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AUSTRALIAN SECURITIES EXCHANGE ANNOUNCEMENT

15 June 2021

EdenCrete®- Continued Market Progress in Colorado Infrastructure

Highlights

- **EdenCrete® Specified in Restoration of East Portal of Moffat Tunnel**
- **EdenCrete® trialled on I-70 in Vail Pass Paving Project Trial**

Details

Eden Innovations Ltd (ASX: EDE) is pleased to provide the following update on continued EdenCrete® sales and marketing progress in the Colorado infrastructure market.

Moffat Tunnel

EdenCrete® has been specified in shotcrete that is to be used in the restoration of the East Portal of the Moffat Tunnel, an operational tunnel that passes under the Rocky Mountains in Colorado, connecting Denver with the West Coast of the USA (see Figures 1 and 2).

The concrete of the East Portal has deteriorated badly, particularly the face of the portal, the arch, and some the interior tunnel lining. EdenCrete® has been specified in the shotcrete to improve durability and resistance to abrasion, ultimately extending the life cycle. All placards, lettering, and numerals will be removed and re-used, retaining the portal's original and traditional design.

For almost 100 years, the Moffat Tunnel has serviced Denver, providing a train route through the Rocky Mountains and continental divide to San Francisco. In addition, the original pilot tunnel continues to provide fresh water from the mountains to the City of Denver. The tunnel was first opened in 1928. The East Portal has been subjected to the rigors of a high mountain environment for many years and the East Portal Repair and Restoration Project is scheduled to begin mid-July 2021. Completion of this project will renew this historic landmark entrance for many years to come.

Connecting the eastern and western slopes of the Rocky Mountains at an elevation of 9,200 feet and 2,800 feet below the surface, the Moffat Tunnel is an important rail (and water) connection in Colorado, with the East Portal located approximately 50 miles west of Denver.

The State of Colorado and the Union Pacific Railroad have contracted with Thorcon Shotcrete and Shoring to provide the demolition and shotcrete application. Aggregate Industries will provide the shotcrete mix. EdenCrete® will be used at 1 gal/yd³. Approximately 85 yd³ of shotcrete are required for the small but important project.

Whilst only approx. US\$2,100 of EdenCrete® will be purchased, this contract represents a significant milestone, being the first such contract for use in Colorado infrastructure, following success in several extended trials in harsh Colorado conditions.



Figure 1. The East Portal of the Moffat Tunnel



Figure 2. The interior of the Moffat Tunnel photographed during an earlier repair project (not involving EdenCrete®)

I-70 - Vail Pass Paving Project Trial

Following several years of planning, design and preparation, the Colorado Department of Transportation (CDOT) recently commenced a major concrete paving trial in the Rocky Mountains on - Interstate Highway 70 ,(I-70),at Vail Pass, Eagle County, Colorado.

For this trial, CDOT collaborated with Peak Materials, the American Concrete Pavement Association (ACPA), Eden Innovations, and IHC Scott to plan and execute the trial to evaluate the performance of three different concrete mix designs in the harsh and challenging conditions experienced at approximately 10,000 feet (approx. 3050 meters) elevation.

Historically, CDOT's high-altitude designs require asphalt pavement due to its flexibility, the ease of placement and repair, as well as the cost. Their arguments against concrete pavement have been increased cost, long construction cycles, and extended lane closures creating unsafe traffic conditions. Further, the soil in the mountains is notorious for movement under load, and a more flexible material such as asphalt pavement has been assumed to perform better than concrete with regards to cracking. Typically, high mountain passes like Vail expose pavements to severe winter weather and freeze thaw cycles that require the application of harsh de-icer chemicals.

Coupled with this, semi-trailers using snow chains and passenger vehicles with studded snow tires for driving safely in icy conditions create pavement rutting, a dangerous safety hazard for the motoring public.

Relevantly, EdenCrete® in the last seven months has announced two long term, highly successful trials in similar conditions in Colorado, each of which involved the extreme use of de-icer chemicals and heavy traffic that together produce extreme chemical and abrasive wear.

The first of these trials, successfully completed in 2020, involved a 3-year long trial on several roads in Denver, undertaken with the Denver Department of Transport and Infrastructure (formerly called the Denver Public Works Department) (see [Eden's ASX announcement dated 26 November 2020](#)) and the second trial, a 15-month trial at the United Airline's maintenance hangar apron at the Denver International Airport, was completed in 2021 (see [Eden's ASX announcement dated 3 May 2021](#)).

The argument presented to support this current I-70 trial is that CDOT should use concrete pavement instead of asphalt, as the service life from placement, until repair or replacement is required, will be greatly extended, and the life-cycle costs greatly reduced. The economic benefits of the extended service life are anticipated to more than offset the increased upfront cost of concrete construction, allowing it to become a highly competitively priced alternative to asphalt. CDOT is evaluating EdenCrete® as one of the options to achieve this outcome.

This is the first evaluation by CDOT of the following three concrete mixes on I-70 near Vail:

- a control mix,
- a silica fume mix, and
- a mix dosed with EdenCrete®.

A 4500 psi (31 MPa) exterior paving mix was specified as the base design for the control. Their second mix used the same control mix but replaced 7% of the cement with silica fume. The third mix included EdenCrete® at 2 gal/yd³ (9.9 l/m³) without silica fume.

Evaluation

The field trial concrete pavement sections that have now been put in place will be evaluated over an extended time, likely to include at least two winters, for surface wear, cracking, scaling, and rutting.

Placement Details

The general contractor, IHC Scott (a merger between Interstate Highway Construction and Scott Contracting), provided the milling and paving. Peak Materials was the concrete supplier. IHC Scott placed approximately 600 yd³ (460 m³) of concrete at a thickness of 6 inches (15 cm) in the drive lane at Mile Marker 184 on eastbound I-70. Each of the three mixes were placed in approximately 200 yd³ (153 m³) increments (see Figures 3 and 4).



Figure 3. Vail Pass Trial on I-70



Figure 4. Vail Pass Trial on I-70

Future

The Vail Pass trial is a major field trial being undertaken by Colorado Department of Transportation, with the potential to open up a huge market for the use of EdenCrete® in harsh winter conditions.

High-altitude highway pavement has always been challenged by the environment. With the first concrete placement now completed on Vail Pass, successful performance by the EdenCrete® pavement will support the case for the future use of concrete pavement in both Colorado for other mountainous states.

Using concrete in place of asphalt will not only help to minimize rutting and provide ancillary benefits to public safety, it is considered highly likely to significantly extend the service life of the pavement and thus also potentially reducing the life-cycles costs of the pavement, potentially save millions of dollars for DOTs in mountainous regions of the USA and elsewhere.

SUMMARY

During past year, following its success in a number of long-term trials in Colorado, EdenCrete® has made significant progress in penetrating the Colorado infrastructure market, for use in applications where the concrete is subject to heavy dosages of de-icer chemicals, extreme abrasion and frequent freeze-thaw cycles. This progress is equally relevant to many other parts of the USA where infrastructure is subject to similar harsh winter or arctic conditions.

EdenCrete® Background

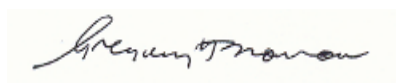
EdenCrete® products are Eden's 100% owned, proprietary carbon-strengthened concrete additives that enhance a wide range of performance characteristics of the concrete including compressive strength, flexural strength, tensile strength, abrasion resistance, reduced permeability, increased modulus of elasticity, reduced shrinkage and that collectively deliver stronger, tougher, more durable and longer lasting concrete.

EdenCrete® is generally used in concrete that incorporates a high percentage of Ordinary Portland Cement (OPC or Portland cement) whilst EdenCrete® Pz is mostly used in concrete that incorporates a high percentage of pozzolans as an alternative cementitious material (including fly-ash and blast furnace slag which are each waste by-products from coal fired power stations and metal smelting respectively, thereby each being treated, as a waste by-product, as having a zero Greenhouse Gas footprint from its production process).

As a result, EdenCrete® Pz in particular has repeatedly shown it is capable of enabling the proportion of the Portland cement in the concrete to be replaced by a percentage of pozzolans with far lower Greenhouse Gas footprints, resulting in a reduction in the Greenhouse Gas footprint generated in the production of the various cementitious components used in the manufacturing of the concrete. Both products have been repeatedly shown to be suitable for use in ready-mix concrete, pre-cast and pre-stressed concrete, shotcrete, pumped concrete and volumetric concrete.

One of the primary target markets for EdenCrete® products is improving the performance of concrete used in the construction and maintenance of concrete roads, bridges, ports, airports, and other infrastructure, particularly where it is subject to heavy wear, freeze/thaw weather conditions, heavy snow falls, and/or high levels of added salt or de-icing chemicals.

Since 2015, EdenCrete® products have been sold in the USA and more recently also in Australia and a growing number of other countries. They have successfully and repeatedly delivered a wide range of benefits when incorporated into concrete that is used in many different applications, including low-rise, medium-rise and high-rise building construction, roads and bridges, ports/marine/coastal applications, bus stations, carparks, water pipes, hardstand areas, waste transfer stations, warehouses, shotcrete applications, stadiums, and pre-stressed and pre-cast concrete products.



Gregory H. Solomon

Executive Chairman

This announcement was authorised by the above signatory.

For any queries regarding this announcement please contact him on +618 9282 5889.