Determining the optimal route for a Cross-Queens canal

Zhi He - Spring 17

Data

- DEM (raster)
  - Elevation (higher the canal, more locks need, higher the cost)
- Transit (points)
  - how connected or need for connections - Bus and Subways stops
- Roadbed (polygon)
  - Locations of roads
- PLUTO (polygon)
  - Land Use
    - Avoiding Transportation and Utility facilities
    - Favoring Vacant Land, Parking, Open space
  - Land Ownership (public or private land)
  - Assessed value (land cost)
  - Build Floor Area Ratio (FAR)
    - Density of lot
  - Historic District/ Landmark

Raster and reclass

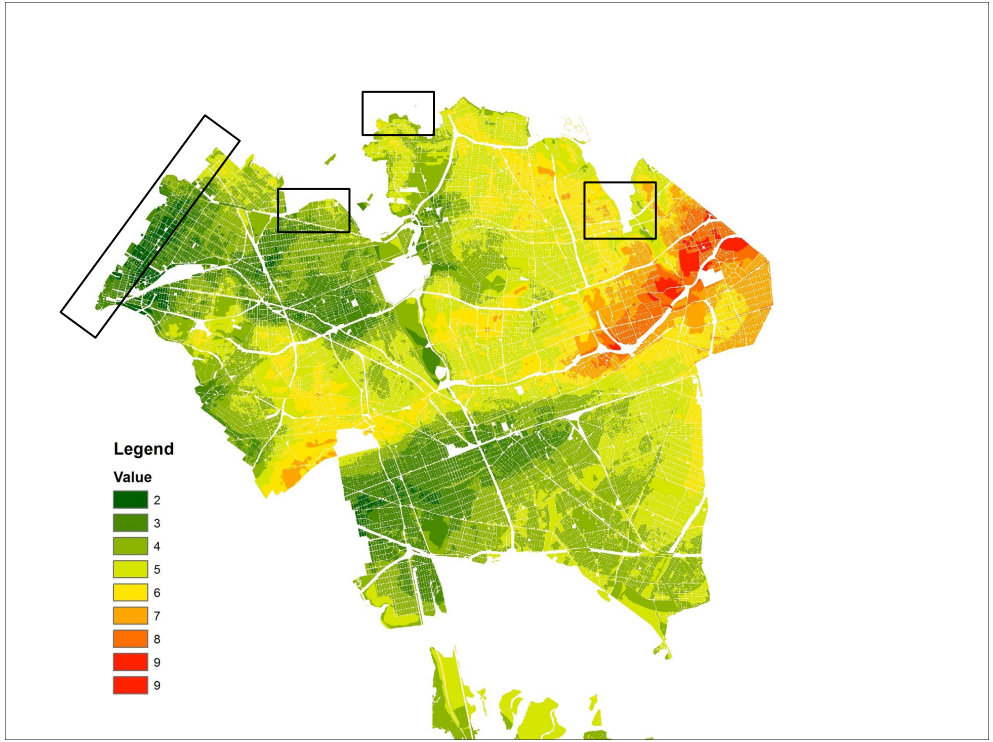
- DEM - used as base raster
  - 10 Meters (later 40 meters ...)
  - NAD 1983 State Plane New York
  - Extent Queens clipped to shoreline
- Transit - Kernel Density
  - Reclass using quantile (9 classes)
- Roadbed (polygon)
  - Converted to raster
- PLUTO
  - Land Use
    - transportation and utility: weighted highest (9),
    - buildings: medium (6),
    - open space, parking , vacant land: lowest (1)
  - Land Ownership
    - Private highest ...
  - Assessed value (land cost)
    - Assessed value / shape area = cost per foot
  - Build Floor Area Ratio (FAR)
    - 0-.9: low density, single (R1-4)
    - .9- 2: low density, multi (R5)
    - 2-5: Medium (R6-7)
    - >5: High density
  - Historic District/ Landmark
    - 1 or 0 value

Possible locations (lower value is more suitable)

- Land value 10%
- Bus 20%
- Subway 20%
- Elevation 50% - closer to cost
- Restrict Roadbed and Historic
- Restrict any transportation/infrastructure land use

End points

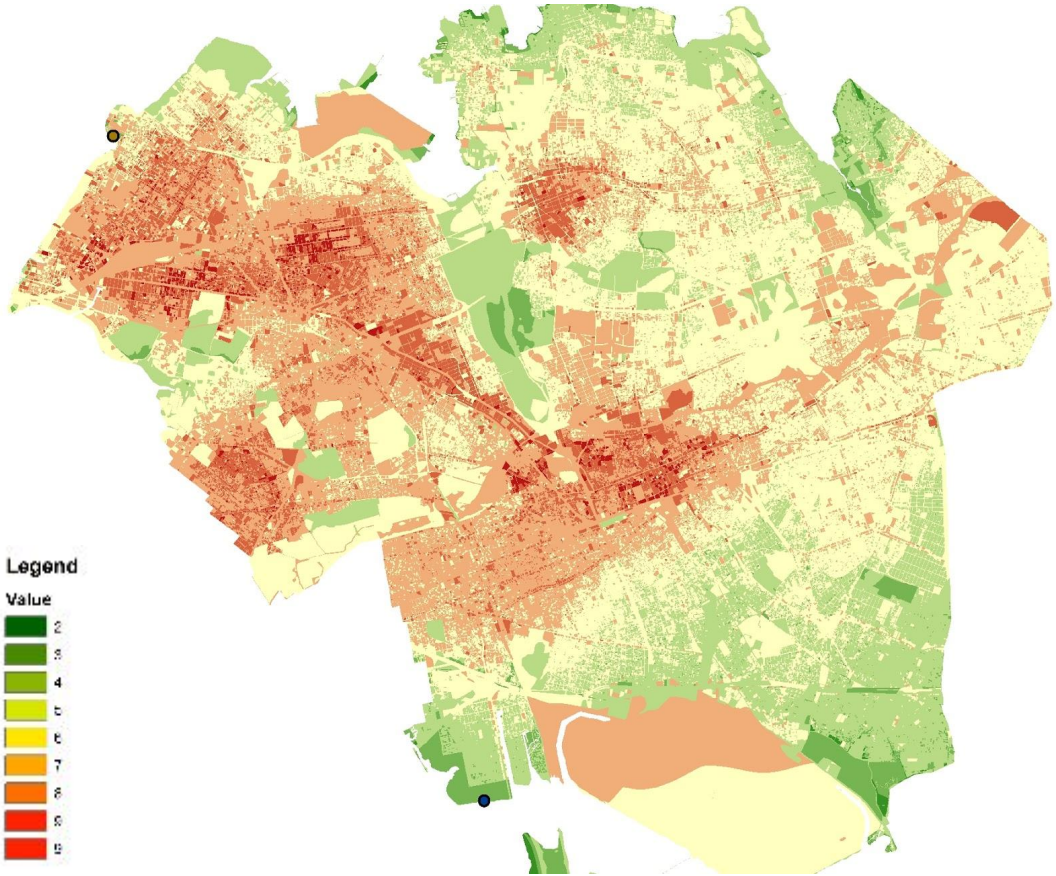
- Astoria , Long island city (east river ferry connections)
- LGA airport
- Whitestone (north queens)
- Bayside (east queens)



Overlay Outcomes

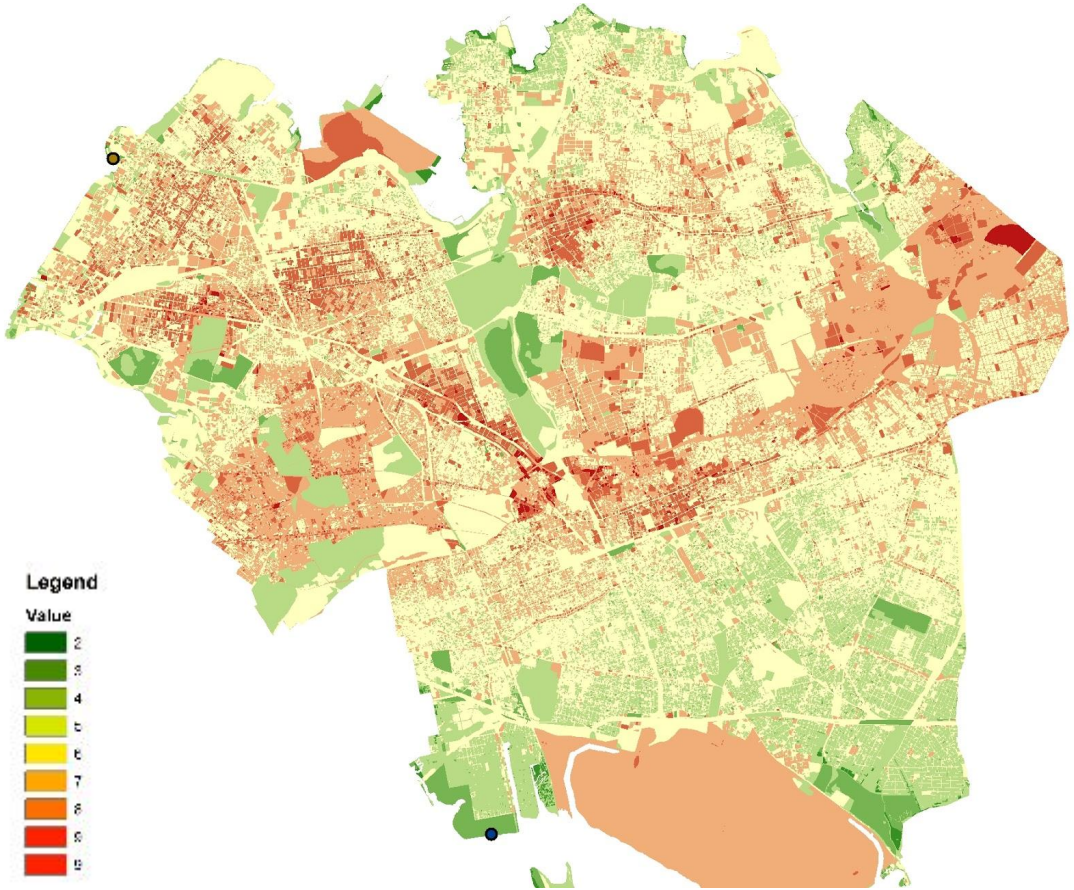
Equal

- FAR 20% - low density
- Land value 20% - lower land value
- Land use - favor open land, 20%
- Bus 10% , Subway 10% (areas with low transportation)
- Elevation 20%



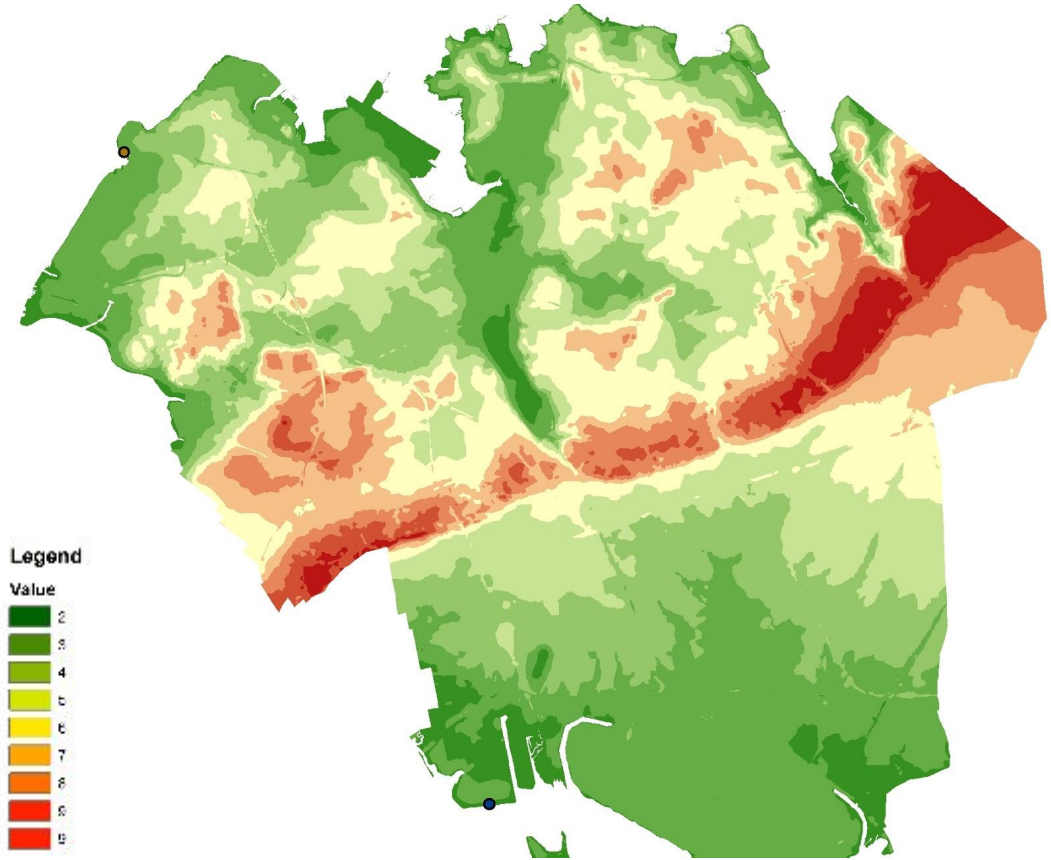
Low cost

- FAR 25%
- Land value 25%
- Landuse 25%
- Elevation 25%



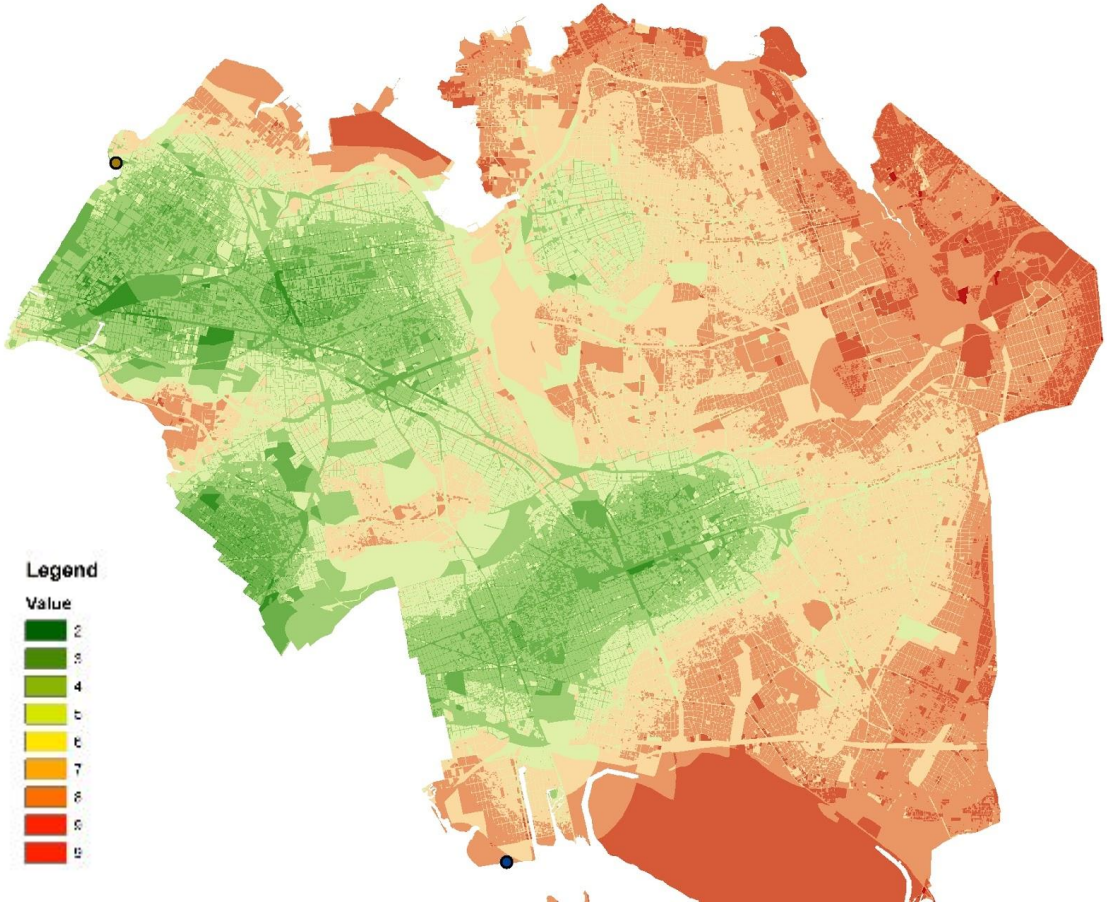
Replace roads with low elevation

- Roadbed 50%
- Elevation 50%



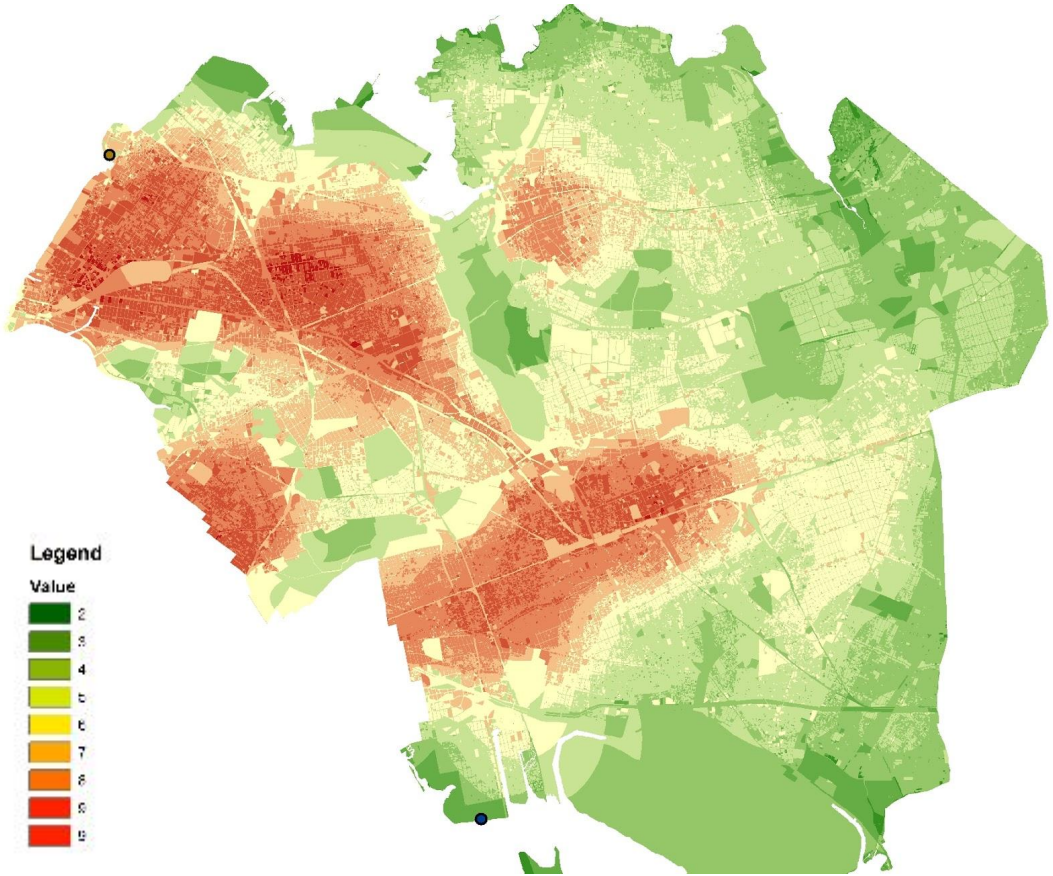
Best connections , cost doesn’t matter

- FAR (favor high density) 10%
- Land use- favor residential areas 15%
- Land value 15%
- Dense bus, dense subway - each 40% , more transportation



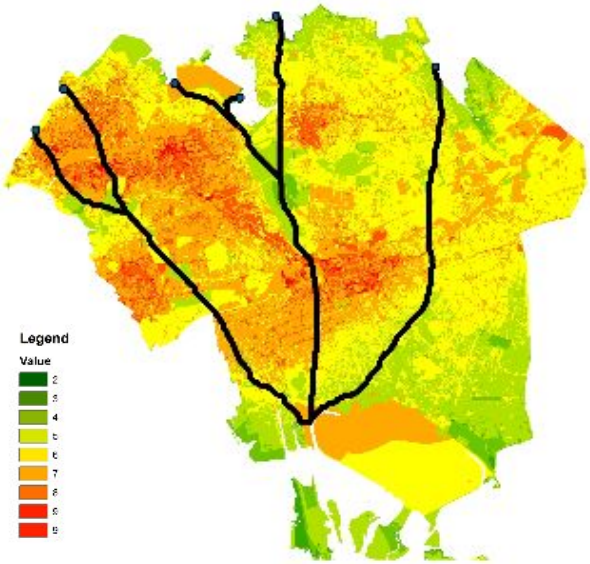
Least connections , low cost

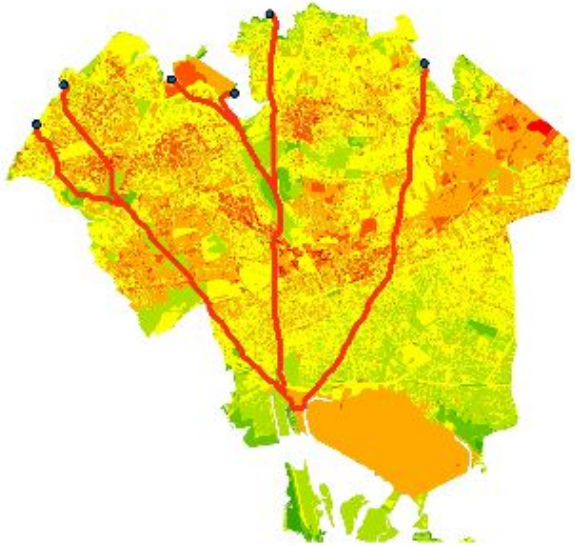
- FAR (favor low density) 10%
- Land use- government land 15%
- Land value 15%
- Dense bus, dense subway - each 40% , less transportation

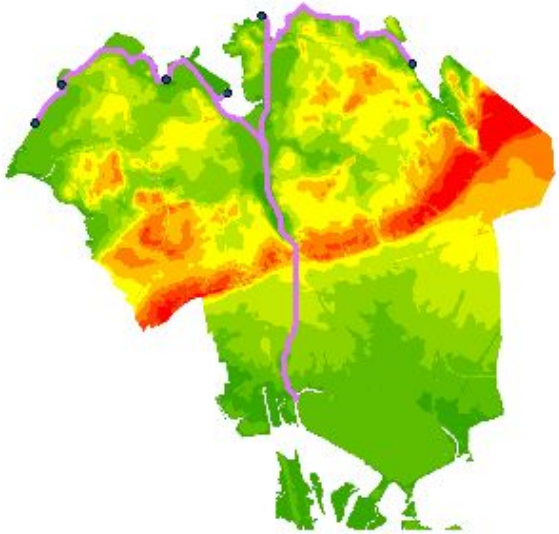


Routes (least cost path)

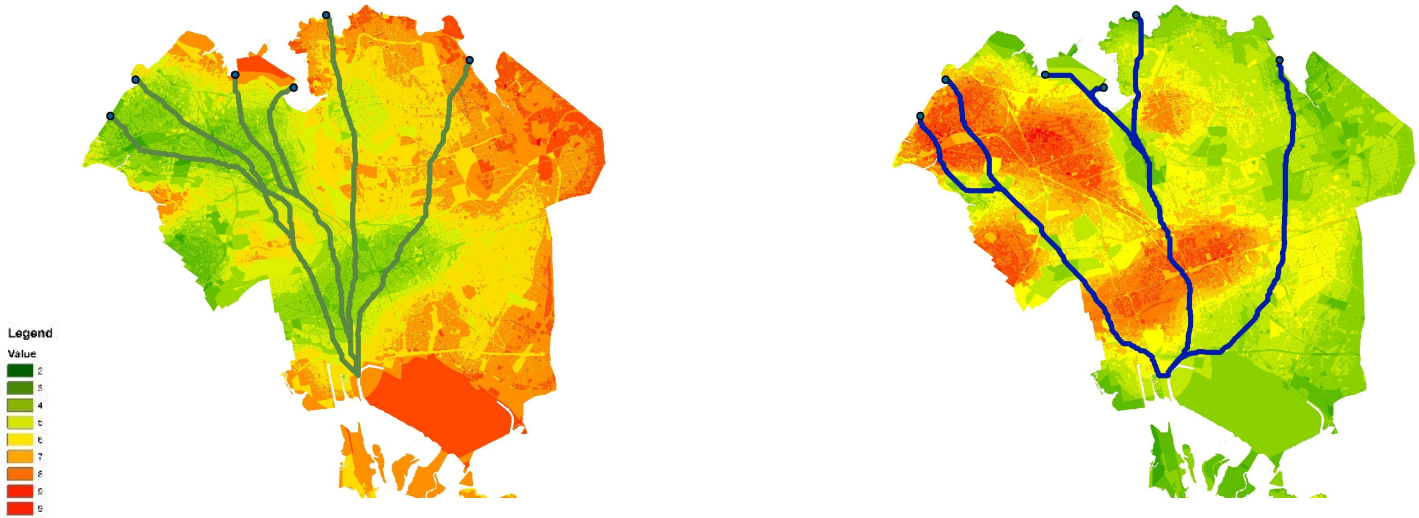
Summary of results are in the paper



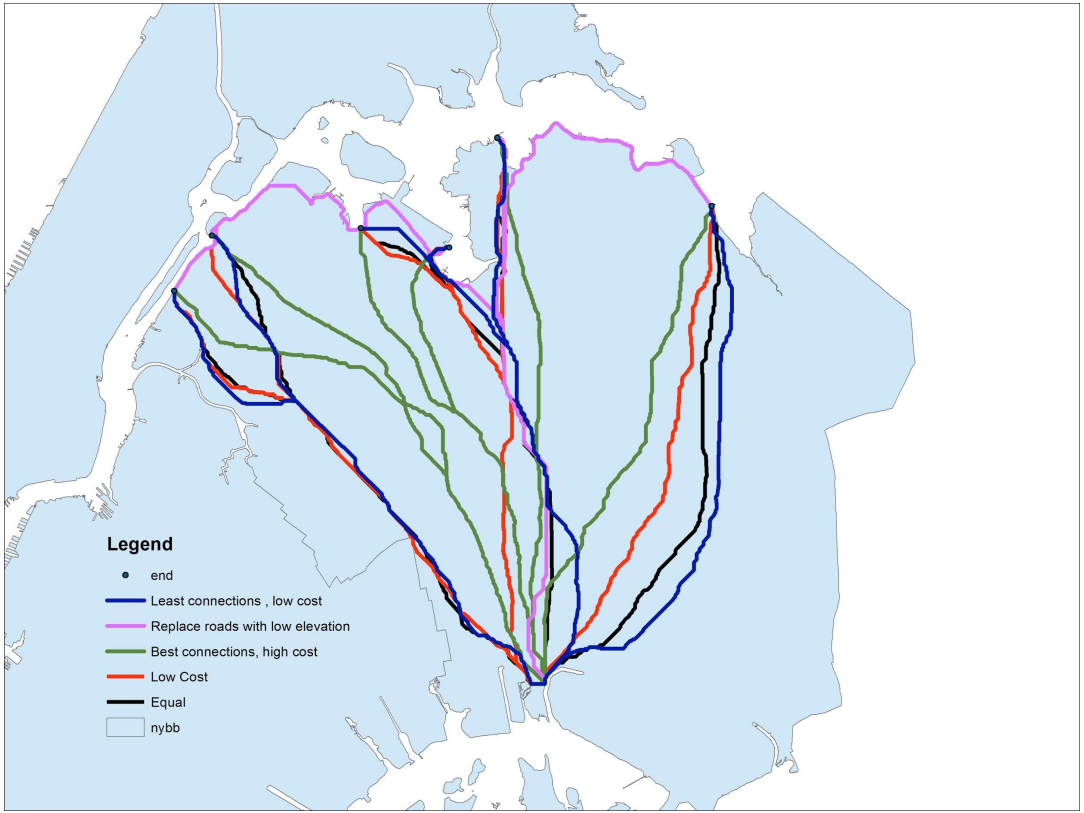




Results for equal, low cost, replace roads overlays



Dense Transportation and High cost, Sparse Transportation and low cost



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