

# NRRA's PGA Program

## Processed Glass Aggregate





Mike Durfor

Executive Director

2/6/2019 - Lakes Region Planning Commission



# M.O.M. and NRRA Workshops



M.O.M: Members/Operations/Marketing

monthly meetings

*In addition, NRRA conducts workshops and facility tours several times a year that can be used for continuing education credits toward transfer facility operator certifications and renewals.*

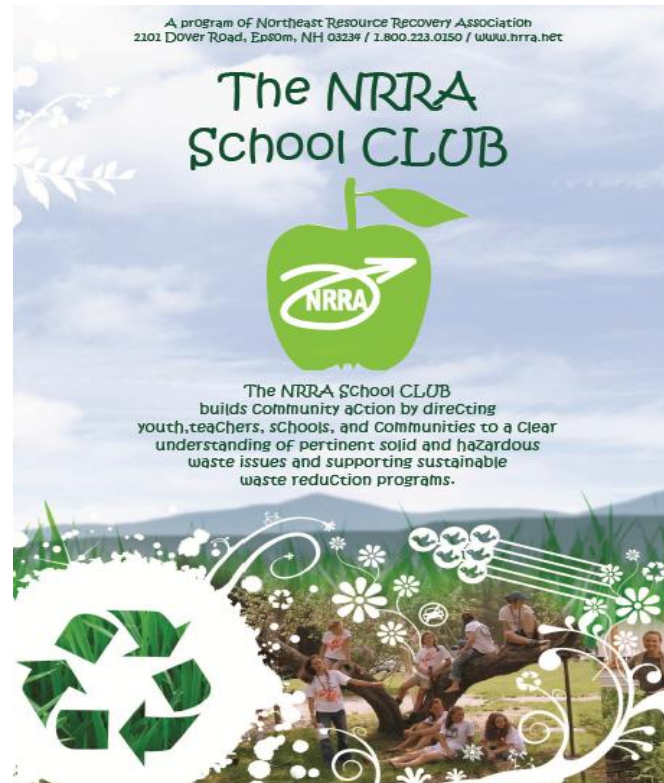


# NRRA's School Recycling CLUB

**School  
Workshops**



**School News  
You Can Use  
Newsletter**



**Technical  
Assistance**



**Annual  
School  
Conference**

**[theclub@nrra.net](mailto:theclub@nrra.net)**





## Classroom Workshops

- Healthy Home, Clean Waters
- Waste = Global Climate Change
- Back to the Earth
- Garbage Guerrillas

## School Technical Assistance

- Green Cleaning & IAQ Evaluation & Review
- Trash On the Lawn Day (TOLD)
- Star Assessment



Northeast Resource  
Recovery Association

Presented by —  
Northeast Resource Recovery Association  
New Hampshire the Beautiful and  
NRRA School CLUB



**38TH ANNUAL  
CONFERENCE  
& EXPO**

**RECYCLING  
STILL  
RULES**  
and it's  
**COOL in SCHOOL!**

**10th Annual  
School Recycling  
Conference**

**Monday, May 20 —  
Tuesday, May 21, 2019**

**Tuesday, May 21, 2019**

Double Tree by Hilton  
Manchester Downtown  
700 Elm St.  
Manchester NH

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Manchester Downtown  
700 Elm St.  
Manchester NH



**Call 800.223.0150 to register or learn more at: [www.NRRA.net](http://www.NRRA.net)**

# NRRA' PGA Program

This program, in cooperation with  
New Hampshire the Beautiful has  
allowed NRRA members to collect  
mixed glass in one bin or pile!



That idea became affectionately  
known as PGA

*.....not the Golf Association but nearly as exciting!*

**PGA**

**is**

**“Processed Glass Aggregate”**





Those were the days.... of separation  
by color and ZERO contamination....



# Let's Simplify Things...

When separation by color became challenging & keeping contaminants such as ceramics, etc. out of the glass became cumbersome, & adding other materials such as window glass, ceramics & porcelain became an option & the Canadian market for Green Glass nearly dried up....NRRA worked with NHDES to come up with a better idea....



In 1999, NHDES deemed PGA as a  
Certified Waste Derived Product No.  
11 – Aggregate for Construction

“This product is approved for use in public works construction and other constructed systems including use as subbase material for roads, bedding material for pipes and fill around retaining walls and foundations”.



October 14, 1999

**Certified Waste-Derived Product No. 11**  
**Aggregate for Construction**  
**Made with Crushed Glass**  
**Specifications and Restrictions**

- (1) This product is approved for use in public works construction and other constructed systems including use as subbase material for roads, bedding material for pipes and fill around retaining walls and foundations.
- (2) This product shall not be applied to the ground surface and left uncovered as a final application.
- (3) 100% of the crushed glass material shall pass a 1 inch screen.
- (4) If the aggregate is used in a public works application, it must meet the specifications required for the particular application as determined by the town, governmental unit or agency or political subdivision of the state using the aggregate.
- (5) If the aggregate is used in a private application, it must meet specifications as determined by a professional engineer or architect licensed in New Hampshire, as applicable.
- (6) Certification of this waste-derived product does not affect the ability of a town, governmental unit or agency or political subdivision of the state to adopt its own specifications for the aggregate product, or adopt further restrictions for use of the aggregate product within its borders when used in private applications.
- (7) Areas where the aggregate has been placed or re-placed shall be cleaned of loose aggregate to the greatest extent possible.
- (8) If disturbed following placement, the glass aggregate must be managed to prevent dispersment of the material
- (9) This product is not approved as general fill.



## SECTION 304

### DIVISION 300--BASE COURSES SECTION 304 -- AGGREGATE BASE COURSE Description Materials

#### 2.1 General. 2.1.1

The materials shall consist of hard, durable particles or fragments of stone or gravel. Materials that break up when alternately frozen and thawed or wetted and dried shall not be used for aggregate base course materials. Fine particles shall consist of natural or processed sand. The materials shall be free of harmful amounts of organic material. Unless otherwise specified, the percent wear of base course material shall not exceed 50 percent as determined by AASHTO T 96, Grading A.

#### 2.1.2

Crushed stone shall be processed material obtained from a source that has been stripped of all overburden. The processed material shall consist of clean, durable fragments of ledge rock of uniform quality and reasonably free of thin or elongated pieces.

#### 2.1.3

Materials for glass cullet shall either be separated/recyclables received from a recycling facility permitted (pursuant to RSA 149-M:10) by the Waste Management Division of the Department of Environmental Services and/or materials certified for Direct Re-Use in accordance with Section 318 of the New Hampshire Solid Waste Rules.

2.1.3.1 Glass cullet shall meet the requirements of AASHTO M318.





*VIA E-Mail*

August 2, 2018

**New Hampshire Department of Environmental Services  
Waste Management Division  
Solid Waste Management Bureau  
29 Hazen Drive, P.O. Box 95  
Concord, New Hampshire 03302-0095**

**Attn: Mr. Todd Moore, P.E.**

**RE: Processed Glass Aggregate Use  
Former Rose Lane Waste Water Treatment Plant  
Keene, New Hampshire  
NHDES Site No. 199008049**

Dear Mr. Moore:

Loureiro Engineering Associates, Inc. ("Loureiro") has prepared this letter at the request of the City of Keene, New Hampshire (the "City") to notify the New Hampshire Department of Environmental Services (the "Department") of the intent to utilize processed glass aggregate (PGA) as substitute for gravel as part of construction activities at the above-referenced site (hereinafter referred to as the "Site").



The results of the laboratory grain size analysis indicate the PGA is equivalent to New Hampshire Department of Transportation's (NHDOT) gravel base course specification (NHDOT 304.2). Specifically, 25 percent to 70 percent of the material is finer than the No. 4 sieve, and 0 to 12 percent of the sand portion of the material is finer than the No. 200 sieve. Consistent with Certified Waste Derived Product No. 11, 100 percent of the PGA material analyzed was reported to pass the 1-inch sieve. The PGA analyzed resembles a well-graded gravel (GW) under the Unified Soil Classification System (USCS). The PGA's maximum dry density was reported to be 111.1 pounds per cubic foot at an optimum moisture content of 7.7 percent.



## Conclusion

The PGA's grain size is equivalent to a well-graded gravel base course (NHDOT 304.2), and the materials maximum dry density is sufficient for the Site's potential future uses. Coupled with the proposed profile and re-use guidelines to limit unintended dispersement of the material, it is Loureiro's opinion, the City's proposed intent to use PGA as a substitute for gravel as the base material within the proposed slope is consistent with Certified Waste Derived Product No. 11.





# **MIXED GLASS PROCESSED GLASS AGGREGATE (PGA)**



*A NRRA Cooperative Recycling Program*



Although “glass-to-glass” recycling is the traditional method, due to strict contamination guidelines, storage space requirements and labor costs, managing a color separated glass program can be a challenge for many municipal recycling programs. To assist members in the efficient and economical collection, storage and recycling of mixed color glass, the Northeast Resource Recovery Association (NRRA) offers its members an “easy-to-use” mixed glass recycling program.

NRRA Processed Glass Aggregate (PGA) Program allows communities to collect, store and recycle mixed glass in one bin or pile! NRRA has teamed with communities (throughout New Hampshire) to act as consolidation sites and accept mixed glass from surrounding member communities. Once the piles of mixed glass at the aggregation sites reach 350-400 ton in size, NRRA coordinates the “crushing” of the pile by an industrial crusher to reduce the material to a 3/8” or smaller material to then be used in road/construction projects as aggregate.



## Acceptable Materials

- ♦ ANY colored glass beverage container (if possible, remove caps)
- ♦ ANY colored glass food container (if possible, remove caps)
- ♦ Porcelain (i.e., toilets, sinks with all NON-Porcelain parts REMOVED)
- ♦ Pyrex™
- ♦ Ceramics (i.e., coffee mugs)
- ♦ Drinking glass
- ♦ Window Panes
- ♦ Mirrors

## Unacceptable Materials

- ♦ Headlights
- ♦ Thermometers
- ♦ Incandescent or Fluorescent Light Bulbs
- ♦ Plastics
- ♦ Automotive / Windshield Glass
- ♦ Trash
- ♦ Asphalt
- ♦ Excessive Rocks or Dirt
- ♦ Wood
- ♦ Aluminum/Tin
- ♦ Plexiglas

*Please call NRRA for current pricing.*



# PGA

## How do we get to a usable aggregate?

- 1) NRRRA Members collect & store glass material and transport this to one of 5 NRRRA PGA Host Sites
- 2) NRRRA hires a Crusher to turn the glass material into a usable aggregate
- 3) NRRRA Host Sites use crushed material, sell or give back this material to NRRRA Members



# Collection/Storage - Containerized



# Collection/Storage - Bunkers



# Glass – Porcelain - Tiles



# Before.....



After....





# The means to the “end-product”



Not OK...



# NRRA's PGA Program

- Mixed glass is delivered by member communities and is weighed at each site before it is dumped in the pile.
- Member's deliver their glass in –
  - Roll Off Containers
  - Dump Body Trailers
  - Local Highway Department Dump Trucks

# NRRA's PGA Program

## ● Unacceptable Material

- Headlights
- Thermometers
- Incandescent or Fluorescent bulbs
- Auto Shield Glass
- Plastics, aluminum, tin, etc.



PLAY

# NRRA PGA Host Sites

- Littleton, NH
  - New London, NH
  - Springfield, VT
  - Wakefield, NH
  - Waste Management – Rochester, NH
  - Dennis, Mass
- 
- 50 FREE Tons per Crush – New London's Glass Disposal cost \$22 per ton in 2017 and they reused it.



# PGA Sites



Northeast Resource  
Recovery Association  
(800) 223-9150  
www.nrra.net

## Site Locations 1000-1500 tons/yr

- 1 Springfield VT
- 2 New London NH
- 3 Wakefield NH
- 4 WM Rochester NH
- 5 Littleton NH
- 6 Dennis MA

## Potential Sites

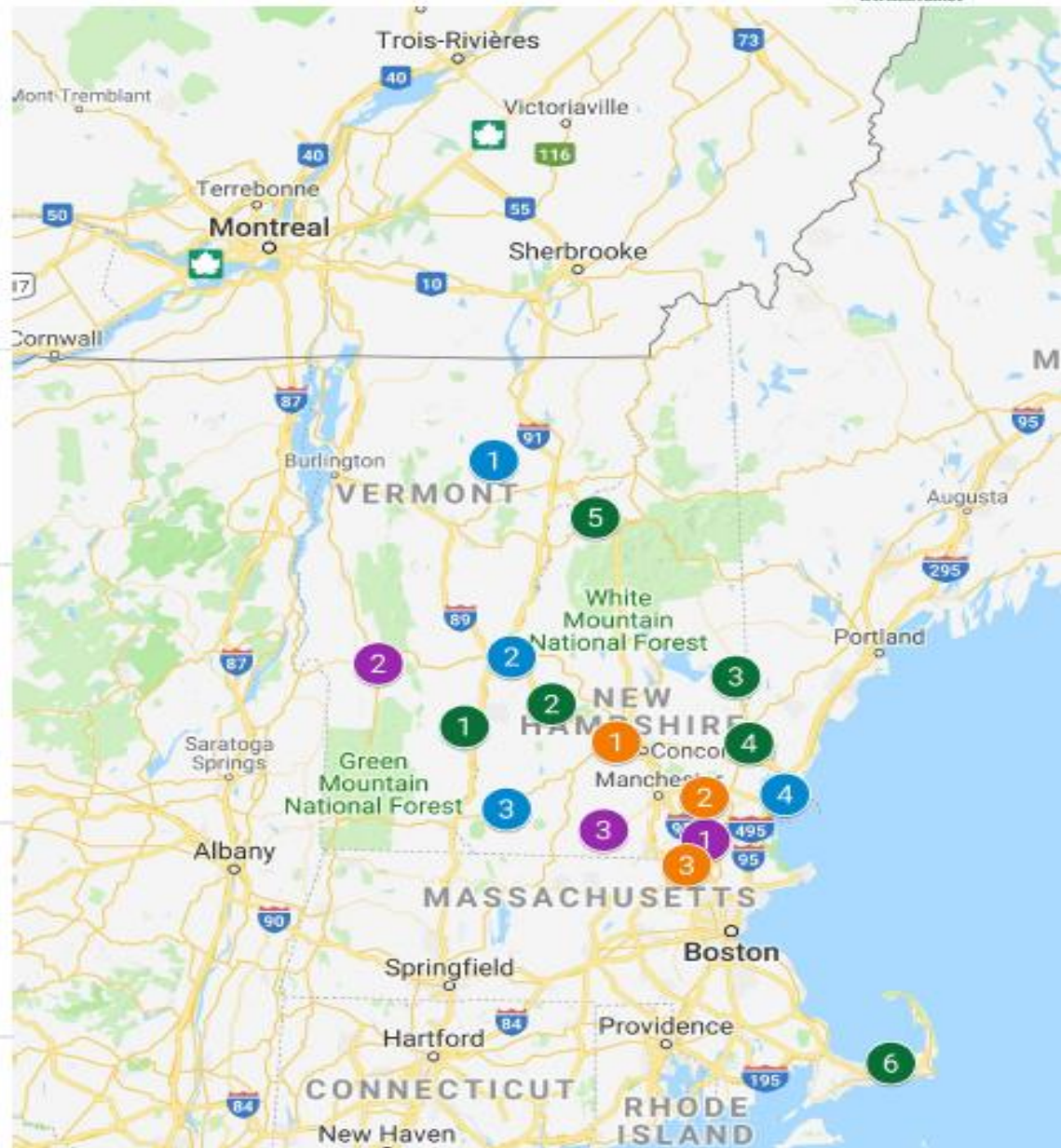
- 1 Hopkinton NH
- 2 Chester NH
- 3 Dracut MA

## Clean Glass Sites

- 1 Hardwick VT
- 2 Lebanon NH
- 3 Keene NH
- 4 Rye NH

## Potential Clean Glass Sites

- 1 Salem NH
- 2 Rutland VT
- 3 Wilton NH



# The Numbers....

In 2017, NRRRA Members in NH, VT & MA recycled over 10 million pounds of glass at \$30/ton tipping fee.

That would be the equivalent total MSW tonnage of 7 towns the size of New Boston, N.H. that was not disposed of... but ground for reuse.





# NRRA Members save \$Millions!!!

October 2009 - April 2017

54,144 tons of PGA was shipped to  
NRRA's Host Sites

@\$30/ton cost to Members of \$1,624,320

IF, this same tonnage was treated as MSW @  
\$85/ton, the cost would have been \$4,602,240!!

**SAVINGS of \$2,977,920 by not landfilling,  
incinerating this valuable product!**

(or \$55/ton!)



# The Challenges

**USAGE –**

**PGA Host Sites** – need more sites close to municipalities to cut down on transport costs and carbon footprint



# The Solutions

**Use of Aggregate** – “Take Back” Program in place; drop off uncrushed material and pick up PGA on back haul

**Use of Aggregate** – Instill confidence in the use of the product in municipal projects – no permit or change in permit needed if used by municipality



















# More Solutions...Innovative Ideas

- Landfill Cover
- Septic Tank Design
- DOT Projects
- Amendment in Ekopolimer Mats
- Carbon Credits for using Recycled Materials
- LEED Credit for construction projects



*“We do not inherit the earth from our ancestors, we borrow it from our children.”*

*- Si'ahl, Chief of the Duwamish tribe.*



<http://2mresources.com/en/>





# "CLEAN" GLASS

**Glass Jars & Bottles ONLY**

*A NRRA Cooperative Recycling Program*



Although "glass-to-glass" recycling has been the traditional method, due to strict contamination guidelines, storage space requirements and labor costs, managing a color separated glass program can be a challenge for many municipal recycling programs and businesses. To assist members in the efficient and economical collection, storage and recycling of mixed color glass, the Northeast Resource Recovery Association (NRRA) offers its members an "easy-to-use" mixed glass recycling program.

NRRA Processed Glass Aggregate (PGA) Program allows communities to collect, store and recycle mixed glass in one bin or pile! NRRA has teamed with communities (throughout New Hampshire and Vermont) to act as consolidation sites and accept mixed glass from surrounding member communities. Once the piles of mixed glass at the aggregation sites reach 800 - 1000 tons in size, NRRA coordinates the "crushing" of the pile by an industrial crusher to reduce the material to a 3/8" or smaller material to then be used in road/construction projects as aggregate.

## PROGRAM DETAILS

- ♻️ Contact NRRA at (603) 736-4401 to sign up for this program
- ♻️ Choose how the Mixed Glass will be stored at the facility (i.e., on the ground, in a simple bunker or in a container)
- ♻️ Arrange for transportation - Need assistance in arranging trucking? Contact NRRA. Below please find transportation options used by member communities participating in this program:
  - ♦ Roll Off Container (30 or 40 Yard Container) - average weight is 12 tons
  - ♦ Dump Body Trailer (70 Yard Trailer) - average weight is 32 tons
  - ♦ Local Highway Department Dump Trucks - 10 wheeler - average weight 10 tons
- ♻️ Contact NRRA to coordinate delivery of the Mixed Glass to an aggregation site (Each location has specific delivery hours. Please contact NRRA to make arrangements for delivery)

### Acceptable Materials

- ANY clear/colored glass beverage container (if possible, remove caps)
- ANY clear/colored glass food container (if possible, remove caps)

### Unacceptable Materials

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• Headlights</li><li>• Thermometers</li><li>• Incandescent or Fluorescent Light Bulbs</li><li>• Plastics</li><li>• Automotive / Windshield Glass</li><li>• Pyrex</li><li>• Drinking Glasses</li><li>• Window Panes</li><li>• Ceramics (i.e., coffee mugs)</li><li>• Porcelain (i.e., toilets, sinks, etc.)</li></ul> | <ul style="list-style-type: none"><li>• Asphalt</li><li>• Excessive Rocks or Dirt</li><li>• Wood</li><li>• Aluminum/Tin</li><li>• Plexiglas</li><li>• Mirrors</li><li>• Trash</li></ul> |
|--|---|

*Please call NRRA for current pricing.*



*NRRA*

*“Clean Glass Locations”*

*Hardwick, Vt*

*Lebanon, NH*

*Keene, NH*

*Rye, NH*

*Salem, NH*



















Catalina Casino May 20, 2019



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*Thank You*

**FOR RECYCLING**

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**NEW HAMPSHIRE** *The Beautiful*



Inc.