Project Description and Request for Proposal

Members: Jamie Lim, Lisa Yeung, Dai Ling Wu, Shun Tomita

1. <u>Project Description, Objective, and challenges</u>

San Francisco, one of the most affluent cities in the United States has a pressing concern - poop complaints. To solve this issue, the city started the 'Pit Stop Program' which is a public toilet program that provides clean public toilets, safe spots to dispose of used needles, and bags to dispose of dog waste. As of today, the city has 33 Pit Stops. In this project, we want to identify the optimal locations and the optimal number of toilets to be installed in each location so that the program can yield higher usages, reduce poop complaints, and eventually generate higher public utility.

One of our challenges is obtaining the model parameters. We need to find out which factors determine the need for public toilets and use them as parameters in our model. Another challenge is identifying the constraints in our model. We should implement constraints that reflect reality, such as budgets, landforms, sewer systems, etc.

2. <u>Analytical Methods</u>

We chose to implement an optimization technique as our project aims to identify the optimal location and the optimal number of toilets to be installed in the city. Out of many optimization techniques, we specifically selected Integer Linear Programming (ILP) because the number of toilets to be installed has to be an integer and the objective function and the constraints in our model are linear in nature.

3. <u>Datasets</u>

These are some data sources that may be good indicators of the need for public toilets:

Dataset Name	Description	Link
311 Call Services	Dataset that contains calls and reports details. We are going to use data related to the problem such as cleaning requests of public roads.	https://data.sfgov.org/City-Infrastructure/311-Cases/vw6y-z8j6
Fire Department Calls for Services		https://data.sfgov.org/Public-Safety/Fire-Department-Calls-for-Service/nuek-vuh3
Police Department Incident Reports		https://data.sfgov.org/Public-Safety/Police-Department-Incident-Reports-Historical-2003/tmnf-yvry

Also, we might need datasets related to constraints of our models such as budgets or maximum number of toilets.

4. <u>Timeline & Task Division</u>

~10/31 Data Collection & Cleaning: Lisa Yeung, Dai Ling Wu
~11/05 Exploratory Data Analysis, Geospatial Analysis: Jamie Lim
        Defining model: Dai Ling Wu
~11/15 Model Implementation & Interpretation: Shun Tomita
~12/03 Final Report: Jamie Lim, Lisa Yeung, Dai Ling Wu, Shun Tomita

5. <u>Rationale for the plan</u>

We believe that our project plant fits the scope of this course as we mainly use the Integer Linear Programming model covered in class. As we have learned, we will formulate an objective function and implement appropriate constraints in order to obtain the optimal solution.

We have also provided a feasible timeline; we believe that data preparation and exploratory analysis steps can be completed in a timely manner with each member being in charge of different datasets. We allocated a considerable amount of time for modeling and interpretation which is the core of this project.