Whitewater Kayaking Association of British Columbia

Phone: (604) 515-6376
Web Site: www.whitewater.org
E-mail: admin@whitewater.org

PO Box 91549 West Vancouver
Postal Outlet, West Vancouver, BC
V7V 3P2

September 16, 2004

Sam Mottram
Knight Piesold
Suite 1400 - 750 West Pender Street
Vancouver, BC
V6C 2T8

Hello Sam:

A note to follow up on the information you sent around about the wet test of the Rutherford Course, performed on September 3, with some thoughts on how we might resolve some of the issues that arose from that test.

I have now had time to discuss these things with the paddlers involved in the design of the course, and to gather some thoughts and inputs, and these are listed below:

1) for the most part, your report captured the items that need to be addressed, with a couple of exceptions:

a) the course is already backing up at Squamish Canyon, even at low flows with no obstacles in place. With higher flows this will occur even further.

There are two things that were identified that are very likely contributing to this;
- the boulder in the river left channel which we had previously identified as one to be removed was grouted with even more concrete, rather than being removed, as we agreed to. This is producing a larger restriction in that channel than before, and therefore backing the water up, creating pooling on the upstream side.

- there was additional grout poured in the river right channel, at the small sill, which is again backing water. This was not discussed, and I am not sure when or why this was done.

SUGGESTED SOLUTIONS
This might be addressed by removal of the boulder previously marked to be removed. Beyond that the river right sill might be lowered. Even if this produces only a small change in the pooling, this will help alleviate upstream flooding at higher flows.

b) the rocks placed in the channel just downstream of Twin Falls work relatively well to back up the water and slow it down so as to help create a take-out eddy.

However, all of the rocks are undercut on the upstream side, and this is a significant hazard to anyone who is either out of their kayak, or perhaps not so much in control of their kayak, as they pass these rocks. For paddlers exiting at the stairs, or in control of their kayaks, this is not an issue, but at other times these are significant entrapment hazards which can be removed relatively easily.

SUGGESTED SOLUTIONS
I think this can be handled through rearranging the boulders so there are no undercuts on the upstream sides. This may just be a case of rotating boulders in place. This could also be rectified by placing smaller rocks in the undercuts, to fill in the space.

Alternatively, moving the boulders to the sides, so as to leave a narrow, but clear channel would likely back up the water without creating the hazard of undercut rocks in the area of where water is flowing through.

c) there is concern that once the start pool is enhanced, and made deeper, by the addition of obstacles, that the recirculation may become an issue. At this point this is a real concern, but one that will be proved, or not, only by further testing using obstacles to hold more water back in the start pool.

2) the areas where there are clear safety issues from the paddlers perspective, in addition to the ones noted above are:

a) V-Box - the recirculation in this feature is near terminal. Even the most experienced paddlers will be unable to pass through this feature. The fact that it held a log for minutes is indicative of the strength of the hydraulic jump. On a real river, no paddlers will go into such a feature.

SUGGESTED SOLUTIONS
As discussed with Sam, one option is to incrementally fill the depression at the bottom in, as well as building up and extending the ramp, thereby moving the drop downstream. This would both reduce the depth of the hydraulic, and move it further downstream, away from the vertical side walls.

In doing so this should reduce the size of, and open the hydraulic, allowing for exit points on either end.

This would require a couple of pours, with successive layers applied until the desired solution is achieved, with flow testing in between. I discussed this with Tim, Sam, and with Paul.

Another option I discussed with Paul might be to test the concepts above with plywood ramp construction before committing to concrete.

b) Vancouver Wave - though slightly less developed than the hydraulic jump at the V-Box, this is also not safe for paddlers. Experts might be able to make it through, but mistakes by those paddlers, or less skilled paddlers entering the hydraulic, will likely result in becoming stuck in the recirculation.

SUGGESTED SOLUTIONS
The same as for the V-Box

c) Twin Falls - the river left side of this feature already had a significant hydraulic jump forming, which would keep paddlers either out of their kayak, or kayakers who are not able to negotiate the hydraulic upright.

The feature at Twin Falls has a previously identified problem with the river left wall that is creating increased shear which makes the hydraulic more severe. The vertical walls on river left are contributing to the size and shape of the hydraulic jump.

SUGGESTED SOLUTIONS
There are some things that were identified previously that are going to make the hydraulic more severe as the flows increase, in particular the vertical wall on river left.

In terms of possible solutions before any other work is performed, I agree with Sam - temporary closure of the river right channel may reduce (or not) the severity of the hydraulic in the left channel. This is a relatively easy change that may or may not be successful, and could provide some indication of what the hydraulic in the left channel will look like at higher flows. It could also change the flow velocity and perhaps make the reversal less pronounced. Only testing will tell.

3) safety concerns

While we can expect that less experienced paddlers are less likely to be on the course, we strongly believe we need to have the course be “moron proof”. That is, that no matter what silly things people might do, they will still end up floating through the course. In that respect hazards created by rock, shallow sections, etc are in some ways part of the inherent risk in participation in kayaking. There were a number of protruding rocks which were identified, and most of those have been grouted, though a few still require some work. These rocks were anomalies, in that they protrude beyond the surrounding channel area, with a lot of relief, or have an undercut face.

However, we feel strongly that we can not have any obstacles that might entrap paddlers, be they hydraulics, or hard points that are undercut or otherwise placed so as to allow for broaching (hitting sideways) or pinning (hitting end on), with the possibility of someone getting stuck in their boat. While experienced paddlers may, or may not, be able to negotiate Twin Falls, we feel it is imperative that anyone who makes a mistake and inadvertently floats over the drop will flush out, whether in their kayak, or out of their kayak.

When we first reviewed the course with an eye for potential hazard rocks we were looking at predicted flow depths which are much different than those we saw in testing. The flow depth predictions that were provided appear to be somewhat off in a number of locations. Because of this, I would suggest that we might need to revisit the sides with a closer eye to potential hazards, if only because at higher flows the channel is going to be much fuller than was originally thought.

4) timelines for addressing the issues identified by Sam, and the others noted above.

I have discussed this with Tim, Paul, and Nick, and there seems to be little value in moving to address these issues this fall. From the paddling community's perspective, having the winter to fabricate the required baffle wall and anchor pad insertable objects is a real benefit. The time which might be lost for paddlers whom wish to utilize the course this fall is likely to be small, given the lateness of the season, and the fact that there appears to be little chance of an extended summer this year.

If we were to look at some of the items above, and attempt to do some testing this fall, I might suggest that work on Twin Falls, which rearranges flows without any permanent modifications might be useful. This would involve the timber gates in the river right channel, and some lock blocks on the anchor pad below. We would also likely be able to get an idea of the start pool recirculation simply by inserting some lock blocks on the first anchor pad, perhaps with some pipe insert back up.

I might also suggest that if we were to do any plywood testing on the V-Box, or Vancouver Waves, this might be useful before moving to concrete based work. Clearly the V-Box is going to require the most material as it has the deepest and most developed hydraulic. I would think that Peter Kiewit would be more informed as to the costs with each method (plywood versus concrete) and be able to supply a better view of whether it would be worth doing any wood work as a testing method.

If there is a benefit to doing the testing this fall, due to the availability of equipment at the site, the paddling community can be pressed, if needed, to provide the baffle wall, and perhaps some objects to insert in the anchor pads. If need be I also think we can use lock blocks, again with pipe inserts to back them up, to test the changes to the V-Box, Vancouver Wave, and Twin Falls features.

Please let me know your thoughts.

Sincerely

Stuart

Stuart Smith
WKABC River Projects Coordinator

PO Box 5537
Squamish, BC
V0N 3G0
Phone/Fax: (604) 815-4113
E-mail: riverman@shaw.ca