

# ADA Assignment

## Gaurav Singh, 2957104

### Part 1

#### **Exploratory Analytics and Visualisation of Data via Information Dashboard**

**Title: Parking Bay 2011-12, Melbourne city, Australia**

**Sources:**

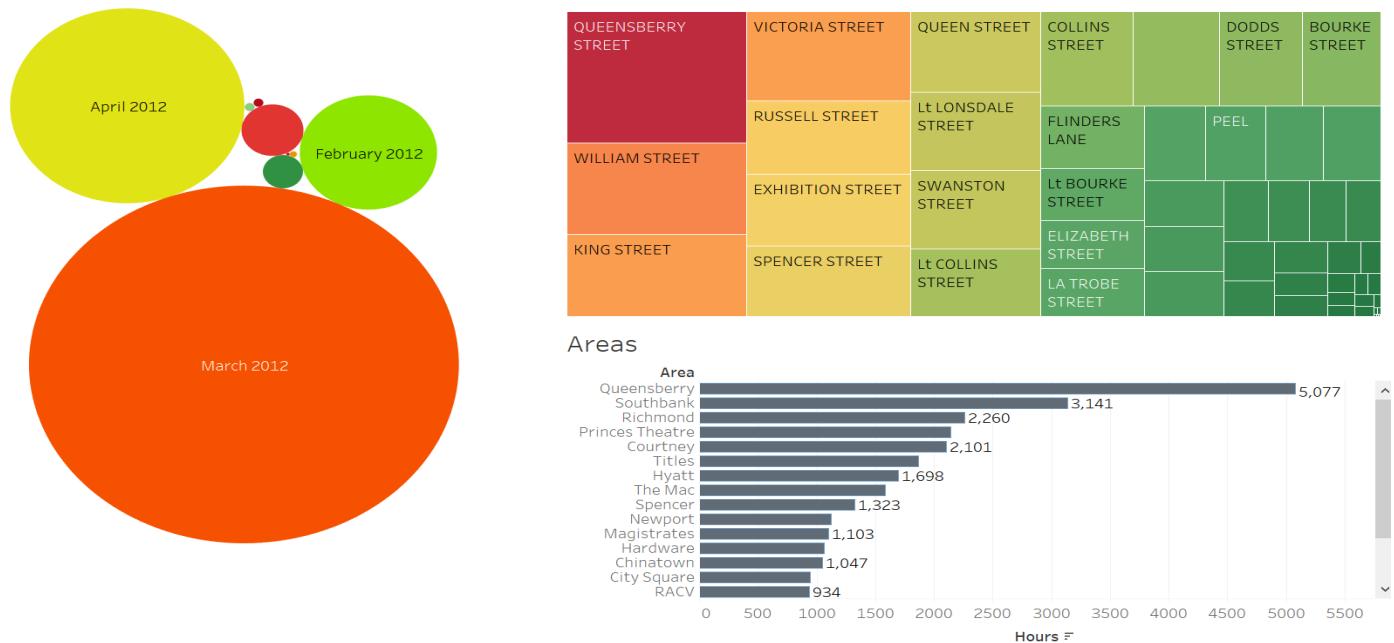
- <https://data.melbourne.vic.gov.au/browse>
- <http://www.melbourne.vic.gov.au/parking-and-transport/parking/Pages/parking-for-people-with-disabilities.aspx>

**Description of Dataset:**

- DeviceID: Devices used for collecting data for the parking area
- ArrivalTime: Vehicle arrival time to the parking bay
- DepartureTime: Vehicle departure time from the parking bay
- DurationSeconds: Time vehicle parked in the parking lot
- Streetmarkers: Streets markers in the area
- Sign: Number of hours allowed, Ticket/Meter, Mon-Sun/Mon-Fri
- Area: Areas in the city
- Latitude: coordinates of the areas into the city
- Longitude: coordinates of the areas into the city
- DisabledParking: Number of disabled parking in parking bay
- StreetId: Street ID of the main streets
- StreetName: Main Street names
- BetweenStreet1: Nearby streets 1 near main street
- BetweenStreet2: Nearby streets 2 near main street
- Side of Street: Number of street parking
- In Violations: Number of violations in parking bay
- Parking Hours: maximum parking hours allowed
- Hours: Number of hours parked

Parking into the city addressed a lot of problems association with educational institution, entertainment uses, religious institutions commercial activities, special events and much more.

## Dashboard 1: Area Map with a top busy area with street

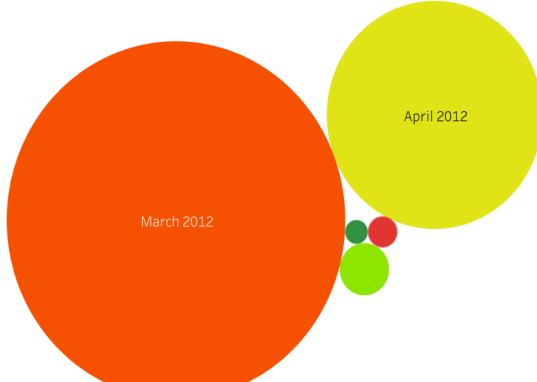


From the above dashboard, as in the month of March, parking into the city is very difficult. From the first relation as can understand, citizens of Melbourne city love to go outside more in March and April. The Queensberry area is the most crowded area which is pointed by bar graph relation between Areas and a total number of hours. The Queensberry might be the hub of shopping centers or IT where the demand for vehicle parking is always high.

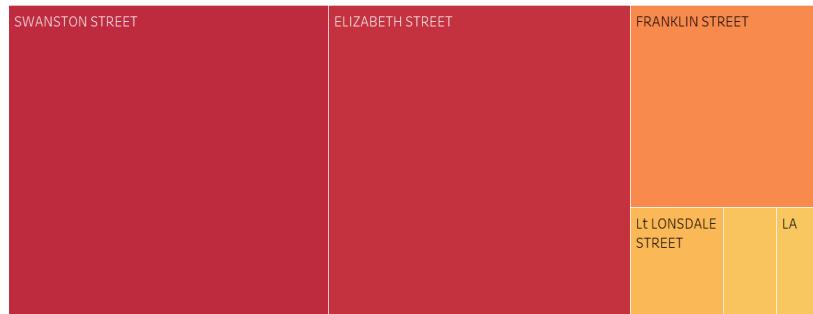
Similarly, as into the Mac area shown below where we can compare of a total number of hours people are spending time into that area. It also shows the 'Swanston and Elizabeth streets' are the busiest streets in that area were getting parking is very difficult. The Franklin street in orange color is also very active. However, the Lt Lonsdale street is not so much busy but might be a little walk to the main street.

### CrowdedAreas

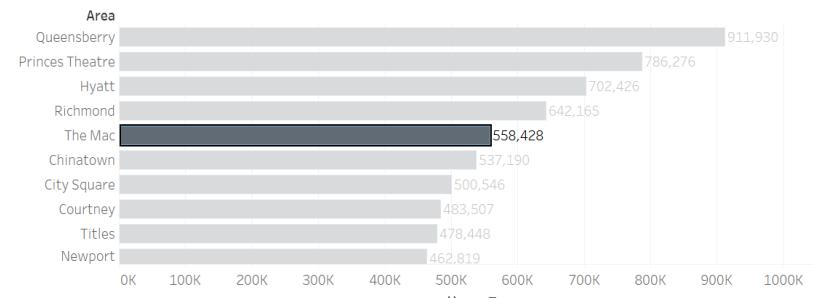
#### BusybyMonth



#### TopBusyStreets



#### Areas



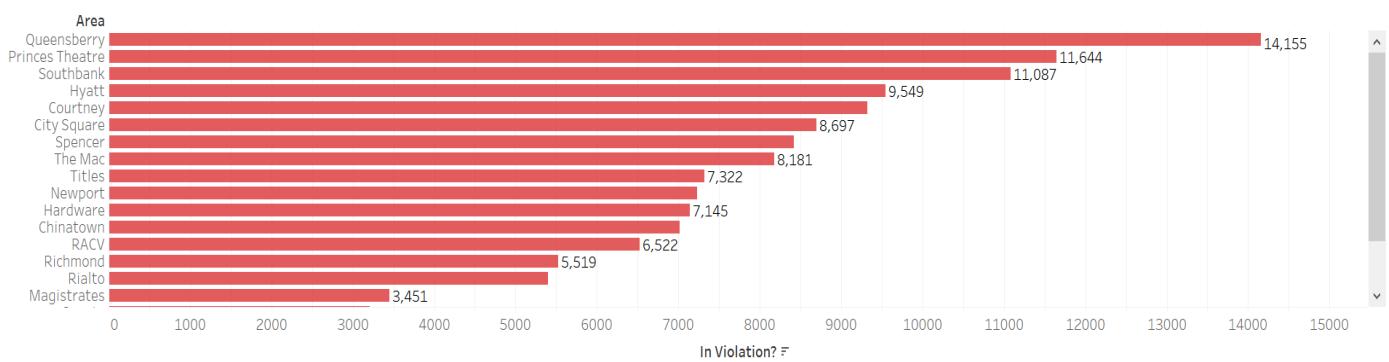
Here issue arises with the impact of out of town parking. The majority of vehicles parked are from outside the local area or city.

This information into the dashboard might be helpful for everyone in the city. As people who are coming from outside the city can hire carpool or use public transport such as buses, metro etc. The local people can use a bicycle. The government transport authority can start more public buses in those peak time and encourage people to use them. The private taxi owners can use this data and provide services to those demanding areas.

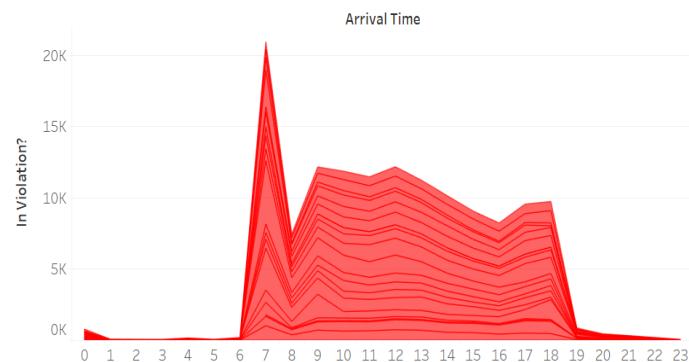
## Dashboard 2: Violations

### ViolationsDashboard

#### ViolationsinArea



#### ViolationsTime



#### ViolationsbyMonth



Parking regulations are observed and enforced on an ongoing basis to achieve compliance with the City's Traffic and Parking By-law. The violation might be the act of parking vehicle in a restricted area, parked at an expired meter etc.

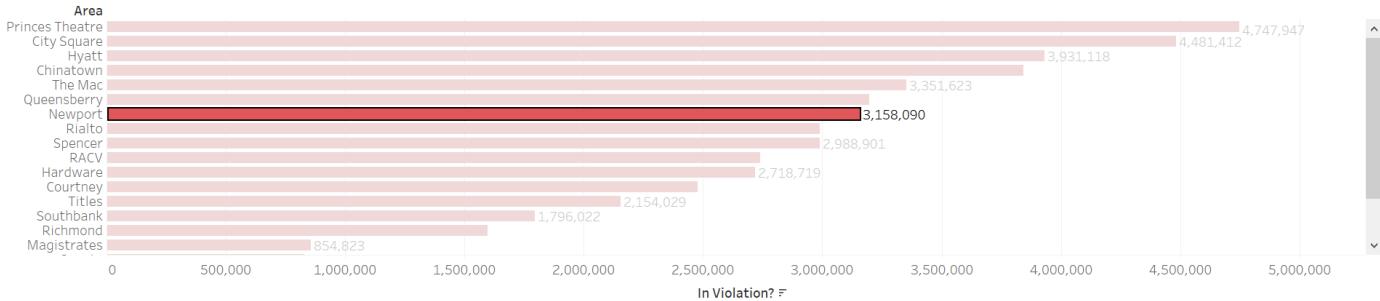
From the violation dashboard, we may get to know in what area and at when the breaches happen into the city. So, from the first bar graph represents the information of the area where most of fewer violations detected. The Queensberry is the most violated area then Princes Theatre and so on.

The second representation is about the violation time. The representation of the 2011-12 year's data shows that most of the violations happen in the morning between 6 to 8 AM.

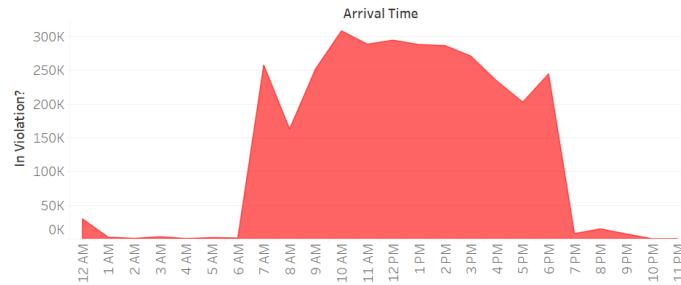
The third representation tells about violations by month. Overall violations in the year were most starts from February month and in March violations are on the peak.

## ViolationsDashboard

### ViolationsinArea



### ViolationsTime



### ViolationsbyMonth



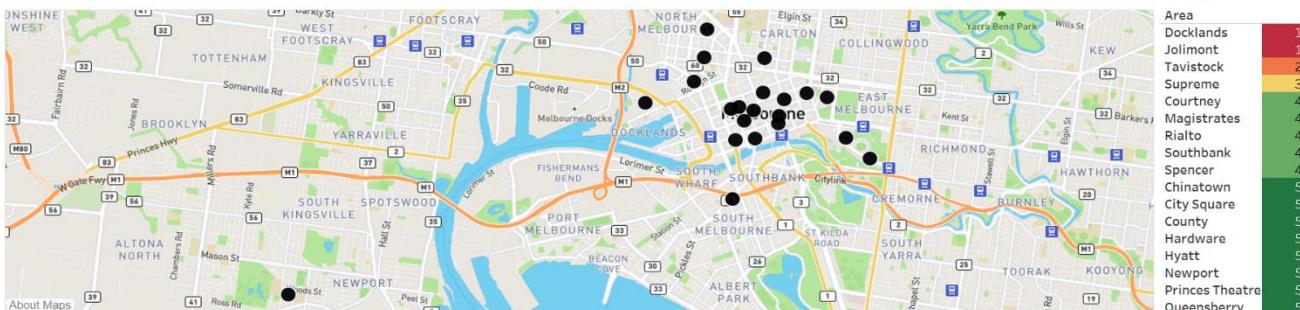
Example, In the Newport area, more than 3 million violations happen in 2011. The violations were on the peak at 10 AM in the month of March.

Here the problem is security and difficulties with parking regulations.

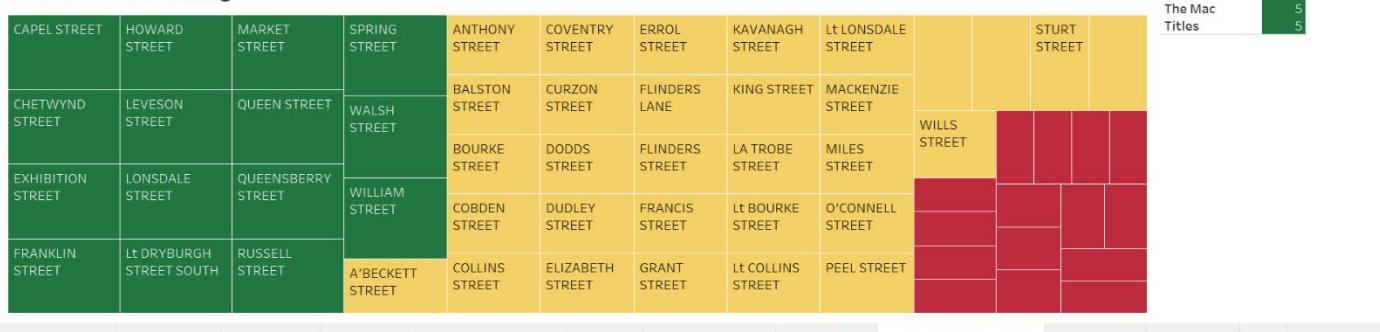
This dashboard might be useful for the traffic police and parking management. As they can use the data and control the violations by patrolling, install CCTV cameras, a frequent update to drivers through phone and so on about the vehicle and parking regulations.

## Dashboard 3: Main streets parking and locate nearby streets for parking spaces in the area

### AreaMap

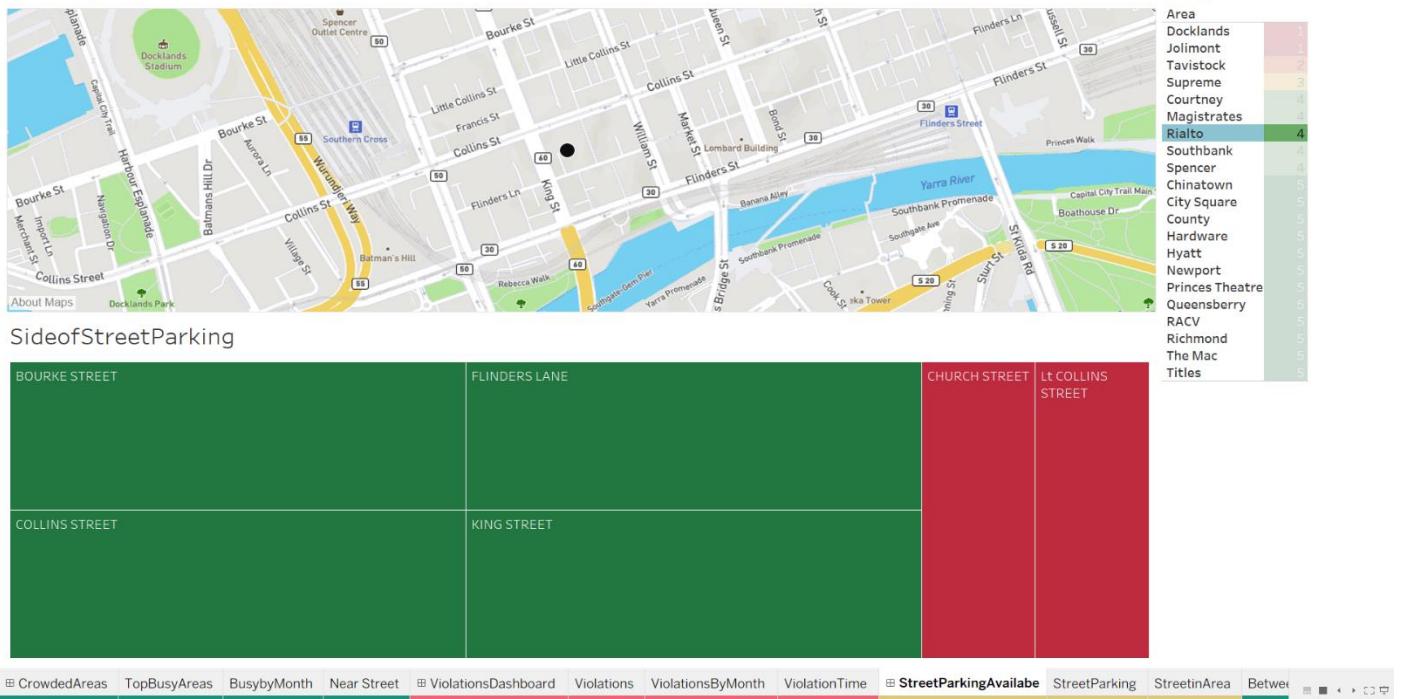


### SideofStreetParking



The third dashboard, Main Street parking and locate nearby streets for parking spaces in the area. This provides the information of all the parking areas with several main street parking availabilities. The first visualize the location of areas using latitude and longitude, second for area list with a number of side street parking in total and third tells the main streets into that area.

AreaMap



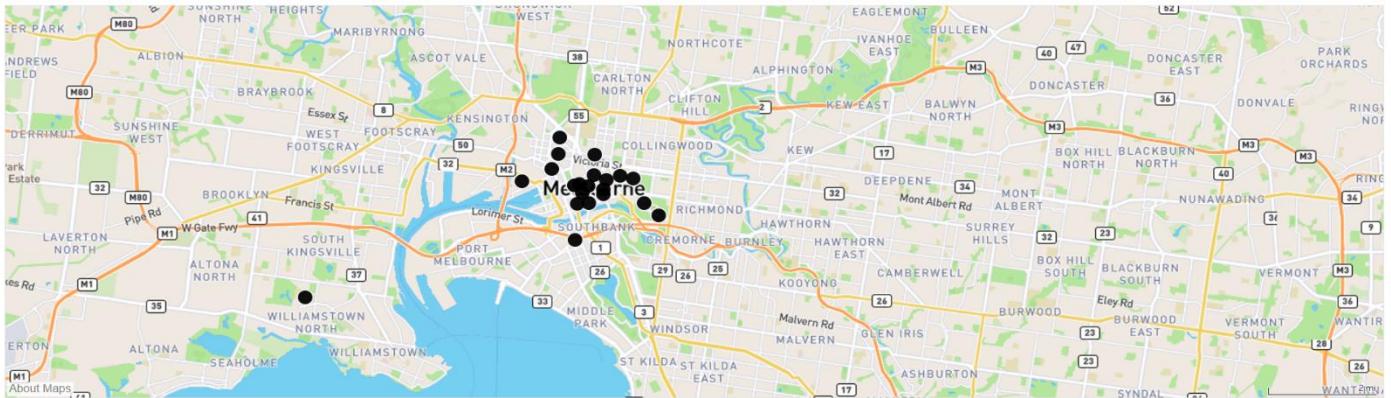
For example, in Rialto area 4 main street parking available. Those might be near to the Bourke street, King and Collins street. They are all main streets.

Here the problem is Inadequate information of parking availability. Sometimes the drivers frustrated if they expect abundant and free parking but limited or expensive parking, or if they spend more time searching for space. This dashboard will help the drivers to locate the parking spaces on street and all the nearby parking streets.

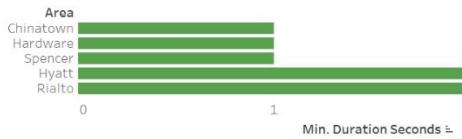
The parking management can fill the unused parking for free or less ticket price to use the places.

## Dashboard 4: Top 5 least busy Areas and streets

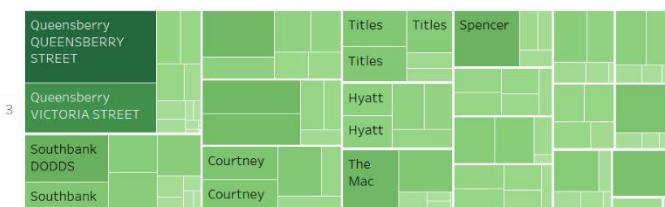
AreaMap



5LeastBusyAreas



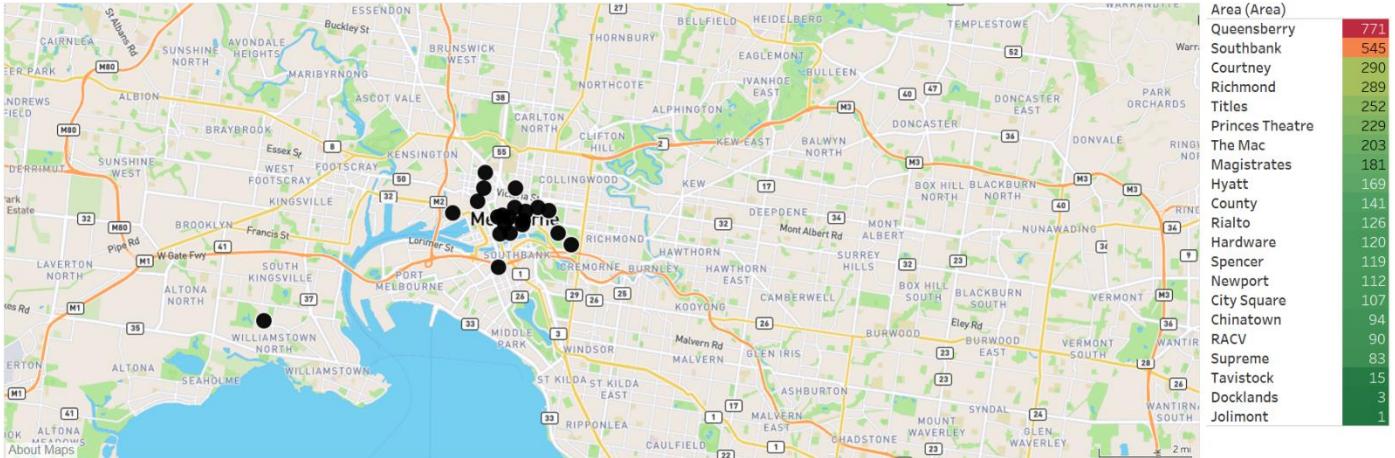
LocalStreets



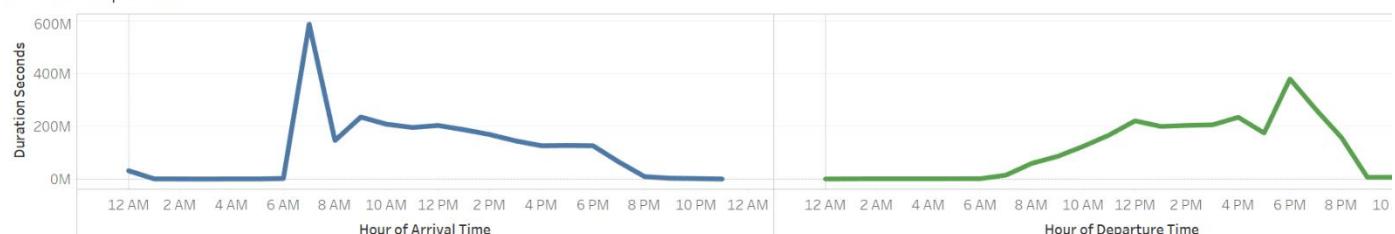
The top 5 least busy areas as above in the dashboard. It is filters on the number of duration in seconds at each location. After applying the filters, getting these area with streets. The map is filtered with latitude and longitude of the areas. The local streets are the main streets into the areas.

This dashboard will be useful for who wants to live in the city with the less busy area.

## Dashboard 5: Arrival/Departure into the parking



ArrivalDeparture



The information of arrival and departure of vehicles are gathering from this dashboard in terms of hours. The first visualize the areas using latitude and longitude, a second number of areas with devices to capture the arrival and departure of the vehicle and third arrival and departure of vehicles collected by devices in

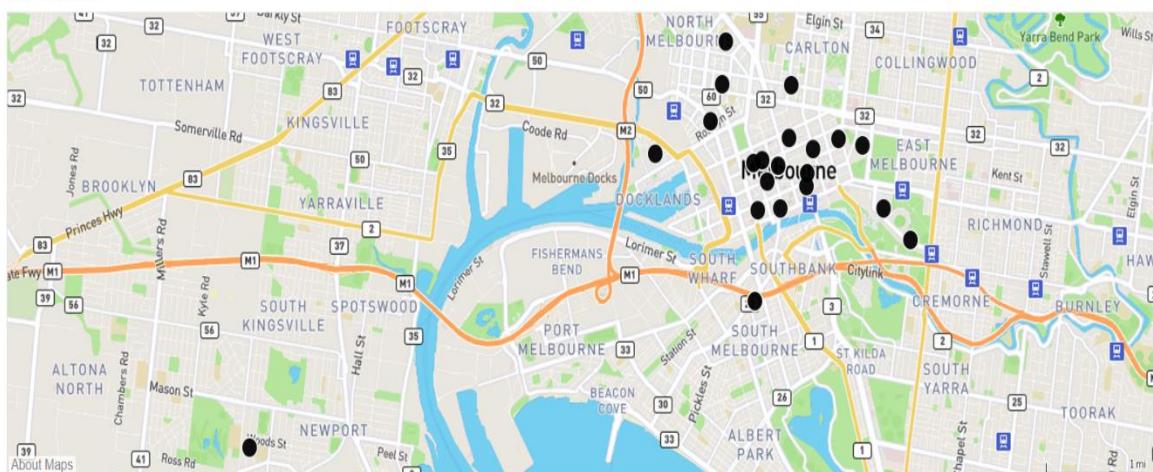
hours. As can notice through all over the data, the rush hour is in the morning between 6-8 AM. And the departure slightly starts from 8 AM and ends up at night 8 PM. This data may give some indication that people are going office in the morning and most of them go back at evening to home.

This dashboard might useful for parking management to manage the parking spaces with intelligent parking system, improve parking facilities and considering long-term commuter parking.

People can use the carpool service to reduce the amount of required parking places.

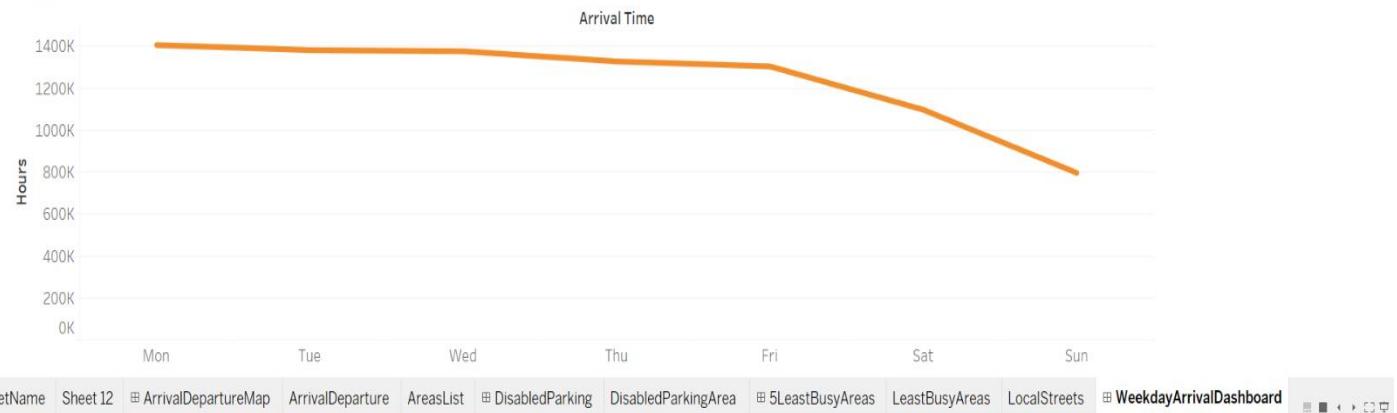
## Dashboard 6: Parking Bay with Weekdays

AreaMap



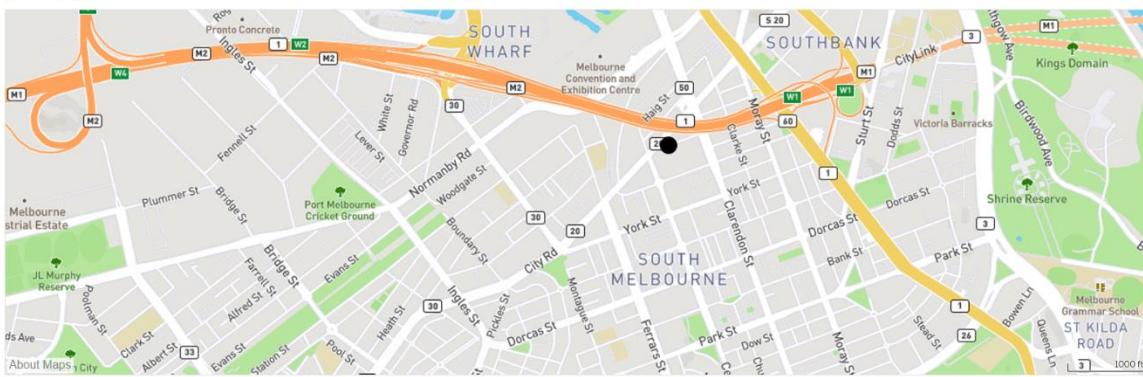
AreasList

WeekdayArrival



As in the last dashboard, which gave the information about the arrival and departure in terms of hours. Now this dashboard will help us to know the arrivals of the vehicle into a parking bay in terms of weekdays. As can figure out from the line graph, the arrivals are from Monday to Friday are continuously constant as on Saturday and Sunday, it decreases.

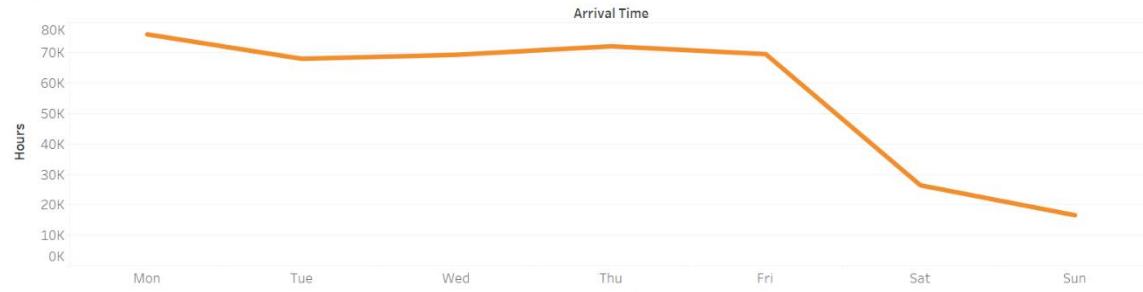
## AreaMap



## AreasList

Area (Area)	Southbank	494
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## WeekdayArrival



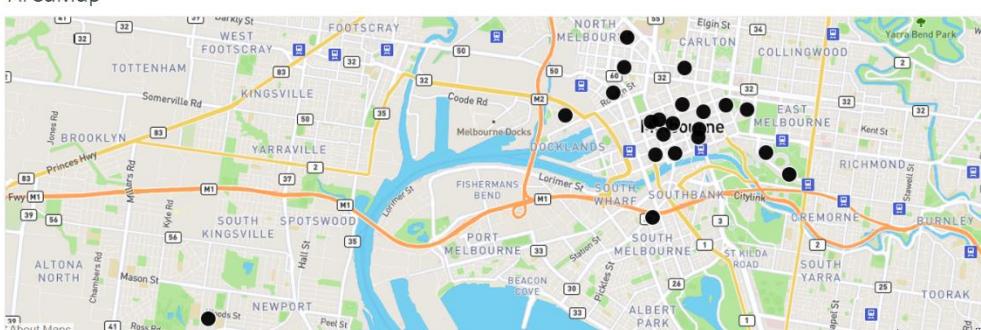
As can check in Southbank with 494 devices at parking bays donates that weekday rush and less on weekends.

This might be because people are working from Monday to Friday to these locations and coming from their own vehicle.

This dashboard might be great for parking management and the public. From this dashboard, understand that on Weekend getting parking is easy compared to Weekdays.

## Dashboard 7: Devices detecting violations

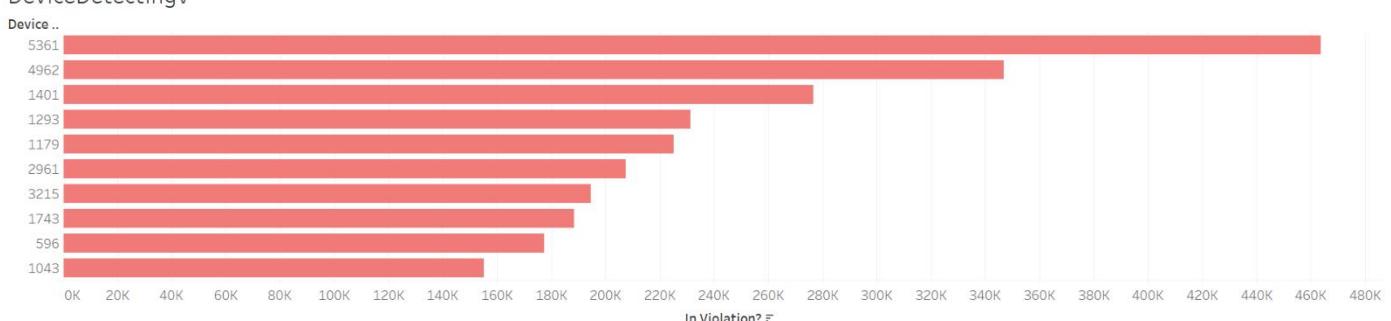
### AreaMap



### AreasList

Area (Area)	Count
Queensberry	714
Southbank	494
Richmond	283
Courtney	278
Titles	247
Princes Theatre	227
The Mac	201
Magistrates	180
Hyatt	168
County	139
Rialto	126
Spencer	116
Hardware	114
Newport	109
City Square	106
Chinatown	106
RACV	94
	89

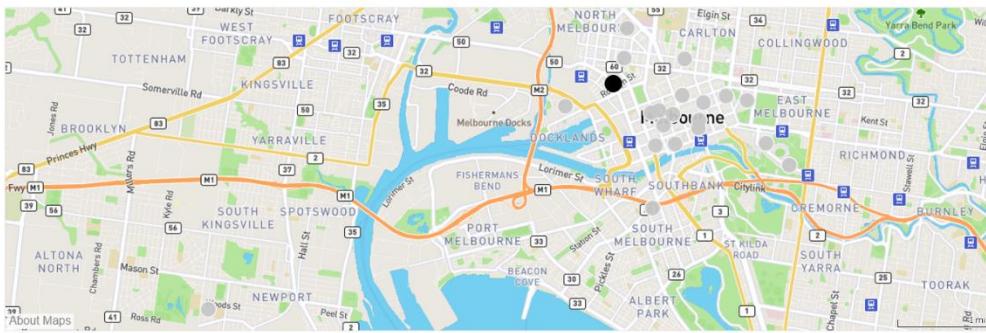
### DeviceDetectingV



ArrivalDeparture	AreasList	DisabledParking	DisabledParkingArea	5LeastBusyAreas	LeastBusyAreas	LocalStreets	WeekdayArrivalDashboard	WeekdayArrival	DeviceDetectVDashboard
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The devices installed on areas of the city detecting all the violations and ranking them as top 10. We can track the violations on the parking spot.

AreaMap



AreasList

Area (Area)	Spencer
	116

DeviceDetectingV



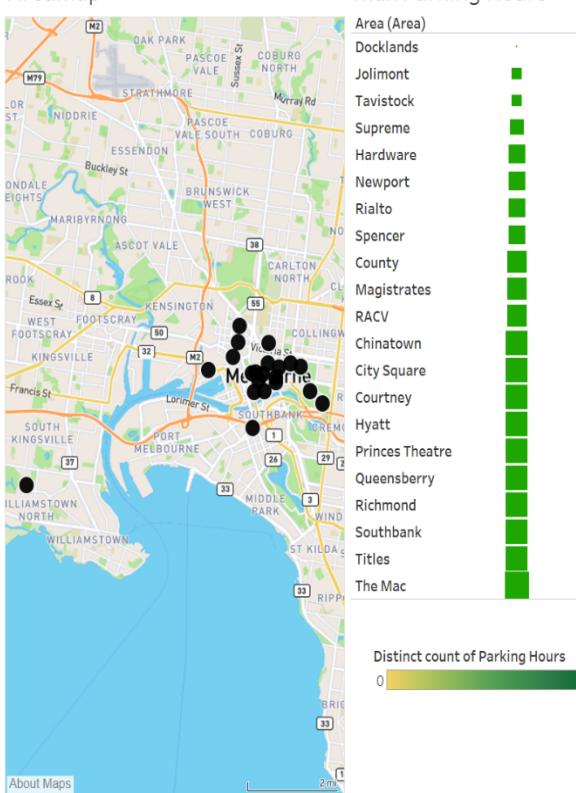
AreasList DisabledParking DisabledParkingArea 5LeastBusyAreas LeastBusyAreas LocalStreets WeekdayArrivalDashboard WeekdayArrival DeviceDetectVDashboard DeviceDetectingV

To understand better, check this example as can see the device number 1743 at Spencer area with 190K violations in 2011.

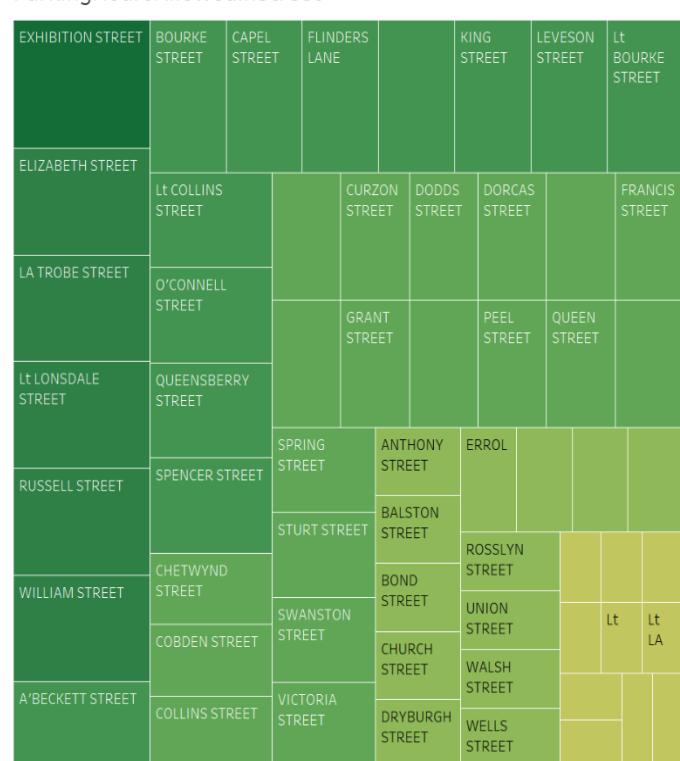
With this information improve security by parking management.

## Dashboard 8: parking allowed for max hours

AreaMap



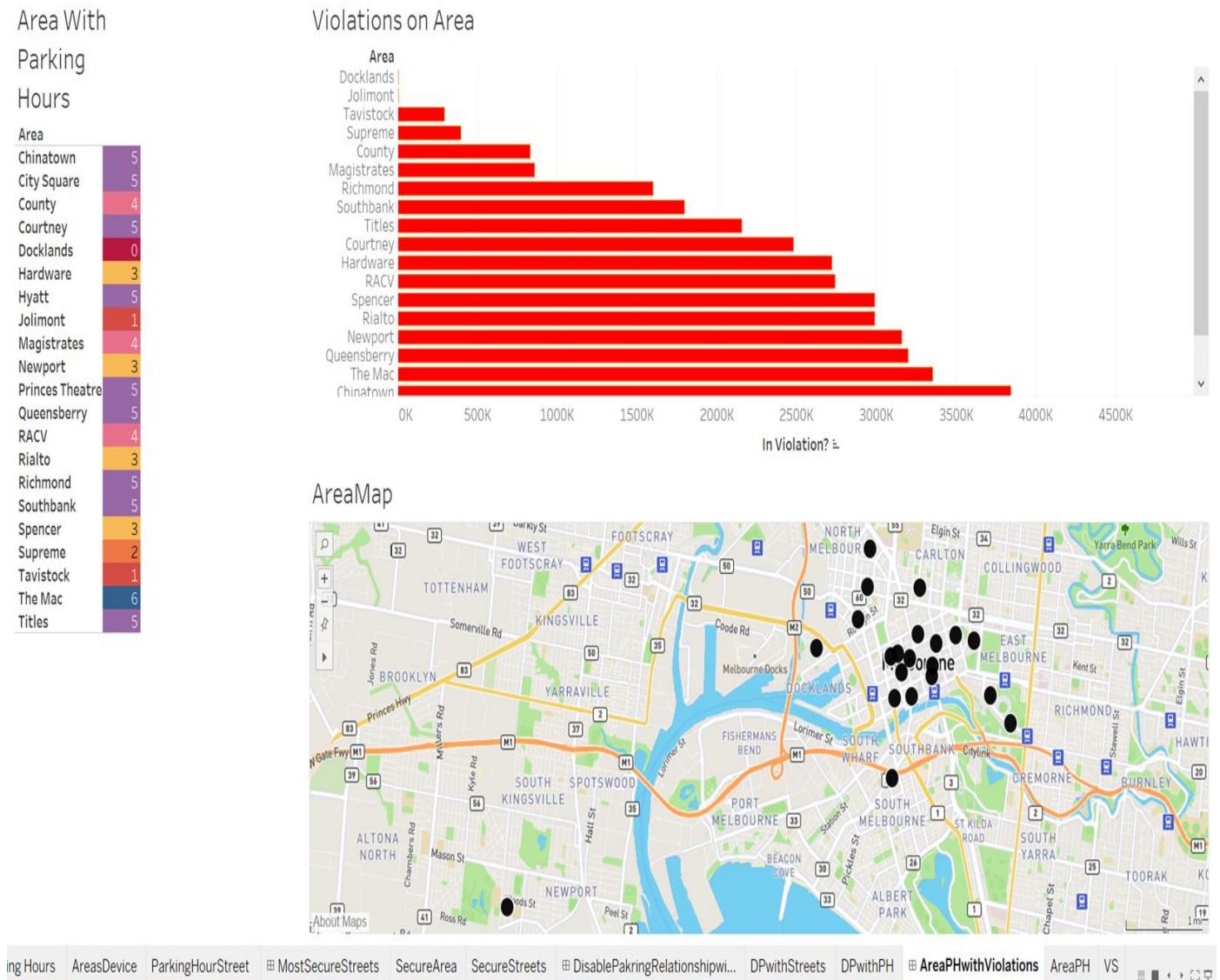
ParkingHoursAllowedinStreet



Area 5LeastBusyAreas LeastBusyAreas LocalStreets WeekdayArrivalDashboard WeekdayArrival DeviceDetectVDashboard DeviceDetectingV ParkingHourStreet Max Parking Hours

The maximum hours allowed on the street to park the vehicle. On the streets, parking hours are not constant. They vary from 0 to 6 as can recognize from the dashboard, 0 means gold color and 6 means green color.

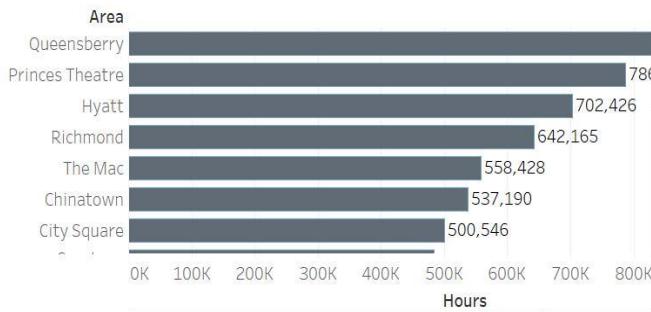
## Dashboard 9: Violations during parking hour



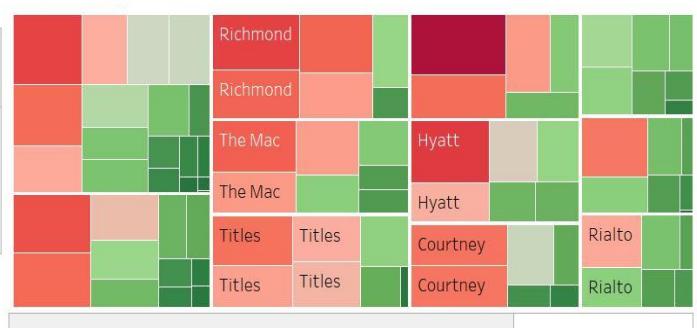
This dashboard may give the relationship between violations happening during maximum parking hours allowed. The first represents the area list with maximum parking hours allowed. The second visualize the number of violations on the area in ascending order. The third locate the area on the map.

## Dashboard 10: All streets near to the parking bay

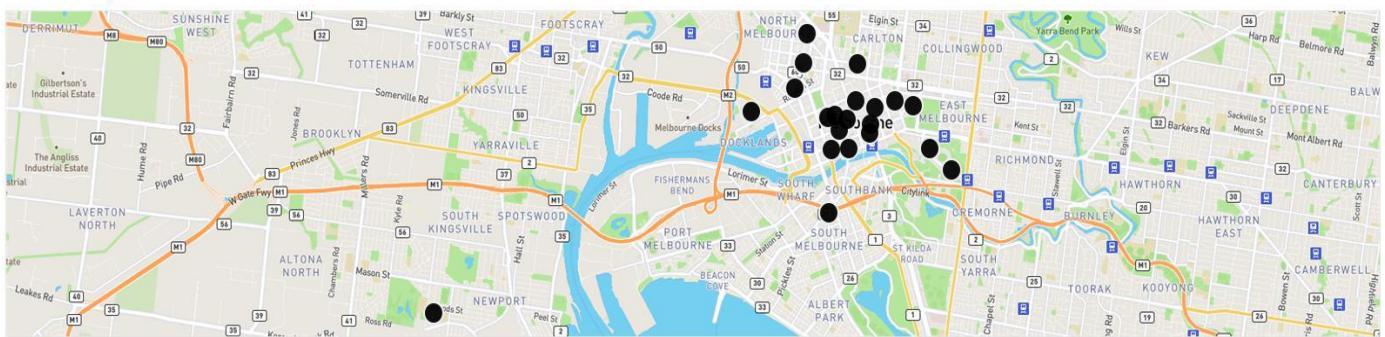
### Areas



### StreetsinArea



### AreaMap



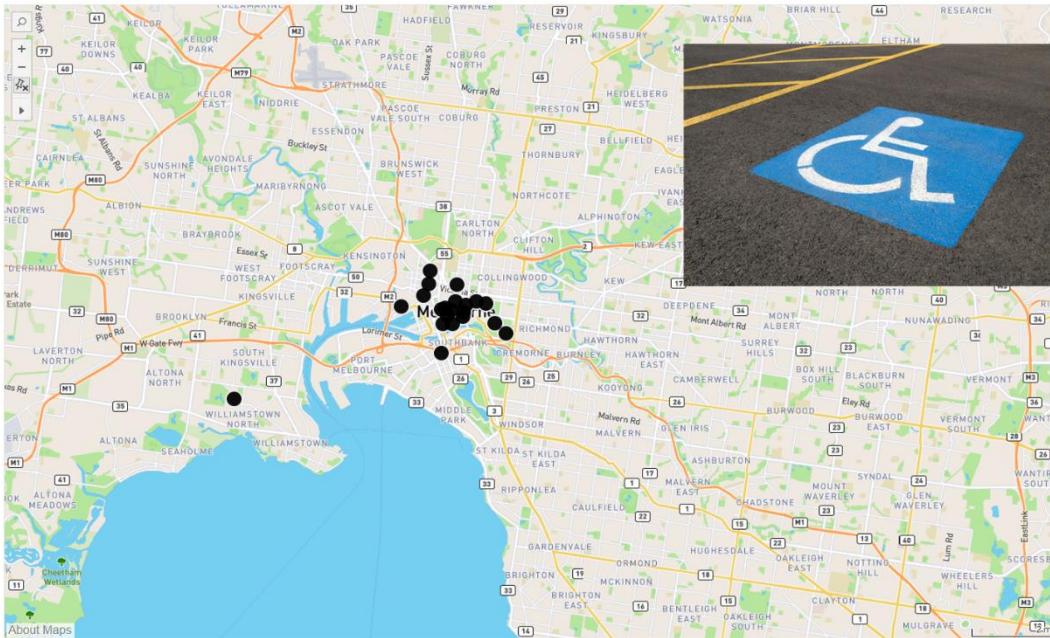
All streets near residential areas where parking exists.

That may help to encourage short-term parking and turnovers. Changes will depend on the property owner or business managers.

## Dashboard 11: Disabled Parking into a parking bay

### Disabled Parking

#### AreaMap



#### Disabled Parking List

Area (Area)	Count
Chinatown	2
City Square	2
County	2
Courtney	1
Docklands	0
Hardware	2
Hyatt	3
Jolimont	1
Magistrates	2
Newport	1
Princes Theatre	1
Queensberry	3
RACV	2
Rialto	1
Richmond	1
Southbank	1
Spencer	1
Supreme	1
Tavistock	2
The Mac	3
Titles	1

This dashboard visualizes the number of disabled parking spot are available in the different area.

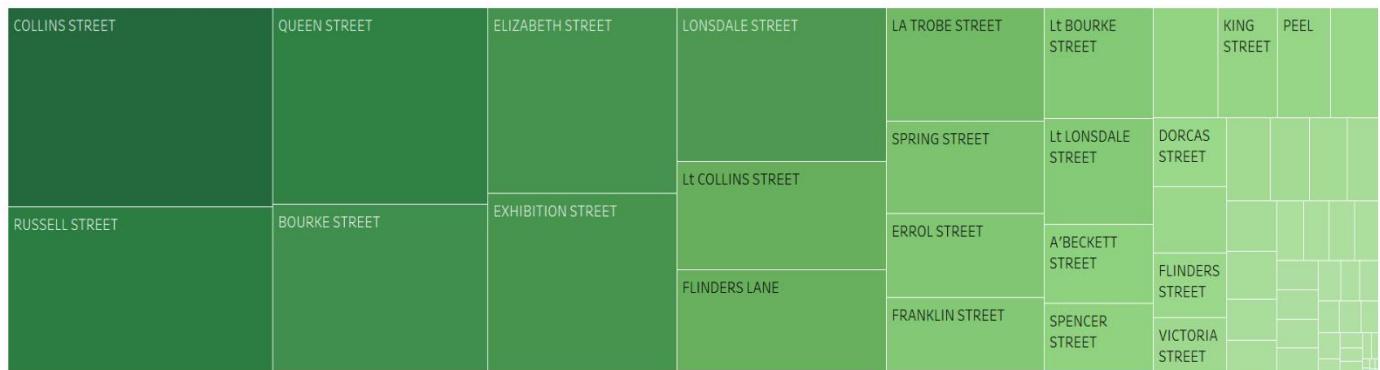
Where to find parking bays for people with disabilities in the city?

This dashboard is the answer to this question to find the number of disabilities parking spaces.

It ensures sufficient handicapped parking to meet existing needs and organizations. Parking facilities with handicapped parking spaces and circulation paths designed for wheelchairs can better accommodate people with disabilities.

## Dashboard 12: Most secure areas of the city

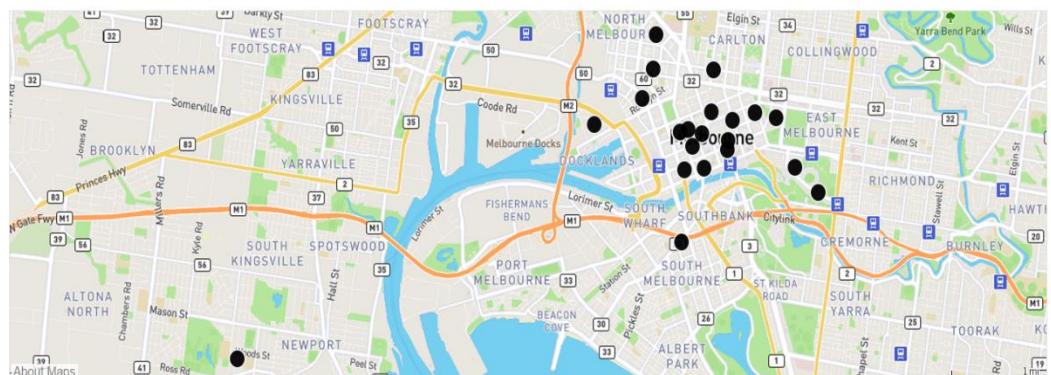
MostSecureStreets



AreasList

Area	
Docklands	6
Jolimont	3,392
Tavistock	290,266
Supreme	394,572
County	827,414

AreaMap



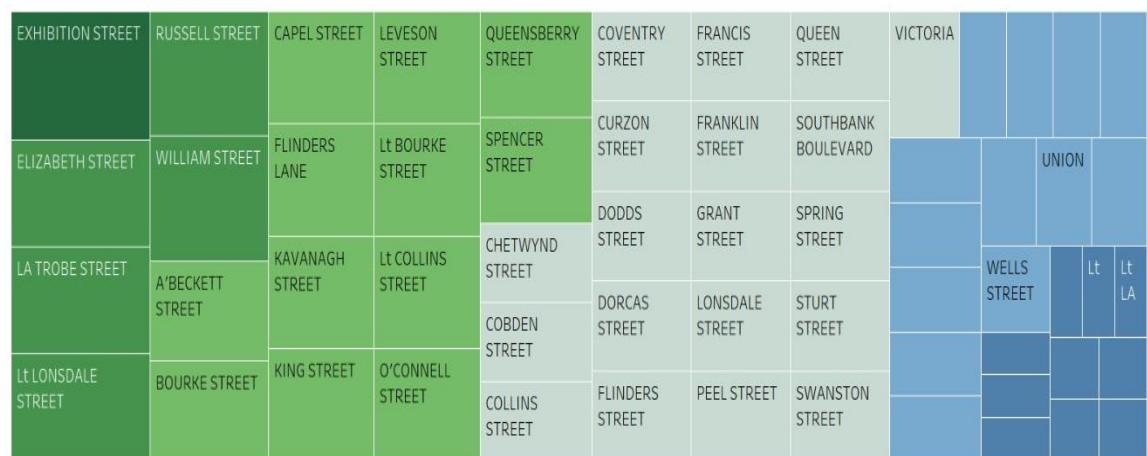
It offers the number of safe areas or less violated areas into the city. The first gives the most secure main streets in the area. The second provides the top 5 areas list and the third locate them on the map.

This dashboard might be useful to open banks, new schools, colleges and hospitals where less crimes happen.

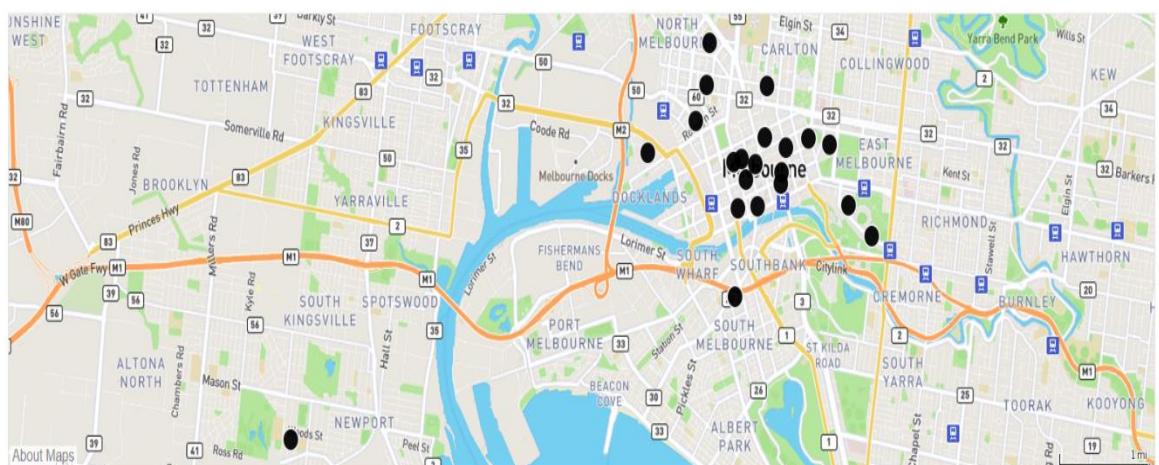
## Dashboard 13: Relationship between Parking hours and disabled parking

Area	Disabled Parking Relationship with Parking Hours
The Mac Chinatown	6
City Square	5
Courtney Hyatt	5
Princes Theatre	5
Queensberry	5
Richmond	5
Southbank	5
Titles County Magistrates	4
RACV	4
Hardware	3
Newport	3
Rialto	3
Spencer	3
Supreme	2
Jolimont	1
Tavistock	1
Docklands	0

Paarking Streets



AreaMap



AreasDevice ParkingHourStreet MostSecureStreets SecureArea SecureStreets DisablePakingRelationship... DPwithStreets DPwithPH AreaPHwithViolations AreaPH VS Parki

Maximum Parking hours allowed with disabled parking. This provides the information of parking bays with disabled parking.

What are the parking areas where people can get the access of disabled parking in rush hours?

In rush hours, if more than 1 disabled parking is available then parking management can use the disabled parking as a regular for demand.

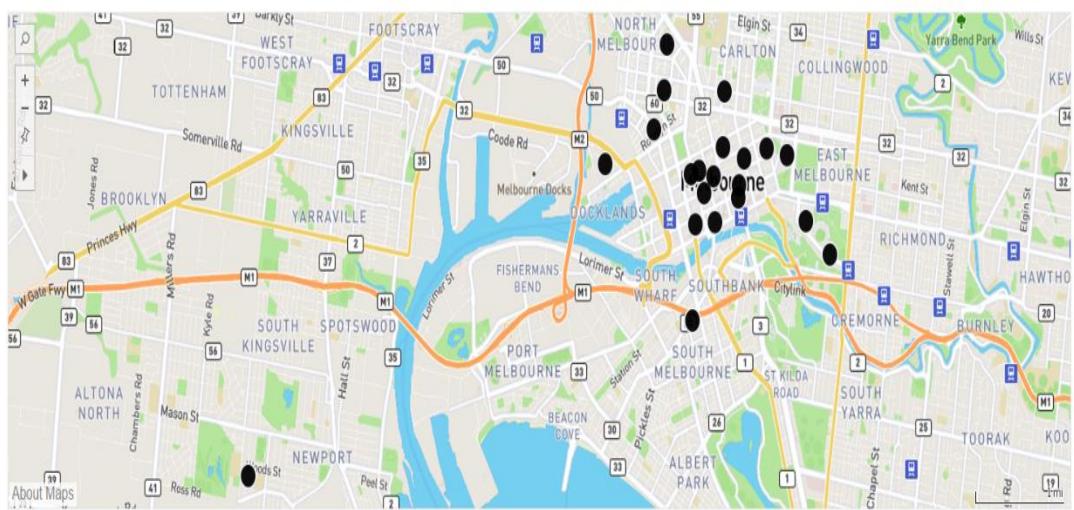
It ensures sufficient handicapped parking to meet existing needs and organizations. Parking facilities with handicapped parking spaces and circulation paths designed for wheelchairs can better accommodate people with disabilities.

## Dashboard 14: Arrival/Departure during maximum hours allowed in a parking bay

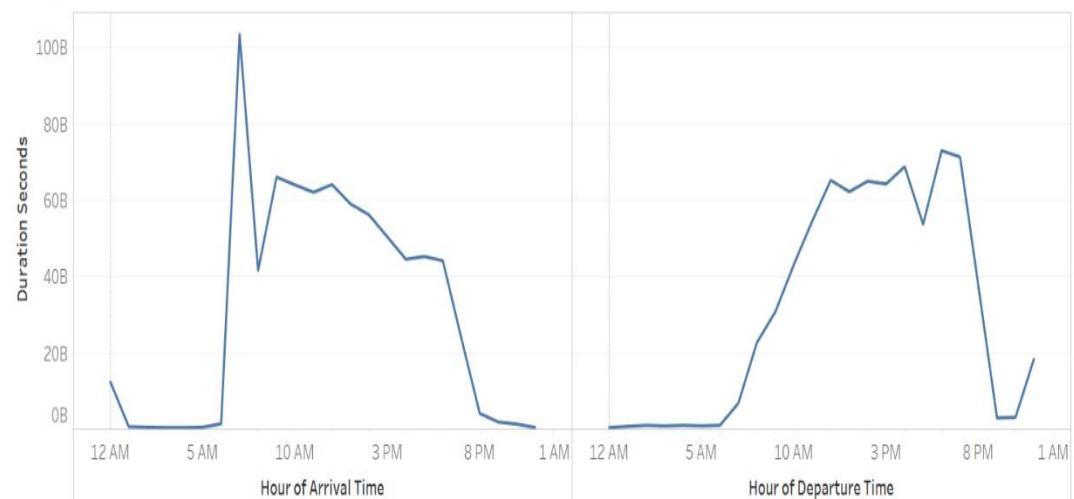
Area With  
Parking  
Hours

Area	Hours
Chinatown	5
City Square	5
County	4
Courtney	5
Docklands	0
Hardware	3
Hyatt	5
Jolimont	1
Magistrates	4
Newport	3
Princes Theatre	5
Queensberry	5
RACV	4
Rialto	3
Richmond	5
Southbank	5
Spencer	3
Supreme	2
Tavistock	1
The Mac	6
Titles	5

AreaMap



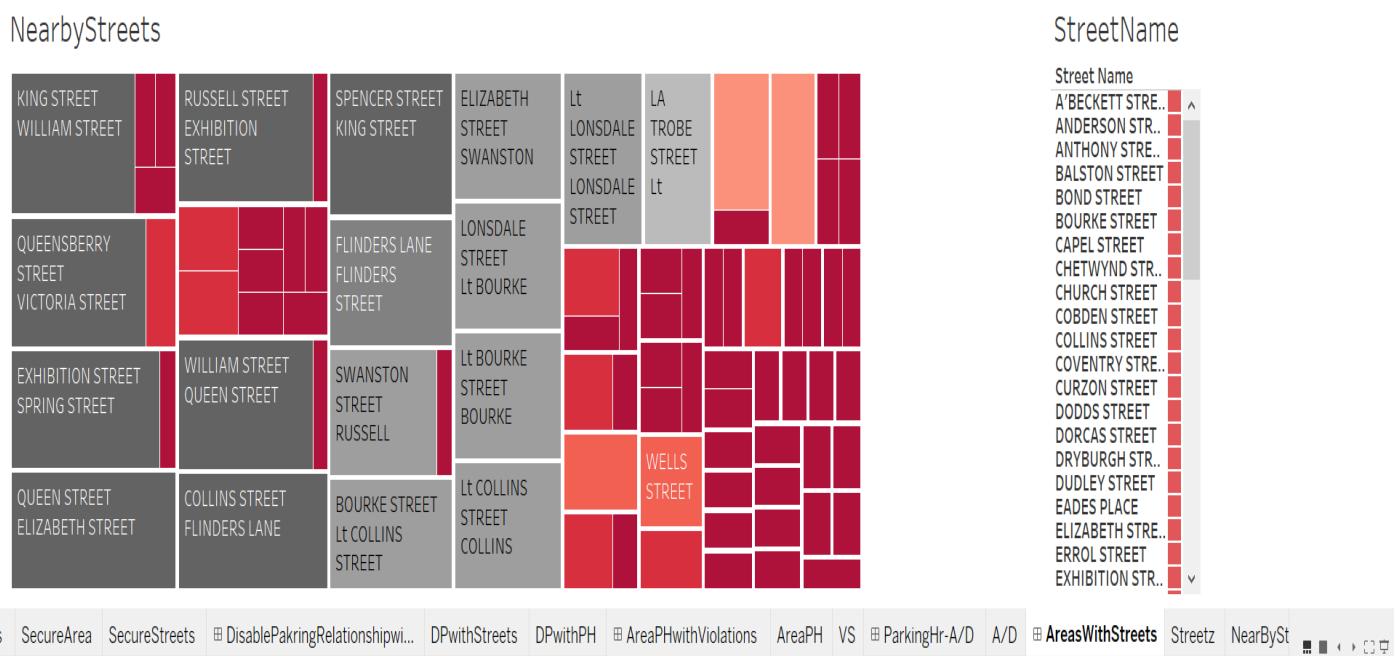
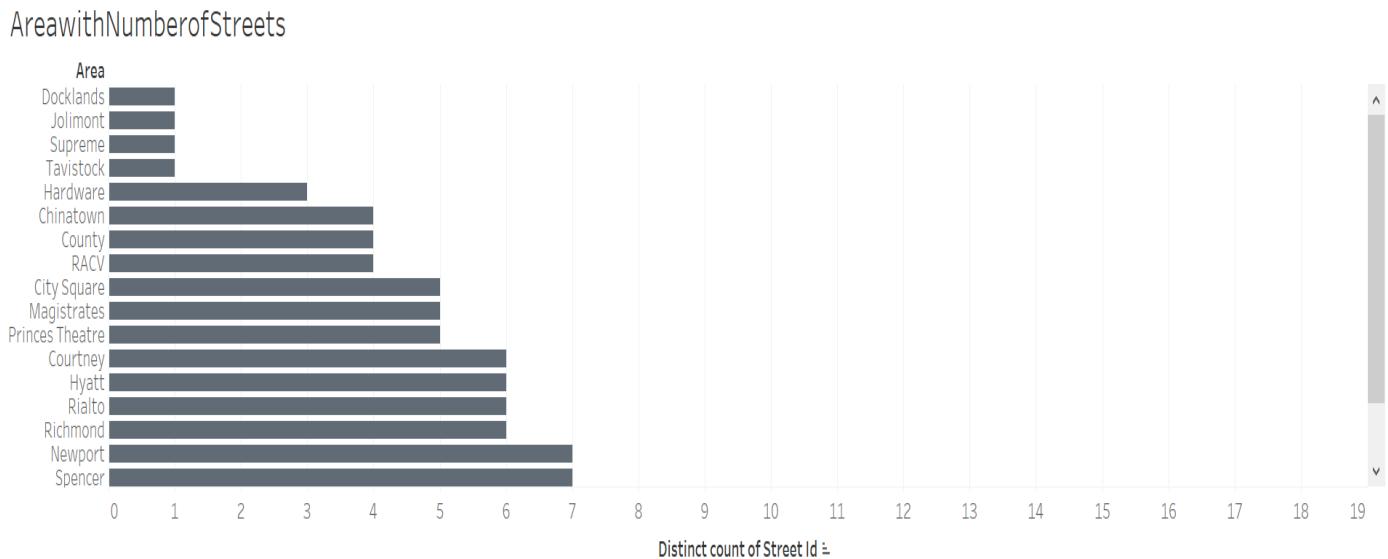
Arrival/Departure



SecureArea SecureStreets DisableParkingRelationshipwi... DPwithStreets DPwithPH AreaPHwithViolations AreaPH VS ParkingHr-A/D A/D AreasWithStreets Streetz NearBySt

The relationship between arrival and departure of the vehicles with hours and the maximum hours allowed to park the vehicle into the parking bay. The first worksheet visualizes the areas list with maximum parking hours, the second is the location of all the area with latitude and longitude of the areas into the city. The third provides the arrival and departure of the vehicles into the parking bay.

## Dashboard 15: Area with main streets and nearby streets



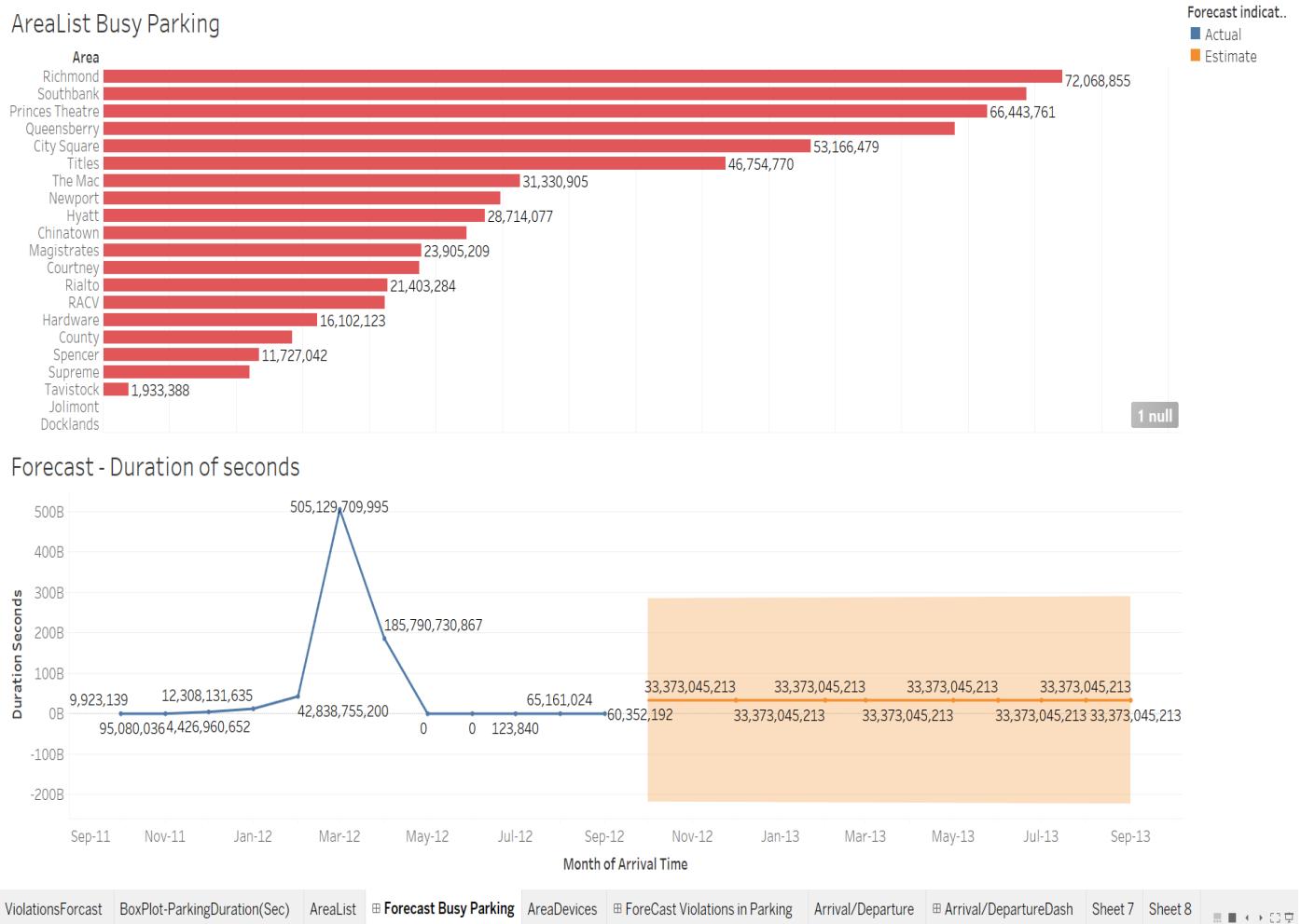
This dashboard visualizes the area with a number of main street parking and all other streets and nearby small lane parking. Sometimes the drivers frustrated if they expect abundant and free parking but limited or expensive parking, or if they spend more time searching for space. This help drivers to locate the nearby free parking.

It also encourages parking management to use the APS as advance parking system, to inform the driver about the available parking spaces, process it and then present it to the drivers by mean variable messages signs. It will also guide them in congested areas to the nearest empty parking.

The parking management also uses this dashboard to make pricing strategies that will discourage long-term use of street parking in busy areas.

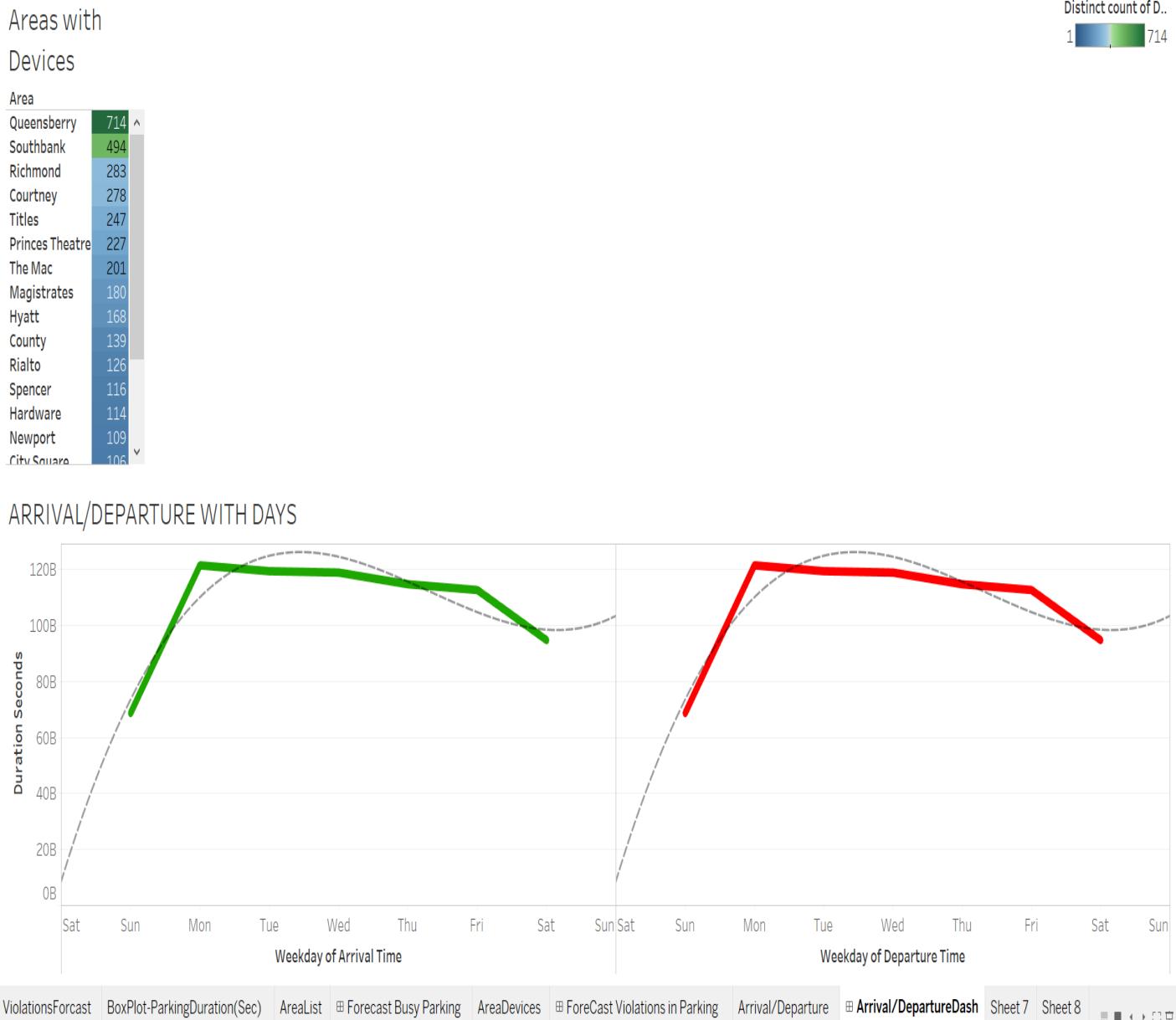
## Part -2 Predictive Analytics and Visualisation of Insights

### Dashboard 1: Forecast of Parking Duration at most busy areas



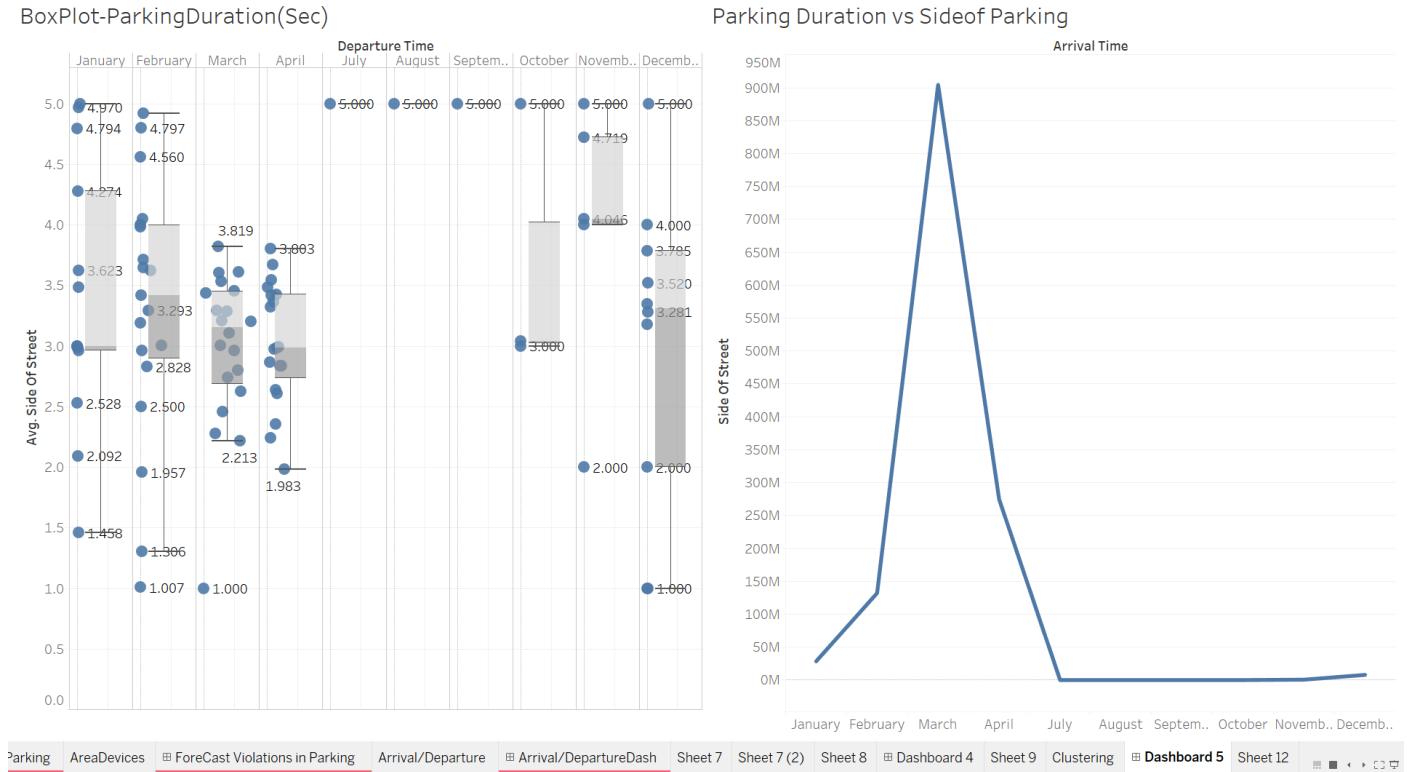
From the dashboard of forecast, can gather information of duration of parking the vehicle since November 2011 to October 2012. The forecast shows in the month of March-2012 huge rush into the city with 500Billion sec. (138888 hrs) people park their vehicles into the parking bays. With the use of Forecast, prediction is possible but here as we can see we don't have enough data with respect to time. So additive and multiplicity prediction is not possible. So from the dashboard we can see the constant prediction for the next 1 year i.e. November-2012 to September-2013.

## Dashboard 2: Trend lines of Arrival/Departure of Vehicles with areas devices



The analytical feature trend lines of arrival and departure of the vehicles with areas shows the areas with devices installed for collecting data of arrival and departure of the vehicles with days enter and exit the parking bay. It shows the traffic increases at parking bays in weekdays not on the weekends.

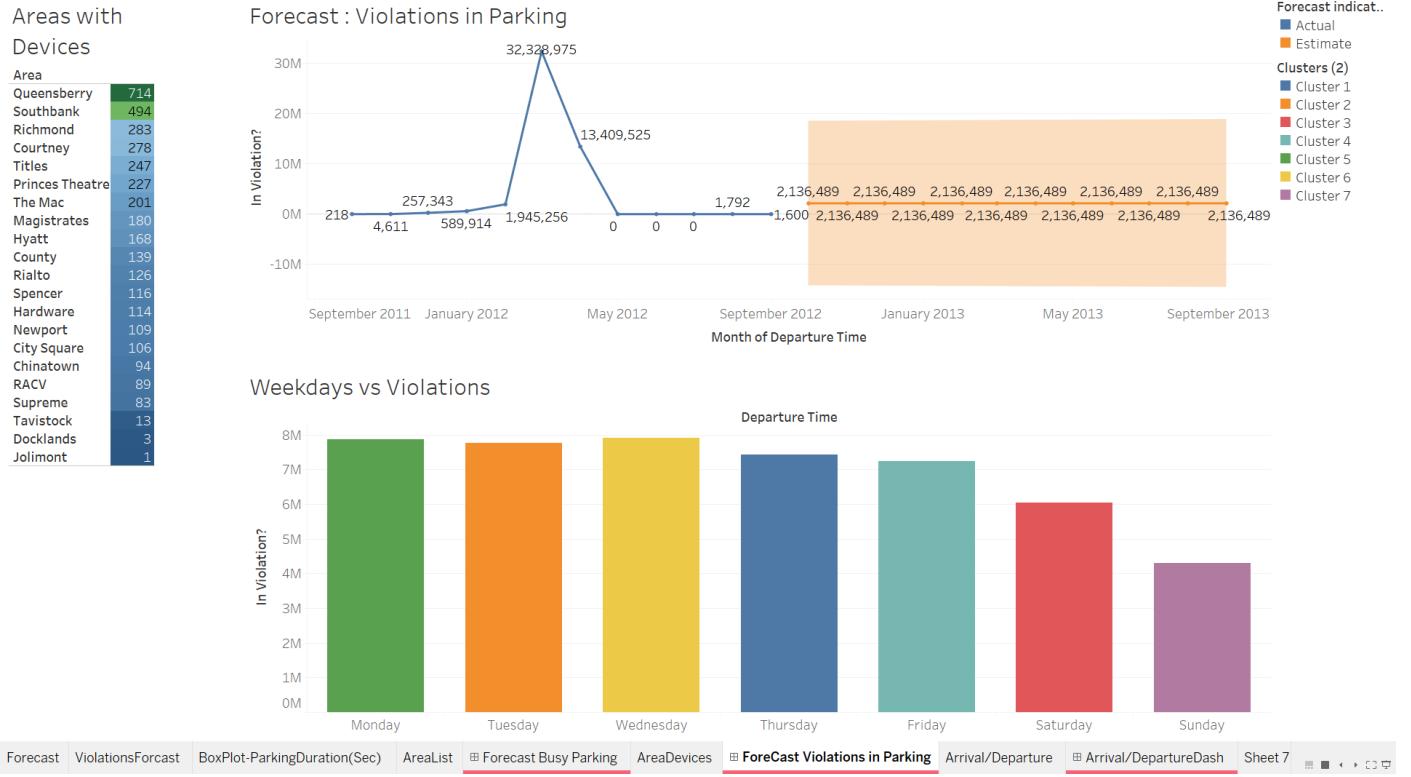
# Dashboard 3: Boxplot of Parking duration on main streets parking



The boxplot shows the standardized way of displaying the distribution of the data of arrival of vehicles in parking bay months with main streets and the time spend on the parking bay by vehicle.

The box plot shows the standardized way of displaying the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum. As can see into the dashboard.

## Dashboard 4: Forecast of violations in parking with areas



The forecast of violations in the city parking bay areas. The Forecast shows from the September 2011 to September 2012. It shows the violations increased huge during March then sudden went to 0 in May which is strange. The forecast shows the prediction which is constant from October 2012 to September 2013. As due to insufficient data related with time we can't expect additive and multiplication prediction.

With the clustering, as we understand the characteristics, are similar for particular day that's why the clusters are different for each day.