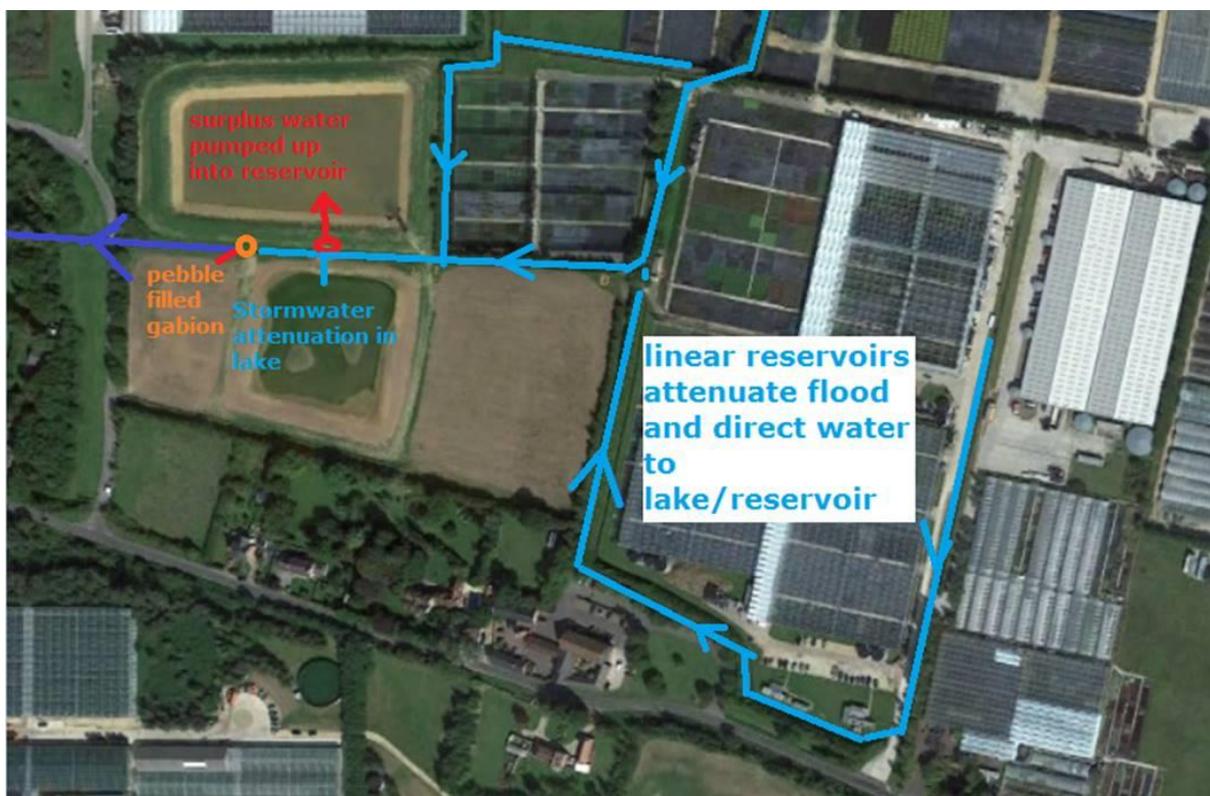


## Summary and history

Binsted and Walberton Nurseries' site at Lake Lane Barnham PO22 0AL has a reservoir which supplies the nursery with most of its irrigation water requirement. The reservoir is fed by pumping from a flood-meadow pond which provides stormwater attenuation, and from about 1000m of open linear-reservoir ditches which also provide stormwater attenuation.

The reservoir and flood-pond were constructed in 2015. With the linear-reservoir ditches, which were mostly dug by the nursery over the preceding 10-15 years, they form a Constructed Farm Wetland on the watershed between the Aldingbourne Rife catchment to the west, and the Binsted Rife catchment to the east.



Being on the watershed, we have only our own water to manage, and we aim

1. to retain and make use of as much as possible for irrigation on site,
2. to manage outflow from the site so as to reduce the risk of flooding downstream,
3. in doing both of the above to create and maintain good wildlife habitat and water quality.

**Simple engineering concept** The ditches are cut in the brickearth clay above the sand layer. These ditches retain & gradually release storm water into the flood-meadow pond and thereafter through a restricted outflow in a pebble filled gabion, to prevent flooding. Water is pumped when available in to the reservoir part of the site, where it is stored prior to pumping back to the nursery for irrigation use.

**Water licensing not required** The clay brickearth has been accepted by the Environment Agency as sufficiently impermeable that water permeation into or from them is effectively nil – as the successful functioning of the unlined reservoir confirms. Consequently no abstraction licence is required for using these linear reservoirs and the flood pond to harvest and re-use our own rainwater. If the ground had been water-permeable then the ditches and reservoir would have needed to be lined to retain unlicensed use of our own harvested water.

### **Establishment of linear reservoir ditches for wildlife habitat**

- The linear-reservoir ditches' sides are mostly steep and so we sowed them with a hydraseeded mix of non-vigorous grasses and wildflowers. Some ditches were given shaped features to improve wildlife habitat potential, most are more uniform in profile due to space constraints. Due to irrigation run-off (and some mini-bunds in the ditch foot), some moisture remains in the ditches at all times of year. A shallower-profile ditch was left to acquire its own vegetation rather than hydraseeded.
- In creating the ditches, the extracted subsoil was placed to form an adjacent bank and the topsoil spread over the top of it. Native shrubs were then planted to form a visual screen and windbreak for the nursery site as well as additional wildlife habitat: including blackthorn, buckthorn, dogwood, wild privet, guelder rose, spindle.

### **Flood-pond-meadow and reservoir**

*The flood meadow pond* was built in summer 2015 as a collection point from which to pump up into the reservoir via the linked linear-reservoir ditch, and for stormwater attenuation to prevent flooding.

It incorporates wildlife-friendly, shallow banks and islands. It also provides an area of permanent, and often moist, flowery grassland. Neutral grassland lowland meadows are a BAP Priority Habitat. Reeds in the lowest part, transplanted from our other ditches, should support UK Red List species such as reed bunting. Seeds were sown for native pond, marginal and meadow wildflowers. Colonisation by invertebrates such as dragonflies, water boatmen, and by birds such as swans and mallards, was immediate, and has subsequently diversified with even great crested grebe spotted there in late autumn 2016.





*The reservoir* was built together with the *flood-pond meadow* in summer 2015. By summer 2016 both facilities, with their grass-and-wildflower banks, already provided an excellent waterfowl habitat area together.





## **Technical Data on Reservoir**

**Reservoir Capacity:** 20,000 m<sup>3</sup>

**Footprint:**

Reservoir including banks = 3.6 acres

Water surface when full = 2.4 acres

Flood pond including banks = 2.1 acres

Water surface when not flooding = 1.0 acres

**Gradient of Side Walls:** 1:3

**Reservoir Base Level:** 48.6 m O.D. (existing field level; 49.4 m O.D.)

**Side Wall Height:** 51.8m O.D. (2.4 m above existing field level)

**Reservoir Input Pump Flow Rate:** 20 m<sup>3</sup>/hour

**Water Treatment of Output:** Ximax Chlorine Dioxide dosage system

**Water Testing Protocols:** Every 6 months samples are taken from the linear reservoirs for nutrient analysis (x2) and biological analysis (x3). Periodically; samples are also taken direct from the reservoir and irrigation lines. Chlorine dioxide levels in irrigation water are monitored fortnightly.

**Principle Design Consultant:** Andrew Hawes

**Principle Groundworks Contractor:** Whitnell Contracts Ltd

**Design and Intallation of Pumping Systems:** Kelvin Baldwin, KJB Contractors