



MoGreen

“Clean My Campus” Mobile Application

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Ellen Vaughan and Brock Brothers

Big Picture

- Flagstaff is a beautiful place to live but more students and travelers means less personal responsibility
- In order to have healthy and resourceful communities, we need to cultivate a culture of sustainability
- More people, more waste, more need for green solutions

What would you do if...



Problem Statement

The image shows a Google search interface with the query "nau facility services". The search results page displays approximately 702,000 results in 0.37 seconds. The top result is an advertisement from go.staplesadvantage.com. The second result, which is circled in red, is "FS_Welcome - Facility Services - Northern Arizona University" with the URL https://nau.edu/facility-services/. Below this are several other search results including "Facility Services | Facility ...", "Employee Services", "Contact Information", "Fac_Staff - Facility Services", "Fleet Services", and "Operations".

Google Search results for "nau facility services":

- Business Facility Services | Improve Productivity & Safety
[Ad go.staplesadvantage.com/Facility/Services](https://go.staplesadvantage.com/Facility/Services)
Every Facility Comes with its Own Set of Challenges. Create a Custom Solution. Exclusive Pricing. Free Next-Day Delivery. No-Risk Guarantee.
Technology Solutions · Coffee Services · Furniture Solutions · Shipping Solutions · Water Services
- FS_Welcome - Facility Services - Northern Arizona University**
<https://nau.edu/facility-services/>
Welcome to the Facility Services website. ... Construction (PDC) of Facility Services guides development of large projects on the NAU campus and statewide.
- Facility Services | Facility ...
Welcome to the Facility Services website. Below you will find a ...
- Employee Services
Facility Services Jobs - Apply Online:
Benefit Eligible ...
- Contact Information
Contact Information on Facility Services | Contact information...
- Fac_Staff - Facility Services
Facility Services Home · Employee Services and Talent ...
- Fleet Services
Fleet Services is located on the northeast corner of building #77 ...
- Operations
Operations on Facility Services |
Operations Stephen Vedral ...

More results from nau.edu »

Clients

Ellen Vaughan

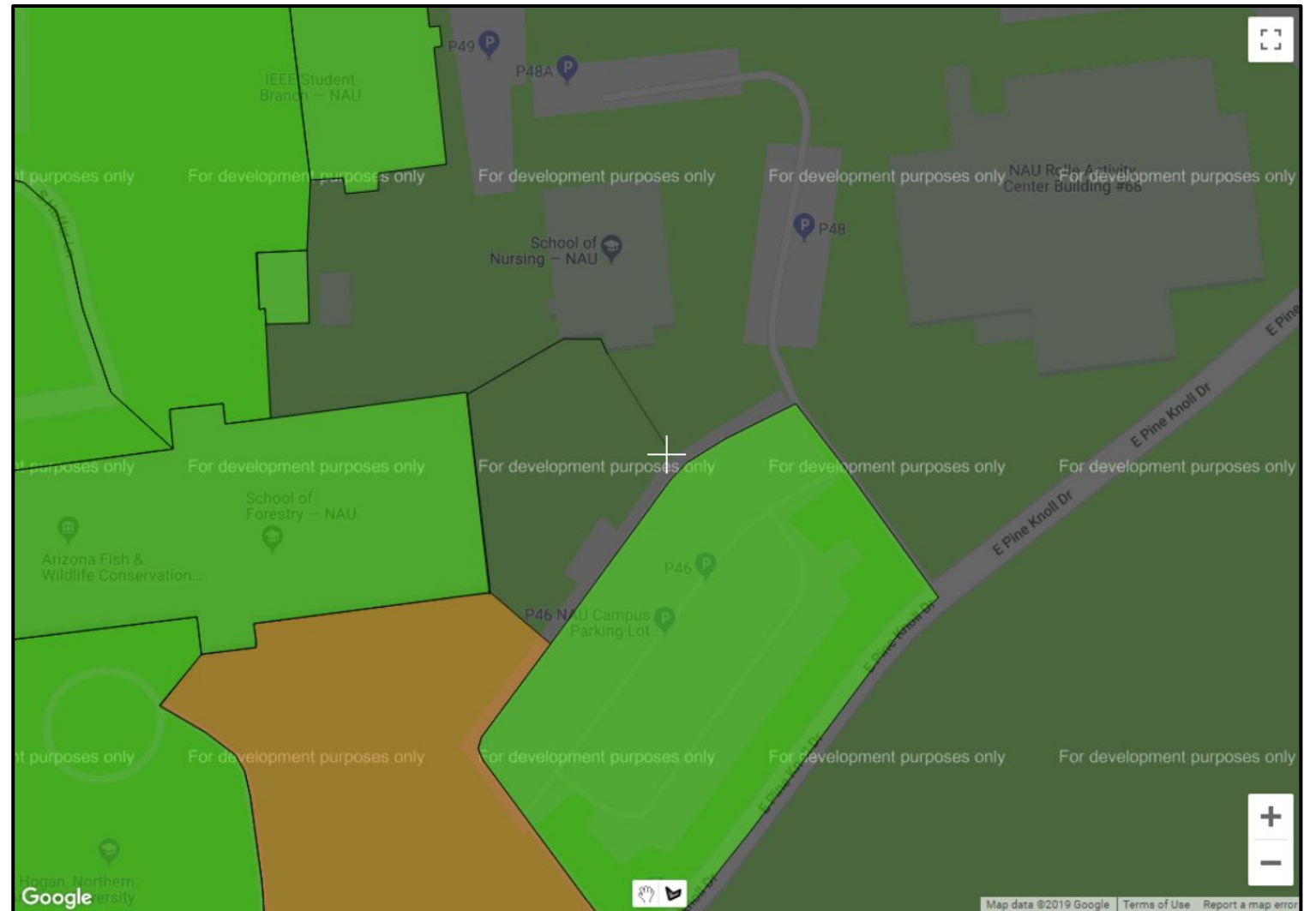
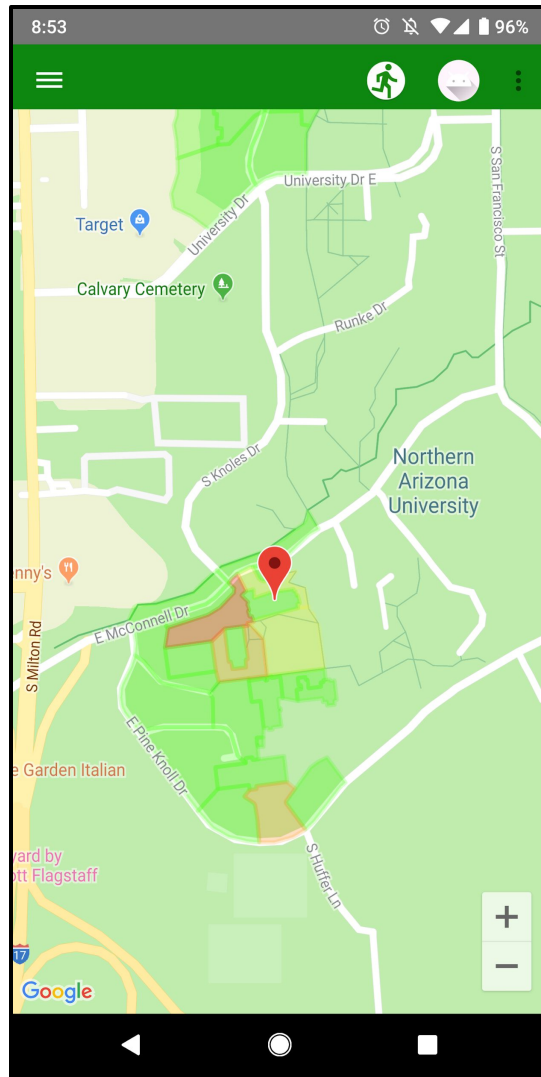
- Former manager with NAU's Office of Sustainability
- Responsible for facilitating community involvement in sustainability culture

Brock Brothers

- Manages NAU's Moving and Recycling department
- Oversees trash and recycling efforts at NAU, and handles general maintenance problems

Our Solution:

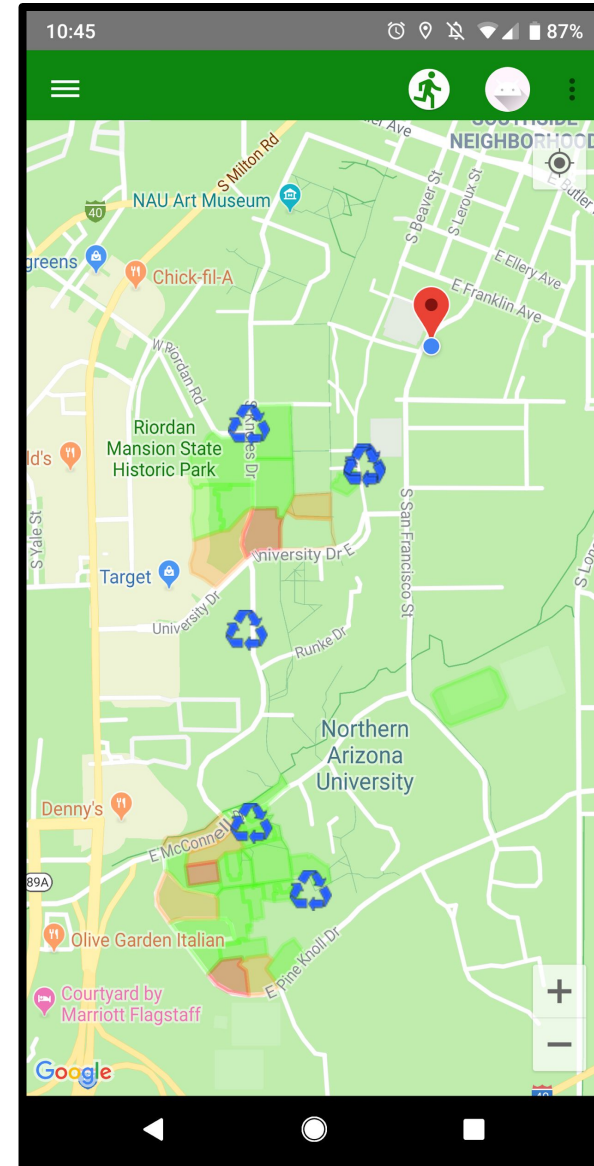
A mobile application and administrative web portal



Key Requirements

Mobile Application

- Interpret and display map with zones and markers
- Mark the user's location
- Allow users to make quick or full reports
 - Quick report: choose from a drop down menu of predefined report types
 - Full report: choose report type, add detail, attach a photo




Key Requirements

Web Portal


- Draw new zones and place new markers denoting campus resources
- Display reports made from application as checkable tasks
- Display a heatmap view of reports, filterable by time period


Hide or Show markers:

Hide	Show	 Normal Recycling
Hide	Show	 Glass Recycling
Hide	Show	 Battery Recycling
Hide	Show	 Dumpster
Hide	Show	 Temp Marker
Hide	Show	All Markers
Hide	Show	Zones


Choose a marker to place:


None

 Normal Recycling

 Glass Recycling

 Dumpster Marker

 Battery Marker

 Temp Marker

Set Zone Colors To DB:

Color Time Intervals:

Seconds	<input type="button" value="Submit"/>
Seconds	<input type="button" value="Submit"/>
Seconds	<input type="button" value="Submit"/>

Reset Zones:

Reset Zone Color

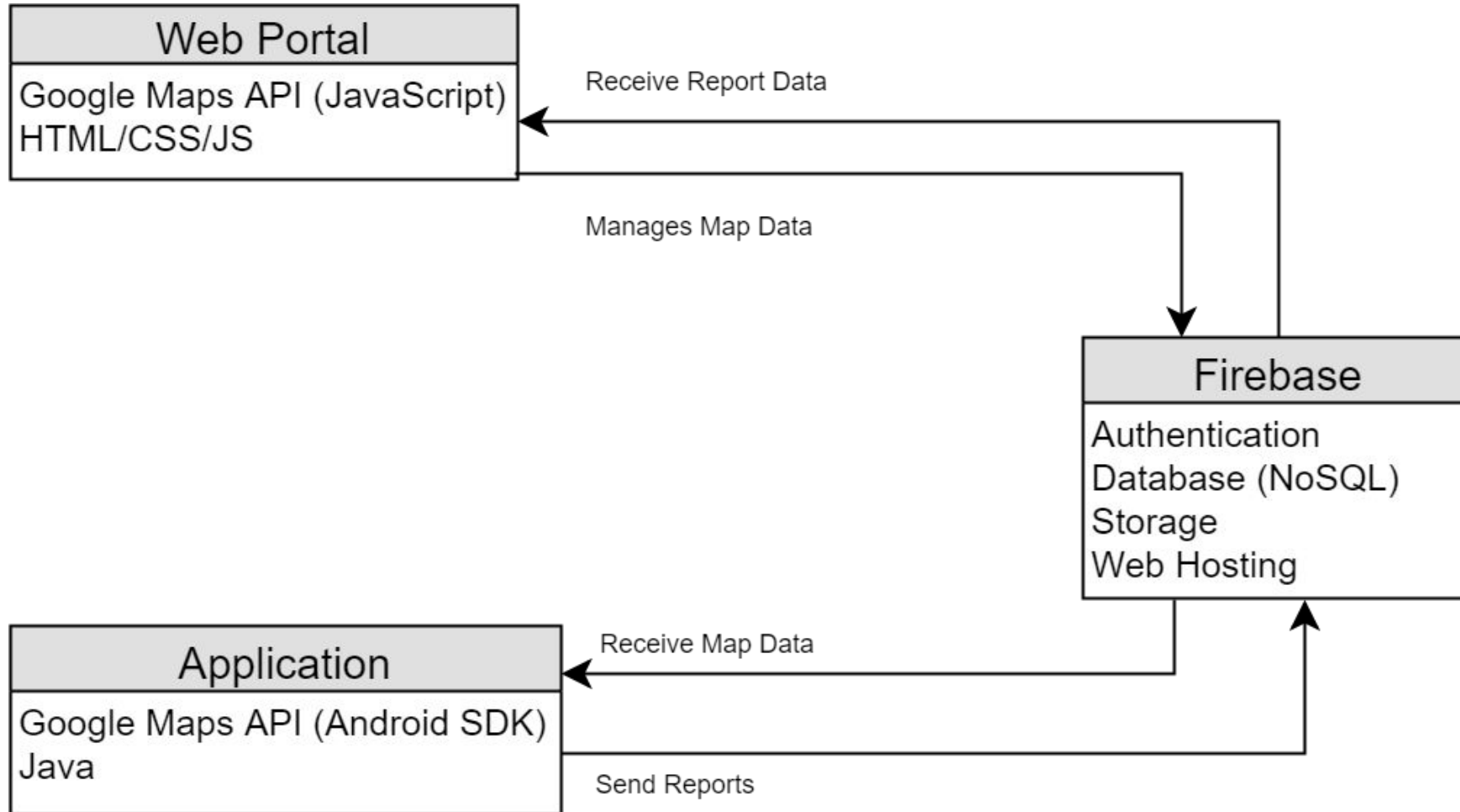
Toggle Marker/Zone Deletion:

Delete Zones/Markers

Toggle Editable Zones:

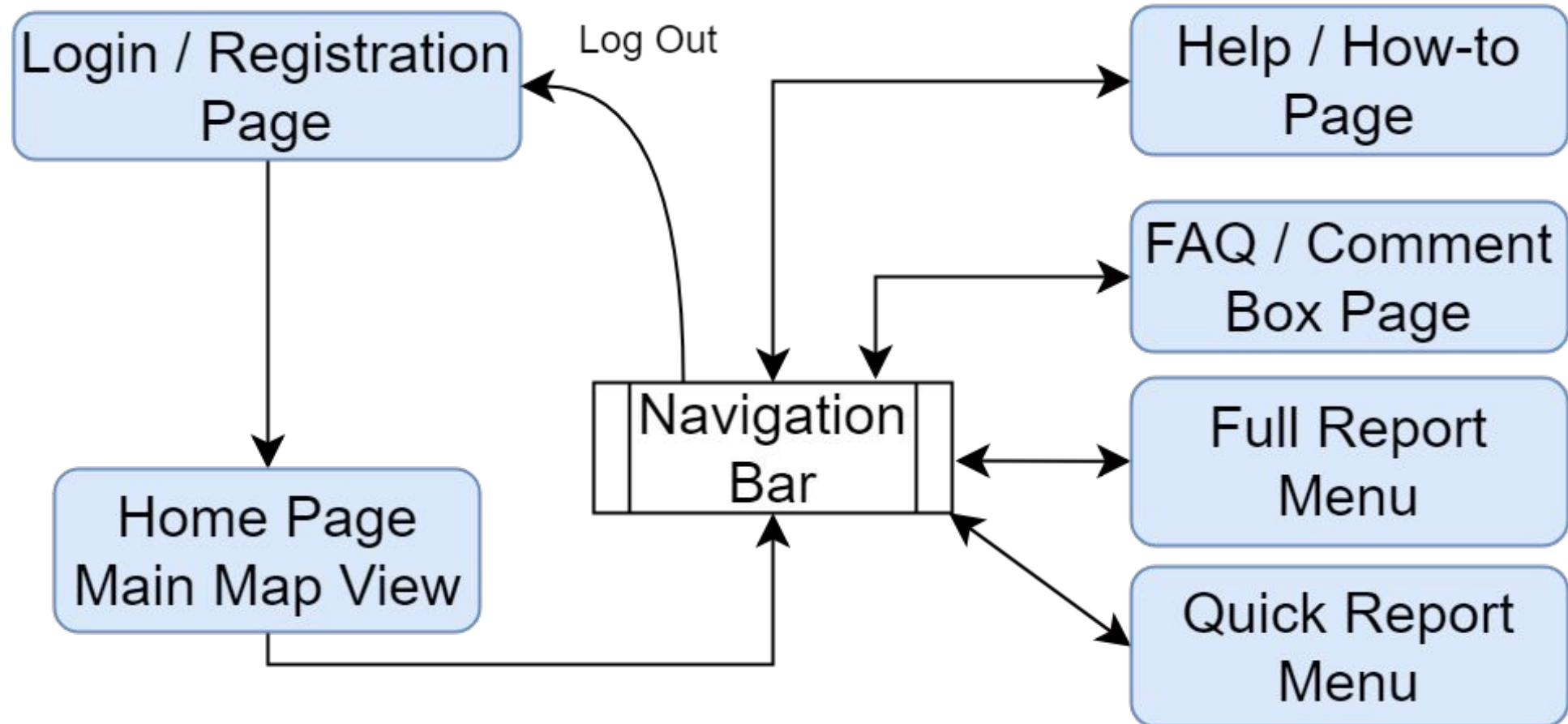
Edit Zone

Implementation Overview



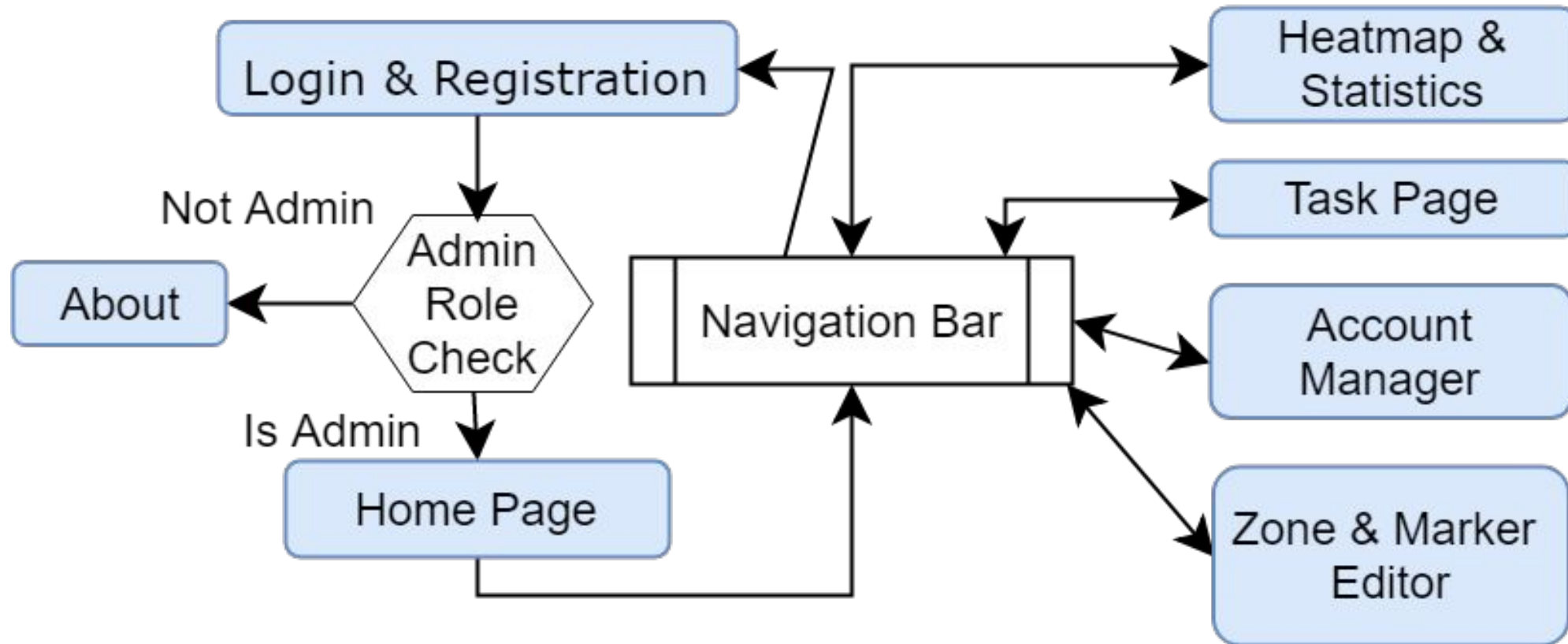
Architecture Overview

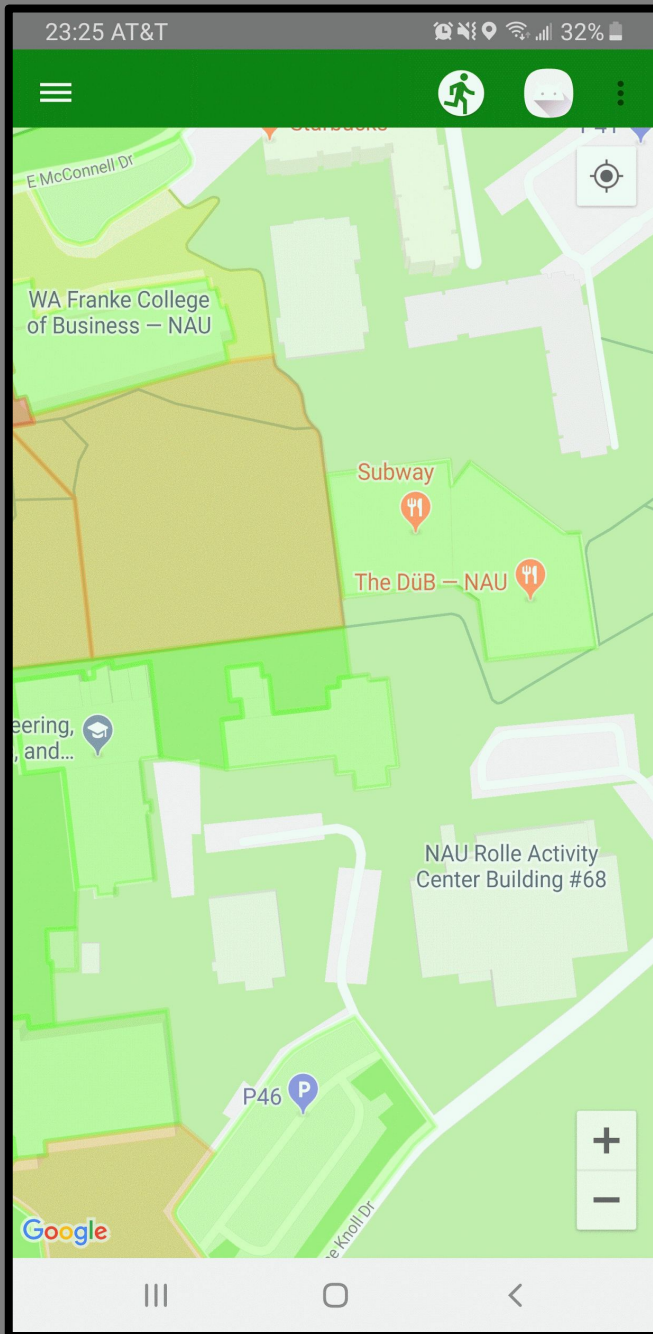
Application Navigational Flow



Architecture Overview

Web Portal Navigational Flow

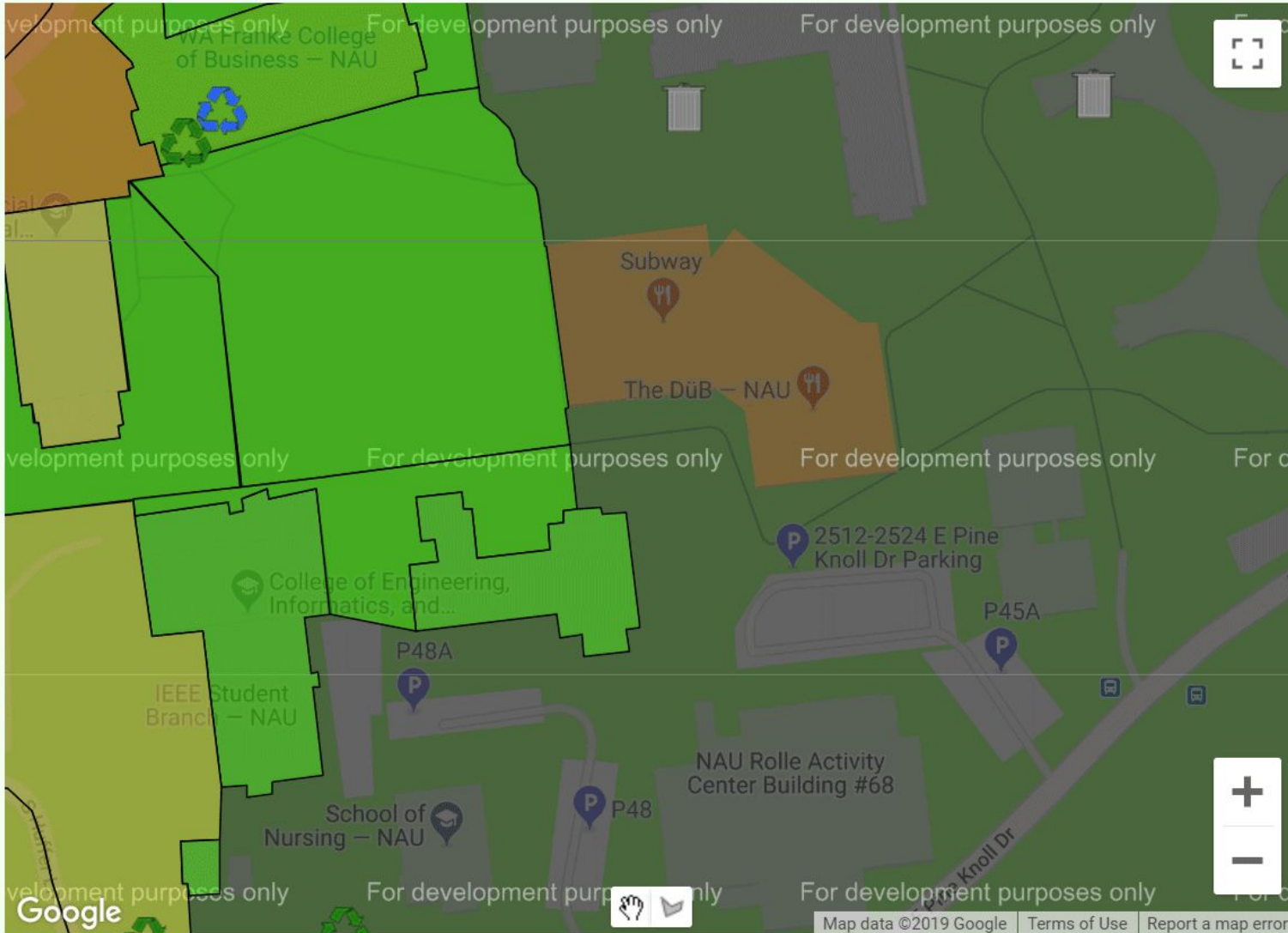




Full Report Demo

- Tap point on map to mark a location
- Tap 'full report' icon or tap 'menu' icon and choose 'full report'
- Choose report type, enter details, and take a photo
- Tap 'submit' button

Map Editor



Hide or Show markers:

Hide	Show	Normal Recycling
Hide	Show	Glass Recycling
Hide	Show	Battery Recycling
Hide	Show	Dumpster
Hide	Show	Temp Marker
Hide	Show	All Markers
Hide	Show	Zones

Choose a marker to place:

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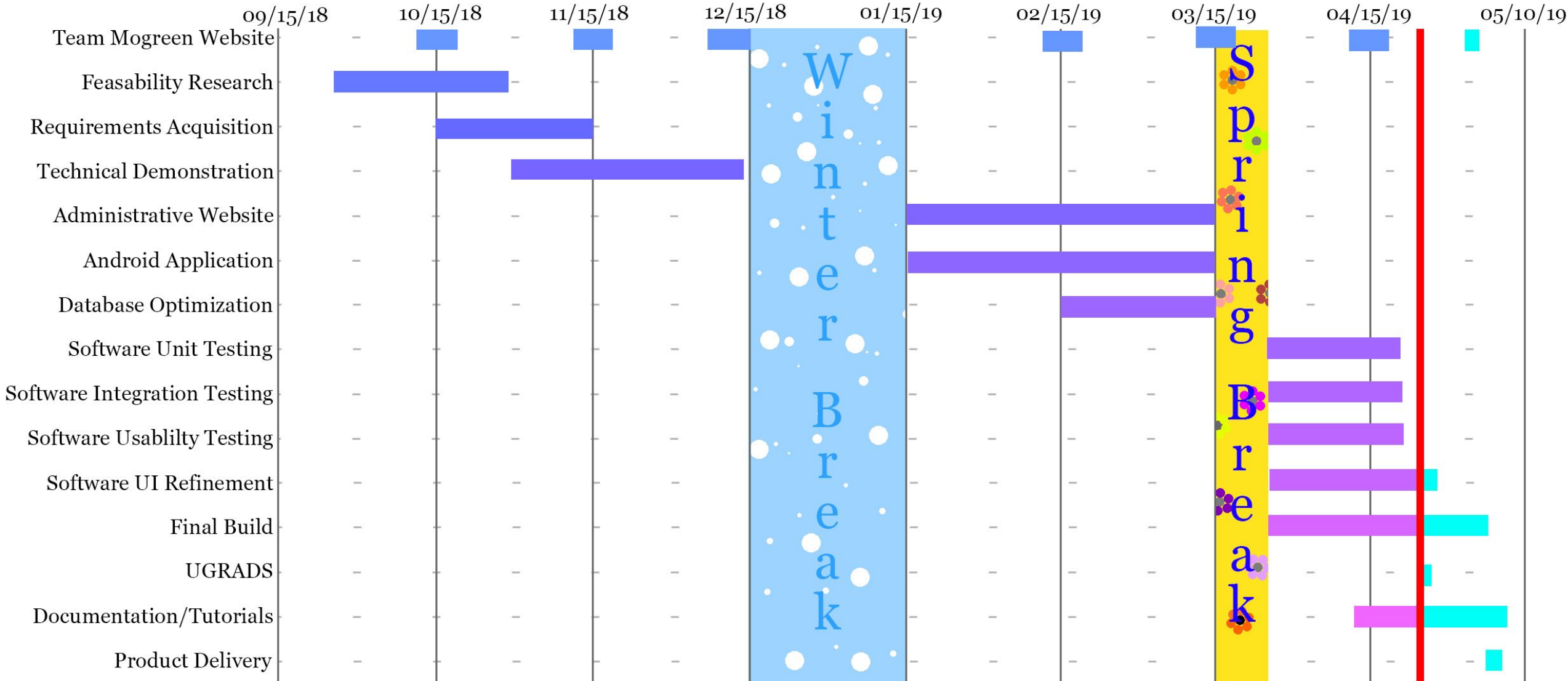
Toggle Marker/Zone Deletion:
 Delete Zones/Markers

Toggle Editable Zones:
 Edit Zone

Challenges & Resolutions

- Implementing user permissions
 - Refactoring and modularizing existing solution to bundle and protect web pages
- Reports from multiple accounts creating tasks for the same issue
 - Group tasks together based on a radius and the type of report to minimize redundancies
- Read/Write/Delete to database affects monthly pricing for clients
 - Efficient calls to database and implementing a cache

Schedule



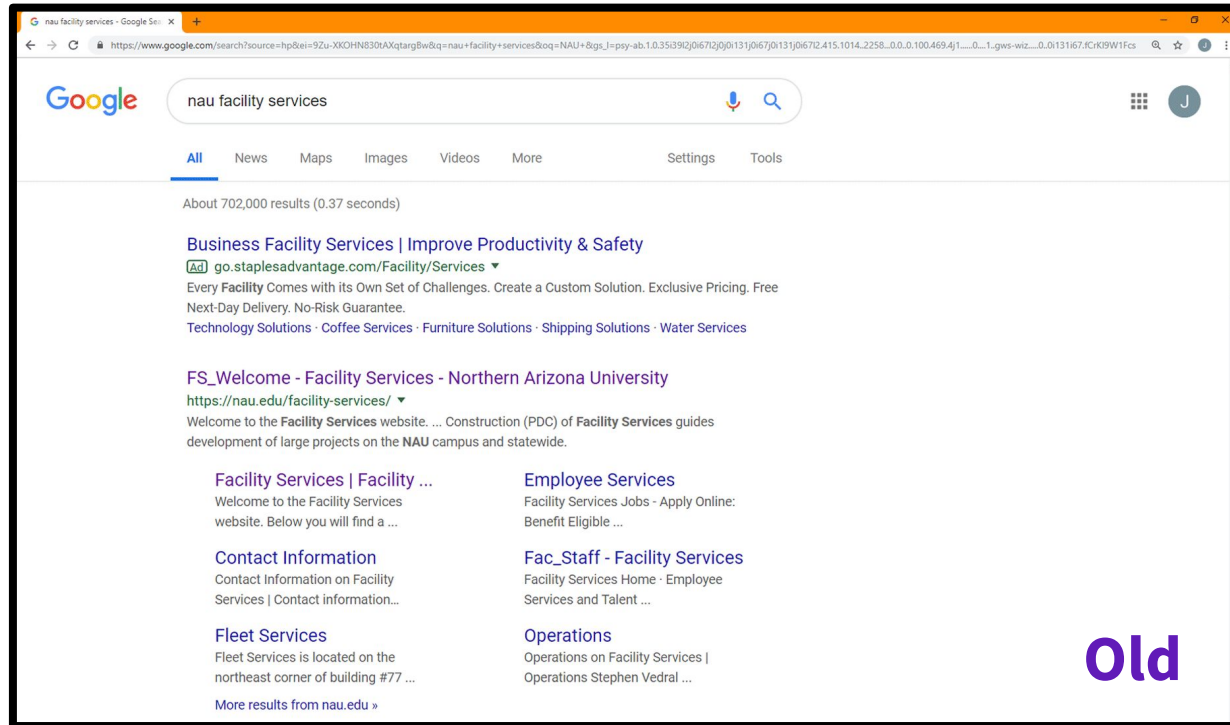
Testing Plan

- Our software components heavily rely on existing APIs
 - Unit tests are limited, causing heavier focus on integration
- Primary focus is usability testing
- 2 pronged plan:
 - General user base for mobile application- NAU students, faculty, employees
 - Specific user base for web portal- NAU Moving & Recycling department

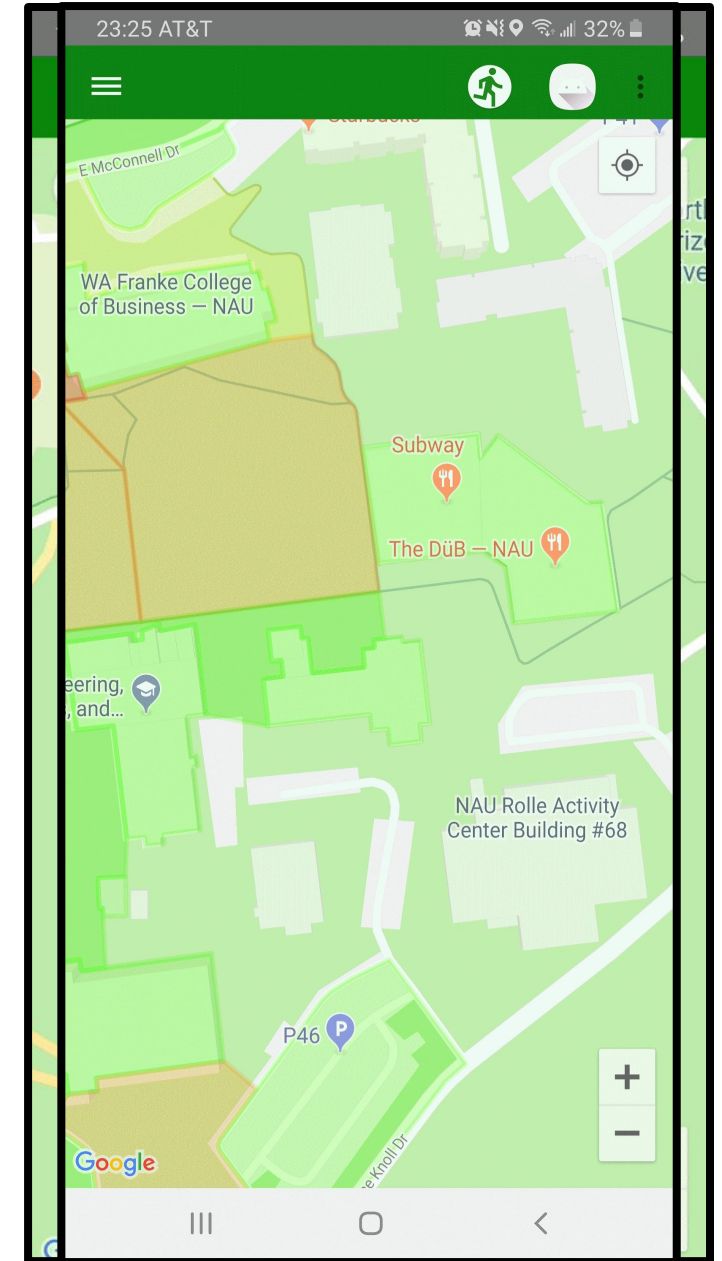
Future Work

- Profiles
 - Let users customize a public-facing profile
 - Allow users to form teams
- Gamification
 - Allow users to earn points from actions on the app
 - Campus groups can incentivize using the application with rewards from points accrual
- Data collection & display
 - Generate different graphs or models based on traffic data
 - Display statistics

Conclusion

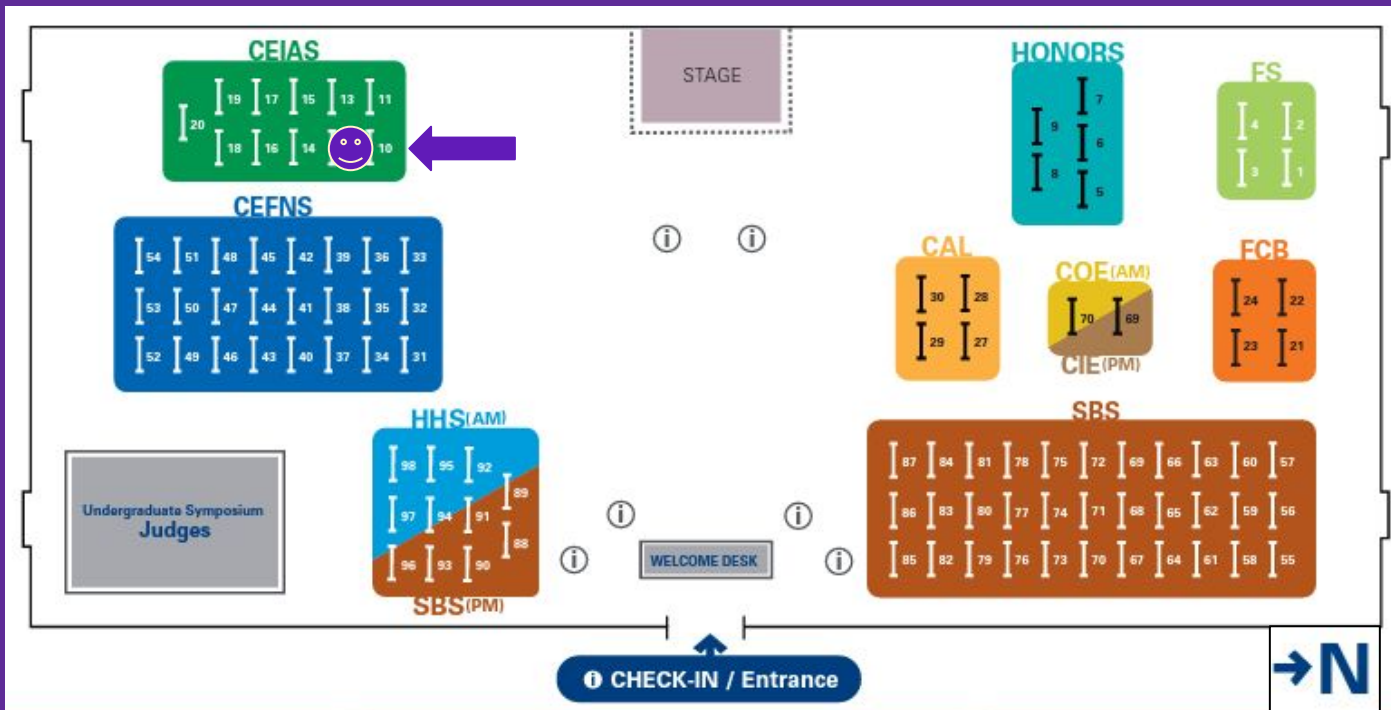


- Outcomes:
 - Easier task control for maintenance employees
 - Boosted visibility of campus resources
 - Facilitate community engagement and change how people view their communities



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Contact:

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Poster session from 2 - 4 p.m. in Union Fieldhouse, location 12A
Phones and laptops available for extended demos!

Thank you to our sponsors, the Office of
Sustainability, the Moving & Recycling
Department for this opportunity!

<https://www.cefns.nau.edu/capstone/projects/CS/2019/MoGreen-S19/>