



## **Project Abstract**

New York State regulates construction and demolition waste (CDW)—its generation, recycling and reuse—and collects all data on CDW from private waste haulers and transfer stations/recycling facilities. There is no city source of data for CDW. For the city to innovate policy with respect to CDW, which is a source of embedded carbon, by leveraging its capital program to close material loops, generating environmental sustainability and financial sustainability benefits, it is important to understand where CDW goes after the demolition process through the transfer and recycling processes.

## **Client**

The Urban Resource Recovery (URR) working group, formerly known as the Construction+Demolition Waste (CDW) working group, is focused on supporting applied research and innovative policy design to close construction material loops. The URR has developed a Closing Loops City Program (CLEP) that initially focuses on recycled concrete aggregate, glass pozzolan and soil, with biosolids and other materials to follow and leverages the City’s capital program to increase the re-use of all material generated within the City that is suitable for re-use in construction projects.

*About T+G Working Groups.* Town+Gown working groups accelerate the action research cycle and move Town+Gown’s work to the “thought leader” stage and toward a more systemic form of decision-making by providing an architecture for intentional, targeted intentional research projects focused on the identified research gap and increasing academic synthesis and translation of the results to serve as useful applied research resources for policy makers.

## **Capstone Project Description & Overview**

The City is always building. As a part of this economic growth, materials are brought to and from private and public construction sites. Movement of CDW components, such as soil, concrete, glass and gypsum, represents a significant portion of the waste and transit associated with construction in NYC. To the extent this recovered material is reused it is not currently tracked. Opportunities exist for City agencies to reuse CDW components among their capital construction projects for environmental and financial benefits. NYS DEC is responsible for the

state's solid waste management regulations, which apply to all CDW from the construction and demolition of buildings and infrastructure. These regulations apply to all local governments in the State, including the City. CDW can be separated on construction sites or elsewhere into various components, all of which can be recycled and reused as permitted by the regulations.

The environmental benefits of closing the CDW loops include fewer emissions from trucking new materials into the city from outside the metropolitan area and trucking materials to landfills for disposal; and financial benefits include reduction in construction costs due to the reuse of recovered CDW components and related reduction of transportation costs. In addition, the ability for CDW re-use move toward higher value uses, with the aid of engineering technology, also depends on understanding the pathways of CDW as a resource.

The URR Working Group needs to understand CDW material flows within Region 1 (Nassau and Suffolk Counties) and Region 2 (New York City) from data that is available from NYS DEC reports —where and when CDW was generated and where it went and how much would be available for reuse. Data visualization of the patterns of CDW generation, processing and recycling within Regions 1 and 2 and amounts of recycled CDW materials that are available for reuse on construction projects within the City is critical for the City to close material loops by leveraging its capital program? While LEED and Envision frameworks do contain credits for re-use of recycled CDW, there is no systemic citywide plan to support efforts in these areas, including economic and market efforts, so that more CDW ends up in landfills than might be feasible under the appropriate citywide supportive plan.

## **Relevance**

The City's OneNYC plan focuses on recycling of putrescible waste not CDW, partly because the State controls the field and is the repository for the data. This is a complex issue area, and this project represents the first data visualization of the State's CDW dataset. With a better understanding of the CDW material flows within the Regions 1 and 2, the URR Working Group hopes to develop an innovation policy that would be implementable in the City's next city-wide long-term sustainability plan, most likely to emerge in the next administration.

## **Datasets**

Two- to three years of data for the Regions 1 and 2 are publicly available at:

<ftp://ftp.dec.state.ny.us/dsh/>

There are two annual reports:

Part 360 Series Waste Tracking Document-Construction & Demolition Debris, which is submitted

by private waste haulers

Permitted C&C Debris Handling and Recovery Facility Annual Report, which is submitted by transfer stations and recycling facilities

While publicly available, these reports are not digitized so an initial step for this data visualization would be to develop code for computer reading of the essential data points to create trip data for the visualization model.

### **Learning Outcomes/Deliverables**

Deliverables:

(1) writing code to read non-digitized data elements to read certain data elements from the non-digitized forms create trip data

An example of code written for a similar exercise is at:

See [https://github.com/NYC-Response-Lab/nycha/tree/master/board\\_meeting\\_minutes](https://github.com/NYC-Response-Lab/nycha/tree/master/board_meeting_minutes)

- process\_files.sh (40 lines)

- process\_single\_file.py (80 lines)

(2) generating the trip data for a subsequent data visualization project

(3) developing a logic-based framework/app for NYS DEC to use to help them process their non-digitized data for reporting and analysis (and which would have additional uses), and

(4) documenting (1) – (3) in a written report

### **Competencies**

Students should have excellent coding, data analytic skills and geospatial data analytic skills; an interest in environmental sustainability and the need to increase reuse of recovered CDW would be helpful.