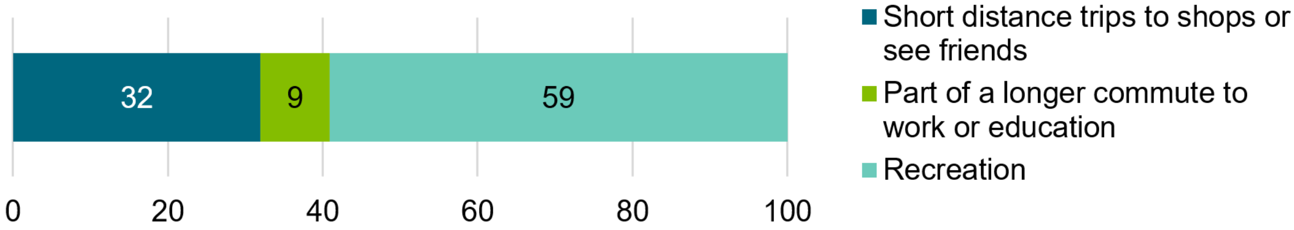
Figure 10: Community perceptions of the SAS (n=338)



Changes in behaviour and trip purpose

- Self-reported changes in behaviour from all respondents, were consistent with observations.
  - **17 per cent** = NET increase in active travel
  - **-8 per cent** = NET decrease in vehicle use.
- People who walked or rode a bike along the SAS did so for a mix of reasons, with over half for recreational purposes.

Figure 11: Walking, riding – trip purpose (n=237)



Verbatim responses on what people liked or didn't like about the SAS

Positives

"Provides a safer route for cyclists between the bike path on the freeway and the neighbourhood and the beach."

"The opportunity for wider community involvement in exercise, casual contact with the community and a better interaction between pedestrians etc and motor vehicles."

"Motorised vehicle deterrent. Safer on road experience for cyclists and scooters."

"The street has a smooth pavement and well-kept green verges for walkers."

"I walk my child (in a pram) and dog to the park every day in the afternoon, mostly peak hour traffic. I specifically like how cars can no longer drive from Cedric Street through to Beatrice Street, it can only be used for bike/scooter/walking access. I also ride my eBike with my child up the local community centre, I use Beatrice Street because it feels safe and is never congested with cars."

Negatives

"Overall layout of whole streets is not effective. Cars are getting impatient and going through give way signs. Accidents waiting to happen due to road obstacles being ineffective. Trees in middle of side roads is dangerous."

"Cyclists to use the safe active streets. Many people driving still try to overtake cyclists. I do not like cycling on this road with my son (7 years) as people make riskier or less room to overtake."

"A lot of people disobey the giveaway [sic] signs and speed through. Cyclists zoom downhill at speeds that are often hard to see when reversing out of driveway if cars are parked in street parking bays."

"I am an avid cyclist and I avoid this street. I have nearly been hit by several cars that don't stop when crossing the street. The give way sign should be stop signs. The road markings on the cross streets are confusing; it's a weird cross/box pattern that doesn't make sense. Also being on a hill while riding you gain a lot of speed and with all the cross streets it is dangerous."

"There should be a footpath but there's nothing. And you have to think about the angle of the street, it faces directly into the setting sun, so if a kid is riding along the road and a car doesn't see them there is nowhere to get out the way."

SUMMARY OF FINDINGS

Achievements

- Significant reduction in vehicle counts was observed on all segments of the route.
- Reductions in vehicle speeds overall to within the preferred operating range.
  - Where speeds were lowered, this was achieved through features such as alternating parking, landscaping at intersections and improvements to locations of filtered permeability.
- Bike riding activity increased on the SAS route to a higher degree than the surrounding area.

Opportunities for improvement

- Walking activity decreased on the SAS to a higher proportion than the surrounding area.
  - Community surveys found people's main concerns centred around comfort sharing the route, provision of clearer wayfinding and amenities (such as footpaths) and unsafe vehicle movements.
- Several severe incidents occurred on the completed route, indicating not all design features were achieving their intended outcomes, with vehicle speeds and driver behaviour not conducive to safe walking and bike riding in some locations.
  - Additional design treatments could be investigated to rectify some of these issues, including further narrowing of carriageway widths in some locations, raised platform speed reducing treatments at cross-streets with the SAS route, and more wayfinding. This would both physically slow vehicles down and provide a design cue of a changed driving environment.

Insights and recommendations

Design treatment changes that influenced vehicle and speed reductions contributed to increases in bike riding activity overall on the Stirling SAS route. However, inconsistencies in treatment application, amenity and wayfinding led to decreases in walking, negative road safety outcomes and mixed community sentiment.

Recommendations to improve outcomes on this SAS project, informed by insights summarised in the SAS Pilot Program Final Evaluation Report:

- Lowering 85th percentile speeds consistently across all segments of the route to within the preferred operating range, by considering additional road treatments as required.
- Amenity improvements, including provision of footpaths along Moorland Street.
- Improving SAS priority and wayfinding at locations of filtered permeability and give way signed cross-streets.

Alignment with program insights

By trialling the use of different design features, and collecting data on user behaviour and community sentiment, the nine evaluated projects in the pilot program generated a rich array of insights that will guide future design and development of SASs.

The SAS Design Guidance developed through this trial provides insights for retrofitting brownfield sites but perhaps most importantly, guidance on how to establish an SAS on greenfield sites at inception.

With this guidance and support from DTMI, local governments can design and implement more SASs, creating effective 30 km/h shared street spaces for people to walk, wheel and ride comfortably and safely in their communities.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