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*The Governing Body for Athletics in the United States
including Track and Field, Long Distance
Running and Race Walking for
men and women and boys and girls
at all age levels.*

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Ragged Mountain Club
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September 19, 1991

TO: Peter S. Riegel, Chairman, Road Running Technical Committee
3354 Kirkham Road, Columbus, Ohio 43221

SUMMARY REPORT - WOMEN'S TEAM MEASUREMENT OF THE HOUSTON TENNECO
MARATHON FOR WOMEN'S 1992 OLYMPIC TRIALS

Attached you will find copies of all data collected during the measurement verification of the Houston Tenneco Marathon course. It was my very great pleasure to serve as leader of this team and to submit the following report. It is intended to summarize our activities for you and to provide some additional details not covered by the attachments.

Tom and Mary Anne McBrayer served our hosts and made all the local arrangements for our visit to Houston. Both Tom and Mary Anne serve on the Marathon Committee, Tom is the current course measurer and Mary Anne is coordinator for the qualified athletes. The Marathon Committee and Race Director David Hannah agreed to provide in-town costs for the measurement to include meals and hotel accommodations, local transportation, police and medic support, recorders during course work, and the bicycles.

The selected riders were RRTC National Certifiers Amy Morss (NY) and Elizabeth Longton (TN) joined by Pittsburgh '88 veterans Betsy Hughes (FL) and Carole Langenbach (WA). Carol McLatchie, TAC Athletes Advisory member of RRTC also joined the Team for the ride. Carol's participation was significant step forward as a Trials Qualified athlete shared the work of the technicians within the sport. Carol gained the Team members respect and devotion for her efforts. She added a very special perspective to both the work and pursuant conversations.

The measurement took place on the weekend of September 13 - 15, 1991. This date was chosen as it coincided with the annual Marathon Kickoff celebration. During the weekend the people's marathon held early sign-up and by Monday over 1000 early registrations had been accepted for the January 26, 1992 event.

The Measurement Team arrived on Friday afternoon. Members were met at the various airports by the McBrayers. We assembled at The Four Seasons, our host hotel, where splendid accommodations and service were provided. The evening meal was graciously hosted at the home of the McBrayers where we were joined by David Hannah, Race Director, and special guest Al Becken, former RRCA Southern Region Director, who happened to be in town on business. Mary Anne served a delicious meal and introduced us to Bluebonnet Ice Cream (fearfully addictive). Following the meal, Tom reviewed the agenda for the weekend and presented us with T shirts

designed especially for the occasion. The warm welcome introduced us quickly to Texas hospitality.

On Saturday morning Mary Anne took us to Butera's on Montrose, a local restaurant, where we enjoyed a delicious breakfast. Next stop was Boone's Cycles for a careful and expert fitting to the bicycles which had been selected according to our requests. During the fittings we were joined by running columnist Gwen Lewis, the photographer from a local newspaper, and the McBrayer's daughter Carol, our official photographer. Jones Counters were carefully installed and when all bicycles were completely adjusted the Team tested them on a ride back to the hotel.

Next on the agenda was a tour of the course in a van rented especially for our stay. We were first shown the calibration course located in front of the George Brown Convention Center adjacent to the start lines, then we drove over the course. Tom shared details of his measurement and explained areas where we would have to follow special instructions. In accord with police requests we agreed to ride in the direction of traffic. This would involve riding one segment separately. We visited that site as well as the dual starts and merge point. The balance of the afternoon was free time and rest in preparation for the 2 AM calibration.

The McBrayers called for us at 5:40 PM for Saturday evening dinner at the XIT in River Oaks Shopping Center. We were joined there by Pete League (Marathon Founder), Pete's wife Lynn, and Carol and Jim McLatchie. We enjoyed good fellowship and tasty meals featuring local specialities. I was especially pleased to meet Pete League. He was the measurer of the Elby's course in Wheeling, West Virginia, validated in 1990 by Mike Wickiser. Pete has since moved from that area back to Houston.

A few hours of rest and it was measurement time. The group assembled at the George Brown Convention Center calibration course where we were met by the support crew which included the police escort, the Course Coordinator, an EMT Team, recorders Pete League and Will Vanderbrink, and Michael Fred with a supply van. (Michael was director of the '91 Bear Creek Loop 50 Mile recently validated by Felix Cichocki). Tom McBrayer and Carol McLatchie joined the bicyclists with Mary Anne McBrayer and I completing the group. Ride order was confirmed as Amy, Elizabeth, Betsy, Carole and Carol with Tom serving as a guide. Radios were mounted on Tom and Amy's bicycles to provide on-course communication and guidance during the rides. Four calibration rides were made with Will and Pete recording on one end and Mary Anne and I on the other. Start time was 2:25 AM with a temperature of 78 degrees F.

We first rode the predetermined segment from the finish point to a reference point at the Shepherd Bridge to accommodate the request we stay with the flow of traffic. The bicycles were then transported back

to the Crawford start line on a truck rigged with racks our hosts designed to transport six bicycles. The course was negotiated from Crawford to the Shepherd Bridge point (approximately 23 miles) with a break at the 15 mile point where we enjoyed the hospitality of the police station. During the measurement, support vehicles blocked intersections and closed lanes to insure a secure ride.

The Crawford (Trials course) course ride was completed when we arrived back at the Shepherd Bridge reference point. During that ride at the section from the merge to the 5K point the riders had been required to use the right lanes rather than the SPR. Although there had been some off-setting the Team members were not comfortable with that portion of the ride. The bicycles were transported back to the 5K point. It was decided to ride from the 5K point back to the LaBranche start line using the SPR from the 5K to the merge and to substitute those figures in the earlier data. This completed the course riding and we returned the bicycles by truck to the George Brown Convention Center and recalibrated. The temperature remained at 78 degrees throughout the measurement and riding was completed shortly after 7 AM (approximately 5 hours total measurement time).

Following a short break, we gathered at Pete League's home for a delicious home cooked breakfast, wonderful Texas hospitality and good fellowship. Tom and Mary Anne presented special plaques to the Team members. They are the first items to display the 1992 Women's Trials logo and we felt especially honored to receive them. Next came the serious calculating time. After the first set of potential findings were determined it was obvious a problem existed. Our very consistent data showed the course to be unreasonably overlength. Checks and double checks only served to confirm the calculations. This pointed to an immediate need to remeasure the calibration course. Scheduled departure times did not allow members of the Team to do this and we had to leave the problem with Tom McBrayer for solution. In retrospect we realize we should have accomplished a calibration course check on Saturday afternoon and will certainly do so in any future remeasurement activity. Though it temporarily placed a damper on an otherwise perfect weekend by leaving the question of course length unanswered, we did know it was "at least the marathon distance". Tom's measurement of the calibration course was originally reported to us as 309.93 meters but proved on remeasurement to be 307.857 meters. The data reflecting the revisions is attached. Tom had predicted we would find overage. It is consistent with his own original measurement data.

The completion of this project represents another significant advance in the technical role of women in the sport. In 1988 the Team activity was a first. For the '92 Trials we not only have women doing the work, but this time the riders included two women certifiers both of whom

are very active Final Signatories. Additionally we had a qualified woman athlete joining the ride for a mutual sharing of experiences and roles in the sport. That is a first!

Heartfelt thanks are extended to everyone who made this possible: Team members Amy Morss, Elizabeth Longton, Betsy Hughes, Carole Langenbach and athlete Carol Mc Latchie, our in-town sponsors Tom and Mary Anne McBrayer, The Houston Tenneco Marathon Committee represented by David Hannah (Director) with Pete, Mac, Michael, and Will, the Houston police, the EMT's, Joy Boone, Lynn League, and several others. Last but not least, our grateful thanks to Pete Riegel without whose encouragement and support our goals would not have been realized.

Respectively submitted,

Sally H. Nicoll
Sally H. Nicoll, Team Leader
Validations Chairman, RRTC



Women's Olympic Trials Marathon Measurement Team assembled outside Boone's bicycle shop - l-r: Betsy Hughes, Sally Nicoll, Amy Morss, Tom McBrayer, Elizabeth Longton, Mary Anne McBrayer, Carole Langenbach

WOMEN'S OLYMPIC TRIALS MARATHON MEASUREMENT

HOUSTON, TEXAS - SEPTEMBER 15, 1991

ALL CALCULATIONS USE AVERAGE CONSTANT WITHOUT 1.001

CALIBRATION DATA

CALIBRATION COURSE LENGTH = 307.857 METERS

	ELIZABETH LONGTON		AMY MORSS		BETSY HUGHES		CAROLE LANGENBACH	
PRECAL	78687		70600		37700		23695	
	81583	2896	73695.5	3095.5	40763.5	3063.5	26591	2896
	84478	2895	76792	3096.5	43828	3064.5	29486	2895
	87373.5	2895.5	79888.5	3096.5	46893.5	3065.5	32381.5	2895.5
	90269.5	2896	82985	3096.5	49957.5	3064	35277.5	2896
AVG		2895.625		3096.25		3064.375		2895.625
CTS/KM		9405.746		10057.42		9953.890		9405.746
CTS/M		9.405746		10.05742		9.953890		9.405746
POSTCAL	39870		67320		26400		85790	
	42765	2895	70415	3095	29462.5	3062.5	88684.5	2894.5
	45660	2895	73509	3094	32524.5	3062	91578.5	2894
	48555	2895	76604.5	3095.5	35586.5	3062	94472.5	2894
	51450	2895	79699	3094.5	38650.5	3064	97367	2894.5
AVG		2895		3094.75		3062.625		2894.25
CTS/KM		9403.716		10052.55		9948.206		9401.280
CTS/M		9.403716		10.05255		9.948206		9.401280
DAY'S CONSTANT CTS/M		9.404731		10.05499		9.951048		9.403513

RECORDED MEASUREMENT DATA

	<u>LONGTON</u>		<u>MORSS</u>		<u>HUGHES</u>		<u>LANGENBACH</u>	
	OBSERVED COUNT	INTERVAL COUNT	OBSERVED COUNT	INTERVAL COUNT	OBSERVED COUNT	INTERVAL COUNT	OBSERVED COUNT	INTERVAL COUNT
CR START	44601		44836		8083		90165	
MERGE	79067	34466	81690	36854	44564	36481	124635	34470
5 KM	91698	12631	95199	13509	57936	13372	137248	12613
10 KM	138762	47064	145520	50321	107743	49807	184322	47074
15 KM	185862	47100	195875	50355	157585	49842	231430	47108
20 KM	232923	47061	246196	50321	207403	49818	278499	47069
HMAR	243245	10322	257234	11038	218325	10922	288819	10320
25 KM	280025	36780	296566	39332	257238	38913	325610	36791
30 KM	328072	48047	347933	51367	308086	50848	373664	48054
35 KM	374207	46135	397263	49330	356915	48829	419814	46150
MEM/SHEP	389512	15305	413626	16363	373115	16200	435126	15312
MEM SHEP	144601		144836		108083		90165	
40 KM	112829	31772	110871	33965	74455	33628	58387	31778
FINISH	92180	20649	88800	22071	52600	21855	37735	20652
START LAB	136766		64223		123265		82845	
MERGE	102298	34468	27363	36860	86781	36484	48371	34474
5 KM	89690	12608	13880	13483	73440	13341	35758	12613

CALCULATED INTERVALS

	LONGTON	MORSS	HUGHES	LANGENBACH
	INTERVAL METERS	INTERVAL METERS	INTERVAL METERS	INTERVAL METERS
CR START				
MERGE	3664.8	3665.2	3666.0	3665.7
5 KM	1343.0	1343.5	1343.8	1341.3
10 KM	5004.3	5004.6	5005.2	5006.0
15 KM	5008.1	5008.0	5008.7	5009.6
20 KM	5004.0	5004.6	5006.3	5005.5
HMAR	1097.5	1097.8	1097.6	1097.5
25 KM	3910.8	3911.7	3910.4	3912.5
30 KM	5108.8	5108.6	5109.8	5110.2
35 KM	4905.5	4906.0	4906.9	4907.7
MEM/SHEP	1627.4	1627.4	1628.0	1628.3
MEM SHEP				
40 KM	3378.3	3377.9	3379.3	3379.4
FINISH	2195.6	2195.0	2196.3	2196.2
START LAB				
MERGE	3665.0	3665.8	3666.3	3666.1
5 KM	1340.6	1340.9	1340.7	1341.3

LENGTHS OF 5 KM SPLITS

	LONGTON	MORSS	HUGHES	LANGENBACH	SOSS
	INTERVAL METERS	INTERVAL METERS	INTERVAL METERS	INTERVAL METERS	
WOM START					
5 KM	5007.8	5008.8	5009.8	5007.0	5007.0
10 KM	5004.3	5004.6	5005.2	5006.0	5004.3
15 KM	5008.1	5008.0	5008.7	5009.6	5008.0
20 KM	5004.0	5004.6	5006.3	5005.5	5004.0
25 KM	5008.3	5009.5	5008.0	5009.9	5008.0
30 KM	5108.8	5108.6	5109.8	5110.2	5108.6
35 KM	4905.5	4906.0	4906.9	4907.7	4905.5
40 KM	5005.7	5005.3	5007.3	5007.7	5005.3
FINISH	2195.6	2195.0	2196.3	2196.2	2195.0
TOTAL	42248.1	42250.3	42258.4	42259.8	
MEN START					
5 KM	5005.6	5006.8	5007.0	5007.4	

MEASURED DISTANCES FROM WOMEN'S START

	LONGTON	MORSS	HUGHES	LANGENBACH	SOSS	DESIRED METERS	REQ'D ADJUST
	ELAPSED METERS	ELAPSED METERS	ELAPSED METERS	ELAPSED METERS			
WOM START							
5 KM	5007.8	5008.8	5009.8	5007.0	5007.0	5005.0	-2.0
10 KM	10012.1	10013.3	10015.0	10013.0	10011.2	10010.0	-1.2
15 KM	15020.2	15021.3	15023.7	15022.6	15019.2	15015.0	-4.2
20 KM	20024.2	20025.9	20030.0	20028.0	20023.2	20020.0	-3.2
25 KM	25032.5	25035.3	25038.1	25038.0	25031.2	25025.0	-6.2
30 KM	30141.3	30143.9	30147.9	30148.2	30139.8	30030.0	-109.8
35 KM	35046.8	35049.9	35054.8	35055.9	35045.3	35035.0	-10.3
40 KM	40052.5	40055.2	40062.1	40063.6	40050.6	40040.0	-10.6
FINISH	42248.1	42250.3	42258.4	42259.8	42245.6	42237.2	-8.4

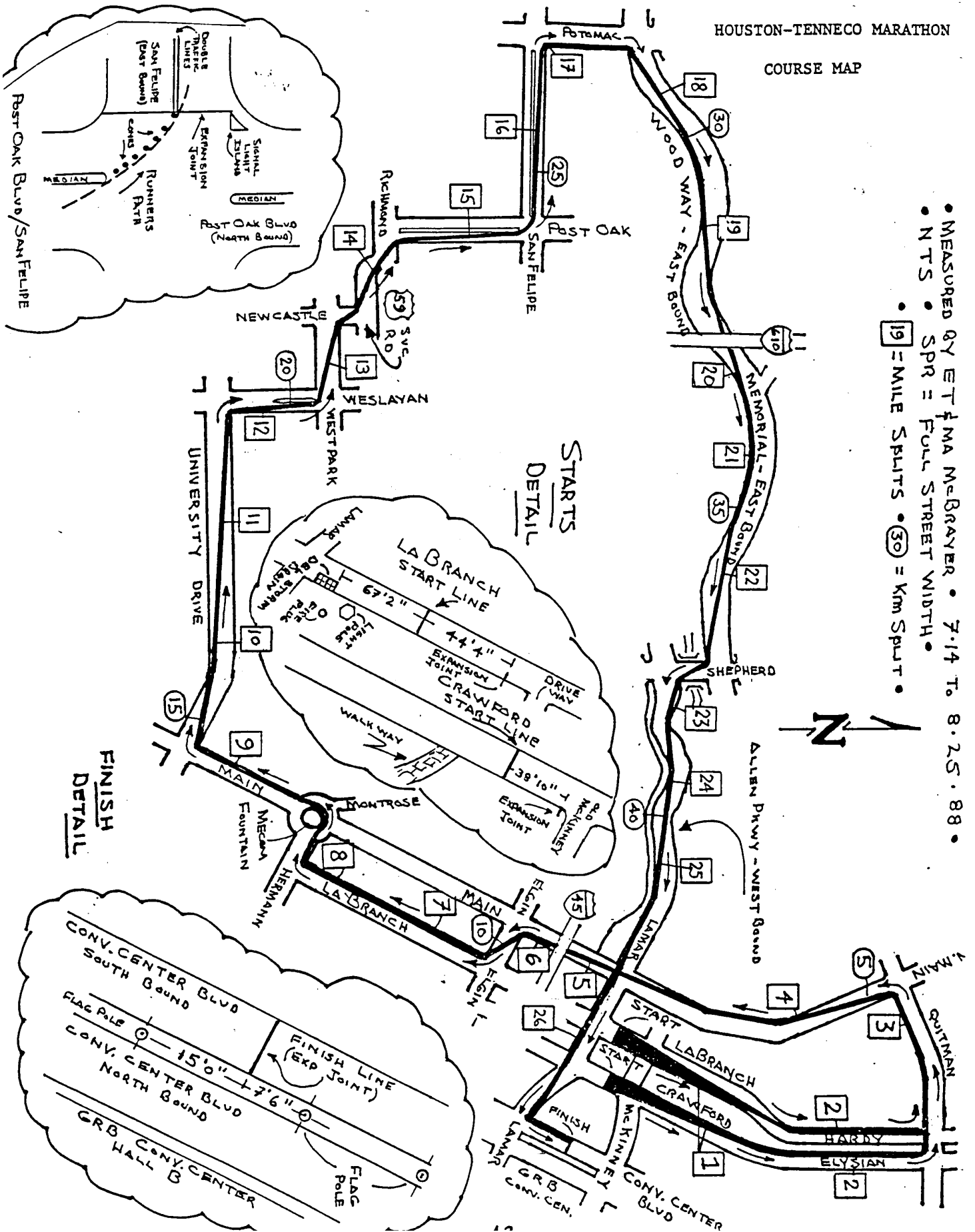
NOTE:

One section of the course between the merge point and the 5K mark was measured twice. After riding this part of the course and while measuring from the Crawford start, the Team was not satisfied they rode the shortest possible route. Late in the measurement when the merge to LaBranche start segment was being measured, the Team started at the 5K point and rode the 5K to merge segment a second time. Three of the riders had lower distances recorded of about 2 meters each. If the lower figures were substituted for the original merge to 5K data, the course length would be about 2 meters shorter in the data of three of the riders.

The data reveals a layout discrepancy in the location of the 30K mark. The point should be located about 100 meters before its recorded point.

HOUSTON-TENNECO MARATHON

COURSE MAP

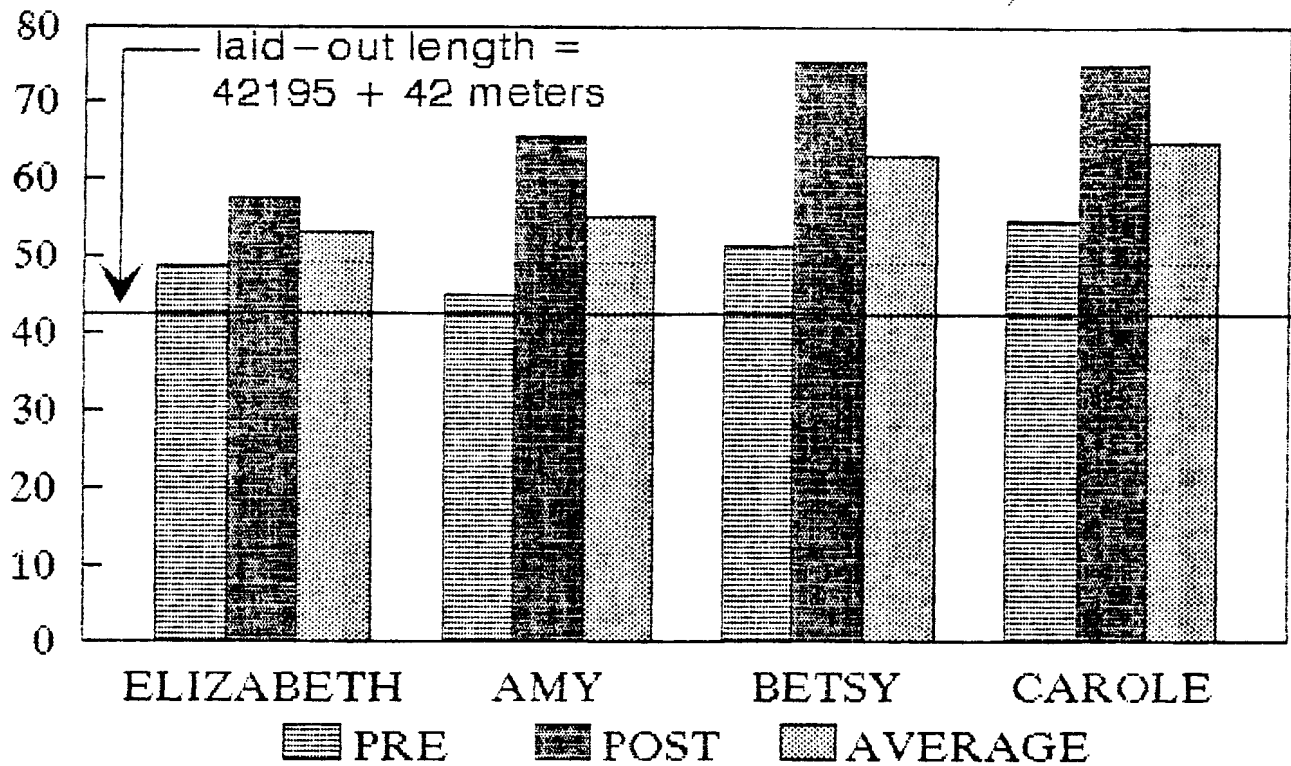


- MEASURED BY ET & MA McBRAYER • 7.14 To 8.25.88 •
- N.T.S • SPR = FULL STREET WIDTH •
- 19 = MILE SPLITS • 30 = Km Split •

HOUSTON MARATHON

VALIDATION - SEPTEMBER 15, 1991

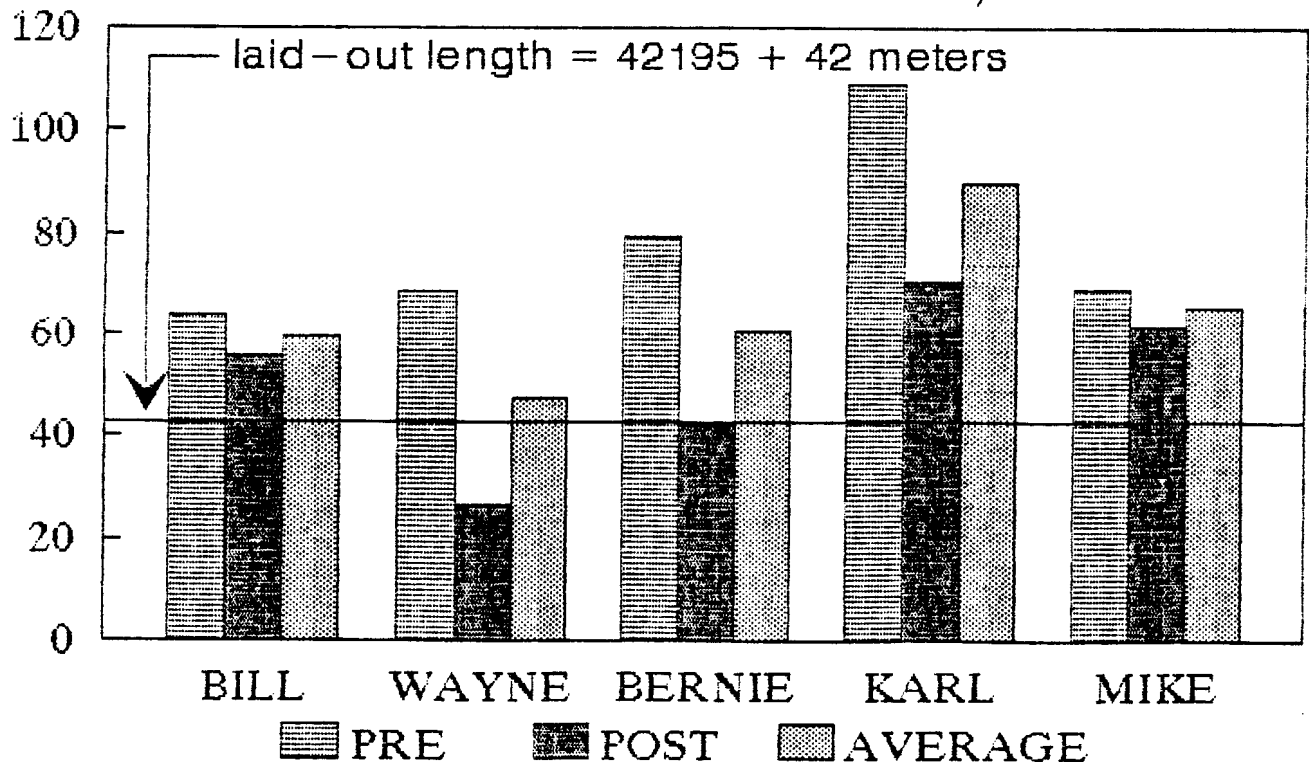
METERS OVER 42195



COLUMBUS MARATHON

VALIDATION - OCTOBER 5, 1991

METERS OVER 42195





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WAYNE B. NICOLL
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15 October 1991

Sally H. Nicoll
Ragged Mountain Club
Potter Place, NH 03265

Dear Sally,

Attached is a report of the pre-validation team measurement of the Columbus Marathon in Columbus, OH. This marathon has been selected as the 1991 TAC/USA Men's Marathon Championships in November 1991 and as the Men's Olympic Marathon Trials event in April 1992. Thus the RRTC felt it was appropriate and in keeping with past precedents to check the length of the course prior to either of the events.

An RRTC measurement team composed of Mike Wickiser, Karl Ungurean, Bill Grass, Bernie Conway (Canadian IAAF measurer) and myself assembled in Columbus on the weekend of 5-6 October 1991. The event was hosted by Pete Riegel, the course measurer/certifier, and Doug Thurston, the race director. The team was hosted at the Marriot Courtyard Motel in Dublin, a suburb northwest of Columbus.

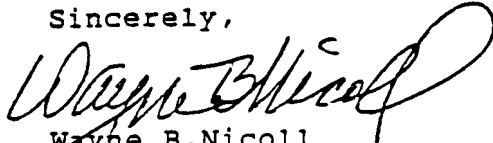
The measurement was conducted on Saturday, 5 October under threatening skies and moderate temperatures. The team gathered at the Riegel home and bikes were calibrated on a 1000' course starting at the edge of Pete's driveway. Pete planned the measurement so there was no need to transport bikes during the measurement and also allowing for a reasonably safe ride along the course. The course was measured in segments, starting at the 10K mark near the calibration course and proceeding forward on the course to a reference point in downtown Columbus. We were visited by several media representatives both at the calibration course and along the race course. At the downtown point we shifted over to the finish line and proceeded in reverse to the new Ameriflora Park project. We were admitted to the park after signing waivers and restarting our measurement on the other side of a closed project fence gate we were not allowed to ride through. We continued to the same downtown reference point and shifted over to the start, riding to the 10K mark where we had begun the measurement. We recalibrated on the same calibration course.

We were accompanied by Pete Riegel and Doug Thurston who assisted us in keeping on the measured path. About two thirds through the ride we encountered rain, high winds, and a ten degree drop in temperature. We continued in spite of the conditions and gradually dried out and warmed up as we moved into the uphill portion of the course. The route passed through or near the Ohio State campus twice. On the return trip we encountered heavy vehicular and pedestrian traffic as football fans were proceeding to the Ohio State-Wisconsin game. Mike Wickiser experienced a flat tire with about eight kilometers to go and rode both the remaining course distance and the four rides of the calibration course on the flat tire! (REAR TIRE)

Following recalibration we returned to the hotel, cleaned up, and enjoyed a lunch where we calculated the results. That evening Doug Thurston hosted a dinner at the motel where we had a chance to relax and discuss the measurement in detail. Pete produced computer generated results which are included with this report. The group decided to accept the Sum of Shortest Splits as the official distance, which was 42236 meters. The following morning we had breakfast together and departed for home.

Deepest thanks go to Pete and Doug for the assistance rendered and hospitality shown during our stay, resulting in a highly successful team measurement. We are also grateful to the team members who sacrificed time, funds and energy to be part of this project.

Sincerely,


Wayne B. Nicoll
Vice Chair East, RRTC



Men's Olympic Trials Marathon Measurement Team assembled in front of the full-size replica of Columbus' ship Santa Maria, now moored in the Scioto River near the finish line - l-r: Wayne Nicoll, Bill Grass, Pete Riegel, Race Director Doug Thurston, Bernie Conway, Mike Wickiser, Karl Ungurean

Prevalidation of Columbus Marathon - US Men's Olympic Marathon Trials

October 5, 1991

Validators: Bill Grass, Wayne Nicoll, Bernie Conway, Karl Ungurean, Mike Wickiser

Calibrations done on Kirkham Road 1000 feet. Calibration course checked out at 999.99 Feet at 56 F. Corrected length = 999.92 feet. However, excess tension was used on tape. Therefore 1000 feet is used in these calculations

Recorded Calibration Counts

	Bill	Wayne	Bernie	Karl	Mike
	38800	76000	90000	67000	12400
	41636.5	79035	92868	70046	15267
	44474	82071	95735	73093	18134
	47312	85105	98603	76139	21001
	50149	88139	101471	79185	23868
	80000	47000	36000	40400	57800
	82837	50038	38871	43449	60668.5
	85675	53076	41741	46498	63536
	88513.5	56113	44611	49547	66403.5
	91351	59151	47481	52596	69270

Interval Calibration Counts

	2836.5	3035	2868	3046	2867
	2837.5	3036	2867	3047	2867
	2838	3034	2868	3046	2867
	2837	3034	2868	3046	2867
Avg	2837.25	3034.75	2867.75	3046.25	2867
Ct/km	9308.563	9956.529	9408.629	9994.259	9406.168
	2837	3038	2871	3049	2868.5
	2838	3038	2870	3049	2867.5
	2838.5	3037	2870	3049	2867.5
	2837.5	3038	2870	3049	2866.5
Avg	2837.75	3037.75	2870.25	3049	2867.5
Ct/km	9310.203	9966.371	9416.831	10003.28	9407.808
Av ct/km	9309.383	9961.45	9412.73	9998.77	9406.988

Recorded Counts

	Bill	Wayne	Bernie	Karl	Mike
10k	62500	1000	14000	92400	36000
15k	109098	50834	61092	142449	83074
20k	155617	100593	108088	192443	130094
hydrant	168041	113880	120644	205796	142652
Finish	74500	21000	27000	12700	49000
40k	94955	42880	47706	34681	69678
35k	141549	92729	94841	84778	116791
30k	188131	142571	141955	134842	163883
fence	215243	171595	169363	163970	191281
fence	19900	76000	74000	68800	95900
hydrant	73709	133533	128405	126656	150276
Start	74200	34000	29000	27000	51000
5k	120827	83887	76156	77139	98129
10k	167452	133769	123308	127252	145231

Interval Counts

	Bill	Wayne	Bernie	Karl	Mike
10k					
15k	46598	49834	47092	50049	47074
20k	46519	49759	46996	49994	47020
hydrant	12424	13287	12556	13353	12558
Finish					
40k	20455	21880	20706	21981	20678
35k	46594	49849	47135	50097	47113
30k	46582	49842	47114	50064	47092
fence	27112	29024	27408	29128	27398
fence					
hydrant	53809	57533	54405	57856	54376
Start					
5k	46627	49887	47156	50139	47129
10k	46625	49882	47152	50113	47102

Interval Meters - all distances calculated using average constant without extra 1.001.

	Bill	Wayne	Bernie	Karl	Mike	SOSS
10k						
15k	5005.5	5002.7	5003.0	5005.5	5004.2	5002.7
20K	4997.0	4995.2	4992.8	5000.0	4998.4	4992.8
hydrant	1334.6	1333.8	1333.9	1335.5	1335.0	1333.8
Finish						
40k	2197.2	2196.5	2199.8	2198.4	2198.2	2196.5
35K	5005.1	5004.2	5007.6	5010.3	5008.3	5004.2
30K	5003.8	5003.5	5005.3	5007.0	5006.1	5003.5
fence	2912.3	2913.6	2911.8	2913.2	2912.5	2911.8
fence hydrant	5780.1	5775.6	5779.9	5786.3	5780.4	5775.6
Start						
5k	5008.6	5008.0	5009.8	5014.5	5010.0	5008.0
10K	5008.4	5007.5	5009.4	5011.9	5007.1	5007.1
Total	42252.5	42240.5	42253.4	42282.6	42260.1	42236.0

Wickiser accounted for his bike length at fence. Others did not. 2 meters has been added in the 20 to 30 km range, below, which is calculated on the basis of SOSS:

	Interval Meters	Cum Meters	Desired Meters	Adjust Meters
Start		0	0	0.0
5 Km	5008.0	5008.0	5005.0	-3.0
10 Km	5007.1	10015.1	10010.0	-5.1
15 Km	5002.7	15017.8	15015.0	-2.8
20 Km	4992.8	20010.6	20020.0	9.4
30 Km	10023.2	30033.8	30030.0	-3.8
35 Km	5003.5	35037.3	35035.0	-2.3
40 Km	5004.2	40041.5	40040.0	-1.5
Finish	2196.5	42238.0	42237.2	-0.8