



A GENERAL CONTRACTOR'S PERSPECTIVE ON GETTING TO ZERO

NRMCA CONCRETE INNOVATION SERIES

CONCRETE INNOVATIONS

SESSION 5 | AUGUST 17, 2022

Turner Construction Company

THREE CASE STUDIES IN CONCRETE



CONCRETE INNOVATIONS



Ground Glass Pozzolans



Low Carbon Concrete



Concrete Maturity Sensors

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**BY THE
(CONCRETE)
NUMBERS**

\$14.6B annual company revenue	450+ prequalified Div. 03 vendors	1.2M CY concrete placed annually
\$790M annually spend Division 03	\$135M Concrete division annual revenue	313 metric tons cement placed annually



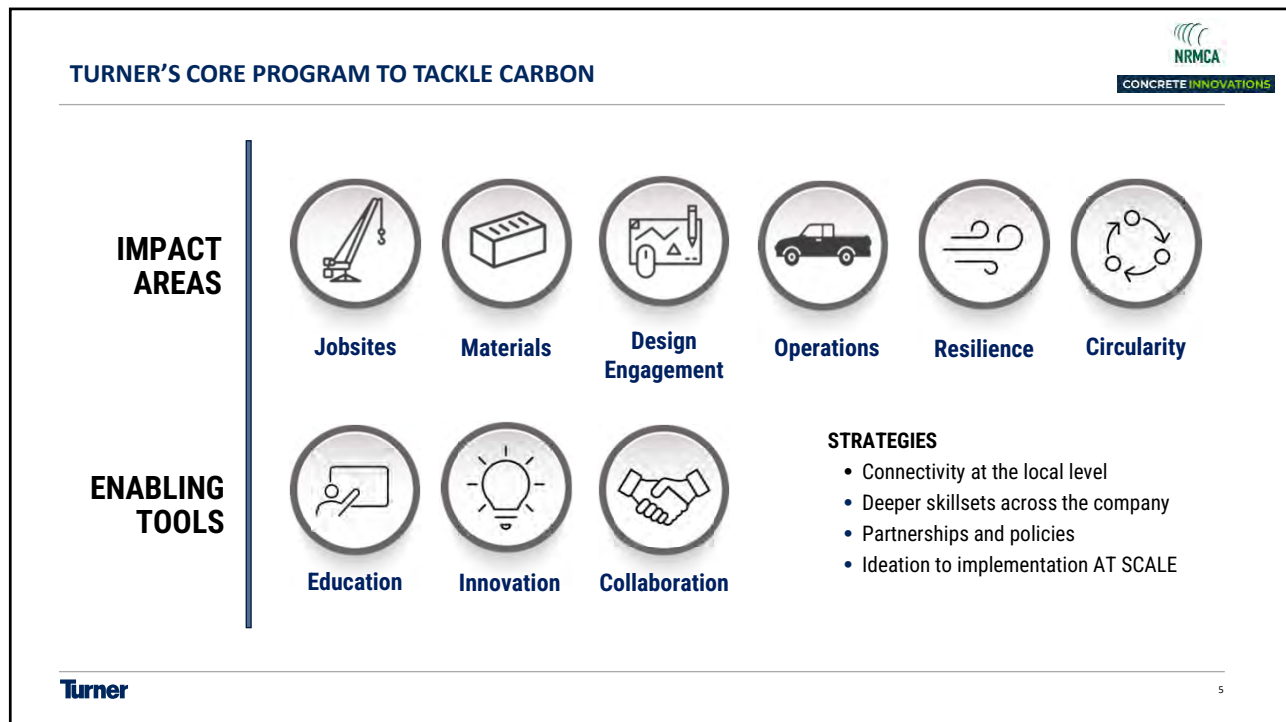
SUSTAINABILITY DRIVERS

What are clients asking?

- Sustainability to meet:
 - corporate targets
 - customer demands
 - compliance and regulations
- Baselineing
- More and better data for decision making

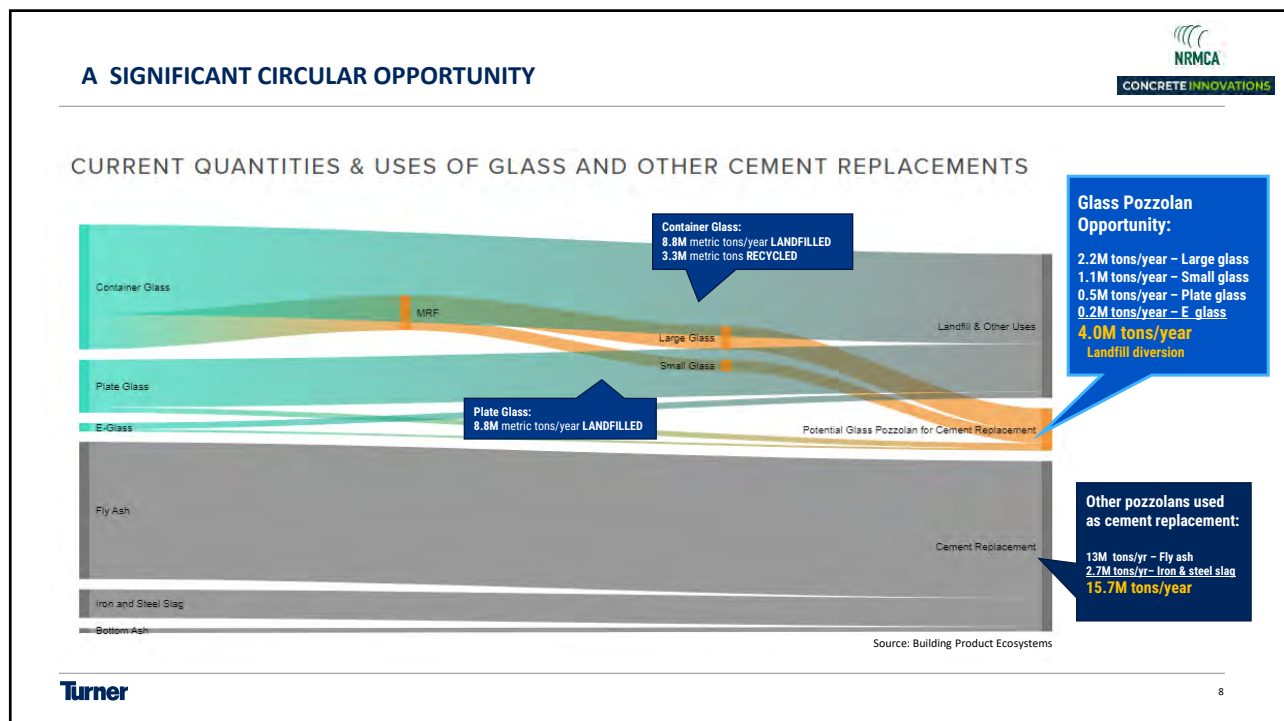
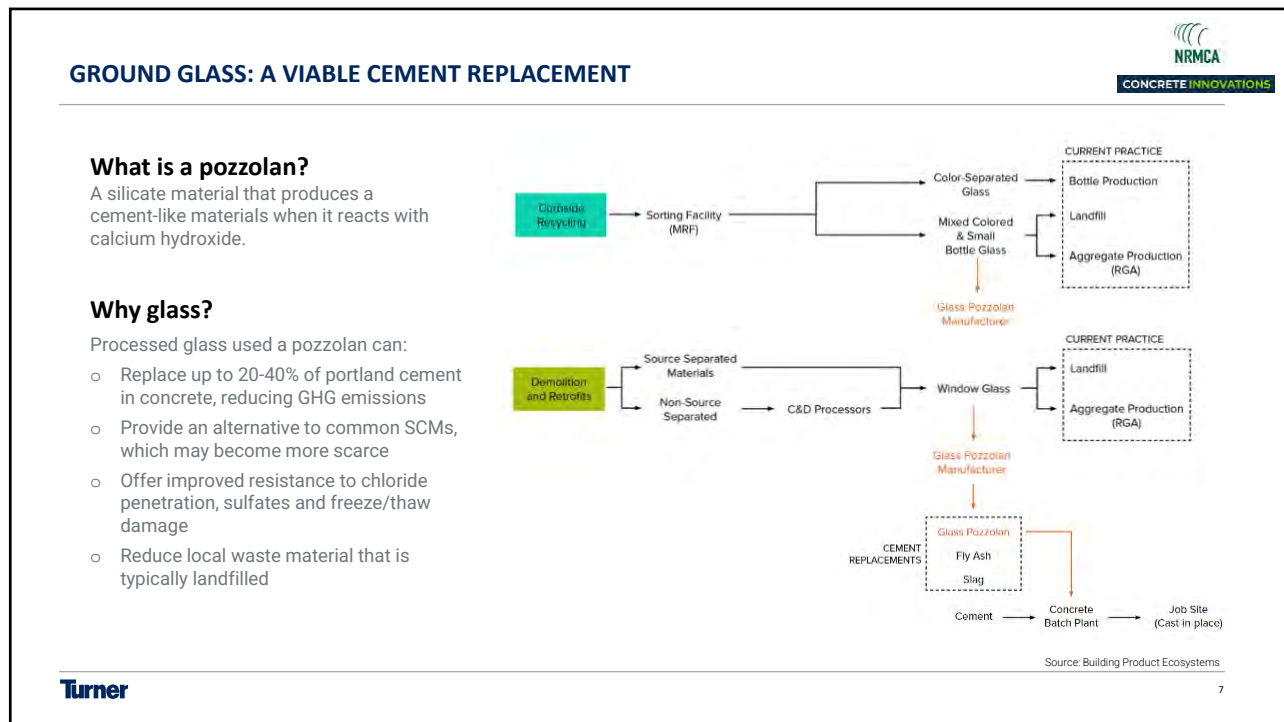
What are employees wanting?

- Work with purpose
- Development opportunities
- Competitive differentiators



CASE STUDY 1

GROUND GLASS POZZOLAN AS CEMENT REPLACEMENT



POZZOTIVE by Urban Mining Industries



HOLISTICALLY POSITIVE IMPACTS

www.pozzotive.com

Plant locations

- New Rochelle, NY
- Beacon Falls, CT

		<h3>CLIMATE</h3> <p>Replacing 50% of a concrete mix's cement with Ground-Glass Pozzolan lowers GWP by 42%.</p>
		<h3>HEALTH</h3> <p>Avoids heavy metal contaminants often found in fly ash, which can affect workers and upstream supply chain.</p>
		<h3>EQUITY</h3> <p>Reduces heat island effect, which often disproportionately affects low-income neighborhoods</p>
		<h3>CIRCULAR ECONOMY</h3> <p>Utilizes regenerative waste streams that are regionally available with stable supply</p>

a sustainable future is here.

www.pozzotive.com

NEW CANAAN LIBRARY


Project Details

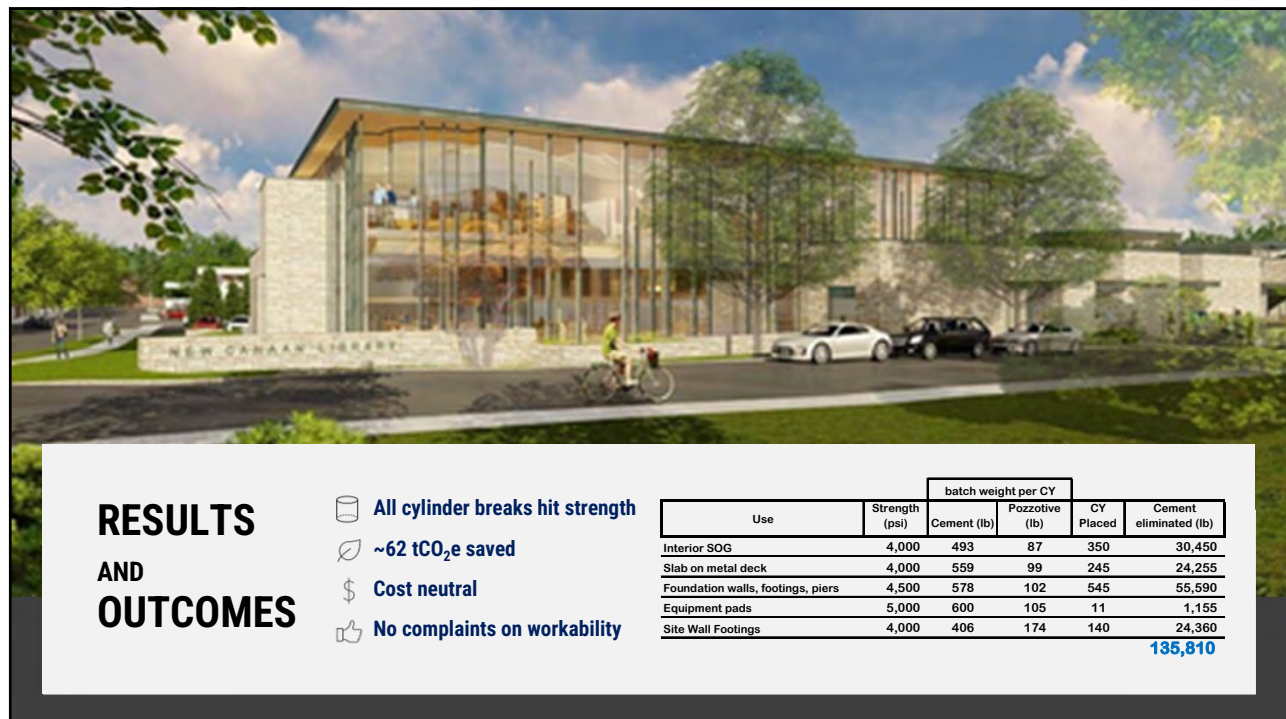
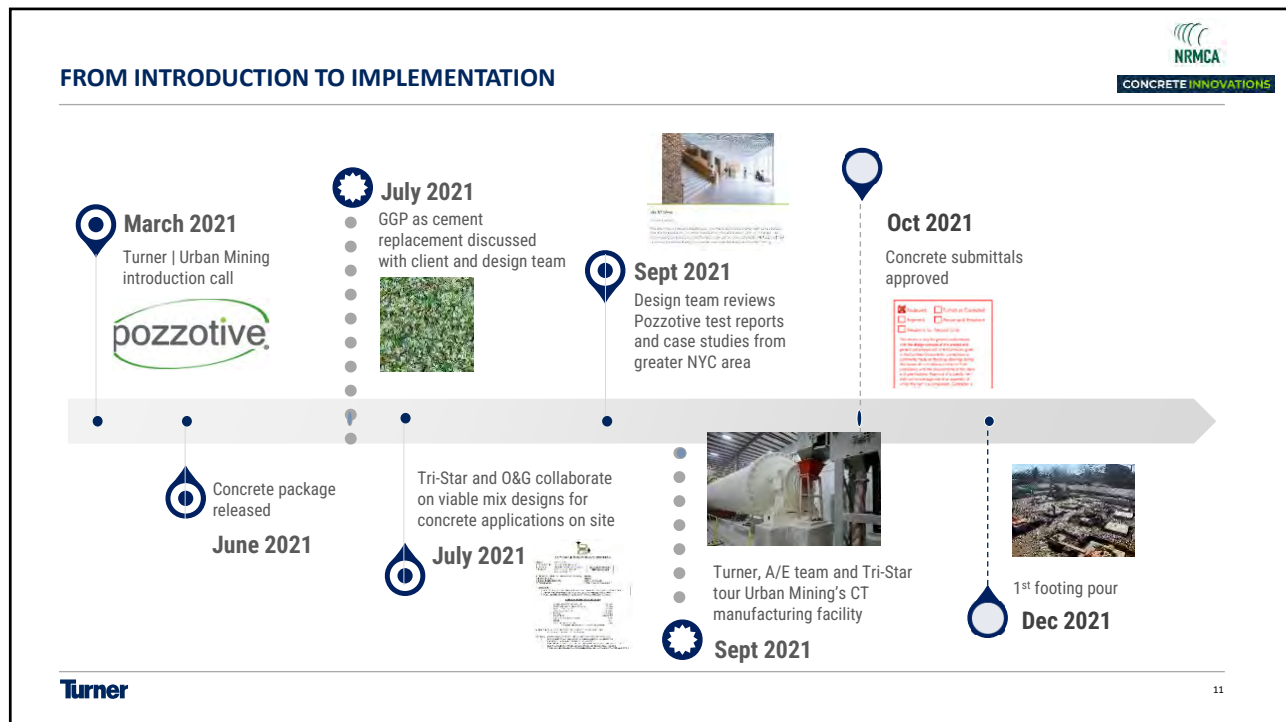
Location
New Canaan, CT

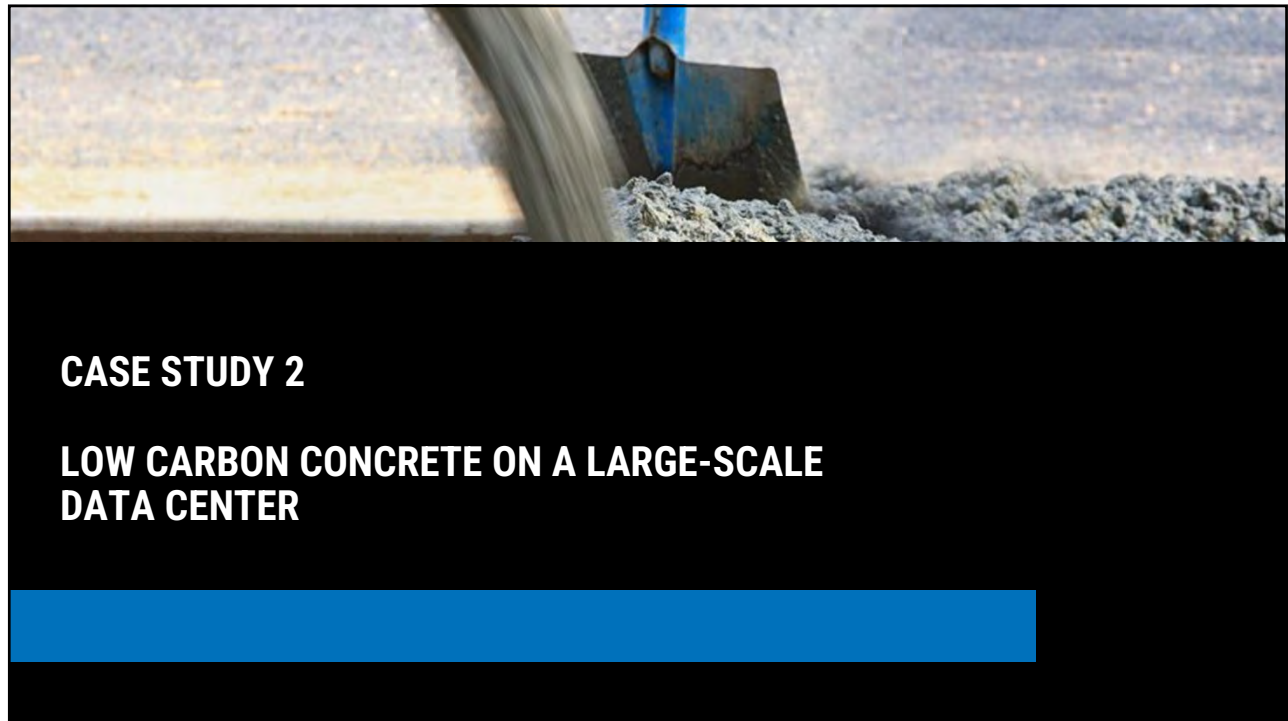
Size and Structure
34,000 GSF | Two story, steel frame | Concrete footings, foundations, slabs & exterior hardscape (1500 CY)

Project Team


<p>Client New Canaan Library</p> <p>Construction Manager Turner Construction</p> <p>Ready Mix Supplier O&G Industries, Inc.</p> <p>Pozzolan Supplier Urban Mining Industries</p>	<p>Architect of Record Centerbrook Architects</p> <p>Structural Engineer E2 Engineers</p> <p>Concrete Contractor Tri-Star Concrete Group</p>
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CONCRETE INNOVATIONS

LARGE SCALE DATA CENTER

Project Details




Location
Omaha, NE




Size and Structure
1,000,000 GSF | Two story, steel frame | Concrete footings, foundations, slabs, exterior hardscape, and Electrical & Telecommunication duct banks (213,608CY To Date)


Project Team




Client
Undisclosed




Structural Engineer
PASE



General Contractor
Turner Construction




Concrete Contractor
Multiple



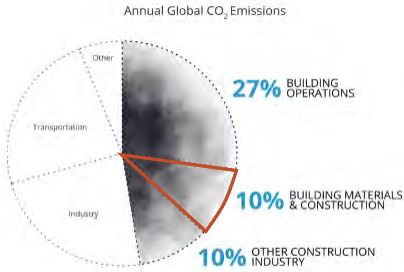
Ready Mix Supplier
Platte River Concrete

WHY CONCRETE?




Turner's 2030 Commitment:

To reduce GHG emissions and Water Consumption of our on-site construction operations by 50% by 2030




Sector	Percentage
Building Operations	27%
Building Materials & Construction	10%
Other Construction Industry	10%
Transportation	-
Other	-

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Data Sources: Global ABC Global Status Report 2021, EIA

- ★ Concrete is the 2nd most-used material on 
- ★ If all cement in the US increased limestone quantities by 10% (i.e. Type 1L) it would cut CO₂ by 8.1 million tons

Equivalent to taking 1.75 million ICE cars off the road for a year.



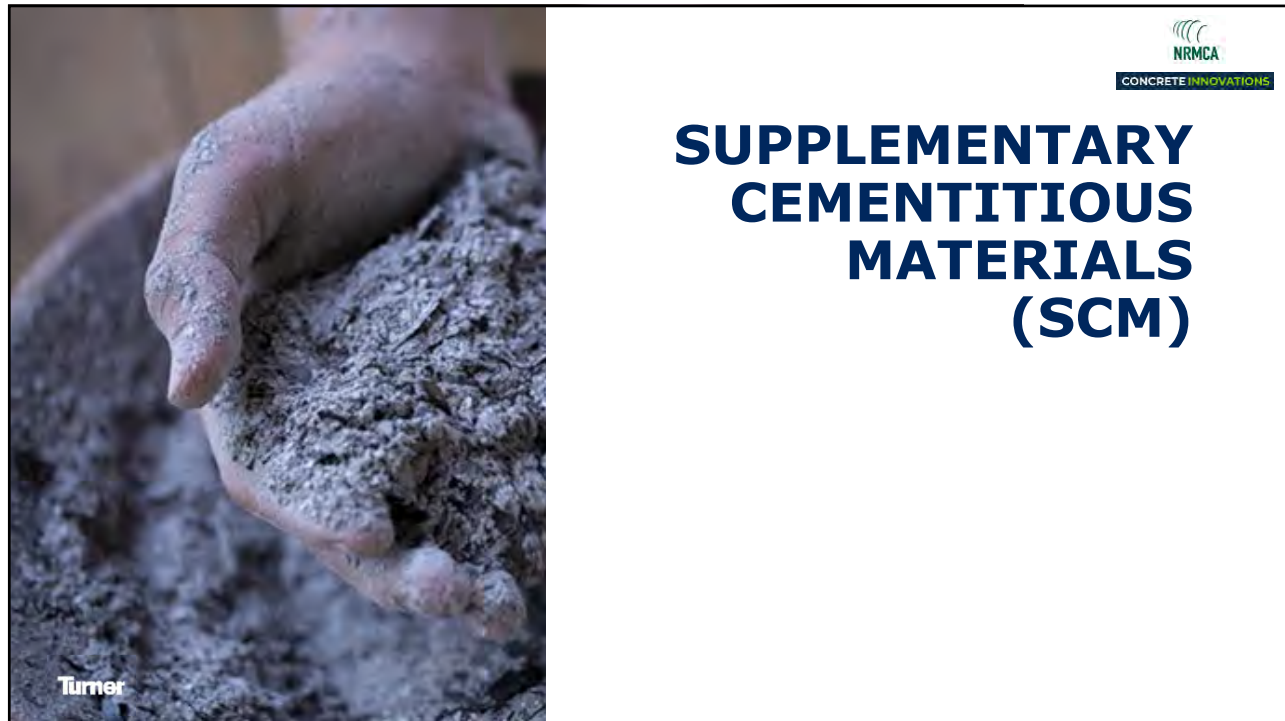
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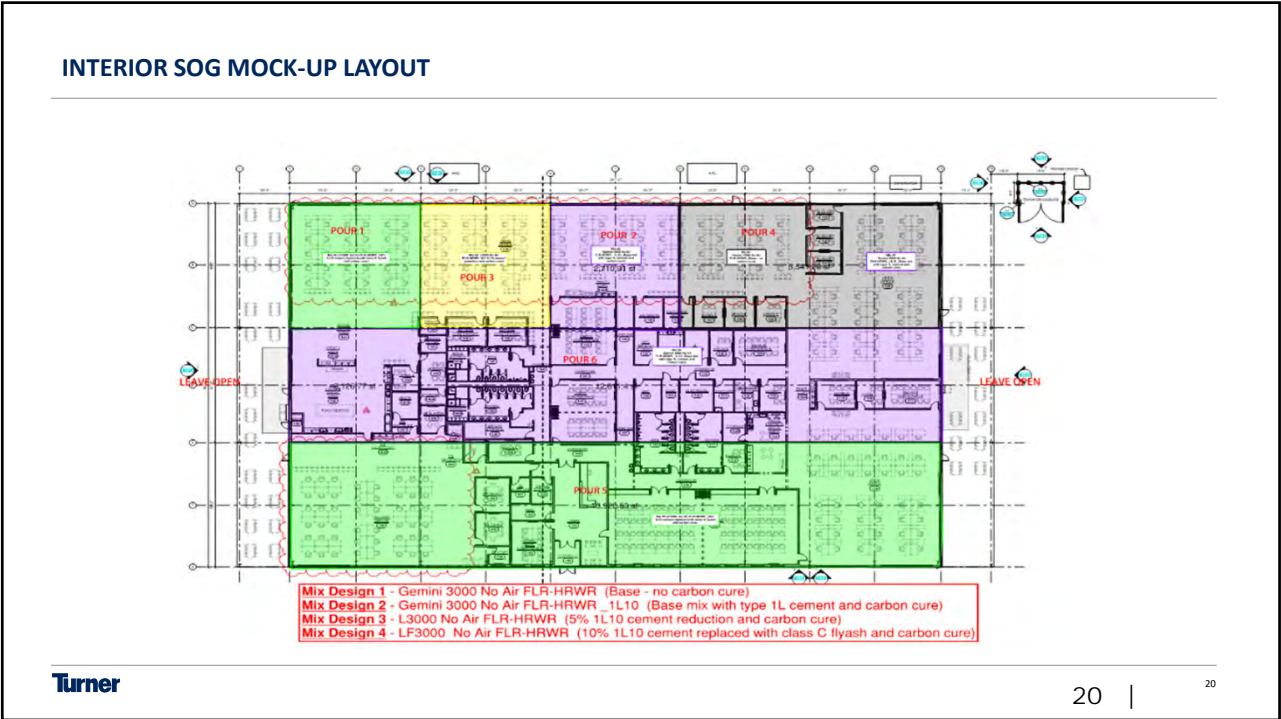
TYPE 1L CEMENT











INTERIOR SOG LOW CARBON RESULTS

MIX	CEMENT TYPE	CEMENT/CARBON REDUCTION METHOD	DESIGN PSI	AVG PSI AT 14 DAYS	GWP GLOBAL WARMING POTENTIAL
1	I/II	CARBON CURE	4000	5797	319
2	IL	CARBON CURE	4000	5845	291
3	IL REDUCED CEMENT CONTENT	CARBON CURE	4000	4844	278
4	IL	10% FLY ASH & CARBON CURE	4000	4985	266

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TELECOM DUCT BANK LOW CARBON RESULTS

MIX	CEMENT TYPE	CEMENT/CARBON REDUCTION METHOD	DESIGN PSI	AVG PSI AT 28 DAYS	GWP GLOBAL WARMING POTENTIAL
2	IL	25% SLAG, 25% FLY ASH, & CARBON CURE	3000	4407	In Progress
3	IL	50% FLY ASH & CARBON CURE	3000	6618	In Progress

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OUTCOMES AND LESSONS LEARNED

Result:

- Successfully executed multiple mockups to gain field knowledge of new materials and gain owner buy-in.
- Successfully implemented low carbon concrete mix designs for many applications on a large-scale data center
- Successfully implemented the use carbon mineralization technology alongside reduced cement mix designs.

Challenges:

- Set up durations did not work within the project schedule
 - Mix designs required revisions
- Gaining owner acceptance of new materials
 - Mockups and site walks were held with client
- Finding efficient and logical sources of CO₂ for carbon mineralization applications

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CASE STUDY 3

CONCRETE MATURITY SENSORS USES & APPLICATIONS

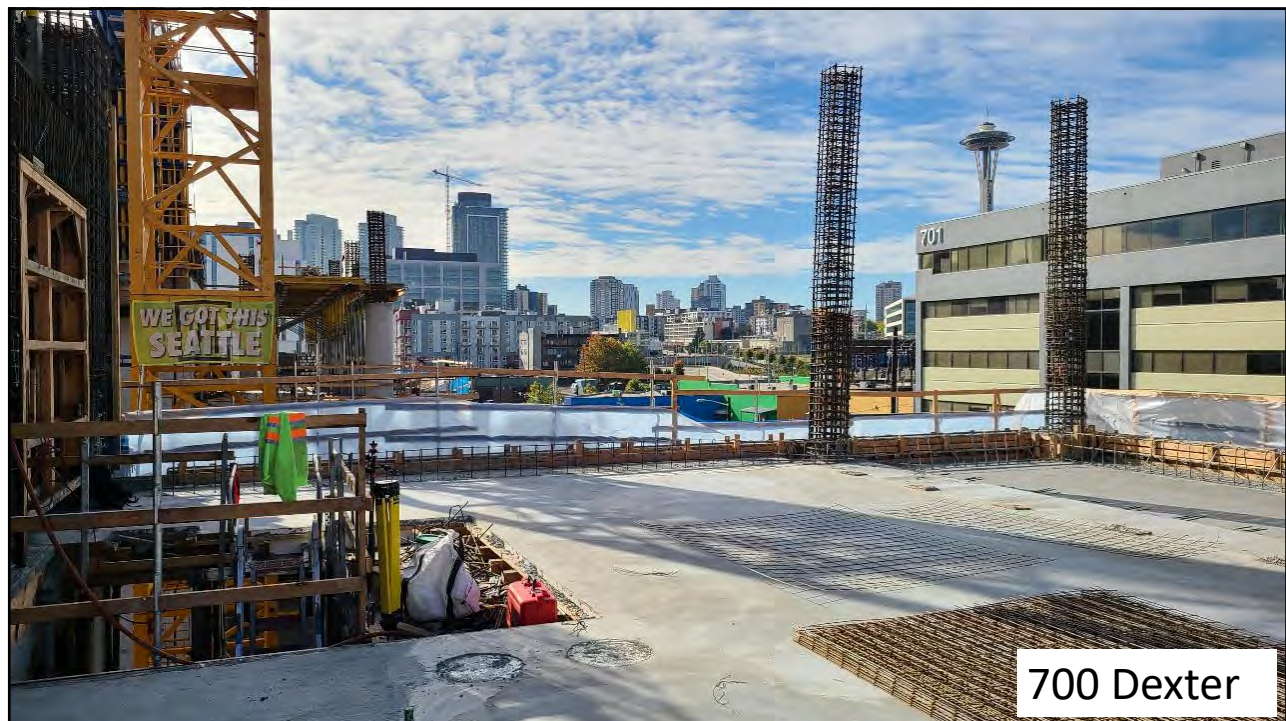
Concrete Sensor Applications

- Structural Concrete Pours
- PT Decks
- Mass Concrete
- Cold and Hot Weather Concrete
- Bridges
- Tilt-Up Panels



Limitations?







QUESTIONS?



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