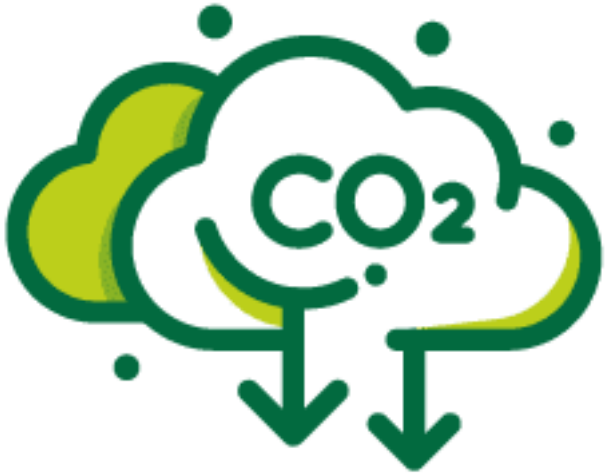


carbon footprint™ & SoilScience

CO_2e Assesment

67%

REDUCTION

When using Sureground

Carbon footprint standard™

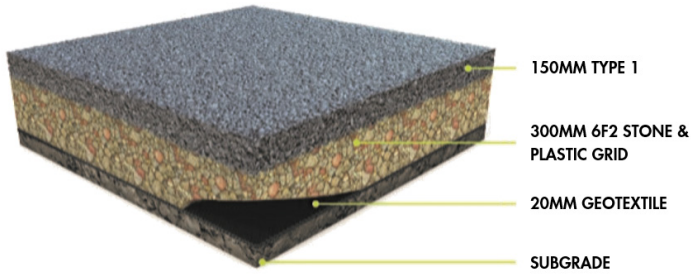
CO_2e Assessed Service

INTRODUCTION:

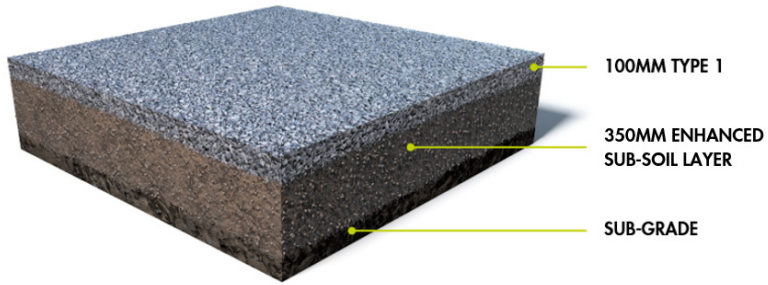
This summary provides an overview analysis of the greenhouse gas emissions associated with a standard Soil Science SUREGROUND™ Solution versus a traditional method.

This assessment encompasses the embodied raw material emissions, transport, manufacture/processing, distribution and disposal of the two methods over a 10,000m² area.

TRADITIONAL DESIGN:



SUREGROUND™ STANDARD DESIGN:



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CO_2e Assessed Service

67% REDUCTION

When using Sureground

Process	Location-Based Emissions		Percentage Difference
	Traditional	SUREGROUND™	
Raw Materials - Embodied	1,052,009.32	350.460.18	-66.69%
Raw Material Transport	63,788.88	16,139.17	-74.7%
Blending	-	206.77	-
Construction Vehicle Distribution	356.76	475.68	+33.33%
On-site Construction Vehicle Fuel Use	47,334.19	26,430.37	-44.16%
Disposal	70,160.59	14,138.09	-79.85%
Total $kgCO_2e$ per 10,000m²	1,233,649.74	407,850.26	-66.94%
Total tCO_2e per 10,000m²	1,233.65	407.85	-66.94%
Total tCO_2e per m²	**0.12**	**0.04**	**-66.94%**

SUREGROUND™ reduces Carbon Emissions by 67% when compared with a traditional method.

The report is based on a combination of a Location-based approach (reflects the emissions from electricity coming from the national grid energy supply) and a Market-based approach (reflects the emissions from the electricity sources or products that the consumer has specifically chosen).

All data is sourced either from EcoInvent's database (v3.7), ICE v3.0 (2019), or the UK Government (BEIS, 2020).

The carbon footprint is derived from a combination of activity data provided by Soil Science and from publicly available sources (primary data), and emission factors extracted from internationally recognised metrics, greenhouse gas (GHG), activity data is then multiplied by GHG emission factors to produce carbon metrics.

The sourcing of the raw materials varies depending on the location of the project. Therefore, within this assessment, an average supply distance was used for the standard on-site construction vehicles (e.g. bowsers, excavators and tractors) and materials. An increased distance was used for the SUREGROUND™ Binder, reagent and specialised construction vehicles (Soil Science use Dust Free mixers for the rotovation of SUREGROUND™ Binder, to mitigate any dust issue). The binder is blended at an offsite facility. The facility is on a 'blue' (Nuclear) tariff resulting in a market-based emission of 0 $kgCO_2e$ for the blending process.

For the comparison, a traditional method for the installation of temporary haul roads and compounds was used to compare and show carbon savings. The traditional methods do not use a binder or reagent but instead uses stone at a deeper depth of 450mm, a plastic grid and geotextile layer for stability. This plastic grid and geotextile layer is the reason for the additional landfill emissions needed for the bottom 50mm of stone, as the extraction of the stone leaves stone containing plastic resulting in it being landfilled. Within this assessment, the emissions associated with the raw materials, transport, production and disposal of the traditional method is examined.

Due to a lack of data, the transport of the raw materials and the service distribution for the traditional methods were modelled equal to the SUREGROUND™ method, ensuring that the results are not biased towards either method.

Disposal was modelled based on reuse of the top 400mm of stone, and landfilling the bottom 50mm of stone, geotextile and plastic grid layer (Ecoinvent 3.7). The lorry distances to reuse and landfill has been modelled based on the same as the raw material transport.

The accuracy of the overall carbon footprint calculations for the Soil Science SUREGROUND™ solution is very good as the majority of the data used in the calculation is primary data or modelled based on past experience and industry standards submitted by Soil Science. The accuracy of the data for the comparison traditional methods was mainly modelled due to lack of primary data. Similar models were used for both methods to avoid bias.

The emissions associated with transport reflect the mass of each component, the mode of transport and the distance travelled. The only associated manufacturing emissions are from the SUREGROUND™ method blending facility. The facility is on a 'blue' (Nuclear) tariff resulting in a market-based emission of 0 $kgCO_2e$, for the blending process.

All on-site vehicles are calculated to include transport to and from site by 33 tonne articulates, and the vehicles use of red diesel fuel on-site.

The disposal emissions of the Type 1 stone used in the SUREGROUND™ solution was calculated as only the emissions associated with the transportation of the raw materials, as the material is often used onsite or given to the landowner.

With the traditional method, during the extraction of the geotextile and plastic grid layers, the bottom 50mm of stone becomes contaminated with plastic. Therefore, the disposal emissions include the transport of all waste to either landfill or reuse, with the bottom 50mm including an emissions factor to account for the landfilling of the geotextile, geogrid, and bottom layer of stone.

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