# **202** Innovations that work."



2019 Annual General Meeting Presentation

**22 November 2019** 

EDE:ASX



## Disclaimer

#### FORWARD LOOKING STATEMENTS

This presentation includes certain forward-looking statements of Eden's management. Forward-looking statements are statements that contemplate the happening of possible future events and are not based on historical fact. Forward-looking statements may be identified by the use of forward-looking terminology, such as "may", "shall", "could", "expect", "estimate", "anticipate", "predict", "probable", "probable", "should", "continue", or similar terms, variations of those terms or the negative of those terms. Forward-looking statements should not be read as a guarantee of future performance or results and may not be accurate indications of when or whether such performance or results will be achieved. Forward-looking statements are based on information known to Eden when those statements are made or management's good faith belief as of that time with respect to future events and are subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in or suggested by the forward-looking statements. The forward-looking statements specified in this presentation have been compiled by Eden's management on the basis of assumptions (which may or may not turn out to be accurate) made by management and considered by management to be reasonable. Eden's future operating results, however, are impossible to predict because of risks and uncertainties, and no representation, guarantee, or warranty is to be inferred from those forward-looking statements. You are cautioned not to place undue reliance on these forward-looking statements.

Forward-looking statements include, but are not limited to, the following:

Statements relating to Eden's future production capacity and sales levels, and business and financial performance; Statements relating to future research and development results and regulatory approvals of Eden's products; Statements relating to Eden's competitive position; and Other statements relating to future developments that you may take into consideration.

Actual results of Eden's operations may differ materially from information contained in the forward-looking statements as a result of risk factors some of which include, among other things: global economic stability, continued compliance with government regulations regarding production and use of carbon nanotubes in the U.S. or any other jurisdiction in which Eden conducts its operations; changing legislation or regulatory environments in the U.S. and any other jurisdiction in which Eden conducts its operations; credit risks and product sales affecting Eden's revenue and profitability; exposure to product liability claims; changes and new competitive products in the specialty concrete admixture industry; the level of market acceptance and demand for EdenCrete<sup>TM</sup>; Eden's ability to effectively market all the product it can produce; Eden's ability to manage its growth, including implementing effective controls and procedures and attracting and retaining key management and personnel; changing interpretations of generally accepted accounting principles; the availability of capital resources, including in the form of capital markets financing opportunities; and general economic conditions.

This presentation has been prepared as a summary only and does not contain all information relating to Eden's assets and liabilities, financial position and performance, profits and losses and prospects: it should be read in conjunction with all of the publicly available information in relation to Eden which has been released to the Australian Securities Exchange (ASX Code: EDE).



# 2019 Highlights

1

#### EdenCrete® - USA

- US sales increasing regular repeat sales in Colorado, Georgia for readymix and shotcrete applications
- Rapidly growing warehouse / industrial flooring market emerging
- First sale into New York ready-mix market for mid-rise building construction
- Many important US trials underway or scheduled for both commercial and infrastructure projects in a growing list of states
- EdenCrete® now approved for use by DOTs in 15 states currently in use in DOT projects in 3 states

2

#### **EdenCrete® – International**

- A growing number of trials underway in Europe, India, Korea and Australia, many with large companies
- Anticipated emerging sales growth in FY20

3

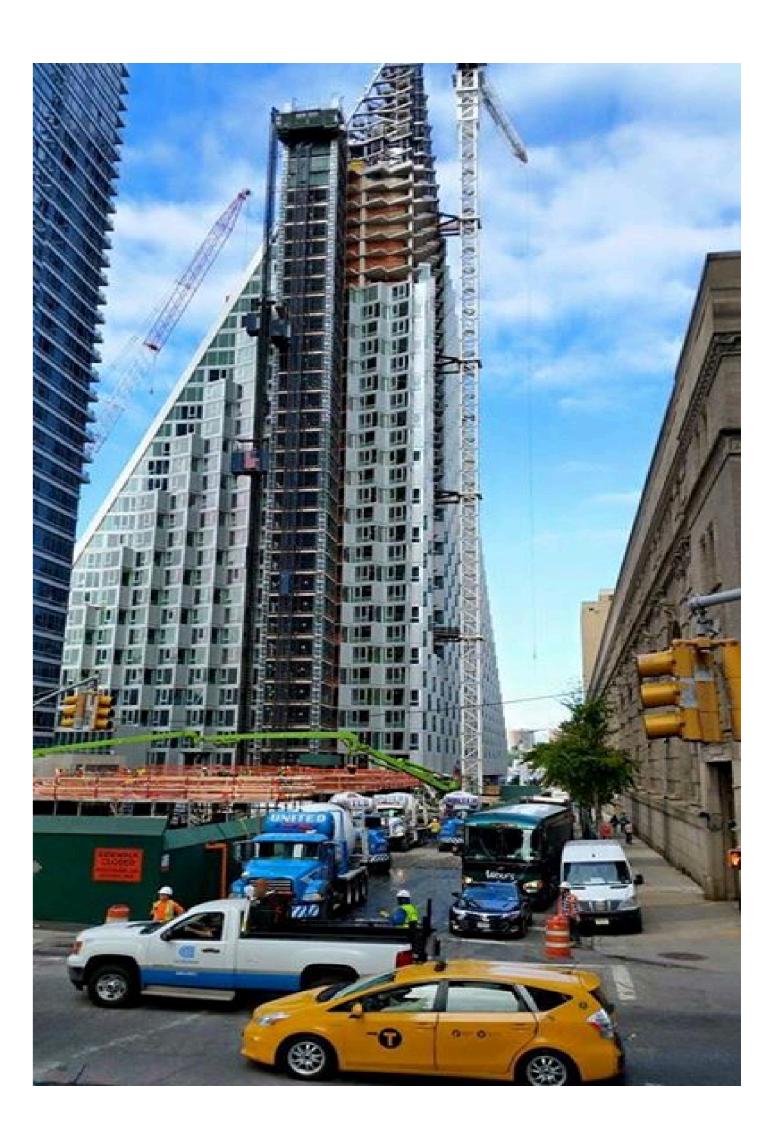
### **OptiBlend®**

- Sales in India increasing significantly and starting to increase in the US after a two year slowdown
- Potential for large scale market growth in India

4

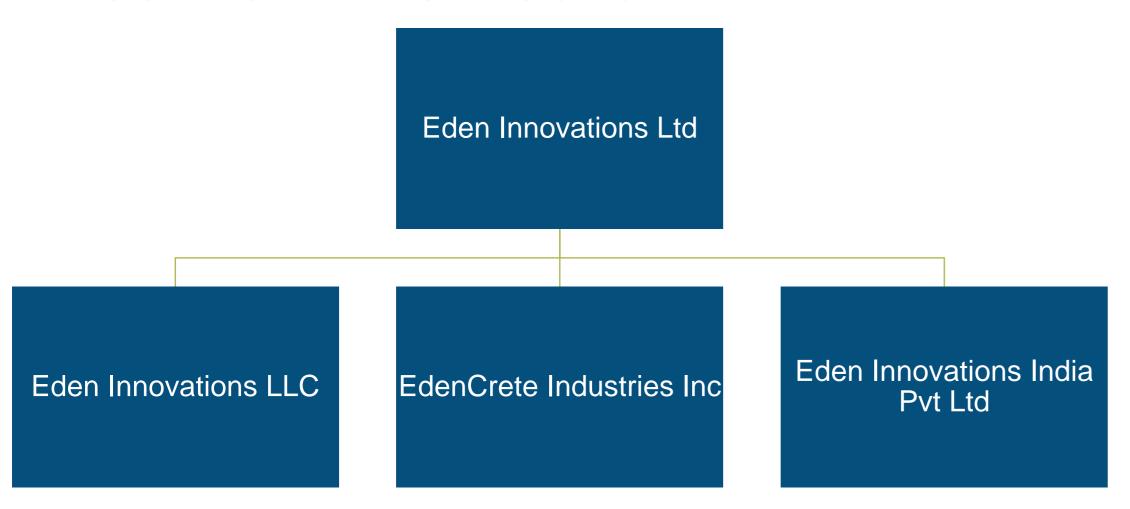
EdenPlast® - Initial planning for commercialisation underway



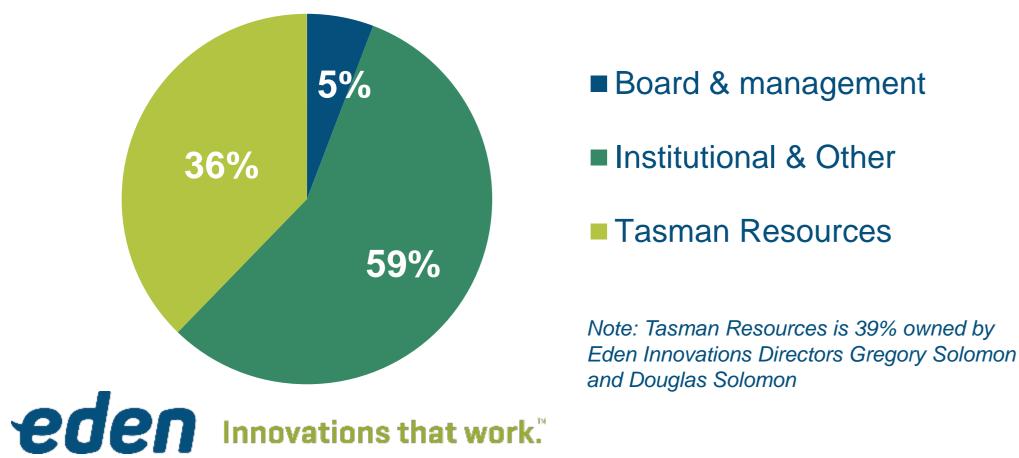


# **Corporate Snapshot**

### **CORPORATE STRUCTURE**



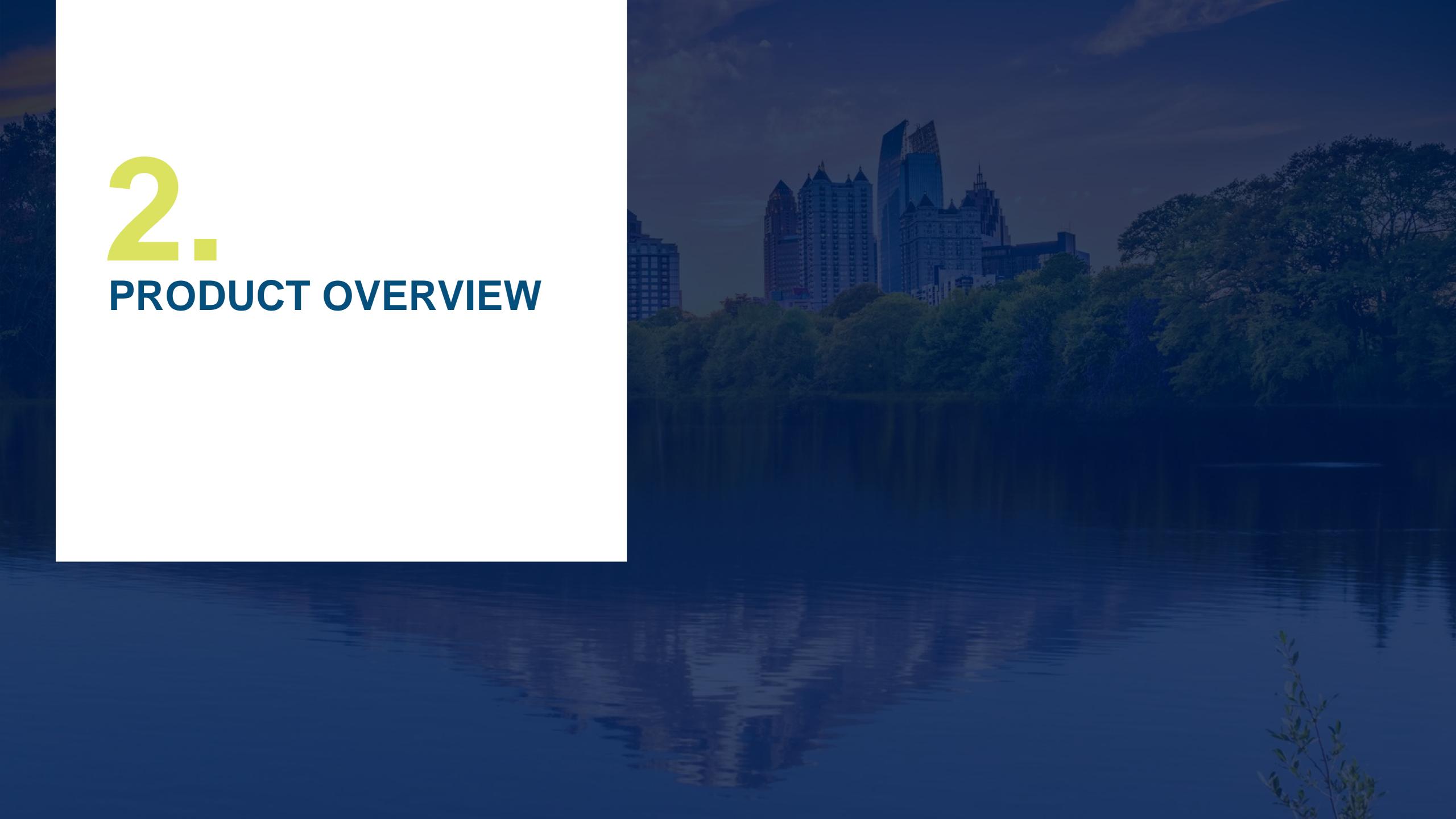
### **SHAREHOLDERS**



### **CAPITAL STRUCTURE**

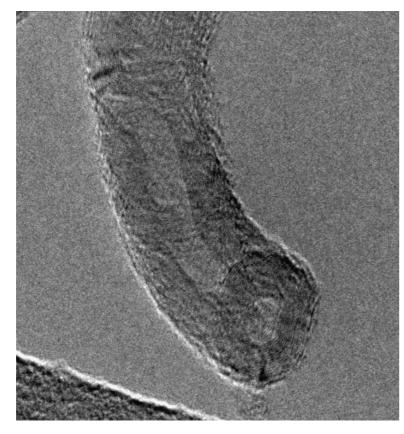
Eden Innovations Ltd			
Symbol	EDE		
Issued shares	1,723,596,366		
Stock Price (1)	A\$0.047		
Market Cap (1)	~ A\$81 million		
Cash	~ A\$1.8 million (1)		
Debt	~ A\$0.9 million (2)		

- 1) As at 20 November 2019
- 2) Mainly long term vendor finance of purchase price on first Colorado property, 2% interest rate



# **Core Expertise – Carbon Nanotubes**

Harnessing the benefits of carbon nanotube technology for commercial application in concrete and plastics



**TEM image of Eden's MWCNT** 

### Key properties:

- Tensile Strength: 100-300x steel
- Weight: ~17% of steel
- Highly conductive: thermally and electrically

# How carbon nanotubes work



Act as nucleation points for dense cement hydration - builds on all surfaces of CNT



Create quintillions (10<sup>18</sup>) of flexible, super-strong carbon nano-structures throughout the concrete



Produces denser, stronger, tougher and more durable concrete



# EdenCrete® Range



**EdenCrete**® is a cost effective, carbon nanotube enriched liquid admixture that is mixed into wet Portland concrete

- Increases flexural, tensile & compressive strength, and abrasion resistance
- Reduces shrinkage, permeability and damage from salt and chemicals and increases freeze / thaw resistance

EdenCrete® Pz is a cost effective, carbon nanotube enriched liquid admixture that is mixed into any wet concrete

 Often increases compressive strength and abrasion resistance and may also improve flexural strength and other characteristics

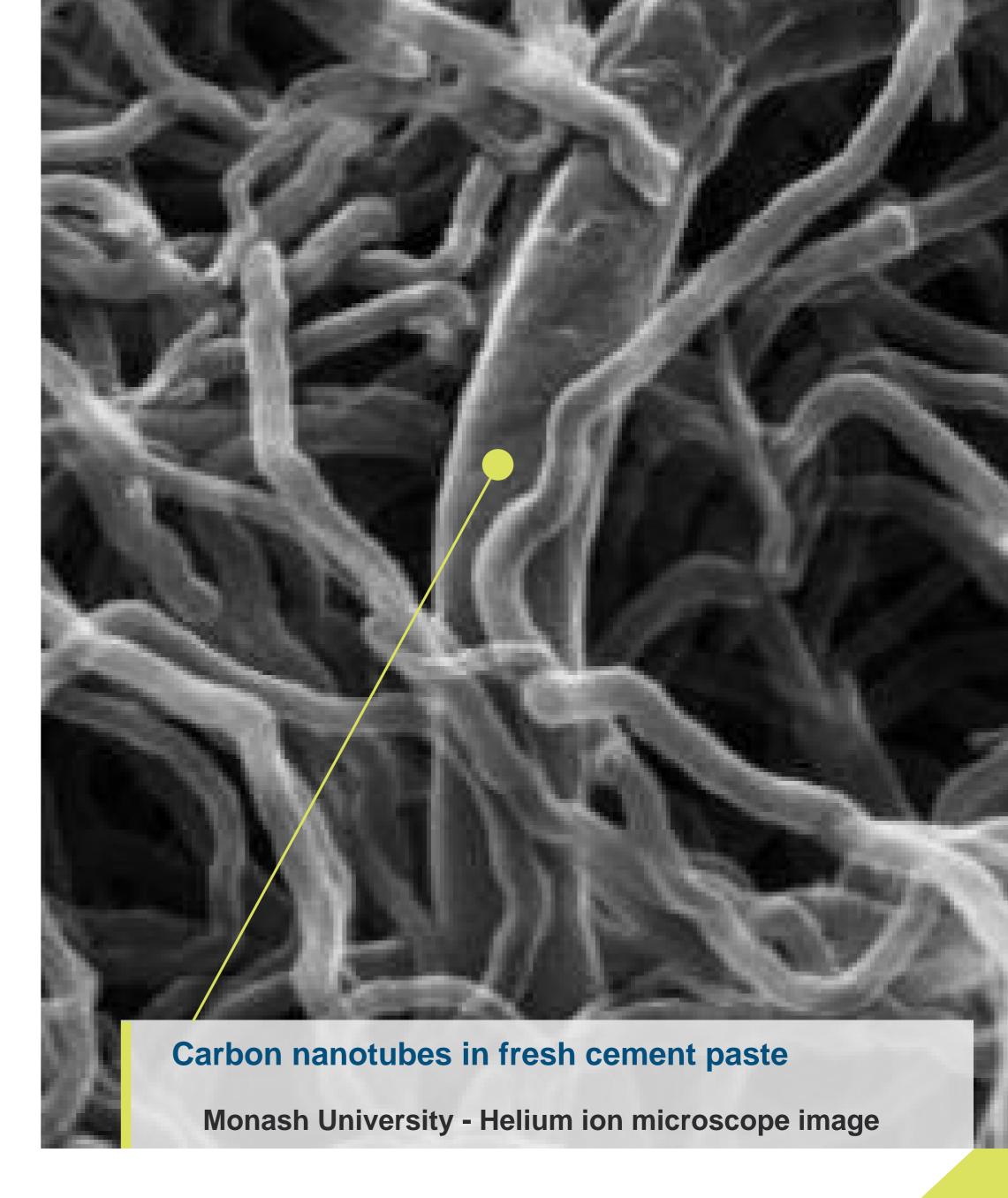
### All key qualities for infrastructure

**EdenCrete**®

Suitable for Portland cement

**EdenCrete® Pz** 

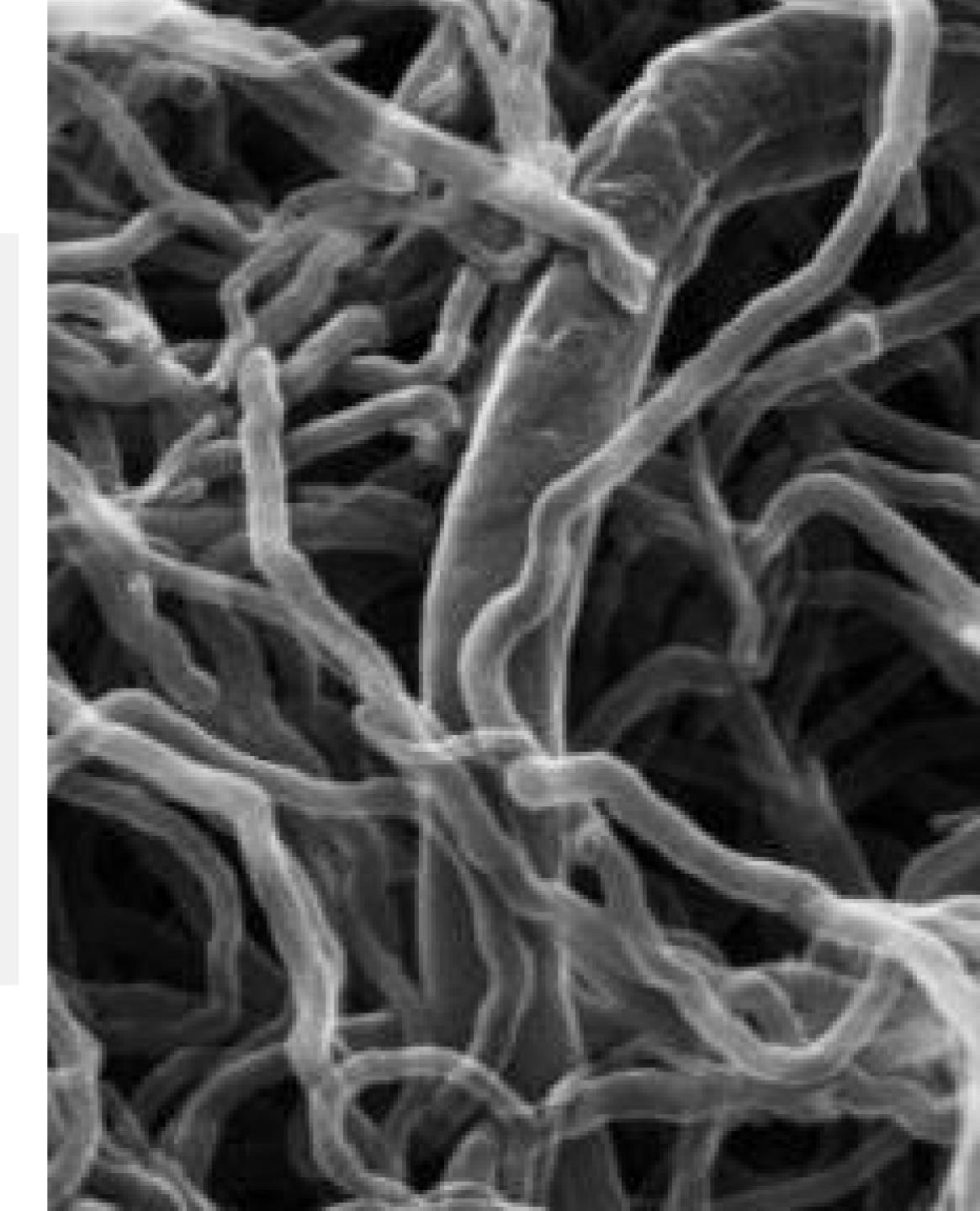
Suitable for both Pozzolanic and Portland cements





# **Barriers to Entry - EdenCrete®**

- 10 years of product development
- Product field testing by Government departments after initial approval typically requires 12 months, including lab tests
- Typical sales cycle for EdenCrete® is 6-9 months, after successful field testing by the relevant DOT
- 100% ownership of the Pyrolysis Project (CNT production)
  Patents granted for Pyrolysis Project
- Patent applications pending for EdenCrete<sup>®</sup>, EdenCrete<sup>®</sup> Pz and EdenPlast<sup>™</sup>





### **OptiBlend**®

### 100% owned, world leading dual fuel system

OptiBlend® is a custom fitted hardware technology designed and produced by Eden that allows conventional diesel engines to run on natural gas as its primary fuel without modifying the engine or the diesel fuel system.

- Works by displacing up to 70% of diesel fuel with natural gas
- Lower fuel costs, lower emissions and increased runtime
- Highly efficient, cost effective system that reduces fuel cost and emissions
- Used by Cummins on its oil/gas drilling power module using 3 Tier II gensets
- Suitable for most makes of diesel engines
- Marketed in USA and India for over 8 years highly reliable and durable, long proven in the market place
- Over 200 systems sold and installed over the past 10 years across USA and India and in a number of Middle East and East Asian countries
- Huge potential market emerging in India and in particular in Delhi where extreme air pollution has resulted in a government ban on use of gensets running solely on diesel fuel



Optiblend® Fuel Control Valve (left) and Air-Gas Mixer (right)





### **EdenPlast®**

### Eden exploring commercialisation of EdenPlast™

### **CNT** enriched plastics

- Patented, cost effective process
- Uses CNT produced by Eden

### **Highly encouraging results:**

- < 50% increase in stiffness</p>
- Increase in electrical conductivity

#### **Current target markets:**

- Automotive, aerospace, packaging
- Batteries cathodes
- Non-corroding reinforcing material

# Proven in-house capability

Development, testing and commercialisation

- EdenCrete®
- EdenCrete<sup>®</sup> Pz
- OptiBlend<sup>®</sup>
- Hythane<sup>®</sup>





# **EdenCrete® - Applications & Customers**

### **ADVANTAGE**

### **SUITABLE FOR**

Permeability / salt resistance / shrinkage

 Roads, airfields, coastal, marine and ports, dams, sewers, bridges, runways, sewer/water pipelines





### **CUSTOMERS**

Government Department of Transport authorities - ~40% of US concrete market



 Hard-stand areas, warehouse floors, roads, bridges, pavements





Pre-cast concrete
manufacturers - ~30% of
US concrete market



 Beams and slabs, roads and bridges, precast & pre-fabricated products, high rise buildings, retaining walls





Ready-mix suppliers - ~30%
 of US concrete market



• Underground mines, tunnels, retaining walls, earth stabilisation

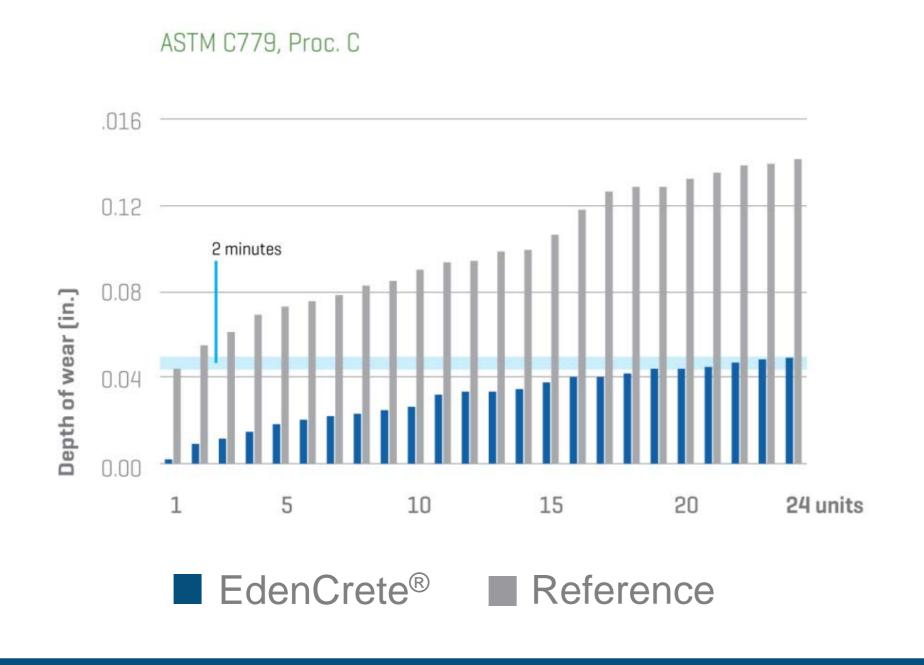


Shotcrete operators



# EdenCrete® - Outstanding Product Benefits

### **ABRASION RESISTANCE**



Dramatic increase in abrasion resistance

### REDUCED PERMEABILITY

Chloride Content (Wt.%)				
Depth (mm)	Control Mix – Not Ponded	Control Mix – Ponded	Penetrated Chloride Values	
10-20	0.004	0.059	0.055	
25-35	0.006	0.045	0.039	
40-50	0.004	0.005	0.001	
55-65	0.003	0.004	0.001	
Depth (mm)  Test Mix – Not Ponded		Test Mix – Ponded	Penetrated Chloride Values	
10-20	0.006	0.012	0.006	
25-35 0.004		0.005	0.001	
40-50	0.004	0.004	0.000	
55-65	0.003	0.003	0.000	

**MARTA Test Results** 

Dramatic reduction in permeability



# **EdenCrete® - Value Proposition**

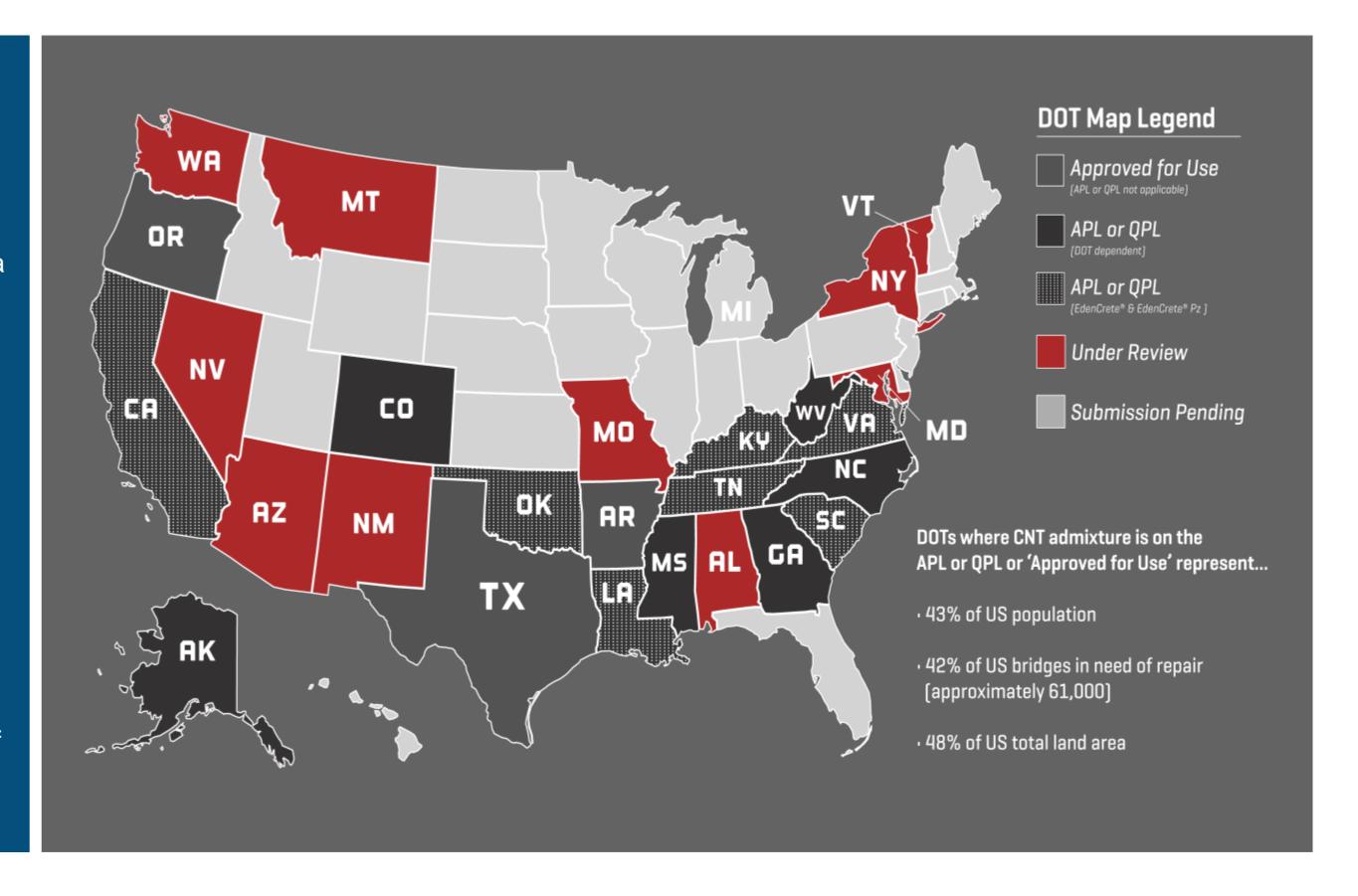
- Cost advantages resulting from price and reduced concrete volumes, plus faster setting times
- Combines multiple product advantages
- Liquid suspension, easy controlled mixing
- Environmental impact from reduced concrete consumption

Products	Increases Compressive Strength	Increases Split- Tensile Strength	Increases Flexural Strength		Reduces Permeability	Increases Abrasion Resistance	Drawback
EdenCrete							
Fibers (PP,PVA,ACRY,LOK)		•	•	•			Reduced workability, difficult to handle
Shrinkage Reducers				•			Strength reduction, expensive, reduces workability, impacts entrained air
Steel Reinforcement			•	•			Expensive, corrosion potential, weight factor, job-site safety
Surface Hardener					•	•	Potential alkali-silica reaction
Silica Fume, Fly Ash	•				•	•	Expensive, increased water, hard to handle, worker/workplace safety
Steel Fibres	•						Reduced workability, difficult to handle, jobsite safety



### **US Government Validation and Commercialisation**

- Government approval for use of EdenCrete® by DOTs in 15 US States, representing 43% of the US population, 42% (61,000) of all US bridges in need of repair.\* EdenCrete®Pz presently approved in 5 states.
- Georgia Department of Transport (GDOT) mandated use of EdenCrete® in all State funded full depth slab repair projects in Jan 2017. Now approved in new mainline paving and about to be trialled in bridges. DOT bridge trial underway of North Carolina and road trial in Idaho.
- Federal Highway Administration (FHWA) approval for use of EdenCrete® in federally funded, repair projects in Georgia in September 2017. First FHWA project (2018)(US\$605,000). Second Federal project (approx US\$250,000) currently underway.
- EdenCrete® approved and used by Texas DOT-approved pre-stressed bridge beam manufacturer for 15 months. New mix designs recently developed and application for TXDOT approval to be made in near future.
- Colorado DOT has approved or is trialling EdenCrete for use in a number of applications including shotcrete, abrasion resistance, resistance to salt and road chemicals, and road construction. Major highway trial scheduled for 2020.
- MARTA Whitepaper endorses use of EdenCrete® and confirms increased durability of concrete and long term cost savings when EdenCrete® used and is hope will start commercial use of EdenCrete® in 2020 as part of a railway stations upgrade project.



<sup>\*</sup> DOT Fact Sheets Highlight Grim State of US Roads and Bridges – 9 July 2015









# EdenCrete® Project

### ABRASION RESISTANCE / ULTRA HIGH WEAR APPLICATION



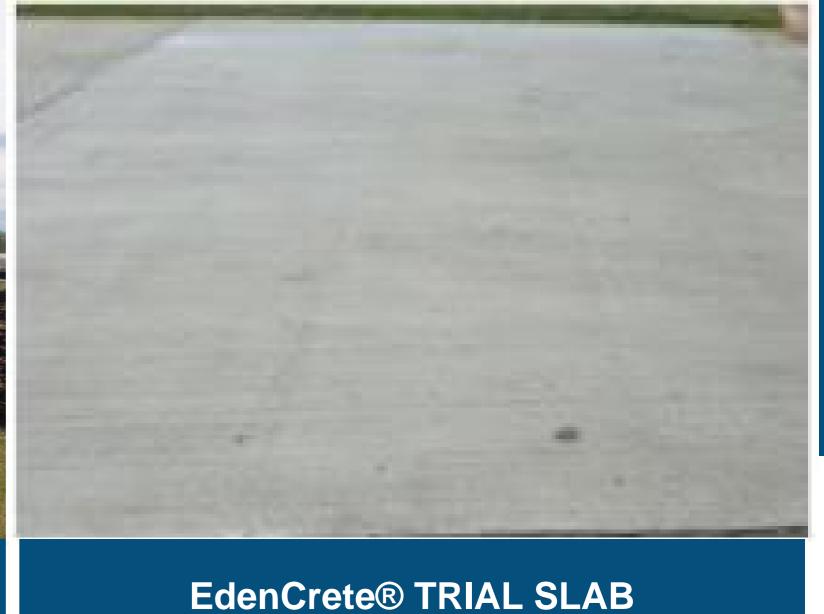
**CONTROL TRIAL SLAB** 

Significant cracks and wear after 6 months



**TYPICAL ULTRA HIGH LOAD** 

High loading/ abrasive application at site – repeat contracts



No cracks or evidence of wear



# **EdenCrete® - Cost Comparison**

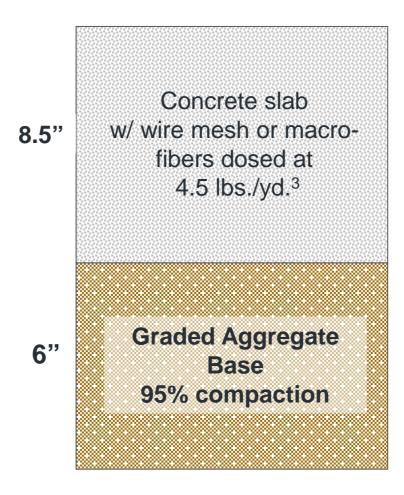
Ultra High Wear / Abrasion Resistance Application

Longer wearing concrete required less depth, without base and compacted layers.

This project delivered significant cost advantages to the customer.

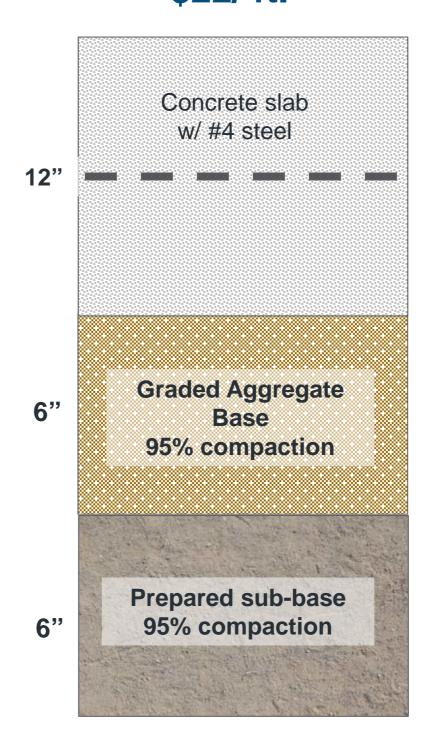
This project has resulted in an increasing number of similar contracts

Concrete slab with wire mesh or macro-fibers ~ \$15/ ft.<sup>2</sup>



# Concrete slab with steel

~ \$22/ ft.<sup>2</sup>



# **Concrete slab** with EdenCrete®

~ \$12/ ft.<sup>2</sup>

6" Concrete slab w/ EdenCrete®



## MARTA - Metropolitan Atlanta Rapid Transit Authority

- Eden conducted a two years' field trial of EdenCrete® with MARTA at the Brady Mobility Centre in Atlanta that concluded in mid 2018.
- Laboratory trials were carried out on a range of performance characteristics of the concrete and these are shown below.
- Following the completion of the two years' trial a joint Whitepaper was prepared by MARTA and Eden.
- MARTA is planning to upgrade a number of its railway stations which is likely commence in 2020 and in which Eden is hopeful that EdenCrete® will be included in the concrete that will be used.

### **Permeability Results**

Chloride Content (Wt. %)					
Depth (mm)	Control Mix - Not Ponded	Control Mix - Ponded	Penetrated Chloride Values		
10 - 20	0.004	0.059	0.055		
25 - 35	0.006	0.045	0.039		
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### Other Laboratory Results

- Compressive Strength Increase 38%
- Split Tensile Strength Increase 59%
- Modulus of Elasticity Increase 24%
- Abrasion Resistance Increase 47%
- Shrinkage Reduction 9%



# EdenCrete® Projects - Warehouses and Industrial Flooring

- Significant performance benefits to concrete shown to be delivered by EdenCrete® include:
  - Abrasion resistance
  - Reduced permeability
  - Increased flexural and compressive strength
  - Resistance to chemical and salt attack
  - Resistance to freeze / thaw damage
  - Reduced shrinkage
- These performance benefits form the base of Eden's sales drive into the warehouse and industrial flooring and hard-stand area markets, that has resulted in significant emerging interest from contractors and plant owners.
- Eden received its first contract for a storage area for a Bridgestone tyre plant, and following that two further projects for similar uses are now being discussed.
- This is a significant market in the US where a large amount of industrial storage space is being built around the country.



## **Commercialisation Progress**

### **EdenCrete**®

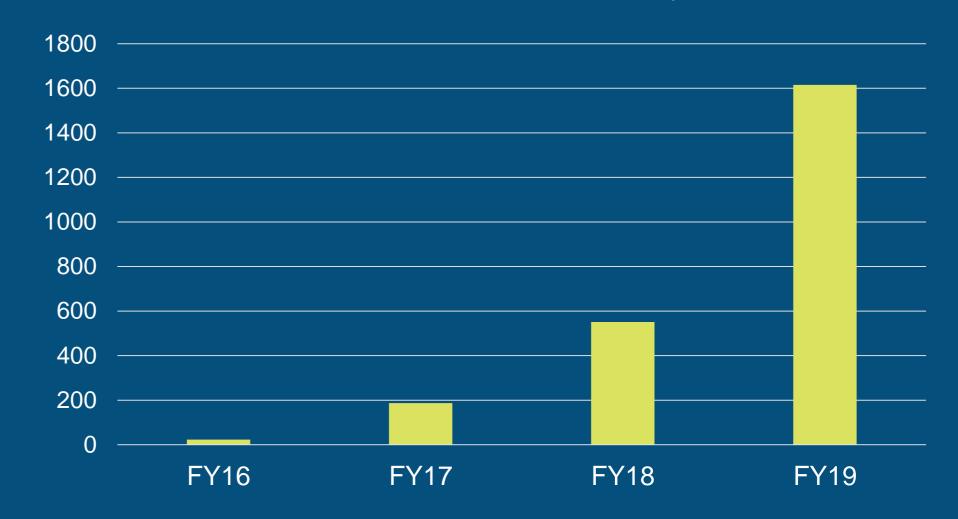
- Increasing number of bulk distribution contracts in USA
- Increasing repeat business customers in USA government and private
- Significant emerging potential in international markets Europe, India, Korea and Australia
- Significant revenue growth projected FY 2020

### **OptiBlend®**

- Customised one-off contracts
- Typically installation plus unit purchase US \$23k-40k (AU \$30k-50k)
- Significant growth potential, particularly in India

# eden Innovations that work."

#### EDENCRETE REVENUE AUD\$



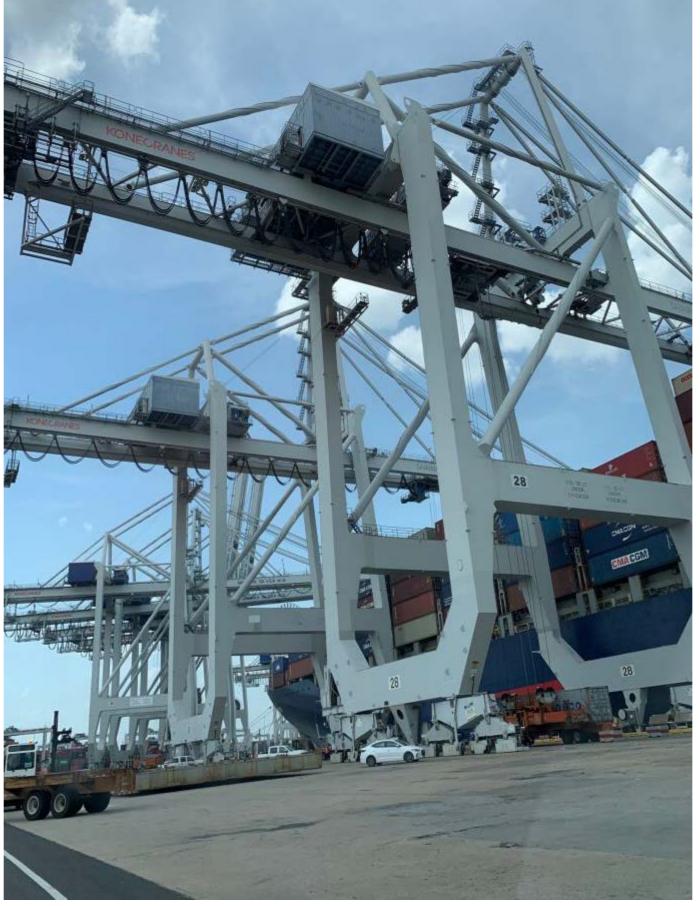
#### OPTIBLEND REVENUE AUD\$



# Infrastructure Target Markets

- Roads, Bridges, Tunnels
- Ports and marine applications
- Airports
- Railways
- Dams and water systems
- Bus transit stations / light rail
- Toll Roads
- Public / Private Partnerships











# **Commercial Target Markets**

- Hardstand areas
- Factories
- Showrooms
- Warehouses / logistics hubs
- Driveways / car parks
- Precast
- Building / construction











# **Current sales pipeline**

### **GEORGIA**

GDOT - EdenCrete® specified in repair projects

Approved for new mainline paving; to be trialled in bridges

### FHWA Federally funded projects using EdenCrete®

1st FHWA project completed – US\$0.6m of EdenCrete; 2<sup>nd</sup> project underway- estimated approx US\$0.25m of EdenCrete

### Corporate, privately funded projects

- First order for Bridgestone warehouse project completed
- Further warehouses and hardstand projects being planned

### **Georgia Ports Authority**

Trial at Port of Savannah planned for early 2020

### Ready mix companies

• EdenCrete® enhanced ready-mix concrete mixes being used in various applications including construction and warehouses

### **COLORADO**

### **Colorado Department of Transport (CDOT)**

- Major trials underway and/or scheduled salt/chemicals, abrasion resistance, freeze thaw
- Tunnels EdenCrete® used in first shotcrete project 2019

### **COLORADO**

Commercial sales - driveways, shotcrete applications, warehouses

6 ready mix companies, 10 contractors and 13 shotcrete operators are using EdenCrete® on a regular basis and sales are growing

### **NEW YORK**

 First ready mix operator – starts selling standard EdenCrete® Pz concrete mix in New York City

### **OTHER US STATES**

 Trials and/or initial moves towards opening up regular commercial sales underway or being discussed in various US states including Texas, Ohio, Utah, Kentucky, Oklahoma, Wisconsin, Illinois and Tennessee

### INDIA, EUROPE, KOREA and AUSTRALIA

- Indian, Korean and European trials underway with large groups involved in construction, infrastructure, ready mix and precast initial commercial sales anticipated to commence in 2020
- Parchem in Australia preparing to launch EdenCrete® after delays with importation approvals – encouraging initial commercial interest



### Outlook

### Strong year on year revenue growth expected for FY20 and beyond driven mainly by EdenCrete® sales based on:

- Georgia ongoing DOT projects / growing number and range of commercial projects and customers
- contracts from MARTA anticipated and many trials planned including at Port of Savannah and GDOT bridge trial
- Colorado Colorado commercial and CDOT sales increasing and many trials underway / planned including major CDOT I-70 trial.
  - increasing number of ready mix suppliers, shotcrete operators and contractors using EdenCrete® on a regular basis
- New York City commercial sales commenced and trials increasing and prospects for further New York City ready mix operators
- US DOT Expansion DOT trials in North Carolina (bridge) and Idaho (road) underway and a number in other states are under discussion
- US Commercial Expansion the number of trials and discussions for possible commercial projects in various US states is growing
- Warehouse and Industrial Flooring Projects significant emerging interest from major companies/ encouraging performance and test
  results
- International Markets EdenCrete® Strong interest anticipated in Europe, India, Korea and Australia arising from current testing programmes
  - OptiBlend® Strong interest in India with significant growth potential
- EdenPlast<sup>TM</sup> Widespread interest anticipated as plastics project moves to commercialisation





# Financials

Year Ended June 2019

### **SUMMARY**

	A\$,000 FY19	A\$,000 FY18	% change
Revenue	2,335	1,318	77% up
Other comprehensive income / (loss)*	622	419	48% up
Total comprehensive income / (loss) attributable to members of the parent company	(8,594)	(10,406)	17% down

### **BALANCE SHEET**

	A\$,000 30 June 2019	A\$,000 30 June 2018
Cash and cash equivalents	3,218	3,490
Total Assets	23,314	20,132
Total Liabilities	2,274	2,370
Net Assets	21,040	17,762
Total equity	21,040	17,762

### **CASH FLOW**

	A\$,000 FY19	A\$,000 FY18
Receipts from customers	2,401	1,013
Net cash used in operating activities	7,174	9,204
Cash at end of period	3,218	3,490

<sup>\*</sup> Exchange differences on translating foreign operations





### **Outlook and Summary**



Three commercialised products: EdenCrete<sup>®</sup>, EdenCrete Pz<sup>®</sup> and OptiBlend<sup>®</sup>, with strong year on year revenue growth for EdenCrete<sup>®</sup> products and OptiBlend<sup>®</sup> anticipated for FY20 and FY21



Proprietary technology and core expertise in manufacturing and production of carbon nanotube products



Core product EdenCrete® operates in global concrete market expected to reach US \$921 billion and growing at almost 8% annually



**High barriers to market entry**, with over 10 years in product development, established direct working relationships with Government departments, plus strong patent protection and proprietary technology



Significant US Government traction with product approval from 15 Departments of Transportation and further under application, plus Federal Highway Authority approval in Georgia / MARTA endorsement of EdenCrete®



Strong EdenCrete® sales growth anticipated in US, with emerging sales in Europe, India, Korea and Australia



OptiBlend® - Expansion of sales anticipated in India / EdenPlast® commercialisation anticipated to create interest



Strong news flow pipeline anticipated



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