



RESEARCH REPORT

Butt Litter Index 2022

Research on Cigarette Disposal
Behaviour for the NSW
Environment Protection Authority

March 2023



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Document Reference: 6455

Version: 10



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1. EXECUTIVE SUMMARY

Cigarette butts are consistently the most-littered item in NSW. It is estimated that each year 1.32 billion butts are littered in NSW.

The NSW Government, through the Environment Protection Authority (EPA), employs a range of programs designed to reduce butt litter. These include working with and funding councils to provide improved cigarette butt disposal infrastructure (bins, signage etc.), and identifying the behavioural and attitudinal characteristics of smokers that lead to butt littering.

As part of its efforts to measure and track butt litter, smoker attitudes and smoker behaviour, the EPA has developed a tool called the Butt Litter Check (or BLC). The agency is now using this tool to develop a Butt Litter Index (BLI), to provide robust evidence of longitudinal (i.e., time-based) changes in smoker, behaviour, attitudes, and butt littering rates.

In 2022, the EPA commissioned Taverner Research to conduct a BLI evaluation of sites across 20 NSW local government areas (LGAs), and at selected TAFE sites. The 2022 BLI was designed to provide benchmark data against a similar study conducted in 2020. (See separate report.)

For the 2022 research, Taverner Research observed smoker behaviour and site characteristics across 117 sites in 20 different metropolitan and regional LGAs.

Across the 117 sites, researchers observed 3,107 incidents of smokers binning or littering cigarette butts (against 3,005 in 2020). They also conducted site inspections (including assessment of the site using 20 different criteria), interviewed 569 smokers about their perceptions of their smoking area, and conducted butt litter counts.

Among the key conclusions for the 2022 research:

- 62% of butts were littered, while 38% were binned. This compares with 64% littered in 2020 – a small (i.e., not statistically significant) improvement. (N.B. These results align with previous cigarette behavioural research completed by the NSW EPA.)
- Littering rates were highest:
 - In regional areas
 - Where there were no butt bins
 - In so-called “hotspots” - i.e., areas not catering to the needs of smokers
 - Where smokers felt they had less ownership of the area
 - When smokers were in groups
 - When bins were more than 2 metres away from where smokers stood
 - Outside transport hubs and entertainment venues (and lowest outside office blocks)

All these findings are in line with 2020 results.

- One-third of sites observed in 2022 had butt bins (i.e. as opposed to general waste bins). Littering rates at sites with butt bins were significantly lower than at those without (53% against 66%).
- The proportion of burning cigarettes littered (53%) as opposed to extinguished (47%) was almost identical to 2020.
- While the majority of littering was done on open ground (70%, vs. 72% in 2020), garden beds were again a popular littering option (14%, against 15% in the previous survey).
- 40% of butts were littered using the “drop and stomp” disposal method (against



1. EXECUTIVE SUMMARY

57% in 2020), with 26% “flagrantly flung” (vs. 17%) and 25% “sneakily dropped” (vs. 13%).

- As in 2020, Area Inspection scores suggest that:
 - Smokers are more likely to bin their cigarettes in areas with convenient litter or butt bins, and where they feel a greater sense of involvement and/or ownership.
 - Signage, surveillance, and fear of fines appear to play lesser roles in lowering littering rates.
 - Perceived cleanliness does not rate highly as a differentiating factor in creating lower littering rates.
- The presence of butt-specific bins appears to be the major indicator that a site is “smoker-friendly”. This in turn appears to have the greatest positive impact on smoker’s likelihood to bin their butts.
- Butt litter counts (within a 48m² zone of the smoking area) varied from zero to 500, with a trimmed mean of 42.8 butts per site (up from 35.7 in 2020).¹
- This latest research strongly backs up conclusions from the 2020 wave (and earlier Taverner research) around the existence of a “social compact” – in particular, showing the correlation between sites with adequate butt or litter bins, higher Area Inspection scores, and lower littering rates.
- Likewise, the relationship between sites where smokers felt greater ownership and lower littering rates again indicates that the social compact applies strongly in such areas.
- Most tellingly, the existence of butt bins in a smoking area (i.e., as opposed to more general waste bins) appears to send a strong message of it being “smoker-friendly” sites. And this in turn is likely to trigger the social compact tendency.
- Though anecdotal only at this stage, researchers noted that some smokers are beginning to “ration” their smoking breaks – i.e., with a “half a cigarette now, the other half later” approach. If this becomes widespread, it may have implications for future research waves (e.g., by increasing the proportion of cigarettes carried away.)
- Likewise, researchers reported seeing many more people vaping in 2022 than in 2021. While again anecdotal, it does back up a number of other research studies (both NSW-wide and national) showing rises in the use of e-cigarettes over recent years. While the health implications of this trend are obviously of concern, it may provide at least one longer-term solution to butt littering.

¹ However, there are a number of extraneous factors that can affect butt litter counts – principally time since site was last cleaned, and recent rainfall.



2. RECOMMENDATIONS

Based on this year's 3,107 observations, 117 site inspections and 569 smoker interviews, we offer the following recommendations:

1. Butt bins are arguably the key defining feature of a “smoker-friendly” site. And as a highly visible sign that an area is welcoming to smokers, they also play a symbolic role in providing “ownership” of the site by smokers. The ongoing rollout of butt bins should hence be a key component of butt litter reduction strategies going forward.
2. The social compact remains an effective way to increase binning. Demonstrating a commitment to provide adequate bins (and, in particular, butt bins) for smokers builds a social compact with smokers and appears to encourage smokers to respond positively in kind. Identifying additional ways to engage smokers in the social compact will continue to drive positive disposal behaviour.
3. The 2022 study includes observations from twelve EPA butt litter reduction grant sites. However, as these sites were only identified post-fieldwork, we were unable to provide sufficient data (by total observations or number of sites) to reliably assess the role these grants play in reducing butt littering. We would hence recommend that any future studies allocate a fixed number of grant sites (ideally 20+) during the project set-up phase, to ensure more robust and reliable data.
4. Future research should have a specific quota of observations conducted post-5pm, to provide more accurate data on the time-of-day impact on butt littering behaviour.
5. As butt bins become more prevalent and given that there are now a variety of different butt bins available for installation by Councils (e.g., free-standing bollards, butt bins attached to litter bins, or those attached to posts), future research should ideally identify the specific type of butt bin being used to see if this has any impact on smoker behaviour/littering rates.
6. The five in-depth interviews conducted as part of this year's research have included important and potentially impactful insights into the attitudes and behaviours of smokers relating to their butt littering. This phase of the research should ideally be expanded (both in number of smokers and scope of interviews) in future waves.
7. While likely to be beneficial to litter counts, the switch from traditional to e-cigarettes appears to have led to reduced smoker activity - which in turn impacted the smoker observation process in 2022. The impact of vaping on usage of traditional cigarettes hence needs to be considered in future research waves.



3. PROJECT BACKGROUND AND METHODOLOGY

3.1. INTRODUCTION

As the NSW Environmental Protection Agency (EPA) website notes², “The National Litter Index shows that cigarette butts are consistently the most-littered item in NSW. It is estimated that each year 1.32 billion cigarette butts are littered in NSW. Cigarette butts are unsightly, toxic, and harmful to the environment. They are easily carried in stormwater runoff through drainage systems and eventually to local streams, rivers, and waterways. Cigarette filters contain cellulose acetate, a form of plastic that does not readily biodegrade and can persist in the environment.”

The NSW EPA has set a target to reduce cigarette butt litter across the state. Working collaboratively with NSW councils and land managers, the EPA is delivering a program to reduce observed butt littering behaviour³ by 50% by 2030.

3.2. PROGRAM CONTEXT

To better understand smokers’ cigarette disposal behaviour, the Butt Litter Check (BLC) was developed to measure littering behaviour and assess the contextual factors in outdoor smoking areas that influence this behaviour. The BLC was then used to undertake extensive quantitative research around NSW.

The Butt litter check

The Butt Litter Check (BLC) is a location-based methodology, combining information from the inspection and grading of a location’s features with insights from community conversations (individual surveys), counts of litter on the ground, and importantly from observing how smokers discard their cigarette butts (disposal behaviour).

Information related to butt littering in each smoking area is measured in four ways.

1. Area Inspection (AI): an indicator of the likelihood that the smoking area provides a context for supporting cigarette butt litter prevention and encouraging smokers to use bins. The AI assessment is based on either a true or false grading for specific attributes and features of the smoking area. A total AI score out of 20 (then converted to 100) for a smoking area is based on adding together those positively scored attributes. The AI grading approach groups attributes into five sub-scales and each sub-scale can be scored to provide detailed guidance on strengths and gaps in smoking areas for preventing butt litter.
2. Behavioural observation: recording a minimum of 30 butt disposal actions as they occur and noting key features of smokers associated with either using bins or littering.
3. Litter count: standardised measure of the number of butts and other litter in the location.
4. Survey: structured conversations with people in smoking areas to gain insights into smokers’ views on the key features of the location and their disposal actions.

² <https://www.epa.nsw.gov.au/your-environment/litter-and-illegal-dumping/epa-work-prevent-litter/reducing-cigarette-butt-litter>

³ Based on the Butt Litter Index scores



3. PROJECT BACKGROUND AND METHODOLOGY

Guidelines for using the BLC, including descriptions of the full approach for conducting all four research stages can be found in the Butt Litter Check Guidelines at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/litter/21p3199-butt-litter-kit-part-4.pdf?la=en&hash=42DCF158A216A048C542219B425ACDD91DC346C8> .

(The four BLC data collection forms are included as Appendix 1 to this report.)

Quantitative Research⁴

In 2017, research was conducted to assess disposal behaviour using the BLC. This included:

- Providing a contrast between subjectively classified streamlined and hotspot smoking areas.
- Validating the BLC area grading system to characterise litter prevention in smoking areas and contrasting with previous baseline findings.
- Establishing a cigarette butt-littering baseline specifically for NSW that could be used as a benchmark to set behavioural targets and monitor progress towards reduced butt litter.
- Comparing the effects on smokers' littering behaviour across different site types (retail, transport, car parks and office work break), and population centres (CBD, urban, rural).
- Providing insights into factors underlying smokers' habitual disposal of butts.

Qualitative Research

The EPA conducted primary research among smokers to help inform development of the new Cigarette Butt Reduction Program. The research aimed to provide a deeper understanding of barriers and drivers to appropriate cigarette butt disposal. The project reported behaviour in relation to cigarette butt disposal from a target audience of NSW smokers aged 18 years and over. The report assessed participants in terms of their capability to appropriately dispose of cigarette butts; observed whether they had the opportunity to appropriately dispose of cigarette butts and evaluated their motivation to appropriately dispose of cigarette butts.

The results were analysed and further categorised by typical disposal moments and smoker typologies and suggested implications of the research findings for intervention design.

⁴ Rob Curnow & Karen Spehr, Butt-littering behaviour in context, The Butt Litter Check: A foundation for the NSW EPA cigarette butt litter reduction program, August 2017. <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/litter/cigarette-butt-littering-behaviour-in-nsw-quantitative-research-and-baseline-report-community-change.pdf?la=en&hash=29E1703A1F364B2C8A336BB0D6B4061A97E1C288>



3. PROJECT BACKGROUND AND METHODOLOGY

Findings from the NSW EPA-led Cigarette Butt Litter Prevention Trial⁵

In 2017, the EPA began working with 16 NSW councils to develop and lead a partnership program, guided by social scientists to identify ways to positively influence smokers' cigarette butt disposal behaviour. In 2018, as a key part of this partnership program, the EPA led a practical quasi-experimental Trial to test strategies to reduce cigarette butt litter by influencing smokers' cigarette butt-littering behaviour in NSW.

The purpose of the Trial was to guide the EPA to develop an evidence-based program to support local land managers to prevent cigarette butt litter.

The Trial aimed to identify:

- The most effective strategies for reducing smokers' cigarette butt litter behaviour.
- Councils' experiences as project partners trained to use tools to co-deliver the interventions and assess impacts.
- The features of the relationship between place managers and smokers for keeping locations free of butt littering.

The Butt Litter Prevention Trial found that land managers who objectively review the way smokers interact with a smoking area can identify needed improvements, understand the '**social compact**' operating in the area and can design and implement projects that respond to local challenges.

Guide to prevent cigarette butt littering⁶

Based on the extensive research and Trial, the NSW EPA developed a Guide to prevent cigarette butt littering, which provides 13 detailed steps for land managers, local government, businesses, and community groups to prevent cigarette butts from being littered. It is a key document in designing the locally tailored butt litter prevention projects.

The Butt Litter Index Report

In 2020, the NSW EPA commissioned Taverner Research to conduct an audit of butt littering behaviour and attitudes in 112 local government areas across the state. The final report, delivered in April 2021, can be found here: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/litter/butt-litter-index-2020.pdf?la=en&hash=328BEFF81F750D7468CD289E243AB33333FCF9FE>

This latest report, using the same methodology (and wherever possible the same sites) employed in 2020, seeks to track progress in butt littering behaviours and attitudes over the intervening two years. This latest wave of research covered 117 sites – including for the first time four TAFE-specific sites.

⁵ Identifying effective strategies to reduce cigarette butt litter Findings from the NSW EPA-led Cigarette Butt Litter Prevention Trial 2019. <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/litter/19p1840-butt-litter-trial-report.pdf?la=en&hash=D28C9E091A7082F33942BD278C8F8D258637A7C6>

⁶ <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/litter/19p1840-butt-litter-trial-report.pdf?la=en&hash=D28C9E091A7082F33942BD278C8F8D258637A7C6>



3. PROJECT BACKGROUND AND METHODOLOGY

3.3. RESEARCH METHODOLOGY

As in 2020, the EPA and Taverner Research worked collaboratively to identify local government areas across NSW to be targeted for this research. **Table 1** below shows the LGAs selected for 2022, and the numbers of sites per LGA visited during the seven-week research program.

Table 1 Smoking areas

Region	LGA	# Sites visited	Streamlined ⁷	Hotspot	Observations ⁸
Sydney & East	City of Sydney	11	5	6	444
	Waverley	8	6	2	241
	Bayside	9	3	6	304
	Randwick	8	2	6	192
Western Sydney	Parramatta	4	3	1	120
	Blacktown	4	4	0	141
	Cumberland	4	0	4	165
	Canterbury-Bankstown	2	0	2	69
Other Sydney	North Sydney	2	2	0	37
	Ku-ring-gai	1	0	1	20
	Northern Beaches	3	0	3	20
	Canada Bay	3	3	0	103
	Inner West	1	0	1	36
Newcastle	Newcastle	12	0	12	470
Wollongong	Wollongong	11	2	9	357
Central Coast	Central Coast	9	2	7	282
Inland	Tamworth	9	0	9	290
	Walgett	4	1	3	56
Coastal	Coffs Harbour	4	1	3	124
	Port Stephens	4	1	3	127
	TAFE	4	2	2	84
TOTAL		117	37	80	3682

⁷ See following page for explanation of "streamlined" and "hotspot" smoking locations.

⁸ Includes "carried away" cigarettes – i.e., those for which a binning or littering behaviour could not be determined. These "carried away" observations have been removed from the observation dataset prior to analysis.



3. PROJECT BACKGROUND AND METHODOLOGY

A team of 10 Taverner researchers were trained in the use of the BLC at Taverner's Surry Hills headquarters, initially on Thursday September 15th, 2022. Further researchers, covering Coffs Harbour, Newcastle, Central Coast and Wollongong were trained separately. Over the following seven weeks, researchers covered all Council areas covered in **Table 1** (previous page).

The research was focussed on seven different location types⁹, described in the BLC Guidelines as:

1. **Transport** (an interchange, hub or thoroughfare near a train station, bus stop, bus interchange or car park).
2. **Shops** including retail strips, outdoor malls and outside shopping centres.
3. **Office buildings** including office blocks, landmark buildings, courts, adult education centres and tertiary institutions.
4. **Venues** – outside pubs, clubs, or hotels or other licensed venues, and outdoor eating areas.
5. **Health facilities** including outside hospitals, or medical centres.
6. **Recreational parks**, outdoor markets, and waterways.
7. **Roadside stops or rest areas**.

The breakdown of disposals by location type is shown in **Table 2**, below:

Table 2 Breakdown of disposals by location type 2020 vs. 2022

LOCATION TYPE	2020	2022
Transport	25%	23%
Shops	37%	41%
Office Buildings	22%	23%
Venues	16%	9%
Health Facilities	0%	2%
Recreational Parks	0%	2%
Roadside Stops	0%	0%

⁹ Note that the 2020 study focussed mainly on transport, shops offices and venues. As we attempted to replicate as many 2020 sites as possible in this latest research, these four venue types will remain dominant.



3. PROJECT BACKGROUND AND METHODOLOGY

It might be worthwhile having a greater presence at venues from 5pm onwards in future waves of this project (see **Table 3** below).

Table 3 Observations breakdown of time of day by location type 2020 vs. 2022

	Up to 10:59am		11am to 1:59pm		2pm to 4:59pm		5pm onwards	
	2020	2022	2020	2022	2020	2022	2020	2022
Transport	309	318	236	225	182	89	39	14
Shops	263	466	647	619	197	189	9	0
Office buildings	281	254	351	328	23	137	0	0
Venues	153	65	236	170	62	46	17	12
Health facilities	0	5	0	56	0	10	0	0
Recreational parks	0	38	0	23	0	0	0	0
Roadside stops	0	0	0	0	0	0	0	0

Researchers were also asked to designate areas as either “streamlined” or “hotspots” These are again defined in the BLC Guidelines as such:

- **Streamlined smoking areas** are places where the expectations of the correct disposal of butts is obvious and clear. Typically, these areas are clean, well prepared for capturing butts, relatively free of butt litter, may have clear signage on where to smoke and dispose of butts and have places for smokers to meet out of the weather.
- **Hotspot smoking areas** are where expectations of correct butt disposal are unclear, butt littering is a problem and there are inadequate butt bin facilities available.

(These terms are referenced throughout the Results section of this report.)

In 2022, 30% of observations were conducted in streamlined sites. This compares with 32% in 2020.

In all, 117 sites were eventually measured. This encompassed 3,682 observations¹⁰ (against 3,484 observations in 2020). In addition, researchers conducted butt litter counts at a designated 48 m² zone within each of the 117 sites and conducted 569 brief interviews with smokers to understand their perceptions of each smoking area.

¹⁰ This includes 412 observations where the cigarette was carried away from the smoking area.



3. PROJECT BACKGROUND AND METHODOLOGY

In 2022, Steps 1, 3 and 4 were programmed onto tablet computers. However, data for Step 2 remained captured in paper format. Results from the Step 2 paper forms were manually data-entered into an Excel spreadsheet by trained Taverner staff. This data was audited for quality control purposes. Through this process 163 observations were removed from analysis due to poor or inconsistent data quality.

Once the 412 “carried away” and inadequately recorded observations were removed, the final number of observations analysed was n=3,107 (against n=3,005 in 2020).

The Excel-based results were then converted to SPSS and Q formats for analysis.

Sampling error

Random sampling error for the sample of 3,107 smoker observations is +/- 1.76% at the 95% confidence level. This means that (in effect) results from this study should be representative of the overall target population (i.e., “adult smokers in NSW who smoke and dispose of their cigarette butts in public”) to within +/- 1.76% in 95 of any 100 research studies conducted.

Sampling error will be higher for specific sub-samples – such as by site, site type or smoker demographic. (By way of example, random sampling error for each of the 117 selected sites will be +/- 9.05%, again at the 95% confidence level.)

Caution should hence be taken in extrapolating results to specific sub-segments of the overall target population.

Case studies

In addition to the quantitative research, this year’s report includes five smoker case studies. These smokers were initially interviewed during the main fieldwork phase and asked at the end if they would be interested in taking part in follow-up discussions. One hundred and thirty two smokers expressed an interest, of which five were later successfully contacted and eligible to contribute further insights.

Follow-up interviews were conducted by telephone, lasted 15-20 minutes, and participants were provided with a \$40 gift card to thank them for their time.

Five case studies are included within this report. While the insights are anecdotal, they do provide a different perspective on the issue of butt littering, smoker behaviour and issues surrounding the smoker compact.

Note that the names of smokers have been changed to protect their anonymity.



4. SURVEY RESULTS

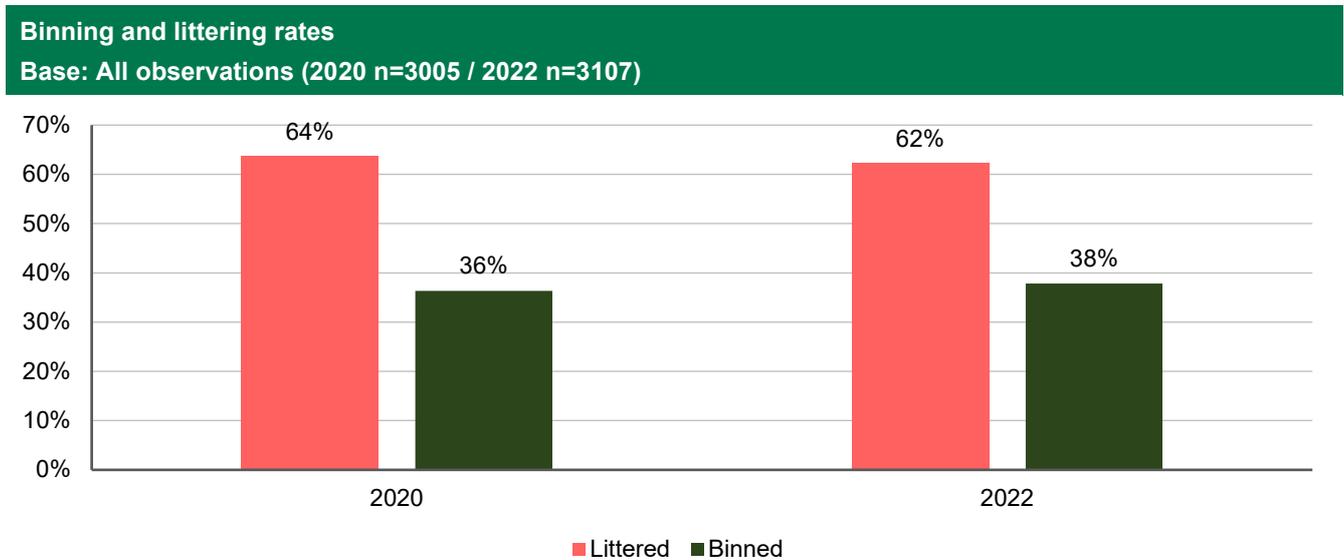
This section details survey results for observations, smoking area inspections, smoker interviews, and the links between these different steps. See METHODOLOGY section for details of how the survey was conducted, and APPENDIX 1 for examples of the four different survey forms used.

For all observations, researchers noted whether the smoker being observed: (a) binned their cigarette; (b) littered their butt; or (c) carried the butt away from the observation area. **Observations where the cigarette was carried away have been excluded from this analysis**, meaning that the binned and littered rate will always (unless advised otherwise) add to 100%. Hence where only a binned rate is provided, the littered rate will be 100% less this binned rate – and vice versa.

4.1. OBSERVED BEHAVIOUR

Excluding instances where smokers carried their cigarette butt away from the smoking area, there were 3,107 observations made in 117 sites across NSW in 2022.

Figure 1 Binning and littering rates



Of all observations (excluding those where the cigarette or butt was carried away from the smoking area), 62% were littered against 38% which were binned in 2022. Although this represents an improvement of two percentage points since 2020, that difference is not considered statistically significant¹¹ (see **Figure 1** above).

Key Finding 1:

Overall, cigarette butt littering behaviour has neither improved nor worsened since the 2020 study.

¹¹ i.e. is within the bounds of random sampling error



4. SURVEY RESULTS

Table 4 Littering rates by different smoker or site characteristics

Factor	Characteristics	2022 Littering rate	2020 Littering rate	Statistically significant difference between categories (2022)?
Region	Metro	56%	64%	Yes
	Regional	69%	59%	
Group size	One	60%	61%	Yes
	Two	63%	70%	
	Three or more	74%	66%	
Age (approx.)	Under 25	62%	60%	No
	25-34	60%	64%	
	35-44	61%	66%	
	45-54	63%	66%	
	55+	66%	62%	
Distance to nearest bin	0.5 metres or less	30%	6%	Yes
	1-1.5 metres	36%	45%	
	2-5 metres	59%	65%	
	6-10 metres	74%	78%	
	11-20 metres	81%	88%	
	21+ metres	88%	92%	
Location Type (1)	Hotspot	71%	74%	Yes
	Streamlined	42%	43%	
Location Type (2) ¹²	Transport	75%	66%	Yes
	Shops	64%	63%	
	Office block	39%	57%	
	Entertainment venue	71%	71%	
	Health facility	94%	N/A	
	Recreational parks	84%	N/A	
Graffiti and damage	Some/lots graffiti	69%	64%	No
	Some/lots damage	69%	60%	

(N.B. Figures in red or green, above, show statistically significant improvements or deteriorations in binning behaviour from 2020 to 2022.)

¹² Note that health facilities and recreational parks accounted for only 2% each of total observations. These figures should hence be treated with caution.



4. SURVEY RESULTS

The littering rate for Metro sites was significantly lower in 2022 (56%) compared to 2020 (64%), however the littering rate for Regional was significantly higher in 2022 (69%) compared to 2020 (59%).

The littering rate for groups of two was significantly lower in 2022 (63%) compared to 2020 (70%), however the littering rate for groups of three or more was significantly higher in 2022 (74%) compared to 2020 (66%).

The littering rate for those estimated to be aged 35-44 years was significantly lower in 2022 (61%) than in 2020 (66%).

The littering rate for those standing 0.5 metres or less from a bin was five times in 2022 (30%) the rate in 2020 (6%). For all distances higher than 0.5 metres, the 2022 littering rate was lower than the 2020 littering rate.

The littering rate for transport sites in 2022 (75%) was nine percentage points higher than 2020 (66%). The littering rate for office blocks in 2022 (39%) was 18 percentage points lower than in 2020 (57%). Hospitals and recreation parks were not specified in 2020, so cannot be compared to 2022.

Key Finding 2:

Littering rates were highest:

- **In regional areas**
- **Where there were no butt bins**
- **In so-called “hotspots” - i.e., areas not catering to the needs of smokers**
- **Where smokers felt they had less ownership of the area**
- **When smokers were in groups**
- **When bins were more than 2 metres away from where smokers stood**
- **Outside transport hubs and entertainment venues (and lowest outside office blocks)**

All these findings are in line with 2020 results.



4. SURVEY RESULTS

EPA Grant sites

At the conclusion of fieldwork, the EPA supplied Taverner with the details of Council and TAFE sites that had received NSW Government grant funding over the previous two years. These grants were designed to streamline specific locations with butt bins, signage and other measures designed to reduce butt littering and highlight the social contract with smokers.

The study includes 325 observations from 12 grant sites – five in the Bayside LGA¹³, one each in the Waverley¹⁴, Walgett¹⁵ and ¹⁶Wollongong LGAs¹⁷, and four Sydney TAFE sites. Of these observations (and excluding carried aways), 54% of butts were littered and 46% binned.¹⁸

While the littering figure for these grant sites is lower than the average across all sites (i.e. 62% littered), results cannot be extrapolated to all grant sites due to the small sample size. The EPA may wish to ensure a higher proportion of grant sites in future BLCs to reflect the effectiveness of grant funding more accurately in reducing butt littering rates.

¹³ King St Mall in Rockdale, Railway Parade in Banksia, Rockdale Station, Kogarah Station, courtyard at Mascot Central Retail Precinct. Within these five sites, and excluding butts carried away, the littering rate was 71% (across 126 observations)

¹⁴ Eastgate Mall, Ebley Street entrance

¹⁵ Lightning Ridge Visitor Centre

¹⁶ Eora TAFE in Darlington, Annandale TAFE, Enmore TAFE and Randwick TAFE

¹⁷ Fern Street Windang

¹⁸ It was also intended to conduct observations at grant sites in Walgett. However this was not possible due to local flooding at the time of research, leading to substitute sites being used.



4. SURVEY RESULTS

Case Study 1: Allana

Allana is 32 and works in Ultimo (Sydney). Her regular smoking spot is in a covered stairwell on the corner of Harris Street and Fig Lane, near the bus stop (pictured).

Allana says the nearest bin is on the other side of Harris Street (a busy four-lane road). While not one of our targeted smoking sites, this suggests it is a hotspot.

Allana says she sometimes bins her butts, and other times litters.

When asked why she thinks people litter, she puts this down to laziness or being in a bad mood. "I've noticed if people are in a bad mood, they go, 'Whatever', and they just dump stuff... They're having a crappy day, they're not going to think about other people, so they're just going to dump it on the floor and move on."



Further, Allana thinks hotspots put smokers in a worse mood due to making them feel more marginalised. She says she is much more likely to litter on her own, believing peer pressure remains against littering. But she is happy to admit that her littering behaviour has gotten worse in recent times. "I used to be quite careful with it. I'd always put mine out and find a bin. I'd even put it in my pocket until I found a bin. Whereas nowadays I think, 'No, I don't want my pocket to smell', and I'm more likely to just chuck it somewhere, in a gutter most likely."

I usually throw (my butts) in the gutter, because I think, 'Oh, well, at least when it rains, it'll get washed away, or the street sweeper will pick it up.'

Interestingly, Allana says she only throws her butts into the gutter, never the footpath. This is because she believes this will make them easier to be picked up by street sweepers. "I usually throw (my butts) in the gutter, because I think, 'Oh, well, at least when it rains, it'll get washed away, or the street sweeper will pick it up.' I don't leave it on the footpath. Even my irresponsible behaviour is focused on, 'Well, the street sweeper will come and pick that up, so someone else doesn't have to'."

On her usual mode of disposal, she said she often uses the "flagrant fling" method – but mainly to ensure the butt ended up in the gutter rather than the footpath.

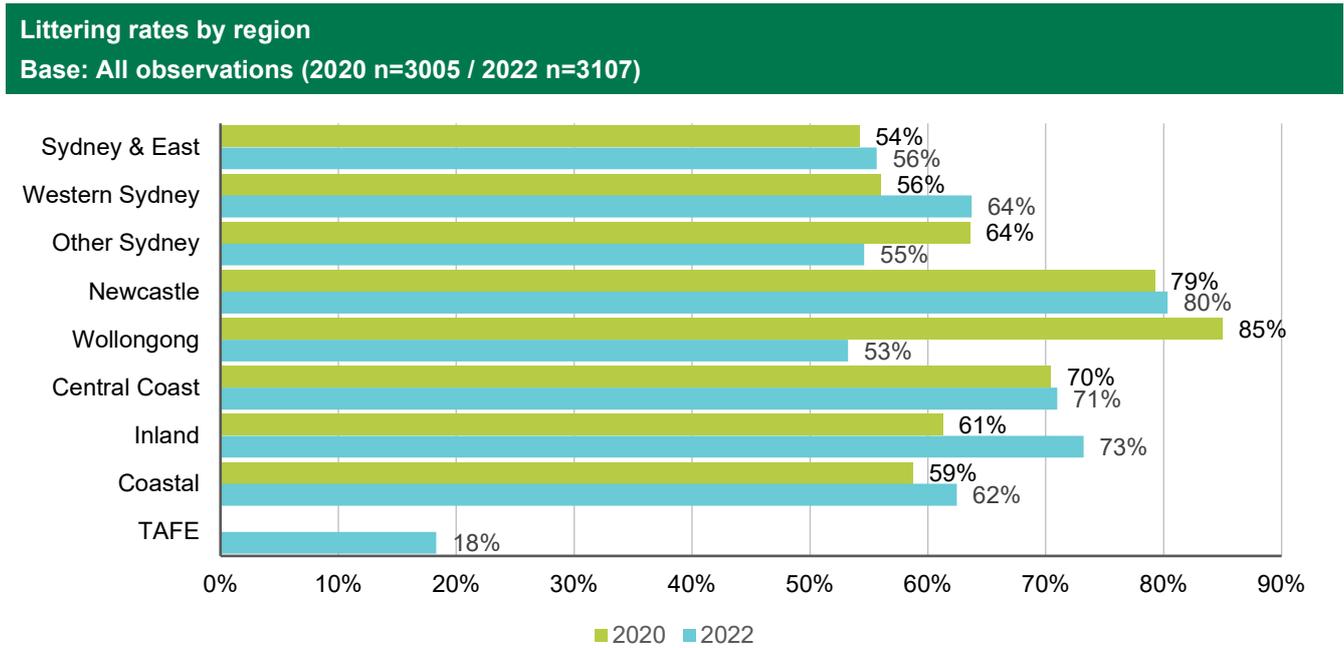
Allana believes that cleanliness plays a big factor in deciding whether to litter or not. And she strongly agrees that butt bins would make a big difference, by clearly defining the spot as being smoker-friendly. (While she felt enforcement might make a difference, she said she had never seen a ranger - and in fact had never considered the possibility of being fined.)

She feels that because smokers are made to feel marginalised, anything which offsets that belief will lead to improved behaviour. In particular Allana believes that shade, seating and butt bins would make smoking much more pleasant and in turn improve smokers' moods – which may in turn improve binning behaviour.



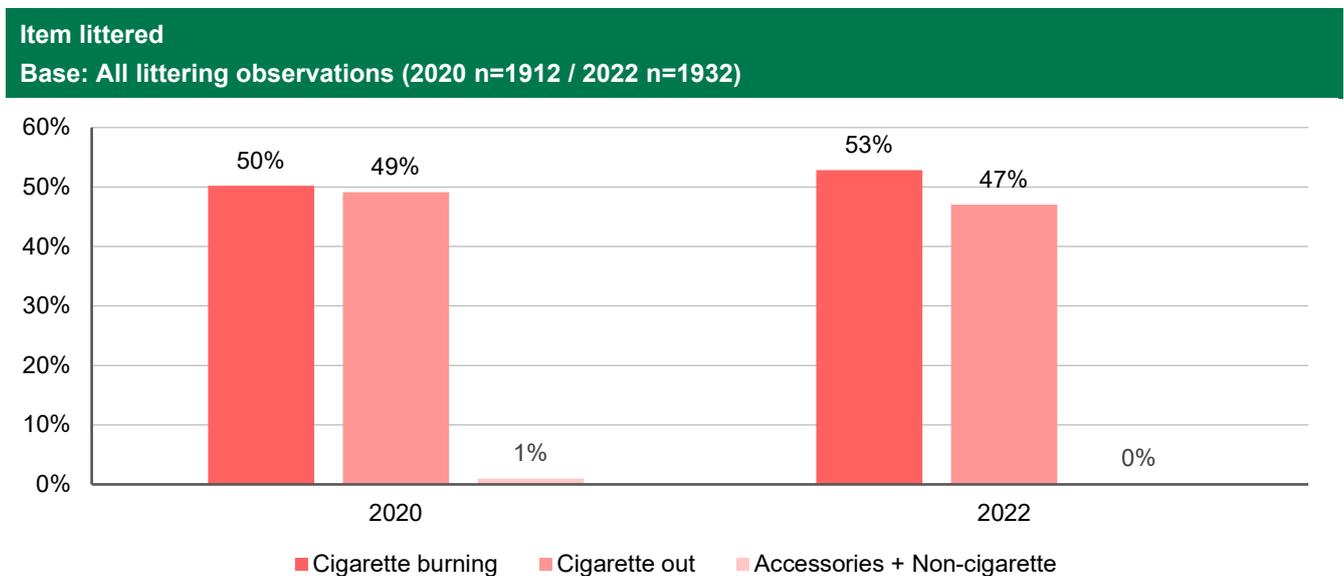
4. SURVEY RESULTS

Figure 2 Littering rate by region



As shown in **Figure 2** above, the largest drop was Wollongong, which went from the region with the highest littering rate in 2020 (85%), down 22 percentage points to be the lowest region (excluding TAFE sites) in 2022 (53%). (This may be due to the impact of the UCI Cycling Road World Championships, held in Wollongong from September 18-25, which could potentially have caused changes in smoker patterns and behaviours.) The largest increase in littering rate was inland (Tamworth and Walgett) from 2020 (61%) to 2022 (73%).

Figure 3 Item littered

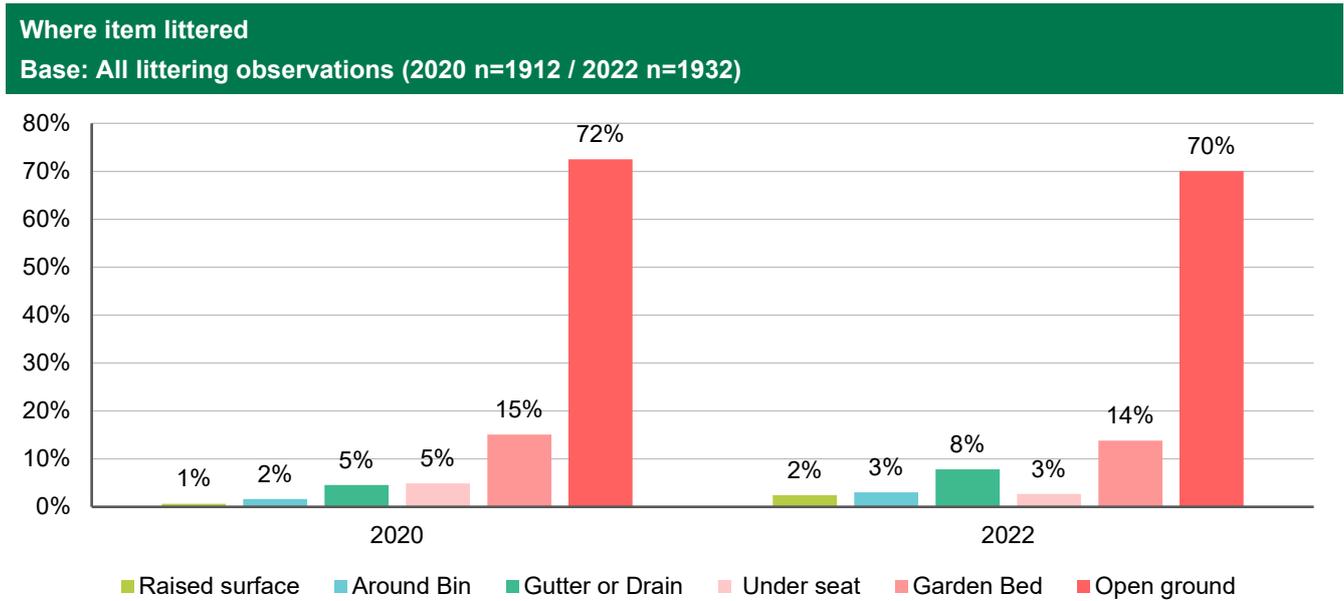


As shown in **Figure 3**, above, there was no statistically significant change in the proportion of burning vs. extinguished cigarettes in this latest wave of research.



4. SURVEY RESULTS

Figure 4 Where item was littered



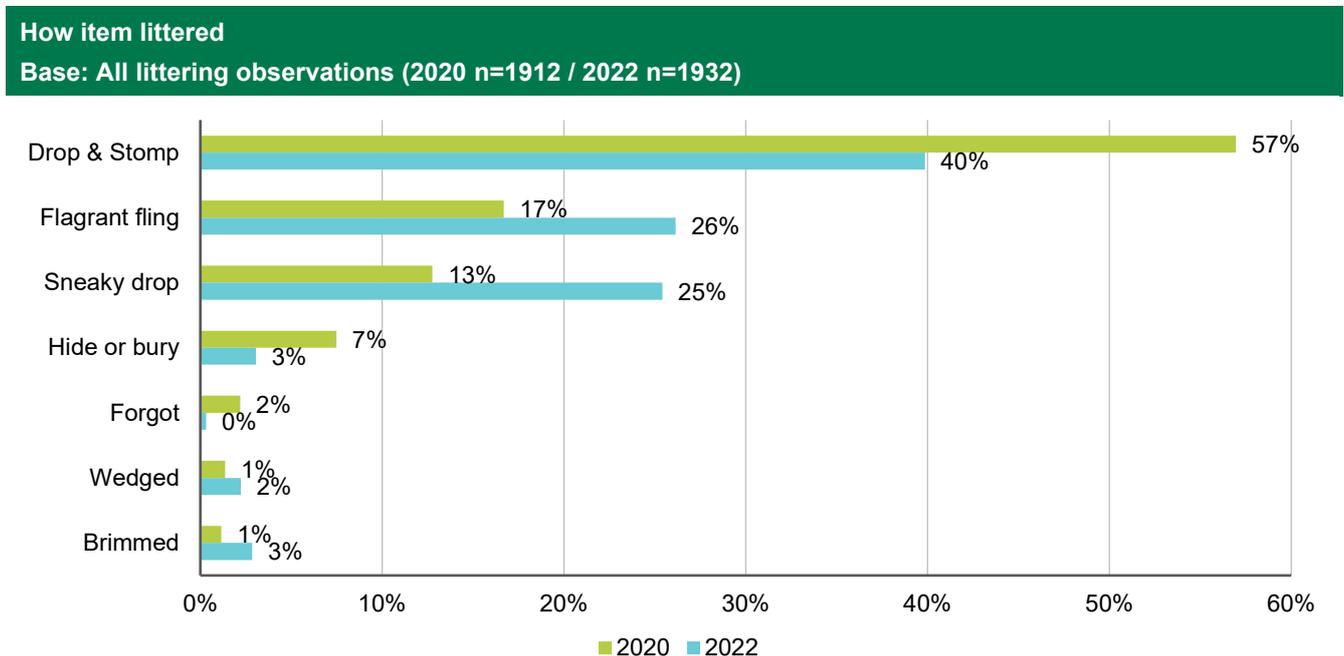
As shown in **Figure 4** (above), there was a significantly higher proportion of littering into a gutter or drain in 2022 (8%) compared to 2020 (5%).

There was significantly more littering observed into garden beds from groups of 3+ (21%) compared to groups of one (12%) or two (14%) in 2022.

Significantly more Central Coast observations littered on a gutter or drain (18%) than other regions. Significantly more TAFE (38%) and Wollongong (32%) observations littered on a garden bed in 2022.

Significantly more shop observations littered to open ground (74%) compared to other site types.

Figure 5 How item was littered





4. SURVEY RESULTS

Flagrant flings (17 to 26%) and sneaky drop (13 to 25%) exhibited significant increases in 2022, at the expense of drop and stomp (down from 57% to 40%), see **Figure 5** (previous page).

The drop and stomp method was significantly more likely to occur at a streamlined location (55%) than at a hotspot (36%). The flagrant fling was significantly more likely to occur at a hotspot location (28%) than at streamlined (18%), and sneaky drop was significantly more likely to occur at a hotspot location (27%) than at streamlined (18%).

Drop and stomp occurred significantly more at metro sites (43%) compared to regional sites (37%) in 2022. Sneaky drop occurred significantly more at regional sites (32%) than metro sites (17%).

Observations in 2022 of flagrant flings occurred significantly more in groups of 3+ (35%) and significantly less of groups of one (24%) – this act of bravado appears to need an audience. Inversely, sneaky drop occurred significantly more in groups of 1 (29%) and significantly less of groups of 3+ smokers (14%) (see also **Figure 7**, two pages down).

Smokers in 2022 estimated to be 25-34 years old were significantly more likely to drop and stomp than other age groups (45%), and those estimated to be 55+ were significantly less likely (31%).

Those in Other Sydney (53%) and Central Coast (49%) were significantly more likely to drop and stomp, and those in Western Sydney (40%) and Wollongong (35%) were significantly more likely to flagrant fling. Those in Newcastle (56%) and Coastal (38%) were significantly more likely to sneaky drop, and those in TAFE (15%) and Wollongong (12%) were significantly more likely to hide or bury.

“We definitely need sheriff and police enforcement to give fines for those who do litter their butts on the ground, put them in gardens or drop their empty packets and their empty tobacco things. It is just unacceptable.”
(Waverley St Mall, Bondi Junction)

Table 5 Method of littering disposal 2022, by site type

Method	Transport	Shops	Office block	Venue	Hospital	Recreational parks
Brimmed on bin	4%	3%	3%	2%	0%	0%
Drop and stomp	37%	42%	45%	31%	30%	55%
Forgot	1%	0%	0%	0%	0%	0%
Flagrant fling	28%	28%	18%	24%	25%	31%
Hide or bury	2%	3%	6%	2%	0%	6%
Sneaky drop	26%	24%	21%	35%	45%	8%
Wedged	1%	1%	7%	4%	0%	0%



4. SURVEY RESULTS

As shown in **Table 5** (previous page), in 2022 venues (35%) and hospitals (45%) saw significantly more sneaky drops than other areas, and office blocks saw significantly less flagrant flings (18%).

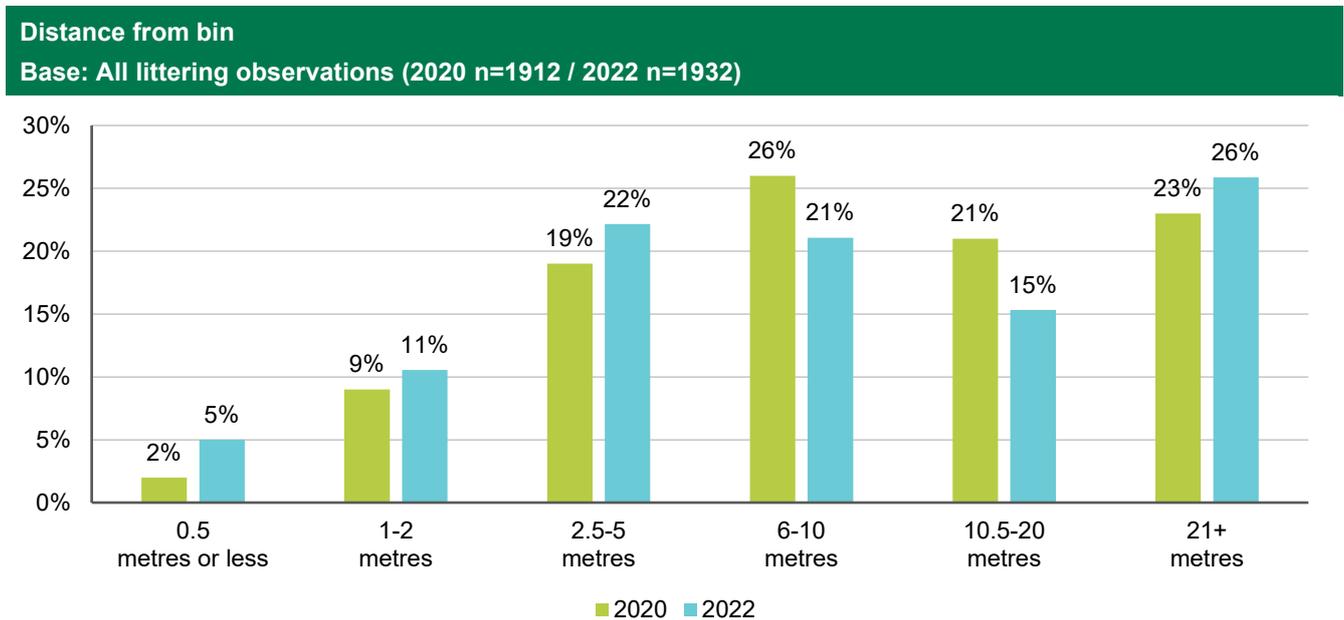
The sneaky drop at a venue in 2022 (35%) was almost twice as much as 2020 (18%), and the flagrant fling at shops in 2022 (28%) was also nearly double its 2020 result (15%). The largest decrease from 2020 was drop and stomp at offices (69% in 2020, to 45% in 2022).

*“I don’t think anyone knows that they can get a fine for litter. There’s no signs.”
(Macquarie Street, Parramatta)*

Key Finding 3:

More smokers are using the “flagrant fling” and “sneaky drop” disposal methods, at the expense of “drop and stomp”. This may suggest smokers are polarising between those who are more defiant, and those who are more ashamed/surreptitious about their littering behaviour.

Figure 6 Distance littered from nearest bin



As shown in **Figure 6** above, there was marginally more littering observed in 2022 close to bins (up to 5 metres) compared to 2020, and then less littering 6-20m from bins. Five metres from a bin seems to be key dividing line- all the rows in **Table 6** (below) up to 5 metres have significantly more binned, and all the rows from 6 metres onwards have significantly more littered.

“There’s a 10-metre rule, from a doorway. If you put in a butt bin 10 metres down, then that’s where they will go, rather than break the law and smoke five metres from the door.” (Coffs Harbour)



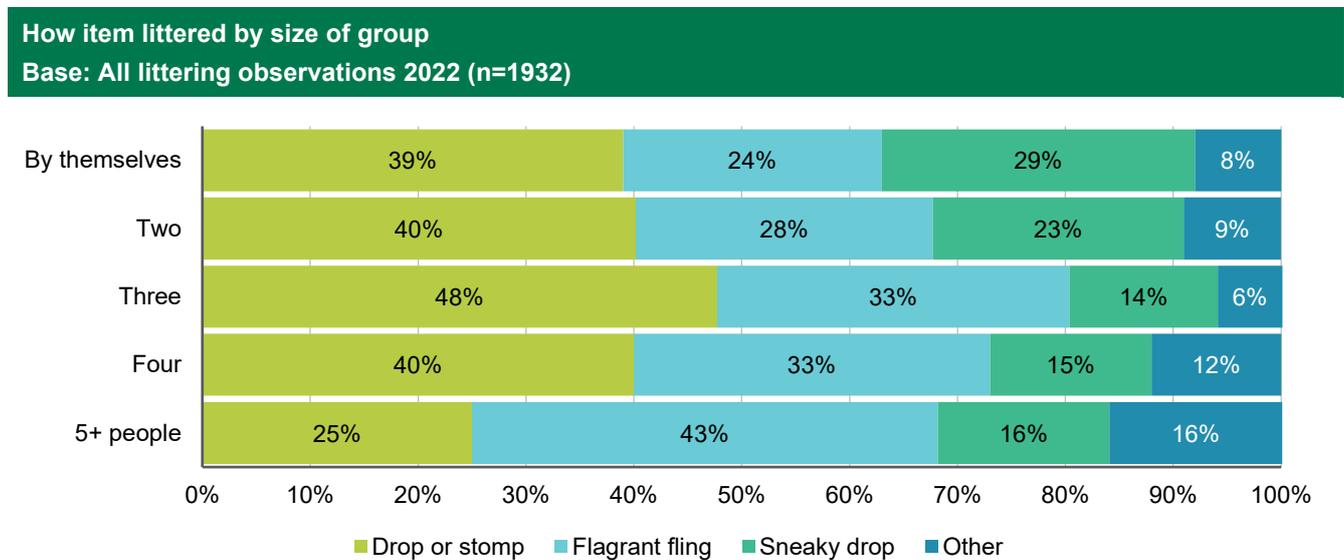
4. SURVEY RESULTS

Table 6 Disposal act, by distance from nearest bin 2022

Distance from bin	Littered	Binned
0.5 metres or less	30%	70%
1-2 metres	36%	64%
2.5-5 metres	59%	41%
6-10 metres	74%	26%
10.5-20 metres	81%	19%
21+ metres	88%	12%

As shown in **Figure 7** below, flagrant flings went from 24% of littering when the smoker was by themselves, up to 43% of littering when they were in a group of five or more.

Figure 7 How item was littered compared to size of group 2022





4. SURVEY RESULTS

Case Study 2: Christine

Christine, 57, lives and works in Lightning Ridge in north-western NSW. She has smoked most of her life but says she has now mostly given up (mainly due to cost).

When she smokes, it is at a shaded spot with table and chairs 50 metres or so from the Visitor Information Centre. (This is an EPA Stage 1 Grant site, with butt bin and signage.) Christine confirms this is a clean site with minimal butts or other litter.

Christine generally smokes alone. She says she is meticulous about binning her butts and picks up other butts she finds.



“It’s that last drag, and then it’s just dropped on the ground and put out, mid-sentence. There’s no thought to it...it’s just a flick and a stomp, done.”

When asked why she thinks people litter, Christine puts it down solely to “pure laziness”. “If there was an ashtray on the table, then fine, they may use it. But if it means taking two steps or more to go and bin it, (they will drop it instead). I really do believe it’s lazy.”

However, Christine also feels that for many smokers dropping their butts has become an unconscious habit, and a fixed part of the smoking process. “Being a smoker, and having stood in groups and smoking over decades, I have noticed the action, the body language of it. It’s that last drag, and then it’s just dropped on the ground and put out, mid-sentence...There’s no thought to it. You don’t see any head looking around, ‘Where do I put this?’ It’s just a flick and a stomp, done.”

While she doesn’t believe young or old people are more likely to litter, Christine feels that young people are probably more likely to “show off” when they do so. “I do agree with the defiance of young people especially...That’s when you’re testing your boundaries with authority and society, and everything else.”

Christine agrees with the social compact notion, agreeing that anything which makes a space more welcoming to smokers is more likely to be cared for by those smokers. She feels that signage is particularly important, making it clear that smokers are welcome but also highlighting the fines for littering. She feels shade or other cover is critical, along with seating and butt bins.

Christine is very familiar with the “Don’t be a Tosser” campaign and believes it has become part of the Aussie vernacular. “I’ve worked few different places over the last couple of decades, just different suburban areas around New South Wales, and I found it to be a common phrase that people use if they see it, ‘Ah, you tosser’. And adults that I’ve seen, if they see a stranger chuck something on the ground, (they’ll say) ‘Pick it up, you tosser’.”



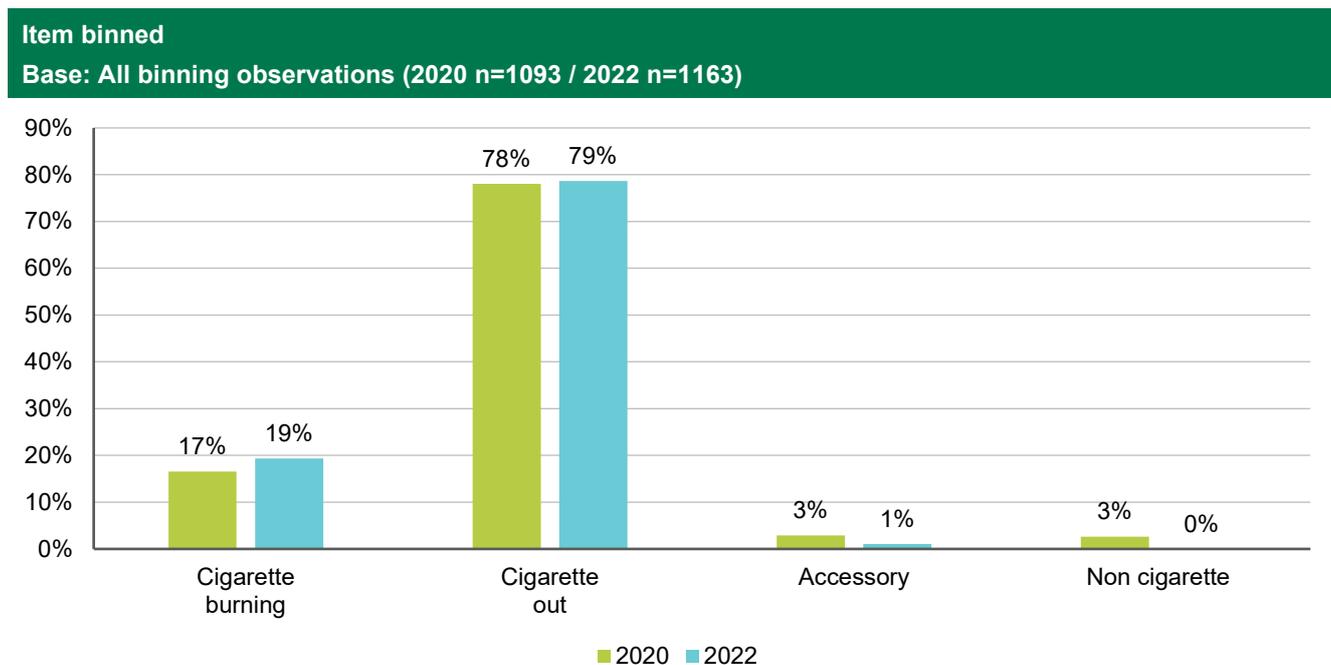
4. SURVEY RESULTS

Table 7 Breakdown of littering rates by time of day and location type 2020 vs. 2022

	Up to 10:59am		11am to 1:59pm		2pm to 4:59pm		5pm onwards	
	2020	2022	2020	2022	2020	2022	2020	2022
Transport	62%	67%	67%	83%	68%	80%	85%	93%
Shops	56%	65%	67%	65%	58%	68%	56%	-
Office buildings	59%	54%	56%	29%	48%	35%	-	-
Venues	75%	54%	73%	77%	63%	72%	35%	67%
Health facilities	-	100%	-	93%	-	100%	-	-
Recreational parks	-	79%	-	91%	-	-	-	-
Roadside stops	-	-	-	-	-	-	-	-

Table 7, above, shows littering rates by time of day observed and time of observation, for both 2020 and 2022. This suggests that within transport venues, littering rates increase as the day progresses (perhaps because these sites are cleaned at night?).

Figure 8 Item binned





4. SURVEY RESULTS

The pattern of binning behaviour between burning and extinguished cigarettes did not change from survey to survey (

Figure 8, above). However this masks some significant differences between regions, venue types, group size, nearest bin and streamlined vs. hotspots.

Significantly more observations in Newcastle in 2022 saw smokers binning burning cigarettes (59%) compared to other regions. In 2022, 46% of binning observed at hotspots were of cigarettes burning (significantly higher than streamlined 26%). Site type showed stark differences in 2022 – significantly more transport (46%), venues (49%) and hospitals (72%) had burning cigarettes binned, and significantly more shops and office blocks (both 63%) had extinguished cigarettes binned.

Significantly more people smoking alone (43%) binned burning cigarettes, compared to those in groups of two or more. Significantly more of those 21+ metres from a bin binned burning cigarettes (48%) compared to lesser distances to the nearest bin, and significantly more of those under a metre from a bin binned an extinguished cigarette (74%) compared to those a greater distance from the nearest bin.

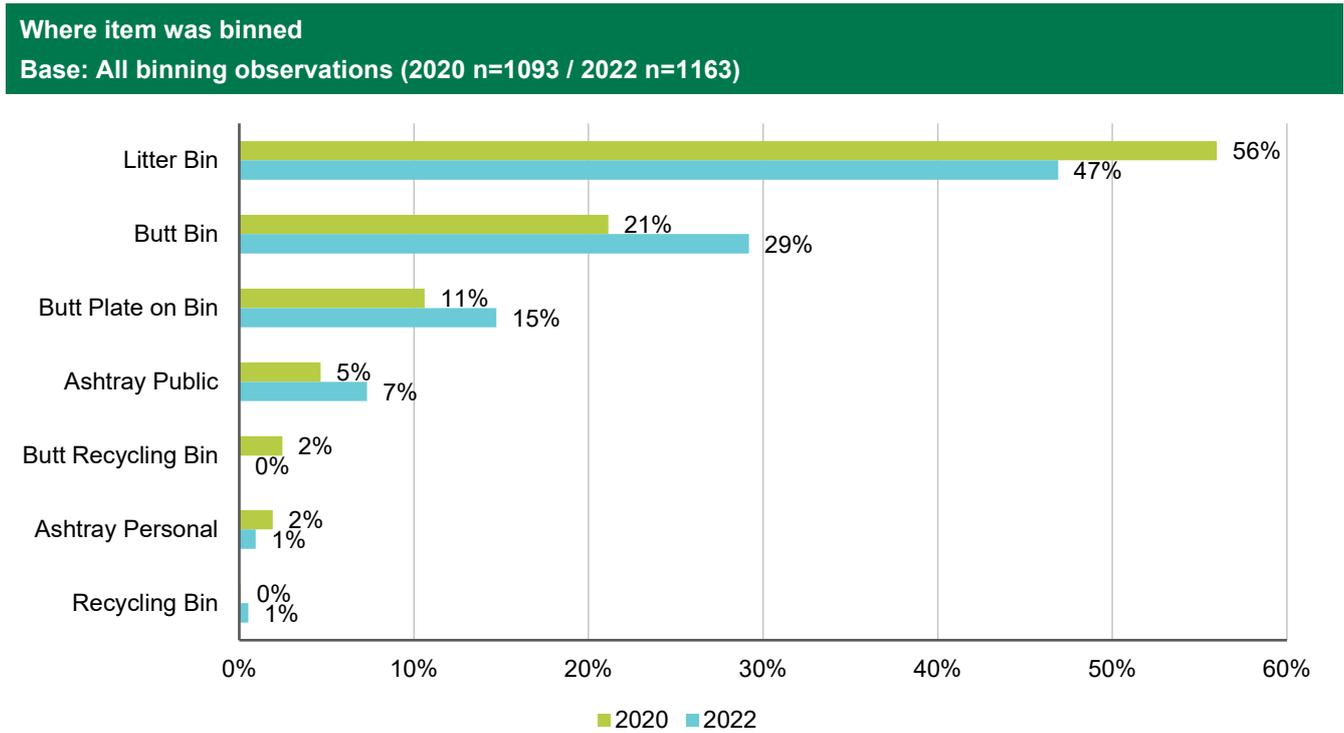
Of burning cigarettes binned in 2022, 46% were put into a butt bin. However, 35% were put into a litter bin.

“It’s not that we’re ignoring the signs, it’s the fact that by law we must be up to four metres away from any entrance. And they’ve got a sign that is 20 metres away from an entrance that is still a no smoking area, which is where us workers go to smoke. It puts people off.”
(Waratah Village shops, Newcastle)



4. SURVEY RESULTS

Figure 9 Where item was binned



As shown in **Figure 9** above, placing butts in litter bins was significantly lower in 2022 (47%) than in 2020 (56%), and placing them in butt bins was significantly higher (21% in 2020, 29% in 2022).

Fifty-four percent (54%) of binning at streamlined sites were into butt bins in 2022, and 73% of binning at hotspots were into litter bins.

Significantly more of those observed at regional sites used a litter bin (60%). The proportion of those at metro sites who used a butt bin (36%) was double that of regional sites (18%). (However this is not surprising, given that 44% of Sydney sites had butt bins against just 19% of those in regional areas.)

“There is only one butt bin for the entire area, and it is damaged.” (Taxi rank, Bridge Street, Tamworth)

Across all sites, 34% had specific butt bins (i.e. as opposed to general waste bins). Those sites with butt bins had significantly lower littering rates than those without (at 53% and 66% respectively).

Key Finding 4:

Butt bins are becoming more common in smoking sites, especially in Sydney and on the Central Coast. And the presence of butt bins appears to be having a significant and favourable impact on littering rates.



4. SURVEY RESULTS

Case Study 3: Jake

Jake, 28 is an electrician. He was initially interviewed at TAFE Annandale, while he was attending a three-day safety training course.

The TAFE site is an EPA Round 2 Grant site. It contains a butt bin and has some cover. Jake also thought he recalled signage designating this as a smoking area.

Jake mainly works around industrial and commercial premises. He feels that less than half of these sites have specific smoker-friendly spots, while maybe 20% have a site where one can smoke uncomfortably, and the remainder are smoke-free.



Jake says he never litters his butts. But he claims that others in his circle aren't nearly as careful, and that if one person litters it provides implicit permission for others to do so as well. "If there is a group of people and someone flicks out their cigarette and just throws it off to the side...most people would also do that. I think (others) just succumb to the Alpha pack mentality - if the leader does it, then the sheep will also do it."

He believes that littering is largely attitudinal, "because I've seen places where there are bins and people just throw them on the ground - even beside the bin...I think having bins in the area is definitely a help, but I think it's also more of an attitude problem." He agreed that it might also be mood-related, if others (like him) tend to smoke more when they are frustrated or stressed.

I've seen places where there are bins and people just throw them on the ground - even beside the bin...I think having bins in the area is definitely a help, but it's also more of an attitude problem.

Jake feels signage welcoming of smokers is critical to improving littering behaviour and seeks these signs out when at a new site. "Just seeing a smoking area sign is an easy way to place where you are going to have your smoke, and if there's bins in the area, you would want to hope that people follow a good mentality and throw it in the bin." And he also felt that clean sites were more likely to deter littering. "It does make it a lot better if it's a nice clean area. You tend to keep it that way, especially if...you're eating there as well as smoking."

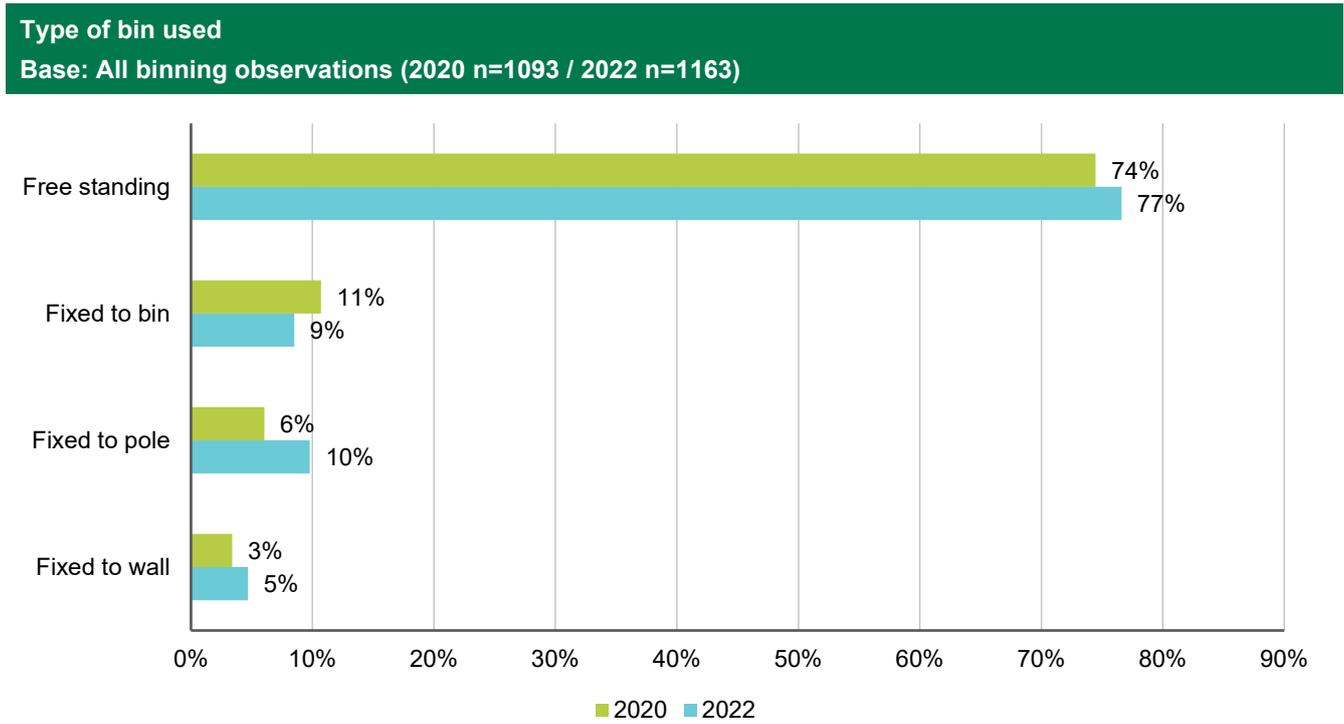
He agrees butt bins are a good visual device to signal a smoker-friendly area but believes that on their own they can easily be missed – and should hence be accompanied by signage where possible. "I've seen them around where there's just no signage and you can easily miss them." Jake also noted that he is more likely these days to smoke half a cigarette at a time – though more due to being in a rush than financial constraints.

When asked about the main inclusions in a smoker-friendly site, Jake focussed mainly on cover, butt bins and seating – especially for tradies like himself. "Because you don't always want to be on your feet while you're having a cigarette. Sometimes you want to find a brick wall or just something to sit on and take the weight off."



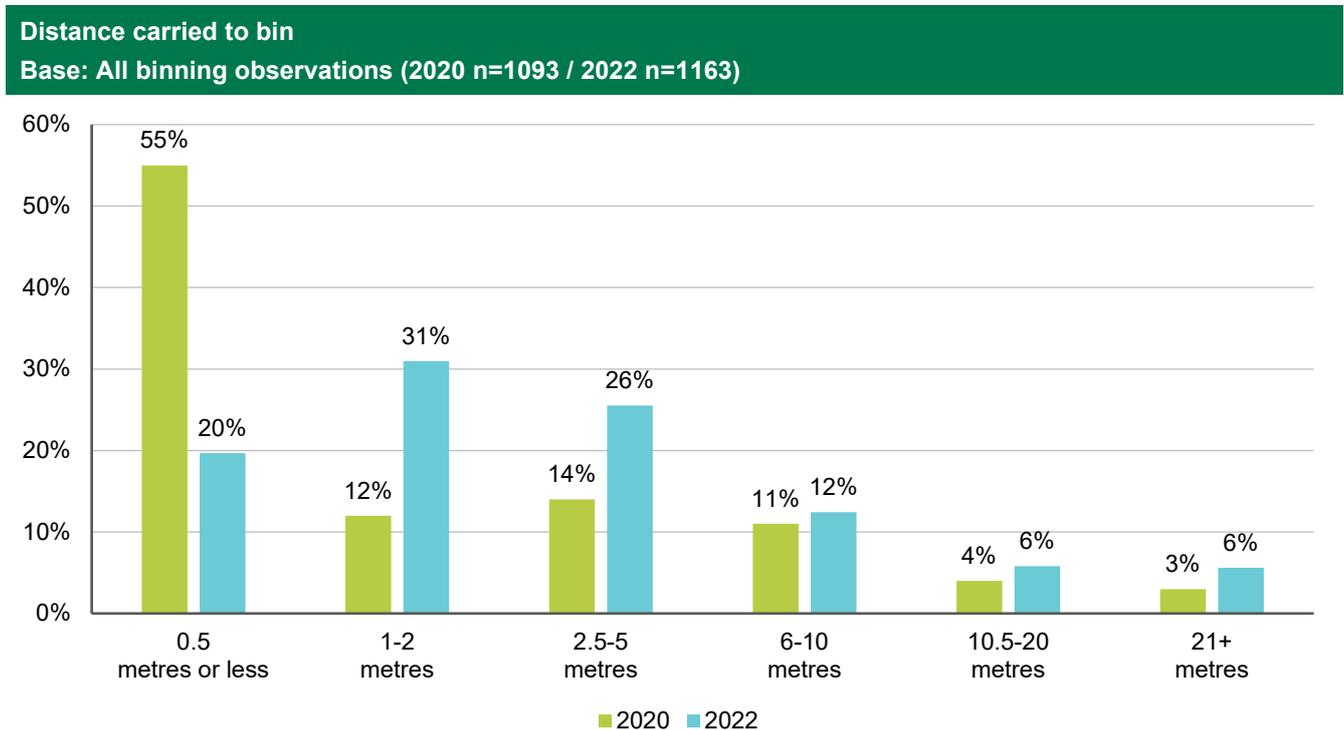
4. SURVEY RESULTS

Figure 10 Type of bin used



In the 2020 report, this comment was made: *“The majority of bins used were free-standing, with only 11% fixed to litter bins. One would expect this latter figure to increase in subsequent waves, as butt bins become more common”*. As shown in **Figure 10** above, this does not appear to have happened. There was a significant increase in use of bins fixed to a pole (6% in 2020, 10% in 2022).

Figure 11 Distance carried to bin





4. SURVEY RESULTS

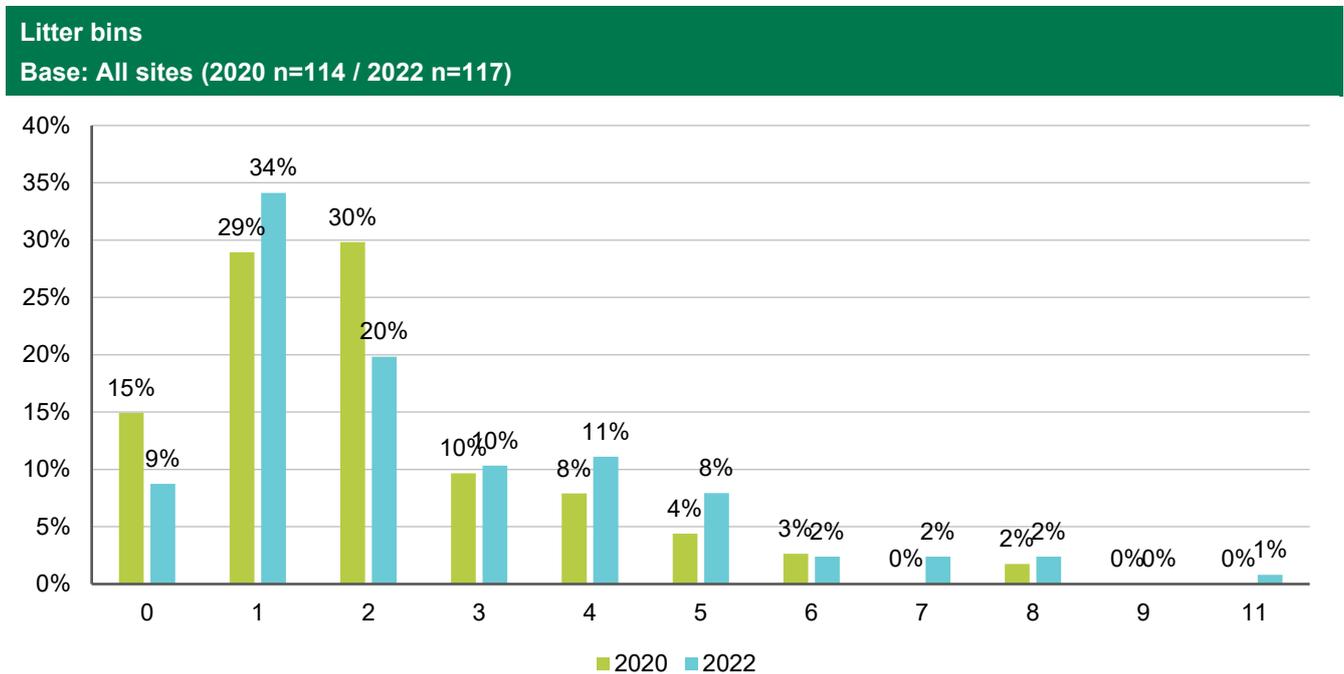
The highest response in 2022 was 1-2 metres from the bin, whereas the highest response in 2020 was 0.5 metres or less (see **Figure 11**, previous page). This suggests that at least some anti-littering messaging is getting through, in that smokers disposing of butts responsibly appear to be walking further to do so.

4.2. SMOKING AREA INSPECTION SCORES

The Area Inspection (AI): rates the features of the smoking area to provide insights into the context for encouraging smokers to use bins. This includes specific attributes, and features that relate to known influences of littering behaviour, including presence of bins, site cleanliness amongst other factors. A location is scored against 20 statements that provide a total AI score out of 100 for those positively scored attributes in the area.

Comparing observed disposal behaviour (section 4.1 above) against the AI scores gives insight into which contextual factors may influence binning behaviour.

Figure 12 Number of litter bins



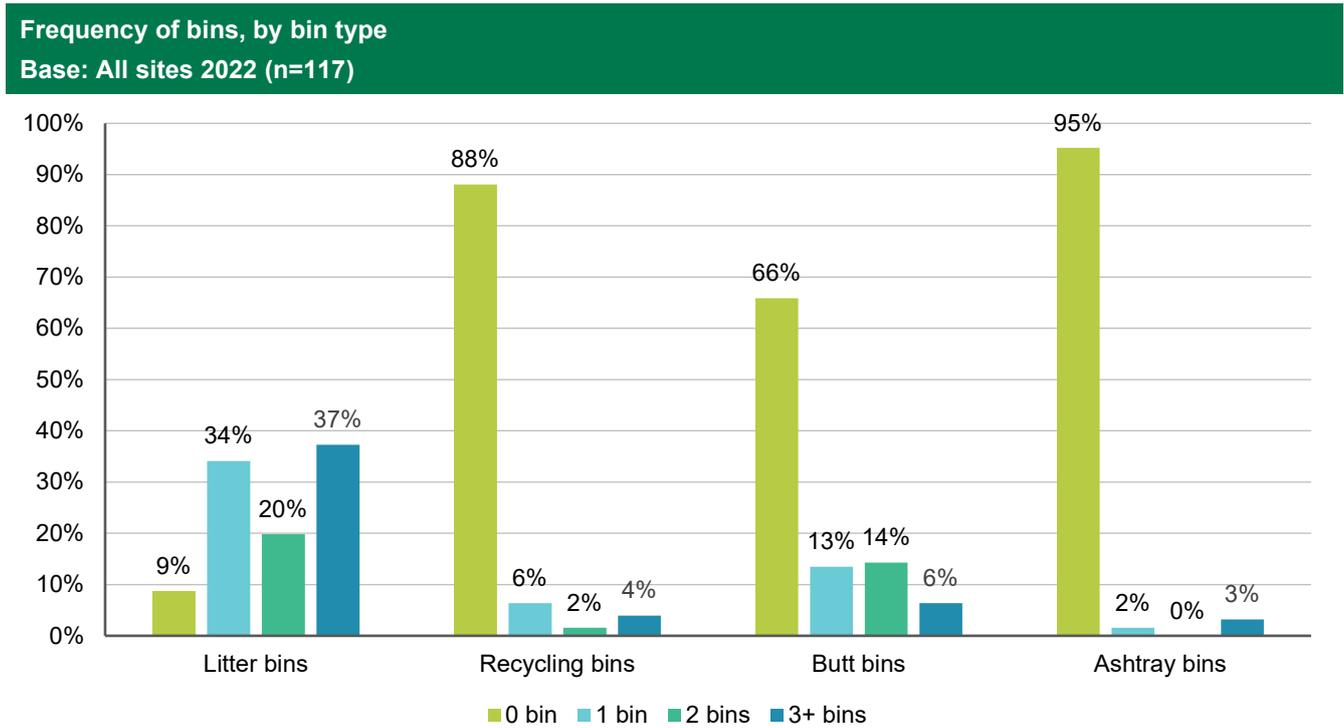
The number of sites without any bins fell significantly in 2022, from 15% to 9%. Along with the number of sites with one bin rising from 29% to 34%, there were also more sites with four or five bins evident.

“They’ve taken away most of the bins. There’s nowhere to put it, so, you know, it goes on the ground.” (Sydney Central Station)



4. SURVEY RESULTS

Figure 13 Frequency of bins, by bin type



Butt bins grew from being present in 21% of sites in 2020 to 34% of sites in 2022: a statistically significant increase. As previously noted, littering rates were significantly lower at sites with butt bins.

Of the 117 sites, 15% were described by researchers as “very busy” (in terms of people), with 55% moderately busy and 30% classed as quiet.

Ninety one percent (91%) of sites contained litter (“some” 80% and “lots” 11%). Hotspots were more likely to contain litter (at 94%, against 86% of streamlined spots).

The Smoking Area Inspection included a 20-question “True/False” scoring system for cleanliness (0-2 inclusive), butt bins and infrastructure (0-6), information (0-4), surveillance (0-4) and involvement (0-4). In each case, the higher the score (i.e., the more statements marked as “True”), the more favourable.

“We see the council clean it every morning. Every morning. They’re pretty good around here” (Eastgate shopping centre, Bondi Junction)

Figures 13-17 on next pages show how binning/littering rates vary under each measure, while Figure 18 shows how littering rates relate to the total score.

“Sometimes the bins catch on fire, the plate. A couple of times we had to throw water in there. Once the fire brigade came and didn’t have the key so had to break it open.” (Mayfield TAB, Newcastle)



4. SURVEY RESULTS

Case Study 4: Belinda

Belinda, 37, works at a shop on Memorial Avenue in St. Ives. As there are no visually attractive designated areas in close proximity, she smokes near the trees on the adjoining sports oval. "I will sit down in the shade, have my cigarette, put my cigarette out, and then then walk my butt to wherever the closest bin is."

She claims to bin all her butts, and says she gets very frustrated by those who don't. "If you are a smoker, the least you can do is put your butt in the bin. It's not like it decomposes quickly, they go white, they sit around for ages. It just looks horrible. And I think that then gives non-smokers even more fuel to shame us with. 'Well, you can't even keep the area clean'."



Belinda says her nearest designated smoking area is quite a walk away, has only one seat, "and a tiny little butt bin that's generally full". She generally smokes alone, saying that most of her group of smokers had now converted to vaping.

"You want something that is pleasing to look at, with some potted plants or something to make you feel like there's some sort of atmosphere...It's not like you're being sent to the naughty corner."

She blames littering largely on a lack of infrastructure. "It's the fact that there's no actual pleasant spot to be that has an area to be able to put your butts, so (smokers) generally just sort of throw it on the floor, stomp it, and head straight back in to work)." She also agreed that peer pressure was an important factor in the decision to litter or not: "It's just like 'Yeah, okay. Somebody else has done it, I'll follow that same chain'... I think they'd be a lot more aware as to their butt being the only one there."

Belinda feels she has become more environmentally-conscious in recent years, and that this has reduced her littering tendencies. In particular she notes the local signs near drains signalling which water catchment they feed into as an excellent way to make people think about where their litter end up.

She is wary of the value of signage, claiming that everyone ignores the no-smoking signs on Hornsby Mall. And she is annoyed there are no designated smoking areas in such a busy area. She claims this forces smokers into pubs and clubs where they know they will be accommodated.

While she was aware of the "Don't be a Tosser" campaign, Belinda preferred the "If it's not in the bin, it's on you" advertising. "That one where they walk around with the rubbish stuck to them. I think that's a good way of visualising the impact that you're making in the world."

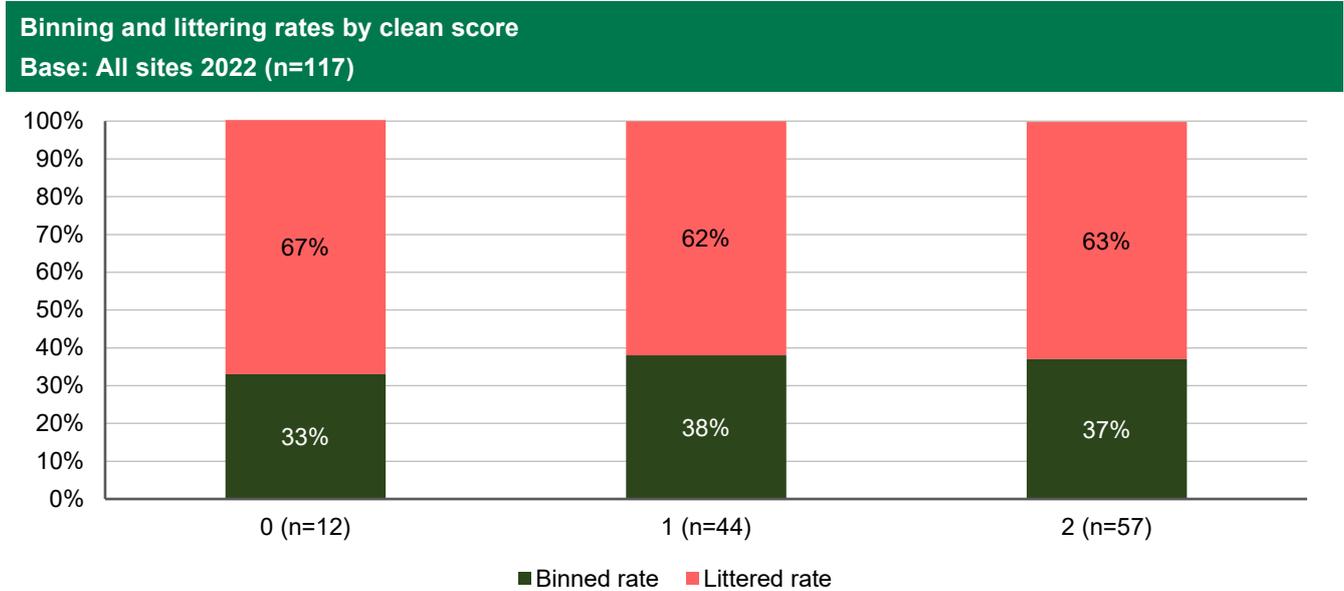
Her critical factor for a smoker-friendly spot is visual amenity. "You want something that is pleasing to look at, with some potted plants or something to make you feel like there's some sort of atmosphere...It's not like you're being sent to the naughty corner, where there's nothing there and it's stale, and nothing's going on."



4. SURVEY RESULTS

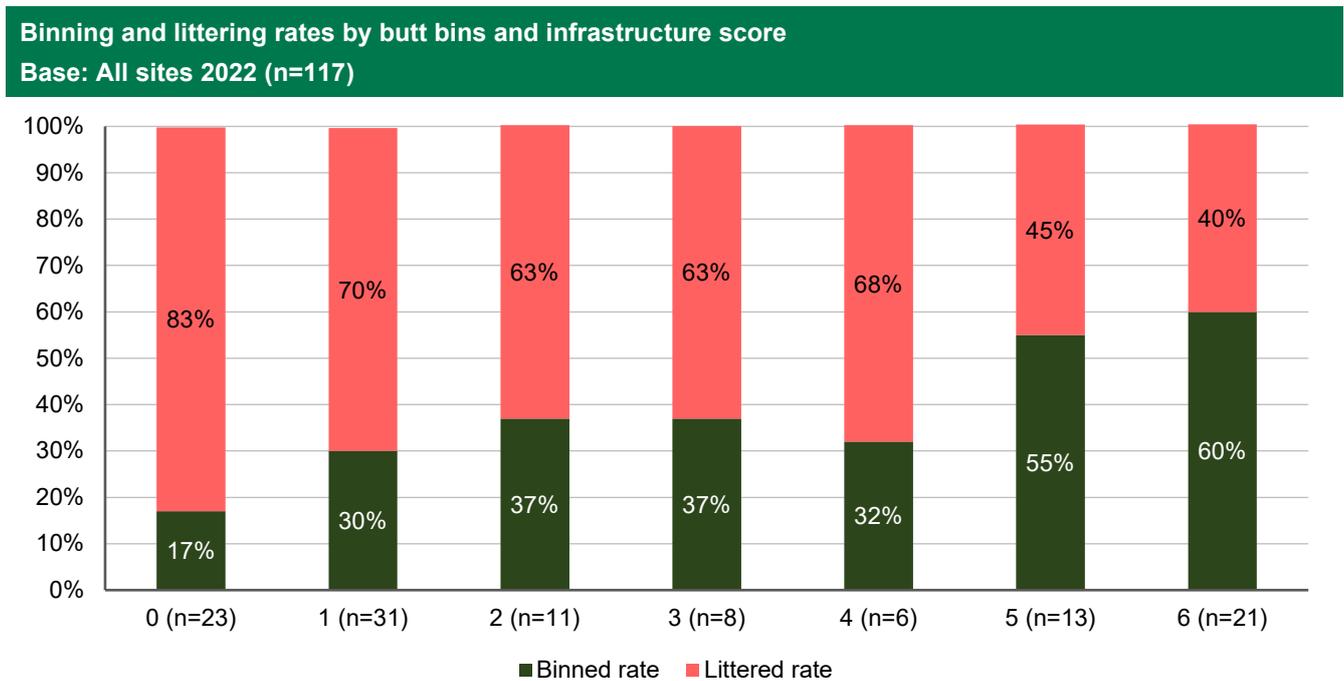
As shown in **Figure 14**, below, the clean score appears to have relatively little impact on littering rates. (This finding replicates what was encountered in 2020.)

Figure 14 Binning/littering by ‘clean’ score



However, there is a large (and statistically significant) difference in binning rates based on butt bin and infrastructure scores (see **Figure 15** below). This suggests again that butt bins and related infrastructure are key influences in smoker behaviour.

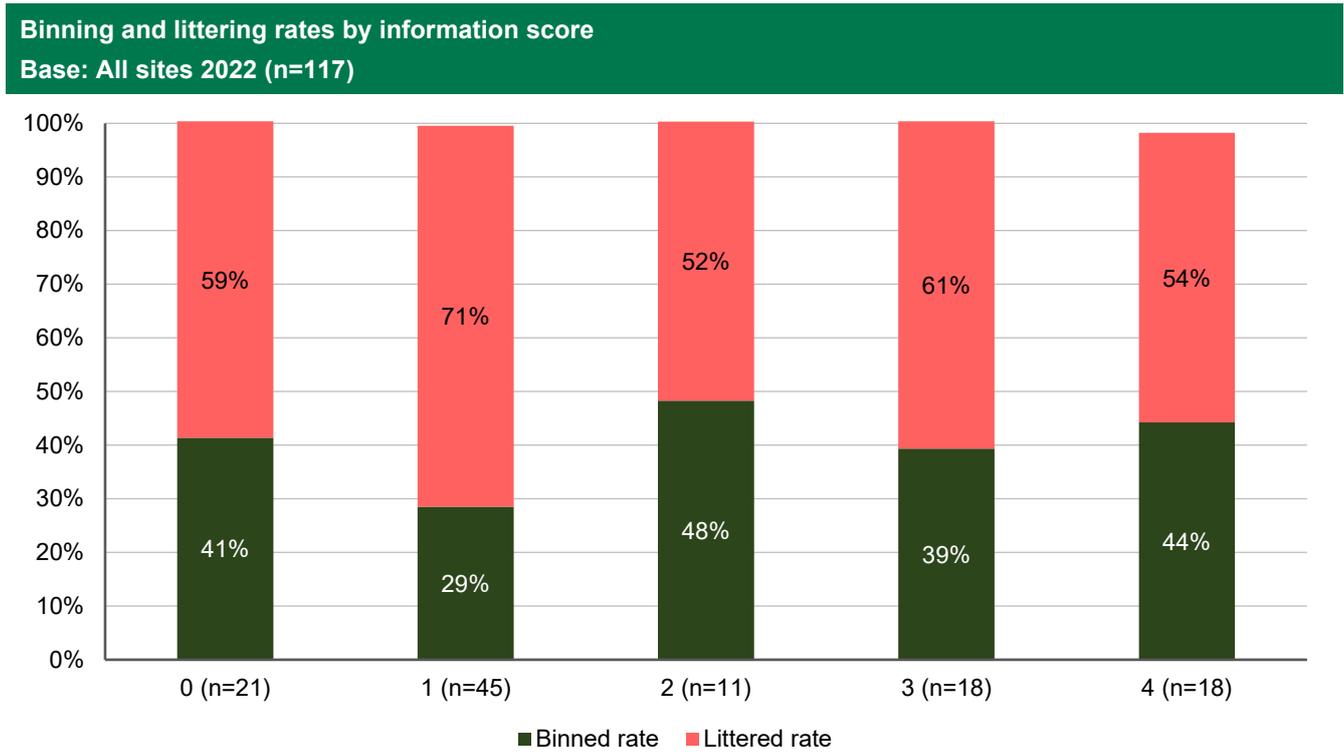
Figure 15 Binning/littering by ‘butt bins and infrastructure’ score





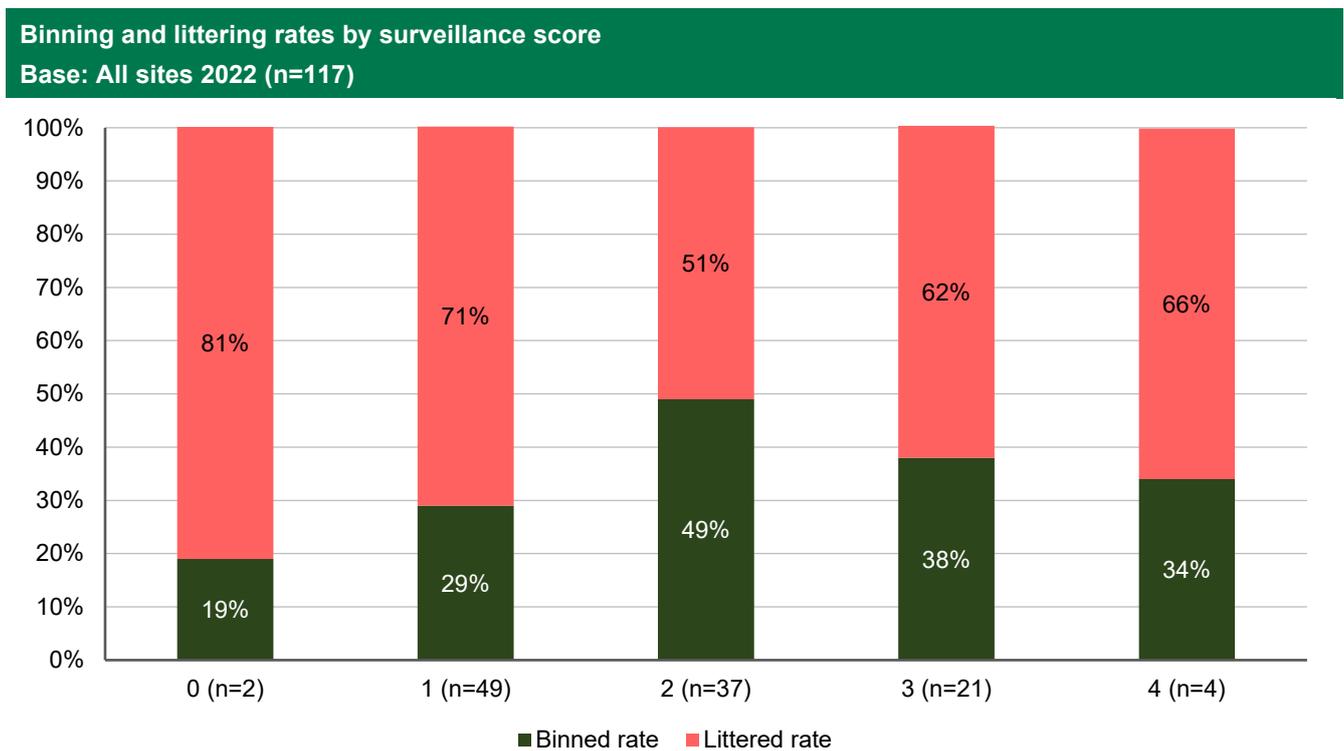
4. SURVEY RESULTS

Figure 16 Binning/littering by 'information' score



Similar to 2020, there was no increase in binned rate as information (**Figure 16** above) or surveillance (**Figure 17** below) scores increased.

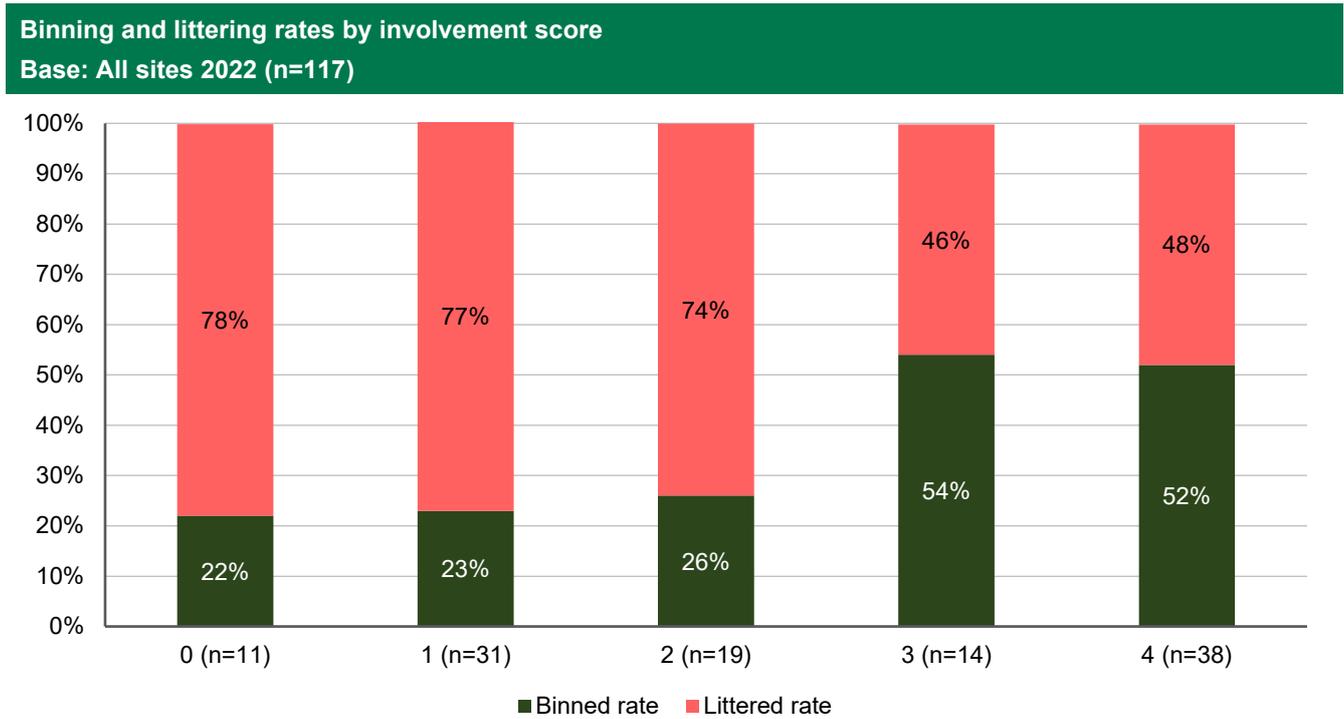
Figure 17 Binning/littering by 'surveillance' score





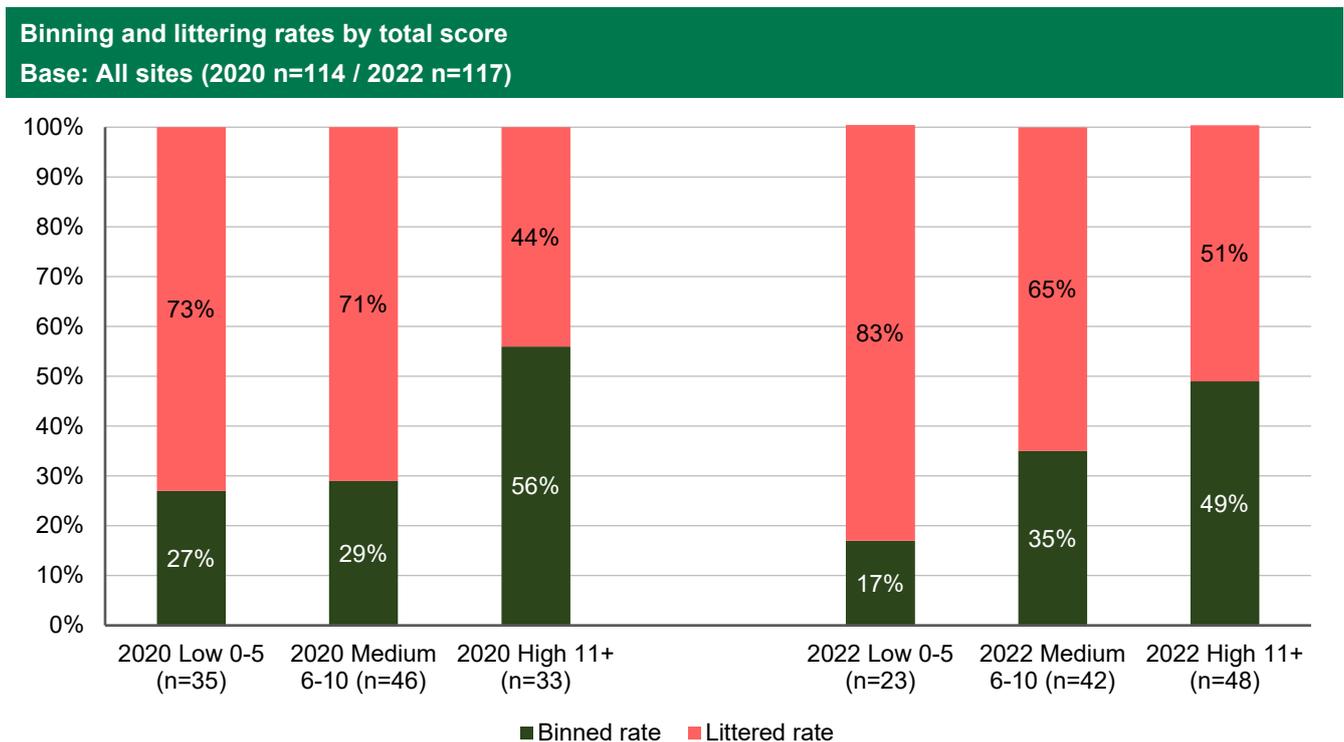
4. SURVEY RESULTS

Figure 18 Binning/littering by 'involvement' score



As shown in **Figure 18** above, a tipping point occurs where three conditions were met (binning rate of 54%, nearly double the rate of two conditions), which was a repeat of 2020 (26% binning rate at score of two, then 50+% binning rate at score of three).

Figure 19 Binning/littering rate by total score





4. SURVEY RESULTS

As shown in **Figure 19** (previous page), the binning rate in 2022 (17%) was 10% lower where 0-5 statements were deemed true than in 2020 (27%), and the binning rate in 2022 (49%) was seven percentage points lower where 11+ statements were deemed true than in 2020 (56%).

So, while the binning rates were lower in an absolute sense in 2022 compared to 2020, the more pronounced increases in 2022 from low total score to medium total score (+18 percentage points) compared to 2020 (+2 percentage points) may mean smaller improvements in conditions saw higher binning rates in 2022 compared to 2020.

Table 8 Area Inspection scores by region, site type and streamlined/hotspot

Factor	Characteristics	AI score 2022	AI score 2020	Change in AI score (%)	Binning rate 2022	Binning rate 2020
Region	Sydney & East	52.8	45.3	+17%	47%	46%
	Western Sydney	49.6	50.3	-1%	29%	44%
	Other Sydney	48.9	37.3	+31%	20%	46%
	Central Coast	66.1	58.1	+14%	38%	29%
	Newcastle	32.7	27.9	+17%	46%	21%
	Wollongong	41.8	37.1	+13%	27%	15%
	Coastal	49.4	43.1	+15%	44%	41%
	Inland	40.4	39.2	+3%	36%	39%
	TAFE	58.8	N/A	N/A	82%	N/A
Area	Streamlined	69.0	60.7	+14%	58%	57%
	Hotspot	39.5	33.9	+17%	29%	26%
Site Type	Transport	46.5	36.0	+29%	25%	34%
	Shops	45.6	45.9	-1%	36%	37%
	Office Block	61.0	51.5	+18%	61%	43%
	Venue	49.4	32.4	+52%	29%	29%
Total AI score		48.7	42.6	+14%	38%	36%

When looking at the characteristics in **Table 8** above, results are overall favourable with most regions, areas and site types showing healthy increases in average AI scores. However, the resulting impact on binning rates is less clear, with a high divergence in results.

“People here know they can be fined if they litter, I have received two myself. That is why I use a butt bin. The fines should be more standard, I've seen people throwing cigarette butts in front of police officers and they don't even care.” (Granville)

For example a 17% increase in hotspot AI's correlated with a 12% increase in binning rates. However for streamlined spots, a 14% increase in AI scores led to just a 2% increase in binning rates.



4. SURVEY RESULTS

Likewise, it seems favourable that a higher AI score fed through to higher binning rates in **Newcastle** (a 4.8 improvement in AI score between 2020 and 2022 alongside a 25-percentage point increase in binning rate) and **Office blocks** (a 9.5 improvement in AI score alongside an 18-percentage point increase in binning rate) were favourable.

However, in some other areas, there was little flow-through from higher AI scores: e.g. **Sydney & East** (a 7.5 improvement in AI score alongside a one percentage point increase in binning rate), **Coastal** (a 6.3 improvement in AI score alongside a three percentage point increase in binning rate) and **Venue** (a 17 improvement in AI score alongside no change in binning rate) might be considered effort that did not yield much.

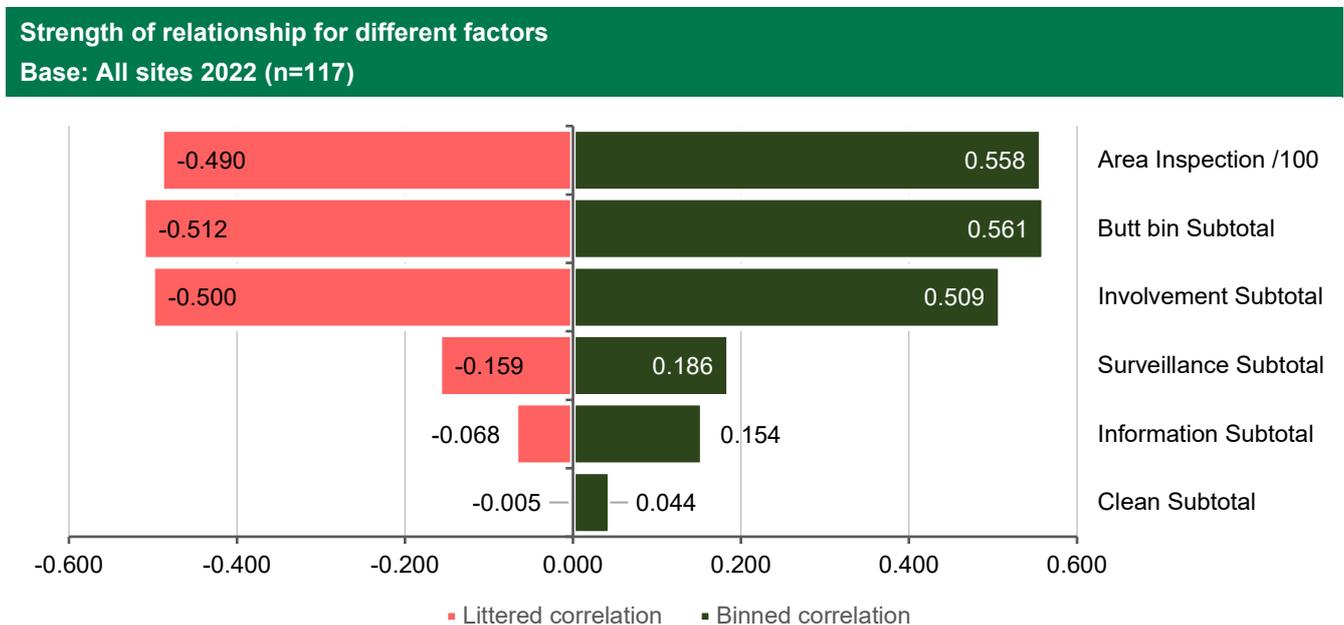
“There are generally old butts that are around. If you're a smoker you tend to look for the old butts, because you know you can smoke in that area. Because there's not a lot of areas where you can smoke.” (Kibble Park, Gosford)

Key Finding 5:

As in 2020, Area Inspection scores suggest that:

- Smokers are more likely to bin their cigarettes in areas with convenient litter or butt bins, and where they feel a greater sense of involvement and/or ownership
- Signage, surveillance, and fear of fines appear to play lesser roles in lowering littering rates
- Perceived cleanliness does not rate highly as a differentiating factor in creating lower littering rates

Figure 20 Strength of relationship between different factors and binning/littering rate





4. SURVEY RESULTS

As per 2020 findings, **Figure 20** (above) indicates that there was a relatively high correlation between the AI scores for (a) butt bins and (b) involvement, and subsequent binning rates. This reinforces the 2020 finding that these factors are critical for encouraging increased binning rates.

More generally, and as one would expect, there is a reasonably high degree of correlation between total AI scores and binning rates.

Table 9 Statement correlations to AI 2022

Statement	Correlation to AI
Butt bins can be easily seen in the area	0.710
There are enough butt bins in the area	0.661
Butts cannot escape from butt bins	0.651
Butt bins are easy to use	0.642
Signs tell smokers what to do with butts	0.634
Butt bins are clean	0.627
This area looks cared for	0.586
The area is a good example of smokers doing the right thing	0.583
I am satisfied with how clean this area is today	0.555
Butt litter seems to be under control	0.541
Signs are easy to understand	0.528
Smokers seem to look after this area	0.515
Litter is from smokers ignoring signs	0.499
Smokers are aware of potential fines for littering	0.424
Most butt litter seems to be new	0.401
Smokers littering butts will be easily seen	0.216
Rangers seen patrolling in this area	0.197
Finding graffiti or damage to things in the area requires considerable effort	0.127
Cleaning up the butt litter would be easy to do	0.105
Butt litter and the problems it causes are easily seen	-0.027

As shown in **Table 9** above, the top four correlations were positive statements about butt bins. The top correlation in 2020 was “Smokers seem to look after this area” (0.68), though this statement found itself in the middle of the rankings in 2022.

Collectively, this indicates that butt bins are having a powerful impact on smokers’ perceptions of sites, and hence their willingness to bin their butts.

“If there was a butt bin here, we would use it” (Rhodes shops)



4. SURVEY RESULTS

Table 10 Correlation between binning/littering rates and individual statements 2022

Correlation	Litter rate	Bin rate
There are enough butt bins in the area	-0.549	0.549
Smokers seem to look after this area	-0.548	0.548
The area is a good example of smokers doing the right thing	-0.528	0.528
Butt bins can be easily seen in the area	-0.471	0.472
Butt bins are easy to use	-0.450	0.450
I am satisfied with how clean this area is today	-0.422	0.423
Butts cannot escape from butt bins	-0.409	0.409
Butt bins are clean (free of dirt, graffiti, damage)	-0.384	0.385
This area looks cared for (e.g., seats, garden, paths)	-0.362	0.360
Butt litter seems to be under control	-0.327	0.325
Signs tell smokers what to do with butts	-0.296	0.297
Litter is from smokers ignoring signs	-0.154	0.155
Signs are easy to understand	-0.125	0.126
Cleaning up the butt litter would be easy to do	-0.058	0.059
Smokers littering butts will be easily seen	-0.045	0.046
Finding graffiti or damage to things in the area requires considerable effort	-0.029	0.029
Smokers are aware of potential fines for littering	-0.009	0.011
Most butt litter seems to be new (recently discarded)	-0.006	0.005
Rangers seen patrolling in this area	0.067	-0.067
Butt litter and the problems it causes are easily seen	0.214	-0.214

The comment made in 2020 “Those statements relating to positive perception of cleanliness and presence of butt bins appear to have the highest correlation with high binning rates....statements related to detection, potential shaming and enforcement have the lowest correlation – suggesting that this is not a major motivating factor for increased cigarette binning.” seems to also apply to the findings in **Table 10** (above) for the 2022 study.

**“Maybe put up a sign that designates a smoking area, like in Japan.”
(Waverley)**

Key Finding 6:

The presence of butt bins appear to be having a major impact on perceptions that a site is “smoker-friendly”. This, combined with the ensuing sense of “ownership”, seems to have the greatest positive impact on a smoker’s tendency to bin their butts.



4. SURVEY RESULTS

4.3. BUTT LITTER COUNTS

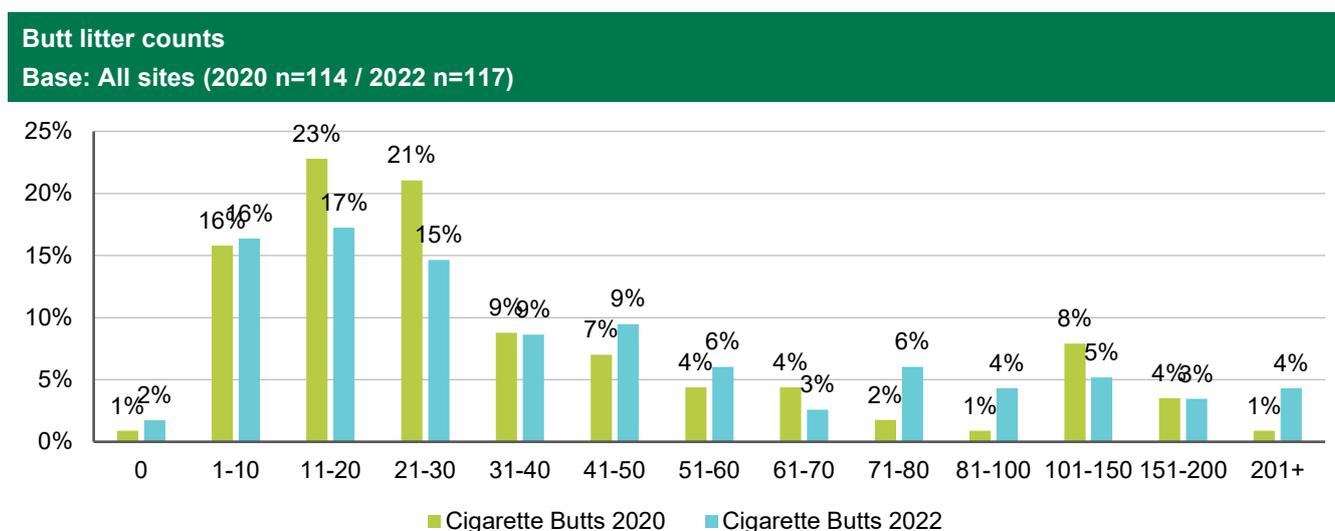
Researchers counted the number of cigarette butts within a 48 m² zone of each smoking area¹⁹. The results, with outliers removed, are shown in **Table 11**, below:

Table 11 Butt litter count

	2020 count	2022 count
Mean number of butts	42.11	54.48
5% Trimmed Mean	35.66	42.84
Median	25.00	29.50
Mode (most popular frequency)	25.00	14.00
Std. Deviation	50.08	74.46
Minimum	0	0
Maximum	326	500
Range	326	500

The trimmed mean number of cigarette butts increased by seven between 2020 and 2022, and the median (a more reliable measure in this instance²⁰) increased by 4.5. Although there were fewer butts per streamlined spot than at hotspots (with average counts of 49.4 against 56.8 respectively), the difference is not statistically significant.

Figure 21 Butt litter counts



¹⁹ The Butt Litter Check Guidelines stipulate that “The 48-square metre butt litter count space should not be the most or least littered part of the smoking area. Ideally the amount of butt litter in the count space should be about the same as the rest of the area. If the area has seats, tables, litter bins and butt bins then try to include them in the count space.” It needs to be noted that figures will be largely dependent on-site cleaning schedules.

²⁰ Due to one site with +/- 500 butts heavily impacting the average.



4. SURVEY RESULTS

As shown in **Figure 21** (previous page), there was a decrease in the proportion of sites with 11-30 butts and increases in most cohorts in the long tail of 41+ butts.

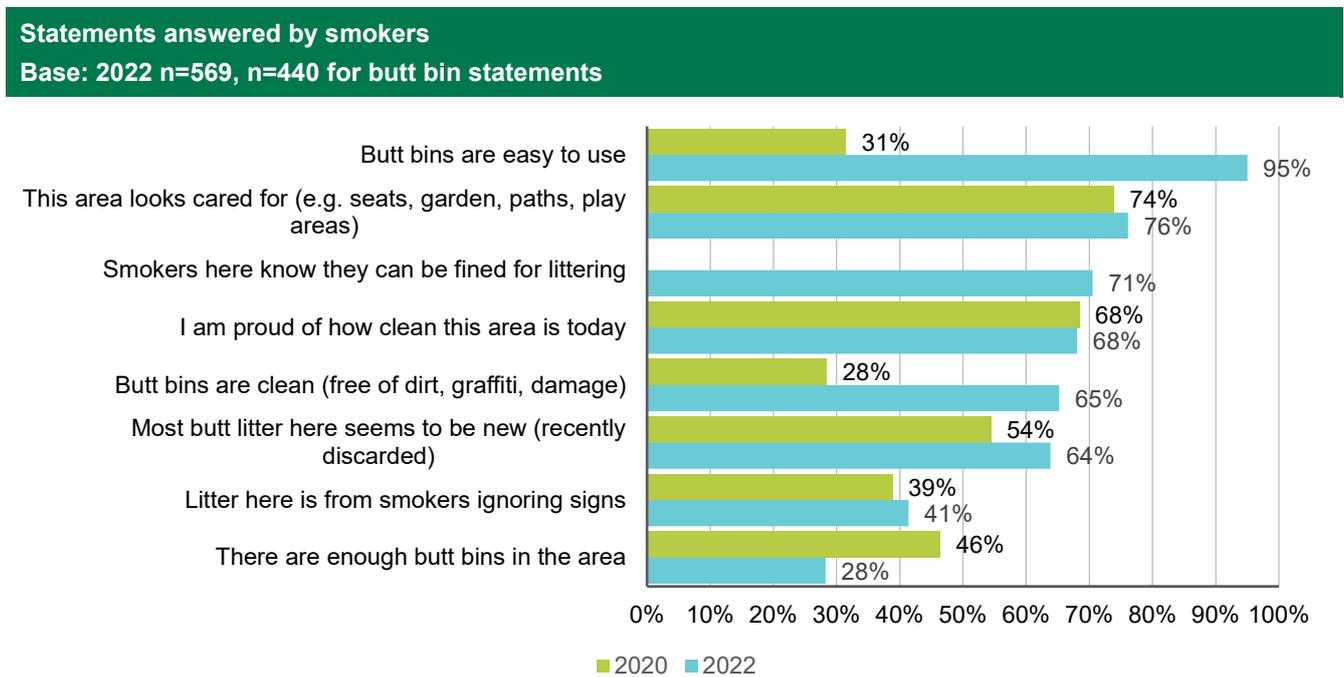
Importantly, it needs to be acknowledged that a variety of factors can affect butt litter counts – principally time since site was last cleaned, and recent rainfall. As our researchers did not have this information, butt counts should be treated with caution.

4.4. SMOKER PERCEPTIONS

As in 2020, researchers interviewed smokers at each site with a range of “True/False” questions about the site. These questions broadly correlate with the items listed in the Area Inspection.

Results for the 569 smoker interviews (the same number as in 2020) are shown below.

Figure 22 Smoker statements (% saying this was true)



As shown in **Figure 22** above, there has been a tremendous increase in enthusiasm for butt bins over the past two years- those saying they are easy to use more than tripled, while those saying they are clean has doubled. Significantly fewer smokers in 2022 (28%) said there were enough butt bins compared to 2020 (46%) – suggesting they are keen for more of them.

Key finding 7:

Smokers are noticing the increased presence of butt bins and are enthusiastic about their role in signifying an area is “smoker-friendly”.



4. SURVEY RESULTS

Case Study 5: Ben

Ben, 58 is a lifelong smoker and former Council employee, who now spends most days at a beachside plaza between the café and TAB. Or as he puts it, "The coffee shop's where I go and mingle. And the TAB is where I go and jingle."

This appears to be a hotspot, in that there is no nearby bin nor signage. Despite the lack of smoking infrastructure Ben likes this spot as it's in the shade, and good for people-watching. Ben says many people smoke outside the TAB and freely admits that, like them, he drops his butts. "The butts just get left there. And if they don't get left there, they just get thrown on the car park."

He is unsure where the nearest smoker-friendly site is, and believes that his Council should be promoting and signposting these sites. "It would be good if they gave a heads-up where (the smoking sites) are, if they have any."

Ben said that while he has always littered butts when there are no convenient bins, he now does it more discreetly. Because while he says he has never seen a ranger fine a smoker, he feels there is more societal disapproval of smokers now.



***I think the more
buttbin-friendly
Councils are, and
the more signage
there is to show
people where to
put cigarettes
....this will
probably make
people
responsible.***

He agrees that he would be less likely to litter at clean sites but puts this squarely down to the presence of bins. "It's not going to be clean if there's no bins...I think the more (butt)bin-friendly (councils) are, and the more signage there is to show people where to put (cigarettes)...this will probably make people responsible. I just don't think people want to be responsible unless they're told to be."

Ben would like to see litter bins with a butt bin as a standard attachment, which can easily be emptied at the same time as the bin, "like they used to do in the city."

He also feels that butt bins attached to street poles are a good idea. He argues they would make some larger bins unnecessary, as they would provide a useful place for smokers to congregate and then bin their butts.

Ben is familiar with the "Don't be a Tosser" campaign and says it has definitely made him less likely to litter packaging and other "larger" waste. But interestingly he doesn't apply this same care to cigarettes – which he puts down to being easier to "get away with it".



4. SURVEY RESULTS

Table 12 Smoker statements 2022, by streamlined or hotspot

Column %	Total	Streamlined	Hotspot
Most butt litter here seems to be new	64%	63%	64%
There are enough butt bins in the area	28%	47%	17%
Butt bins are easy to use	95%	96%	94%
Butt bins are clean	65%	84%	50%
This area looks cared for	76%	88%	69%
Litter here is from smokers ignoring signs	41%	52%	35%
Smokers here know they can be fined for littering	71%	68%	72%
I am proud of how clean this area is today	68%	81%	60%

As shown in **Table 12**, above, the proportion of smokers interviewed at streamlined sites in 2022 who claimed ‘butt bins are clean’ was 34 points ahead of the proportion at hotspots who said this was true. Streamlined was also ahead of hotspots for ‘I am proud of how clean this area is today’ (+21), ‘This area looks cared for’ (+21) and ‘Litter here is from smokers ignoring signs’ (+17).

The proportion answering true to ‘Most butt litter here seems to be new’ was relatively stable at streamlined sites from 2020 (61%) to 2022 (63%), however at hotspots it increased from 53% in 2020 to 64% in 2022.

The proportion answering true to ‘There are enough butt bins in the area’ was relatively stable at streamlined sites from 2020 (51%) to 2022 (47%), however at hotspots it decreased from 36% in 2020 to 17% in 2022.

4.5. CORRELATION BETWEEN AREA INSPECTION AND SMOKER INTERVIEWS

Eight of the statements in the smoker interviews (Step 4 of the BLC) mirror researcher notes in the Area Inspection Score (Step 1). We hence thought it would be of interest to understand what differences (if any) emerged between interviewer perceptions of sites, and those of smokers.

In order to understand this, we conducted two types of analysis:

- A correlation between the mean agreement score (on a scale of 1=true and 2=false) of researchers and smokers for the eight common statements across each of the 117 sites
- The mean difference (again using the 1-2 scale) for the interviewer and average of smoker scores across the 117 sites as a whole.



4. SURVEY RESULTS

Results for both tests are shown in **Table 13**, below.

Table 13 Correlation between researchers and smokers

STATEMENT	CORRELATION	DIFF IN MEAN AGREEMENT	MORE LIKELY TO AGREE
Most butt litter here seems to be new (recently discarded)	0.078	24%	Smokers
There are enough butt bins in the area	-0.015	-19%	Researcher
Butt bins are easy to use	-0.010	46%	Smokers
Butt bins are clean (free of dirt, graffiti, damage)	0.145	23%	Smokers
This area looks cared for (e.g. seats, garden, paths, play areas)	-0.053	27%	Smokers
Litter here is from smokers ignoring signs	-0.065	-1%	Neither
Smokers here know they can be fined for littering	0.035	28%	Smokers
I am proud of how clean this area is today	-0.028	25%	Smokers

(Correlation is based on a -1 to +1 scale, where -1 = a perfect negative correlation, 0 = no correlation, and +1 = a perfect positive correlation.)

This indicates that:

- There is essentially no correlation between the views of smokers and researchers
- In six of the eight cases, smokers were more likely to agree with the statements than researchers (with researchers more likely than smokers to agree that “There are enough butt bins in the area” and no difference between “litter here is from smokers ignoring signs”)
- In six of the eight cases, the difference in views (across all sites) exceeds 20%.

This would seem to indicate that smokers typically viewed the selected sites more positively than the researchers. This might be because:

1. They visit the sites more often and are more “immune” to its deficiencies, and/or
2. Their expectations are lower.

Key finding 8:

Researchers were generally more critical of the cleanliness and condition of smoking areas than smokers. This suggests that smokers have lower expectations, perhaps due to frequency of visitation.



5. APPENDIX 1 – SURVEY FORMS



5. APPENDIX 1 – SURVEY FORMS

Step 1: Smoking area inspection

Butt Litter Check



Organisation name _____

Contact name _____ Phone _____

Date	Time	Area name and description			
Streamlined	Hotspot				
Stage of butt litter prevention activities		Before	During	After	Long after

Site type (around area) ¹	Sketch (aerial view)																																																																															
<table border="1"> <tr> <th colspan="4">Number of bins</th> </tr> <tr> <td>Litter</td> <td>Recycling</td> <td></td> <td></td> </tr> <tr> <td>Butt</td> <td>Ashtray</td> <td></td> <td></td> </tr> <tr> <td colspan="4">Number of full bins?</td> </tr> <tr> <th colspan="4">How busy is the area?</th> </tr> <tr> <td>Quiet</td> <td>Moderate</td> <td>Very</td> <td></td> </tr> <tr> <th colspan="4">How much litter is in this area?</th> </tr> <tr> <td>None</td> <td>Some</td> <td>Lots</td> <td></td> </tr> <tr> <th colspan="4">How much protection for weather is there?</th> </tr> <tr> <td>None</td> <td>Some</td> <td>Lots</td> <td></td> </tr> <tr> <th colspan="4">Butt litter cause</th> </tr> <tr> <td>Littering</td> <td>Bin design</td> <td>Weather</td> <td></td> </tr> <tr> <td>Brimming</td> <td>Scavengers</td> <td>Spills</td> <td></td> </tr> <tr> <th colspan="4">How much graffiti is in the area?</th> </tr> <tr> <td>None</td> <td>Some</td> <td>Lots</td> <td></td> </tr> <tr> <th colspan="4">How damaged infrastructure is in the area?</th> </tr> <tr> <td>None</td> <td>Some</td> <td>Lots</td> <td></td> </tr> <tr> <th>Photos?</th> <td>Yes</td> <td>No</td> <td></td> </tr> <tr> <td colspan="4">Sketch the inspection area include corners, bins and features</td> </tr> <tr> <td colspan="4" style="height: 100px;"></td> </tr> </table>	Number of bins				Litter	Recycling			Butt	Ashtray			Number of full bins?				How busy is the area?				Quiet	Moderate	Very		How much litter is in this area?				None	Some	Lots		How much protection for weather is there?				None	Some	Lots		Butt litter cause				Littering	Bin design	Weather		Brimming	Scavengers	Spills		How much graffiti is in the area?				None	Some	Lots		How damaged infrastructure is in the area?				None	Some	Lots		Photos?	Yes	No		Sketch the inspection area include corners, bins and features							
Number of bins																																																																																
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Sketch the inspection area include corners, bins and features																																																																																

¹ Transport, shops; office block; venue (pubs; clubs, outdoor eating); recreational parks, roadside stops or rest areas.



5. APPENDIX 1 – SURVEY FORMS

In this area, write down whether you think the statement is True or False

Only statements about features that are True for the area are counted.

		Area Inspection – True or False	T/F	Notes
Tips	Clean			
Walk around the area, record impressions about whether each statement is True or False.	1	Most butt litter seems to be new (recently discarded)		What is or isn't working well? e.g. the area is very clean. Note suggestions to improve clean features.
	2	Cleaning up the butt litter would be easy to do		
	Clean subtotal (add only True responses)		/2	

		Butt bins and Infrastructure	T/F	Notes
Tips	Butt bins and Infrastructure			
Q3. If no butt bins, but the area is free of butt litter, answer 'T'. Q. 4,5,6. If no butt bins answer 'F'. If there is more than one butt bin in the area, if the statement is 'False' for one bin then answer 'F' for all.	3	There are enough butt bins in the area		Examples: Butt bins effectively capture and hold butts. Repair or improve bins and/or furniture. Area needs more bins.
	4	Butt bins can be easily seen in the area		
	5	Butt bins are easy to use		
	6	Butt bins are clean (free of dirt, graffiti, damage)		
	7	Butts cannot escape from butt bins		
If the answer is 'False' for any one amenity, e.g. furniture, answer 'F'.	8	This area looks cared for (e.g. seats, garden, paths)		
	Butt bins and infrastructure subtotal (add only True responses)		/6	

		Information	T/F	Notes
Tips	Information			
Look at all signs, focusing on litter signs.	9	Signs tell smokers what to do with butts		Examples: There are butt litter prevention signs and the signs are undamaged and clear. There are no litter prevention signs.
	10	Signs are easy to understand		
	11	Litter is from smokers ignoring signs		
	12	Butt litter and the problems it causes are easily seen		
	Information subtotal (add only True responses)		/4	



5. APPENDIX 1 – SURVEY FORMS

Tips		Surveillance (visibility of disposals)	
	13	Butt litter seems to be under control	Examples: Consider giving more warnings to smokers caught littering.
	14	Smokers littering butts will be easily seen	
	15	Smokers are aware of potential fines for littering	
	16	Rangers seen patrolling this area	
	Surveillance subtotal (add only True responses)		

Tips		Involvement	
	17	The area is a good example of smokers doing the right thing	Examples: Smokers seem comfortable and proud of the area.
If vandalism or damage is evident, answer 'F'.	18	Finding graffiti or damage to things in the area requires considerable effort	
	19	Smokers seem to look after this area	
	20	I am satisfied with how clean this area is today	
	Involvement subtotal (add only True responses)		

Add the totals for each subsection to get a total out of 20. Multiply this score by 5 for a score out of 100 and insert it in the box on far right.	Area inspection total (add all True responses)	/20	/100
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5. APPENDIX 1 – SURVEY FORMS

Step 2: Observation

Butt Litter Check



Organisation name _____

Contact name _____ Phone _____

Area name and description				Area	
Site type	office block? retail? car park? etc.		Date	Streamlined	Hotspot
Session #	Start time	Number of people in area	Number of people smoking	Tips: Note the start time for each session and record the number of people and % of smokers. In the data table below rule a line across the observations at the end of a session.	
1					
2					
3					
4					
5					
6					

Disposal act	Item disposed	Where	How			
Littered (L)	Cigarette burning	CB	Around bin	AB	Brimmed on bin	BM
	Cigarette out	CO	Garden bed	GB	Drop and stomp	DS
	Accessory (cigarette)	A	Gutter or drain	GD	Forgot	FG
	Non-cigarette	N	Open ground	OG	Flagrant fling	FL
			Raised surface	RS	Hide or bury	HB
			Under seat	US	Sneaky drop	SD
					Wedged	WD

Disposal act	Item disposed	Bin type	Bin fixture			
Binned (B)	Cigarette burning	CB	Ashtray	AF	Free standing	FS
	Cigarette out	CO	Ashtray personal	AP	Fixed to bin	FB
	Accessory (cigarette)	A	Butt bin	BB	Fixed to pole	FP
	Non-cigarette	N	Butt recycling bin	BRB	Fixed to wall	FW
			Litter bin	LB		
			Butt plate on bin	BPB	Bin distance	
			Recycling bin	RB	How far from bin before disposal (metres)	

Disposal act	Item disposed	Demographics				
Carried away (CA)	Cigarette burning	CB	Age	Years	Group size	Number 1–9
	Cigarette out	CO	Tick ✓ in the demographics column below if person was spoken to or surveyed i.e. a conversation			
	Accessory (cigarette)	A				
	Non-cigarette	N				

Obs. #	Disposal act			Item disposed				Littered		Binned		Distance	Demographics			
	L	B	CA	CB	CO	A	N	Where	How	Type	Fixture	From bin	Age	Size	✓ Conv.	
1																
2																
3																
4																
5																
6																



5. APPENDIX 1 – SURVEY FORMS

Obs. #	Disposal act			Item disposed				Littered		Binned		Distance	Demographic			
	L	B	CA	CB	CO	A	N	Where	How	Type	Fixture	From bin	Age	Size	✓ Conv.	
7																
8																
9																
10																
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13																
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Summary of impressions (one sentence only)



5. APPENDIX 1 – SURVEY FORMS

Step 3: Cigarette butt litter count

Butt Litter Check



Organisation name _____

Contact name _____ Phone _____

Area type (tick 4)		Area name	Date
Streamlined	<input type="checkbox"/>	Hotspot	<input type="checkbox"/>

Item category	Small item tally: Cigarette butts All cigarette butts are considered to be small items – up to thumb size	Total
Cigarette butts	Butts (all small)	

Item category	Small item tally	Sum	Medium item tally	Sum	Large item	Sum	TOTAL
Cigarette accessories	Matches, foil, plastic wrap, lighters		Cigarette packet, cigarette pouch, matchbox		Cigarette carton		

Cigarette items total	Cigarette butts + Cigarette accessories						
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Item category	Small item tally	Sum	Medium item tally	Sum	Large item	Sum	TOTAL
Non-cigarette items All other items	Up to thumb size		Fist size		Bigger		

Total: All items (3)							
Total: All items	Small items (includes butts)		Medium items		Large items		TOTAL
Percentage: All items	Small items %		Medium items %		Large items %		Total = 100%



5. APPENDIX 1 – SURVEY FORMS

Step 4: Conversations with smokers Butt Litter Check



Organisation name _____

Contact name _____ Phone _____

Area Name			
Date (write in)	Area type		Conversation #
	Streamlined	Hotspot	Enter the number

In the conversation with smokers ask if they think the statements below are true for the area. The conversations are all about the smoking area where the survey is conducted. Make sure each aspect of the smoking area is covered in the conversation. **Write in T for TRUE or F for FALSE.**

Clean	True/False	Comments
1 Most butt litter here seems to be new (recently discarded)		

Bins and infrastructure	True/False	Comments
2 There are enough butt bins in this area		

If there are no bins in the area ask Q2A and if True then enter a T for Qs 2A, 3 and 4. If false insert F for Q2A, 3 and 4.

2A Butt bins aren't needed in this area		
3 Butt bins are easy to use		
4 Bins are clean (free of dirt, graffiti, damage)		
5 This area looks cared for (e.g. seats, garden, paths, play areas)		

Information	True/False	Comments
6 Litter here is from smokers ignoring signs		

Surveillance (visibility of disposals)	True/False	Comments
7 Smokers here know they can be fined for littering		

Involvement	True/False	Comments
8 I am proud of how clean this area is today		

Count all the True responses to give the total score: 4/8	/8	Multiply total out of 8 by 12.5 to give a score out of 100: 50/100	/100
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Additional comments and stories

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