CONCRETE CANVAS®

Concrete on a Roll

INTRODUCTORY PRESENTATION

VERSION 20.06.10 CIVIL

MADE IN WALES

INTRODUCTION

CONCRETE CANVAS®
Concrete on a Roll

PHILL GREER

UK & NA BUSINESS DEVELOPMENT MANAGER

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PRESENTER

CONCRETE CANVAS®
Concrete on a Roll

WHAT IS CONCRETE CANVAS ® (CC)?

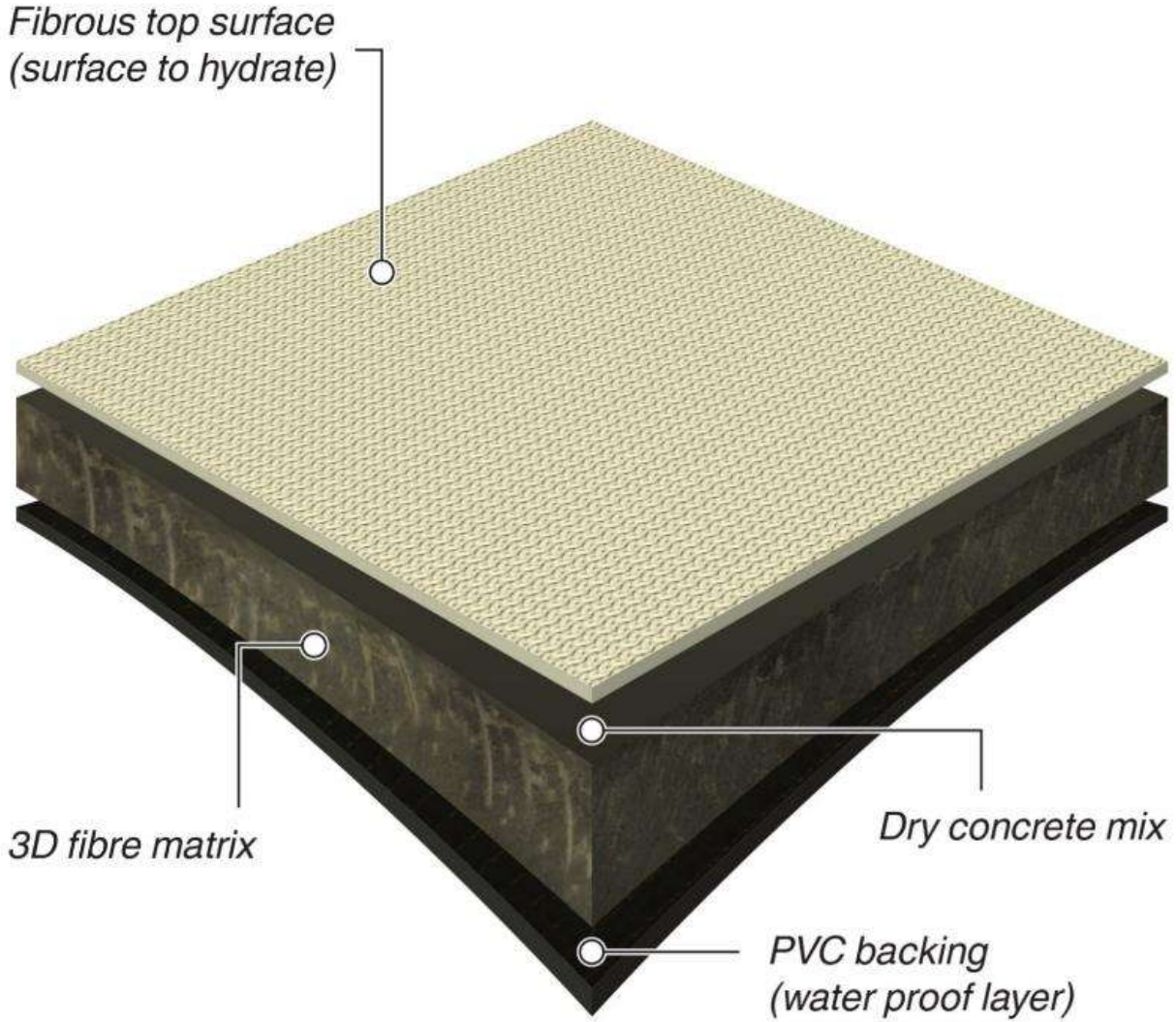
CONCRETE CANVAS®
Concrete on a Roll

CONCRETE CANVAS® (CC)

A flexible concrete filled geosynthetic that hardens when hydrated to form a thin, durable waterproof concrete layer. Used for **erosion control** applications.

CC consists of:

- Fibrous hydrophilic top surface
- Reinforcing fibre matrix
- Dry concrete mix
- Water impermeable PVC rear surface



CC Brochure

CONCRETE CANVAS® (CC) AND CC HYDRO™ (CCH) MATERIAL INTRODUCTION

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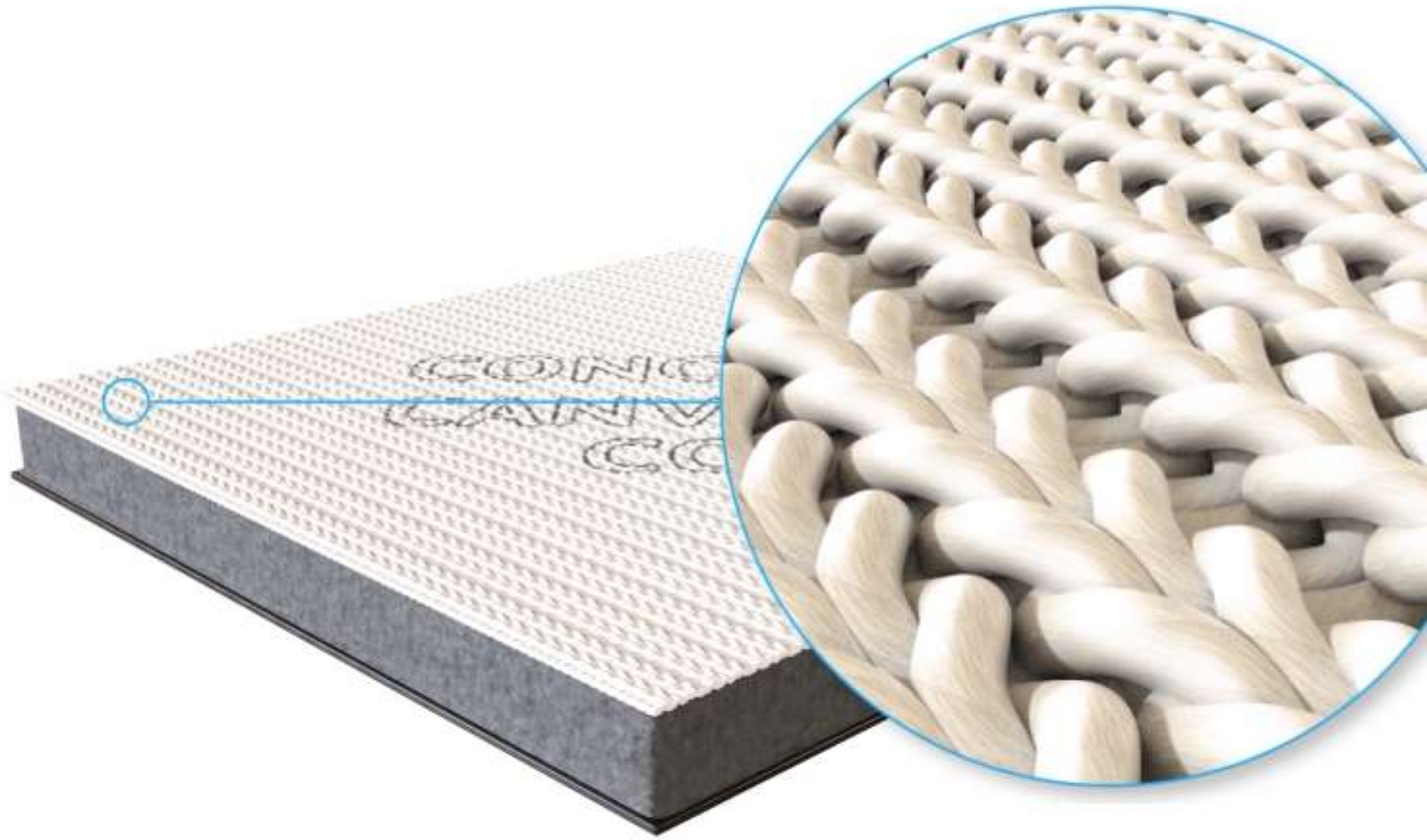

CC Brochure

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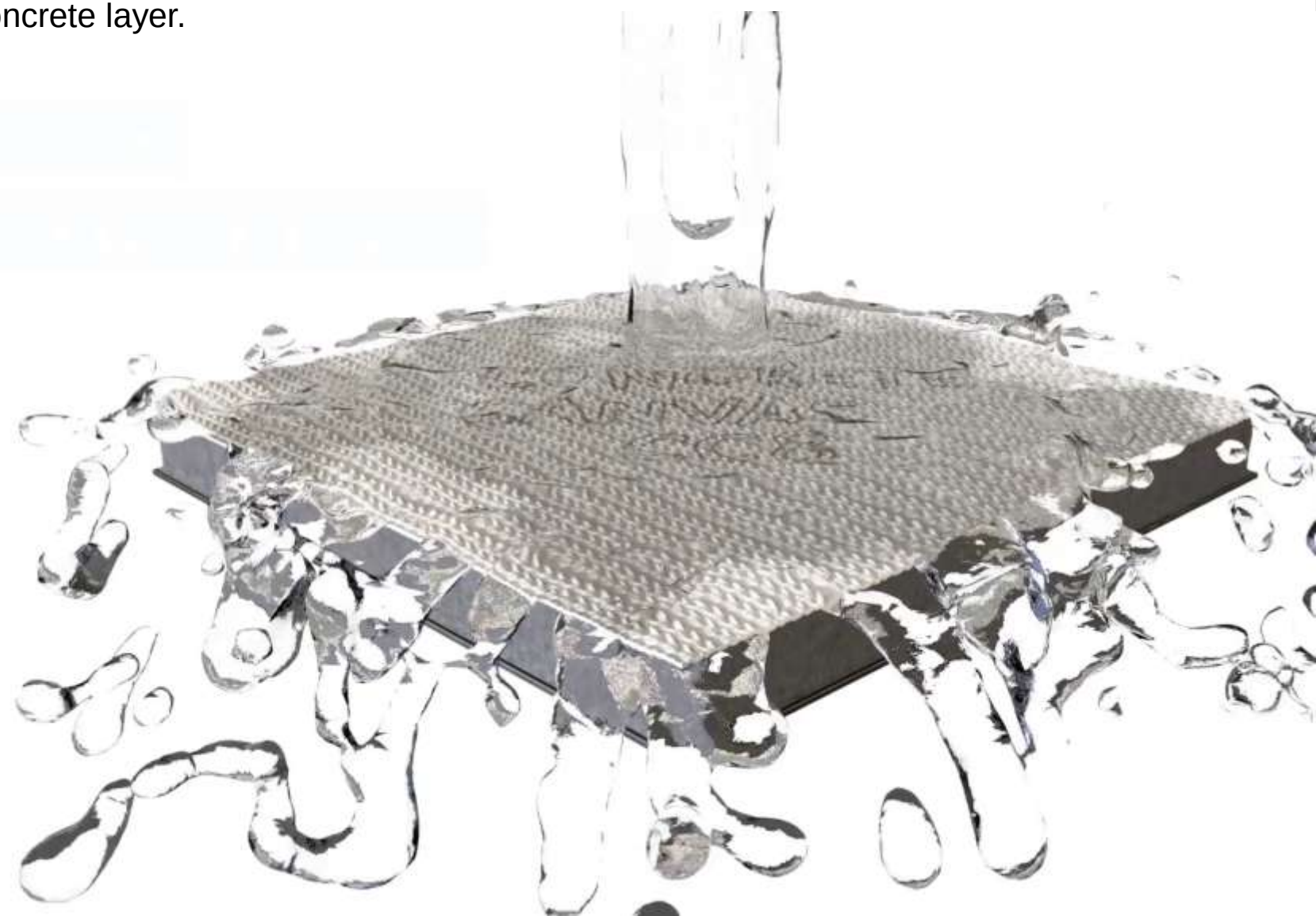

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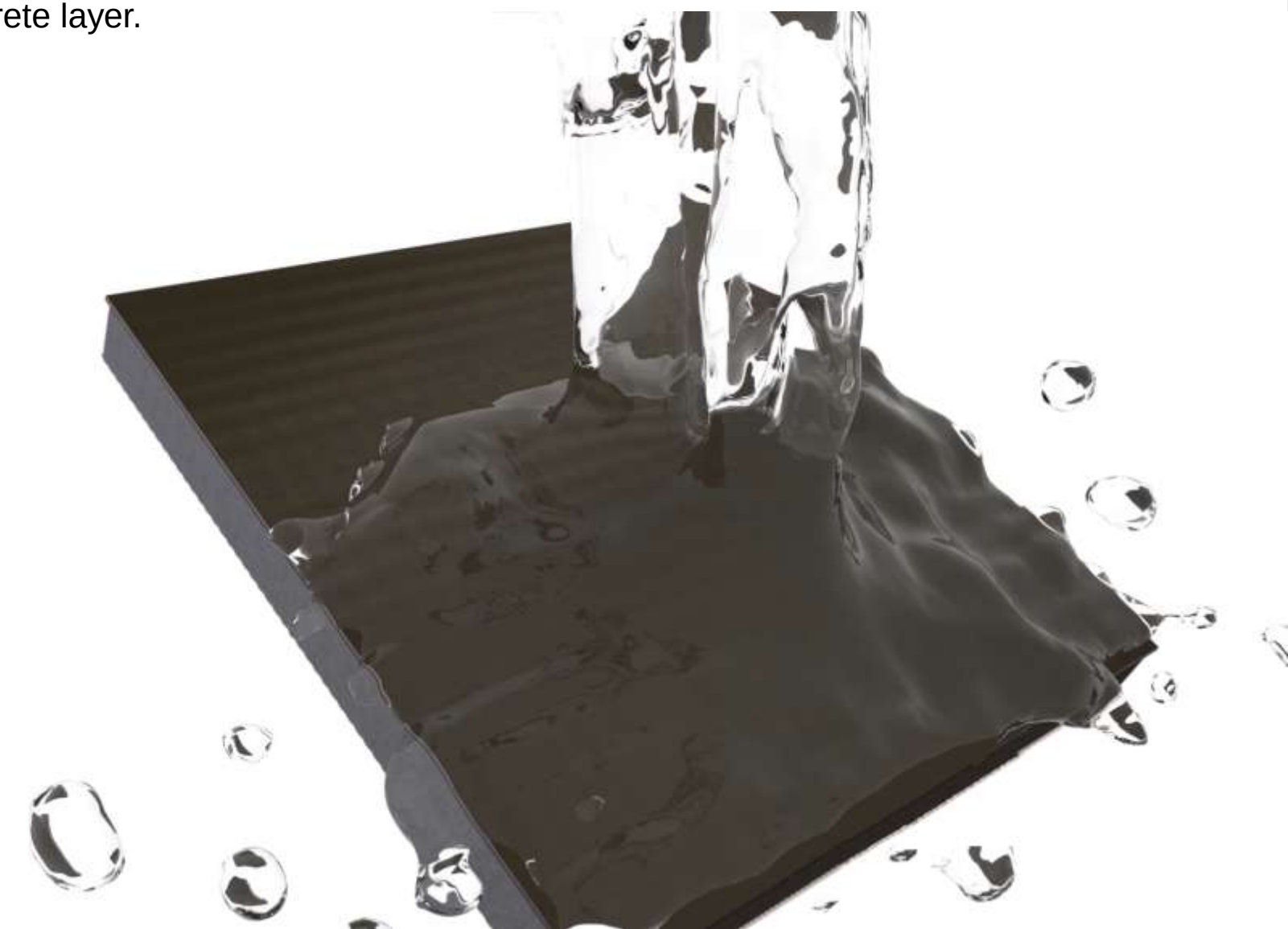


CC Brochure

COMPANY TIMELINE

2005

INCORPORATION OF CONCRETE CANVAS LTD

The company was officially incorporated in September 2005 with the aim of commercialising the inflatable concrete shelter concept.

2004 **2005** 2007 2009 2014 2015 2018 >2021

CONCRETE CANVAS®
Concrete on a Roll

COMPANY TIMELINE

2007

COMPANY RELOCATION TO SOUTH WALES

In 2007 the company relocated from its original development site in Northampton to Pontypridd in South Wales.

COMPANY TIMELINE

2009

VOLUME PRODUCTION STARTS OF CONCRETE CANVAS MATERIAL

Following the development and commissioning of bespoke production machinery, commercial volume production of Concrete Canvas® began in 2009.

This coincided with the switch of focus from the shelter product to the Concrete Canvas® material as an erosion control product.

CONCRETE CANVAS®
Concrete on a Roll

COMPANY TIMELINE

2014

FAST TRACK 100 AWARD

Concrete Canvas Ltd were named the second fastest growing manufacturer in the UK in the Sunday Times Fast Track 100 List.

2014 also marked the production of the 1’000’000th square metre of Concrete Canvas®.

2004 2005 2007 2009 **2014** 2015 2018 >2021

CONCRETE CANVAS®
Concrete on a Roll

COMPANY TIMELINE

2018

PURCHASE OF NEW HEADQUARTERS SITE

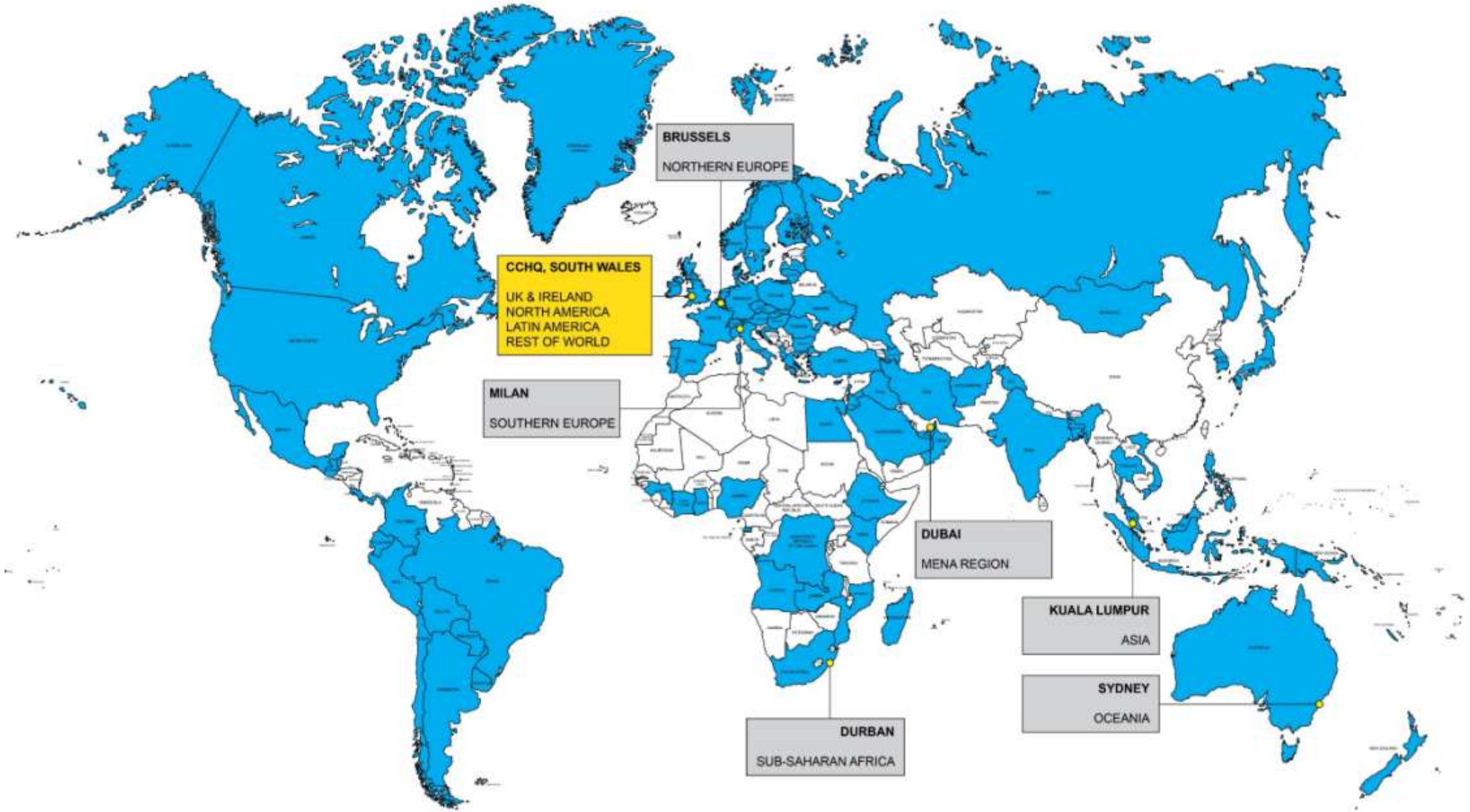
In 2018, Concrete Canvas Ltd secured its future operational needs with the purchase of a new 86’000sqft site in South Wales.

The relocation will allow the company to quadruple it’s manufacturing capacity as well as providing a suite of state-of-the-art laboratories to support our extensive research and development programme.

2004 2005 2007 2009 2014 2015 2018 >2021

CONCRETE CANVAS®
Concrete on a Roll

CC GLOBAL ACTIVITY MAP



INTERACTIVE PROJECT MAP

CONCRETE CANVAS
Concrete on a Roll

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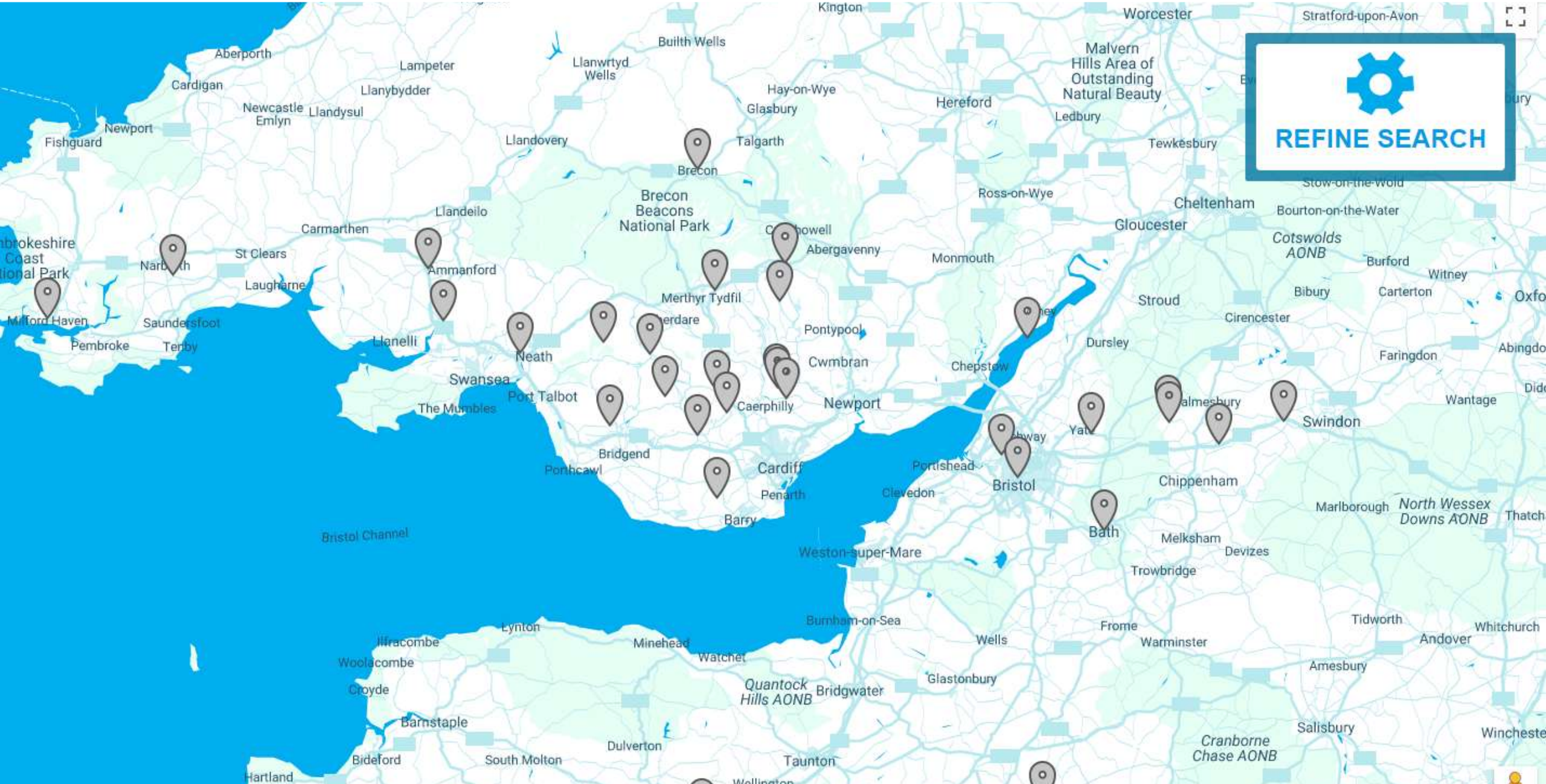

SECTORS

KEY BENEFITS

Speed of install reduces line possession and H&S risk.

CC's design life and robustness meet critical national rail standards.

RAIL

Cold Blow, West Wales

CONCRETE CANVAS
Concrete on a Roll

SECTORS

KEY BENEFITS

Speed of install reduces lane possession and H&S risk.

CC’s design life and robustness meet critical Highways standards.

ROAD

A460, Merthyr Tydfil

CONCRETE CANVAS
Concrete on a Roll

SECTORS

KEY BENEFITS

CC and CC Hydro™ offer excellent hydrocarbon resistance.

Speed of install allow for reduced permit requirements.

Installation methods are conducive to working in the tight confines of sensitive infrastructure.

PETROCHEM

SEM Logistics, Milford Haven

CONCRETE CANVAS
Concrete on a Roll

SECTORS

KEY BENEFITS

CC doesn't require specialist contractors allowing local authorities to use their own maintenance teams.

CC allows for the cost effective reinstatement of existing assets rather than costly new builds.

PUBLIC WORKS

RCTCBC Gilfach Goch, Residential Estate

CONCRETE CANVAS
Concrete on a Roll

SECTORS

KEY BENEFITS

Remediate existing assets rather than costly new build.

Allows swift operational return of assets.

UTILITIES

Bedwas Colliery, South Wales

CONCRETE CANVAS
Concrete on a Roll

SECTORS

KEY BENEFITS

High chemical resistance for conveyance of contaminated waters.

Low logistical footprint for remote areas.

MINING

Bedwas Colliery, CCBC

CONCRETE CANVAS
Concrete on a Roll

UK EXAMPLE CLIENTS

UK EXAMPLE CONSULTANTS AND CONTRACTORS

CONCRETE CANVAS
Concrete on a Roll

WHAT SERVICES DO WE PROVIDE?

PRE-DESIGN STAGE
- UK regional and international support
- Certified CPD presentations
- Project meetings
- Site visits
- Proof of principle trials

DESIGN STAGE
- Standard detail CAD portfolio
- Project specific GA drawings
- Non-indemnified design advice
- Hydraulic guidance / Wind uplift calculator
- BOQ and ancillary calculations
- Test certificates
- Drop-In-Specifications

INSTALLATION STAGE
- Toolbox talks
- Installation guides
- Installation equipment supply

AFTER CARE
- Case study
- Maintenance advice
- Repair advice

CONCRETE CANVAS ®

CONCRETE CANVAS
Concrete on a Roll

CC IS AVAILABLE IN THREE DELIVERY FORMATS

CC Bulk Rolls
Up to 200sqm of concrete on a single pallet

CC Batched Rolls
Man portable batched rolls of 5 or 10sqm
CC5 and CC8 only

CC Wide Rolls
Available in 2.2m and 3.3m widths

CC FORMAT SPECIFICATION

Cloudhill Quarry, UK.

BULK ROLLS

- Suitable for major works
- Material efficient (zero waste)
- Cost efficient
- Transport efficient
- Staggered production and delivery for specific projects

BATCHED ROLLS

- Suitable for minor works
- Use on restricted access sites
- Do not require plant equipment
- Ideal for stocking for reactive works
- Man portable

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CC FORMAT SPECIFICATION

WIDE ROLLS

- Suitable for major works
- Increased installation rates
- Reduced jointing
- Reduced ancillary requirement
- Ideal for straight uniform channels of constant profile

STORAGE

- All three formats are supplied palletised and in shrink wrapped plastic packaging
- CC has a shelf life of 2 years when stored correctly
- Rolls should be stored under cover in dry conditions away from direct sunlight and in the manufacturer’s sealed packaging

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CC PHYSICAL PROPERTIES


Natural Resources Wales, Pontardullais

Product	Nominal Thickness (mm)	Batched Roll Size (m^2)	Bulk Roll Size (m^2)	Roll Width (m)
CC5™	5	10	200	1.0
CC8™	8	5	125	1.1
CC13™	13	N/A	80	1.1

CC THICKNESS SPECIFICATION

CC5™

- Reinstating existing concrete assets
- Un-trafficked bunds and slopes for weathering protection
- Un-trafficked weed suppression

CC8™

- Soil substrate
- Episodic pedestrian trafficking

CC13™

- Flow rates greater than 8.6m/s
- Projects where CC is likely to bear repeated loading (i.e. regular pedestrian trafficking)
- Applications where an increased mass is advantageous (i.e. negative buoyancy)
- Applications requiring impact protection

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PRE-SET CONCRETE CANVAS PROPERTIES

	Test Method	Unit	Typical Values		
			CC5™	CC8™	CC13™
Physical Properties					
Thickness	BS EN 1849-2	mm	5	8	13
Batched Roll Sizes		m	1.0 x 10	1.1 x 4.55	N/A
Area of CC per Batched Roll		m^2	10	5	N/A
Bulk Roll Sizes		m^2	1.0 x 200	1.1 x 114	1.1 x 73
Area of CC per Bulk Roll		m^2	200	125	80
Mass per Unit Area	BS EN 1849-2	kg/m^2	7	12	19
Density	BS EN 1849-2	kg/m^3	1430 - 1540		
Density Increase on Curing		% increase	30 - 35		
Other Properties					
Peel Strength (strength of internal linking fibres)	BS EN ISO 13426-2	kN/m	4.0	4.5	5.0
Embodied CO2 *(cradle to gate for CC8TM vs poured concrete)*	ISO 14040	% Saving	45		
Working Time from Hydration *(refer to the CC Hydration Guide)*		Hours	1 to 2		

POST-SET CONCRETE CANVAS PROPERTIES

(Hydrated by full immersion in accordance with ASTM D8030. Water:GCCM ratio of 0.33)

	Test Method	Unit	Typical Values		
			CC5™	CC8™	CC13™
Mechanical Performance					
Compressive Strength of Cementitious Mix +					
- 24 Hour	BS EN 12390-3	MPa		50	
- 28 Day	BS EN 12390-3	MPa		80	
Flexural Strength at 24 Hours from Hydration					
- Initial Break (MD)	ASTM D8058	MPa		>4.0	
- Initial Break (MD)	ASTM D8058	N/m	750	1750	5000
- Final Break (MD)	ASTM D8058	MPa	>10	>6	>6
Static Puncture Resistance *(mean ultimate puncture force)*	BS EN ISO 12236	kN	2.0	4.0	4.0
Dynamic Puncture Resistance *(depth of perforation)*	BS EN ISO 13433	mm		0*	
Pyramid Puncture Resistance	BS EN ISO 14574	kN	4	7	12.5
Differential Ground Movement *(strain to PVC failure - min. 50mm per 1m width)*		%	>5	>5	>2
Coefficient of Thermal Expansion		α(mm/mk)		0.012 - 0.015	

+ Cube testing at Water:Powder ratio of 0.3 to correspond to GCCM hydration by immersion to ASTM D8030
** Probe did not make a full penetration through the product, therefore the depth of penetration is zero.*

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(Hydrated by full immersion in accordance with ASTM D8030. Water:GCCM ratio of 0.33)

	Test Method	Unit	Typical Values		
			CC5™	CC8™	CC13™
Environmental Durability (minimum 120 year expected life)					
Freeze - Thaw Resistance *(retained Initial Flexural Strength after 250 cycles)*	BS EN 12467	%	95		
Weathering Resistance *(refer to CC Age Certification)*	BS EN 12467	-	Passed		
Chemical Resistance *(refer to CC Chemical Resistance)*	BS EN 14414	-	Passed		
Root Resistance *(refer to CC Root Resistance Testing)*	DD CEN/TS 14416	-	Passed		
Reaction to Fire *(refer to CC Fire Certification)*	BS EN 13501	-	Euroclass B-s1, d0		
Hydraulic Performance					
Abrasion Resistance *(cementitious barrier depth of wear)*	ASTM C1353	mm/1000 cycles	0.2		
Manning's Roughness Coefficient	ASTM D6460	n	0.011		
Recommended Permissible Velocity *(intermediate fixings may be required - contact CC Ltd)*		m/s	N/A	<8.6	>8.6

CC CHEMICAL RESISTANCE

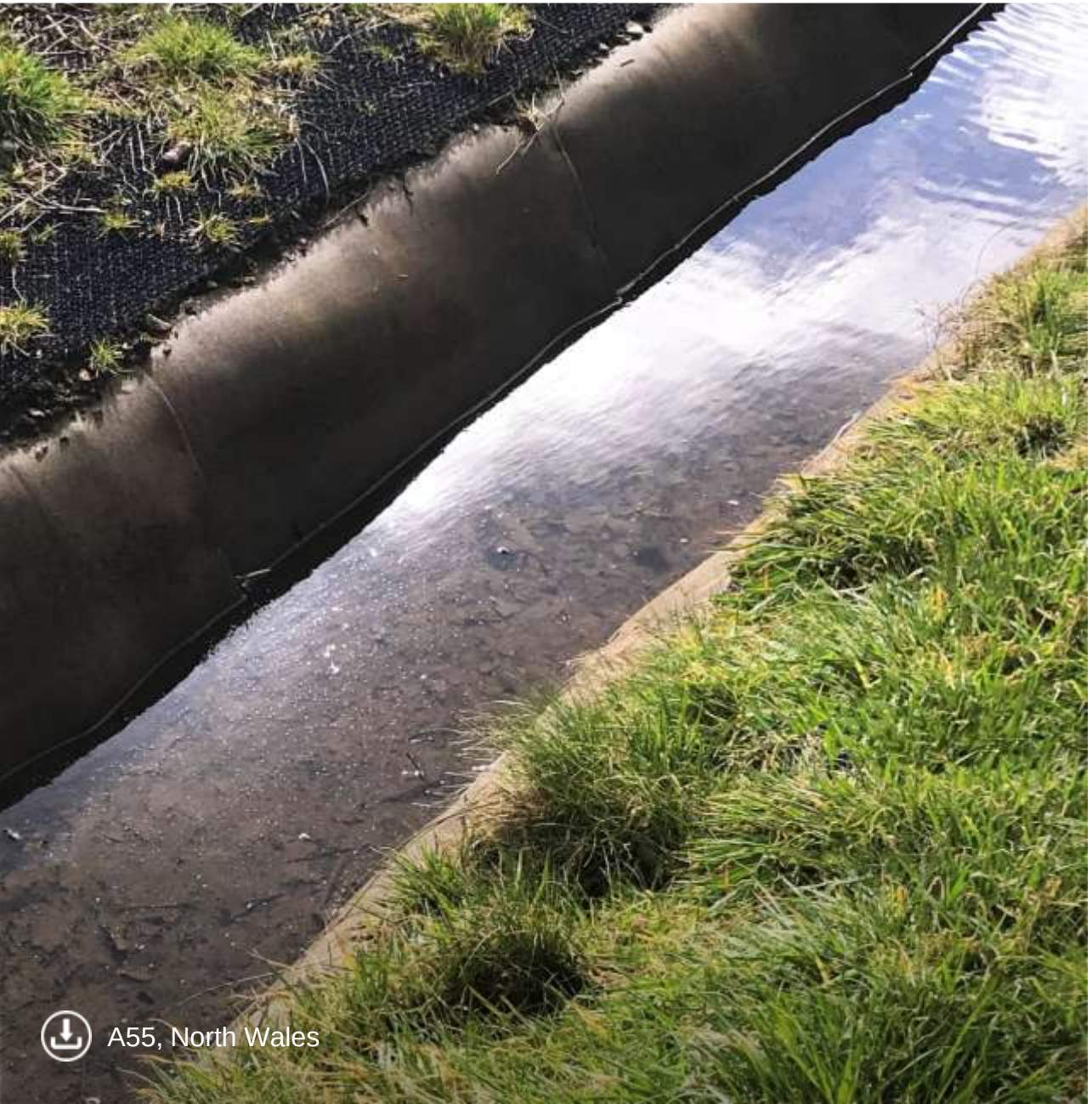
- BS EN 14414:2004 'Geosynthetics'. Screening test method for determining chemical resistance for landfill applications
- Immersion for 56 days at an elevated temperature of 50°C
- Following tests, samples subject to ASTM D8058-17 3-point bend test and flexural strength compared to control samples

		CC5™	CC8™	CC13™
Acid (pH 1.0) (0.5% Sulfuric Acid)	Mean Strength (MPa)	6.07	4.45	5.57
	Retained Strength (%)	**107%**	**115%**	**111%**
Alkaline (pH 13.0)	Mean Strength (MPa)	6.92	3.84	4.62
	Retained Strength (%)	**121%**	**99%**	**92%**
Hydrocarbon (35% diesel, 35% paraffin & 30% lubricating oil)	Mean Strength (MPa)	9.93	5.86	8.31
	Retained Strength (%)	**115%**	**99%**	**103%**

CC Chemical Resistance – BS EN 14414:2004 Report

CC Sulphate Resistance

CC CERTIFICATION



A55, North Wales

DESIGN LIFE

Concrete Canvas® is BBA certified with a durability in excess of 120 years where CC is used for erosion control. The certificate relates to channel lining, slope protection, bund lining, remediation and culvert lining.

Key factors that were assessed;

- Durability
- Climatic performance
- Structural performance

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 19/5685

CC BBA Certificate 120yr Durability 5685ps 1i1

CC ACCREDITATION

CE Mark / ISO 9001

CC is CE marked in accordance with ETA 19/0086 and

Concrete Canvas Ltd is ISO 9001:2015 certified.


CE

19

Concrete Canvas Ltd.
Unit 3 Block A02,
Seven Road,
Treforest Industrial Estate
Pontypridd
CF37 5SP

DOP 1904.01.EN
CC5, CC8, CC10.

European Assessment Document: EAD 090039-00-0301
European Technical Assessment: ETA-19/0086
Technical Assessment Body: British Board of Agrément
Notified Body: 0836

System of assessment and verification of constancy of performance of the product is 3+

Intended Uses:

The products are for use in erosion control applications and the intended uses can be outlined as:

Channel Lining,
Slope Protection,
Bund Lining,
Remediation of Concrete Structures,
Culvert Lining,
Weed Suppression.

CC CE Certification

CHANNEL LINING

SLOPE PROTECTION

BUND LINING

CONCRETE REMEDIATION

WEED SUPPRESSION

Rapid lining of earth channels, ditches, gullies, canals and spillways.

Compared to conventional concrete lining:

- Faster
- Easier
- Less expensive
- Does not require specialist contractors or equipment
- Environmentally friendlier

CC Channel Lining Installation Guide

Parc Slip Overflow channel, Bridgend

CC CORE APPLICATIONS

CHANNEL LINING

SLOPE PROTECTION

BUND LINING

CONCRETE REMEDIATION

WEED SUPPRESSION

Hard armoured facing for slopes to mitigate weathering erosion and water ingress.

Compared to shotcrete:

- Typically faster to install
- More cost effective
- Does not require specialist contractors or equipment
- Eliminates the risk associated with rebound or debris

CC Slope Protection Installation Guide

Natural Resources Wales, River Taff

CC CORE APPLICATIONS

CHANNEL LINING

SLOPE PROTECTION

BUND LINING

CONCRETE REMEDIATION

WEED SUPPRESSION

Encapsulation of typically trapezoidal earth or clay secondary containment berms.

- Provides protection against weathering erosion
- Effective weed suppression
- Protects against burrowing animals
- Reduce maintenance costs
- Provide additional level of impermeability

CC Bund Lining Installation Guide

SEM Logistics, Milford Haven

CC CORE APPLICATIONS

CHANNEL LINING

SLOPE PROTECTION

BUND LINING

CONCRETE REMEDIATION

WEED SUPPRESSION

Reinstatement of existing assets, typically repairing cracked and dilapidated pre-cast concrete sections.

Compared to injection resins, in-situ pour or slab replacement:

- Swift return of asset to operation
- Maintain internal volume of structure to preserve capacity

CC Concrete Remediation Installation Guide

CC CORE APPLICATIONS

CHANNEL LINING

SLOPE PROTECTION

BUND LINING

CONCRETE REMEDIATION

WEED SUPPRESSION

Rapidly installed, effective vegetation control typically installed along road or rail structures, under pipe tracks and across easement areas of security fencing.

Compared to geotextiles and aggregate:

- Durable
- Reduce maintenance
- Protects against burrowing animals
- Effective against invasive species

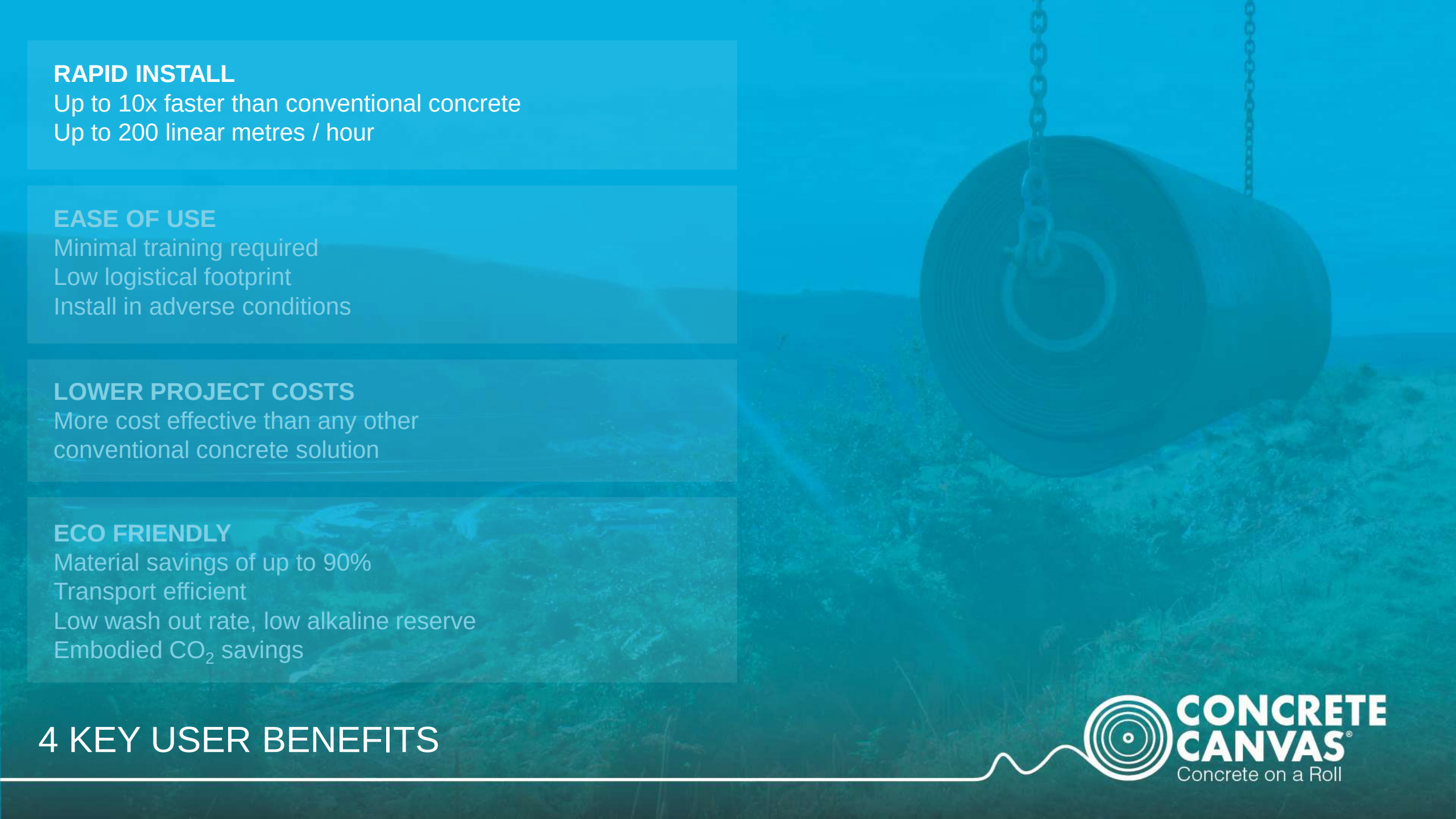
CC Weed Suppression Installation Guide

CC DEVELOPING APPLICATIONS

Network Rail, Great ham Beck Culvert Upgrade

OTHER

- Culvert Repair
- Gabion Reinforcement
- Temporary Works
- Pipe Protection
- Mining Vent / Blast Walls
- Cable Covering / Protection



RAPID INSTALL
Up to 10x faster than conventional concrete
Up to 200 linear metres / hour

EASE OF USE
Minimal training required
Low logistical footprint
Install in adverse conditions

LOWER PROJECT COSTS
More cost effective than any other conventional concrete solution

ECO FRIENDLY
Material savings of up to 90%
Transport efficient
Low wash out rate, low alkaline reserve
Embodied CO_2 savings

4 KEY USER BENEFITS

CONCRETE CANVAS®
Concrete on a Roll

VALE OF GLAMORGAN / CAPITA

CHANNEL LINING

A4226, WALES

2018

ROAD

2,250SQM CC8™ BULK

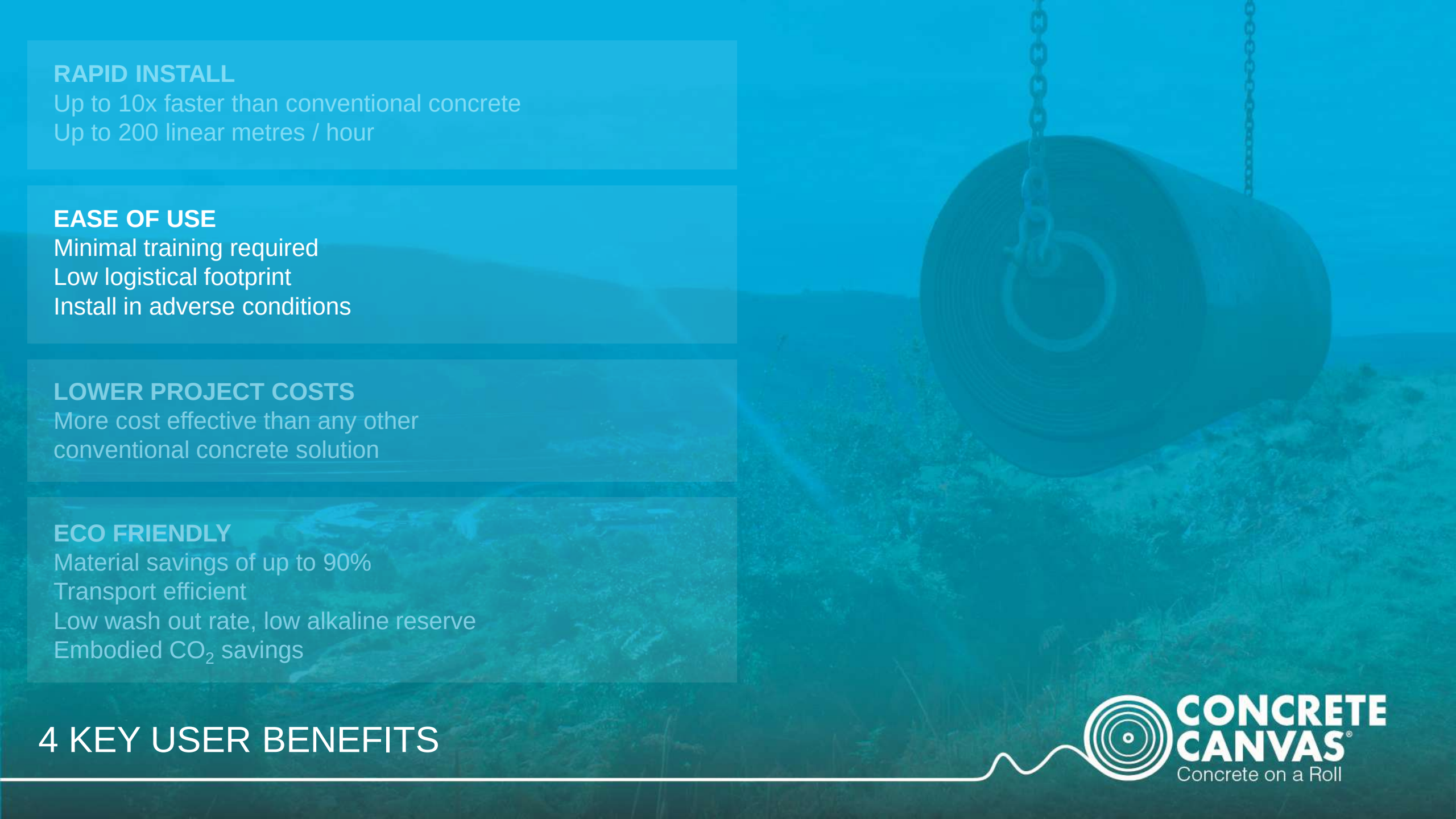
NEW ROAD BYPASS
CREST DRAINAGE

600 linear metre length channel along eastern crest of road cutting embankment.

- Enabled continued construction of road, preventing flooding
- Maintained integrity of cutting.
- Quicker to install than pre-cast concrete option
- 2250SQM installed in less than 4 days

5 Mile Lane, Channel Lining

CONCRETE CANVAS®
Concrete on a Roll



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CONCRETE CANVAS®
Concrete on a Roll

LOW LOGISTICAL FOOTPRINT

1 CC Bulk Roll provides the equivalent coverage area of two 17T ready-mix cement trucks

- Reduced vehicle movement
- Reduced transportation CO_2
- Reduced H&S implications

KEY BENEFITS

INSTALL IN ADVERSE CONDITIONS

CCBC / JD CIVILS
CHANNEL LINING
BEDWAS, WALES
2011

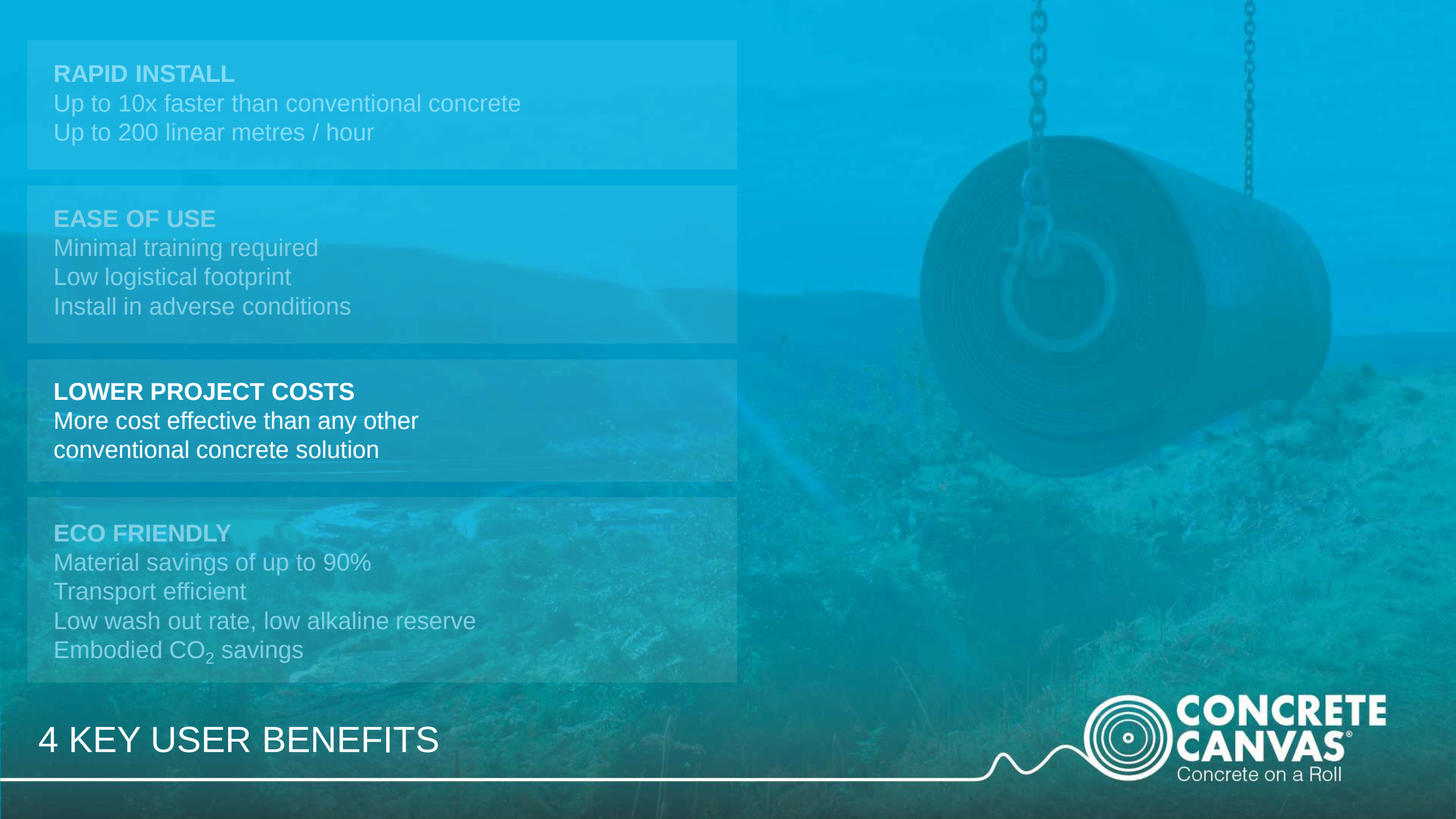
PUBLIC WORKS

Scour protection to a series of spoil tip drainage channels at a former colliery in South Wales.

- Install in wet weather conditions
- Reduce programme disruption
- 2 hour working time (UK)

Bedwas Colliery, South Wales, UK

CONCRETE CANVAS®
Concrete on a Roll



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Concrete on a Roll

KEY BENEFITS

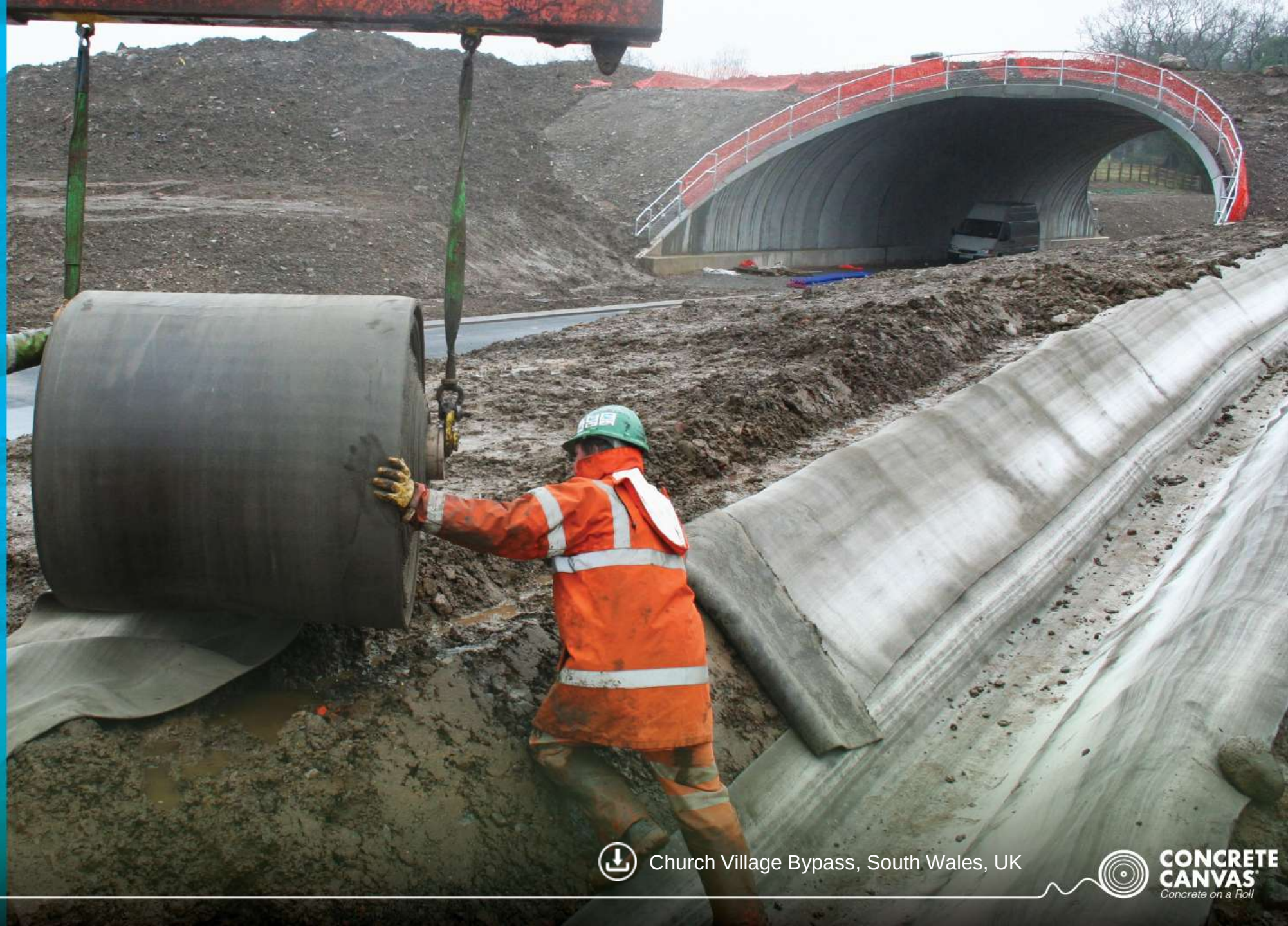
LOWER PROJECT COSTS

COSTAIN / WELSH GOV.
CHANNEL LINING
CHURCH VILLAGE,
SOUTH WALES
2010

ROAD

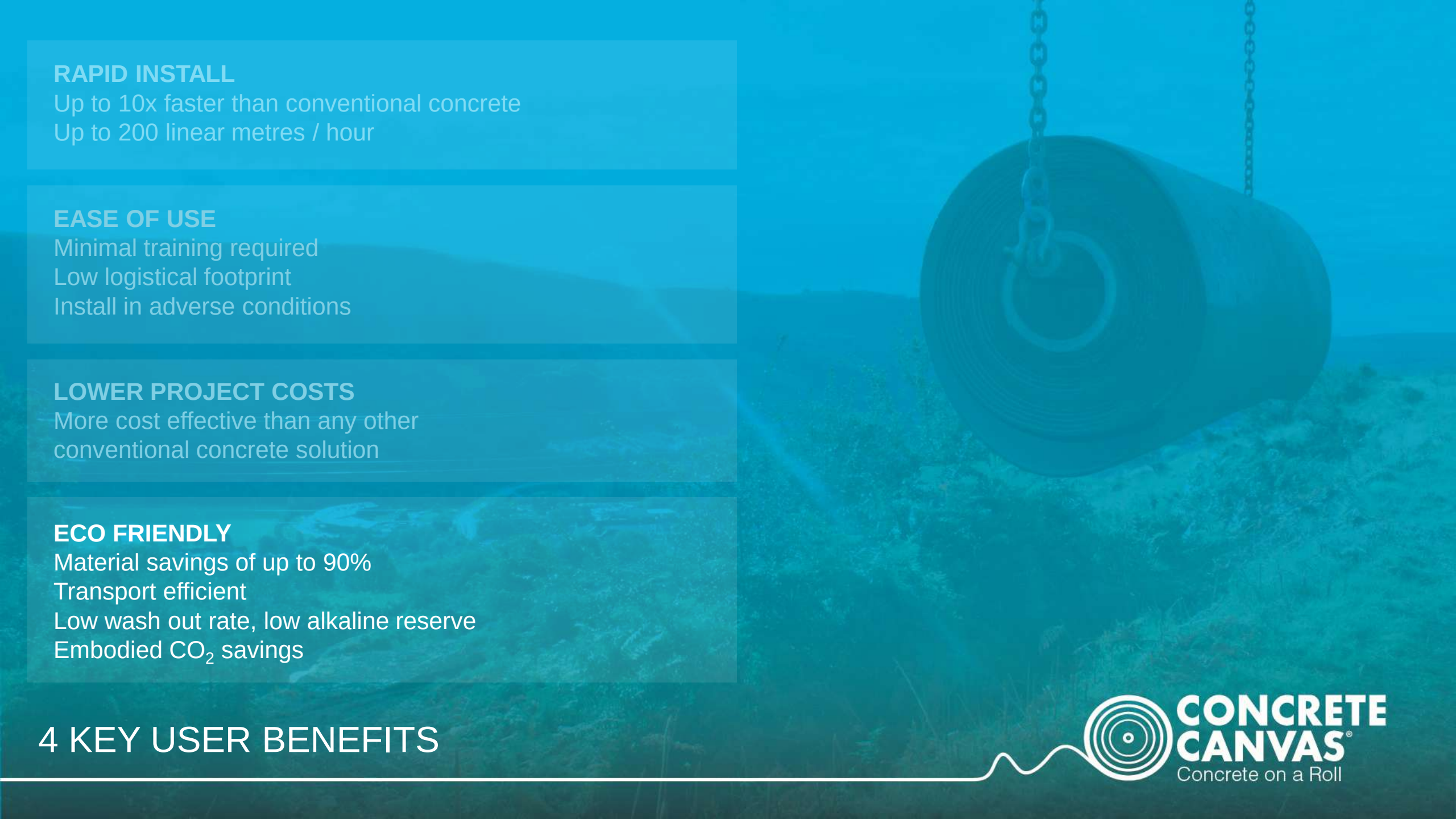
Scour protection to crest drainage as part of Bypass construction scheme in South Wales.

- Alternative to grouted rip-rap
- Installed in three hours compared to three days
- Environment Agency approval



Church Village Bypass, South Wales, UK

CONCRETE CANVAS®
Concrete on a Roll



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4 KEY USER BENEFITS

CONCRETE CANVAS®
Concrete on a Roll

KEY BENEFITS

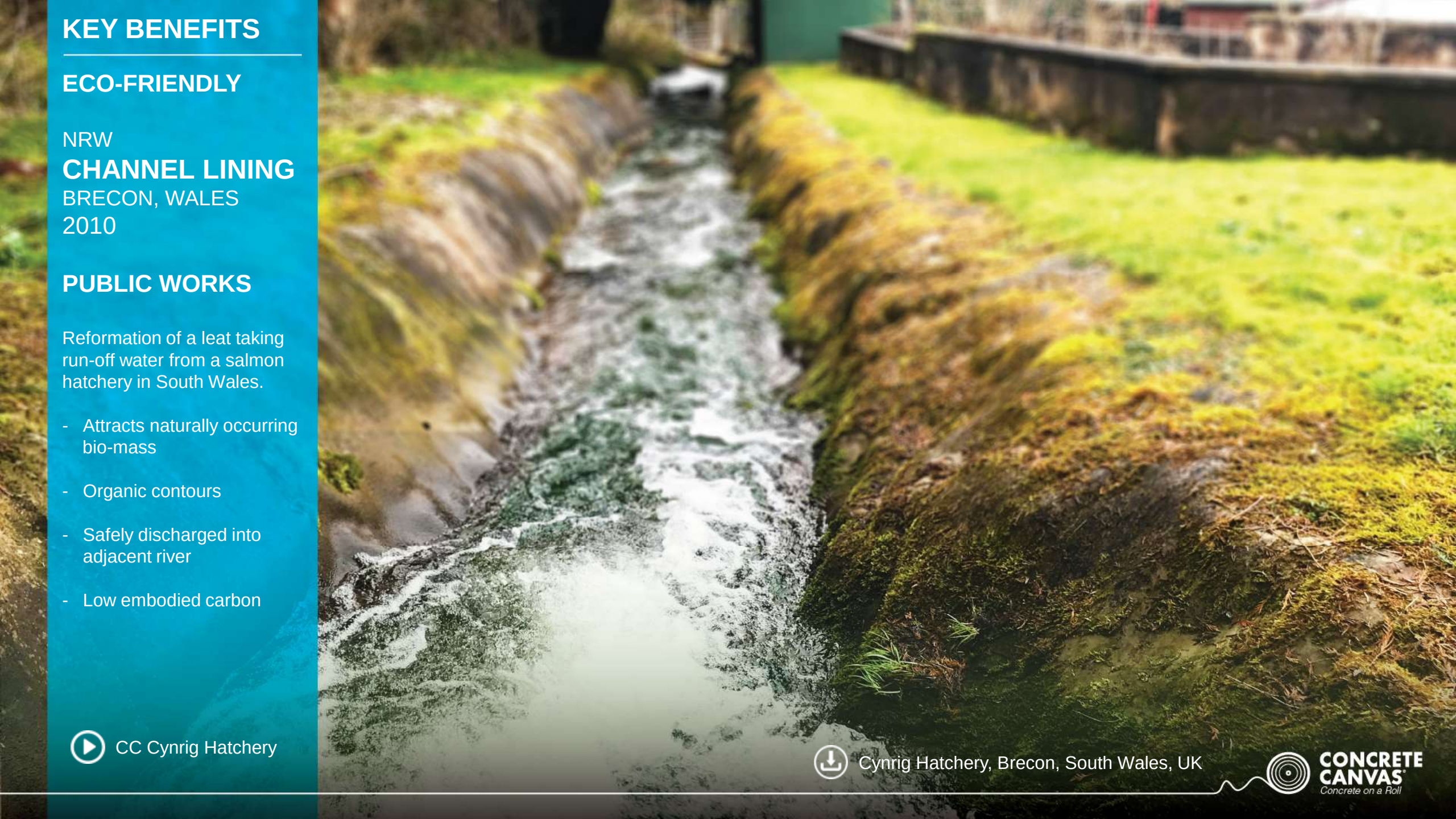
ECO-FRIENDLY

NRW
CHANNEL LINING
BRECON, WALES
2010

PUBLIC WORKS

Reformation of a leat taking run-off water from a salmon hatchery in South Wales.

- Attracts naturally occurring bio-mass
- Organic contours
- Safely discharged into adjacent river
- Low embodied carbon



CC Cynrig Hatchery

Cynrig Hatchery, Brecon, South Wales, UK

CONCRETE CANVAS® Concrete on a Roll

LIFE CYCLE ASSESSMENT (LCA)

- Independent Life Cycle Assessment of the Global Warming Potential (GWP) of CC8™ was undertaken independently by Ricardo Energy and Environment (REE)

- CC8™ was compared to 150mm of ST4 (20N) poured concrete for a hypothetical channel, 200km from factory and 20km from ST4 batching plant

- 'Cradle to Grave' assessment included Upstream (sourcing raw materials), Core (manufacture), Transport, Installation, Use, Removal and End of Life

- **CC8™ has a GWP that is 55% lower than the ST4 poured concrete alternative**

- Sensitivity analysis also shows that CC8™ has a lower GWP than 100mm of poured concrete

- Concrete Canvas and REE have created a tool for calculating the project specific GWP for all CC products and comparing to the ST4 poured concrete alternative.

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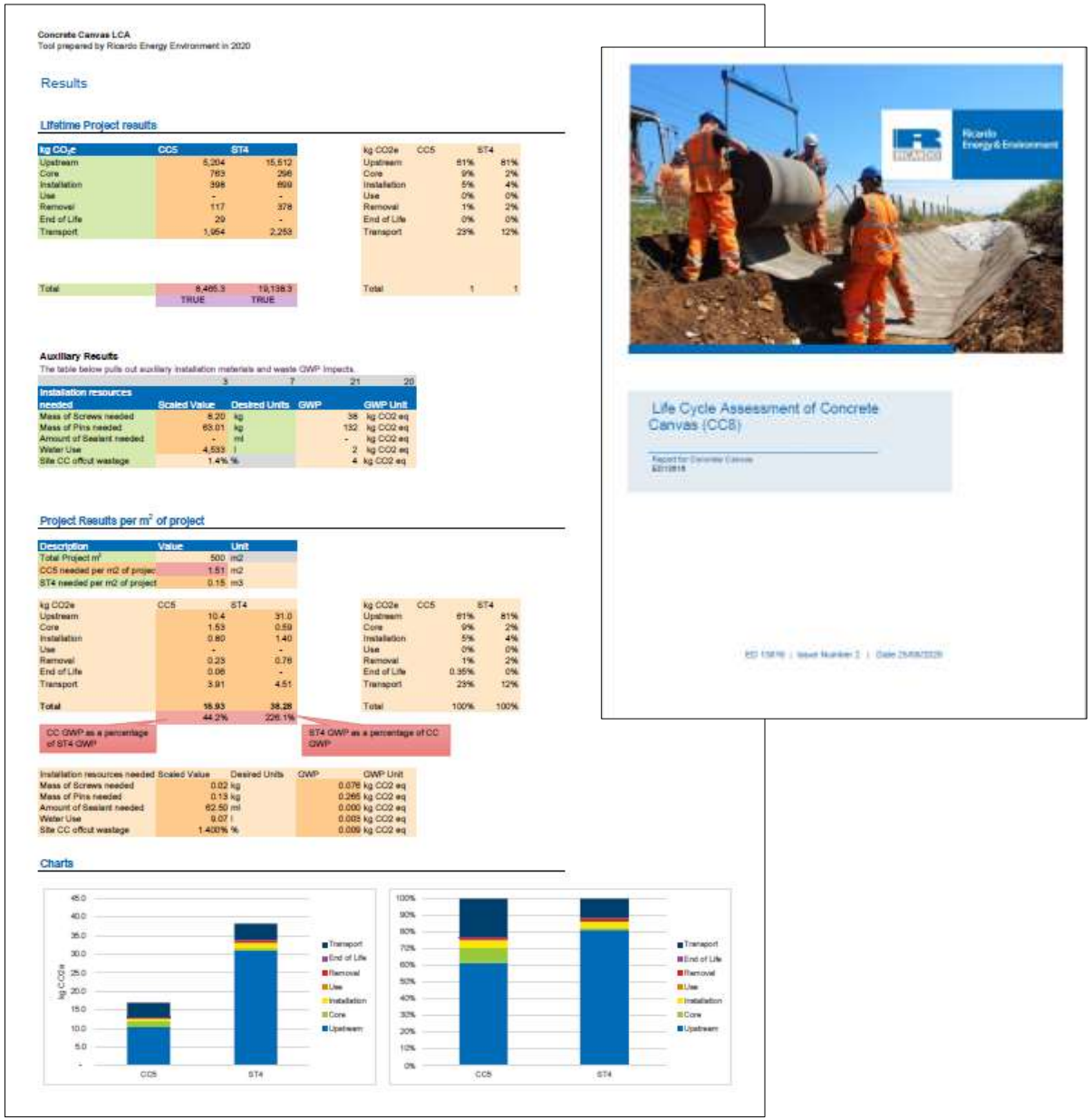

CASE STUDIES

CONCRETE CANVAS®
Concrete on a Roll

COAL AUTHORITY

CHANNEL LINING

GLYNCORRWG, WALES

2016

UTILITIES

1,640SQM CC8™ BULK

GLYNCORRWG WATER TREATMENT SITE

Series of cascading drainage channels to treat and discharge orange ochre.

CC used to replace the failed LLDPE a geotextile liner that had been installed five years earlier.

- Chemically resistance to contaminants

- Able to be installed in inclement weather

- Long term durability

Glyncorrwg, Channel Lining

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NATURAL RESOURCES WALES

SLOPE PROTECTION

PONTYPRIDD, WALES

2017

PUBLIC WORKS

1,040SQM CC13™ BULK

RIVER TAFF BANK PROTECTION

Dilapidated grouted rip-rap embankment along river Taff threatening stability of adjacent factory site.

.

- Replacement of rip-rap
- Geotextile sub-layer
- Framework contractors
- Specified by environment body

River Taff, Slope Protection

NATURAL RESOURCES WALES

SLOPE PROTECTION

PONTYPRIDD, WALES

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River Taff, Slope Protection

SUMMARY

CONCRETE CANVAS®
Concrete on a Roll

CONCRETE CANVAS® (CC)

EROSION CONTROL

- Used for the rapid lining of channels, slope protection, bund lining, concrete remediation, culvert repair and weed suppression.
- Up to 10 times quicker than traditional concrete solutions.
- Easier to install, requiring minimum training and no specialist equipment.
- More cost effective than any other concrete solution.
- Environmental advantages
- Provides long term excellent scour and chemical resistance. 120 year design life.

CC / CC HYDRO SPECIFICATION

CONCRETE CANVAS®
Concrete on a Roll

CONCRETE CANVAS LTD
COWBRIDGE RD,
TALBOT GREEN,
PONTYCLUN
CF72 8HL
UNITED KINGDOM

info@concretecanvas.com
www.concretecanvas.com

QUESTIONS?

CONCRETE CANVAS®
Concrete on a Roll

THANK YOU

www.concretecanvas.com