

## The Rother Valley See-Saw

The design is for a pivoting, see-saw type construction to provide a caisson style boat lift combined with a rising view caisson (a people pod), with the advantage of virtually zero water usage due to the caisson principle, whilst providing an advantageous income from tourism.

The current plan to exit Nethermoor Lake at its north-eastern tip is retained. A wide beam waterway to be provided under a flood clearance height bridge at Barbers Lane heading north-east, the channel quickly opening into a long, narrow oval-shaped pool extending to the full area of the planned quintuplet lock flight. The bank on which the locks were planned, to be re-contoured to the steepest practical slope to increase the visual impact.

On an island in the middle of this pool, two substantial columns over 100 feet apart and parallel to the pool side, and of identical height will be topped by large pivot bearing housings on a single axis. The short shaft through each bearing to carry a fabricated beam extending across the pool at right angles to the pool side and to reach just short of the west bank. At the end of each fabricated beam to be the attachment for a caisson to carry a wide beam or two or more narrow beam boats of maximum permissible waterway length.

The opposite end of each beam to be extended past the column pivot bearings to the maximum allowable design length (to give maximum viewing height), then joined by a 'people-caisson' pod, which is maintained in a horizontal mode at all times as is the boat-caisson, largely by gravity (due to the pivot point being above the rotational centre of gravity), but both also maintained level by powered gearing around the caisson/pod pivot points, activated by level sensors. The pod is a fully enclosed glass fronted structure with longitudinal stepped seating from the window wall backwards across part-width of the pod to allow views-for-all as in theatre-seating. A level area at highest seating height to extend back to the rear wall of the pod, to give a table seating area with a cafe-style kitchen area for food and drinks to be served and toilets at the south end. Beneath this upper seating/cafe area will be space for materials storage/services for toilets etc./power units for the operation of the see-saw movement. This people pod will be positioned at rest on the eastern bank and above the flood water level.

The two ends of the beams will be designed to be essentially equal in weight. The boat caisson will be of constant weight due to the advantage of Archimedes principle. The people pod will vary due to materials storage and human loading. Long slender dumbbell-shaped weights along the length of each fabricated beam and mounted below the column pivot shaft, in bearing assemblies and movable along their own axes, powered by a hydraulic system mounted under floor of the cafe-seating area. The movement of each weight to be controlled by load-cells initially at people pod rest position. Angular position and speed-of-rotation sensors (around the column pivot bearings) to move the caisson/pod around an arc. This small movement of the balance weights will result in a very small power-usage requirement, equating to a very few kettles boiled per movement (similar to the claims made for the Falkirk Wheel).

At starting point the boat caisson will be adjacent to a floating dock (to allow for flood conditions). The caisson doors to open to allow entry of the load (one or more boats). On sealing of the caisson, the dumbbell weights will be caused to move away from the boat caisson across the column pivots until balance causes the caisson to rise from the water, up in an arc and past the pivot point height until it reaches the upper limit which is aligned with the end of a short aqueduct emanating from the canal line tangentially, and eliminating the originally planned Moorhouse junction lock. On reaching this upper limit, interlocks will hold the caisson in place with location pins to the aqueduct structure for safety, and similarly the people pod will have settled to its loading position on load-cells to verify its changing weight due to people transfer, automatically adjusting the dumbbell weights individually to remove uneven loading of the beam structures.

Disembarking/embarking of passengers for their pod-flight will be through access doors at the northern end (emergency doors at the southern end), with level disabled access capability, to the table seating area, the disabled wheelchair positions to be at the uppermost viewing seat height. Door-closed interlocks coupled to the boat caisson ready signal, will allow the Operator in the Control Room to double check the weight balance condition for stability, then release the safety location pins at the aqueduct to caisson and activate the dumbbell movements required to transfer weight to the boat-caisson side and cause the arms to move in an arc until the boat-caisson reaches its floating position adjacent to the floating dock. At this position the people pod will be at its maximum height, depending on the water level in the pool, to give views across the Rother Valley Country Park.

If it is deemed preferable to have a fairly constant pool water level, then flood lock gates could be installed close to the new Barbers Lane Bridge, and with a short pound to opposed gates facing the pool. This would enable the pool to be maintained at best working level, should drought conditions cause Nethermoor Lake to drop below its usual level.

Emergency evacuation of the people pod is a fundamental difficulty due to rotation around the column pivot point causing varying attitude to an escape staircase (could be designed down the fabricated arms and down a staircase within the columns, but only at set angular positions, to allow physical transfer). However, the people pod is no different to a boat caisson on any lift design, for ease of emergency exit. As a safety measure a pre-tensioned wire rope wrapped around drums at the people pod ends and similar drums at the pod rest position, and powered by a completely separate power supply, could be made to forcibly lower the pod irrespective of the individual loading or dumbbell-weight position. This capability could mean a considerable size of cable, but surely possible given the knowledge of e.g. mining lift cages.

On the western bank of the pool would be maybe a three-level Visitor Centre opposite and at least as long as the pod, with toilet facilities on the upper two levels and lifts at each end. The lower level would be an (underground) car-park, just above flood-water level, and since the Centre would be used at all times of the day/darkness and all year round, to give

improved security. The middle level would be for café/restaurant/merchandising premises with limited viewing from just above the pool level. The upper level to have vertical windows end to end to view down into the boat caisson at floating position and views across to the people pod embarking position. At the upper edge of the vertical windows, further windows angling backwards would allow views to both pods when in their uppermost positions. When the boat caisson commences movement from its floating position, the arc generated by the pivots atop the columns would cause the boat caisson to move closest to the viewing windows at approximate pivot level. This closeness would allow viewers/boat caisson occupants (and at a greater distance people pod occupants) to make eye-contact as the transfer takes place.

The Control Room would ideally be located at centre line of the caisson/pod and standing slightly forward of the middle level windows. This will allow uninterrupted views of the pool including caisson and pod at all positions.

Access to the people pod would be provided from the northern end of the building through airport-style transfer gates along a covered walk-way around the end of the pool, at constant level for disabled access, this will bring the walk-way (with windows) under the last section of the aqueduct and provide a waiting area/queue for the next embarkation to pod flight. Return from the pod will be by a parallel passage way, separated by half-glass wall, so the returnees can see the next group and also see past them the full length of the pool.

The 'underground' car-park in the Visitor Centre would be physically limited in capacity (a barrier/ticket machine entry/exit would be preferable, whether payable or not) to provide an extra measure of security for darkness visits, but mainly to control capacity and show suitable signage when full. Overspill parking areas should be provided adjacent to and east of Barbers Lane. The lane will need improving considerably to carry the anticipated vehicle numbers. A green screen should be planted as soon as possible in the project on the Meadowgate Lake side of Barbers Lane to reduce noise/intrusion to the nature reserve. Similarly, major traffic planning should take place at the entrance to Rother Valley Country Park from Rotherham Road, and maybe even re-planning of the access to the A57 (a potential major traffic bottleneck).

Access to the boat caisson for pleasure cruise boats would be provided from the southern end of the building, again through airport-style transfer gates, down/along a ramp (depending on pool depth) to a floating dock adjacent to the poolside wall. When embarkation is complete, the cruise boat will manoeuvre the short distance to the boat caisson to await entry. The returning boat to exit the opposite end of the caisson and travel around the pool close to the eastern bank to return to starting point after passing the end of the incoming lake narrows. The specially designed cruise boats would also have a longitudinal seating arrangement, with stepped levels as in the people pod, because the main views are to the observation viewing levels in the Visitor Centre, and then an ever-increasing view over the Rother Valley wild life lakes, then the main water-sport lakes as the height increased to aqueduct height. After transfer to the aqueduct/canal proper, a stopping point would be naturally created by the sharp turn to the right towards Norwood

and consequent loss of view. The special cruise boats should be double-bowed with propulsion and bow-thrusters at each end to save winding and give all seating positions a similar view. In busy summer periods, there may be a need for multiple cruise boats; one embarking, one in caisson, one on the canal, one returning in the pool to disembark etc. The longitudinal seating will give passengers a view of the opposite bank and of the channel to the main lake under the bridge as it returns to the starting point. The boat caisson is intended to be wide-beam:

1. So a private narrowboat in transit to the Norwood Flight can accompany a cruise-boat 'for free'. Alternatively, two narrow boats could travel together if no cruise boat is ready, or two cruise boats at exceptionally busy times.
2. A wide-beam could transfer from the Rother Link through Nethermoor Lake and claim to have 'done the Chesterfield' even though at the top of the flight, and before Norwood, a winding hole would need to be provided for return, and the planned moorings on the Primrose spur could also then be accessed by wide-beams (again ideally another winding-hole for wide-beams on the Primrose spur).

The whole reason for the design is income. Boat cruises up the see-saw would surely become a tourist attraction (a see-saw principle can be understood even by young children, and youth should be the focus). The pod flights at regular intervals would possibly be a greater tourist attraction. Disembarking/embarking from the pod would necessarily be a longer operation than cruise boat exchange and a 'double-journey' of flight-land-flight-land would reinforce the experience by having the chance to see what you missed on the first cycle and whet the appetite for a return visit. There is also the potential to 'hire-the-pod' at non-busy boat travel times for:

1. Corporate outings/meetings.
2. School outings.
3. Wildlife enthusiasts to oversee the Meadowgate Lake Nature Reserve.

These flights could delay at the upper position indefinitely (café/toilet requirements), to be paid for on a flight basic cost, plus variable delay time cost. The beauty of a pre-dawn flight to watch the sun come to the valley (the sun is then behind the pod) would surely give a memorable experience. A sun-setting scene looking west would be a similar experience.

The initial cost is considerable, but the See-Saw could be in use before the Rother Link, Norwood Flight or Staveley to Nethermoor Lake links are made. Hence a cash-flow would be in place to help finance future canal restoration, and with Gulliver's Kingdom coming on stream at maybe the same period, tourism would be almost guaranteed.

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