



 **CONCRETE CANVAS®**
Concrete on a Roll

**WEED SUPPRESSION
CASE STUDIES**



RAIL



ROAD



MINING



PETROCHEM



AGRO



PUBLIC WORKS



UTILITIES



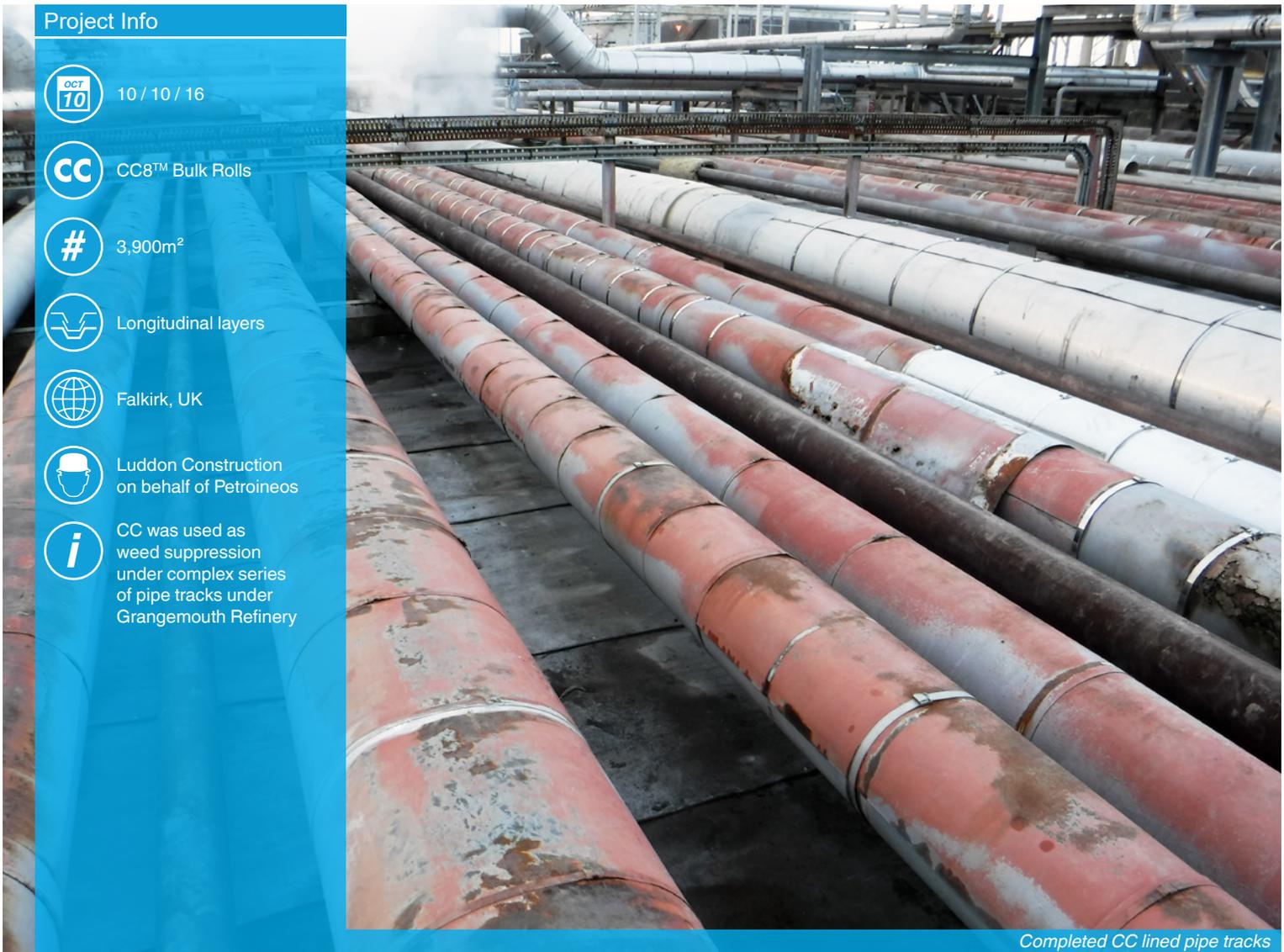
DEFENCE



DESIGN



SHELTER



Project Info

 10 / 10 / 16

 CC8™ Bulk Rolls

 3,900m²

 Longitudinal layers

 Falkirk, UK

 Luddon Construction
on behalf of Petroineos

 CC was used as
weed suppression
under complex series
of pipe tracks under
Grangemouth Refinery

Completed CC lined pipe tracks

In October 2016, Concrete Canvas® (CC) GCCM* was extensively used to provide weed suppression under a series of complex pipe tracks at Grangemouth Refinery, operated by Petroineos in Falkirk, UK.

Grangemouth Refinery is Scotland's only crude oil refinery with a capacity in excess of 10 million tonnes per year. Grangemouth traces its origins back to 1924 and was previously owned by BP before being sold to Ineos Group in 2005. Since its change of ownership, Ineos have invested heavily in infrastructure at the site.

Safety is paramount at Grangemouth, and as part of the Refinery Integrity Improvement Project, a section of pipe track at Overton Road was identified as in need of attention to remedy pooling of water and prevent the growth of vegetation. There had been previous weed suppression work carried out in earlier phases of the pipe track remediation but in this instance, the engineering consultancy IKM proposed CC as part of a new drainage and weed suppression system.

The existing pipe track drainage system was not performing as required: leaked hydrocarbons would have been able to soak into the ground, potentially causing environmental damage, while the pooling water and vegetation could have created an integrity risk in terms of corrosion to the pipework.

Limited clearance between the underside of the pipework and track floor, which was uneven, puddled and of low CBR value, posed an issue for installation. A number of irregularly placed upstands of varying sizes were also present.

*Geosynthetic Cementitious Composite Mat

Alternatives considered were disregarded for the following reasons: poured concrete would have required additional digging within the pipe floor to achieve the required thickness which would have been difficult to achieve given access restrictions. Without reinforcement, the concrete would also be prone to cracking and perishing, and would be unable to accommodate the underlying water table, leading to flooding elsewhere. Stone chips were unsuitable as dirt build up over time among the chips would allow root vegetation to grow and would not prevent the burrowing of animals and wildlife which could lead to damage of sensitive infrastructure on site.

As a result of these issues, CC was specified for the project, and would allow for little to no preparation work, a significantly quicker and cleaner install, with little risk of damage to infrastructure, tested weed suppression and root penetration resistance according to DD CEN/TS 14416:2005. The material can also be easily cut to accommodate existing infrastructure such as upstands, and provides visible leak detection.

Prior to installation, the pipe track was graded to provide as even a surface as possible, and vegetation was removed. The CC was deployed using a modified lightweight spreader beam to allow for easier installation despite access issues below the pipework.



Site prior to clearance and showing vegetation growth



Feeding of CC8 under low profile



Adjusting position to create 100mm overlaps prior to screwing joint



CC8 terminations to existing concrete infrastructure

The CC was laid perpendicular to the pipe track to minimise the length and subsequent weight of each individual layer. Subsequent layers were overlapped by 100mm and jointed using screws at 200mm centres through the overlap. The material was then hydrated using onsite water mains. Layers were periodically fixed to the substrate using a combination of steel or plastic ground pegs, depending on ground conditions, at specific points.

A total of 3,900m² of CC8™ were installed in challenging conditions, with inclement weather, restricted access and on a complex site over six weeks. The site was later reviewed, with no signs of vegetation growth found.

“After a year of installation, nothing has grown within the Concrete Canvas lined areas, whereas vegetation continues to grow within the stop chipped sections of the pipetrack. Concrete Canvas has proven to be the better and more cost effective vegetation suppressor and we look forward to specifying the material wherever possible for this type of control.”

Stewart Woolley
Mechanical Asset Care Engineer, Petroineos

Completed installation:



Project Info



July 2016



CC5™ Batched Rolls



20m²



Vertical and Longitudinal layers



Kyoto-tanba Cho, Kyoto, Japan



Taiyo Kogyo Corporation



CC used in a trial to establish its suitability for weed suppression against invasive species like Japanese knotweed



Trial CC section 26 months after installation

In July 2016 a trial began to establish the effectiveness of Concrete Canvas® GCCM as a vegetation control method for Japanese knotweed. The trial focussed on verifying the strength of joints in Concrete Canvas® (CC) material against weed growth, and aimed to prove that these joints and the material itself is capable of preventing the protrusion of knotweed.

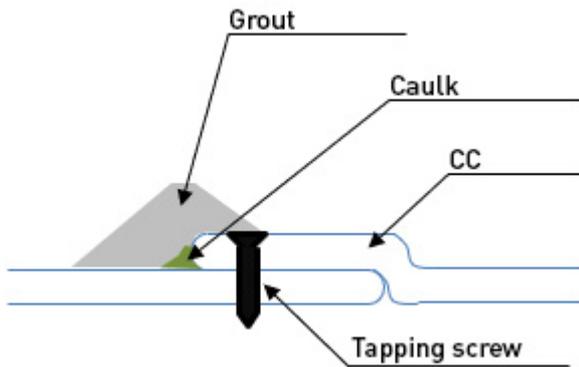
Three different joint types were trialled as described overleaf and placed over areas where weeds were overgrown in order to accurately establish the strength and effectiveness of each joint type area. The trial was carried out by Taiyo Kogyo Corporation on behalf of Concrete Canvas Ltd with the objective of establishing CC as an effective Japanese knotweed suppressant for use on future projects where the weed is present on site.

The trials were carried out on two sites in Kyoto-tamba Cho, Kyoto. On the first site, the knotweed had been felled only, while the knotweed on site two was cut down two weeks after being sprayed with herbicide. The first of the installations was carried out on a slope, with a gradient of 1: 1.2 and facing southwest, while the second was installed on a flat area. The installation areas are surrounded by fields and mixed forest.

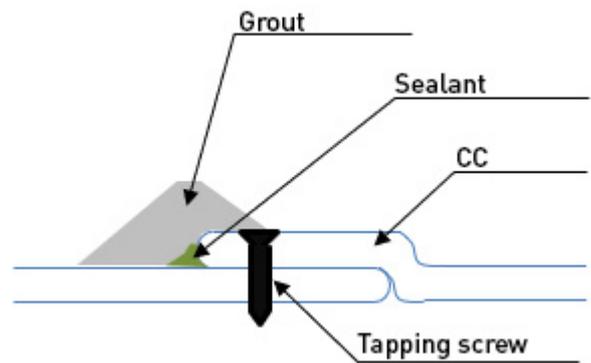


CC was installed using three jointing methods (below) where several strong growing wild grasses and knotweed were overgrown in order to establish CC's ability to suppress them. In order to examine the necessity of herbicide application, the joints were applied in similar conditions on both sites, allowing for a controlled comparison of the sites. The locations of the shoots were marked with spray paint and the CC joints were arranged so that a shoot was located in the overlap to help with identification throughout the trial.

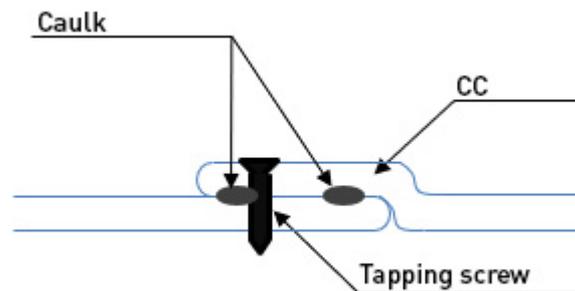
Joint Method 1: Standard caulk + self tapping screws + grout



Joint Method 2: Standard silicone sealant + self tapping screws + grout



Joint Method 3: Adhesive sealant + self tapping screws



The installation on site 1 was carried out on 29th July 2016. The performance of the CC material was observed over 2 years; during this trial period, the contractors visited the site at regular intervals in order to track the performance of the material. On completion of the trial, both the contractor and client established that all three jointing methods used on this site were successful in suppressing the strong growth of the wild grasses and knotweed found on the site and there was no evidence of growth through the joints or the material itself.

Site 1 Results



Day 1: Location of shoots marked with spray paint



Day 816 - CC beginning to moss over, still no signs of weed protrusion

Site 2 Results



Day 1: Location of shoots marked with spray paint



Day 816 - CC beginning to moss over, still no signs of weed protrusion

At the end of the study, it was observed that all three jointing methods had proven their ability to provide effective weed suppression to a range of weeds and wildflowers, including those that are notoriously difficult to control, such as knotweed, on both sites. There was no evidence of vegetation growth below the body of the CC installation, and no protrusion of weeds through the joints, despite what was described as a remarkable amount of growth around the installation areas. As a result, the contractor, Taiyo Kogyo Corporation, concluded that Concrete Canvas® material is indeed an effective method of control against these plant types.

Project Info



07 / 12 / 14



CC5™ Batched Rolls



100m²



Single longitudinal layer



Ilford, London,
United Kingdom



Network Rail



CC5™ used to provide weed suppression along a 100 linear metre length of parapet at Ilford down electric 7m10-65ch LTDN1 near Ilford Station on the East Anglian Line.



Completed section of lined parapet

In December 2014, Concrete Canvas® (CC) GCCM* was used on a trial installation to provide weed suppression along a 100 linear metre length of a 2.7m high signalling station. Commissioned by Network Rail, the installation was completed by Railscape Ltd, during a Sunday line possession scheduled for separate works. Access was only possible via steep stairwells. The CC was supplied in man-portable batched rolls and delivered to the deployment area via rail mounted trolley, along with water supplies, spraying equipment and the ancillaries required for fixing.

The area to be suppressed was first cleared of vegetation and loosely raked flat. Brickwork debris and refuge was removed. Batched rolls of CC were then lifted onto the parapet and unrolled parallel to the track and butted up against the track side brickwork. Where required, the CC layers were cut using hand tools to accommodate stanchions and pipework. Adjacent layers of CC were overlapped providing a continuous run of material across the parapet sections. Once positioned, the CC material was fixed to the substrate using 250mm steel ground pegs to secure its position at approximately 2m intervals and through overlaps. The final stage was hydration of the CC via 35L backpack sprayers.

CC provides durable weed suppression and has been tested successfully against DD CEN/TS 14416:2005. It has a minimum design life of 50 years within a UK climate and once set, will provide a long lasting, fibre reinforced and water proof concrete layer to effectively suppress weed and vegetation growth. This mitigates the requirement for any future and costly vegetation cutting along critical trackside infrastructure where access is severely limited.





Access to site via track during line possession



Vegetation growth along parapet presenting H&S risk



Delivery of CC batched rolls to site area via rail trolley



Cutting and detailing of CC to accommodate stanchions and upstands



Backfilling anchor trench at toe of second section berm

Project Info



October 2016



CC5™ Batched Rolls



1,260m²



Vertical layers



Hokkaido, Japan



Sumitomo Mitsui Construction Co. Ltd.



CC5™ was used to provide both slope protection and weed suppression to prevent insects.



Completed installation



Seeding was rejected due to complaints from residents



Vegetated slope prior to works



Completed installation

In October 2016, Concrete Canvas® GCCM* (CC) was used to provide both slope protection and weed suppression to an embankment adjacent to an expressway in Hokkaido, Japan.

The original design for the project had specified seeding, but the slope is also situated close to a residential area, and those living closest to the slope claimed that the vegetation would invite bugs such as mosquitos. Due to the level of complaints from the residents, the client and contractor were forced to change the design specification. Sprayed concrete was considered as an alternative, but the level of rebound associated with its use in this area meant it was ruled out. CC was then chosen due to its speed and ease of install, along with the fact that it is much cleaner to install than many alternatives and would cause less interruption to traffic. The works were carried out by Sumitomo Mitsui Construction Co. Ltd, for East Nippon Expressway Co. Ltd.

In preparation for the installation, all vegetation was removed from the slope, along with any stones and other debris to provide a flat, smooth surface on which to lay the CC material. The CC was delivered to site in batched rolls, and deployed vertically down the slope by hand. The material was overlapped by 100mm, with the edges fixed using galvanised steel pegs at 2m intervals. The material was then sealed at the overlaps using Clearfix adhesive sealant to prevent weed ingress, and jointed using stainless steel screws at 200mm intervals down the length of the slope. Once installation was completed, the CC was hydrated.

1,260m² of CC5™ were installed without the use of any plant, on a sensitive site with restricted access.

*Geosynthetic Cementitious Composite Mat



Project Info

-  JUN 13 13 / 06 / 18
-  CC5™ Bulk Rolls
-  # 200m²
-  Longitudinal layers
-  Département Lozere, Southern France
-  Gauthier / Etair Groupe Vinci
-  CC5™ used as an erosion protection and weed suppression measure around tunnel entablatures





Completed installation



Site prior to ground preparation



Works were carried out using climbing equipment



Completed installation

In June 2018, Concrete Canvas® GCCM* (CC) was used to provide erosion protection and weed suppression to tunnel entablatures in Département Lozere, Southern France.

The three tunnels involved in the project were situated along a road, tunnelling through hills to preserve the ecology above. Shotcrete was also considered for the project but would have required partial or full road closures while works were carried out. CC was chosen for the installations as a trial to establish its suitability in installations like this one. However, the use of CC prevented road closures, was considerably quicker and easier to install compared to shotcrete and other traditional concreting methods. The works were carried out by Gauthier and Etair Groupe Vinci for Dir Lozere, with CC material (known in France as Cimtex) provided by CC Partner, Point P Travaux Publics.

In preparation for the installation, vegetation was removed from the area where CC was to be installed. The CC was then delivered to the contractor's warehouse, where it was cut to length. The pre-batched lengths were then transported to the site. The material was laid following the pattern of the existing concrete blockwork of the entablatures. The CC was butted up to the concrete blockwork and fixed to the substrate using ground pegs, while overlapping layers were jointed using adhesive sealant and screws. Once installation was completed, a hose pipe was used to provide hydration. This method was repeated for each tunnel.

A total of 200m² of CC5™ (Cimtex 5) were installed around the three tunnels in just 1.5 days by a team of 3 people.

Project Info

 18 / 03 / 19

 CC5™ Bulk Rolls

 250m²

 Vertical layers

 Ireland

 CEM Services

 CC5™ installed at petroleum facility in Ireland to provide erosion protection and weed suppression for an existing bund



Completed installation at Ireland petroleum facility

In March 2019, Concrete Canvas® (CC) was installed at a major petroleum facility in Ireland. On the site, bunds surround a series of tank farms storing hydrocarbons and required regular maintenance to control vegetation growth. CC was chosen on a trial basis to provide weathering protection, weed suppression, and protection against animal damage, containment and fire. The works were carried out by CEM Services who provide extensive multidisciplinary maintenance and civil engineering services to the oil and gas industry in Ireland.

Vegetation, sharp rocks and protrusions were removed from the substrate to ensure a uniform profile. Bulk rolls of CC5™ were dispensed from a crane-mounted spreader beam from the bund's crest. Each material edge was secured within the 150mm anchor trenches at the toe using 250mm galvanised pegs. CC was then unrolled up the bund, cut to length using utility knives and secured within the crest anchor trench. Subsequent layers were overlapped by 100mm, sealed using sealant and jointed with autofed stainless steel screws at 50mm intervals. The sealant created an impermeable joint whilst the screws provided a mechanical bond between overlapped layers. Hydration was given at the end of the working day using a bowser and pressure hose with spray nozzle attached, after which the anchor trenches were backfilled to prevent water ingress under the CC and provide a neat termination. A fall restraint system was used to ensure safety of the crew.

In total 250m² of CC5™ was installed in less than 2 days with a crew of 4 people from CEM Services and will provide long-term erosion protection and weed suppression for the client while providing additional levels of containment and fire protection for the bund area.



Bund area prepared prior to works



Installation in progress



CC secured in toe anchor trench and unrolled up bund height



CC layers laid vertically



Applying sealant and screwing layers together at 50mm centres



Anchor trenches backfilled following hydration

Project Info

 07 / 01 / 19

 CC5™ Bulk Rolls

 500m²

 Longitudinal layers

 Knostrop STW, Leeds, UK

 JN Bentley

 CC5™ used to provide weed suppression below a new pipeline to eliminate future maintenance and prevent damage to the pipes



Completed installation of CC5™ around Electrosteel pipeline upstands for weed suppression

The installation of a new 350mm diameter rising main at the Knostrop Sludge Treatment Works in Leeds required a weed suppression layer below the pipes in order to eliminate future maintenance requirements and risk of damage to the pipes during maintenance.

Concrete Canvas® GCCM* (CC) was specified for the project, carried out by JN Bentley for Yorkshire Water. Having previously worked with CC, the design manager for JN Bentley was aware of the material's beneficial properties for weed suppression and therefore recommended the material to the client. CC was ultimately chosen due to its quick and easy installation process, proven weed suppression properties and lack of damage risk to sensitive infrastructure, unlike alternatives such as poured or sprayed concrete. 500m² of CC5™ were installed in conjunction with the installation of the rising main between January - April 2019.

Prior to installation of the material between pipe upstands, large roots and sections of weeds were removed to provide a smoother substrate on which to lay the CC. Bulk rolls of CC were hung from a spreader beam and cut to required lengths using hand tools before being laid, anchor trenched at each end and edges secured using galvanised mild steel pegs at 1m intervals.

Once installation of a section was completed, the CC was hydrated using a bowser and hose pipe. This process was repeated for each section. The installation was a great success and will allow for a maintenance-free solution under the pipe track moving forward, preventing weed growth and damage to the pipe.



Weed growth below pipeline



Weeds removed prior to installation



Installation of CC length



First lengths of CC installed



Smaller installation section



CC end anchor trenched

Project Info



07 / 01 / 19



CC5™ Bulk Rolls



500m²



Longitudinal layers



Knostrop STW, Leeds, UK



JN Bentley



CC5™ used to provide weed suppression below a new pipeline to eliminate future maintenance and prevent damage to the pipes



Completed installation



Alarm wire will be protected from false trips



CC can be cut to accommodate existing infrastructure



CC installed retrospectively around fencing

In 2019, Concrete Canvas® was trialled as an alternative solution for under-fence sterile zones. Sterile zones are required to prevent weed growth around the base of the fence and/or to provide a line of site for security cameras. Security fencing is manufactured and installed to standard BS1722 and is either alarmed with a physical or virtual wire (the latter in conjunction with a CCTV system) or installed without an alarm. For alarmed systems, sterile zones are required to prevent false triggering of the sensitive alarm or CCTV systems from weed growth. In the case of non-alarmed fencing, the sterile zone is required to reduce maintenance around the fence.

At present, the most common solutions tend to include layers of non-woven geotextile, and a stone chipping layer on top. Over time dust and debris can accumulate in the chipping layer, enabling vegetation to grow and potentially triggering false alarms. Poured or sprayed concrete is also used but is costly and impractical to install on slopes or around existing infrastructure. The size of the sterile zone can depend on the type of security system being put in place.

Concrete Canvas® (CC) has been trialled as an alternative sterile zone solution for a number of reasons:

- It can be installed around existing fencing
- It can be easily and rapidly installed without requirement for specialist training, contractors or equipment
- It can be installed without damaging existing fencing, alarm systems and other infrastructure due to lack of rebound
- It eliminates complications associated with installing poured or sprayed concretes on steep slopes
- It is an effective weed suppressant
- CC is BBA certified with 120 year durability, making it a more cost-effective option in the long-term compared to traditional solutions.

