LAND USE DIVERSITY

NYC Department of City Planning Transportation Division

December 2021

NYC PLANNING

- **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

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

Cat3 LUDI Land Use Grouping and Expansion Factor

Residential Area — Residential Area × 1

Office Area
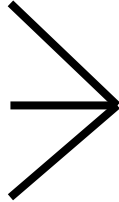Retail Area
}
Office & Retail Area × 1

Garage Area
Storage Area
Factory Area
Other Area
}
Other Area × 1

DRAFT

Residential Area — Residential Area × 1

Office Area — Office Area × 1

Retail Area — Retail Area × 1

Garage Area
Storage Area — Industrial Area × 1
Factory Area

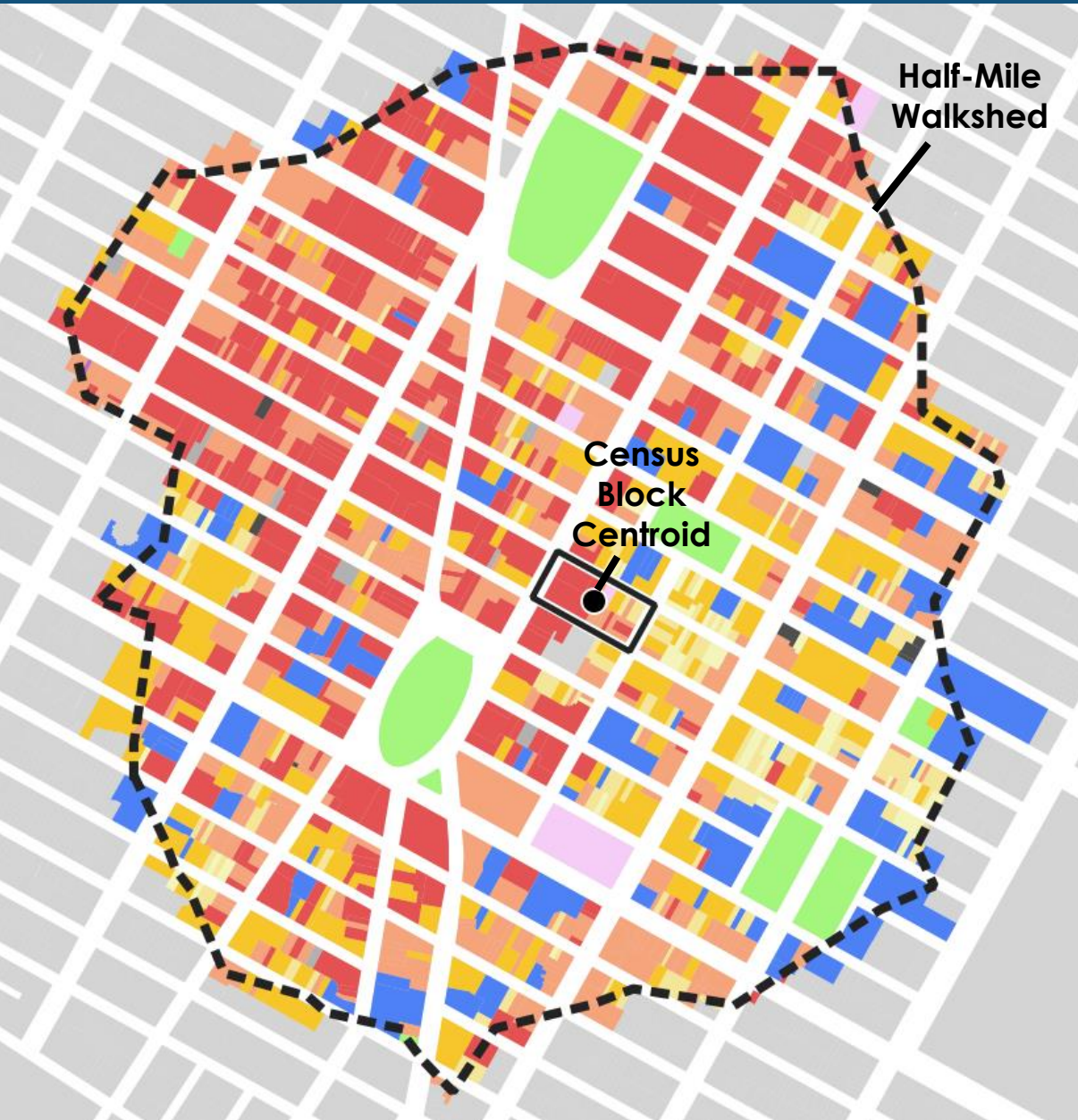Other Area — Other Area × 1

Residential Area —— Residential Area × 1

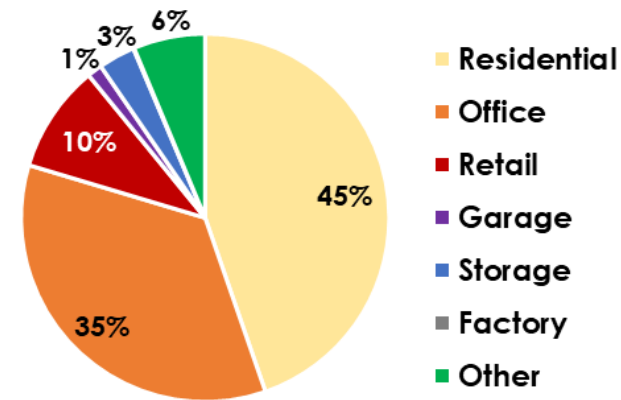Office Area —— Office Area × 1.5

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 — 45%
- Office — 35%
- Retail — 10%
- Garage — 1%
- Storage — 3%
- Factory
- Other — 6%

Adjusted Land Use Areas

- Residential*1 — 23%
- Office*1.5 — 26%
- Retail*10 — 47%
- Industry*0.5 — 1%
- Other*1 — 3%
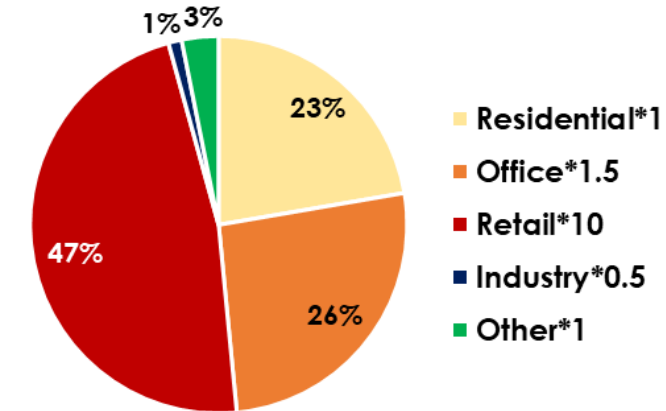
$$LUDI_{BK}$$
$$= -\big(P_{Res} \times \ln(P_{Res}) + P_{Off} \times \ln(P_{Off}) + P_{Ret} \times \ln(P_{Ret})$$
$$+ P_{Ind} \times \ln(P_{Ind}) + P_{Oth} \times \ln(P_{Oth})\big) \div \ln(5)$$
$$= -(23\% \times \ln(23\%) + 26\% \times \ln(26\%) + 47\% \times \ln(47\%)$$
$$+ 1\% \times \ln(1\%) + 3\% \times \ln(3\%)) \div \ln(5)$$
$$= 0.75$$