

# Low Carbon Concrete

## FOR CITY CONSTRUCTION PROJECTS

City of Austin Environmental Commission

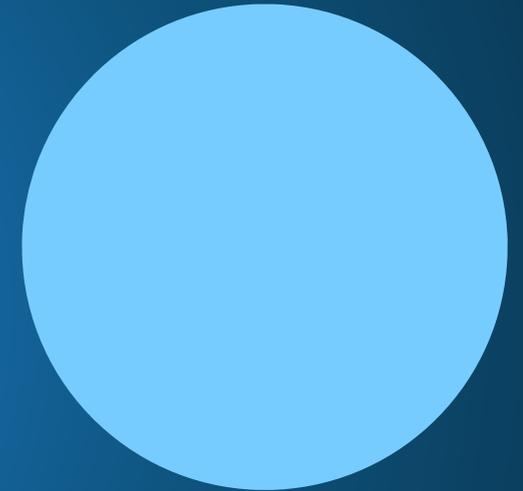
Tom Ennis, PE, LEED AP, WPD Sustainability Officer

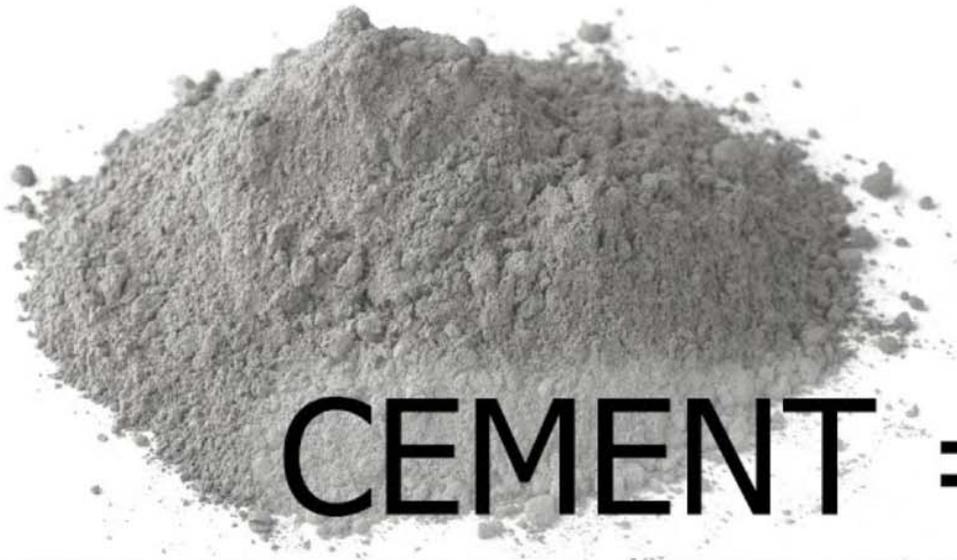
June 19, 2019

*Low carbon concrete has potential carbon benefits in our region similar to those gained from our water quality protection lands (which took 20+ years & cost over \$150 million) but w/o upfront costs or maintenance fees.*

# Overview

- ▶ Fundamentals
- ▶ Intro video
- ▶ State of the Technology
- ▶ Central Texas Context
- ▶ Next Steps
- ▶ Q&A





**CEMENT**

**=**



**FLOUR**

**CONCRETE**

**=**

**BREAD**





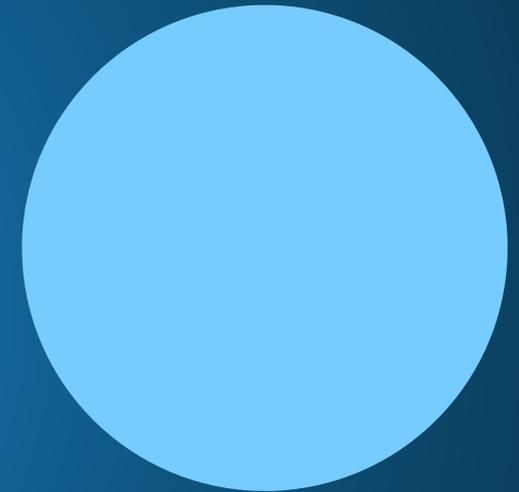
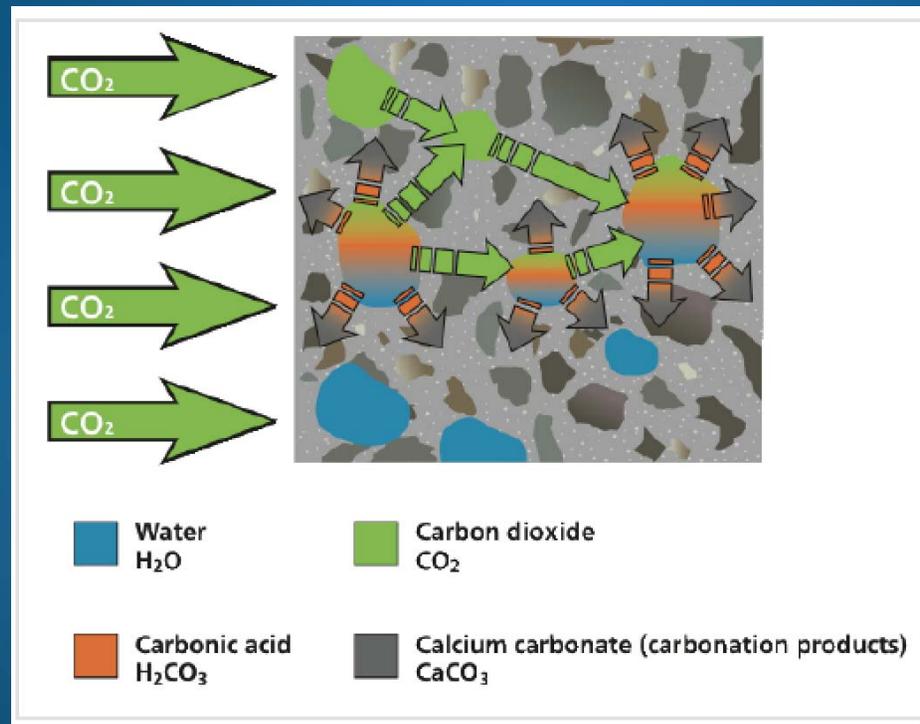
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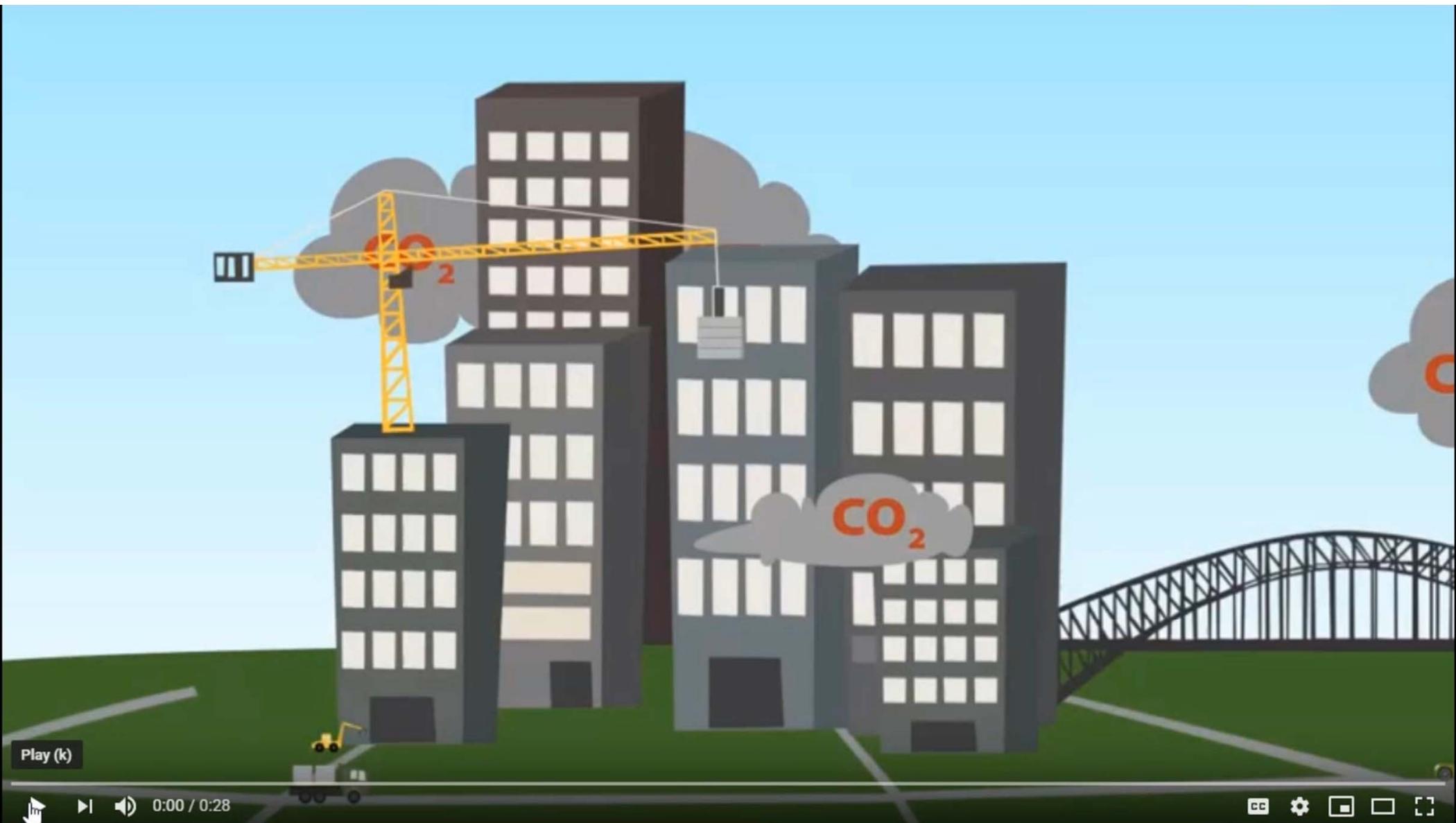
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**ET1**

Ennis, Tom, 6/19/2019

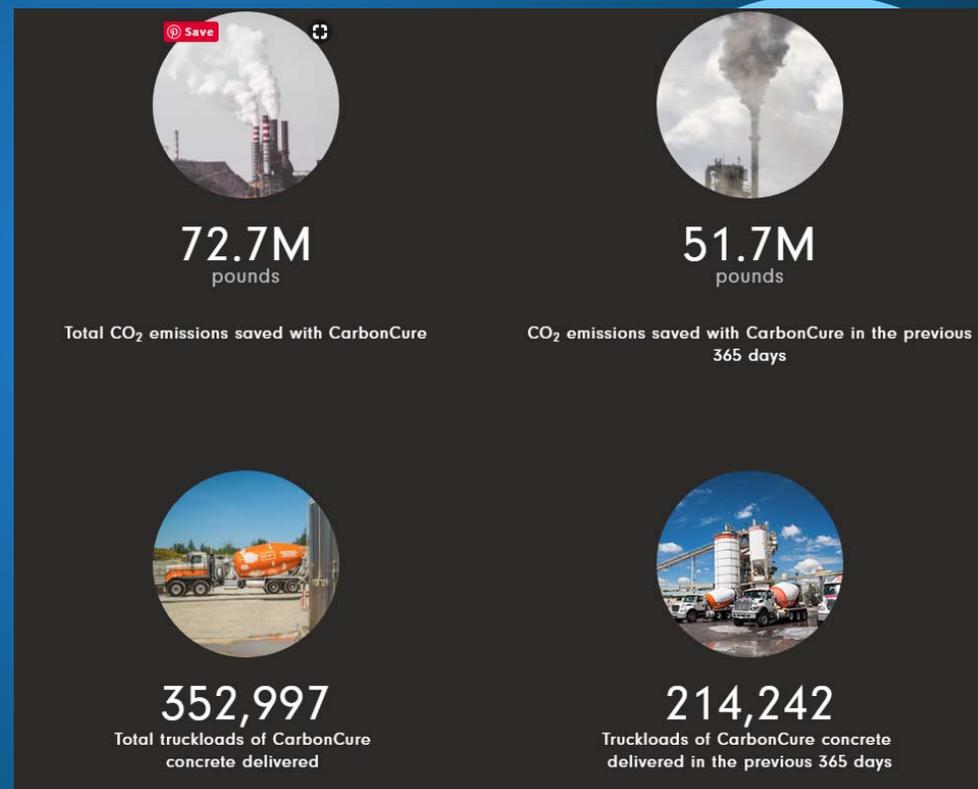
# CO<sub>2</sub> injection converts to calcium carbonate (limestone)





# Use of the Technology

- ▶ 2007 Started in Canada
- ▶ In 126 concrete plants in US
- ▶ Ozinga Concrete in Chicago
  - ▶ Started 2016
  - ▶ 200,000 cubic yards done to date
  - ▶ Recently approved by Chicago DOT
  - ▶ Flagship McDonald downtown
  - ▶ Coming soon: Advocate Hospital, SC Johnson headquarters

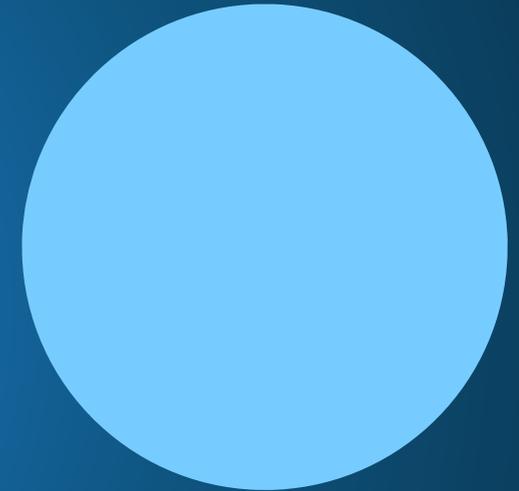




# Unintended Consequences?

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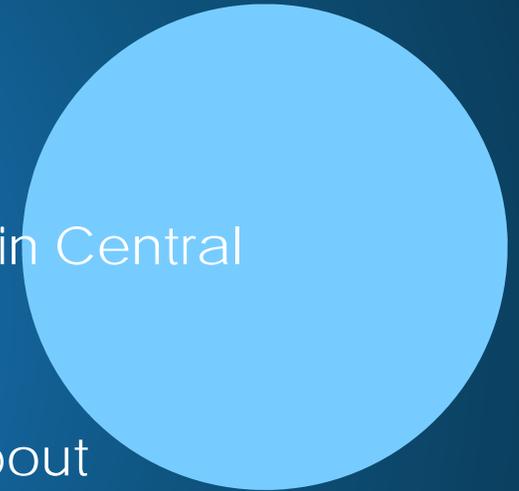
- ▶ pH?
- ▶ Chloride intrusion?
- ▶ Off-gassing?
- ▶ Workability?
- ▶ CO<sub>2</sub> contamination?



# Central Texas Context

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- ▶ 25 pounds of CO<sub>2</sub> per cubic yard of concrete
- ▶ About 5.75 million tonnes of concrete annually in Central Texas
- ▶ If fully realized, it would be the equivalent of about 36,000 metric tonnes per year of CO<sub>2</sub>
- ▶ Or about the CO<sub>2</sub> output of about 8,000 cars



# Next Steps

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The piloting, evaluation, and utilization of this process could provide significant benefits to the City and the support of the Environmental Commission and the Austin City Council could accelerate the potential adoption of post-industrial carbon dioxide mineralized concrete for use in all City of Austin capital improvement projects utilizing concrete where the utilization of carbon dioxide mineralized concrete does not significantly increase the costs of or significantly delay the project.

Questions...?

Thank you!

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