



**“Evolution of Crushed Glass Aggregate
Produced at the Rockland County Solid Waste Management
Materials Recovery Facility”**

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History

- In 2004/05, the Authority included glass recycling equipment as part of a capital improvement to the MRF.
- Based on (the then current section) Part 360-1.15(b)- Generic Beneficial Use Determination which deemed “The following items are no longer considered solid waste for the purposes of this Part when used as described”
- Uncontaminated glass when used as a substitute for conventional aggregate in asphalt or subsurface applications

RCSWMA's Materials Recovery Facility



Starting with Commingled Containers



Lubo Star Screen = First step in Glass Processing



A Hammermill Further Reduces Glass Size



Brush-and-Screen Removes Deleterious Material and Size Sorts



Two Sizes of Materials are Generated -1/8" and -3/8"



Typical over-the-top loading – note no/low dusting



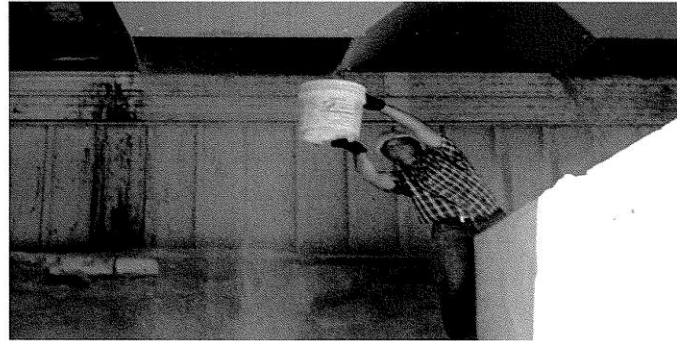
2006 Geotechnical Parameters Analyzed

- Coefficient of Uniformity
- Coefficient of Gradation
- USCS Soil Classification
- AASHTO Soil Classification
- Standard Proctor Max. Dry Density
- Internal Friction Angle
- Coefficient of Permeability

Material Sampling Points



Picture 1 – Sampling.



Picture 2 – Sampling.

Samples Prior to Separation



Picture 3 – 3/8-Inch Crushed Glass Sample Prior to Separation.



Picture 4 – 1/8-Inch Crushed Glass Sample Prior to Separation.

Analysis for Deleterious Material



Picture 4 – Clean Crushed Glass Sample After Removal of Deleterious Material. Deleterious Material (Left).



Picture 5 – Deleterious Material.

Geotechnical Analysis Results

- Not suitable alone for structural fill
- Mixes of 10% to 30% with clean, inert soil
- “Small percentage of deleterious materials noticed in samples...would not have an adverse impact on engineering properties of the crushed glass product”
- Suitable Uses include the following

Possible Uses Comparing Geotechnical Characteristics with Agency Technical Specifications

- Pipe Bedding Material
- Drainage/Filtration Material
- Compacted Fills
- Component of Sub-base material
- Component of Embankment Material
- Component of Hot Mix Asphalt

Next Steps

- After the technical analysis was complete, the Authority required collaboration with a champion(s) to utilize the product in applications.



Collaborative Effort of Elected Officials, Depts. of Public Works, Authority, Private Contractors



Contractor's Employees Reported Less Dusting, Visual Discontinuity, Fluidity Easing Pipe Handling



Pipe Bedding Material



Preconstruction - Ramapo Middle School Ball field Material for Underdrain System



Middle School Sewer Main



Sandbags



On Site Demonstration project Complete - September 2005



Eight Weeks Later...



What happened next?

- Denis O'Donnell used his marketing skills within the County to educate various groups on the product.
 - Visited B&Z departments throughout the County and discussed and informed each town Director about uses.
 - Spoke to contractors and builders about the use of the product and pricing (free!)
 - Spoke to engineers within the County on the product.

Major projects utilizing Glass Aggregate over the years

- 128 unit over 55 housing project (bedding for utilities)
- Strip Mall project for pipe bedding (Lowe's, Stop&Shop)
- Athletic Fields (drainage system and pipe bedding for irrigation system).
- NYFC (drainage system)
- DPW Projects (drainage, rain gardens)
- RCSD#1

Glass Aggregate use in Orangetown

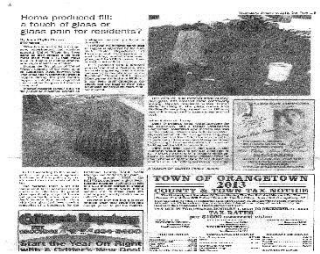


2013 Utility Company Pilot Project

- The Authority partnered with Jim Dean, Orangetown Highway Superintendent and Hetal Mistry, Suez New York Water Senior Project engineer, to determine how the crushed glass aggregate would perform when utilized in a 12” main replacement project.
- The pilot included evaluation of the compaction of backfill materials within the water main trench under four different set of conditions.

What happened – Authority Perspective?

- Article in the local paper
- Opposition by vocal residents



- Determination by the water company to continue with pilot project.

What happened ? – Suez perspective

- After one year, there was no difference in the level of compaction whether the trench was backfilled with crushed recycled glass or virgin stone.
- Hetal Mistry (Suez) Awarded 2014 National Association of Water Companies Management Innovation Award for a pilot program.
- Included in the Fall/Winter 2015 Aquarius magazine (peer article for American Water Works Association).

RCSWMA Glass Statistics & Information

- **Approximately 100,000 tons of glass have been processed since installation.**
- **Original Andella system cost in 2005 – app \$250,000**
- **Andella O&M costs included in overall RCSWMA MRF O&M costs**
- **Over the years Denis O'Donnell's marketing efforts has conservatively saved the Authority over \$3,500,000 (100,000 tons x \$35 per ton T&D as ADC).**

Thoughts & Takeaways -Local

- Find a champion and work on projects collaboratively
 - DPW and Highway Superintendents are material managers
 - Provide local engineers with samples and information on the glass aggregate
 - Discuss potential uses with utility companies to determine if they can provide a consistent outlet and work with them towards their sustainability goals

Thoughts & Takeaways – Broader View

- Can Rockland County Authority's success be duplicated?
- Potential regional glass recycling
- Potential collaboration with NYS organizations (such as DOT) on utilizing glass aggregate as a requirement on projects.
- Potential Regional Council funding

Economics to Consider

- How does the economics work with only glass processing (i.e. not supported by other recyclables).
- Look at cost of glass vs. cost of other material.
- Businesses focus on cost and sustainability goals.
- Do we have enough aggregate available for very large projects?

Thank you!

Rockland County Solid Waste Management Authority

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