

Question to answer:

1. Establish a full list of the factors and criteria for installation of new filling stations.
 - a. For example, you can consider buildings with and without air conditioning (noted in the building list as “mechanical ventilation”. Especially as heat waves are becoming more frequent, we may want to prioritize installation of water filling stations in buildings without air conditioning.)
 - b. Consider that some spaces have their own water coolers or sinks in kitchens. Analyze the building list - kitchens tab and set these spaces at a lower priority.

Factors and criteria

- Kitchen
 - Buildings with a common kitchen do not need the installation of new filling stations
 - In other words, buildings without a common kitchen are prioritized to build a water bottle filling station
- Air ventilation
 - Buildings without air ventilation require the installation of new stations compared to buildings with air ventilation since heat waves become more frequent.
- Maintenance
 - Buildings that receive constant maintenance would be better to install water bottle filling stations since water bottle filling stations require maintenance for filters and proper functioning.
- High-density / foot traffic
 - Places with abnormally large foot traffic and only 1 filling station (just an example) could be considered for a 2nd filling station (preferably near a bathroom)
 - Additionally, locations that do not have a water bottle filling station and have high foot traffic are required for the installation of a water bottle filling station.
 - We will analyze foot traffic by the WiFi data. The more people use the WiFi, the higher the foot traffic.
- Cost
 - Although cost is something we do not have to worry about, it would be nice to take into consideration efficiency
 - Therefore, installing a water bottle filling station near the existing plumbing is prioritized.
- (Low priority) Buildings with no filling station on every floor
 - Costly, brute force, hence low priority

2. Establish how many students and employees are impacted by each water filling station in the current inventory.
 - a. Analyze the BU Sustainability inventory and building list, in tandem with wifi data on foot traffic.

For question 2, we found all the unique buildings in the Wifi “building_desc” column. Then, using the Geospatial data and high-volume people data, we also found all the unique buildings that provide the current list of water bottle filling stations. If there existed an overlap of the buildings between the Wifi data’s “building_desc” column and the buildings from Geospatial data and high-volume people data, we could calculate how many people (students and employees) benefitted from the water bottle station.

For example, if Mugar Library was listed in both the Wifi data and Geospatial data/high-volume people data, the number of people at Mugar Library could have benefitted from the water bottle filling station.

We decided to calculate the number of benefitted people on an average day by using the groupby function in pandas by building_desc & hour column and taking the sum of the mean of capacity (the number of people) based on the hour. In other words, we took the mean of the people from a specific building at every hour and added all of them to calculate the capacity of the building for an average day.

All of our code is written on the ipynb file on the early insight report (the very last section).

- On an average day, 1305 people benefitted from the existing water bottle station at 1019 COMMONWEALTH AVENUE
- On an average day, 1237 people benefitted from the existing water bottle station at 111 CUMMINGTON MALL
- On an average day, 1357 people benefitted from the existing water bottle station at 110-112 CUMMINGTON MALL
- On an average day, 136 people benefitted from the existing water bottle station at 154 BAY STATE ROAD
- On an average day, 126 people benefitted from the existing water bottle station at 156 BAY STATE ROAD
- On an average day, 171 people benefitted from the existing water bottle station at 196 BAY STATE ROAD
- On an average day, 1246 people benefitted from the existing water bottle station at 2 CUMMINGTON MALL
- On an average day, 4347 people benefitted from the existing water bottle station at 25 BUICK STREET
- On an average day, 1339 people benefitted from the existing water bottle station at 270 BAY STATE ROAD

- On an average day, 4930 people benefitted from the existing water bottle station at 300 BABCOCK STREET
- On an average day, 1524 people benefitted from the existing water bottle station at 33 HARRY AGGANIS WAY
- On an average day, 1295 people benefitted from the existing water bottle station at 36 CUMMINGTON MALL
- On an average day, 771 people benefitted from the existing water bottle station at 48 CUMMINGTON MALL
- On an average day, 2956 people benefitted from the existing water bottle station at 5 CUMMINGTON MALL
- On an average day, 1140 people benefitted from the existing water bottle station at 96 CUMMINGTON MALL
- On an average day, 2317 people benefitted from the existing water bottle station at 64 CUMMINGTON MALL
- On an average day, 2375 people benefitted from the existing water bottle station at 565 COMMONWEALTH AVENUE
- On an average day, 1968 people benefitted from the existing water bottle station at 881 COMMONWEALTH AVENUE
- On an average day, 366 people benefitted from the existing water bottle station at 517 BEACON STREET
- On an average day, 1118 people benefitted from the existing water bottle station at 712 BEACON STREET
- On an average day, 1121 people benefitted from the existing water bottle station at 233 BAY STATE ROAD (Admissions)
- On an average day, 1967 people benefitted from the existing water bottle station at 820 COMMONWEALTH AVENUE (Booth)
- On an average day, 3915 people benefitted from the existing water bottle station at 1 UNIVERSITY ROAD (BUA)
- On an average day, 0.0 people benefitted from the existing water bottle station at 675 - 725 COMMONWEALTH AVENUE (CAS) – No Data
- On an average day, 9534 people benefitted from the existing water bottle station at 285 BABCOCK STREET (Case Center)
- On an average day, 4352 people benefitted from the existing water bottle station at 890 COMMONWEALTH AVENUE (CELOP)
- On an average day, 3735 people benefitted from the existing water bottle station at 855 COMMONWEALTH AVENUE (CFA)
- On an average day, 3381 people benefitted from the existing water bottle station at 871 COMMONWEALTH AVENUE
- On an average day, 1151 people benefitted from the existing water bottle station at 273 BABCOCK STREET (Clafflin)

- On an average day, 3113 people benefitted from the existing water bottle station at 640 COMMONWEALTH AVENUE (COM)
- On an average day, 692 people benefitted from the existing water bottle station at 512 BEACON STREET (Danielson)
- On an average day, 2642 people benefitted from the existing water bottle station at 730 COMMONWEALTH AVENUE (EMA)
- On an average day, 1403 people benefitted from the existing water bottle station at 44 CUMMINGTON MALL (ENG)
- On an average day, 32744 people benefitted from the existing water bottle station at 915 COMMONWEALTH AVENUE (Fitrec)
- On an average day, 4916 people benefitted from the existing water bottle station at 808 COMMONWEALTH AVENUE (Fuller Building)
- On an average day, 613 people benefitted from the existing water bottle station at 704 COMMONWEALTH AVENUE (GRS)
- On an average day, 5634 people benefitted from the existing water bottle station at 775 COMMONWEALTH AVENUE (GSU)
- On an average day, 1476 people benefitted from the existing water bottle station at 575 COMMONWEALTH AVENUE (HOJO)
- On an average day, 2149 people benefitted from the existing water bottle station at 91 BAY STATE ROAD (Kilachand)
- On an average day, 4379 people benefitted from the existing water bottle station at 765 COMMONWEALTH AVENUE (LAW)
- On an average day, 575 people benefitted from the existing water bottle station at 621 COMMONWEALTH AVENUE (Linguistics)
- On an average day, 2567 people benefitted from the existing water bottle station at 985 COMMONWEALTH AVENUE (Marcom)
- On an average day, 415 people benefitted from the existing water bottle station at 735 COMMONWEALTH AVENUE (Marsh)
- On an average day, 6227 people benefitted from the existing water bottle station at 590 COMMONWEALTH AVENUE (Metcalf)
- On an average day, 1311 people benefitted from the existing water bottle station at 771 COMMONWEALTH AVENUE (Mugar)
- On an average day, 2115 people benefitted from the existing water bottle station at 610 BEACON STREET (Myles Standish)
- On an average day, 3498 people benefitted from the existing water bottle station at 8 ST. MARY'S STREET (Photonics)
- On an average day, 5501 people benefitted from the existing water bottle station at 595 COMMONWEALTH AVENUE (Questrom)
- On an average day, 1238 people benefitted from the existing water bottle station at 277 BABCOCK STREET (Rich)

- On an average day, 1847 people benefitted from the existing water bottle station at 635 COMMONWEALTH AVENUE (Sargent)
- On an average day, 1867 people benefitted from the existing water bottle station at 928 COMMONWEALTH AVENUE (SHA)
- On an average day, 2059 people benefitted from the existing water bottle station at 275 BABCOCK STREET (Sleeper)
- On an average day, 1972 people benefitted from the existing water bottle station at 745 COMMONWEALTH AVENUE (STH)
- On an average day, 1089 people benefitted from the existing water bottle station at 140 BAY STATE ROAD (TOWERS)
- On an average day, 11043 people benefitted from the existing water bottle station at 100 ASHFORD STREET (TTC)
- On an average day, 3158 people benefitted from the existing water bottle station at 700 COMMONWEALTH AVENUE (WARREN)
- On an average day, 1778 people benefitted from the existing water bottle station at 2 SILBER WAY (WHEELLOCK)
- On an average day, 2390 people benefitted from the existing water bottle station at 100 BAY STATE ROAD (YAWKEY)
- On an average day, 475 people benefitted from the existing water bottle station at 255 BAY STATE ROAD (The CASTLE)
- On an average day, 5016 people benefitted from the existing water bottle station at 120 ASHFORD STREET
- On an average day, 324 people benefitted from the existing water bottle station at 226 BAY STATE ROAD
- On an average day, 3023 people benefitted from the existing water bottle station at 610 COMMONWEALTH AVENUE
- On an average day, 2131 people benefitted from the existing water bottle station at 750 COMMONWEALTH AVENUE
- On an average day, 44 people benefitted from the existing water bottle station at 925 COMMONWEALTH AVENUE
- On an average day, 2289 people benefitted from the existing water bottle station at 24 CUMMINGTON MALL

Water Bottle Filling Stations on the Dataset that Do Not Have WiFi Data

1. Myles Annex - 632 Beacon Street
2. SSW - 264 Bay State Road
3. Stone - 675 Commonwealth Avenue
4. Tsai - 685 Commonwealth Avenue
5. 68 Cummington Mall

It is important to note that there may exist water filling stations in the campus that are not existent from the dataset as mentioned in the Google Doc Folder (mentioned that 80% of the water filling stations exist in the dataset).