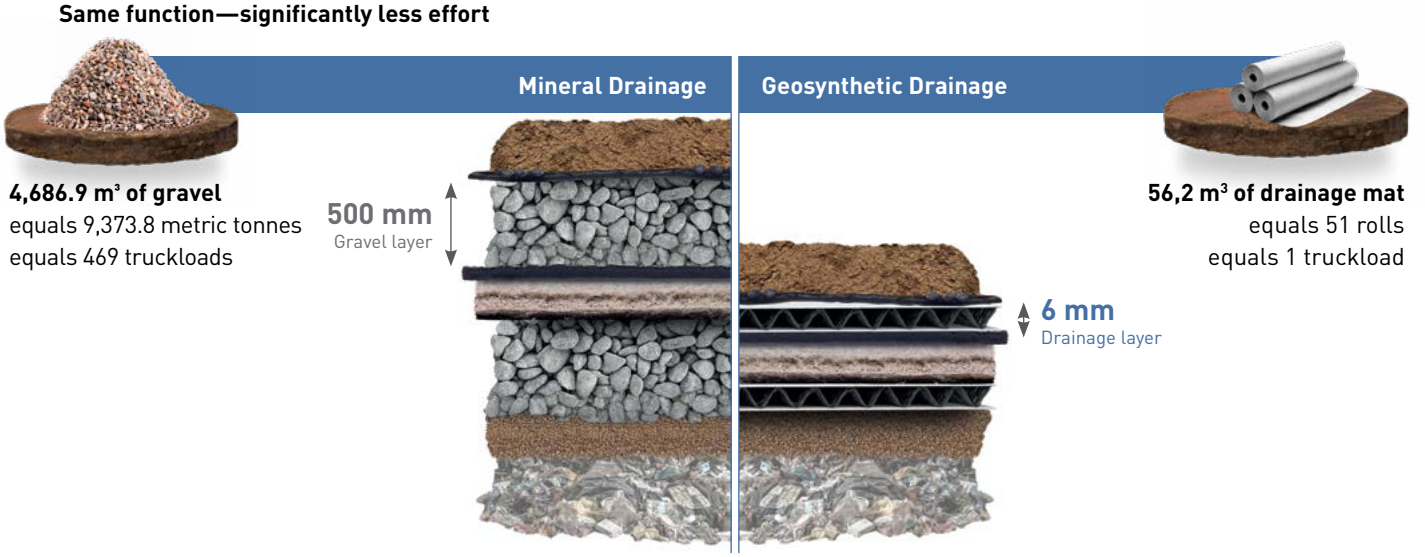
Geosynthetic Drainage

A compact alternative to mineral drainage

Mineral drainage layers made of gravel or crushed stone have proven effective for draining water. However, the required layer structure involves large quantities of material and significant costs for transportation and installation.

Geosynthetic drainage systems can offer a compact alternative for this purpose. The low installation height and the fact that it is delivered in rolls reduce material requirements as well as the effort involved in transportation and handling. This makes it possible to replace mineral drainage layers in many applications in a cost-effective and resource-efficient manner.

Same function—significantly less effort



	Mineral		Geosynthetic
Transportation Costs 20 metric tonnes payload per trip *Total distance in each case including the outbound and return trips	469 Trips of 50 km each*	⟷	1 600 km per trip*
Tyre wear	39.9 kg	⟷	0.72 kg
CO_2 emissions	21,800 kg	⟷	557 kg

Use of Geosynthetic Drainage
Reduction in transportation-related CO_2 emissions of up to **97%**

Basis for Calculation

The calculation example is based on a reference area of 9,373.8 m². The comparison is between a 0.5m thick mineral drainage layer made of gravel or crushed stone and a geosynthetic drainage solution, Hydrain C06-350 FCF100, which serves the same function in the reference case. For the mineral based variant, a material density of 2 t/m³ and a payload of 20 t per truck trip were assumed. The figures for tyre wear and CO_2 emissions apply exclusively to transportation. The required sizing must be verified on a project-by-project basis.

Size / Calculation	Mineral Drainage	Geosynthetic Drainage
Surface area	9,373.8 m^2	9,373.8 m^2
Comparison material / product	Mineral Drainage Material	Hydrain C06-350 FCF100
Layer thickness	0.50 m = 500 mm	6 mm
Material volume x mineral layer	9,373.8 m^2 × 0.50 m = 4,686.9 m^3	9.373,8 m^2 x 0,006 m = 56,2 m^3
Assumed material density	2 t/m^3	Not scheduled
Quantity to be transported	4,686.9 m^3 × 2 t/m^3 = 9,373.8 t	Not specified
Truck loading capacity	20 tonnes per truckload	9,373.8 m^2 per truckload
Number of rolls	-	51 rolls
Number of shipments	9,373.8 t ÷ 20 t = 468.69 → 469	1
Distance covered per truck*	50 km	600 km
Material deliveries	Gravel from a nearby construction site	Hydrain from a distant location
Calculated total vehicle-km	469 × 50 km = 23.450 km	1 × 600 km = 600 km
Assumed CO_2 emission factor	0.928 kg CO_2/vehicle-km	0.928 kg CO_2/vehicle-km
Calculated transport-related CO_2 emissions	21,761.6 kg CO_2	556.8 kg CO_2
Difference in transport-related CO_2 emissions	-	21,204.8 kg less CO_2
Reduction compared to mineral-based variant	-	97.44 %
Assumed tyre wear per vehicle-km	0.0017 kg/km	0.0012 kg/km
Calculated tyre wear for all scheduled vehicles	23,450 km × 0.0017 kg/km = 39,865 kg	600 km × 0.0012 kg/km = 0.72 kg

* Assumed total distances, including the outward and return journeys. The actual distances depend on the project.

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