

Leachate Management and Monitoring Solution at a UK Landfill Site



Subject	Leachate Management	Location	Essex, United Kingdom
Application	Management of leachate levels across seven wells in an active landfill site	Implementation	Project designed and installed by enitial
Size	Up to 89,000 US gal per day	Installation	2013

Brittons Hall Farm is a landfill site in Essex, UK which serves the city of Chelmsford and the surrounding area. The site is managed by one of the largest landfill site operators in the UK and has won several awards for innovation. The site is now almost full and nearing the end of its active life. It will be closed in 2014 and a process of aftercare and regeneration will start which will take approximately 20 years.

The customer was looking for a way to manage the leachate levels on the site, firstly to ensure the levels were in compliance with those mandated but also to maintain sustainable gas extraction levels for the onsite power generation plant.

The challenge was to offer a solution that could do this for the last active months of the site and to provide a solution that would assist with the longer term management of the site.



Project

enital took on the challenge to provide a leachate pumping and management system designed to the customers' requirements. Initially five pumps were placed strategically around the site to manage the leachate levels in various cells. The pumps maintained the compliance levels and pumped the leachate back to a central 13,000 USgal tank where it could be collected for treatment and disposal. A telemetry system was installed in the storage tank to alert the site operator when the tank needed to be emptied.

enital chose LORENTZ low energy pumps for the project at Brittons Hall Farm. In September 2013 enital began to implement the surface pipework and cable laying to install five low energy leachate pumps. As the LORENTZ pumps have the ability to use integrated monitoring and management functions enital also made use of this to provide the onsite team and headquarters staff with real time views of the system performance.

By October a sixth pump was added and the communication portal (pumpMANAGER) went live. The site team could now view and see all data and the performance of each pump. The team on site could also control the pumps from the site office or from any internet connected device.

Technical Solution

Each pump system operates independently.

LORENTZ PS600 HR-07 Energy pumps were used to pump the leachate. Currently these are powered from a 3 phase power connection. All pumps are ready to run from solar panels, each pump would typically operate with 2x 250Wp solar modules.

Each pump system has a PS Communicator device installed. This is a stand-alone, solar powered communication unit which provides a real-time communication link between the pump and the cloud based pumpMANAGER application. pumpMANAGER allows all pumps to be monitored and managed from any internet connected device through a web browser interface. This

means that the client did not need to have an IT infrastructure investment to use these advanced services.

A localized pressure switch is installed in the pipework close to each well head so should the tank fill, pipes freeze or equipment be parked on over ground pipes, the pressure switch auto detects the pressure build up and shuts down the pump. A "tank full" warning is shown locally on the controller and also sent via the communication system and displayed on the pumpMANAGER portal.

For resilience an additional telemetry unit was installed on the central storage tank to provide SMS alerts of the tank levels.

Each system is also equipped with a level sensor. The level sensor measures the level of the leachate in each well and both records and reports this figure back to the PumpManager application via a GSM SIM card fitted into each communicator.

The website allowed users to log on and see the running status of each pump with data such as Run time, volume pumped, rotation speed, motor current and any event that may need action, i.e. tank full or well level source low and even the ability to turn the pump on or off and upgrade software via the website reducing the need for costly on-site visits.

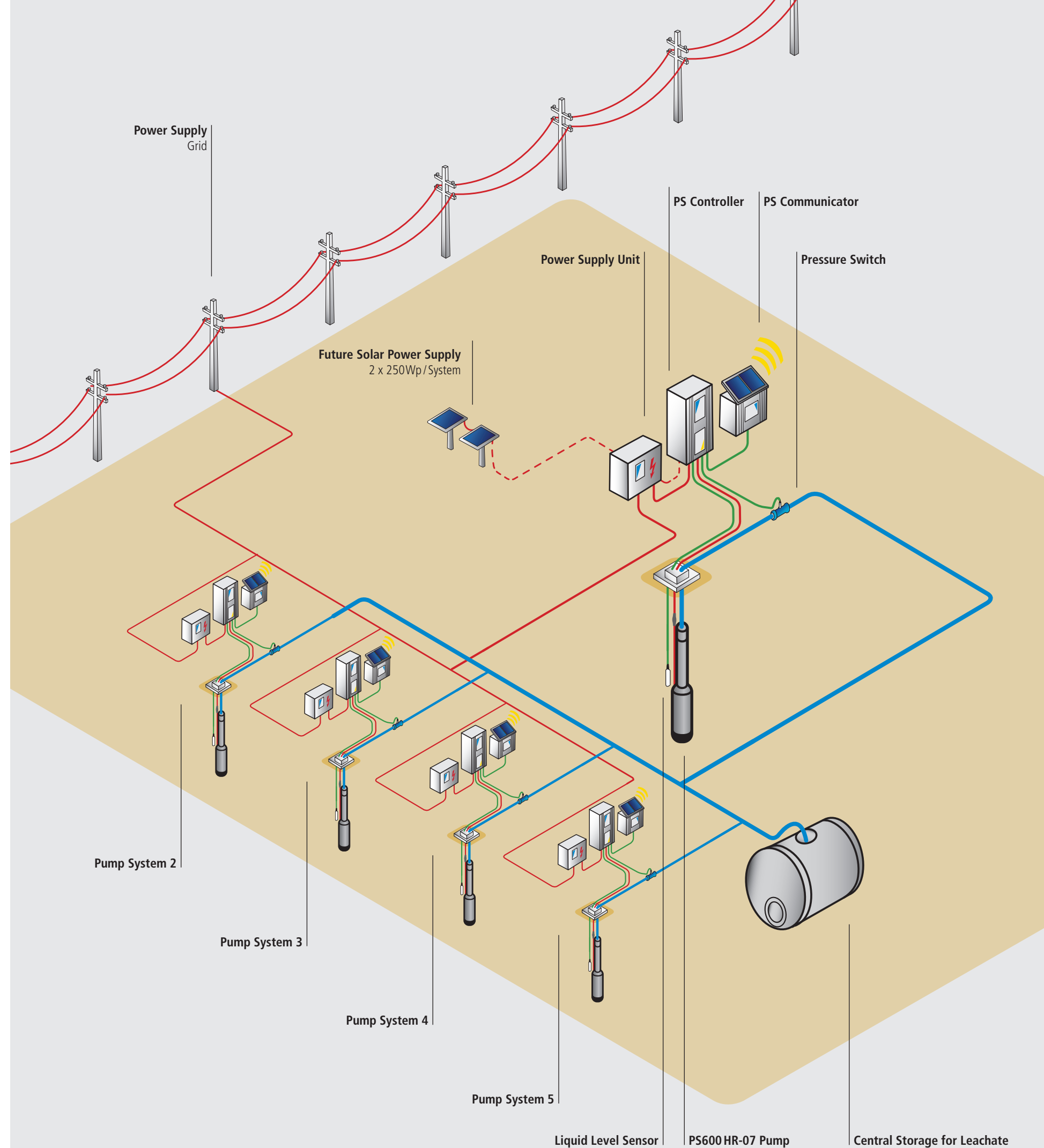
LORENTZ Energy pumps for leachate pumping

LORENTZ have been designing and manufacturing solar powered water pumps for over 15 years. These water pumps are used in the most extreme environments on earth and being solar powered are designed with highest efficiency in mind. LORENTZ Leachate pumps are specialized products which use some of the design elements which have made LORENTZ water pumps so successful but then have been adapted for use in harsh chemical and high liquid temperature conditions. LORENTZ Energy family of pumps also include solutions for the oil and gas industry where they have a long proven record of reliability and improving operating cost efficiency.

Low energy helical rotor pumps

The low energy helical rotor design has three benefits.

- High lifts are possible with very low power consumption. In the leachate application then a typical pump would pump 580 US gal per hour with a head of 130 ft using only 200W of power.
- Low power means that there are choices for the power supply. The pumps can be powered from the grid with single or three phase power or can be powered directly from solar panels, which are a very good option, even in the UK, for the life-cycle management of landfill sites.
- The helical rotor mechanism is a positive displacement pump, by design and operation the pump end is self-cleaning and does not introduce air into the leachate. Even in traditionally difficult extraction wells regular cleaning is not required so reducing operating overheads.



LORENTZ

Performance and compliance monitoring

All LORENTZ pumps are equipped with on board data logging and management tools. Using the PumpScanner Android™ App live data can be viewed over a local Bluetooth connection. Data is stored for up to ten years. Other settings such as speed and timers can also be used.

The pump controller also has inputs for additional flow and pressure monitoring. Using specialized software levels in the well can be measured and stored. This allows for automatic compliance level measurement.

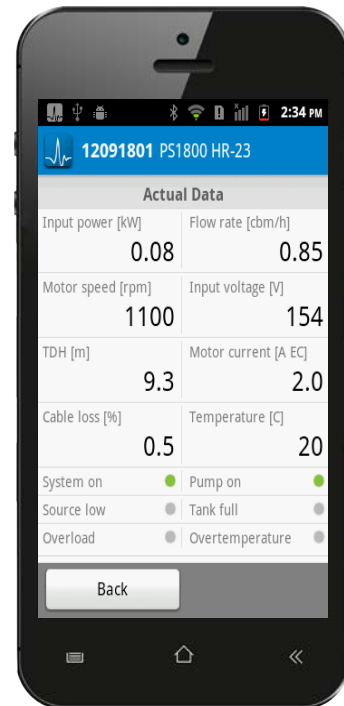
Where remote management and monitoring is required a PS Communicator device is added. This device sends all data back to the pumpMANAGER cloud based application. pumpMANAGER actively monitors all pumps and reports on status and performance. pumpMANAGER can be accessed by any web connected device meaning that site compliance visits and costs are greatly reduced.



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LORENTZ PumpScanner

PumpScanner is an Android™ App that allows you to monitor and manage your LORENTZ pumps from a Smartphone or Tablet. This exciting development for the LORENTZ pump systems is a clear differentiator from the competitor offerings. It allows easy setup of the pump system and improves identifying performance issues and pro-active service work to a great extent. Compliance, maintenance and fault finding time and costs therefore are reduced significantly.



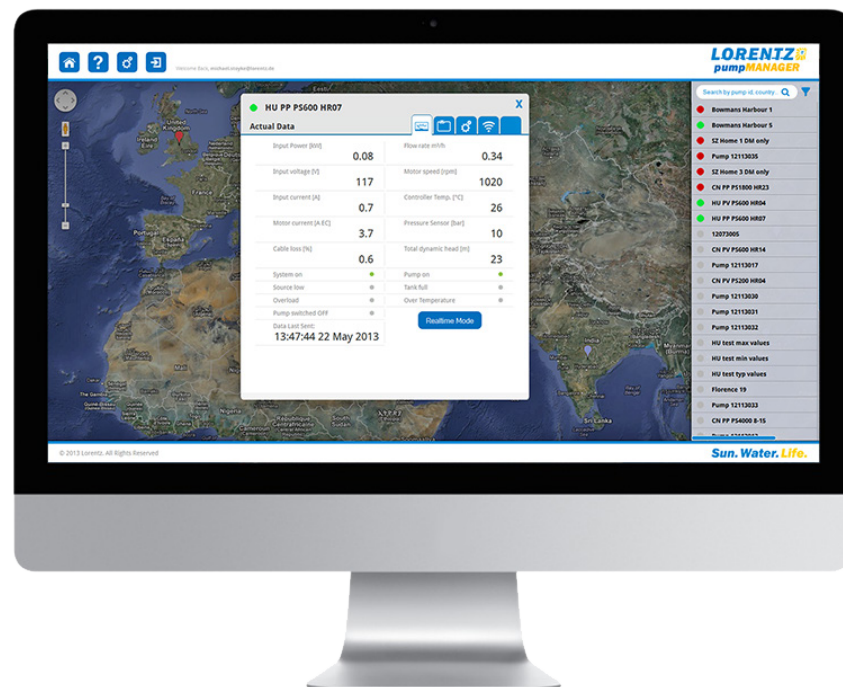
LORENTZ pumpMANAGER

pumpMANAGER is a cloud based management, monitoring and control platform for LORENTZ pump systems.

pumpMANAGER provides:

- Recording of voltages, current, flow rates, pump speed, temperature and pressures of monitored pumps
- Liquid-level measurement
- Real time and historical data views
- Remote configuration and programming of pump systems
- Proactive alerts via email in the event of a system problem

With a LORENTZ pump system and pumpMANAGER you can monitor and manage your pump from anywhere online.



Results

Fully operational and working very well. The leachate levels are very much under control and the onsite teams are able to see the performance of the systems at all times. The system enables the site to comply with permit requirements, giving confidence to the site operator and regulator.

The reliability of the systems has been excellent, even when control equipment has accidentally buried then it has continued to operate successfully.

The site now has seven Lorentz pumps and the client is now looking at introducing similar systems on other sites.



What customers are saying about LORENTZ Energy Pumps

We are amazed that with all pumps operating the storage tank is filled in just a morning, these small pumps really do move some liquid quickly with very little power consumption.

In the past we have had reliability problems caused by silt, varying leachate consistency and temperature changes. The LORENTZ Energy pumps take all of this in their stride.

In one of the wells we had a very large build-up of silt and ash, the LORENTZ pumps managed to pump a pipe full to a height of 65 ft of this material before showing an error, after clearing the pipe the pump carried on without any issues.

The detailed data we have from the system is a real time and a cost saver.

I can see that as the site is now closed down the system that enitah has installed will be incredibly beneficial. Being able to monitor the site remotely and understand the levels, what has been pumped and the general activity of the leachate management will be invaluable. Being able to move to solar power is very exciting from both a site safety point of view, environmental benefit and cost savings.

Once the site had been capped and closed the site should be self-maintained with little or no need to be supervised by any staff and to also capture any data or issues automatically and alert staff to those issues in real time.

Back Data capture and report handling was a large consideration for this project and each pump came with its own controller, communicator, level probe, level sensor and pressure switch.

The system provides an industry leading solution, integrating cutting edge pump engineering with advanced communications technology to optimize operational efficiency.



**ABOUT enitial**

enitial is an independent environmental monitoring and contaminated land management service providers in the UK. Delivering specialist expertise primarily to the closed waste management sector their services extend to quarries, construction sites, contaminated land and a variety of other industrial/commercial premises and land uses.

Emission and pollution control activities include landfill gas extraction and combustion, landfill leachate, extraction, treatment and disposal, contaminated groundwater treatment, effluent treatment and disposal. Management services include complete closed landfill management, facilities management, specialist investigation services such as pumping trials, control infrastructure evaluation and diagnosis, project management, bespoke data capture, management and reporting along with dedicated training programs.

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**ABOUT LORENTZ**

LORENTZ is a market leader in solar powered water pumping solutions.

Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping.

Today LORENTZ is active in over 120 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

Simply – *Sun. Water. Life.*

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