Technical Sheet for Solution Implementation

Stabilized Surfaces for Paddocks and High-Traffic Areas

Thematic Area: Health and Welfare of Equines.

Priority: How to accommodate horses while ensuring their well-being?

Need: How to guarantee health and well-being on limited surfaces?

Solution EU Number: WE-10.

Content of the Solution:
Stabilized surfaces improve footing, reduce mud formation, and protect soils from damage in high-use areas such as paddocks, gateways, feeding areas, shelters, and track systems. Depending on site conditions, they can be created using layered construction methods, stabilization grids, or paddock reinforcement systems that improve drainage, durability, and year-round usability.

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Reasons for Implementing this Solution

Stabilized surfaces help prevent mud, soil compaction, and pasture degradation in areas exposed to frequent horse traffic. They improve horse welfare and health, facilitate daily management, and support more sustainable use of paddocks and grazing areas throughout the year.

Description of Solution Strategies

Stabilized surfaces are reinforced and well-drained areas designed to withstand intensive horse traffic while maintaining safe and usable footing throughout the year. They are commonly installed in high-use locations such as gateways, feeding stations, water points, shelters, resting areas, paddocks, sacrifice areas, and track systems, where repeated trampling would otherwise lead to mud formation, soil compaction, and loss of vegetation cover.

Several construction approaches can be used depending on soil conditions, intended use, budget, and local regulations. Traditional systems typically involve excavation, installation of a geotextile membrane, a compacted base layer of crushed stone or gravel, and a suitable surface layer. These systems provide excellent load-bearing capacity and long-term durability, particularly in heavily used areas.

Alternatively, various stabilization grids or paddock reinforcement panels are available. Depending on the product and local soil conditions, some of these systems can be installed with a reduced foundation depth or only a levelling layer, potentially reducing excavation work, material use, and installation costs. Such systems may be particularly attractive for smaller paddocks, temporary installations, or locations where extensive groundworks are difficult or undesirable.

Regardless of the chosen system, proper drainage is essential. A slight surface gradient, suitable drainage structures, and regular maintenance help prevent water accumulation and extend the lifespan of the installation.

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Stabilized surfaces can also play an important role in pasture management. By concentrating horse traffic on designated areas, they reduce damage to surrounding grassland, allow pasture recovery, and support rotational grazing systems. Sacrifice areas and stabilized paddocks can be particularly valuable during wet winters, drought periods, or pasture renovation phases.

From an animal welfare perspective, dry and stable footing reduces the risk of slipping and may help prevent hoof and skin conditions associated with prolonged exposure to mud, such as thrush and pastern dermatitis. Cleaner surfaces can also improve accessibility for horses with mobility challenges and facilitate daily management tasks.

Before installing stabilized surfaces, farmers should verify applicable local planning, environmental, and construction regulations. In some regions, ground stabilization, excavation works, drainage modifications, or permanent paddock construction may require permits, environmental assessments, or approval from local authorities. Requirements vary considerably between countries and municipalities and should therefore be checked before work begins.

Costs and funding: Costs vary considerably depending on the selected construction method, site conditions, drainage requirements, material availability, labour costs, and local regulations. Country-specific cost estimates and potential funding opportunities should therefore be added by each partner according to regional conditions.

Implementation Steps

1. Check legal and planning requirements
- Verify whether planning permission, environmental approval, or other permits are required.
- Check local regulations concerning groundworks, drainage systems, paddock construction, and land-use changes.
- Consider any restrictions related to protected landscapes, watercourses, or agricultural land.

2. Identify the priority areas
- Assess where mud formation, soil damage, or excessive wear occur most frequently.
- Prioritise areas such as:
  - gateways,
  - feeding stations,
  - water points,
  - shelters,
  - paddocks,
  - sacrifice areas,
  - track systems.

3. Select the most appropriate stabilization system
- Consider:
  - soil type,
  - drainage conditions,
  - expected horse traffic,
  - intended use,
  - maintenance requirements,
  - available budget.
- Compare traditional layered constructions with stabilization grids or paddock reinforcement system

4. Prepare the site
- Remove vegetation and unsuitable topsoil where necessary.
- Level the area and establish the required slope for drainage.
- Install drainage infrastructure if needed.

5. Install the stabilization system
- For traditional constructions:
- Install a geotextile membrane.
- Add and compact the foundation layer.
- Apply the selected surface material.
- For stabilization grids or paddock panels:
- Follow manufacturer recommendations regarding foundation preparation.
- Install the grid system and fill it with the recommended material if required.

6. Ensure effective drainage
- Verify that surface water can drain away effectively.
- Avoid low spots where water can accumulate.
- Regularly inspect drainage structures, especially after heavy rainfall

7. Integrate into pasture management
- Use stabilized areas strategically to reduce pressure on grazing land.
- Combine with rotational grazing, sacrifice areas, or track systems where appropriate.
- Monitor surrounding pasture condition and adapt management accordingly.

8. Maintain the surface regularly
- Remove manure frequently.
- Repair damaged sections promptly.
- Replenish surface materials when necessary.
- Check drainage performance and correct any developing issues.

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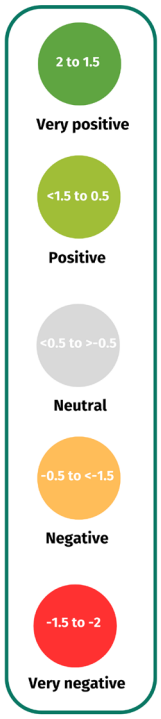
How Will this Solution Impact the Performance of your Farm ?

TOPIC	SCORE
Social	2.00
Economics	2.00
Welfare	2.00
Health	2.00
Environmental	-0.33
Pasture access and management	2.00
Global	1.42



Socioeconomics: This solution will support the social performance of the farm because it improves horse welfare and working conditions by providing clean, dry, and safe surfaces, enhancing the farm's public image and reducing the daily care associated with mud-related health problems. This solution will support the economic performance of the farm because it reduces maintenance and veterinary costs linked to muddy conditions, protects pasture infrastructure, and increases the long-term value of the farm through durable, well-maintained facilities.

Health & Welfare: This solution will support the farm's day-to-day health performance in farms facing challenges related to muddy housing conditions by helping to maintain low levels of pain associated with tendon strains due to sinking in the mud or slipping on the high-traffic tracks and turns, reducing the need for medication used to treat hoof disorders, pastern dermatitis, and thrush under wet and muddy conditions. It will also improve animal welfare by supporting welfare-friendly housing conditions, as animals are less likely to slip and can move more safely on drier surfaces.

Environmental Sustainability: This solution will not have an effect on the environmental performance of the farm because it has mixed effects. On one hand, the use of plastic materials negatively impacts climate change mitigation. On the other hand, the solution has a neutral effect on halting biodiversity loss, because stabilizing the area may prevent trampling that would otherwise occur. Additionally, the solution has no significant effect on water management. This solution will support the land access or management performance of the farm because it allows horses to be turned out in winter and facilitates the management of small areas.

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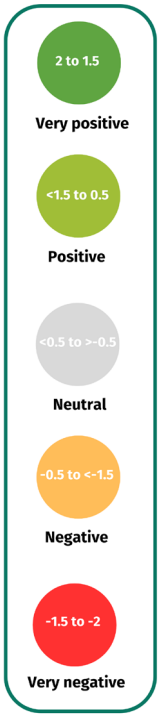
How Will this Solution Impact the Resilience of your Farm?

TOPIC	SCORE
Social	0.58
Economics	0.50
Welfare	0.67
Health	0.67
Environmental	0
Pasture access and management	0
Global	0.40



Socioeconomics: This solution will support social performance of the farm facing external challenges assessed because it helps maintain a positive image of the farm by ensuring clean, welfare-friendly outdoor conditions even under challenging circumstances. Stabilized surfaces improve working conditions by reducing mud, making daily horse management easier and safer for staff, while supporting compliance with higher welfare standards and enabling horses to remain outdoors even when weather conditions deteriorate or grassland availability is limited. This solution will support economic performance of the farm facing external challenges assessed because outdoor housing on stabilized surfaces reduces reliance on more expensive indoor management, limiting operating costs during inflation. It also lowers expenditure associated with mud-related health problems and facilitates compliance with future welfare regulations without requiring major additional investments. Furthermore, by enabling year-round outdoor housing even where pasture availability is limited, it helps maintain efficient use of available land and farm infrastructure.

Health & Welfare: This solution will support the farm's health performance, as it contributes to reducing pain and the need for medication, even when the farm is exposed to external pressures. With appropriate management, like stabilized surfaces for paddocks, the health status of horses can be maintained at a good or high level despite external challenges. This solution also has a positive effect on farm welfare performance, as it directly improves housing conditions when the farm is subjected to external pressures. In some cases, relatively simple improvements in farm management can enhance the standards of animal welfare. Consequently,

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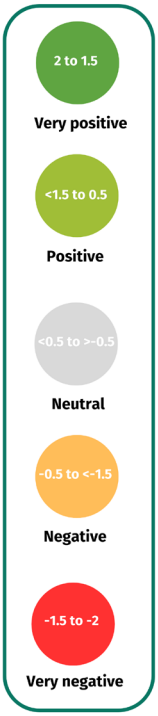
the implementation of this solution may strengthen farm resilience and improve its capacity to withstand and adapt to external pressures.

Environmental Sustainability: This solution will not impact environmental performance of the farm facing external challenges assessed because it has does not have any direct impact on climate change mitigation and adoption, halting biodiversity loss or water management when farm faces inflation, pandemics, high welfare standards, extreme weather event or limited access to land.

This solution will not impact land access or management performance of the farm facing external challenges assessed because it does not directly impact on land access or management hen farm faces inflation, pandemics, high welfare standards, extreme weather event or limited access to land.

How Can this Solution Help your Farm Cope with Specific External Challenges to Become More Resilient?

CHALLENGES	SCORE
Inflation	0.08
Pandemic	0
High welfare standard	0.17
High infectious diseases	0
Extreme weather event	1.17
Loss/limited access to grassland	0.92



Inflation & Social Crises: Social challenge: This solution will not impact the global performance of the farm facing pandemics because stabilized surfaces mainly improve housing conditions rather than addressing the operational constraints created by a pandemic. While they continue to provide safe, clean environments and facilitate daily work, they do not reduce dependence on staff availability or mitigate the broader social impacts of a pandemic on farm activities.

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Economic challenge: This solution will not impact the global performance of the farm facing inflation because although stabilized outdoor areas can reduce housing and health-related costs over the long term, they do not substantially offset rising prices for labour, energy, or other farm inputs. Their economic benefits remain relatively stable under inflation but do not significantly change the farm's overall resilience to increasing production costs.

Welfare & Diseases: Health challenge: This solution has a neutral effect on the overall sustainability performance of the farm across the three dimensions when facing an infectious disease challenge. Socioeconomic, environmental, and animal health and welfare objectives may be difficult to achieve in the event of a disease outbreak. Effective disease management requires specific measures, including the ability to isolate affected animals, access to appropriate biosecurity equipment and facilities, and the availability of veterinary services and pharmaceutical treatments. Therefore, although stabilised surfaces may contribute to improved housing conditions, they are unlikely to substantially mitigate the impacts of infectious disease outbreaks.

Welfare challenge: Similarly, this solution does not significantly affect the overall sustainability performance of the farm when adapting to high-standard animal welfare legislation. Providing a dry, well-drained surface that supports safe movement and does not impair locomotion is a fundamental requirement from an equine welfare perspective. While this solution alone may not be sufficient to ensure compliance with more stringent welfare regulations, it can contribute to maintaining appropriate housing conditions, thereby improving farm resilience and facilitating compliance with higher animal welfare standards.

Climate Change & Access to Land: Environmental challenge: this solution will support the global performance of the farm facing abnormally low temperatures, excessive raining, windstorms or flood because it improves infrastructure resilience, helps maintain safe and efficient operations despite adverse conditions. The impact of this solution is positive or very positive in several areas: it enhances social outreach, improves the quality of working life for staff, increases profitability, and significantly benefits equine welfare. During periods of heavy rain, the facility will improve the well-being of both horses by reducing exposure to mud and associated health issues. The solution is expected to have a neutral impact on farm capital, environmental sustainability, and land access.

Land access/management challenge: this solution will support the global performance of the farm facing loss or limited access to agricultural land because equines can be kept outdoors even in smaller spaces. It has a positive or very positive impact in several areas: it strengthens social outreach and increases farm capital, while also significantly improving equine welfare and health. The solution is expected to have a neutral effect on quality of working life, farm profitability, environmental sustainability, and land access.

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Cost-Benefit Analysis

Costs

Socioeconomics:

- Initial investment in materials (geotextile, gravel, stabilizing grids/ paddock panels), machinery use, and earthworks.
- Installation costs, including labour and possible contractor services.
- Ongoing maintenance and occasional repair or topping-up of surface materials.

Benefits

- Improved year-round usability of paddocks, especially during wet conditions, enhancing overall farm functionality.
- Reduced long-term maintenance and repair costs for damaged or overgrazed areas.
- Time savings in daily management (less muck removal from muddy areas, easier access to horses).
- Increased operational efficiency and system resilience during wet seasons and extreme weather.
- Positive impact on farm image and perceived horse welfare standards, which may increase property or service value.
- Reduced need for rehabilitation of severely degraded paddocks over time.

Health & Welfare:

- Temporary disturbance of soil and environment during construction works.
- Short-term stress for horses if areas are restricted or construction is ongoing nearby.
- Risk of improper installation (e.g. uneven surfaces) if poorly designed or maintained.

- Significantly improved hoof health due to reduced exposure to mud and wet conditions.
- Lower incidence of mud-related diseases (e.g. pastern dermatitis, thrush).
- Reduced risk of slips, falls, and musculoskeletal injuries.
- Improved access to key resources (feed, water, shelter) under all weather conditions.
- Increased comfort and welfare, particularly in winter or prolonged wet periods.
- Reduced chronic stress associated with poor footing and limited movement options.
- Safer management for older or less mobile horses.

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Cost-Benefit Analysis

Costs

Environmental Sustainability :

- Soil excavation and disturbance during installation.
- Resource use and environmental footprint of construction materials (gravel, aggregates, geotextiles, plastic grids).
- Potential sealing of soil surface if overused or improperly designed, reducing infiltration in localized areas.
- Production and transport emissions associated with construction materials.

Cooperation between farms:

- Coordination required for shared design standards if systems are implemented across multiple farms.
- Possible cost-sharing negotiations when infrastructure is jointly used (e.g. shared turnout areas or track systems).
- Need for alignment on maintenance responsibilities in cooperative grazing systems.

Benefits

- Protection of surrounding pasture by concentrating horse traffic in designated areas.
- Reduced soil compaction and erosion outside stabilized zones.
- Improved vegetation recovery and pasture resilience.
- Better water infiltration and reduced surface runoff in non-stabilized areas.
- More efficient land-use planning, reducing widespread degradation of grazing land.
- Indirect environmental benefit: reduced need for repeated pasture restoration or reseeding interventions.

- Shared experience and knowledge exchange regarding effective surface stabilization techniques.
- Joint procurement of materials (grids, gravel, geotextiles) can reduce costs.
- Potential cooperation in managing seasonal grazing pressure through shared turnout or overflow areas.
- Improved regional resilience in horse management during extreme weather events.
- Development of best-practice standards for paddock management within local farming networks.

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Additional Resources

Publications

- Hiltebrand, C., Keller, T., Bachmann Rieder, I., & Doetterl, S. (2025). Changes in soil quality on horse paddock trails and the influence of paddock grids. Soil Use and Management, 41, e70028. https://doi.org/10.1111/sum.70028

Websites

- **In English**
  - British Horse Society: Mud Management https://www.bhs.org.uk/horse-care-and-welfare/health-care-management/pasture-management/mud-management/
  - British Horse Society: Pasture management https://www.bhs.org.uk/horse-care-and-welfare/health-care-management/pasture-management/
  - Ecoraster Case Study. Ecoraster E50 Muddy Paddock Solutions https://ecorastergrid.com/case-study/ecoraster-e50-muddy-paddock-solutions
  - Extension Horses: How can I control mud in heavy traffic areas in my horse pastures and paddocks? https://horses.extension.org/how-can-i-control-mud-in-heavy-traffic-areas-in-my-horse-pastures-and-paddocks
  - Hübner Lee. The paddock plate for horse-friendly paddocks https://www.huebner-lee.de/en/paddock-enclosure.html
  - Irish Equine Center: Grassland for Horses. A handbook on best grazing/forage management practices and techniques https://teagasc.ie/wp-content/uploads/uploads/media/website/rural-economy/rural-development/equine/Grassland-for-Horses.pdf
  - University of Minnesota Extension: Managing established horse pastures https://extension.umn.edu/horse-pastures-and-facilities/managing-established-horse-pastures

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Annex

Ideas to Animate a Workshop About the Solution

- Invite a specialist in equine facility construction, paddock systems, or land management (e.g. stable builders, equine engineers, or agricultural advisors) to co-host or present.
- Organise the workshop on a model farm where stabilized surfaces (traditional systems and/or paddock panels) are already installed and in use.
- Include a live demonstration of different surface systems (gravel construction, geotextile-based systems, and paddock grids if available).

Proposed structure for the workshop on Stabilized Surfaces in Equine Facilities

1. Introduction to Stabilized Surfaces
- What are stabilized surfaces and where are they used?
- Key problem: mud formation, soil compaction, and pasture damage in horse management systems.
- Overview of common systems (gravel-based, geotextile constructions, paddock panels/grids).

2. Benefits of Stabilized Surfaces in Equine Farms
- Improved horse welfare (dry, safe footing, fewer injuries).
- Better year-round turnout possibilities.
- Reduced maintenance workload and pasture repair costs.
- Improved farm functionality and resilience in wet seasons.

3. Practical Applications on Equine Farms
- High-traffic zones: gateways, feeders, water points, shelters.
- Paddocks and sacrifice areas.
- Integration into track systems and rotational grazing systems.
- Use for rehabilitation or restricted-movement areas.

4. Planning and System Selection
- Assessing soil type, drainage, and horse traffic intensity.
- Choosing between full construction systems vs. paddock stabilization grids.
- Cost–benefit considerations depending on farm size and usage.
- Importance of drainage and long-term maintenance planning.
- Regulatory aspects (planning permission, land-use regulations, environmental restrictions).

5. Hands-On Demonstration
- Live demonstration of surface construction or existing installations.
- Comparison of different surface types (gravel, grid systems, mixed solutions).
- Practical exercises: participants evaluate an area and propose stabilization solutions.
- If available: comparison of muddy vs. stabilized areas.

6. Maintenance and Troubleshooting
- Regular inspection and surface leveling.
- Drainage monitoring and repair of damaged areas.
- Managing manure accumulation and hygiene.
- Preventing long-term compaction or surface failure.

7. Case Studies and Real-World Examples
- Examples of farms using stabilized surfaces successfully.
- Lessons learned from installation and long-term use.
- Cost-saving and welfare improvements observed in practice.
- Common mistakes and how to avoid them.

8. Cost Analysis and Return on Investment (ROI)
- Initial installation costs vs. long-term savings.
- Reduced costs for pasture restoration and veterinary treatment.
- Labour savings in daily management.
- Durability and lifespan of different systems (grids vs. gravel systems).
- Financial planning for phased installation across a farm.

9. Q&A Session
- Open discussion of site-specific challenges.
- Material choices and system suitability.
- Maintenance strategies and cost concerns.

10. Wrap-Up and Resources
- Summary of key principles.
- Supplier and technical guidance resources.
- Best-practice recommendations for installation and maintenance.
- Networking opportunities with contractors and advisors.