

**Go Parking**

# **Load Specifications**

**System for Free Parking Localisation**

**Mr. Abdulghani Sabsabi**

**22/09/2019**

## Table of content

<b>1. Overview</b> .....	<b>3</b>
<b>2. Understanding the problem</b> .....	<b>3</b>
<b>3. Solution</b> .....	<b>3</b>
3.1. “Go Parking” objective.....	3
3.2. Requirement Matrix.....	4
<b>4. High level workflow</b> .....	<b>4</b>
<b>5. Architecture overview</b> .....	<b>5</b>
<b>6. Architecture solutions</b> .....	<b>6</b>
6.1 Front-End development .....	6
6.2 Backend development.....	6
6.2.1 Firebase.....	6
6.2.2 Server from scratch.....	6
<b>7. Timeline</b> .....	<b>7</b>
<b>8. Project costs</b> .....	<b>8</b>
<b>9. Other costs</b> .....	<b>8</b>
9.1 Firebase fees example .....	8
<b>10. “Go Parking” Mockup</b> .....	<b>9</b>
10.1 Logo.....	10
10.2 Search Page (1 of 2).....	11
10.3 Search Page (2 of 2).....	12
10.4 Navigation Drawer.....	13
10.5 Filters Page.....	14
10.6 Position Page .....	15
10.7 Favorite Page.....	16
10.8 Other assets.....	17

## **1. Overview**

This document is a response to a project idea proposed by Mr. Abdulghani Sabsabi, the CEO of a startup company in Montreal. The project itself will be named “Go Parking” and will resolve some common parking problems uncounted in the city of Montreal. The document will describe in more details the purpose of the project, the solution that will be implemented and the infrastructure we are going to build.

## **2. Understanding the problem**

With the grows of the Quebec population, it’s getting harder to find a free parking spot when attending events, going to work or simply park a car nearby. We commonly see payed solutions which, at the end of the year, is not the best pocket friendly answer. Turning around over and over again for a parking spot is also the primary cause of traffic in the down town of Montreal. A lot of people end up getting late to meetings or receive tickets for misreading a parking sign. It will be useful to have an indicator of nearby parking availability and real-time alerts of the remaining time to park.

## **3. Solution**

The system must conveniently allow car owners to locate free parking spots at there nearby position. The infrastructure provided should keep track of the parking hours and send real-time alerts to notify the user about the time left. The user will also have geolocations of all available parking spots in a radius of his choice.

### **3.1. “Go Parking” objective**

The objective of “Go Parking” is to provide a mobile application to car owners so they can freely locate a parking spot for the given location area. A server will send the relevant information to the client and the data will be displayed in a google map view on the user’s phone. Users will also be able to received real-time alerts regarding the parking time limitations and availability. For this first version of “G.P.”, the parking data will cover the geographic location of Montreal. It will soon expand to reach a larger part of Canada. A minimalistic interface will be designed giving the user a very intuitive app to work with.

### 3.2. Requirement Matrix

The following section qualify the correspondence between what is requested by Mr. Abdulghani Sabsabi and what is proposed by our team.

<b>Requested</b>
The map of Montreal will be covered
No login screen. Users can directly use the app
The user can locate free and payed parking spots
Color code for free parking, no parking, payed parking or limited parking
The user can save his parking location for real-time alerts
The construction area can be detected and avoided
The user can zoom-in to see free parking spots

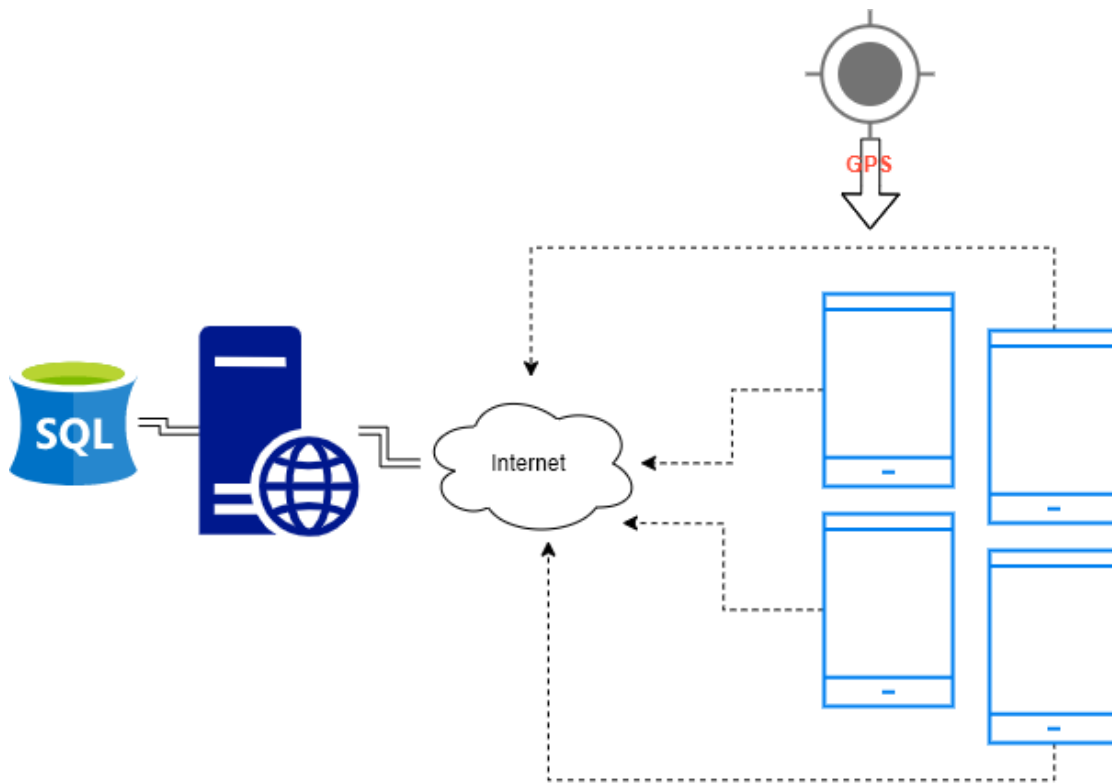
<b>Proposed</b>
The map of Montreal will be covered
No login screen. Users can directly use the app
The user can locate free parking spots
Green color for free parking
The user can save his parking location for real-time alerts and statistics
The user can enter the parking time needed
The user will see available free parking spots for the given radius search area

### 4. High level workflow

The purpose of the project is to build a mobile application and a server for a real time interaction between the car owner and the parking API. This is how the flow will look like:

- The user opens the mobile application “Go Parking”
- The user will then provide a destination, a parking radius and the time needed for his car
- The user presses the start button
- The server will send the free parking spot for the given user requirements
- The free parking streets will be displayed in green
- The user can save his parking location
- The user will get alerts regarding the remaining time
- The user can turn off notifications by removing his parking location

## 5. Architecture overview



\* The schema above is a high level overview of the architecture we are going to implement. A web server will be used to handle parking requests coming from the users and a SQL database will have all the related parking data. If Firebase is chosen instead, the server side will be handled differently. The end user will need to enable GPS localisation so the server can give back relevant data.

## **6. Architecture solutions**

### **6.1 Front-End development**

To build an iOS and an Android application, our team suggest the framework React Native with Expo. It has a set of components for both platforms and provide native look and feel. Since React Native uses the same code base, we can cut drastically the cost and time of development process. The mobile application will only require to access GPS signal and pop-up alerts of the device, which is currently supported by the suggested framework. React-Native is UI focused which makes the app loads quickly and gives a smoother feel. It is used by the giant companies like Facebook, Instagram, Skype, Airbnb, Tesla, Walmart, Uber, ... To conclude, React Native is Cross-Platform and can provide good UI and UX experience for the user.

### **6.2 Backend development**

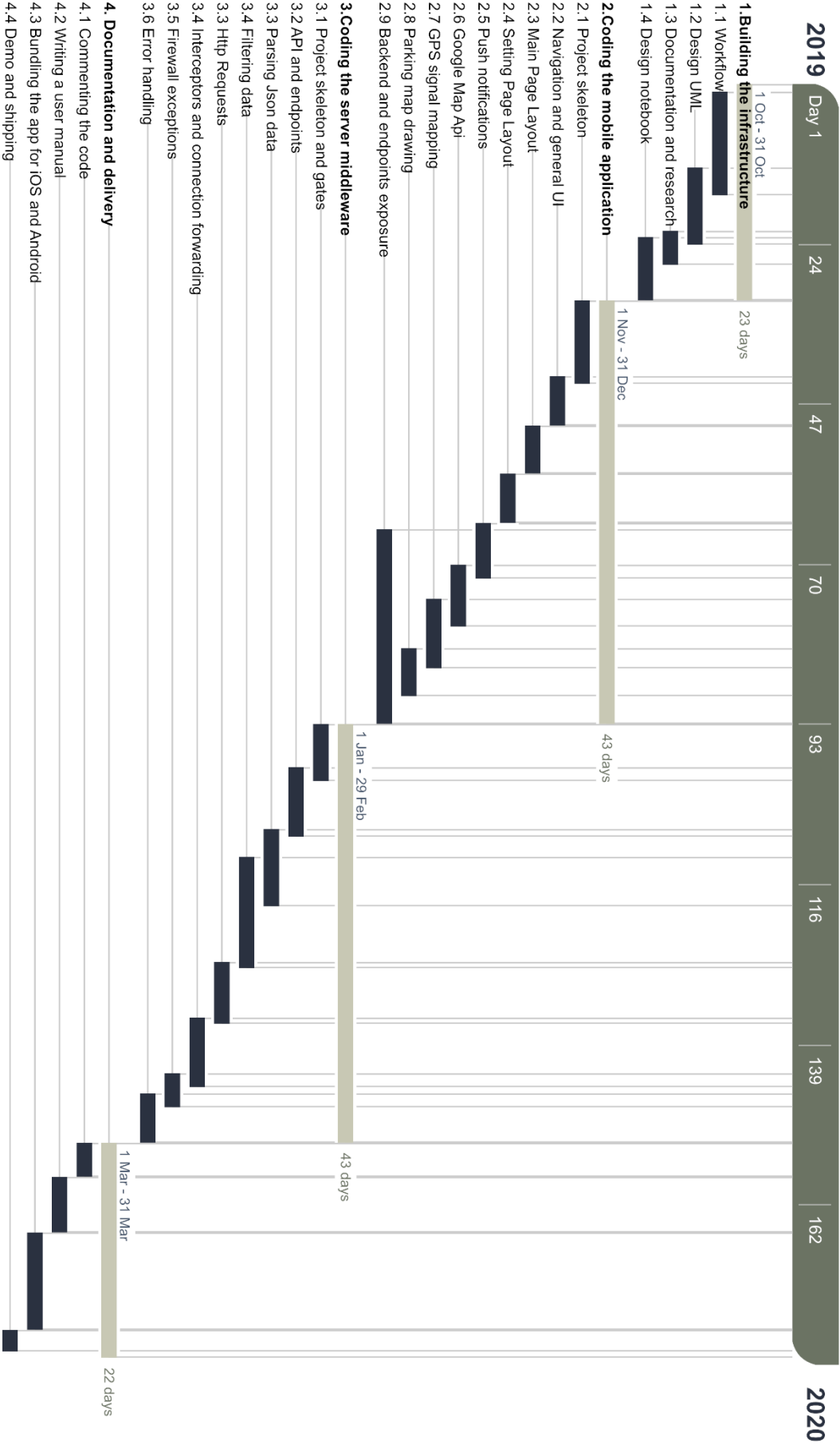
#### **6.2.1 Firebase**

Firebase is a Backend as a Service (BaaS) that can provide a real-time database with pre-written APIs to query the database. Firebase has been developed by Google and starts free for small projects. Our developers won't have to worry about rewriting a server from scratch and could simply use the API provided by Firebase. Firebase is based on web sockets which is very fast and can handle millions of requests per second. It can however get pricier for larger projects (ex: more then 100 simultaneous connections).

#### **6.2.2 Server from scratch**

Our team can write a server from scratch using NodeJS and PostgreSQL. The server will use the same coding language as the front-end application which make the development process faster and easier. In the long term, this can have more advantages and cost less then a BaaS company. However, the hosting and maintenance of the server is not included in the plan and has to be managed on it's own.

# 7. Timeline



## 8. Project costs

	Estimated Days	Total cost (CAD)
Design/UML	10-15	450.00\$
Mobile Application	50-65	17900.00\$
Server (from scratch)	40-55	15600.00\$
Server (BaaS)	30-40	9450.00\$
Bundling	7-13	380.00\$

## 9. Other costs

	Total cost (USD)
App store fees	99\$/year
Google Play	25\$
Self Hosted Server	3000 - 10000\$
Firebase as BaaS	Free - 25\$/month - On usage
Google Map API	Unknown

\*For the self hosted server, electricity and maintenance fees are not considered in the estimation.

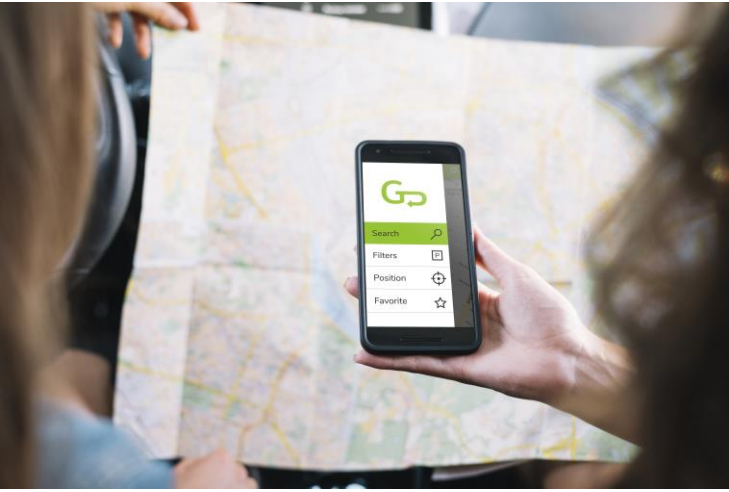
### 9.1 Firebase fees example

Products	Free	25\$/month	As you go
Simultaneous connections	100	100k	100k/db
GB-seconds	40k/month	400k/month	\$0.0025/thousand
CPU-seconds	40k/month	200k/month	\$0.01/thousand
GB stored	1GB	10GB	\$0.026/GB
GB transferred	10GB/month	50GB/month	\$0.15/BG

\*Ref: <https://firebase.google.com/pricing>



# 10. "Go Parking" Mockup



## 10.1 Logo

Description: Main logo (choose one)



Go Parking

Go Parking

Go Parking

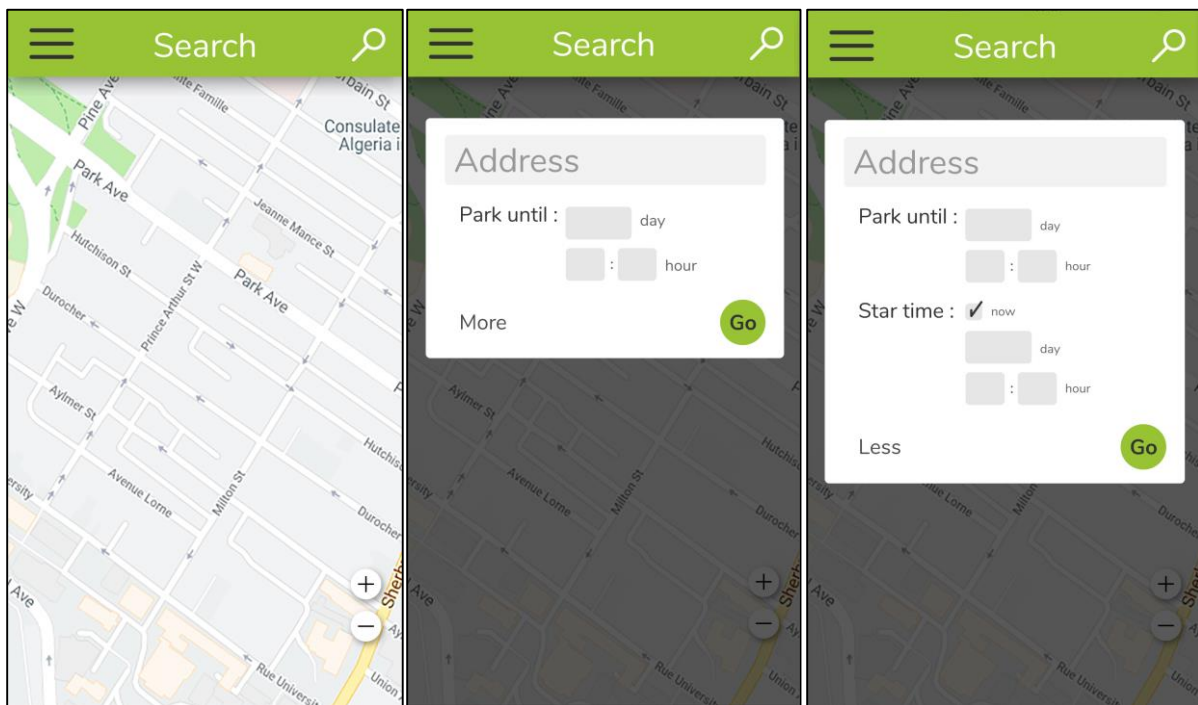
Go Parking

Go Parking

## 10.2 Search Page (1 of 2)

Description: The car owner can see free parking spots on the map

- Click the search Icon on the top right of the screen
- Enter a destination address
- Add the time needed to park
- Fine tune the parking start time with the “more” button
- Click on the “Go” button
- All the free parking spots are displayed on the map

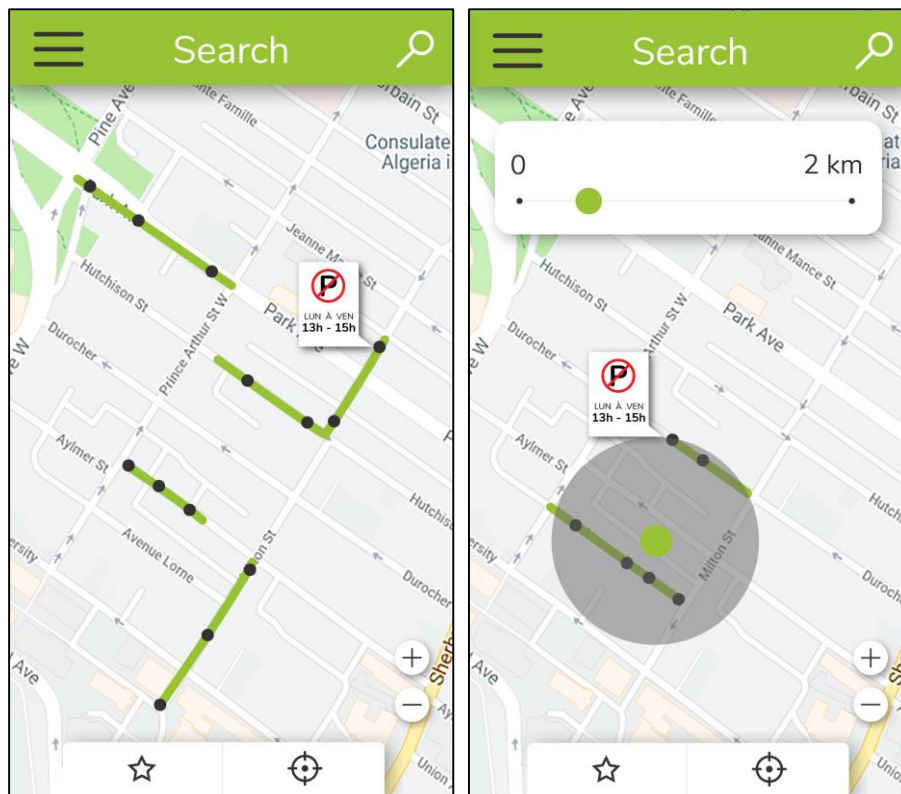


### 10.3 Search Page (2 of 2)

Description: The car owner can see free parking spots on the map

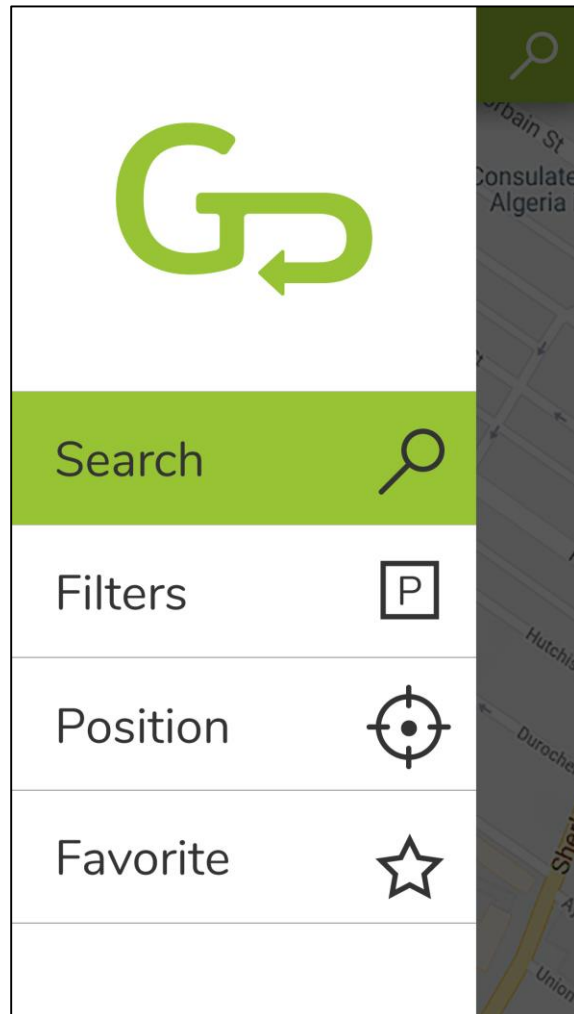
-Target or favorite a parking location

-Set parking search radius



## 10.4 Navigation Drawer

Description: The user can change pages



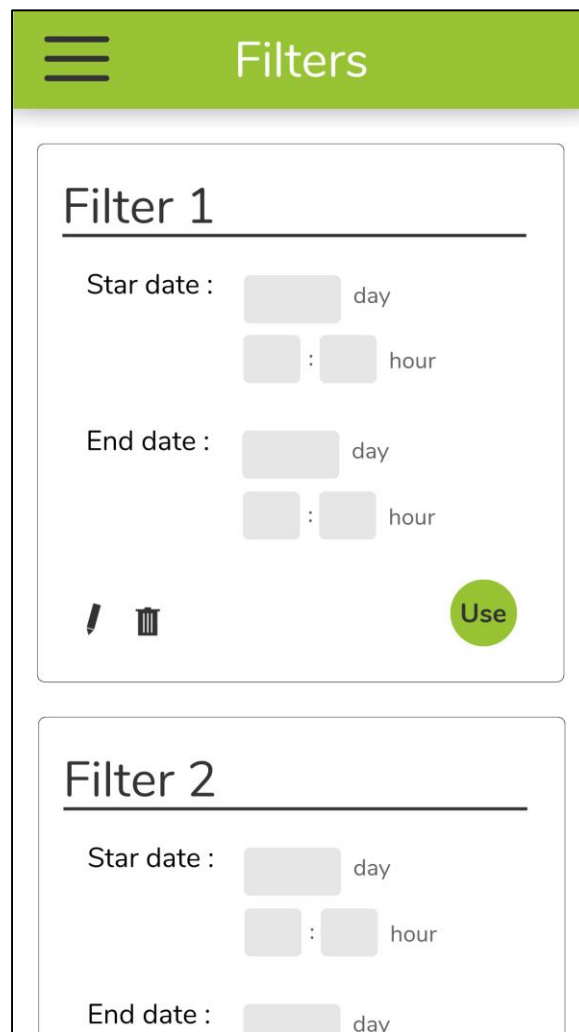
## 10.5 Filters Page

Description: The user adds filters to be used in future search

-Click the “use” button to search the map with the selected filter

-Edit filter start and end date

-Delete the filter

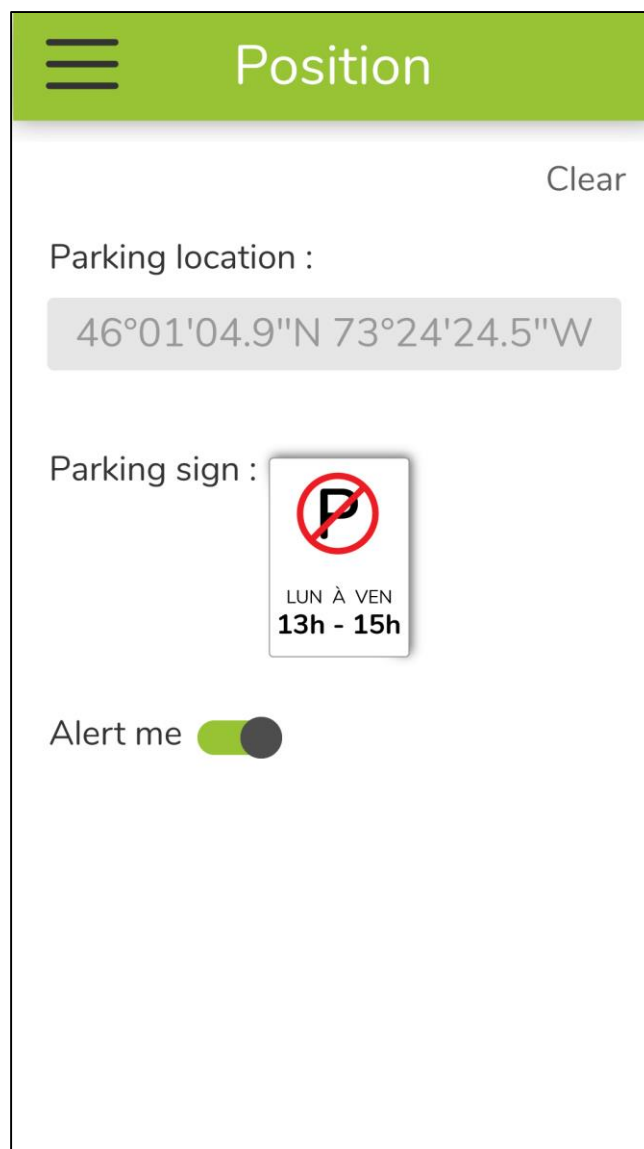


The screenshot displays a mobile application interface for managing filters. At the top, there is a green header bar with a hamburger menu icon on the left and the title "Filters" in white text. Below the header, the page is divided into two sections, each containing a filter card. The first card is titled "Filter 1" and features a form with two date and time input fields. The "Star date" field consists of a text input for the day, followed by a colon and another text input for the hour. The "End date" field is structured similarly. At the bottom of the "Filter 1" card, there are three icons: a pencil for editing, a trash can for deleting, and a green circular button labeled "Use". The second card, titled "Filter 2", is partially visible and shows the same "Star date" and "End date" input fields.

## 10.6 Position Page

Description: The current parking location of the user

- Click the “clear” button to remove the parking location
- Click the long/lat input to go to this location (opens with google map)
- Reminder of the no-parking sign
- Enable or disable Alerts regarding the time left before no-parking




Position

Clear

Parking location :

46°01'04.9"N 73°24'24.5"W

Parking sign :

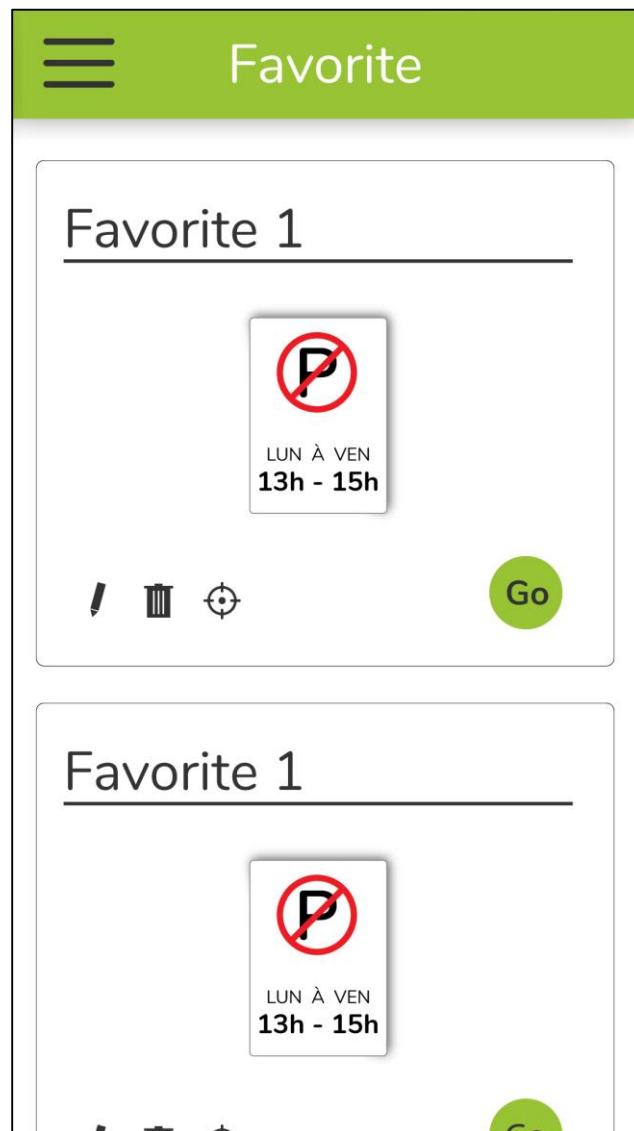


Alert me

## 10.7 Favorite Page

Description: The user can use his favorite parking spots

- Click the “Go” button to get to the location (opens with google map)
- Click the target icon when parked at this favorite location
- Delete favorite
- Edit favorite name
- No-parking sign reminder





10.8 Other assets

