MICHIGAN STATE UNIVERSITY

Project Plan Presentation

#BIKES4ERP Tracking

The Capstone Experience

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Spring 2023

From Students…
…to Professionals

Project Sponsor Overview

- Consulting company based in Chicago.
- Helps with building and scaling an enterprise application.
- Part of the Group Elephant non-profit organization.

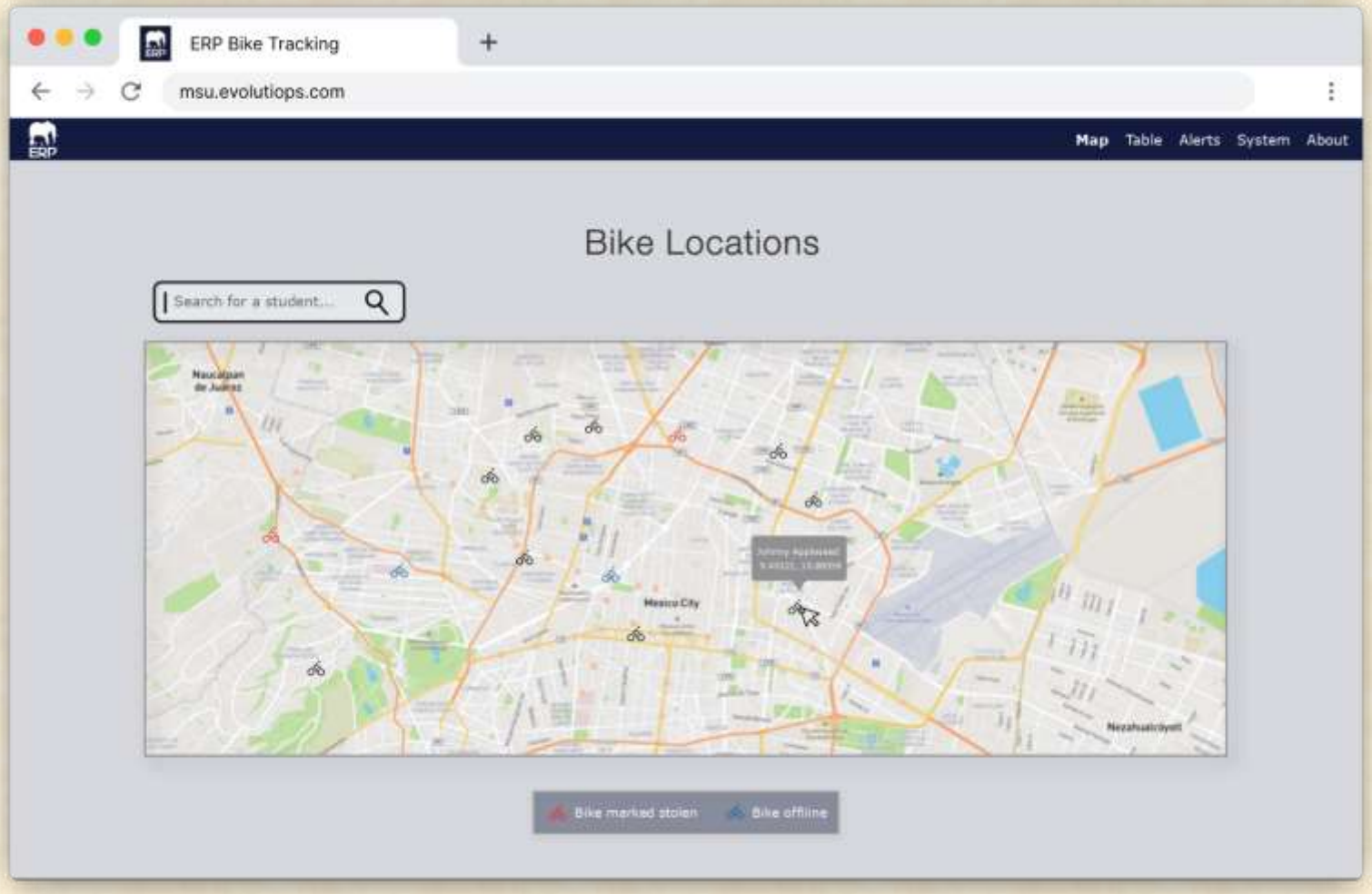
Project Functional Specifications

- High rate of theft/loss of bikes in South Africa.
- Use GPS to track bikes for children in South Africa.
- Show tracked bikes on web page.
- This allows for lost or stolen bikes to be recovered rather than replaced, lowering costs.

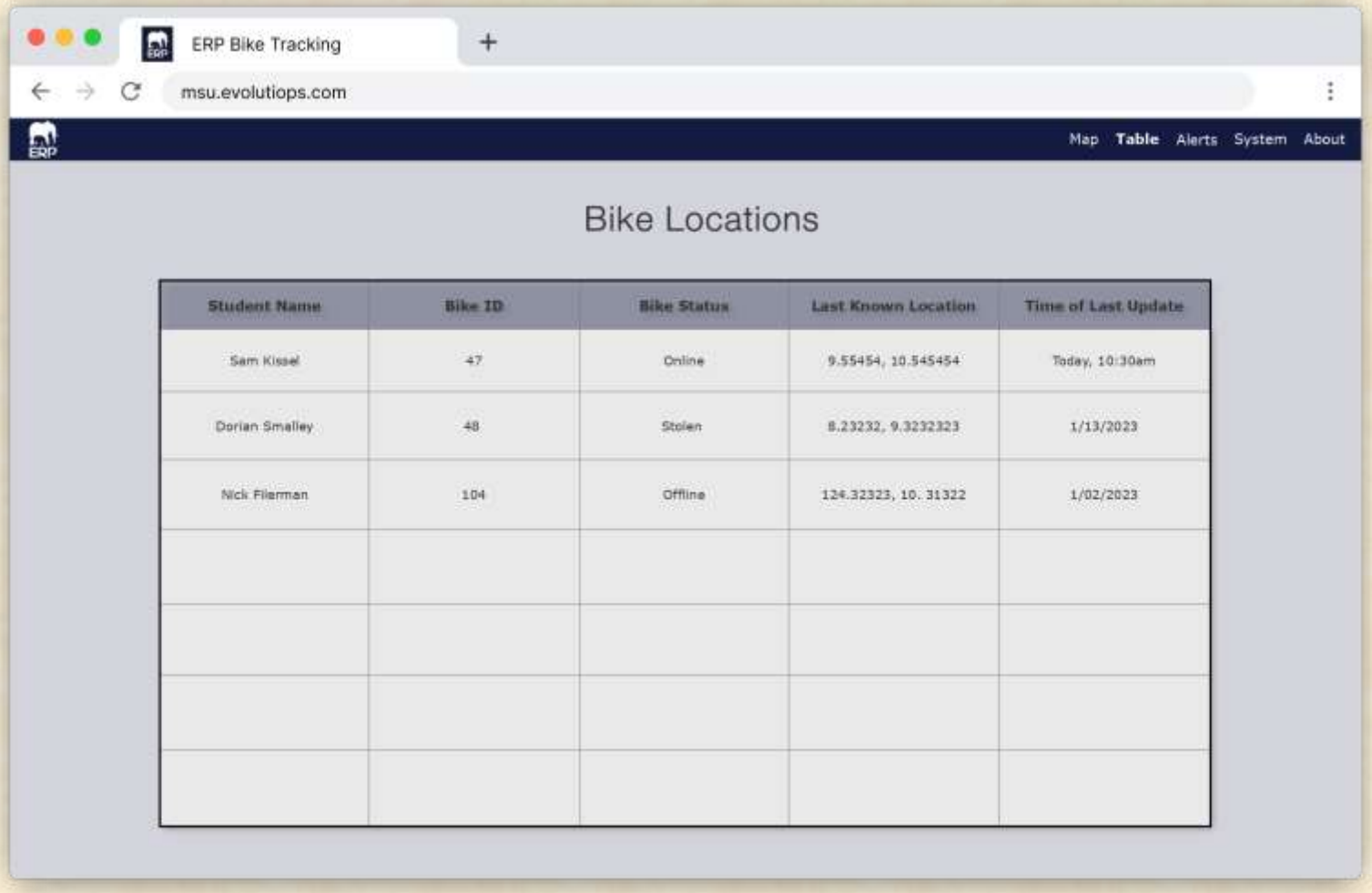
Project Design Specifications

- Interactive map on web page to show the location of the bikes.
- Users are able to mark bikes as lost/stolen.
- Users with a higher role can mark a bike as found.
- Automated message is sent when a bike is reported.
- Bikes are assigned to users by admins.
- Various statistics such as distance traveled and speed are shown in addition to location.

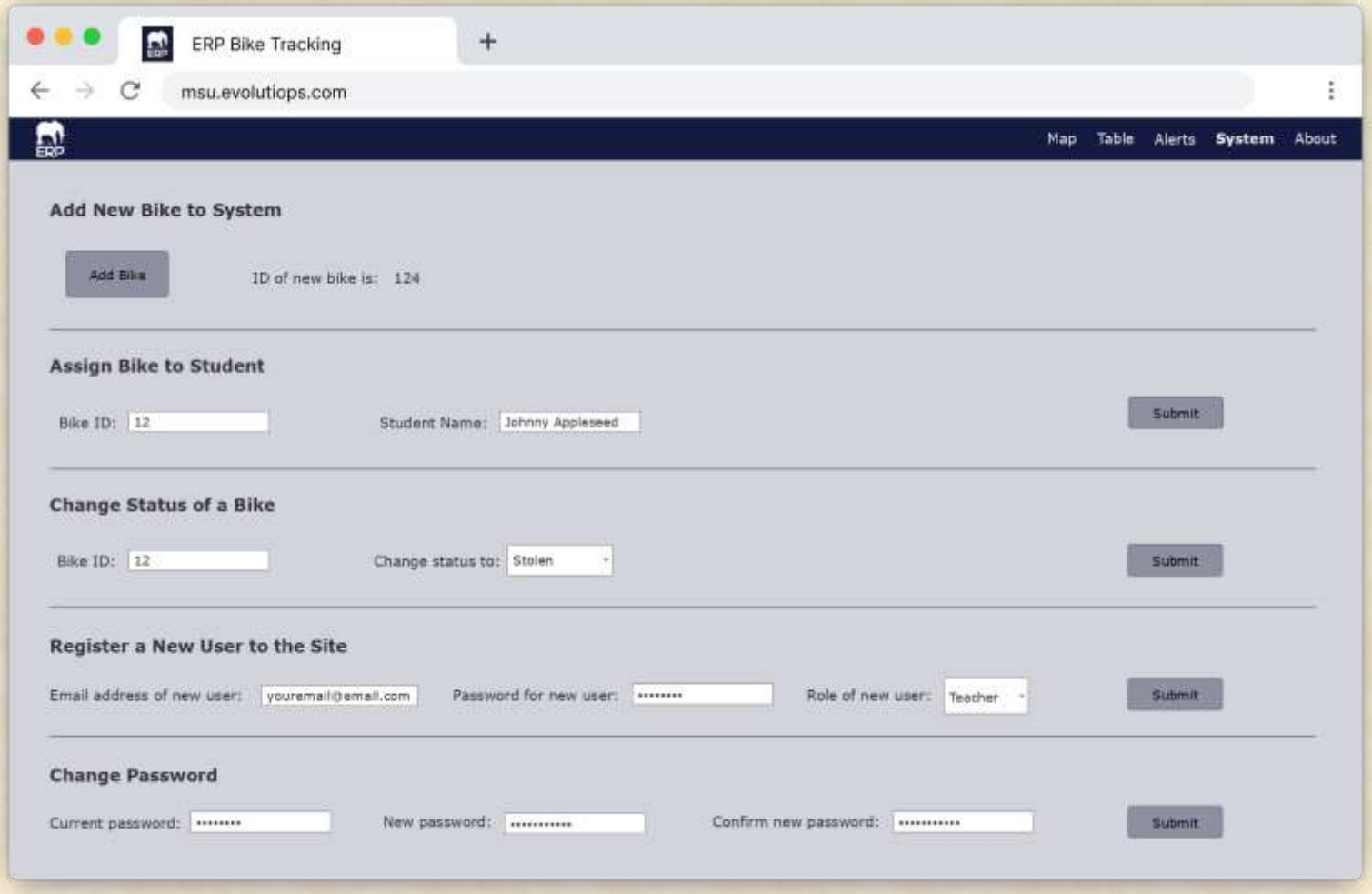
Screen Mockup: Home Screen



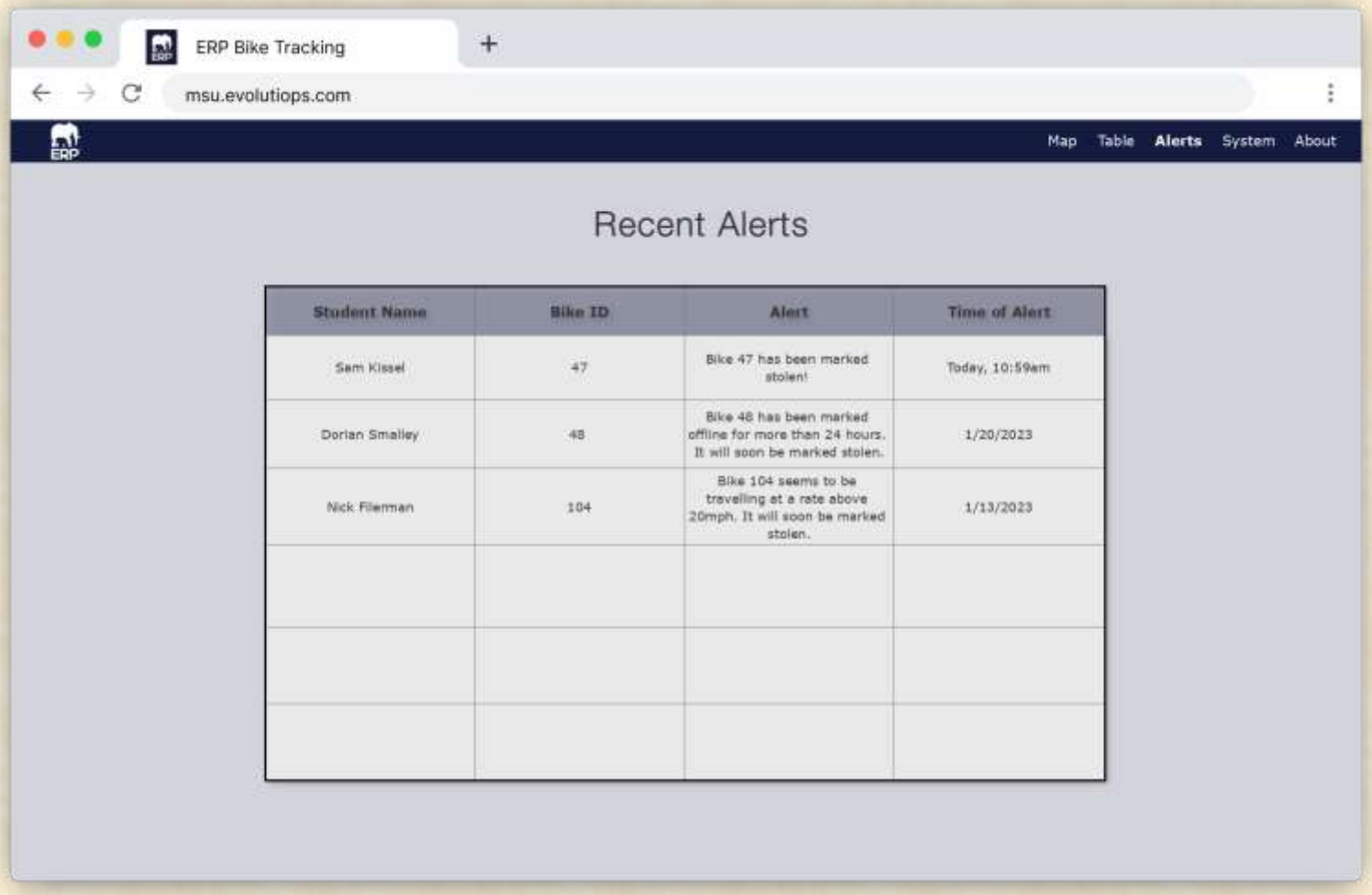
Screen Mockup: Bike Status Screen



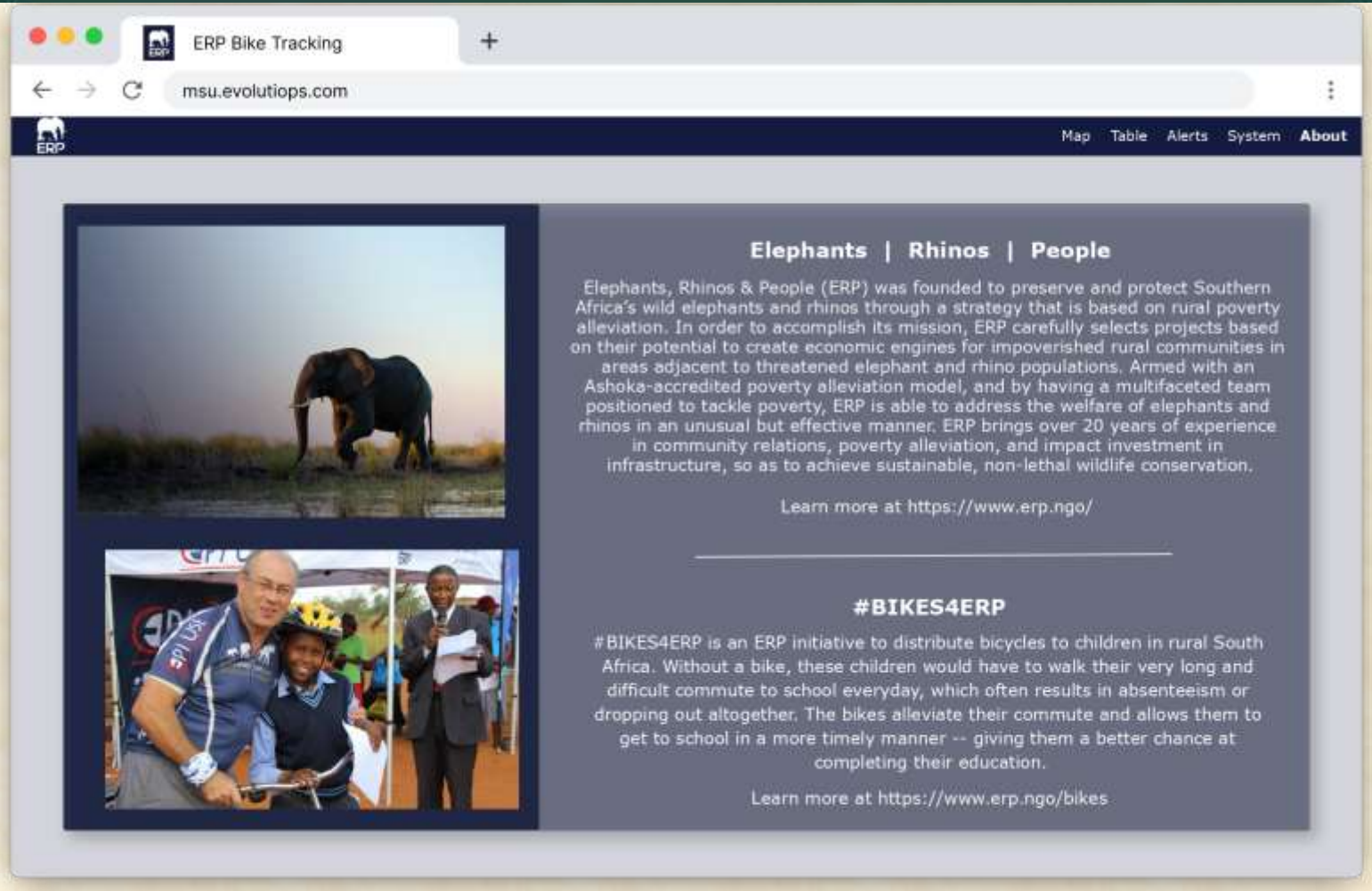
Screen Mockup: Systems Screen



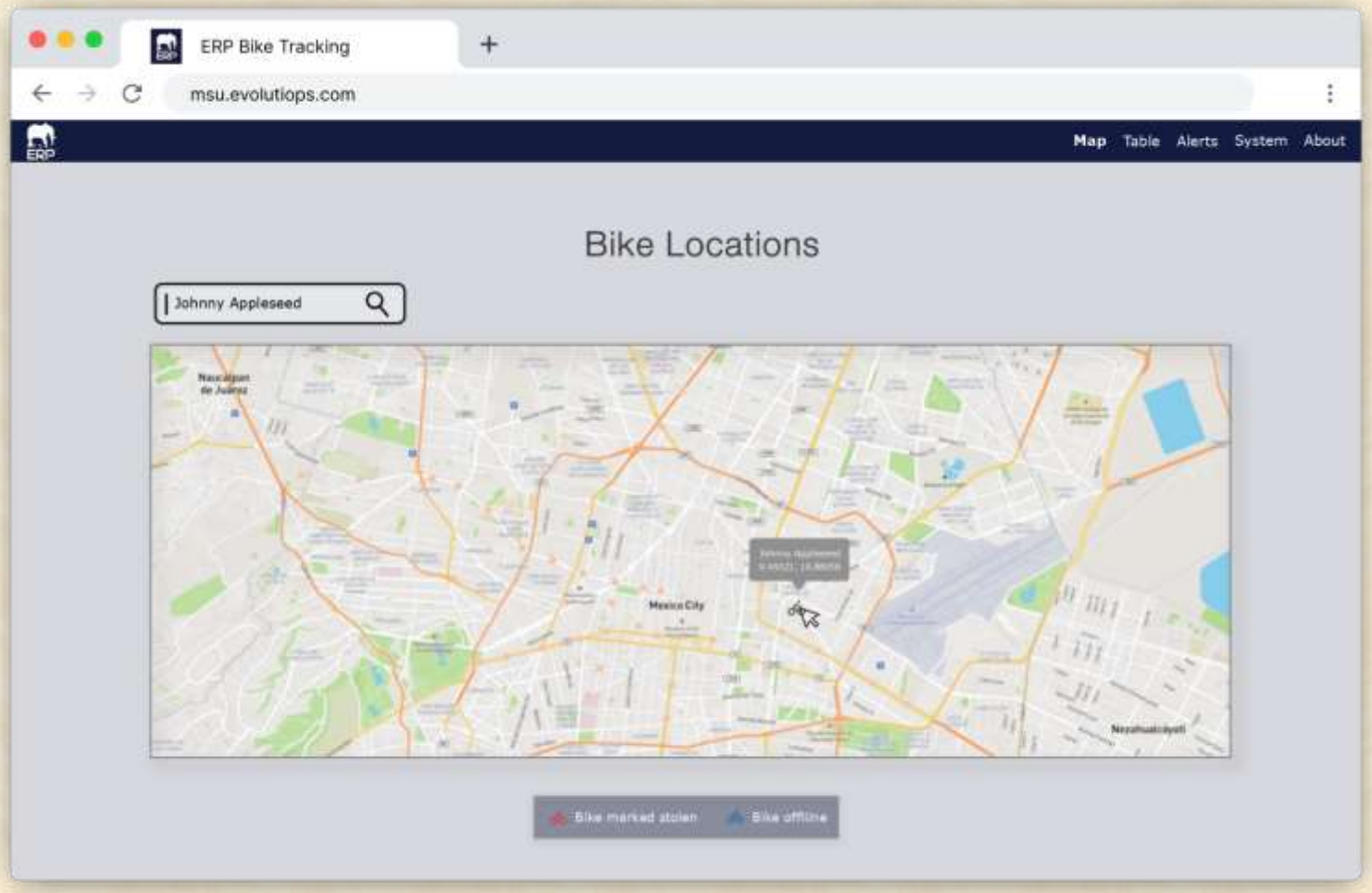
Screen Mockup: Alerts Screen



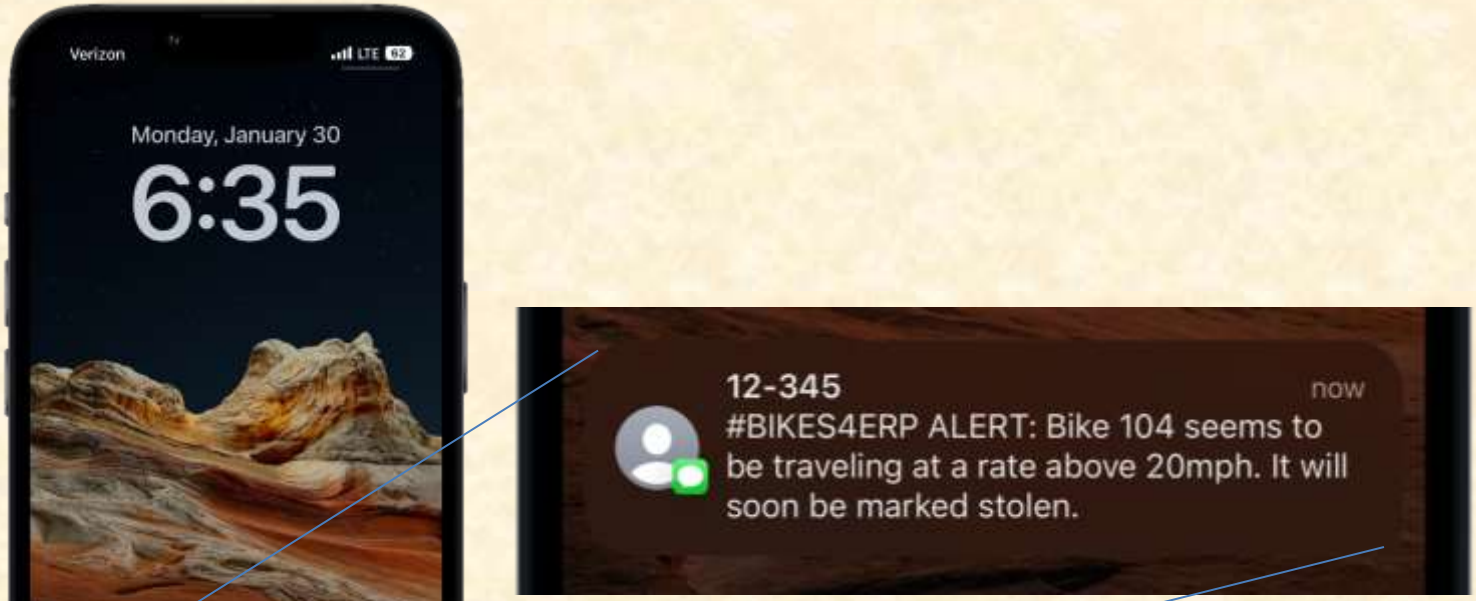
Screen Mockup: About Screen



Screen Mockup: Focused Tracking Screen



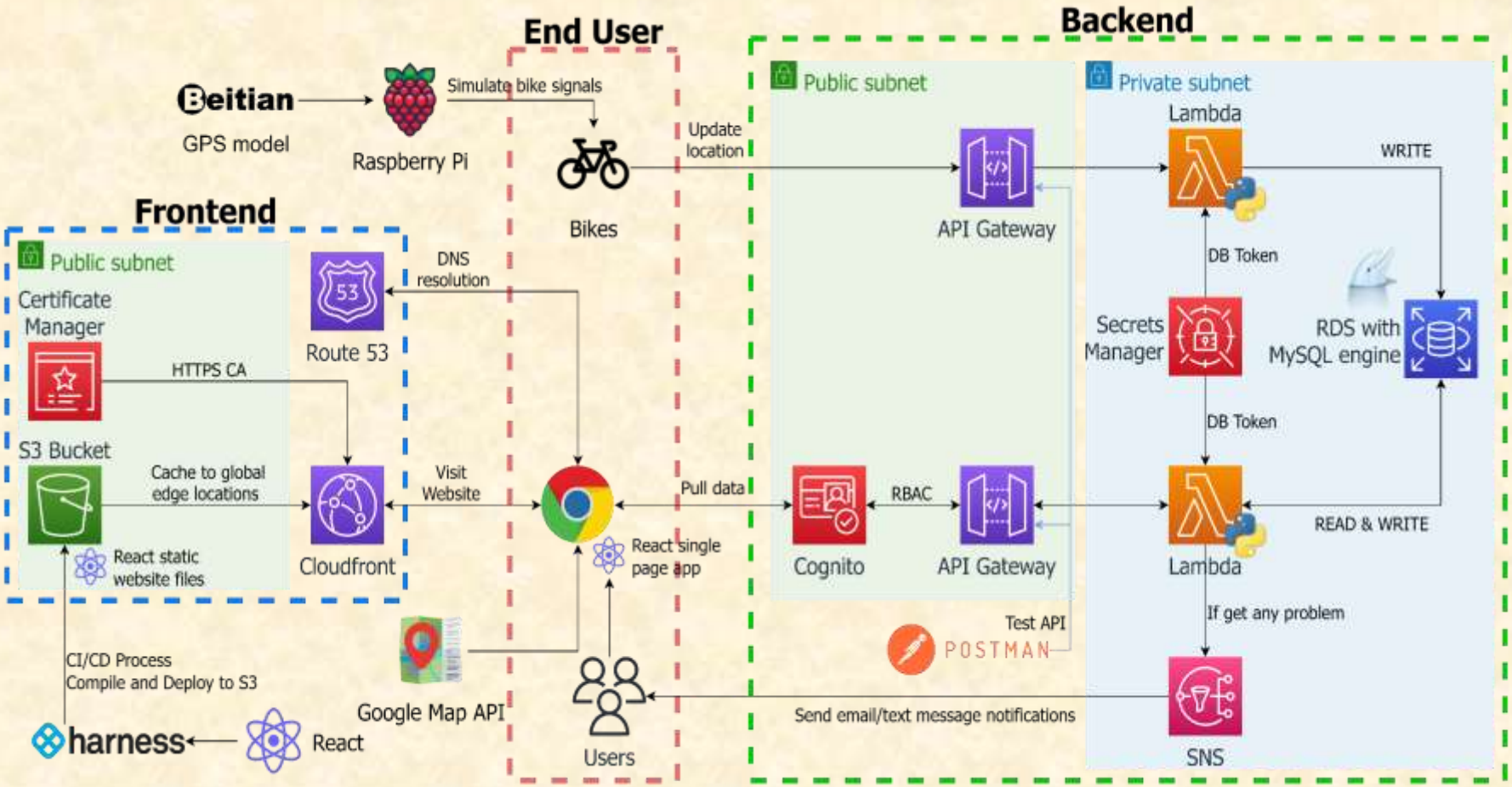
Screen Mockup: Mobile Alerts Screen



Project Technical Specifications

- Raspberry Pi 3B
- Raspberry Pi GPS Module
- AWS Cloud Platform
- Harness
- Postman
- React
- Google Maps API

Project System Architecture



Project System Components

- Hardware Platforms
  - Raspberry Pi 3B.
  - Beitian BN-880 GPS Module.
- Software Platforms / Technologies
  - Python for Raspberry Pi application.
  - React for web application.
  - AWS for backend and database operations.
  - Harness for CI/CD of React app.
  - Google Maps API for tracking map.
  - Postman in order to test API.

Project Risks

- Tracker Connection
  - How to get GPS and other data points from the Raspberry Pi to the database.
  - Client has stated that the Raspberry Pi is a prototype/proof of concept and has said the use of only Wi-Fi and mobile hot spots are fine.
- Theft Classification
  - What are the metrics for determining if a bike is stolen.
  - Start by basing the metrics on speed or missed pings, adding more as progress is made.
- Database Scalability
  - Client is requesting large amounts of data to be stored for extended periods of time, drastically increasing costs.
  - Test various rates of data upload and possible averaging.
- API Utilization
  - Depending on how often the tracking map is updated the cost associated could quickly rise.
  - Limit the map updates to occurring only once during a period of time and on page reload.

Questions?