

Where Circular Economy Can Happen in NYC

IBZ and M1–M3 NAICS Mapping — Research Summary
Town+Gown:NYC | NYC DDC • Seth Gordon • Spring 2026

Project Overview

This report documents the research, data pipeline, and policy analysis completed for the Town+Gown:NYC @ NYC DDC for the Urban Resource Recovery Working Group, during Spring 2026. It is intended to serve two audiences: the research mentor overseeing this work, and a future research scholar who may continue or build on it.

The central question guiding this project was: what is actually happening inside NYC's Industrial Business Zones (IBZs), and which businesses and land conditions are most relevant to advancing circular economy practices — particularly in the context of Construction and Demolition (C&D) policy?

Research Questions

- What sectors are currently operating in the IBZs?
- Who are the business owners operating there, and what is the MWBE landscape?
- Are there spatial patterns that might shape future C&D policy?
- What policy tools can be used to encourage circular economy practices within IBZs?

Data Sources & Methodology

Primary Data Sources

Business Registry	2024 NAICS registration data from ReferenceUSA Historical Business Data (QCQ-A and QCQ-B files)
MWBE Directory	NYC SBS Certified Business List, sourced from NYC Open Data
Parcel Data	NYC MapPLUTO (v25.4) — used to identify industrial-zoned lots and assess land utilization
IBZ Boundaries	NYC IBZ shapefile from NYC EDC/SBS

Data Pipeline (R Script)

All data processing was conducted in R. The pipeline is documented in `IBZ_Analysis.R` and proceeds in the following stages:

1. Load and clean business registry data (Parts A and B)
2. Apply a zip code pre-filter to reduce data volume before spatial processing
3. Convert businesses to spatial points (WGS84) and clip to IBZ boundaries using `st_filter()`
4. Classify each business by 2-digit NAICS sector and C&D policy impact flag
5. Merge MWBE-certified businesses not already in the registry (deduplicated by company name)
6. Join PLUTO parcel data to identify industrial lots (LandUse = 06) with no business activity
7. Export GeoJSON and CSV outputs for ArcGIS

Known Data Limitations

- The business registry is a snapshot, not a live document — it does not reflect closures or new openings in real time.
- NAICS registration is incomplete. Not all businesses are registered, and crosswalking between NAICS and SIC codes introduces inconsistencies.
- MWBE name matching is fuzzy — slight variations in company names may result in missed matches or occasional duplicates.
- The most accurate picture of IBZ activity sits in proprietary data held by EDC, SBS, and IBZ trade groups, which is not publicly accessible. This is the most significant gap in the dataset.

Spatial Analyses

Analysis 1: C&D Policy Impact Share by IBZ

For each IBZ, the share of businesses operating in C&D policy-impacted sectors was calculated. The four flagged sectors are:

- Construction
- Manufacturing
- Mining, Quarrying, and Oil and Gas Extraction
- Transportation and Warehousing

Output: `CD_Impact_by_IBZ.csv` and `CD_Impact_by_IBZ.png`. IBZs with the highest C&D share represent the zones where businesses are most exposed to policy changes affecting construction waste, material reuse, and demolition permitting.

Analysis 2: Underutilized Industrial Lots Near C&D Clusters

Industrial-zoned lots (PLUTO LandUse = 06) with no matching business points were identified as potentially underutilized. A Floor Area Ratio (FAR) threshold of 0.25 was applied — lots where existing buildings cover less than 25% of the lot's theoretical capacity were flagged as underutilized.

A 500-foot buffer (approximately one city block) was drawn around all C&D-impacted businesses. Underutilized lots falling within that buffer were identified as displacement risk zones — locations where land is available but underused, adjacent to concentrations of C&D-dependent businesses.

Output: Underutilized_Lots_Near_CD_Clusters.geojson, .csv, and Underutilized_Lots_CD_Summary_by_IBZ.csv.

Policy Findings & Recommendations

FAR Bonuses

Modeled on the POPS framework and City of Yes, FAR bonuses could incentivize circular economy upgrades in M1-M3 zoned lots within IBZs. The key design challenge is demand: FAR bonuses work best when developers want to build more square footage. In many IBZ contexts, demand is limited, reducing the lever's effectiveness as a standalone tool.

A more viable framing combines FAR bonuses with ELURP eligibility and LL97 funding for M1-M3 projects that use adaptive reuse or recycled materials.

Industrial Development Bonds (IDBs)

Raised as a potential policy direction at the C&D Reuse Summit but not researched in depth as part of this project. The concept — that the NYC Industrial Development Agency (IDA) could issue targeted IDBs to reduce the fiscal burden of circular economy compliance — warrants further investigation by a future researcher. See the "For a Future Research Scholar" section below.

Carbon Tax Credits / Embodied Carbon

Also raised as a potential direction but not researched as part of this project. The broad concept involves embodied carbon taxes or credits that integrate construction waste into New York State's Cap-and-Invest program. This remains an open research question. See the "For a Future Research Scholar" section below.

For a Future Research Scholar

Where to Pick This Up

- The R script (IBZ_Analysis.R) is fully annotated and organized into 11 sections. Run it top to bottom after updating the file paths in Section 1.
- The ArcGIS Experience Builder map is live at: experience.arcgis.com/experience/a1d4e01e878b436191604bf40259bab0
- The GitHub repository contains the R script and README: github.com/sgordon2000-cyber/tg-nyc-IBZ-mapping

Recommended Next Steps

- Validate the underutilized lot findings against NYC HPD or EDC internal data to confirm which lots are genuinely available vs. structurally occupied.
- Conduct interviews with IBZ Business Improvement Districts (BIDs) and trade groups to capture the proprietary knowledge gap identified in this project.
- Extend the MWBE analysis to ask whether MWBE businesses are overrepresented in C&D-impacted sectors — if so, that is a significant equity finding with direct policy implications.
- Re-run the analysis with updated business data annually — the QCQ files are published each year and the pipeline is built to be replicable.
- Consider a location quotient analysis to identify which IBZs are truly specialized in C&D-relevant sectors versus those where those sectors appear at roughly citywide rates.
- Research Industrial Development Bonds (IDBs) as a financing mechanism for circular economy compliance in IBZs — this was raised at the C&D Reuse Summit as a promising direction but was not investigated in this project.
- Research embodied carbon tax credits and how construction waste could be integrated into New York State's Cap-and-Invest program — also raised at the Summit but not developed here.

Technical Notes for Continuity

- `sf_use_s2(FALSE)` must be set at the start of any R session. The IBZ shapefile has minor geometry irregularities that cause errors with S2 spherical geometry.
- All buffering and distance calculations must use EPSG:2263 (NY State Plane feet). Attempting these operations in WGS84 (4326) will produce incorrect results.
- The MWBE column names (`vendor_formal_name`, `postcode`, `telephone`, `id6_digit_naics_code`) may change in future SBS exports. Check `names(mwbe_df)` after loading and update the `rename()` calls in Section 8 accordingly.
- The underutilized lot FAR threshold of 0.25 is a methodological choice, not a regulatory definition. It can and should be adjusted based on feedback from planning or EDC stakeholders.

Contact

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