Processed Glass Aggregate

Increasing the Use of Recycled Content in Infrastructure Projects

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Presenters

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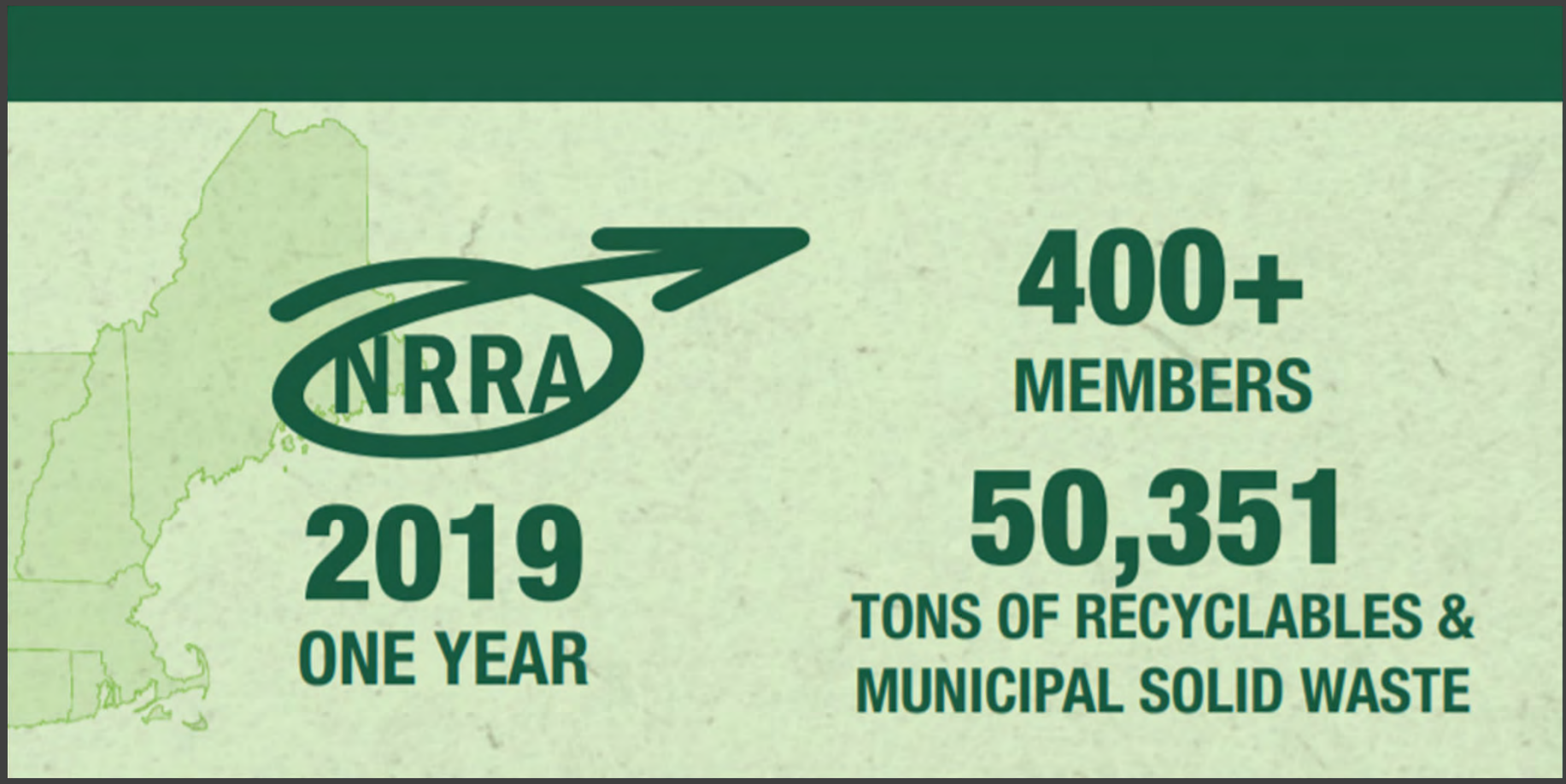
Agenda

- Creating PGA
- Specifications for PGA
- Benefits of Using PGA
- PGA Survey Results
- Examples of PGA Use
  - Littleton, NH
  - New London, NH



Recycling non-profit that enables communities to manage their own recycling programs

Cooperative Marketing and Purchasing

- Connect sellers of recyclables to purchasers
- Returned $1.8 million to members last year

Education

- Meetings, facility tours, annual conference
- Robust Resource Library on website
- Hands on technical assistance
- School recycling programs

Creating PGA

Glass
• Markets for recycling glass are limited
• NRRA offers two glass management programs

Glass Recycling

Into fiberglass insulation

Glass Recycling

Glass bottles and jars only

Canadian vendor cleans and crushes

Made into fiberglass insulation back in US

40 communities in NH, VT & MA

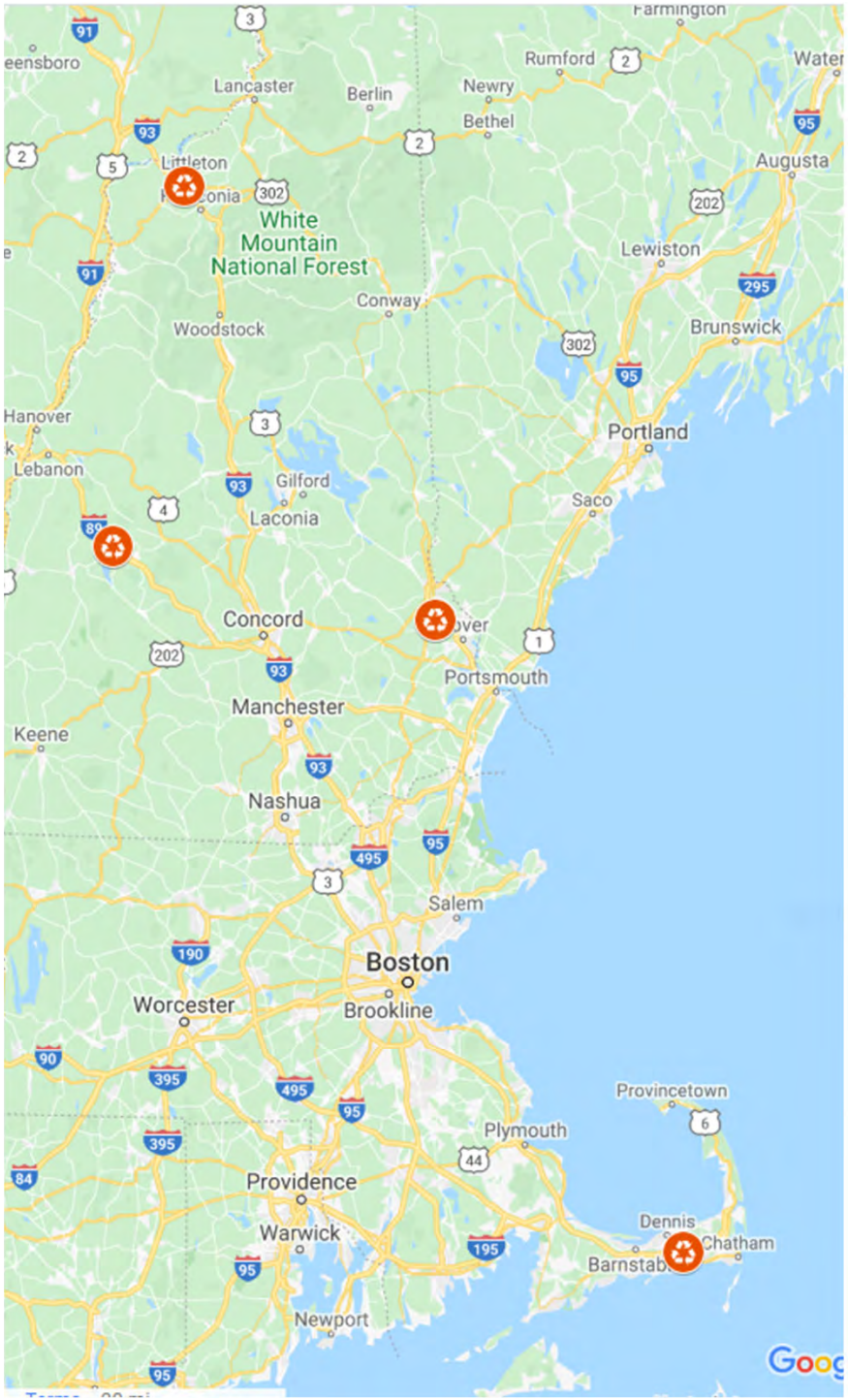
Processed Glass Aggregate

- Glass bottles and jars
- Crush into aggregate when have 1,000 tons
- Subbase for road and infrastructure projects
- 60 communities in NH, VT & MA

Collecting Glass for PGA

Unacceptable Materials

- Headlights
- Thermometers
- Light bulbs
- Windshield glass
- Plexiglas
- Plus others, depending on state



Processed Glass Aggregate Host Sites

(# communities served)

Littleton, NH (7)

New London, NH (25)

Rochester, NH (23)

Dennis, MA (5)

Ideal Glass Host Site

- Flat one-acre area
- Truck scale
- Staff inspect each incoming load
- Front end loader to maintain pile

Crusher in Action

Municipal Crusher

Who Owns the PGA?

- Host site owns PGA to use, give away, or sell
- Take back provision for contributing communities if host site has excess material

Using PGA

In general (varies by state):

- Construction projects, including under roads, sidewalks, foundations, pipe bedding, landfill cover
- Can be mixed with gravel
- Can use up to 100% in some private and municipal applications
- Must be covered and not left on surface

Specifications for PGA

AASHTO Designation M 318-02

- Broken food and beverage containers
- China dishes, ceramics or plate glass limited to max 5% by mass
- Crushed so 100% passes 9.5-mm (3/8”) sieve
- Container tops, paper, labels, food residue, etc. limited to max 1% by mass
- Up to 20% by mass of composite blend (20% PGA/80% natural aggregates)

PGA Specifications

Vary considerably by state

Glass food or beverage containers

In some states, other glass-like materials also allowed (ex. Pyrex, ceramic)

Crush to 1” or less or 3/8” or less

Various subgrade construction applications

Gradation Requirements

State & Agency	Gradation Requirement
MA DEP	3/8” or less
MA DOT	3/8” or less
NH DES	1” or less
NH DOT	3/8” or less
VT DES	1” or less
VT DOT	1” or less
CT DEEP	3/8” or less
CT DOT	3/8” or less (as reclaimed waste) or 1” or less (in bituminous concrete)
ME & RI	No PGA specifications

Additional Equipment Needed to Crush to 3/8”

Benefits of Using PGA

Environmental Benefits of PGA

Alternative to landfilling valuable material

Local use reduces transportation emissions

World is facing shortage of sand and PGA reduces sand and gravel extraction

Glass is inert, so won’t erode or leach contaminants

Physical Benefits of PGA

- Not frost susceptible – US Army Corps Study
- Ease of compaction
- Can store uncovered outdoors and won't freeze

Financial Benefits of PGA

Glass is heavy, so expensive to transport and throw away

Valuable cost avoidance strategy

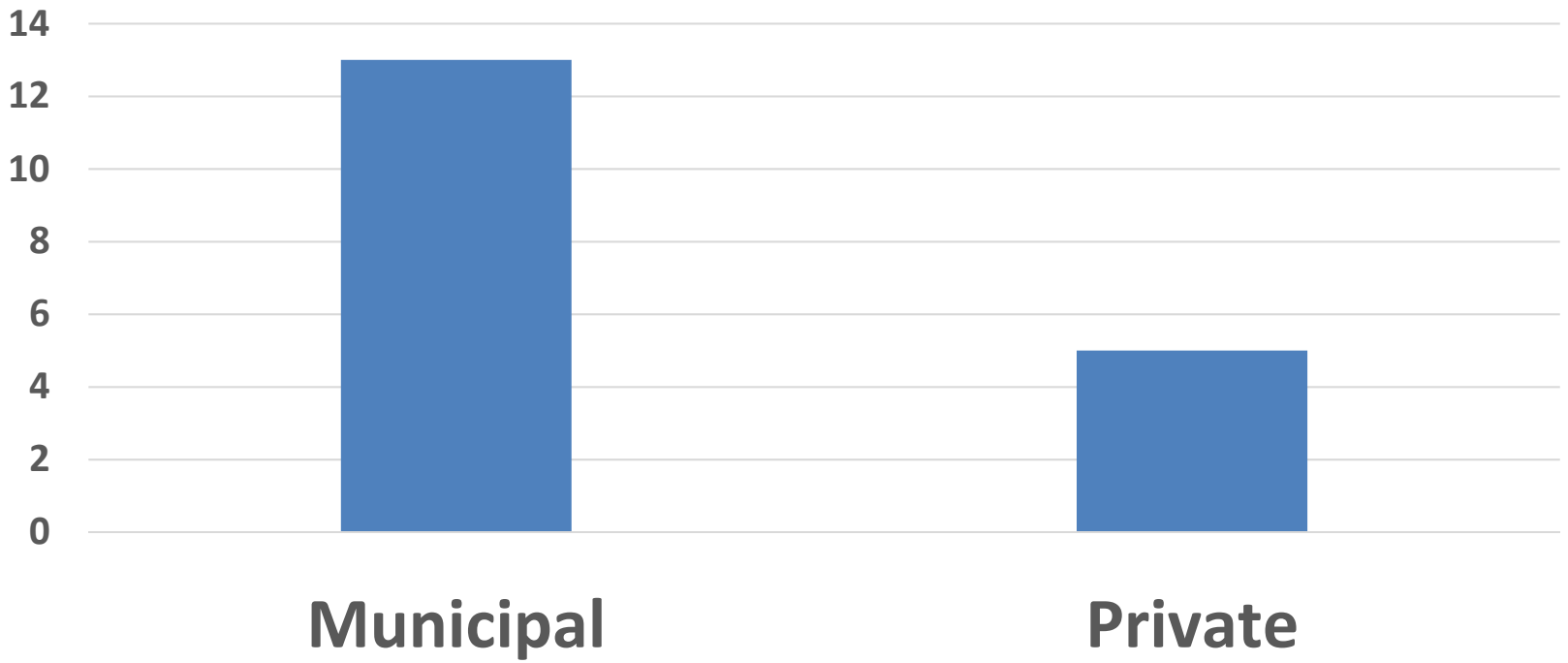
Save money by not buying gravel and sand

PGA Survey Results

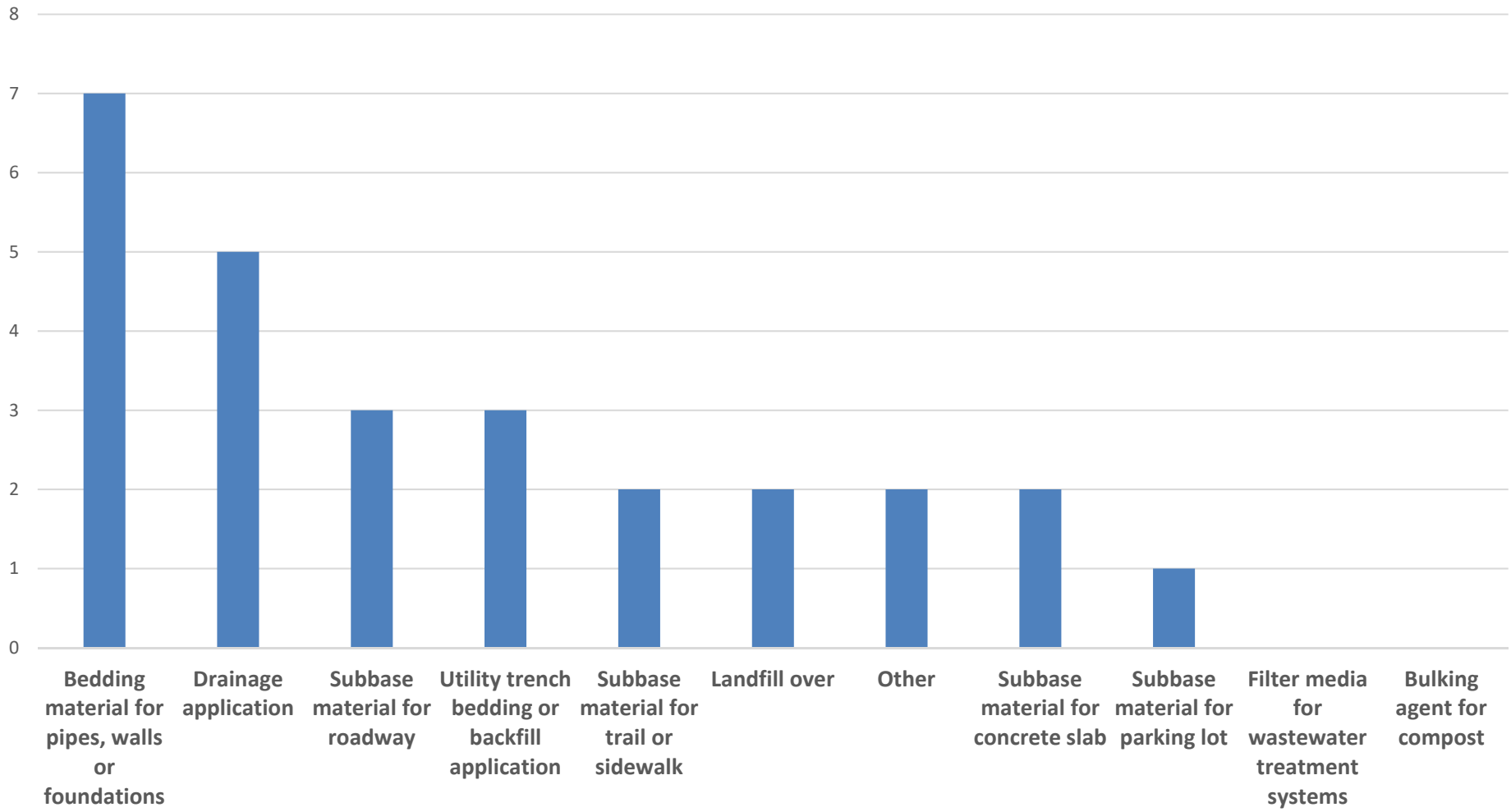
Processed Glass Aggregate Survey

- Completed July 2020
- 16 participants from NH, VT, MA, CT, NJ
- Public works as well as private applications

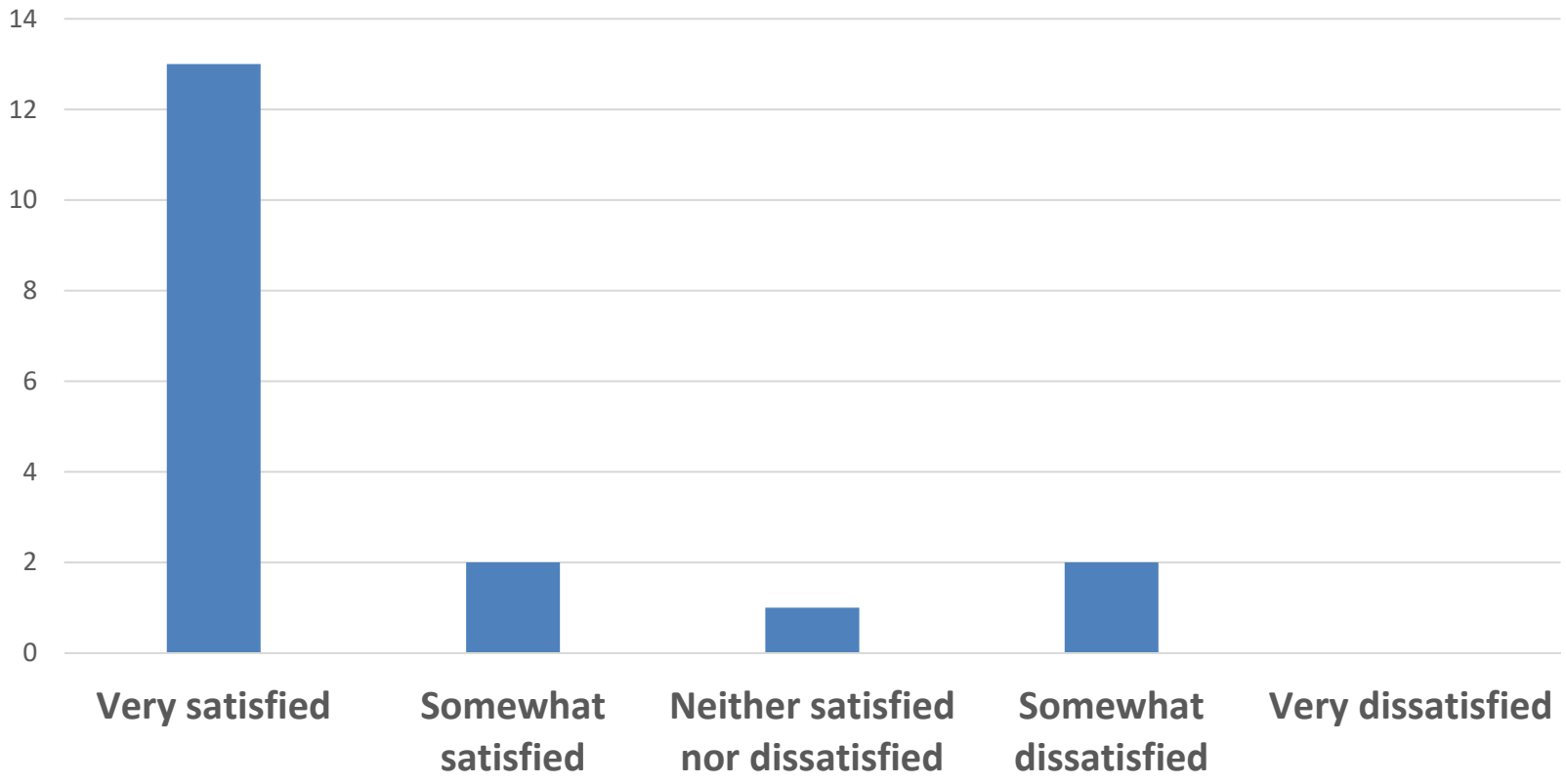
Was the processed glass aggregate used for a municipal project, a state project or for private use?



What was the application of the processed glass aggregate? (Survey)

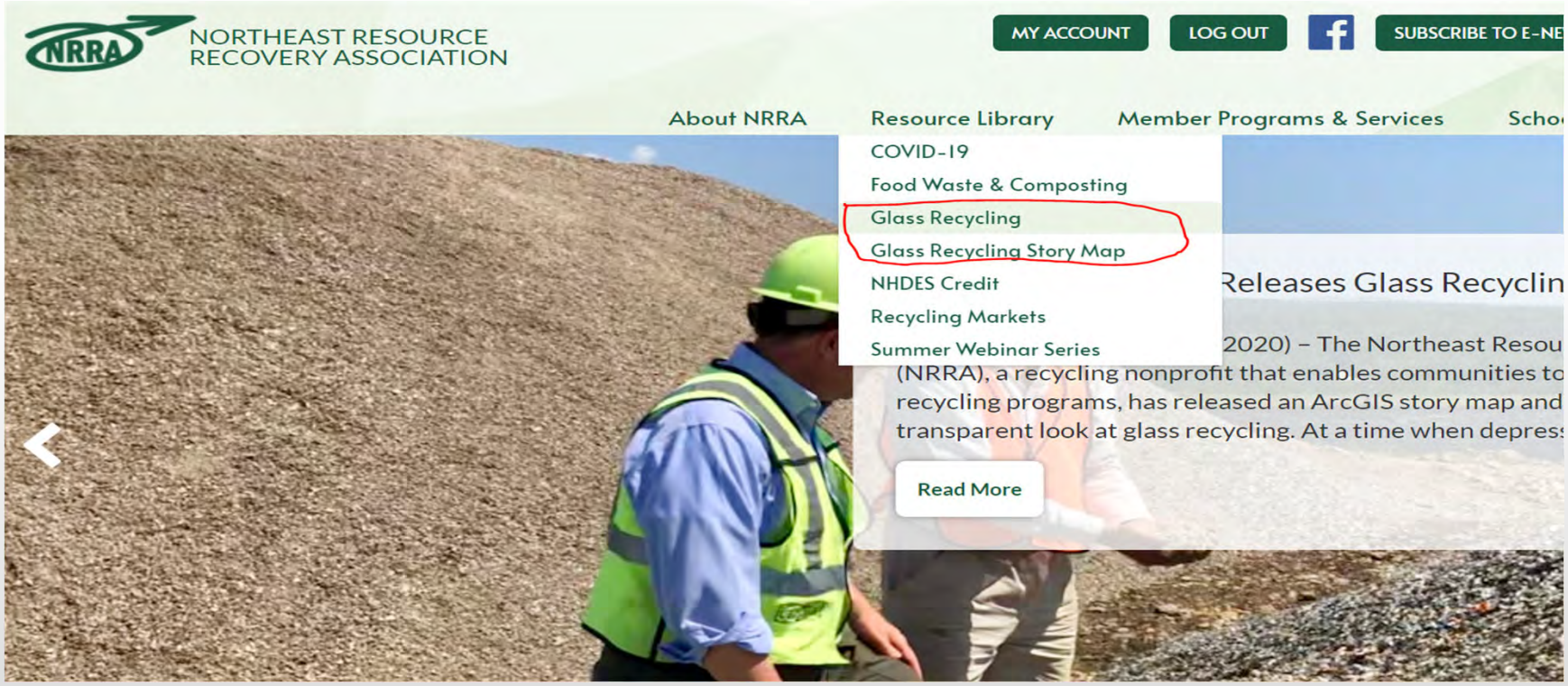


How satisfied were you with the result after using this material?



Glass Recycling Story Map & Video

www.nrrarecycles.org



Resource Documents

New England PGA Chart by State Specifications

https://www.nrrarecycles.org/sites/default/files/uploads/resource-documents/pga_by_state_new_england_7.27.20.pdf

PGA Survey Report

https://www.nrrarecycles.org/resource-library/processed-glass-aggregate-survey-report

Examples of PGA Use

Processed Glass Aggregate

ABOUT ME:

- Town of Littleton Solid Waste Manager… 7 Years
- 20+ Years in field… since freshman year in HS

MY PERSONAL THOUGHTS:

- Not for all jobs
- Good for Small Jobs… **Sidewalks, Parking Lots, Concrete Pads, etc**
- For Large Jobs… **Mix**
- Great for areas where no major water issues… **Water lines, Major Runoff, etc**
- What do you want for its purpose
  - Best Areas of use… **LESS FROST HEAVES**
  - Just to use it up… **SAVE MONEY**
  - Bragging… "**SAVE THE ENVIRONMENT"**
- Be Creative, Can use for a lot of things… **Conduit, Piping, Water, Sewer, Septic, Driveways, De/Re-tension Ponds, Where you want water to seep**

LITTLETON'S USE

- Small Jobs
- Boynton Lane (short, goes to PD, Highway Dept)
- Carlton Street (Short Dead End)
- Under some sidewalks
- Around Culverts
- Around TS
- **SOME PLACES FAILED, SOME SUCCESSFUL**
  - Misused!!!
- Given a lot to Casella for use around piping at Landfill

BE CAREFUL WHEN USING…

- A lot around water mains
  - Leaks powerful and blows glass away causing more damage
  - If do use, make sure separate from sewer
  - Can use but just **MIX WELL**
- Culverts
  - Great to use but don't put too much as winter will raise around and cause massive frost heaves… **like any road project try to use same material throughout**

FINAL THOUGHTS ON USES

- IF use consistent on road may create less frost heaves
  - But hard to tell if really is a big difference… **EVERY ROAD IS DIFFERENT**
- Around conduit
  - Less frost but also if digging up can know when getting close… **PROTECTS**
- If use just under loam, don't expect grass to grow good

BUDGET

- Different Budgets But Look at Whole Picture.. **Transfer Station/Highway**

- $40/Ton **COST** to Crush
- **SAVE** $70/Ton if not Trashed
- TS = $70-$40 = **$30/Ton Savings**

- Highway Dept: $8.75/Ton **COST** (3/4" Crushed Gravel)

- Town Savings = $30 + $8.75 = **$38.75/Ton**
- $40/Ton = 4.5 Tons Crushed Gravel… **Not volume equal though**

FUTURE HOPES

- State Regulations Changes… **Set Plans For Certain Projects**
  - Eliminate Engineer if follow the plans
  - Driveways, septic, foundations, etc
- Give to Gravel Yards – **They have tools to mix… Big Issue for Towns**
  - 3:1 Ratio of gravel:PGA would work amazing
- More Than Just Roads!

Town of New London

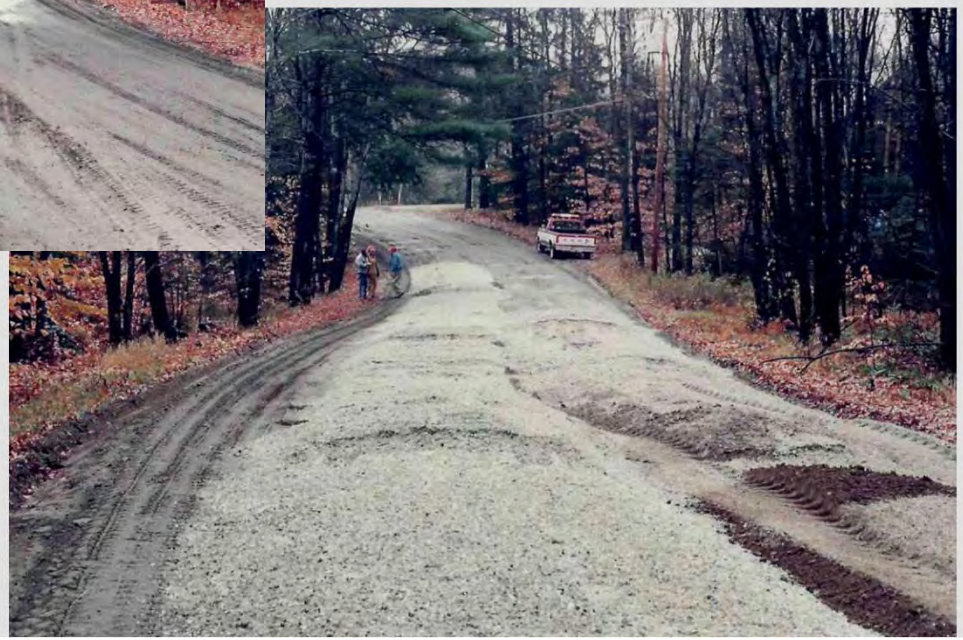
Projects thus far

- Sidewalks
- Flooring under slab
- Backfill water line for a sprinkler system
- Road sub base
- Parking lot base

Upcoming project

- New building complex base

Bog Rd New London subbase when laying roads



New London Public Works Dept
Garage floor base

Laying it

Compacting

Parking Lot Base – New London

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