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Registered charity no: 1080319

## *Wetland Planting Methodology*

*Tremeirchion ICW*

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### **Revision History**

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### **Purpose**

*This document consists of the planting methodology for the wetland development at Tremeirchion.*



## Planting Detail

The wetland consists of three separate cells which vary in size: cell 1 (1650 m<sup>2</sup>), cell 2 (1575 m<sup>2</sup>), and cell 3 (1370 m<sup>2</sup>). The species composition of the plants in each cell must adhere to certain proportions, as detailed in Table 1, to ensure that no single species becomes too dominant and to maximise phosphorous reduction. Within the selection of plant species, different plants grow and function at slightly different depths, and some plants may die if planted in 20cm of water. Therefore the plants will need to be planted in bands at different depths, increasing from the edge of the wetland towards the centre. The species have been grouped into 4 bands:

### 5cm Plants

*Mentha aquatica*

*Juncus effusus*

*Juncus inflexus*

*Lythrum salicaria*

### 10cm Plants

*Eleocharis palustris*

*Carex pseudocyperus*

*Caltha palustris*

### 15cm Plants

*Sparganium erectum*

*Veronica beccabunga*

*Equisetum hyemale*

### 20cm Plants

*Iris pseudacorus*

*Carex acutiformis*

*Typha angustifolia*

*Glyceria maxima*

*Persicaria amphibia*

*Schoenoplectus lacustris*

Although the species are categorised into different favourable depths, it is assumed that they will not necessarily be planted in exactly these depths. However, by planting from the edge inwards this will allow some gradient of depth as it can be assumed that the deepest water will be in the centre



of the pool and this will allow the plants to be planted in the most favourable depth possible to reduce loss. Please see more detail of the initial plant establishment phase in the 'Tremeirchion Commissioning Plan'.

Most of the wetland plants will be planted at 6 plants per m<sup>2</sup>; this planting density is at the lower end of the range of densities recommended (6-10 plants/m<sup>2</sup>), and this may lead to a slightly reduced performance in the first 6 months of the lifetime of the wetlands. The impact is expected to be short term as the wetland plants should grow and proliferate rapidly once established. Three of the wetland plant species will be planted at 9 plants per m<sup>2</sup> to include *Sparganium erectum*, *Mentha aquatica* and *Veronica beccabunga*. This increased density will allow the system to mature more quickly in terms of vegetation cover. Non-rhizomatous spreading and non-tussock-forming species benefit the greatest from being planted at a higher density. Further details of the planting are as follows:

#### **Cell 1**

Cell 1 will consist of a selection of key species, with no marginal species present. Individual species will need to be planted in blocks of 3 x 3 m wide. The outside band should be planted with blocks of '15cm plant' *Sparganium erectum* (2,673 plants) covering an area of 297 m<sup>2</sup> around the margin of the wetland cell. Blocks of the five other '20cm plant' species, *Iris pseudacorus* (792 plants), *Carex acutiformis* (2,178 plants), *Typha angustifolia* (2,178 plants), *Glyceria maxima* (2,178 plants) and *Schoenoplectus lacustris* (792 plants) should then be planted in the remaining area of 1,353 m<sup>2</sup>.

#### **Cell 2**

Cell 2 will consist of a mix of key species and marginal species. Individual species will be planted in blocks of 3 x 3 m. Blocks of marginal species including '5cm plants' *Mentha aquatica* (284 plants) covering an area of 31.5 m<sup>2</sup>, *Juncus effusus* (189 plants) covering an area of 31.5 m<sup>2</sup>, *Juncus inflexus* (189 plants) covering an area of 31.5 m<sup>2</sup> and *Lythrum salicaria* (95 plants) covering an area of 15.75 m<sup>2</sup> will be planted around the margin of the wetland cell in a band. This band will be followed by blocks of '10cm plants' *Eleocharis palustris* (284 plants) covering an area of 47.25 m<sup>2</sup>, *Carex pseudocyperus* (189 plants) and *Caltha palustris* (189 plants) covering a combined area of 63 m<sup>2</sup>. This band will be followed by blocks of '15cm plants' *Veronica beccabunga* (142 plants) covering an area of 15.75 m<sup>2</sup>, *Equisetum hyemale* (284 plants) covering an area of 47.25 m<sup>2</sup> and *Sparganium erectum* (1701 plants) covering 189 m<sup>2</sup>. Progressing towards the middle of the cell, the remaining area of 1,102.5 m<sup>2</sup> will be blocks of the '20cm plants' including *Iris pseudacorus* (756 plants), *Carex*



*acutiformis* (1701 plants), *Typha angustifolia* (1323 plants), *Glyceria maxima* (1701 plants), *Schoenoplectus lacustris* (945 plants) and *Persicaria amphibia* (189 plants).

### Cell 3

Cell 3 will consist of a mix of key species and marginal species. Individual species will be planted in blocks of 3 x 3 m. Blocks of marginal species including '5cm plants' *Mentha aquatica* (247 plants) covering an area of 27.4 m<sup>2</sup>, *Juncus effusus* (164 plants) covering an area of 27.4 m<sup>2</sup>, *Juncus inflexus* (164 plants) covering an area of 27.4 m<sup>2</sup> and *Lythrum salicaria* (82 plants) covering an area of 13.7 m<sup>2</sup> will be planted around the margin of the wetland cell in a band. This band will be followed by blocks of '10cm plants' *Eleocharis palustris* (247 plants) covering an area of 41.1 m<sup>2</sup>, *Carex pseudocyperus* (164 plants) and *Caltha palustris* (164 plants) covering a combined area of 54.8 m<sup>2</sup>. This band will be followed by blocks of '15cm plants' *Veronica beccabunga* (123 plants) covering an area of 13.7 m<sup>2</sup>, *Equisetum hyemale* (247 plants) covering an area of 41.1 m<sup>2</sup> and *Sparganium erectum* (1480 plants) covering 164.4 m<sup>2</sup>. Progressing towards the middle of the cell, the remaining area of 959 m<sup>2</sup> will be blocks of the '20cm plants' including *Iris pseudacorus* (658 plants), *Carex acutiformis* (1480 plants), *Typha angustifolia* (1151 plants), *Glyceria maxima* (1480 plants), *Schoenoplectus lacustris* (822 plants) and *Persicaria amphibia* (164 plants).

**Table 1: Species Planting Proportions**

Species		No. of plants (based on 6 plants m <sup>2</sup> )
<i>Iris pseudacorus</i>	Species in green make up 80% plant species	2206
<i>Carex acutiformis</i>		5359
<i>Typha angustifolia</i>		4652
<i>Glyceria maxima</i>		5359
<i>Sparganium erectum</i>		5854
<i>Schoenoplectus lacustris</i>		2559
<i>Equisetum hyemale</i>	Species in orange make up 20% plant species	530
<i>Eleocharis palustris</i>		530
<i>Carex pseudocyperus</i>		353
<i>Caltha palustris</i>		353
<i>Mentha aquatica</i>		530
<i>Persicaria amphibia</i>		353
<i>Juncus effusus</i>		353
<i>Juncus inflexus</i>		353
<i>Veronica beccabunga</i>		265



<i>Lythrum salicaria</i>		177
<b>Total</b>		<b>29786</b>

### **Planting Technique**

The plants (in their plugs) should be embedded in the clay lining of the wetland. This can be done by using a dibber to form indentations in the surface of the lining in which the plants can be placed and firmed in. This technique is consistent with the planting methodology used for other constructed wetlands in the UK which are currently operational. The plant roots will not compromise the infiltration rate of the lining as clay is self-sealing, and the slow build-up of material at the base of the wetland over time will further impede infiltration.

No extra topsoil should be added to the wetland during planting.

### **To note:**

Plants are provided by Salix in trays of 60 of each species. Consequently, the number of the plants ordered is slightly higher than listed in this document. Distribute the surplus plants equally between 3 x 3m blocks of each species.

			Cell 1		Cell 2		Cell 3	
20cm	Species	6 Plants m2	No of plants	Area (m2)	No of plants	Area (m2)	No of plants	Area (m2)
	<i>Iris pseudacorus</i>	2206	792	132	756	126	658	109.6
	<i>Carex acutiformis</i>	5359	2178	363	1701	283.5	1480	246.6
	<i>Typha angustifolia</i>	4652	2178	363	1323	220.5	1151	191.8
	<i>Glyceria maxima</i>	5359	2178	363	1701	283.5	1480	246.6
	<i>Pericaria amphibia</i>	353	0	0	189	31.5	164	27.4
	<i>Schoenoplectus lacustris</i>	2559	792	132	945	157.5	822	137
<b>Totals</b>			<b>8118</b>	<b>1353</b>	<b>6615</b>	<b>1102.5</b>	<b>5755</b>	<b>959</b>

			Cell 1		Cell 2		Cell 3	
15cm	Species	9 Plants m2	No of plants	Area (m2)	No of plants	Area (m2)	No of plants	Area (m2)
	<i>Sparganium erectum</i>	5859	2673	297	1701	189	1480	164.4
	<i>Veronica beccabunga</i>	265	0	0	142	15.75	123	13.7
<b>Totals</b>			<b>2673</b>	<b>297</b>	<b>1843</b>	<b>204.75</b>	<b>1603</b>	<b>178.1</b>
<b>Width of planting band (m)</b>			<b>3</b>		<b>3</b>		<b>3</b>	
			Cell 1		Cell 2		Cell 3	
15cm	Species	6 Plants m2	No of plants	Area (m2)	No of plants	Area (m2)	No of plants	Area (m2)
	<i>Equisetum hyemale</i>	530	0	0	284	47.25	247	41.1
	<b>Totals</b>			<b>0</b>	<b>0</b>	<b>284</b>	<b>15.75</b>	<b>123</b>
<b>Width of planting band (m)</b>			<b>3</b>		<b>3</b>		<b>3</b>	

			Cell 1		Cell 2		Cell 3	
10cm	Species	6 Plants m2	No of plants	Area (m2)	No of plants	Area (m2)	No of plants	Area (m2)
	<i>Eleocharis palustris</i>	530	0	0	284	47.25	247	41.1
	<i>Carex pseudocyperus</i>	353	0	0	189	31.5	164	27.4
	<i>Caltha palustris</i>	353	0	0	189	31.5	164	27.4
	<b>Totals</b>		<b>0</b>	<b>0</b>	<b>662</b>	<b>110.25</b>	<b>575</b>	<b>95.9</b>
<b>Depth of planting (m)</b>			<b>3</b>		<b>3</b>		<b>3</b>	

			Cell 1		Cell 2		Cell 3	
5-10cm	Species	9 Plants m2	No of plants	Area (m2)	No of plants	Area (m2)	No of plants	Area (m2)
	<i>Mentha aquatica</i>	530	0	0	284	31.5	247	27.4
	<b>Totals</b>		<b>0</b>	<b>0</b>	<b>284</b>	<b>31.5</b>	<b>247</b>	<b>27.4</b>
	<b>Depth of planting (m)</b>			<b>3</b>		<b>3</b>		<b>3</b>

			Cell 1		Cell 2		Cell 3	
5-10cm	Species	6 Plants m2	No of plants	Area (m2)	No of plants	Area (m2)	No of plants	Area (m2)
	<i>Juncus effusus</i>	353	0	0	189	31.5	164	27.4
	<i>Juncus inflexus</i>	353	0	0	189	31.5	164	27.4
	<b>Totals</b>		<b>0</b>	<b>0</b>	<b>378</b>	<b>63</b>	<b>328</b>	<b>54.8</b>
	<b>Depth of planting (m)</b>			<b>3</b>		<b>3</b>		<b>3</b>