COURSE MEASUREMENT SUMMARY SHEET

EVENT: *CITY OF BRISTOL HALF MARATHON*

LOCATION: *BRISTOL, UK*   DATE: *8 OCTOBER 2000*

Promoting Organisation: *BRISTOL CITY COUNCIL / GREAT WESTERN RUNNERS*

Name & Address of race director	*Ray Jaeckels* *33 North Devon Road* *Fishponds* *Bristol BS16 2EX*	Course Director:	*Mike Gott* *5 Providence View* *Long Ashton* *N Somerset BS41 9DH*
Tel:	*0117 965 4056*	Tel:	*01275 392705*

Distance: *not less than 21,097.5m*   Measured by: *Hugh Jones*
Date: *27 February 2000*

Measurement method: *Jones counter mounted on bicycle wheel*

Elevation, if not same, of: START c.5m   FINISH c.5m
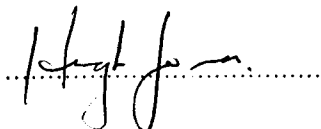Distance, in straight line, between start & finish: *identical*

Description of the Course

i) Terrain   *Flat*

ii) Race surface: *Tarmac city streets, short cobbled sections.*

iii) Course configuration: *Two laps (21km), second shortened near start by 224.2m*

Measurement Details

i) Section of road available: *Entire width of roadway or carriageway if divided, except at Redcliffe Way roundabout & western section of Redcliffe Way (100m section from 4km/14.5km); and The Grove, Cumberland Road, Avon Crescent, Cumberland Basin Road, Hotwell Road and Anchor Road (4.8-10.4km/15.4-20.9km) where half width of road is used.*

ii) Line to be taken at turns: *Shortest route keeping within limits specified in (i) above and keeping left of the centre of the mini roundabout at the start of Cumberland Road (4.8/15.4km)*

iii) Other information:

SIGNED: ....   DATE *29 February 2000*

CITY OF BRISTOL HALF MARATHON

BRISTOL, UK

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Hugh Jones, 29 Feb 2000

CITY OF BRISTOL HALF MARATHON

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I had attended a Bristol Half Marathon 2000 Technical Committee meeting in January, at which I was asked to measure the course. The same course will also be used for the World Half Marathon Championships in 2001.

I arrived on Saturday afternoon and reconnoitred a location previously selected from an AtoZ as a likely spot for a calibration course on Feeder Road, near to Temple Meads Station. I returned here later to lay out a calibration course with the help of my son, Nathan. We completed this quickly (see calibration course sheet attached) and I then calibrated in order to make a rough measurement of the course.

Starting from a position on St Augustine's Parade, I measured in the running direction for 3km but then had to measure a 1km section in reverse to avoid riding against traffic. Resuming the measurement in sequence, I noted a turnaround reference at the end of the canopy under the Clifton Suspension Bridge. It was essential to adjust the course so that the turnaround would be located beyond the canopy. Restarting, I measured back from the end of the canopy to the starting point. The distance of the lap as measured (10605m) implied a need to shorten the lap by 56m, which would then put the turnaround in the undesired location.

I discussed this problem with race director Ray Jaeckels and course director Mike Gott back at the hotel. I had diverged from the intended course slightly by using the full width of the road instead of half-width in places, and in the way I negotiated some of the roundabouts. These slight changes would not have made enough difference to put the turnaround point beyond the canopy. It was thought that the best way to achieve this would be to shorten the route immediately after starting the second lap, and the difference would be about 230m (ie extending the turnaround location by about a quarter of this distance).

I calibrated at 05.40 on Sunday morning and measured the section in reverse (4th kilometre) first. I then measured the difference between the 'long' and 'short' variations at the start of the lap, and found it to be 224.2m. This implied that the first, longer, lap would have to be fixed as a quarter-marathon plus half of the difference ($21097.5/2 + 112.1 = 10660.8$m), and the second lap would be 224.2m less than this.

I measured the first 3km, stopping to note reference points for split mile and kilometre points as I went, and sometimes to check on the precise running line to be enforced. I stopped at the 2 mile reference and moved on to the point at which I could restart the sequential measurement after adding the previously recorded counts to the counter reading. This gives the appearance of an unbroken measurement ride, and there were no split marks to be located on the 'reverse-measured' section other than 4km, very close to the end of it, which I obtained with a separate, supplementary measurement.

Continuing the ride to beyond the bridge canopy I turned around and restarted at lp89. Riding to the end of the lap, I again took split references, but I could not be certain that these would necessarily be very close to the actual kilometre points concerned. The last part of the lap involved riding against traffic, and I decided to make a check on my measurement by repeating this section in reverse. In fact it turned out to be virtually identical but gave me the chance to locate new references closer to the split positions.

I repeated the procedure for the second lap, riding the shorter variation soon after the start, and reached the turnaround reference with a measurement only a single count different, once the 224.2m difference had been accounted. I recalibrated at 10.00 and returned to the hotel for breakfast. After recalculation using the average constant I returned to the finish at about 11.40

and used the finish constant to lay out the final few split references in reverse. This led me to make a simple mistake in calculating the location of the turnaround point. By inadvertently using the finish constant for the overall measurement calculation as well as the layout of the final splits I overestimated the amount by which I had to measure back from the turnaround reference to locate the centre of the turnaround circle. I fixed a PK nail in the centre of the roadway 30.8m before my lp89 reference - exactly level with lp88 in fact - but this was slightly too much. Using the average constant, as I had meant to, the centre of the turnaround circle should be only 30m short of lp89.

IMPORTANT: This means that the turnaround circle, of a 2m radius, (2.3m radius to the running path) should be centred around a point 1m beyond the nail marked with green paint (see course map detail).

To fix course length:

1st lap - 10,660.85m; 2nd lap 10436.65m
Start to lp89 = 72860/9.386752 m   )
lp89 to finish = 27706/9.386752 m   )   = 10713.6m + turn circle of (2.3 x pi)m
                                                        = 10720.82m, or 60m overdistance
Therefore centre of turnaround circle should be located 30m before (south from) lp89

reading	count	distance	adj.distance	location
70000	00000			St Augustine's Parade, TF traffic island outside Boots
79291	9291	989.1m		lp3, The Grove (LHS)
85111	15111	1609.8m		Redcliffe St, central rail of staircase to Jessop Court (LHS)
88852	18852	2008.3m		lp4, High Street (LHS, outside St Nicholas' Market)
98165	28165	3000.5m		Stop line at end of Queen St (at turn into Passage Street)
99364	**29364**	**3128.23m**	**+8790counts**	lp 1T2, Narrow Plain (RHS)
00318	30318	3229.8m		lp20, Temple Way (RHS)

RESTART WITH 8790 COUNTS ADDED (= 08154) AS PREVIOUSLY MEASURED IN REVERSE:

08154	38154	4064.66m		Redcliffe Way, kerb at crossover into south carrigeway
(-940 counts for 4km reference)				
	37214	3964.5m		TS of zebra on Redcliffe Way, before Redcliffe Roundabout
15495	45495	4846.7m		First lp on LHS, Cumberland Road (no number)
16945	46945	5001.2m		Cumberland Road, level with TS side of footbridge (LHS)
26255	56255	5993.0m		lp31 Cumberland Road (RHS)
30482	60482	6443.3m		TS side of traffic island at end of Avon Crescent (LHS)
35638	65638	6992.6m		Cumberland Basin Road, last floodlight pylon before Hotwell Rd
42300	72300	7702.3m		end of Canopy, Hotwell Road (LHS)
42860	72860	7762.0m		lp89, Hotwell Road (RHS)

RESTART, ADD 72860 COUNTS AND 7.2m TURN CIRCLE, THEN SUBTRACT ADJUSTMENT OF 60m

43000	00000	7762.0 >>	7709.2m	lp89, Hotwell Road (RHS)
45247	2247	+239.3	7948.5m	lp70T45, Hotwell Road (RHS)
45560	2560	+272.7	7981.9m	lp69T44, Hotwell Road (RHS)
54474	11474	+1222.3	8931.5m	lp9, Merchant's Road (LHS)
[remaining splits (6miles &10km) laid out in reverse from end of lap, see below]				
70706	27706	+2951.6	10660.8m	St Augustine's Parade, TF traffic island outside Boots

REVERSE MEASUREMENT FOR LAYOUT OF SPLITS:

71000	00000		10660.8m	St Augustine's Parade, TF traffic island outside Boots
77398	6398	-681.6	9979.2m	lp15, Anchor Road (RHS)
80601	9601	-1022.8	9638.0m	lp4, Hotwell Road (RHS)
86683	15683	-1670.7	8990.1m	lp4, Merchant's Road (RHS)
[Ref.note: +546 counts from lp4-lp9, Merchant's Road]				

List of split kilometre & mile positions:

START - Level with end traffic island, outside Boots in St Augustine's Parade
1km   The Grove, 11m TF from lp3 (LHS)
1mile Redcliffe Street, level with central rail of staircase to Jessop Court (LHS)
2km   High Street, 8m TS of lp4 (LHS, outside St Nicholas' Market)
3km   At stop line at end of Queen Street (turning left into Passage Street)
2miles Temple Way, 11m TS of lp20 (RHS)
4km   Redcliffe Roundabout, 35m TF from TS side of zebra (TS of roundabout)
3miles Cumberland Road, 19m TS from first lp (LHS)
5km   Cumberland Road, 1m TF from TS side of footbridge (LHS)
6km   Cumberland Road, 7m TF from lp31 (RHS)
4miles end of Avon Crescent, 6m TS from TS side of traffic island (by slip road)
7km   end of Cumberland Basin Road, 7m TF of floodlight pylon

TURNAROUND CIRCLE (1st lap) AT 7702-7709m (radius of 2m, running path = 2.3m x pi)

8km   Hotwell Road (after turnaround, heading south), 18m TF from lp69T44 (RHS)
5miles Hotwell Road, 65m TF from lp69T44 (RHS)
9km   Merchant's Road, 10m TF from lp4 (RHS)
6miles Hotwell Road, 18m TF from lp4 (RHS)
10km Anchor Road, 21m TF from lp15 (RHS)

END OF FIRST LAP AT 10661m

11km Broad Quay, at lp outside Bristol & West (LHS)
7miles Prince St, at pay & display sign (LHS), opposite Jurys Hotel
12km Redcliffe Street, 10m TF from lp5 (LHS)
8miles Broad Weir, 10m TS from lp2 (RHS)
13km Pedestrian light at end of Broad Weir (RHS)
14km Temple Way, 2m TF from TS pedestrian light outside Templar House (RHS)
9miles Redcliffe Way, 2m TF from pedstrian fingerpost, TF of roundabout (LHS)
15km Wapping, 17m TS from TF end of swing bridge
16km Cumberland Road, 4m TF from lp20 (RHS)
10miles Cumberland Road, 1m TF from lp 22 (RHS)
17km Merchant's Road, 3m TS from TF end of swing bridge
11miles Hotwell Road, 14m TS from lp63 (LHS)
18km Hotwell Road, at lp71 (LHS)

TURN CIRCLE (2nd lap) AT 18198-18205m (radius of 2m, running path = 2.3m x pi)

19km Cumberland Basin Road, 5m TS from 2nd floodlight pylon (TF from footbridge)
12miles At left turn into Merchant's Road, opposite traffic sign 'T8' (RHS)
20km Hotwell Road, 2m TS from lp6 (RHS)
13miles Canon's Road (slip road), 4m TF from lp3 (RHS)
21km Start of St Augustine's Parade, 10m TF from pedestrian light (LHS)
FINISH - Level with end traffic island, outside Boots in St Augustine's Parade

FEEDER ROAD CALIBRATION COURSE

BRISTOL, UK   500.000m

Measured on 2000-02-26, twice, using steel tape tensioned to 50N

Nathan Jones and Hugh Jones (AIMS/IAAF grade 'A' measurer)
Duties of i) holding tape to mark and ii) tensioning tape and making mark

The course runs along the pavement about 0.5m from the kerb and is straight
and flat, but strewn with dirt. It is marked at both ends by PK nails

Altitude: c.3m

STEEL TAPING DATA:

Start time: 15.10 @ 10C   Finish time: 15.40 @ 10C   Average temp = 10C

i) First Measurement:

10 tape lengths of 49.9m + 1.000m   = 500.000m

i) Second Measurement:

10 tape lengths of 49.9m + 1.008m   = 500.008m

iii) Averge uncorrected measurement of course: = 500.004m

vi) Correction Factor	=	$1 + [0.000116 \times (10 - 20)$
	=	$1 - 0.000116$
	=	0.999884

v) Corrected Measurement:	=	Average measurement x correction factor
	=	500.004m x 0.999884
	=	499.946m

vi) To obtain an exact 500.000m calibration course, 54mm was added
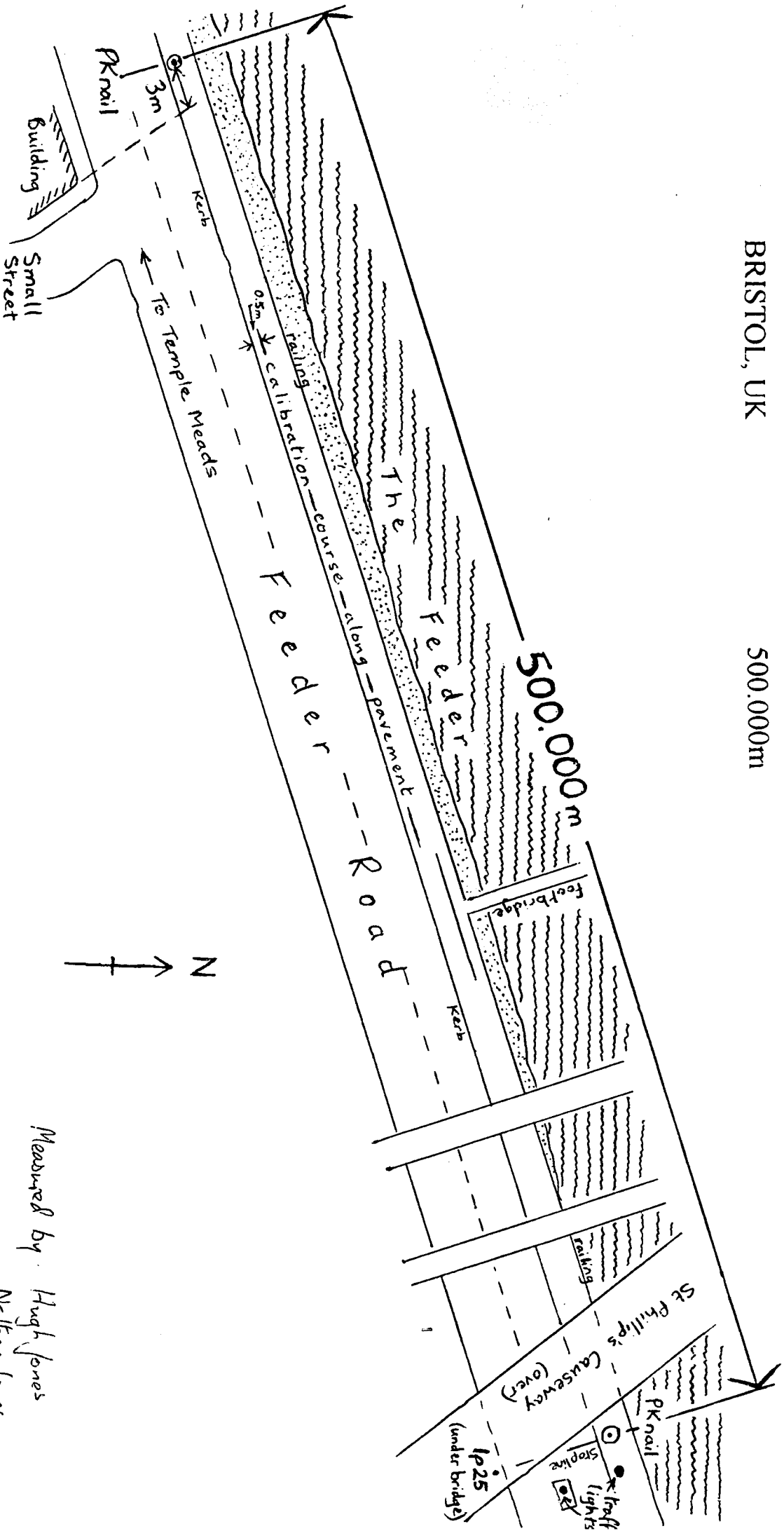
The west end point was then marked with a PK nail in the roadway.
The eastern end had been similarly marked at the start of taping at a point
level with the stop line to traffic lights and lamp-post 25 on the opposite side
of Feeder Road.

FEEDER ROAD CALIBRATION COURSE

BRISTOL, UK

500.000m

PK nail

3m

Building

Small Street

Kerb

railing

0.5m

calibration course along pavement

To Temple Meads

The Feeder

500.000m

footbridge

Feeder Road

Kerb

N

railing

St Phillip's Causeway (over)

1p25 (under bridge)

PK nail

stop line

traffic lights

Measured by: Hugh Jones
Nathan Jones
26 Feb 2000