

Using a RAM Pump to Provide Alternative Watering for livestock

Case Study: Hardens Farm

Background

Providing an alternative drinking water supply is not always as simple as connecting to water mains. Rural locations often do not have mains water or the pressure available is insufficient to deliver to those fields at higher levels.

This was the problem facing farmer John Anderson of Hardens Farm which lies within the Lower Tweed Priority Catchment. The farm steading is located at 200 m above sea level, has a weak main supply with fields that rise to 300 m which are located a distance of 900 m from the steading in two different directions.

Providing Alternative watering

John investigated different methods of raising water to a supply tank in the top field and allow gravity to feed water to a network of field troughs. The options identified were;

- Using an electric pump system located at the steading to pump mains water
- Using a solar powered system to pump water from a small reservoir 600 m from the steading
- Using a water powered RAM pump feed from the reservoir

Utilising the reservoir was the most attractive option to John because it would not place additional strain on the mains water which supplies the farmhouse and neighbouring residential properties. It would also have lower annual running costs, as there would be no water charge. The reservoir lies below the steading requiring the pump system to lift water 120 m in height over a distance of 1400 m.

The German made Lorentz high efficiency solar powered pump is capable of lifting water up to 180 m and in this situation would require four solar panels to provide the necessary power. The down side of this system is the pump does not operate in the dark or in low light conditions therefore a larger tank would be required to provide additional system resilience.

Solar pump – indicative costs:

- 270W solar PV panels £ 253 x 4 = £1,012
- PS600HR pump £ 2,035
- **Total of £3,047.00 (ex VAT).**

The RAM pump system is operated by the flow of water through the pump, no other power source is required and it operates constantly providing a more reliable water delivery system. RAM pump - indicative costs:

- **RAM Pump £5,000 (ex VAT)**



Protecting Scotland's water

Historically farm field boundaries were set out to use available sources of open water to provide drinking water for livestock. Whilst this has provided stock with access to water over many years, in some circumstances it has led to negative impacts, such as field soil and nutrient run-off, poaching, erosion of banksides and faecal contamination into the water from livestock. This in turn could have an effect on livestock health and productivity, for example the spread of animal disease such as Johnes, Leptospirosis, Salmonella, Cryptosporidia, Fluke, Coccidiosis and Clostridia disease, as well as physical injury and lameness.

Legislation to improve water quality has made great progress in terms of reducing pollution from industrial sources, and more recently has focused on diffuse sources such as those caused by agriculture and forestry. Since 2008 SEPA have introduced priority catchments for diffuse pollution across 57 river catchments in Scotland with the aim of improving water quality from diffuse pollution from rural activities.

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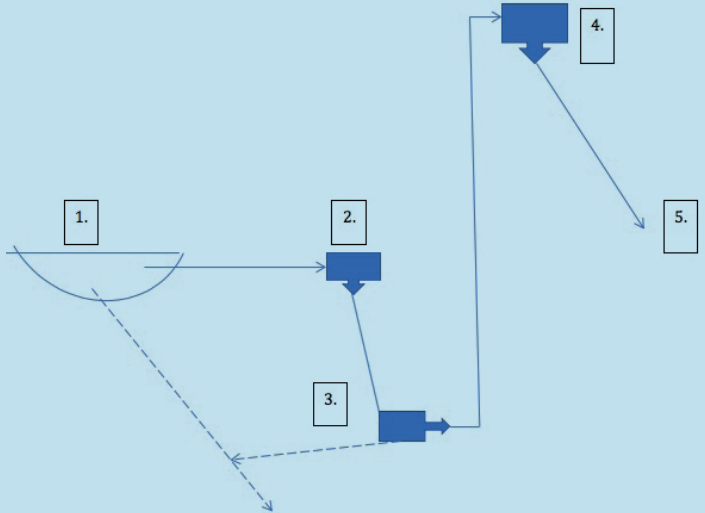
System design

John opted for the RAM pump and got professional advice on the design of the system. The key requirements are;

- Adequate incoming water flow and head of pressure to provide the required lift to the supply tank
- Off-line supply from the reservoir which allow air to escape from the pump delivery pipe

System Design Diagram

1. Abstraction pipe (double walled drainage pipe) from reservoir requires filter to prevent debris entering the system.
2. Delivery tank positioned at the same level as the abstraction pipe to maintain constant water level in the tank. Steel delivery pipe required from delivery tank to RAM pump.
3. RAM pump complete with isolation valves. Surplus water return to the reservoir outflow.
4. Supply pipe 32mm EPDM to supply tank
5. Gravity supply to field water troughs



John says *"The system has been working for just under a year and I am delighted with the reliable, maintenance free performance and stock health benefits. It had a real test in the dry summer and passed with flying colours saving me hours of time not needing to cart water to stock."*

For those considering this system, it's worth noting that the water that drives the ram pump is subject to abstraction licensing regulations even though it returns a large percentage of water back to the watercourse. If you are taking up to 10 m³ water per day, compliance with General Binding Rules is enough to grant authorisation.

If taking between 10 to 50m³ water per day, then a one-off registration with SEPA is required. If you are taking more water than this, authorisation would fall under "simple" licence with associated annual fee. Contact your local farm consultant or SEPA office for more information.

Part of the project cost was secured from the Scottish Rural Development Programme Agri-environment Climate Scheme with funding

towards the supply and installation of the RAM pump, the pipe line and the field water troughs.

There is more information on Alternative Watering Systems and links to other useful information on the FAS webpage.

