

## Processed Glass Aggregate (PGA)

Processed glass aggregate (PGA) studied in this project is a fine crushed recycled glass with a high potential to replace sand borrow and other free-draining fill materials. The major benefits of using PGA are that it reduces demands for limited high-quality sand borrow, which is increasingly scarce and expensive; and it keeps glass out of landfills. In practice however, PGA is not widely used in our region because of a lack of clear guidance on deleterious material content determination.

## Project Objectives and Methodology

Primary objectives include developing quick, inexpensive and reliable methods to determine deleterious content in PGA; assessing the engineering properties of regionally-available PGA and sand borrow materials; revising or developing new specifications to facilitate the use of PGA; and performing economic analysis to determine the feasibility and environmental impacts of replacing sand borrow with PGA and to inform incentives for the production and use of PGA.

At present a number of laboratory tests are conducted on PGA (from CSWD – Chittenden Solid Waste District) and sand borrow (from VTrans) samples including specific gravity, grain size, compaction, hydraulic conductivity and direct shear testing. A number of tests for determining deleterious material types and contents are being explored including float test, furnacing, solvents, magnets and eddy current separation.

A laboratory-scale glass crusher is acquired to manufacture clean crushed glass to which known amounts of deleterious materials would be added (e.g. paper, plastic, metal) for verifying the developed laboratory methods for deleterious materials.

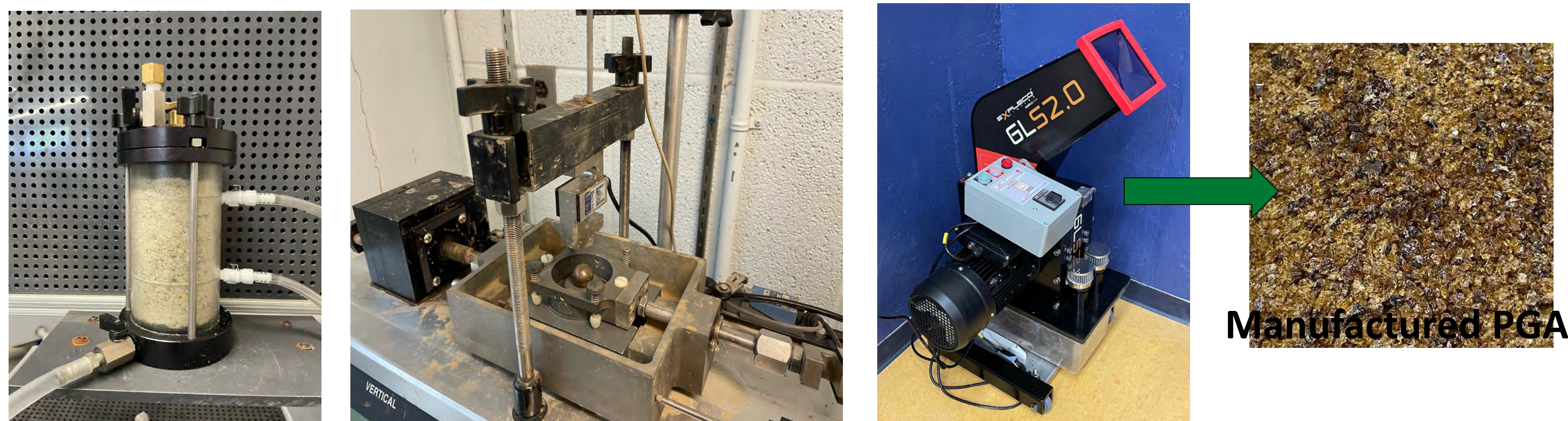


Figure 1. Permeameter (left), direct shear device (center), & glass crusher (right).

## Preliminary Results

The acquired PGA samples are within VTrans gradation requirements for sand borrow and PGA, which references AASHTO M 318. Figure 2 indicates that the gradation of the manufactured PGA matches that of the PGA sample obtained from CSWD. The internal friction angle of dry PGA ranged 38 - 42°.

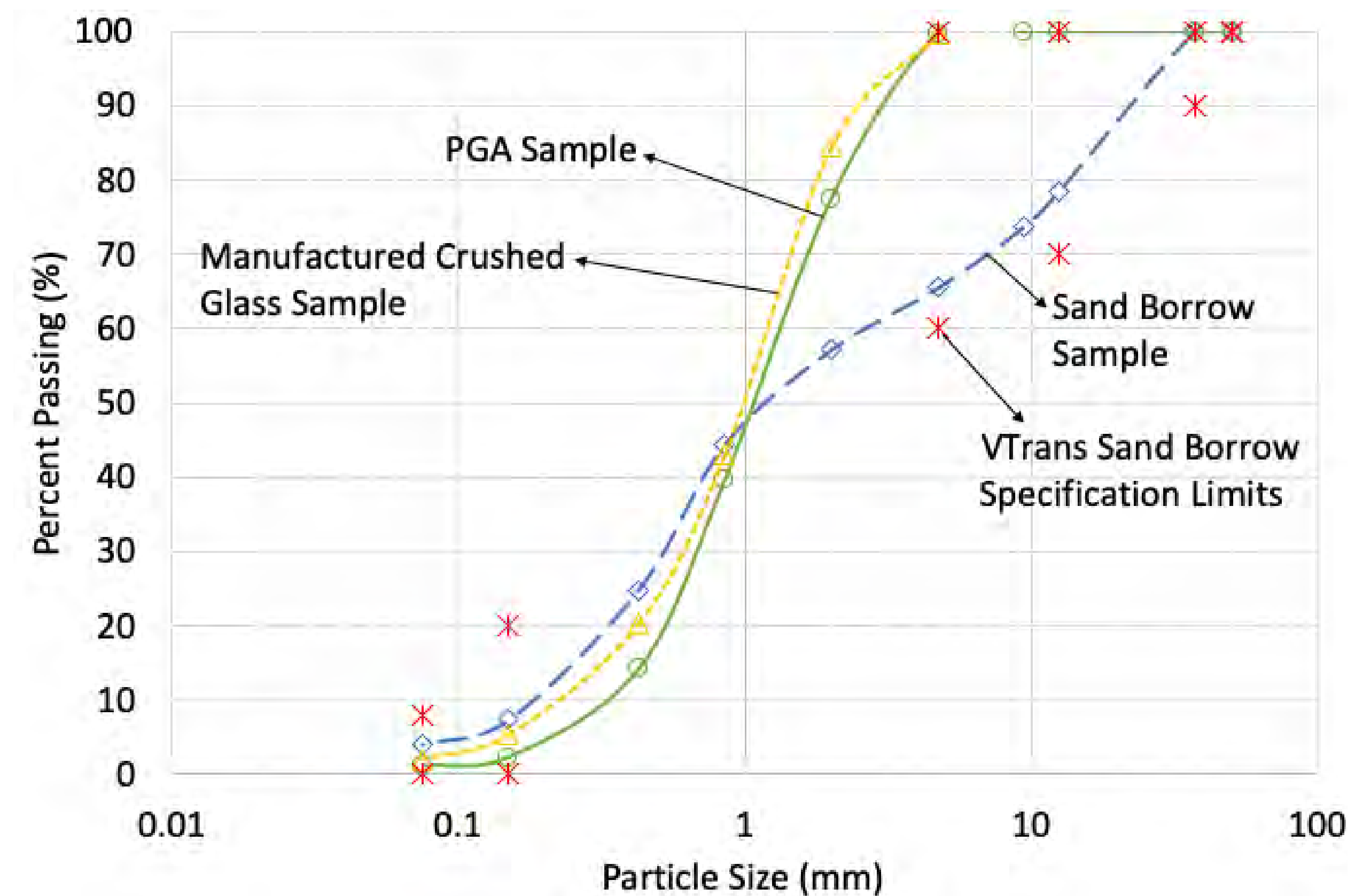


Figure 2. Comparison of gradations for Sand Borrow Sample, PGA, Sample, & Manufactured Crushed Glass.

## Future Work

Additional PGA and sand borrow samples will be acquired and supplemented with manufactured PGA with known deleterious content and type. Currently, the focus will remain on the deleterious material testing, with engineering properties determination of PGA, manufactured PGA, and sand borrow samples and economic analysis in the following year of the project.

## Acknowledgements

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## References

VTrans 2018 *Standard Specifications for Construction*.

VTrans 2021 "General Special Provisions Version Number GSP-1809."