

# Tithe Barn

## Aerators Project 2017



## Purpose

The Tithe Barn lakes are usually good quality waters with consistent conditions. However the low water levels of 2016 have highlighted that a worse drought summer might cause eutrophication problems. The aeration is to insure against this in both the Bottom Lake and Middle lake.

The idea was to use this installation as a prototype for a rollout programme across around 12 of our other waters.

## Solution

With no permanent power available, the plan was to establish an Oxybox aerator into each of the lakes. This is a low maintenance solar powered aerator. They would be securely housed on an island in each lake. The middle lake already has the island; the bottom lake needed to have an island/fish refuge constructed. The aerators are on a timer and are planned to be run 365 days a year over the early morning period when the waters are at most eutrophication risk.

## Funding

In early January 2017, the club sought funding from the Angling trusts 'Ready for Spring' programme. The Oxybox solution was part of a wider request which included purchasing an emergency aerator and a DO meter. In late March, the club were told 'the Angling Trust has agreed to award Portsmouth and District Angling Association a grant of £3,402 towards an estimated total project cost of £7,840 for the project titled 'Ready for Spring – Combatting Eutrophication project'.

## Time Scales

In April 2017, the club started the project by ordering the main components from Aquaculture Limited.

We pressed on with building the 'island' on the lower lake. Materials were purchased from local building suppliers.

The first delivery of equipment came in late June 17 however the actual Oxyboxes are built to order, and didn't arrive until the 15<sup>th</sup> July.

The solar panels were larger than we had thought so some technical design work resulted in us ordering some additional frames, two in landscape (middle lake) and one in portrait (bottom lake). These were bought from Plug-in Solar Ltd. The landscape frames were in stock and the club installed the aerators on the middle lake by the end of July 17.



Figure 1 Middle Lake - frames install



Figure 2 Middle Lake - complete

The portrait frame came from Germany and there were a few issues with fittings so the Bottom lake was finally installed on the 19th August 17. The Lower lake is in Landscape mode which was the preferred orientation advised by Plug In Solar for ground based installations, but used a TRIC F Portrait frame. The Landscape mode is used to provide optimal angle adjustment since we could only fit one panel on the platform. It is also less intrusive visually and requires less ballasting to secure the panel against wind damage.



Figure 3 Installing Lower Lake



## Outcomes

Both installs worked first time when they were installed. The Middle Lake timer was initially left with its default settings. However, this was adjusted after 2 weeks to remove the settings which were after 11am. It runs for about 3 hours a day currently.

The Lower lake aerator is driven by 1 solar panel. The timer has been set to work on the likely peak problem hours and runs for about 2 hours a day currently.

The panels will be adjusted for the winter months (lower sun) and the batteries will be assessed after a full winters running to see if we need to make changes next spring.

The Middle lake aerator is secured by a padlock and chain as access can be made by wading.

The Lower lake aerator is unsecured (other than by the ballast) but access is very difficult.



Figure 4 Bottom Lake working



Figure 5 Middle Lake working

## Final Costs

The project did run over initial budget mainly due to the fittings/ frames and man power required. The main costs were:

|                              |                     |                           |
|------------------------------|---------------------|---------------------------|
| 2 x Oxybox                   | £3418.20            | Aquaculture Equipment Ltd |
| 2 x 40m limpet hose          | £266.40             | Aquaculture Equipment Ltd |
| 8 x Diffusers                | £396.00             | Aquaculture Equipment Ltd |
| 16 x Clamps                  | £46.40              | Aquaculture Equipment Ltd |
| Mounts for panels            | £224.97             | Plug-In Solar             |
| Additional fittings          | £21.20              | Plug-In Solar             |
| Island materials             | £62.65              | Wickes                    |
| Ballast and island materials | £24.79              | B&Q                       |
| Security chain and padlock   | £25.07              | Tool station              |
| Preservers and sealants      | £55.24              | Toolstation               |
| Delivery                     | £100                | Aquaculture Equipment Ltd |
| VAT                          | £1028.17            |                           |
| Total cost                   | £5669.09            |                           |
| Labour (not a direct cost)   | Approx 60 man hours |                           |

This works out at around £2800 per installation, and requires 2 work parties with 4/5 skilled attendees.

## Lessons Learnt

These are the initial thoughts. They will be reviewed and added to after the aerators have been running for a period. We will check the installations regularly in the first year to make sure nothing is likely to break/blow away or the batteries lose all charge and the hose are all still connected and working

1. Location of the platform for the aerator needs careful consideration. Need to be able to get maximum sun on the panels so aim for north/south aspect. Any shadow to be avoided particularly when sun is low in winter.
2. The platform should be big enough to house 2 solar panels in landscape, and the Oxybox. We have 1 solar panel on the lower lake currently in portrait and we can assess how that performs, but 2 will be better especially if the panel is not always in full winter sun. Landscape offers less wind resistance and is an easier install.
3. The build of the platform with marine ply sitting on boards and scaffold tubes is robust. We constructed on bank which worked well. Siting off a boat is tricky though.

4. The aerator programme is probably on too long in its default setting. Initial set up should concentrate on the likely problem times rather than a general spread.
5. Security of the Oxybox needs to be considered. The battery is the most expensive component but other parts could be stolen/vandalised if access is too easy. We fitted hasps to the box lid to secure it with a chain and padlock.
6. 40m hose seems fine for a good spread of diffusers however more hose may be needed in larger lakes. The diffusers must be filled with pea gravel, not partially filled.
7. Ducks do like the temporary island we built. Need to ensure it doesn't encourage nesting etc which could mess up the solar panel.
8. We have planted around the island, with a fish refuge underneath. This is to stop anglers casting too close and to provide some additional cormorant protection. We will see how anglers treat the new features before deciding if more protection is needed.
9. The aerators run very quietly and don't disturb anglers.
10. We should budget for battery replacements every 3 or 4 years. Other parts need little maintenance and should last 10 years plus.

## Conclusion

The aerators have been successfully implemented. We will take random DO meter readings particularly early next year to see what impact the aerators are having , comparing reading to other end of the lakes.

The experience gained should enable quicker and easier installs in the future. Further installs will be considered for other club waters. Surveys need to be done to check suitable sites can be found.

The waters to be considered:

Funtley Lake

Soake Pond

Tithe Top lake

Abshot Pond

Alver Valley Lake

Brownwich Pond

Carron Row Farm (Lakes 1 to 5)

Lakeside 1000

Sinah Lake

## Appendix 1 Invoices (over £100)

Aquaculture

### INVOICE

Customer Address:

Delivery Address:

Portsmouth & District AS



**Aqua Culture Equipment Ltd**

Unit 10, Atrium, 1st Floor, Fish Farm, 10 St. John's...

35, Foxdenton Lane, Middleton, Manchester M24 1QG

Tel: 0161 6835869 Mobile: 07715 007964

Email: sales@aquacultureequipment.co.uk

[www.AquacultureEquipment.co.uk](http://www.AquacultureEquipment.co.uk)

Date: 25th June 2017

Re: Portsmouth AS. 1743

Purchase Order No: Verbal

| PRODUCT                        | DESCRIPTION                                                                 | QTY | UNIT PRICE (£) | TOTAL            |
|--------------------------------|-----------------------------------------------------------------------------|-----|----------------|------------------|
| Oxybox 3 System                | Self contained battery powered aerator with 2 x solar panels for recharging | 2   | 1709.10        | 3418.20          |
| LowPET Self-Sink Air Hose      | 12.5mm LowPET Hose, 40m drum                                                | 2   | 133.20         | 266.40           |
| Diffusers                      | 1m EPDM weighted diffuser                                                   | 8   | 49.50          | 396.00           |
| Stainless Steel KALOR Clamps   | Stainless steel hose clamps                                                 | 16  | 2.90           | 46.40            |
| Acqua & Co. 1hp Splash Aerator | 1hp Splash aerator, single phase with additional protection basket          | 1   | 657.00         | 657.00           |
| DELIVERY                       |                                                                             |     |                | 100.00           |
| SUBTOTAL                       |                                                                             |     |                | 4884.00          |
| VAT (20%)                      |                                                                             |     |                | 976.80           |
| <b>TOTAL DUE</b>               |                                                                             |     |                | <b>£5,860.80</b> |

Terms: Unless otherwise stated this invoice is due for immediate payment

All goods remain the property of Aquaculture Equipment Ltd until paid for in full

Under the terms of the Late Payment of Commercial Debts (Interest) Act 1998, interest will be payable on overdue invoices

#### HOW TO PAY:

Cheques payable to: Aquaculture Equipment Ltd

You can pay this invoice electronically using the following account details:

Sort code: 08 92 50 Account No: 70420505 Co-operative Bank

FOR OVERSEAS PAYMENTS: BIC Number: CPBK GB22 IBAN: GB40 CPBK 08925070420898

The Co-operative Bank, 70-72 Cross Street, Manchester M2 4JG United Kingdom



Please use your invoice reference number on any payment

CREDIT/DEBIT CARD: 2.5% Charge for credit card payments. Debit cards no charge

Registered in England and Wales, Company No. 4470461 VAT Registration Number: GB 134855 2&

Note: This includes the 1hp splash aerator, which is for emergency aeration. (also part of the bid for monies).

Plug in Solar



## INVOICE

01444 6720051 info@pluginsolar.co.uk

Plug In Solar Ltd  
289 London Rd  
Burgess Hill, RH15 9QU  
United Kingdom

www.pluginsolar.co.uk

BILL TO  
Portsmouth and District Angling Club  
Steve Mottershead

Invoice Number: 305

Invoice Date: July 18, 2017

Payment Due: July 18, 2017

Amount Due (GBP): £0.00

| Product                                                              | Quantity | Price  | Amount  |
|----------------------------------------------------------------------|----------|--------|---------|
| TRIC-F Quer Adjustable Landscape Mounts                              | 2        | £59.99 | £119.98 |
| TRIC-F 45 Portrait Mounts<br>includes Rail                           |          | £79.99 | £79.99  |
| International Shipping<br>Special Order Shipping Charge from Germany |          | £25.00 | £25.00  |
| Subtotal                                                             |          |        | £224.97 |
| VAT 20% (228 8506 86):                                               |          |        | £45.00  |
| Total                                                                |          |        | £269.97 |
| Payment on July 19, 2017 using a credit card:                        |          |        | £269.97 |
| Amount Due (GBP):                                                    |          |        | £0.00   |

### Notes

All queries must be no longer than 30 days from the document date. Claims for damages must be made in writing within 3 days, and must be signed for as damaged at point of delivery.