

Glass Beneficiation – Where We Are and How We Got Here

Charlie Forbes, Chief, Recycling, Compliance, and Planning
Solid Waste Management Program

Department of Public Works and Environmental Services
Working for You!



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Outline

- Quick Review of Potential Uses
- Some Details That Engineers Will Need To See (and Believe)
- The Fairfax Approach...*Conceptually*
- Quick Review of Supporting Financial Analyses
- Introducing Lil' Green and Big Blue (*these are stage names*)
- Initial Challenges (*including some we didn't see coming*)
- Next Steps
- Ideas? Questions? Comments?

Quick Review of Potential Uses For Crushed Glass

- **Filtration:**
Choker Grit, Pipe Bedding, Backfill, Drainage Aggregate, Septic Fields, Underdrains, French Drains, Golf Course Green Drainage
- **Aggregate:**
Backfill/Clean Fill, Embankments, Clean Fill Sand, Hydroponics, Landfill Cover, Oil Spill Cleanup, Road Sand, Solar Heat Storage, Termite Barrier, Utility Bedding and Backfill, Weighted Bags
- **Glassphalt - Paving Application:**
Aggregate Base Course, Asphalt Base Course-Glassphalt, Asphalt Surface Course-Glassphalt, Parking Lots and Driveways
- **Exotic Stuff – Aesthetics, Manufacturing Feedstock**

Details That Engineers Might Enjoy

For Aforementioned Uses In Public Works Applications:

- Applicable road base and glassphalt material specifications
- “Off road” applications *may* be able to side-step these requirements
- In general, crushed glass is permitted by VDOT as a substitute for aggregate in various applications. There are some special conditions and prohibitions. See S200.04, which presents general substitution language, replacing minus-3/8 aggregate
- Example project: Mosaic at Merrifield Shops, award-winning glassphalt project by Virginia Paving Co. and recognized by VDOT as its Non-VDOT Green Project of the Year in 2012

Particular (and permissible) applications of interest include:

- Foundation/underlay for pipes, replacing Crusher Run Nos. 25 and 26
- Embankment fill (S3030B-0702)
- Draining embankment and backfill (but not for undercutting or foundation support, some other restrictions)

See VDOT construction specs S303B and S303F0B, and also Section 401.03, which describes the use of CG as porous backfill

- Typical QC and testing requirements, and no more than 5% non-glass.

The Fairfax Approach

- **Research available technologies, and product types and needs**
- **Implement a pilot-scale project to determine proof of concept**
- **Assuming good pilot results, implement a larger-scale project**

Projects are not intended to serve County-wide needs, but to demonstrate a feasible new approach and “prime the pump” for private-sector innovation and intervention.

Summary of Supporting Financial Analyses

- Useful/defensible data on earth products consumption difficult to get
- Focus on internal demands for initial demonstration
 - Maintenance of I-66 tipping floor uses approx. 700 tons of gravel per cycle
 - Maintenance of I-95 driveway consumes approx. 9,000 tons of mat'l per cycle.
 - I-95 facility internal asphalt roadway.
- Above projects could save >\$50K by using crushed glass. Also avoids the glass disposal cost (approx. \$30/ton). Driveway project has projected value of >\$300K
- DPWES-SWMP collects approx. 1,200 tons of glass per week. Market trends suggest that revenue from this source could cover the initial cost of purchase within 3-5 years
- With aggressive outreach/education, and an expanded level of participation, the project has the potential to generate up to \$3M of revenue/value per year

Lil' Green



Lil' Green (continued)

- **Grinds glass into two usable sizes (- 1/8" and - 3/8")**
- **Automatically separates labels and trash from ground glass**
- **Rated capacity of up to 1000 lbs. per hour**
- **Proprietary crusher system ("friendly glass", Compactors, Inc.)**

Big Blue



Big Blue (continued)

- **Grinds glass into two usable sizes (- 1/8" and – 3/8")**
- **Automatically separates labels and trash from ground glass**
- **Rated capacity 20 tons per hour**
- **Proprietary crusher system ("friendly glass", Andela System, Inc.)**

Initial Challenges

- **Original Concept for Lil' Green was direct public access – Safety and Risk Management folks had concerns**
- **Additional modifications needed to allow for easier product handling and to address safety concerns**
- **Operations staff and public outreach/education/participation**
- **Matching expectations to outcomes**
- **There are always more good ideas than the capacity to execute**
- **Lots of interest but still ISO active/engaged partners**

Next Steps

- **Complete shake-down period**
- **Increase the volume and quality of incoming material**
- **Explore various operating configurations/conditions to optimize efficiency and yield, and to maximize product quality**
- **Identify and secure higher-better applications to close the loop.**
 - Construction material demands are sufficient but...
 - Aesthetic applications
 - Tie-in at the retail level (close the loop)
 - Manufacturing feedstock for more exotic applications
 - Other?

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- **Ideas?**
- **Questions?**
- **Comments?**

Additional Information

For additional information, please contact

Charlie Forbes

Department of Public Works and Environmental Services
Solid Waste Management Program

703.324.5230

Charlie.Forbes@fairfaxcounty.gov

www.fairfaxcounty.gov/dpwes