LAND USE DIVERSITY

NYC Department of City Planning Transportation Division

December 2021

- **MapPLUTO**
  - BBL
  - Census Tract 2010
  - Shape Area
  - Residential Area ⎫
  - Office Area
  - Retail Area
  - Garage Area ⎬ Total Building Area
  - Storage Area
  - Factory Area
  - Other Area ⎭

- Total Building Area != 0

- Total Building Area / Shape Area <= 40

                  ↑   ↑

           Built FAR   Max allowed FAR

NYC PLANNING

Census Block Land Use Diversity Index

$$LUDI_{BK} = -\left(\sum_{i=1}^{n} P_i \times \ln(P_i)\right) \div \ln(n)$$

Where,

$LUDI_{BK}$ = the Census Block level Land Use Diversity Index with a range between 0 and 1; 0 represents homogenous land use, and 1 indicates the building area is equally distributed across all land use types

P_i = the proportion of total building area for the ith land use category found within half-mile walkshed of the Census Block being analyzed

n = the number of land use categories of interest

$$LUDI_{CT} = (\sum_{i=1}^{n} LUDI_{BK}^{i} \times BA_{BK}^{i}) \div \sum_{i=1}^{n} BA_{BK}^{i}$$

Where,

$LUDI_{CT}$ = the Census Tract level Land Use Diversity Index with a range between 0 and 1; 0 represents homogenous land use, and 1 indicates the building area is equally distributed across all land use types

$LUDI_{BK}^{i}$ = the Census Block level Land Use Diversity Index of Census Block i

BA_{BK}^{i} = the total building area within half-mile walkshed of the Census Block i

$$LUDI_{NTA} = (\sum_{i=1}^{n} LUDI_{BK}^{i} \times BA_{BK}^{i}) \div \sum_{i=1}^{n} BA_{BK}^{i}$$

Where,

$LUDI_{NTA}$ = the Neighborhood Tabulation (NTA) level Land Use Diversity Index with a range between 0 and 1; 0 represents homogenous land use, and 1 indicates the building area is equally distributed across all land use types

$LUDI_{BK}^{i}$ = the Census Block level Land Use Diversity Index of Census Block i

BA_{BK}^{i} = the total building area within half-mile walkshed of the Census Block i

Residential Area —— Residential Area × 1

Office Area
Retail Area
⟩ Office & Retail Area × 1

Garage Area
Storage Area
Factory Area
Other Area
⟩ Other Area × 1

Residential Area —— Residential Area × 1

Office Area —— Office Area × 1

Retail Area —— Retail Area × 1

Garage Area
Storage Area > Industrial Area × 1
Factory Area

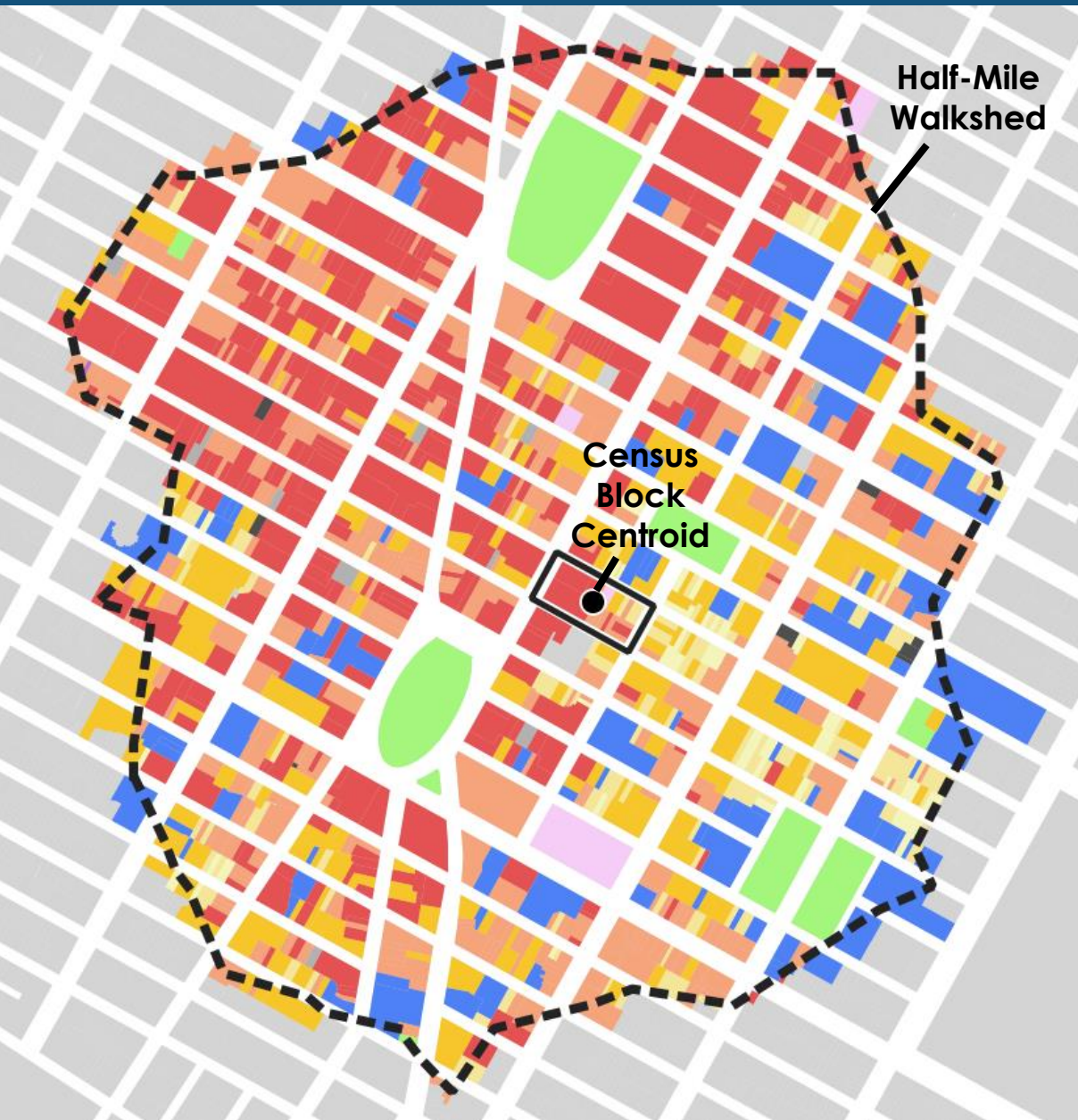Other Area —— Other Area × 1

Residential Area ⟶ Residential Area × 1

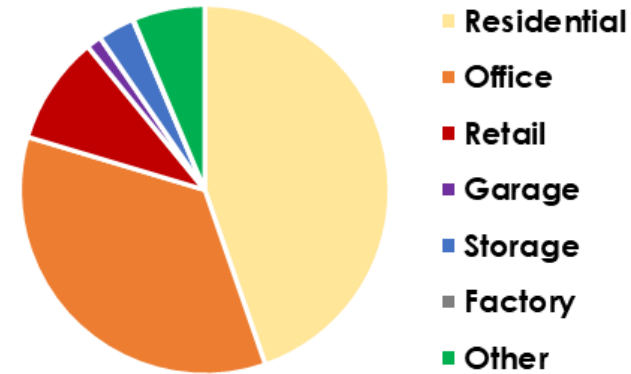Office Area ⟶ Office Area × 1.5

Retail Area ⟶ Retail Area × 10

Garage Area
Storage Area ⟶ Industrial Area × 0.5
Factory Area

Other Area ⟶ Other Area × 1

Example

Half-Mile Walkshed

Census Block Centroid

Original Land Use Areas

- Residential
- Office
- Retail
- Garage
- Storage
- Factory
- Other

Adjusted Land Use Areas

- Residential
- Office
- Retail
- Industry
- Other
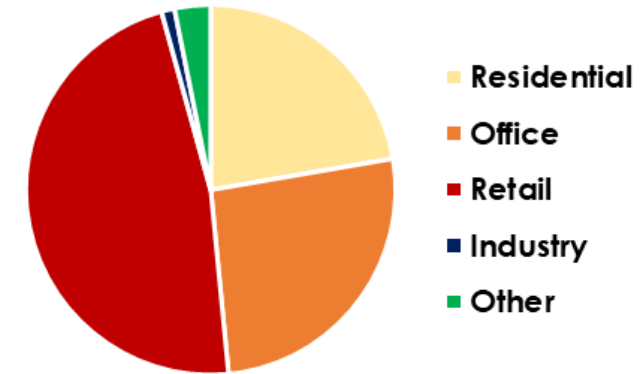
$$LUDI_{BK} = -(P_{Res} \times \ln(P_{Res}) + P_{Off} \times \ln(P_{Off}) + P_{Ret} \times \ln(P_{Ret}) + P_{Ind} \times \ln(P_{Ind}) + P_{Oth} \times \ln(P_{Oth})) \div \ln(5)$$