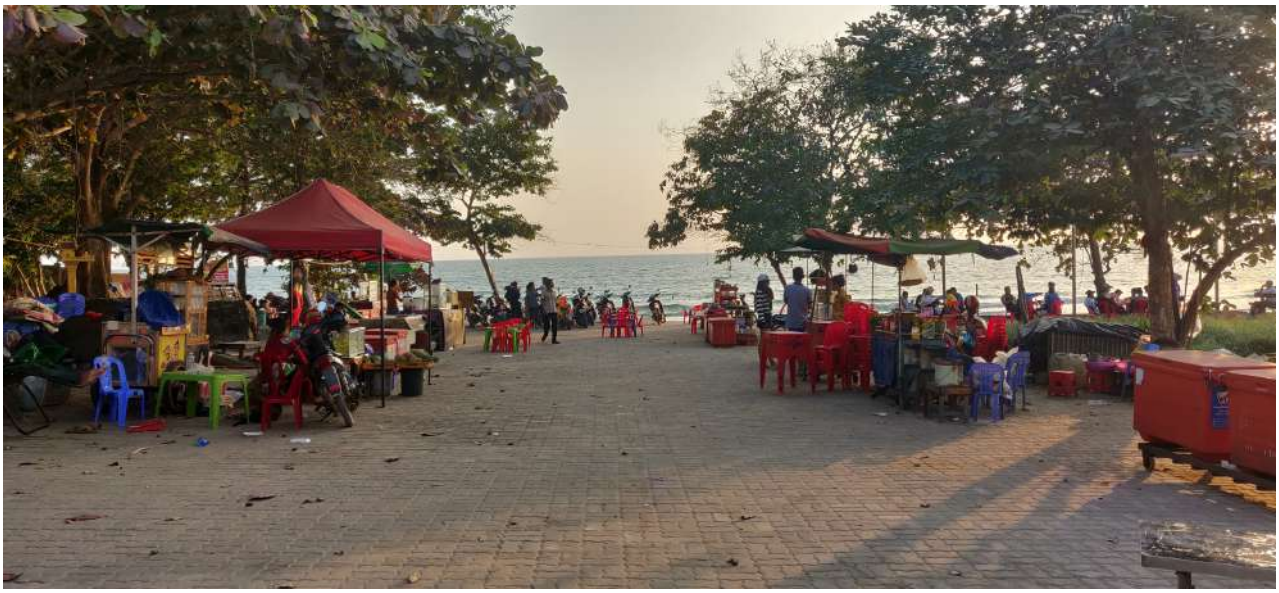
# Safety Audits in Sihanoukville

## A Study on Urban Safety for Women

2020 | 2021



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*The Asia Foundation (TAF) is a non-profit international development organisation committed to improving lives across a dynamic and developing Asia. Informed by six decades of experience and deep local expertise, our work across the region addresses five overarching goals, strengthen governance, empower women, expand economic opportunity, increase environmental resilience, and promote regional cooperation.*

SAFETIPIN
Supporting Safer Cities

*Safetipin is a technology platform that uses apps to collect data in order to make cities and public spaces safer and more inclusive for women, and other excluded groups. Safetipin works with city governments to use data for improvement, and for specific initiatives to address women's safety in public spaces.*

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# Acknowledgement

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We would also like to thank the Governor and his team for making our vision for the city of Sihanoukville a reality by allowing us to conduct our trainings and data collection. Their presence at the training made it more concrete that our data collection is being done for a change and motivated the volunteers to put in their efforts.

Lastly, we would like to thank the team at Reproductive and Child Health Alliance (RACHA) and Let Us Create Futures (LUCF), for their support in mobilising the volunteers to collect data for this project. We would also like to extend our thanks to the volunteers and drivers who dedicated their time to collect data in the city of Sihanoukville and doing so with the utmost quality and care.

This report was prepared by a team from Safetipin comprising of Sonali Vyas and Shreya V. Basu, under the guidance of Dr. Kalpana Viswanath.



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# Introduction

*Image 1: Golden lions roundabout in Sihanoukville*

Sihanoukville is a coastal city in the country of Cambodia and the capital of Sihanoukville Province. It is at the top of an elevated peninsula in the southwest part of the country on the Gulf of Thailand with an area of 80 square kilometers. The city has a population of 302,877, according to the 2019 census data, out of which 149,632 are women. [1] The sex ratio in Sihanoukville is 102.4, an increase from 100.1 in 2008, the number of men per 100 women. Owing to its seaside location, Sihanoukville has seen increased growth in its tourism over the past few years. The city is going through a rapid change with current investment in the construction industry however, there are many infrastructural problems and deficiencies in the city, including those related to water, power and the lack of a formal public transportation system. There are moto-taxis and tuk-tuks, as informal modes of transportation, but the fares are ad-hoc and vary due to the lack of formal management from the local authorities or government.

The lack of a formal and regularised system makes it difficult to monitor, thus increasing crime, and challenging the perception of safety. As a result, the mobility of vulnerable residents, especially women and girls, is significantly restricted. Sihanoukville has the added responsibility of ensuring the safety and comfort of tourists as well, as there have been cases reported of murders, rapes, and robberies.[2] The lack of an actual or perceived sense of safety, reduces the quality of life within the city, as the residents feel too unsafe to access the available opportunities. On the other hand, a safe and inclusive public transport network encourages their active participation in the public domain and enables them to enjoy the resources, both socially and economically.

In order to build such inclusive and universally accessible public transport systems, the travel needs and concerns of all relevant stakeholders, especially women and children, older persons and persons with disabilities must be understood and incorporated into the planning of these systems. This study has been conducted in partnership with The Asia Foundation (TAF), Cambodia to assess the urban safety in Sihanoukville and provide recommendations for creating safe public spaces. The study has been conducted over a span of two years- 2020 and 2021. After the first mapping in 2020, efforts were taken up by the government in Sihanoukville to improve the existing infrastructure. This report presents a comparative analysis of the city from 2020 to 2021

[1] General Population Census of the Kingdom of Cambodia 2019
[2] Crime in Sihanoukville Numbeo.com

# Safety Audit Methodology

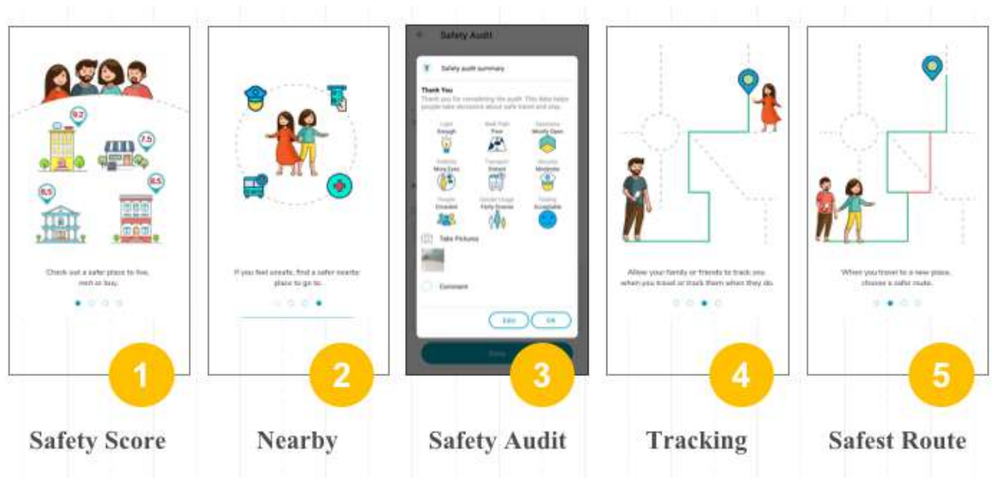
Safetipin is a technology platform that uses data to make public spaces safer and more inclusive for women. To understand the safety in a place, the physical infrastructure as well as the social usage of a space are looked into. At the core of Safetipin is the safety audit which is a participatory tool for collecting and assessing the perceptions of safety in public spaces. Safetipin collects data based on 9 parameters, namely: Lighting, Walkpath, Visibility, Openness, access to Public Transport, Security, presence of People, Gender Usage and Feeling to assess a public space. (refer Annex 1). Each parameter can be given a rating of 0, 1, 2 or 3 where 0 is a poor rating and 3 is good.  Two apps were used to collect the data in Sihanoukville. These are explained in the next section.

| | |
|---|---|
| ***Lighting*** | *Availability of enough light to see all around you* |
| ***Walkpath*** | *Either a pavement or road with space to walk* |
| ***Openness*** | *Ability to see and move in all directions* |
| ***Visibility*** | *Vendors, shops or buildings from where you can be seen* |
| ***Public Transport*** | *Availability of any form of public transport* |
| ***Security*** | *Presence of police of security guards* |
| ***People*** | *Number of people around you* |
| ***Gender Usage*** | *Presence of women and children near you* |



# My Safetipin

The My Safetipin app is a free crowdsourcing app available on the Play Store and App Store. Using this app, a user can conduct safety audits by rating the 9 parameters introduced in the previous section. The data from the safety audits is used to generate a Safety Score, which could help users make safer decisions for their mobility. The data collected through this app is analysed along with the data from the Safetipin Nite app (explained in next section) to get a spatial understanding of a city. The features of the app are shown below.




**Play Store Reviews** ★★★★★

**Safety with simplicity**
I no longer need to worry about late night commute with Safetipin. It helps me go around the city without worrying about what the time of the day it is or what area it is. At least I am aware of my surroundings!!

Extremely beneficial and user-friendly app, working towards one of the most pressing issues of the country! The interface makes it really easy to use it. One of my favourite features is the tracking feature, which lets you share your real-time location with your family and close ones, whenever you feel unsafe. I would suggest everyone to give it a try and conduct audits, to stimulate further action. Hoping it reaches a bigger crowd and makes women take safer decisions about their mobility.

# Safetipin Nite

Safetipin Nite is a proprietary app which is used for large-scale geo-referenced image collection of streets in a city. The phone with this app is mounted in a car and while the car is driven, images get clicked automatically. These images are collected to capture a pedestrian's safety conditions at regular intervals. Using Safetipin Nite, the entire city road network is mapped with images which are then assessed on the Safetipin backend technology platform. The images are analysed based on 8 parameters (not including Feeling) as well as additional sub-parameters as seen in Figure 1.

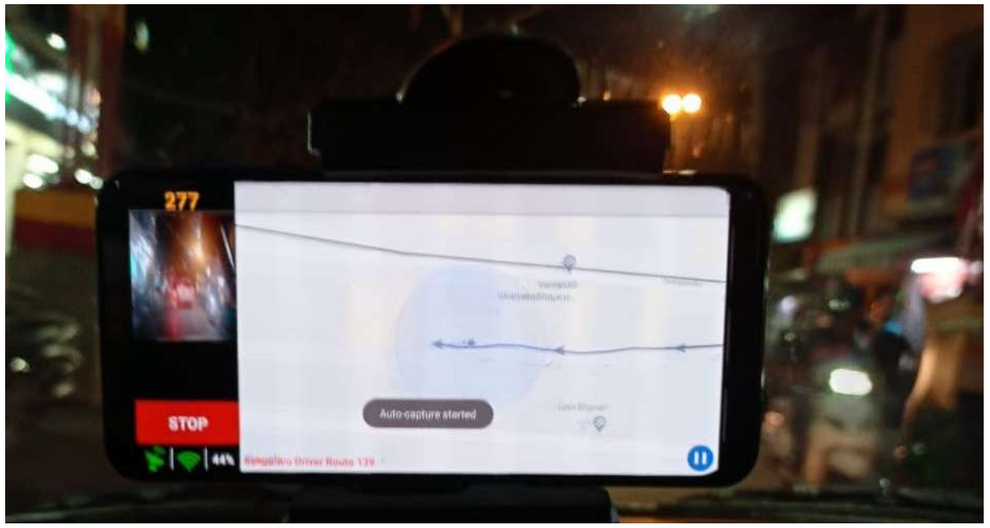



*Image 2: A phone with the Safetipin Nite app in use*

| *Lighting* | *Visibility* | *Walkpath* | *Security* | *Public Transport* |
|---|---|---|---|---|
| No Street Light | 50% Boundary Wall | No Pavement | Private Guards | Rail |
| Off Street Light | 100% Boundary Wall | Broken Pavement | Police | Bus/ Mini Bus |
| Dim Street Light | Unused Land | Unpaved Pavement | Police Van/ Bike | Auto/ Shared Auto |
| High Street Light | Road Side Vendors | Car Blocking | Police Check | Taxi |
| Too Far Street Light | Temporary Stalls | Vendor Blocking | Police Booth | Bicycle |
| Leaves Cover Street Light | Shops | Houses Extending | Other Govt. | |
| Other Cover Street Light | Houses upto 4 Floors | Trees Blocking | | |
| One Side Street Light | Houses > 4 floors | Other Blocking | | |
| | | Walkable Road | | |
| | | On-Street Parking | | |

*Figure 1: Sub-parameters for analysis*



# Data Analysis and Representation

On completion of the data collection, the Safetipin team analyses the data based on 8 parameters (not including Feeling) as well as on additional sub-parameters, on the analysis portal as shown in Image 3. Along with this level of detail, photographic evidence is also provided for each point to validate the data.

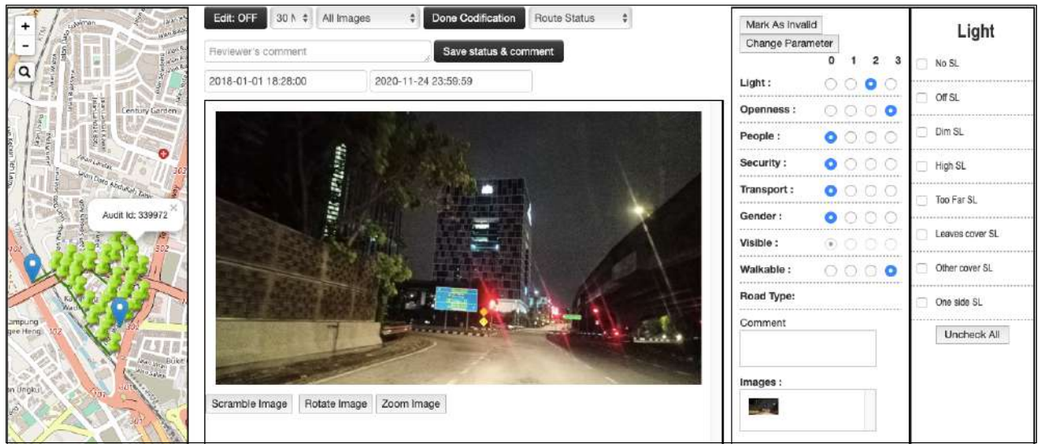



*Image 3: Safetipin portal for analysis*

This data is then worked on further to generate a report which can be presented to local stakeholders to make the actionable changes necessary for improving the existing conditions of safety. Along with the report, the Safetipin team also provides the excel sheet of all the points with images attached (refer Annex 2) that could be easily imported onto any GIS platform (shown on Google maps in Image 4 below).

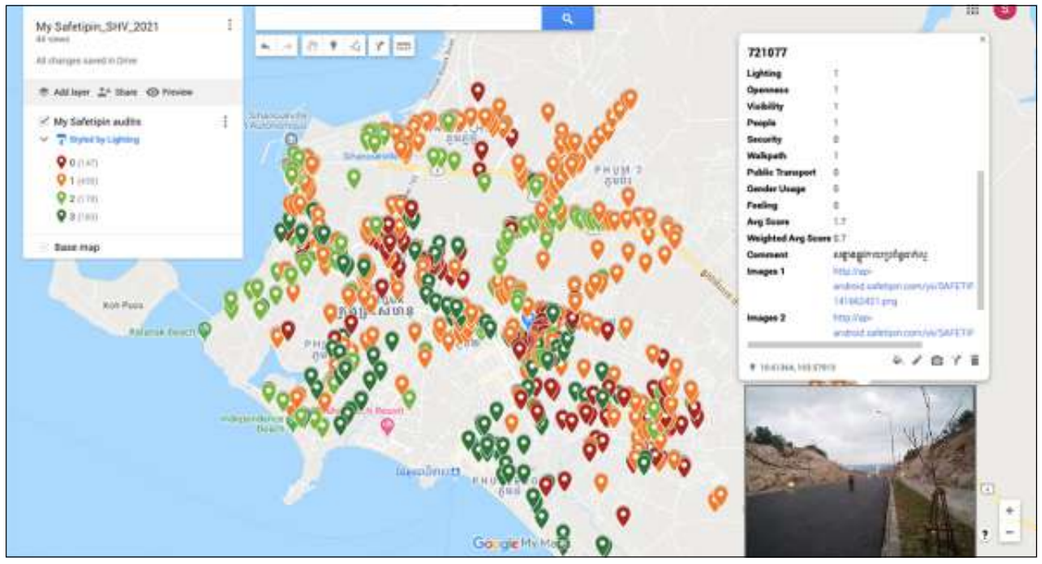



*Image 4: Data as seen on google maps*

# Data Collection in 2020

In partnership with The Asia Foundation, Safetipin collected data in the city of Sihanoukville in 2020 to understand the ongoing and existing conditions of its physical infrastructure and social inclusion in order to improve the overall perception of safety. The project faced obstacles in data collection, training, and travel as a result of the unprecedented spread of the novel coronavirus. Due to this, the training was conducted online on 4th and 5th March, 2020.

The LUCF team mobilised the volunteers and drivers to collect data for the study. The data was collected using the two Safetipin tools: the My Safetipin app and the Safetipin Nite app between 6 and 9 pm. These two apps complement each other in data collection and using both of them, we got a clear understanding of the city. On day one, 5 drivers were trained to use the Safetipin Nite app and on day two, 15 volunteers were trained to use the My Safetipin app. The entire data collection was completed by 20th March, 2020.

*Image 5: Volunteers from the training session with TAF and LUCF team*

# Data Collection in 2021

Over the course of 2020, the Sihanoukville administration undertook a lot of work to make improvements in the city, specifically by creating proper pavements, installing street lights and laying  roads. To measure the impact of the work done, Safetipin conducted a re-mapping of the city. The impact of the pandemic was still prevalent in the form of lockdowns and travel bans, due to which the training was again conducted online. The same two tools (My Safetipin and Safetipin Nite) were used for the data collection.

The Reproductive and Child Health Alliance (RACHA) team organised volunteers and drivers for both the trainings and which were held on the 22nd of February, 2021. First, 6 volunteers were trained to use the My Safetipin app, followed by the training of 2 drivers for Safetipin Nite. Both groups conducted test audits and test drives that evening. The audits were done between 6 and 9 pm. The process went off smoothly without any major challenges and the data collection was completed by March 19th, 2021.

The data from both years has been compared and presented in this report. The findings and recommendations in this report will be shared by the Asia Foundation, Cambodia team, with the key stakeholders in the city.

*Image 6: Volunteers from the training session with TAF and RACHA team*

# Safety Audit Analysis

The Safety Score at an audit location reflects the aggregated rating of all the nine Safetipin parameters. For each audit point, a numeric value between 0 and 5 is provided where 0 is poor and 5 is good in terms of overall safety. A total of 2100 points were audited in the year 2020 and 2128 in in the year 2021. The distribution of these points can be seen in Map 1 and 2.

Though the overall Safety Score has remained the same in both years at 2.2/5 (which is below average), the ratings of individual parameters contributing to the Safety Score have varied. Some parameters have shown an improvement. Others have seen a decrease in the rating. This will be seen in the following sections.

**Note:** The Safety Score is rated out of 5 based on an algorithm which provides a weightage to each parameter based on its impact on the perception of safety. The individual parameters, however, are rated on a scale from 0-3.

| | 2020 | 2021 |
|---|---|---|
| My Safetipin | 1239 | 1384 |
| Safetipin Nite | 869 | 745 |

*Figure 2: Number of audits*

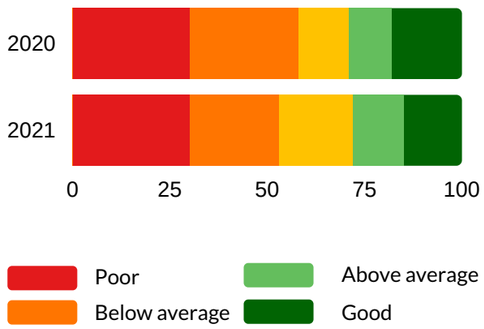
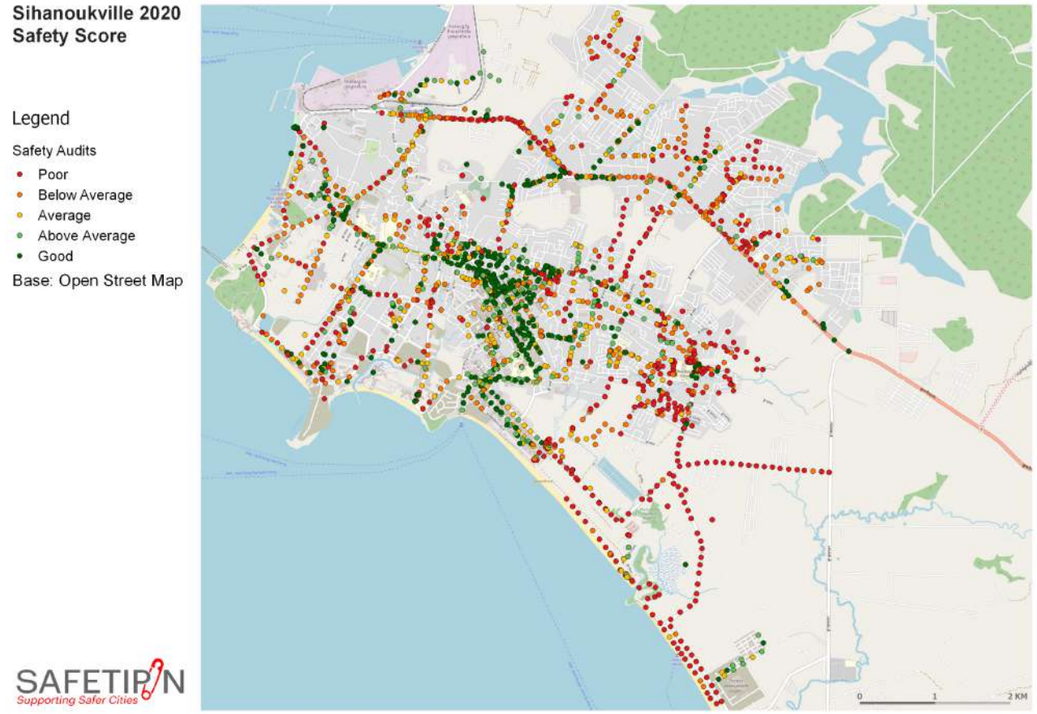
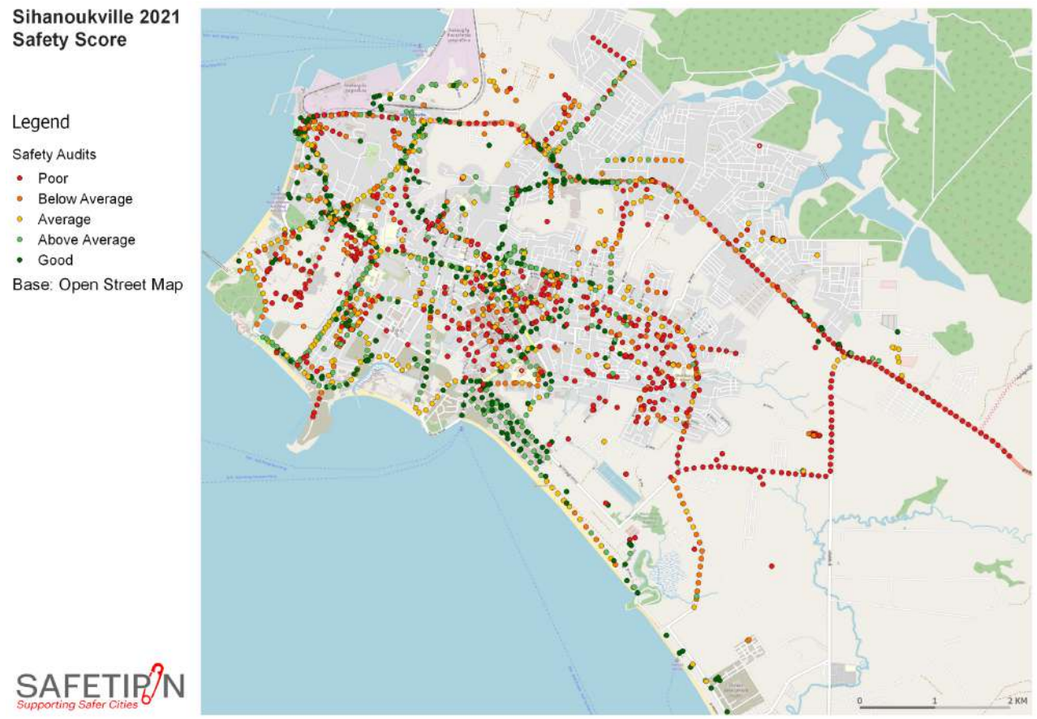



*Figure 3: Comparative Safety Score in 2020 and 2021*

*Image 7: A safe and inclusive public space*




*Map 1: Safety Score in 2020*




*Map 2: Safety Score in 2021*

# Infrastructure Related Parameter Findings

## Parameter Ratings

All the Safetipin parameters are rated between 0-3, where 0 indicates a poor rating and 3 a good one. The audit parameters are analysed in two parts. The first is of 6 parameters linked to physical infrastructure. Across studies conducted by Safetipin across the globe, it has been found that the design of physical infrastructure i.e. the built environment, can impact the social environment of these spaces as well. Thus, the parameter findings for social usage are also discussed in the following sections. These parameters include the presence of People, Gender Usage in a space, and the feeling or perception of safety.

Figure 4 shows the comparative average ratings of all the physical infrastructure parameters in 2020 and 2021. Parameters such as Lighting, Walkpath and Public Transport have increased from 2020 to 2021. However, the ratings for the Visibility and Openness parameters have reduced and the Security parameter has remained the same. For Security, only police stations were mapped with no information about police patrolling routes, hence the low ratings.

**Note:** The ratings of the parameters have been taken by combining the data collected from both the My Safetipin app as well as Safetipin Nite. For the analysis of each of the physical infrastructure parameters, only the Safetipin Nite data is considered as the sub-parameters analysis only takes place with that data.

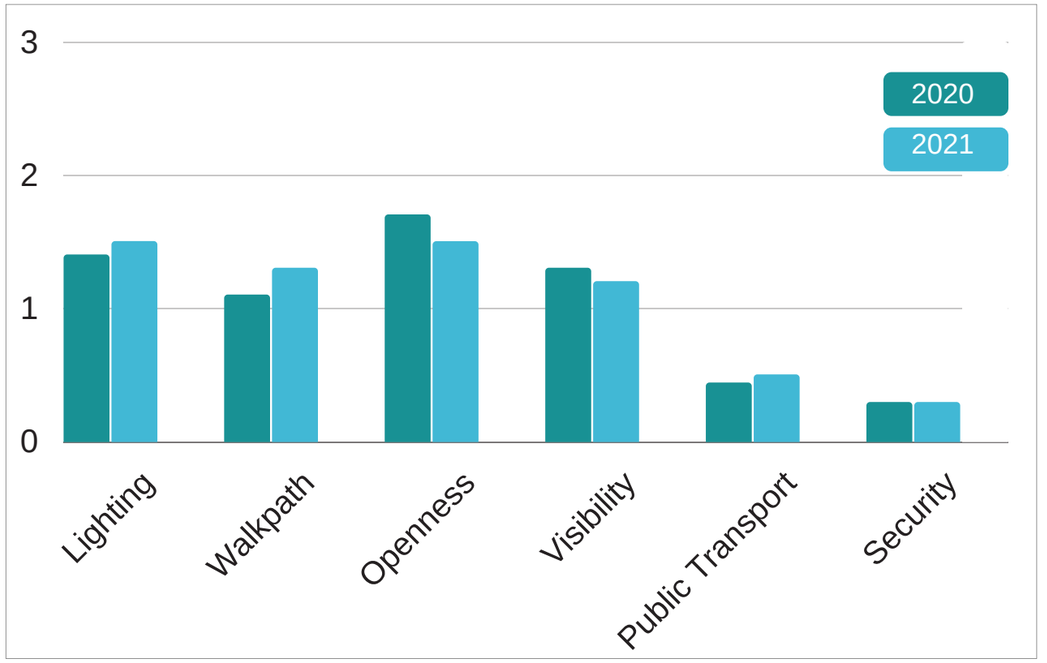



*Figure 4: Average rating of physical infrastructure parameters in 2020 and 2021*

# Lighting

The Lighting parameter measures the amount of illumination at a place and ranges from dark to bright. For the rating of the Lighting parameter, the sources which are considered are street lights, light from houses, shops and street vendors. Temporary sources of light like the light from cars are not considered when rating this parameter. Images collected during the day are also not considered for this parameter. Points which have a rating of 0 are referred to as dark spots. These are places where there is either no lighting infrastructure present or where the existing lighting infrastructure is not functional.

Map 3 and 4 show the distribution of audit points according to their Lighting rating in 2020 and 2021 respectively.

The number of points with a rating of 2 out of 3 (shown in light green) has reduced from 2020 to 2021. The points with a rating of 3 out of 3 (shown in dark green), however, have increased, which signifies that the overall rating for the Lighting parameter has increased from 2020 to 2021.

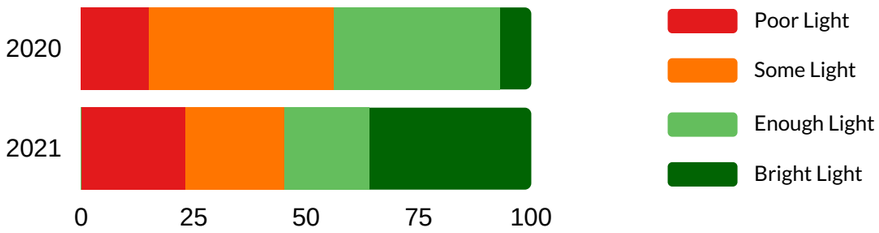
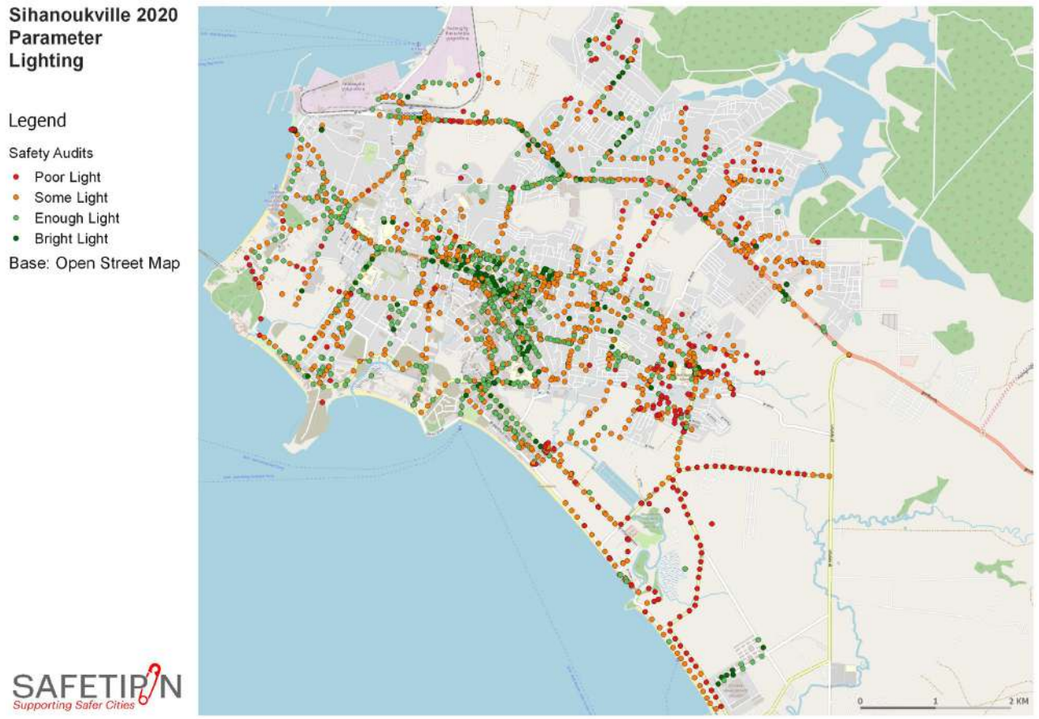
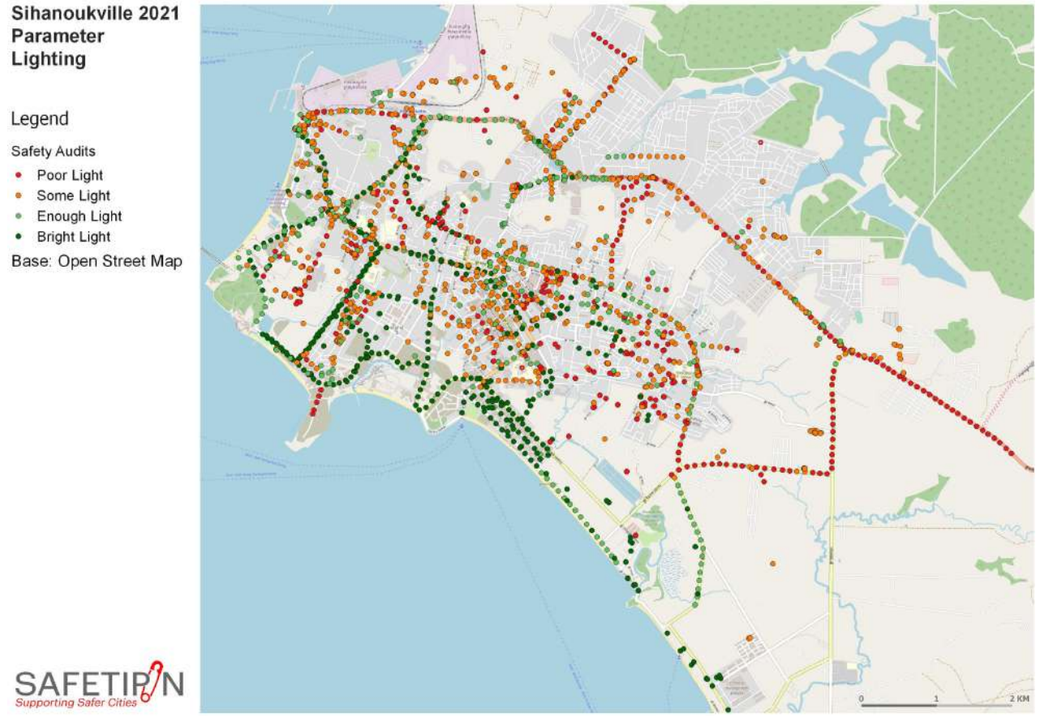



*Figure 5: Stacked graph of Lighting rating in 2020 and 2021*




*Map 3: Lighting rating 2020*




*Map 4: Lighting rating 2021*

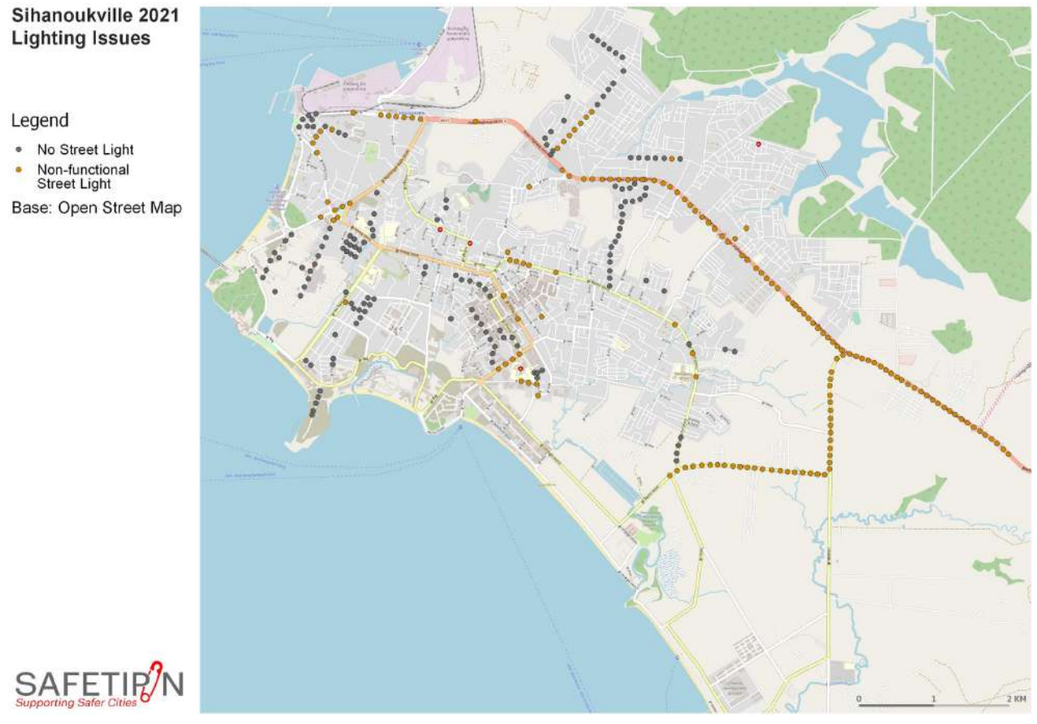
# Lighting Observations and Issues

The lighting issues as recorded from the 2020 and 2021 audits are shown in Figure 6. The data indicates that the number of areas with 'No streetlights' reduced by 73%, as more lights have been installed. However, there was a slight increase in the number of streetlights that were found to be non-functional at the time of audits, as seen in images 8 and 9.

| Lighting Issues | Audit Points in 2020 | Audit Points in 2021 |
|---|---|---|
| **No street lights** | 555 | 150 |
| **Non-functional street lights** | 107 | 160 |

*Figure 6: Lighting issues*

The points with no street lights and the points with non-functional street lights as identified from the 2021 audits can be seen in Map 5. Installing streetlights at these points would improve the overall lighting score of the city. Regular maintenance checks should be carried out to ensure uniform illumination.




*Map 5: Lighting issues in 2021*

**Addition of street lights near Adidas Sihanoukville Factory Outlet, Ekreach Street, Preah Sihanouk**

*Image 8: No street lights in 2020*

*Image 9: Non-functional street lights in 2021*

# Walkpath

The Walkpath parameter rating indicates whether a place is walkable or not. This includes the quality of the pavement or the space designated for walking along a road. If a pavement is present, its quality and condition is assessed. If it is a shared road or residential area, then the area for walking along with the condition of the road (broken or obstructed) is assessed.

Map 6 and 7 show the distribution of audit points according to their Walkpath rating in 2020 and 2021 respectively.

While the number of points with a rating of 0 (shown in red) have remained same, the number of points with a rating of 1 (shown in orange) have drastically reduced. Subsequently, the number of points with a rating of 3 (shown in dark green) have increased indicating the presence of proper pavements.

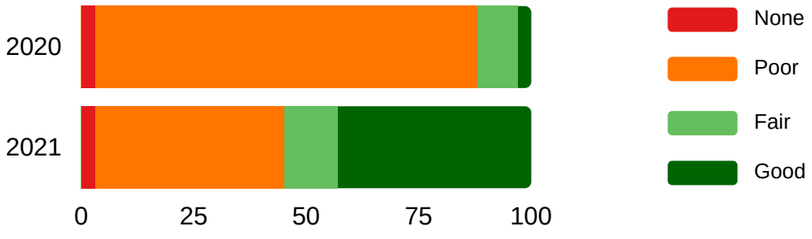
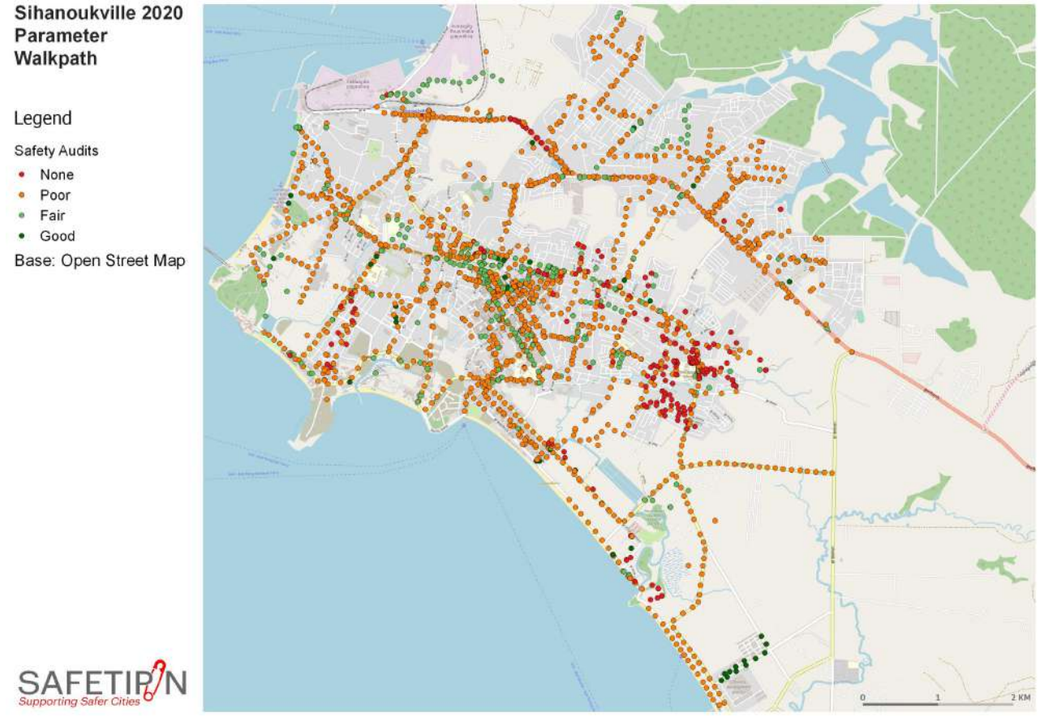
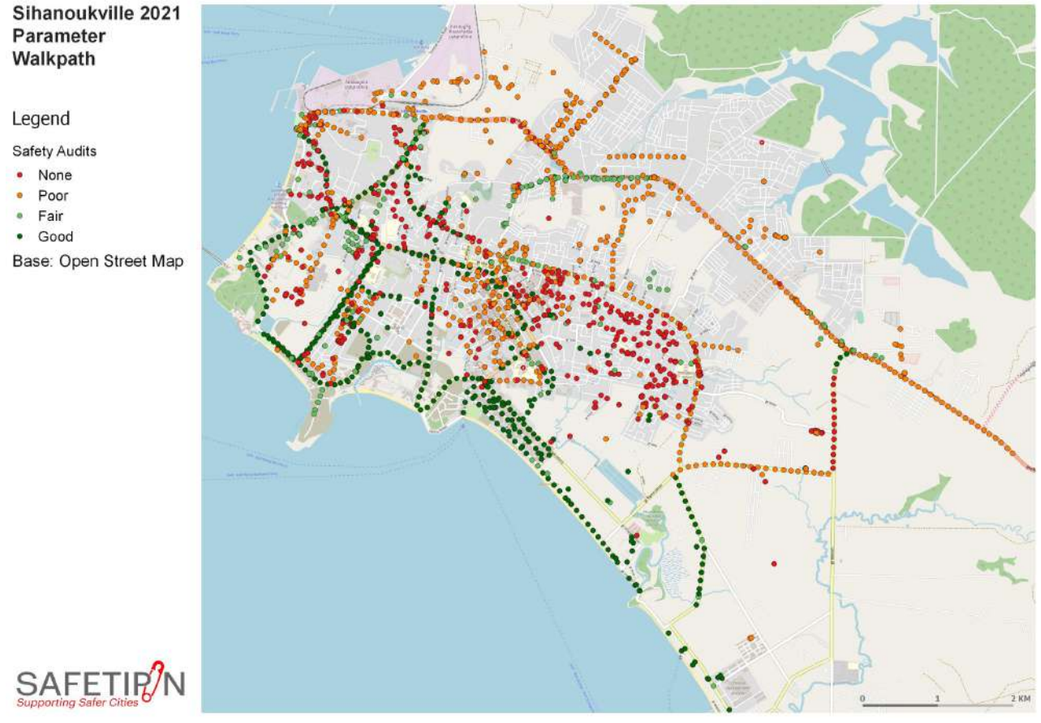



*Figure 7: Stacked graph of Walkpath rating in 2020 and 2021*




*Map 6: Walkpath rating 2020*



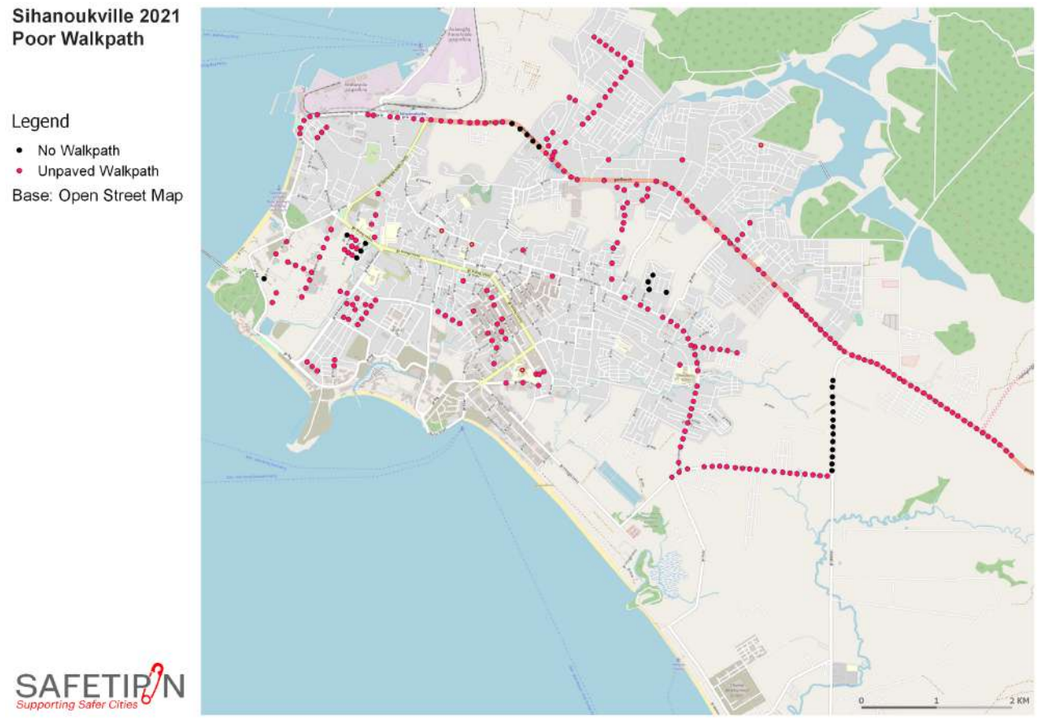

*Map 7: Walkpath rating 2021*

# Walkpath Observations and Issues

For rating the Walkpath parameter, the presence and quality of a pavement are considered. There were 620 points identified as unpaved in 2020. These points reduced by 59% in 2021. Map 8 shows the points where there is no pavement or an unpaved pavement in 2021. Along with the quality of the pavement, obstructions or things which blocked the road were also measured. These can be seen in Figure 8. The points where obstructions have been identified should be taken up on priority to improve the walkability.

| Walkpath Issues | Audit Points in 2020 | Audit Points in 2021 |
|---|---|---|
| No pavement | 30 | 27 |
| Unpaved pavement | 620 | 255 |
| Car blocking | 125 | 80 |
| Other blocking | 407 | 189 |

*Figure 8: Walkpath issues*




*Map 8: Walkpath issues in 2021*

**Change in pavement on street near ក្រុម 9, ភូមិ មណ្ឌល 1, Preah Sihanouk, Cambodia**

*Image 10: No pavement in 2020*

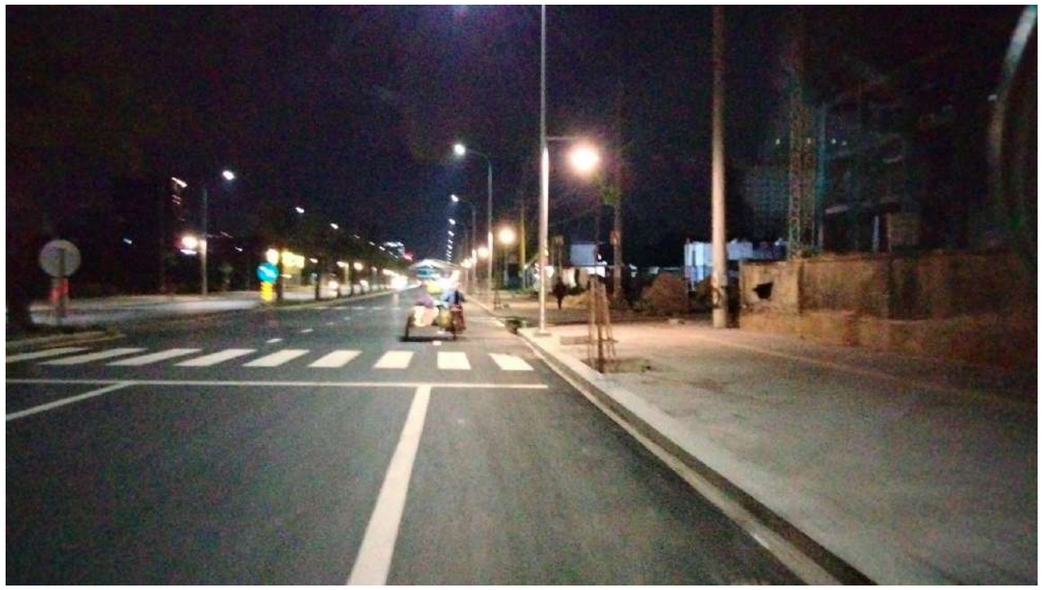


*Image 11: Proper pavement in 2021*

# Visibility

The Visibility parameter indicates if a person walking on the street is visible by people living or working in that public space. It is based on the principle of having “eyes on the street”, which refers to elements of the street design which ensure a visual connection between the pedestrians and the built environment. This includes windows and doors of shops or buildings and street vendors and hawkers that provide natural surveillance. Pedestrians using the public space do not contribute to this parameter because they are temporary as compared to shops and vendors who are more permanent.

Map 9 and 10 show the distribution of audit points according to their Visibility rating in 2020 and 2021 respectively.

As seen in Figure 9, the points with a rating of 3 (shown in red) have increased from 2020 to 2021 indicating poorer visibility in 2021. The number of points with a rating of 2 and 3 (shown in light green and dark green, respectively) have also reduced. This could be attributed to the reduced movement during the COVID-19 induced lockdown in the city.

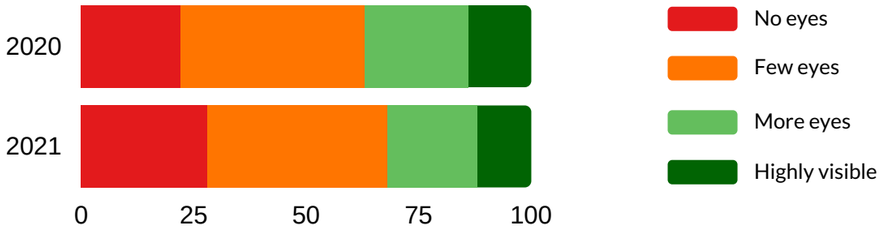
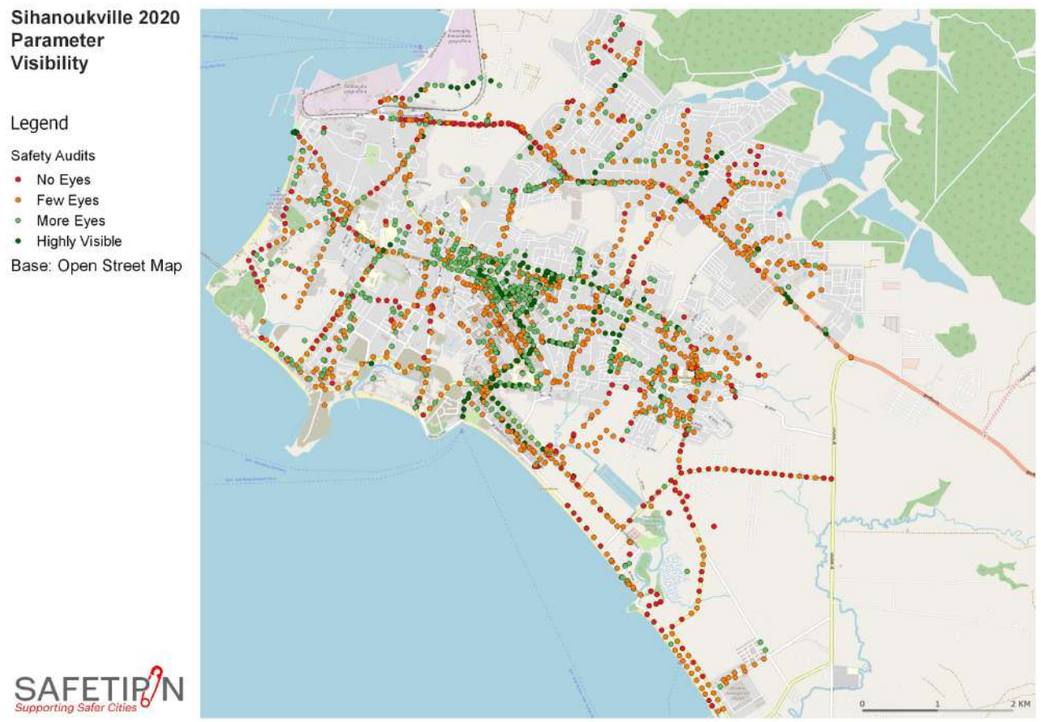
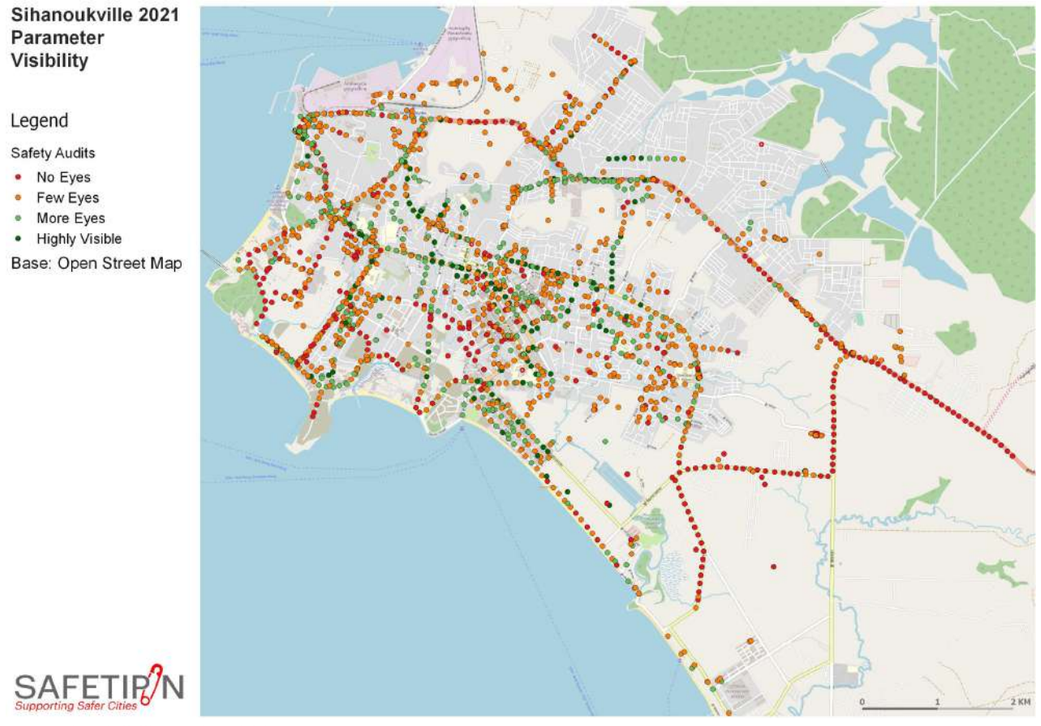



*Figure 9: Stacked graph of Visibility rating in 2020 and 2021*




*Map 9: Visibility rating 2020*




*Map 10: Visibility rating 2021*

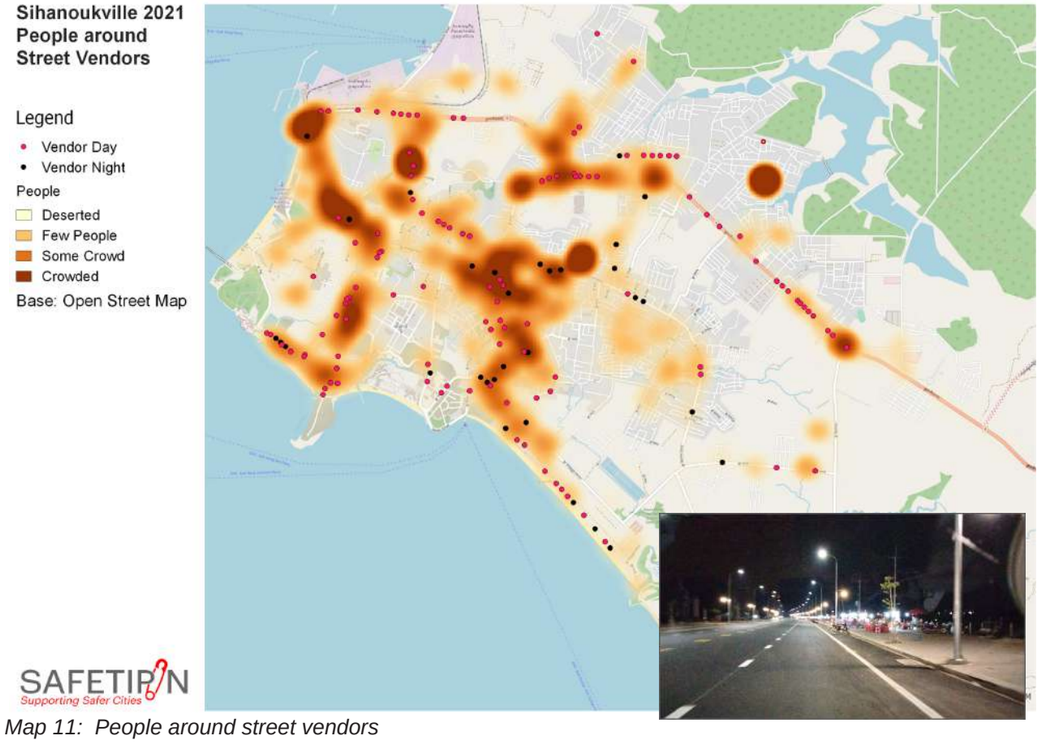
# Visibility Observations and Issues

For the Visibility parameter, street vendors and temporary stalls were mapped during the data analysis (shown in Figure 10). The areas with street vendors are more active, hence inviting for people on streets and public places.

| Visibility Subparameters | Audit Points in 2020 | Audit Points in 2021 |
|---|---|---|
| Street vendors | 84 | 71 |
| Temporary stalls | 5 | 1 |

*Figure 10: Visibility subparameters*

The presence of vendors during the day (magenta points) and night (black points) are seen in Map 11. This heat map shows the density of people with dark brown indicating high density and light brown indicating few people. Specific interventions could be provided in the areas with vendors and high presence of people to create more active spaces in the city. The streets should have designated vending zones which are clear of the pedestrian path.




*Map 11: People around street vendors*

# Public Transport

The Public Transport parameter measures the distance from the audit point to the nearest mode of public transportation. Public transport includes both formal and informal modes of transportation such as metros, buses, tuk-tuks, minibuses, etc. The time taken and accessibility to any form of public transport adds to the ease of mobility in a city. Since there is no formal mode of public transportation in Sihanoukville, this parameter measured the nearest informal tuk-tuk stands based on photographs collected.

Map 12 and 13 show the distribution of audit points according to their Public Transport rating in 2020 and 2021 respectively.

As can be seen from Figure 11, the rating for the Public Transport parameter has remained similar from 2020 to 2021 with a majority of points having a rating of 0. This is mainly attributed to the fact that there is no mode of formal public transportation in the city. Most of the ratings have remained similar from 2020 to 2021 indicating the persisting requirement of designated tuk-tuk stands.

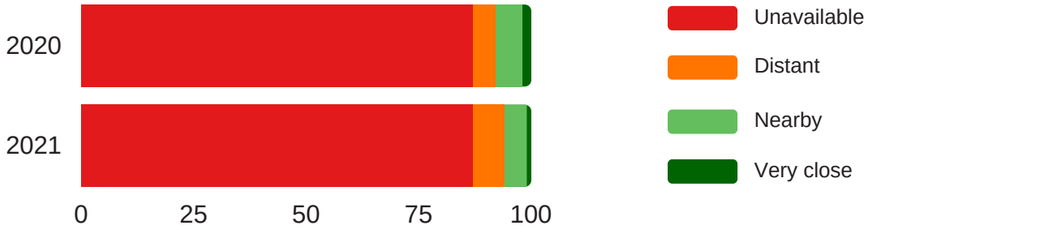
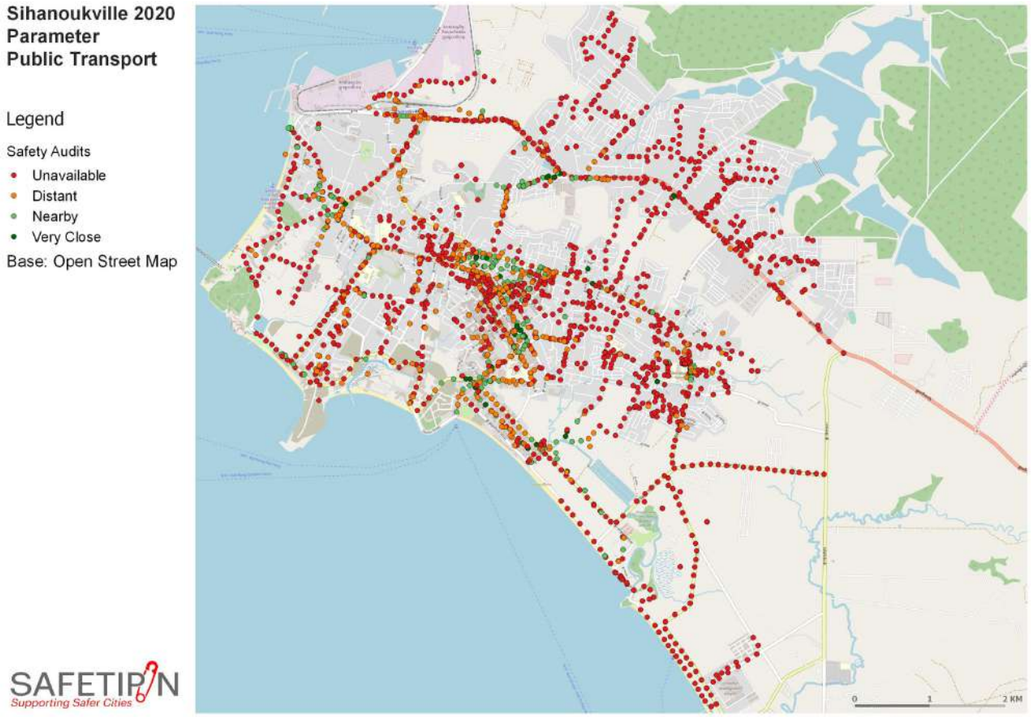
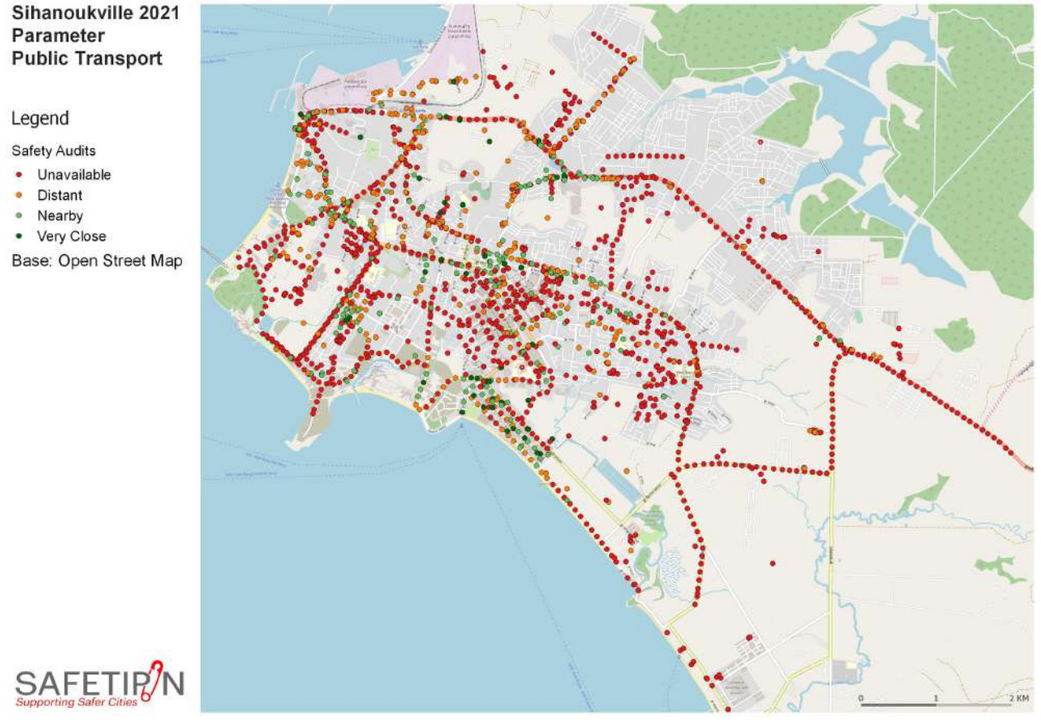



*Figure 11: Stacked graph of Public Transport rating in 2020 and 2021*




*Map 12: Public Transport rating 2020*



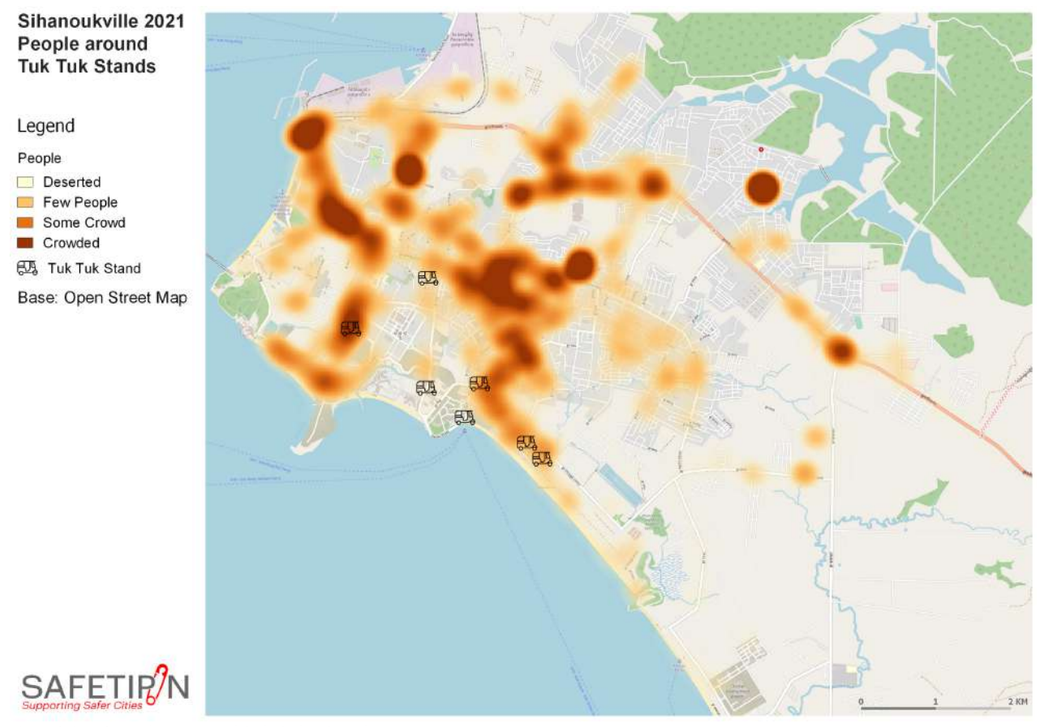

*Map 13: Public Transport rating 2021*

# Public Transport Observations and Issues

The only mode of transport considered within this parameter was tuk-tuks. As the primary mode of public transportation, they ply all over the city, but their fares are unregulated and there are no designated stands for them. The lack of designated stands affects the transport accessibility for people, especially women, who tend to take shorter and more frequent trips. Tuk-tuk stands were identified as a point with two or more parked tuk-tuks (examples in Image 12 and 13). The distribution of points where tuk-tuk stands were identified over a heat map of the People parameter is shown in Map 14. Designated tuk-tuk stands could be designed for places with a higher presence of people, which will help make the city more accessible.

*Image 12: Possible tuk-tuk stand*

*Image 13: Possible tuk-tuk stand*




*Map 14: People around tuk-tuk stands*

# Parameter Findings on Social Usage

## People and Gender Usage

While the parameters of Lighting, Openness, Walkpath, Public Transport and Visibility are based on the urban infrastructure, the others refer to the way that a public space is used and occupied - the presence of People and Gender Usage. The People parameter represents the number of people in a place and Gender Usage refers to the number of women and children in comparison to the total number of people. This means that if the number of people in a place is low, but the percentage of women is high, the rating of the Gender Usage parameter will also be high.

As can be seen from Figure 12, the rating for presence of People has reduced from 2020 to 2021, while the rating for Gender Usage has remained the same. In both years, the overall average rating for these parameters has been poor. This could be attributed to the global pandemic which has restricted movement around the city or the lack of active and inclusive streets.

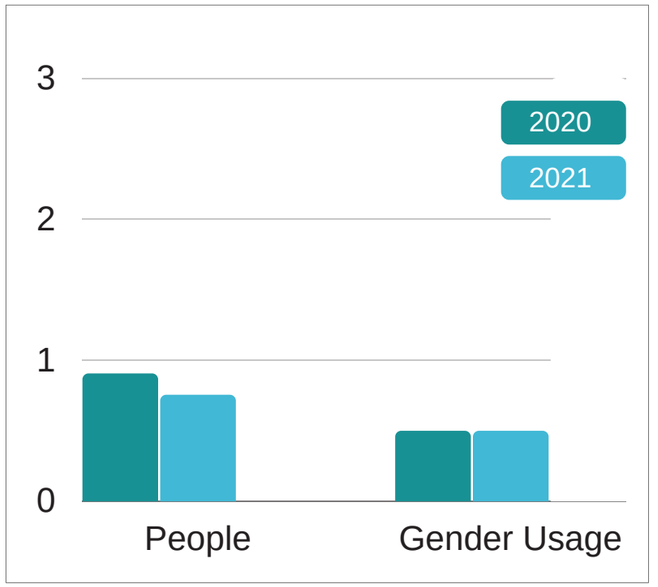



*Figure 12: Average rating of People and Gender Usage in 2020 and 2021*

It is pertinent to mention that these parameters are dependent on the physical infrastructure parameters. Having well-lit, walkable and active streets would encourage more people to use public spaces. The social usage parameters could be improved by working on the physical infrastructure parameters and could also impact the feeling of safety as discussed in the next section.

# Feeling of Safety

The Feeling parameter is the only subjective parameter in the Safetipin analysis as it measures an individual's perception of safety. It is used to assess how safe or unsafe a user feels at the audit point. The rating for Feeling could depend on many factors including gender, age, and one's familiarity with the location. To analyse people's perception of safety, only the data collected from the My Safetipin app is used for analysis.

Figure 13 shows the correlations of all the parameters with the Feeling parameter for the crowdsourced safety audits. It was found that the highest correlation to Feeling is with the presence of People followed by Gender Usage, Visibility and Lighting. This analysis clearly indicates the co-relation of the perception of safety, with the high presence of people around the user. Thus, having people actively participate in a public space is critical in ensuring that women and other vulnerable groups feel safe in that space.

The next section lists the recommendations to create a safer and more inclusive Sihanoukville, based on the findings from 4 physical infrastructure parameters. These interventions, if taken up, could lead to more people using spaces with increased gender diversity.

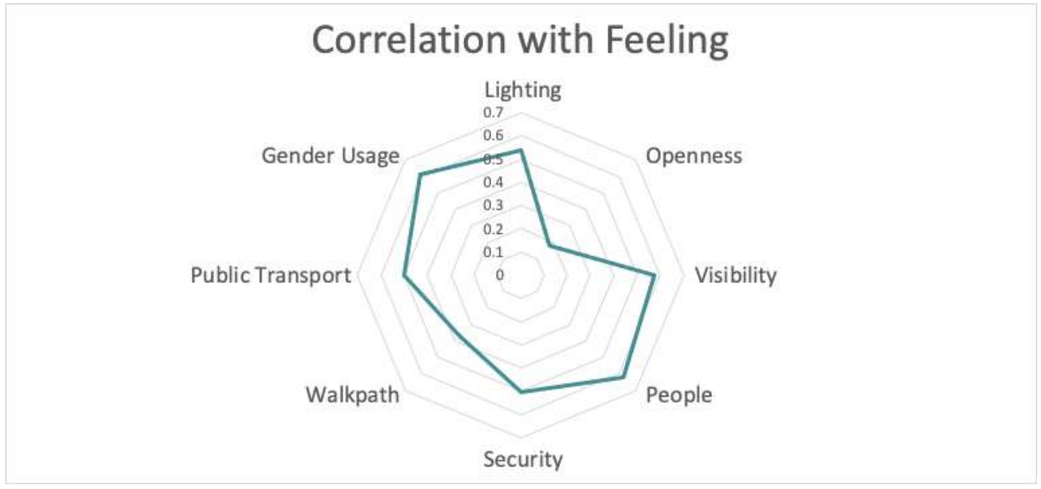



*Figure 13: Correlation between Feeling and other parameters*

# Recommendations

# Recommendations

## *Lighting*

| Parameter | Findings 2020 | Findings 2021 | Action to be taken |
|---|---|---|---|
| Lighting | 555 points identified with no streetlights | 150 points identified with no streetlights | The points where there are no streetlights should have lighting infrastructure installed. On the wide streets with more than 4 lanes, streetlights with varying heights should be installed along the pavement to ensure uniform illumination as seen in image 14. |
| | 107 points identified with non-functional streetlights | 160 points identified with non-functional streetlights | An example of this is seen in Image 15, where street lights can be seen but there is no illumination. The streetlight fixtures should be checked to see if they have working bulbs and regular maintenance checks should be done. |

In Image 15, street lights can be seen but there is no illumination.

*Image 14: Ideal street light installation*

*Image 15: Street with non-functional street lights*

## *Walkpath*

| Parameter | Findings 2020 | Findings 2021 | Action to be taken |
|---|---|---|---|
| Walkpath | 30 points identified with no existing walkpath | 27 points identified with no existing walkpath | Proper pavement should be constructed at these points for the pedestrians with durable material, as they are highly used and hence susceptible to wear and tear. There should be regular maintenance checks organised to keep the condition of the pavement at a good standard. |
| | 620 points where the walkpath was unpaved | 255 points where the walkpath was unpaved | |
| | 125 points identified with cars blocking the walkpath | 80 points identified with cars blocking the walkpath | To ensure an obstruction-free pavement, vehicular parking on the pavement should be disallowed. Obstructions such as construction debris and garbage should be cleared, and provisions should be made for regular maintenance checks. |
| | 407 points identified with blockings on the walkpath | 189 points identified with blockings on the walkpath | |

Images 16 and 17 show different types of obstructions on the pavement.

*Image 16: Garbage obstructing pavement*

*Image 17: Vehicles obstructing pavement*

## *Visibility*

| Parameter | Findings 2020 | Findings 2021 | Action to be taken |
|---|---|---|---|
| **Visibility** | 84 points identified with vendors | 71 points identified with vendors | Visibility has the highest correlation with the feeling of safety. Having 'eyes on the street' is integral to creating active and inclusive spaces where people feel comfortable.<br><br>The points identified where vendors are present, they do not have space allocated to them. Vending zones should be created with sheltered space for vendors and street furniture, clear of the pedestrian path so that there is proper space for walking as well. |

An example of an active street with vending zones is shown in Image 18. An example of proper vending zones is seen on the road along Independence Beach in Sihanoukville. There is ample space for vendors without obstructing or interrupting the pavement for pedestrians. This is seen in Image 19.

*Image 18: Ideal street with vending zones*

*Image 19: Road near Independence Beach with proper space for vendors*



## *Public Transport*

| Parameter | Findings 2020 | Findings 2021 | Action to be taken |
|---|---|---|---|
| **Public Transport** | 16 points identified as tuk-tuk stands | 9 points identified as tuk-tuk stands | Points identified as tuk-tuk stands should be developed as designated transport stops with shelter, signage and waiting areas for the commuters. The stop should have proper parking space for the tuk-tuks, clear of the pedestrian path. |

Tuk-tuk stands should also be developed in areas where there is a high density of people as was shown in the heat map in the Public Transport section. These designated tuk-tuk stands should have appropriate signage nearby to help people navigate the city with ease.

*Image 20: Tuk-tuks in Cambodia*

# Way Forward

International agendas like the Sustainable Development Goals (SDG 11 in particular) and the New Urban Agenda have brought urban problems and challenges to the centre and set targets for achieving more inclusive and sustainable cities. Data is key in being able to measure how well each city and country is able to achieve these goals. Further, partnerships are crucial in addressing key social challenges today (SDG 17) and initiatives such as this exemplify strong partnerships between a range of stakeholders.

Within the SDGs, gender equality (SDG 5) works towards promoting gender as a crucial part of the global structure. The lack of safety and presence of fear are a threat to women's rights and equality all over the world and making streets safer for them goes a long way towards the goal of gender equality. Globally, this issue has come into the limelight with the generation of ever more data that demonstrates how sexual harassment and fear shape a women's experience of the city.

Safetipin's mapping in other cities has yielded positive results in identifying and improving certain parameters for enhancing safety and accessibility in public spaces. The data based on the audits generated in Sihanoukville could be used by city stakeholders to create a safer city for women, thereby increasing their rights and access to the city. As discussed before, the analysed data highlights the state of physical infrastructure and social participation in public space. Hence, in order to make streets and public spaces safer and more accessible, certain parameters need immediate attention.

Condition of street lighting, quality of pavement, visibility (eyes on the street), and access to public transport, are the physical infrastructure parameters that need improvement. Specific maps for each parameter with data points having lower ratings have been given along with the recommendations to improve them. If public spaces are active and safer, it positively impacts women's perception of safety in the city.

# Annex 1

Safetipin parameter rubric.

| Rubric | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Light (Night) | **None:** No street or other lights | **Little:** Can see lights, but there is low visibility in the area | **Enough:** Lighting is enough for clear visibility | **Bright:** Whole area is brightly lit |
| Walkpath | **None:** No walking path available | **Poor:** Path exists but in very bad condition | **Fair:** Can walk but not run | **Good:** Easy to walk fast or run |
| Openness | **Not Open:** Many blind corners and no clear sightline | **Partly Open:** Able to see a little ahead and around | **Mostly Open:** Able to see in most directions | **Completely Open:** Can see clearly in all directions |
| Visibility | **No Eyes:** No windows or entrances of shops or residences overlook this point | **Few Eyes:** Less than 5 windows or entrances overlook this point | **More Eyes:** Between 5 to 10 windows or entrances overlook this point | **Highly Visible:** More than 10 windows or entrances overlook this point |
| Public Transport | **Unavailable:** No metro, bus stop or auto/ rickshaw within 10 minutes walking distance | **Distant:** Metro, bus stop or auto/ rickshaw within a 5 to 10 minute walking distance | **Nearby:** Metro, bus stop or auto/ rickshaw within a 2 to 5 minute walking distance | **Very Close:** Metro, bus stop or auto/ rickshaw available within a 2 minute walking distance |
| Security | **None:** No guards or police visible in the surrounding area | **Minimal:** Some private security visible in the surrounding area but not nearby | **Moderate:** Private security within hailing distance | **High:** Police/ reliable security within hailing distance |
| People | **Deserted:** No one in sight | **Few People:** Less than 10 people in sight | **Some Crowd:** Between 10-20 people in sight | **Crowded:** Many people within touching distance |
| Gender Usage | **Not Diverse:** No one in sight or only men | **Somewhat Diverse:** Mostly men and very few women or children | **Fairly Diverse:** Some women and children | **Diverse:** Balance of all genders or more women and children |



# Annex 2

Safety audit CSV file.

| S No | ID | Latitude | Longitude | Lighting | Openness | Visibility | People | Security | Walkpath | Public Trans | Gender Usa | Feeling | Avg Score | Weighted A | Comment | Images |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 717823 | 10.640707 | 103.5012 | 2 | 2 | 1 | 2 | 2 | 3 | 1 | 1 | 2 | 6 | 4.3 | ???????????? | |
| 2 | 717824 | 10.640733 | 103.50117 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 9 | 4.8 | | http://api-an |
| 3 | 717825 | 10.640734 | 103.50117 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 2 | 2 | 7.3 | 4.5 | | http://api-an |
| 4 | 717826 | 10.640632 | 103.50126 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 10 | 5 | | http://api-an |
| 5 | 717827 | 10.64068 | 103.50114 | 3 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 6.7 | 4.4 | ???????????? | http://api-an |
| 6 | 717828 | 10.640534 | 103.50129 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 10 | 5 | ??????? | http://api-an |
| 7 | 718487 | 10.640635 | 103.50122 | 3 | 1 | 3 | 1 | 2 | 0 | 1 | 1 | 1 | 4.7 | 4 | ??????? | http://api-an |
| 8 | 718488 | 10.637643 | 103.50267 | 2 | 1 | 3 | 1 | 2 | 0 | 2 | 0 | 2 | 5 | 4.1 | ??????? | http://api-an |
| 9 | 718489 | 10.640616 | 103.50115 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3.3 | 2 | | |
| 10 | 718490 | 10.640603 | 103.50115 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3.3 | 2 | | http://api-an |
| 11 | 718491 | 10.640735 | 103.50127 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 6.7 | 4.4 | ???????????????????? | http://api-an |
| 12 | 718492 | 10.640534 | 103.50152 | 3 | 2 | 3 | 0 | 2 | 1 | 3 | 0 | 2 | 6 | 4.3 | Test | http://api-an |
| 13 | 718493 | 10.642362 | 103.50182 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 7.3 | 4.5 | ???????????????????? | http://api-an |
| 14 | 720799 | 10.610589 | 103.53158 | 3 | 1 | 1 | 1 | 1 | 3 | 2 | 0 | 2 | 5.3 | 4.1 | | http://api-an |
| 15 | 720800 | 10.6127 | 103.5305 | 2 | 1 | 1 | 1 | 0 | 2 | 2 | 0 | 2 | 4.3 | 3.5 | | http://api-an |
| 16 | 720801 | 10.611637 | 103.53122 | 3 | 2 | 1 | 1 | 0 | 3 | 2 | 1 | 2 | 5.7 | 4.2 | | http://api-an |
| 17 | 720802 | 10.610747 | 103.52797 | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 1 | 1 | 3 | 1.6 | | http://api-an |
| 18 | 720803 | 10.61381 | 103.52869 | 1 | 1 | 1 | 2 | 2 | 0 | 2 | 2 | 2 | 5 | 4.1 | | http://api-an |
| 19 | 720804 | 10.615091 | 103.53086 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0.8 | | http://api-an |
| 20 | 720805 | 10.615091 | 103.53086 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1.3 | 0.5 | | http://api-an |
| 21 | 720806 | 10.634895 | 103.53378 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 7.3 | 4.5 | ???????????????????? | http://api-an |
| 22 | 720807 | 10.635067 | 103.53377 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 7.3 | 4.5 | ??????????? | http://api-an |
| 23 | 720808 | 10.634515 | 103.53377 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 7.3 | 4.5 | ????????? ????????? | http://api-an |
| 24 | 720809 | 10.614653 | 103.53303 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 1 | 1 | 2.7 | 1.3 | | http://api-an |
| 25 | 720810 | 10.61234 | 103.53086 | 0 | 2 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 3 | 1.6 | | http://api-an |
| 26 | 720811 | 10.616858 | 103.52977 | 1 | 2 | 3 | 1 | 1 | 0 | 1 | 1 | 2 | 4.7 | 4 | | http://api-an |
| 27 | 720812 | 10.618467 | 103.5323 | 3 | 1 | 1 | 0 | 1 | 3 | 1 | 0 | 1 | 4 | 3 | | http://api-an |
| 28 | 720813 | 10.614542 | 103.53556 | 3 | 3 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 3.3 | 2 | | http://api-an |
| 29 | 720814 | 10.613913 | 103.53677 | 3 | 1 | 1 | 0 | 0 | 3 | 2 | 0 | 0 | 3.3 | 2 | | http://api-an |
| 30 | 720815 | 10.611713 | 103.53736 | 0 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1.7 | 0.7 | | http://api-an |
| 31 | 720816 | 10.60893 | 103.53809 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.4 | | http://api-an |
| 32 | 720817 | 10.599484 | 103.55761 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.7 | 0.3 | ???????????????? | http://api-an |
| 33 | 720818 | 10.61482 | 103.54496 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.4 | | http://api-an |
| 34 | 720819 | 10.633818 | 103.52804 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 2 | 6.3 | 4.3 | ???????????????? | http://api-an |
| 35 | 720820 | 10.634506 | 103.5338 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 6.7 | 4.4 | ??????? ???????????? | http://api-an |
| 36 | 720821 | 10.608555 | 103.53881 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0.3 | | http://api-an |
| 37 | 720822 | 10.633955 | 103.5281 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 6.3 | 4.3 | ???????????? ???????????? ???? | |
| 38 | 720823 | 10.607615 | 103.5446 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 2.3 | 0.9 | ??????????? | http://api-an |
| 39 | 720824 | 10.608007 | 103.54351 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.1 | | http://api-an |
| 40 | 720825 | 10.605852 | 103.54843 | 1 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 3.3 | 2 | ???????????? | http://api-an |
| 41 | 720826 | 10.633826 | 103.5277 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 6.3 | 4.3 | ???????????????????? | http://api-an |
| 42 | 720827 | 10.615012 | 103.53267 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.1 | | http://api-an |
| 43 | 720828 | 10.634021 | 103.52805 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1.3 | 0.5 | ??????????? | http://api-an |
| 44 | 720829 | 10.619315 | 103.51762 | 2 | 3 | 2 | 1 | 0 | 3 | 2 | 0 | 2 | 5.7 | 4.2 | ??????????? | http://api-an |
| 45 | 720830 | 10.592239 | 103.54243 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0.3 | | http://api-an |
| 46 | 720831 | 10.605757 | 103.54854 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.5 | ??????????? | http://api-an |
| 64 | 720849 | 10.613598 | 103.51569 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 6.3 | 4.3 | ????????????? | http://api-an |

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