

APBA

AMERICAN POWER BOAT ASSOCIATION

RACE MANAGEMENT COMMITTEE

RACE COURSES AND RECORDS

**Relationship between the work of the
Race Committee and their appointed surveyor, and
Speed record claims – with helpful guidelines for acceptable
Layout of race courses for records.**

By

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Printed by the American Power Boat Association

January, 2010

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So, your club, association or region wants to develop a race course on which APBA and International speed records can be claimed? This guideline is prepared for use by regatta organizers or race chairmen and their appointed surveyors, as they plan for approval of a "Chart of Record."

Not all race courses need to be surveyed and recorded. Your event may attract better competition if the race course is certified, but that is not always plausible. If official speed records are not to be claimed, then any configuration or approximate course length, if authorized by the appropriate Racing Commission, is acceptable. In this case, the APBA sanction and race circular will state "Not Approved for Records".

General guidelines for establishing a race course for records are recorded in the General Racing Rules, and within various class rules as well.

The **purpose** of surveys, and of APBA approved survey charts, is to pre-establish and document the distance component in the speed equation, whenever speed calculations and records are to be claimed. APBA has over the years, earned an invaluable reputation for the integrity and accuracy of its surveys and recorded charts. It is incumbent upon all of us to continue that fine tradition. It is the role of the Racing Commission Chairman to review a proposed race course, for compliance with safety and class requirement; and, the role of the Chief Surveyor is to provide helpful technical assistance and approval of the official chart to be used for record claims. If approved, the chart will bear a stamp and seal of the Chief Surveyor, stating "Approved for Records".

The **basic rules** for surveying and chart preparation allow no deviation from certain requirements. They are as follows:

1. All measurements and calculations must be performed in straight lines between buoys, NOT along the arcs.
2. The course must be of the length required for the class being raced; and its shape and general layout shall be reviewed for consistency with racing safety and class rules including the number of buoys required by the chairman of the appropriate Racing Commission.
3. The start and finish line must be identical on circular or closed courses and shall be marked on both ends. (Start buoy plus an on-shore marker).
4. Both traditional and modern surveying methods are acceptable. However, a basic requirement is that all calculations and measurements be reference to at least two inter-visible land markers (monuments) of at least 3rd order surveying accuracy.
5. The survey must be performed by a Licensed Land Surveyor who shall be appointed by the Race Committee.
6. A chart of the course, showing all pertinent information shall be reviewed for approval by the Chief Surveyor. Following approval, the chart must be filed by the Race Committee, along with the sanction request, at the APBA National Headquarters, 45 days prior to the regatta. If warranted by circumstances, this time requirement can be waived.

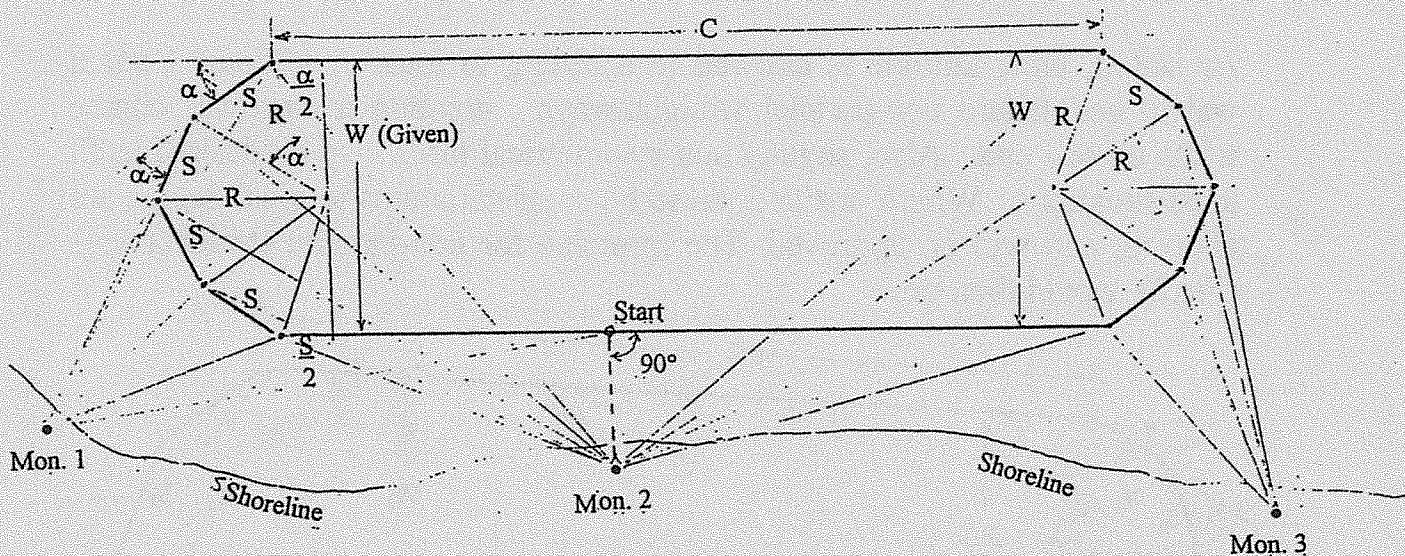


Figure 1.
Five-buoy turn - - - N=5 - - - $\alpha=36^\circ$
(With possible ties to Monuments also indicated)

Formulae: $D = (\text{Given})$

$W = (\text{Given})$

$$\alpha = \frac{180^\circ}{N}$$

$$S = W \tan (\alpha / 2)$$

$$C = \frac{D - [2 \times (N-1) \times S]}{2}$$

Other Relationships:

$$W = S \cot (\alpha / 2)$$

and, $R = S / [2 \sin (\alpha / 2)]$

also, $R = W / [2 \cos (\alpha / 2)]$

Where: $D =$ the distance around the course, in feet.

$W =$ distance between straightaways.

$\alpha =$ deflection angle at each buoy.

and, $N =$ number of buoys per turn.

$S =$ distance between buoys.

$C =$ length of each straightaway, in feet.

These formulae will produce a closed polygon. As a precaution, solve for each unknown element and perform a traverse calculation around the course to verify the total length, and the closure.

Time Trial Courses - [Design rules and suggested procedures for setting up a race course. that can be approved for records].

The rules for conducting Time Trials, once the course chart is approved and filed, are well defined in General Racing Rule 26. Care must be taken to avoid any conflict in the application of either the General, or Specific Design Rules, or by their corresponding jurisdictions.

Specific required elements of the Time Trial race course **design** are as follows. Both the critical element and the design rule are highlighted in **bold** print:

- A **monumented, third order control survey** to provide position and azimuth to all of the essential elements. Witness or reference notes are required for all monuments.
- A **single straightaway**, one kilometer or one statute mile in length, called the track line to which has been added ample approach and run-out distances on both ends. (Refer to Figure #4)
- **Two Range Lines**, placed at right angles to the ends of the Kilometer or one mile straightaway. **The suggested procedure is** to produce a to-scale an overlay drawing of the Straightaway and Range Lines. Rotate this overlay on a same-scale map of the Lake, to form a trial best-fit of the race track in open water. After identifying possible sites for the Timer Locations and Range Markers on the Lake map, then further rotate and refine a final best-fit with the map detail, including the Timer Locations. Proceed with planning and executing the required survey. (See Figure #4)
- **Two Alignment Markers**, (Neither of which may be floating) will be placed on the Range Line, clearly visible from the Timer Location. Targets will be placed at the alignment marker just prior to race day. Limitations of present-day timing equipment precludes the use of back-sights for scanning the boat's track. Therefore **the targeted alignment marker must be in front of the timer station**, and this usually requires placement of the Alignment Marker on the opposite shoreline of the body of water. In situations where land access is blocked or the distance is too great, a work-around is available involving a combined anchor/monument/target holder which is submerged in shallow water, along the Range Line. The target is attached to the submerged Range Marker just prior to race day, using the Global Positioning System or other appropriate measures to recover the submerged monument. A similar work-around would be acceptable, should the situation occur at the timer side. A temporary but stable platform, secured to the submerged monument Marker in shallow water is suggested. Approval, in **this** case, would be limited to the current event only.
- **Two Timer Locations**, placed on stable bases of the two parallel Range Lines - usually on the near side of the lake or river. The **Timer / Scanner equipment must meet the specifications outlined in General Racing Rule # 26**. The Timer Locations will intercommunicate.
- The course track line must be **marked by at least two guide-buoys positioned by normal surveying methods as shown on the charted line** to assure a right-angle relationship between the course and the range lines and also to identify the surveyed track for the racer's benefit and guidance. It is recommended that additional buoys be placed between the guide-buoys and also beyond the limits of the measured track. A lane can be established by buoys (Please refer to Example #4), so that boats will be confined in a safety zone. The lane width established by the chart would mark where the traveled distance was free from unsafe obstacles such as docks,

5. Any future system that achieves universal acceptance by the surveying profession will be accepted. Redundancy will be required, as in any other method, for the purpose of verification by conventional surveying methodology.

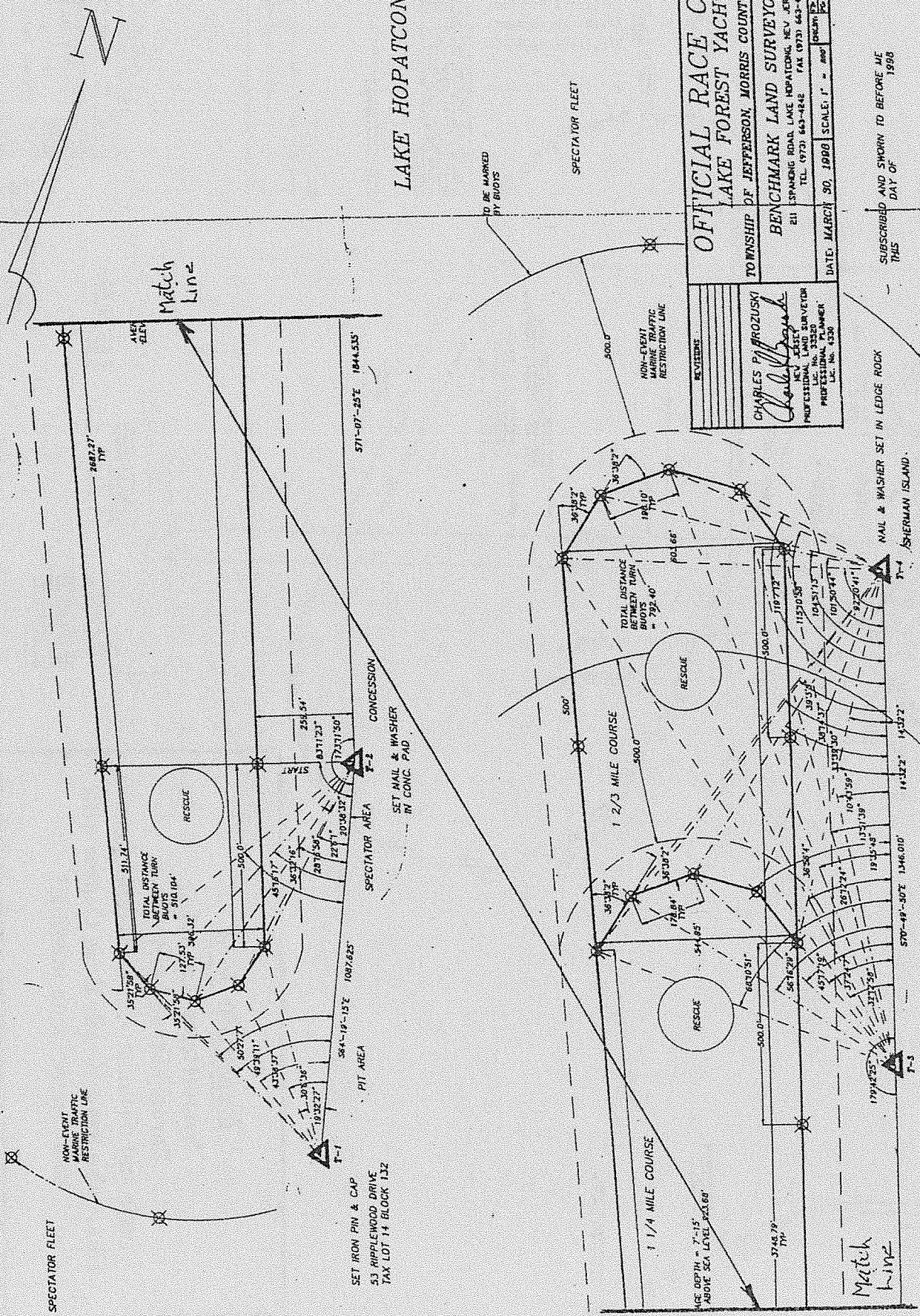
The Course Survey Chart

Regardless of the method of surveying utilized, the race course chart must be complete in all of the necessary details. Consider both the method to be used in establishing the buoy positions, and the probable methods to be used for post-race verification of the layout to substantiate speed record claims, by the surveyor or by APBA officials.

Following is a checklist of necessary elements of an acceptable chart for record claims.

- The chart should be drawn at an approximate scale of 1 inch = 200 feet, in reproducible form. Two prints of the preliminary layout are required by the Chief Surveyor. One will be returned with comments or suggestions for completion. After revision or approval, three final prints are filed by the local committee or surveyor at APBA Headquarters, and one is also returned for the Chief Surveyor's files.
- Angles (or bearings), or angle (bearing) and distance, depending on the method of surveying, are required and are best shown in table form at the edge of the drawing. Be sure to indicate a back-sight and/or a beginning bearing for each instrument set-up.
- Recovery notes and references are required for all land markers used in the survey, including back-sights.
- Sea-level elevation of the site must be shown on the chart.
- Typical water depths are required, particularly in shallow areas.
- Provide a typical sketch showing the proposed method of anchoring.
- If tidal or reservoir elevation changes are anticipated, include in the sketch the proposed method of compensating for height differences.
- NO significant notes shall be hidden in the surveyor's notebook. The chart must be a complete, plat-like record.
- Show certain other key distances and significant features. These include, but are not limited to: Starting buoy to the first turn buoy, safety buoy to the turn, racing lane widths, distances to shoreline, shoals and other hazards. Show also the official stand on the start/finish line and location of the pit, launching and spectator areas.
- Near the title block, the surveyors signature and seal must be accompanied by a statement of certification that includes but not necessarily limited to:
 - Accuracy of the survey (at least third-order)
 - _____ "established by me, or under my direct supervision"
 - existence of monumentation
 - method to be used in buoy placement
 - other statements, as necessary
 - Show, in a Title Block or area, the name and date of proposed sanctioned regatta; city, County, State, etc. Show also the class(s) of boats racing, the name of the APBA Sponsor organization, and any other identifying information.

LAKE HOPATCONG



OFFICIAL RACE COURSE LAKE FOREST YACHT CLUB	
TOWNSHIP OF JEFFERSON, MORRIS COUNTY, NEW JERSEY	
BENCHMARK LAND SURVEYORS, INC.	
811 SPANING ROAD, LAKE HOPATCONG, NEW JERSEY 07849 TEL. (973) 643-8444 FAX (973) 643-4449	
DATE: MARCH 30, 1998	SCALE: 1" = 400' DRAWN BY: J.M.
PROJECT NO. 3320 PROFESSIONAL PLANNER L.C. NO. 1430	

SUBSCRIBED AND SWORN TO BEFORE ME
THIS DAY OF 1998

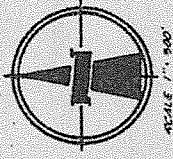
NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE.

I, CHARLES B. BROZUSKI, HEREBY CERTIFY THAT I AM A PROFESSIONAL LAND SURVEYOR IN THE STATE OF NEW JERSEY AND THIS MAP CONSISTING OF ONE SHEET CORRECTLY REPRESENTS THE SPEED BOAT RACE COURSE AND LAND CONTROL POINTS AS SURVEYED AND Laid OUT UNDER MY SUPERVISION, APRIL 6, 1998; AND THAT ALL CONTROL POINTS SHOWN HEREON ACTUALLY EXIST AND THEIR POSITIONS ARE CORRECTLY SHOWN.

Charles Brozski

Example # 1
Non-parallel Straightaways
Two courses on one chart
Angles shown as Vectors

SET IRON PIN AND CAP
79 YACHT CLUB DRIVE
TAX LOT 9, BLOCK 121



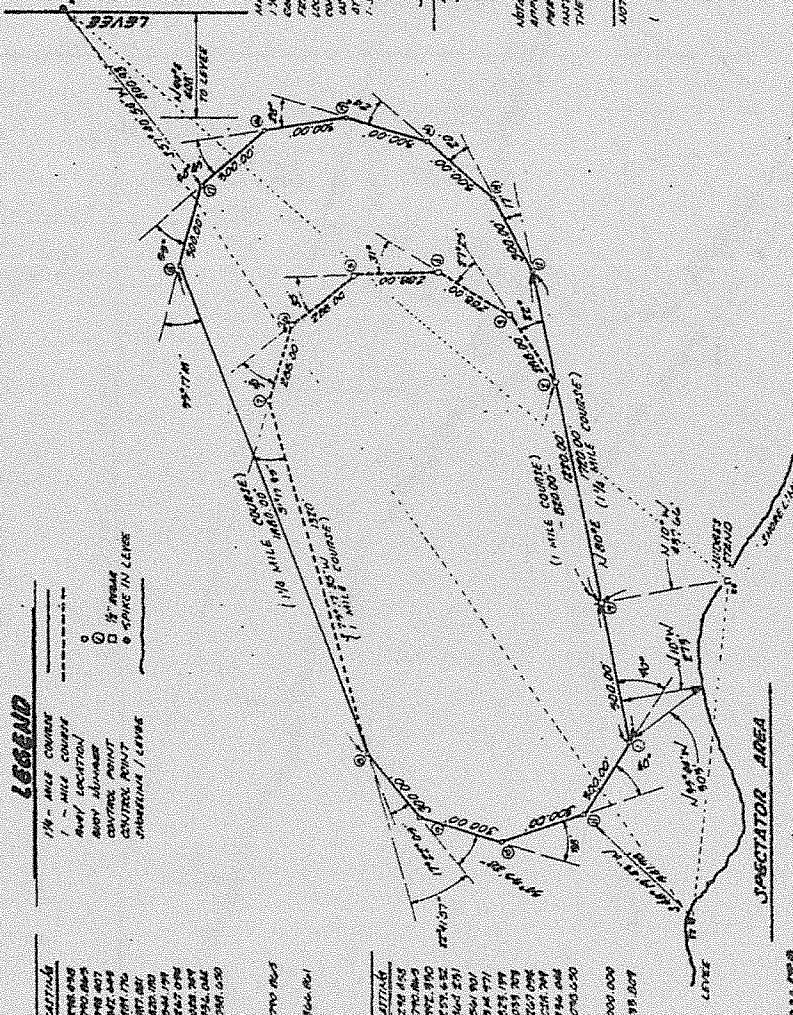
CERTIFICATION

I, RONALD J. GRAVES, CERTIFY THAT THE ABOVE MAP CORRECTLY REPRESENTS THE SURVEY MADE BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT THE SURVEY WAS MADE IN ACCORDANCE WITH THE PROVISIONS OF THE SURVEYING ACTS OF THE STATE OF CALIFORNIA. THE TYPICAL BUIRY INSTALLATION WILL BE ESTABLISHED FROM CONTROL POINTS AS INDICATED HEREON. BUIRY LOCATIONS AND CONTROL POINTS WILL BE ESTABLISHED BY BUIRY CONTACT WITH THE SURVEYOR AND ELECTRIC SURFACE AFTER WHICH BUIRY AND DISTANCES MEASURED FROM THE CENTER OF THESE POINTS, THESE POINTS BEING THE CENTER OF EACH 1/4 MILE AND 1/8 MILE STRIPS, SHALL BE RESPECTIVELY

Ronald J. Graves
 RONALD J. GRAVES
 STATE OF CALIFORNIA

ON JANUARY 19, 1910, BEFORE ME THE UNDER-SIGNED, A Notary Public in and for said County and State, personally appeared RONALD J. GRAVES, known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same.

Ronald J. Graves
 Notary Public
 State of California



1/4 MILE COURSE

POINT	BEARING	DISTANCE	ABSCISSA	ELEVATION
1-1	N 80° 00' 00" E	400.00'	400.00	2700.00
1-2	N 80° 00' 00" E	800.00'	800.00	2700.00
1-3	N 80° 00' 00" E	1200.00'	1200.00	2700.00
1-4	N 80° 00' 00" E	1600.00'	1600.00	2700.00
1-5	N 80° 00' 00" E	2000.00'	2000.00	2700.00
1-6	N 80° 00' 00" E	2400.00'	2400.00	2700.00
1-7	N 80° 00' 00" E	2800.00'	2800.00	2700.00
1-8	N 80° 00' 00" E	3200.00'	3200.00	2700.00
1-9	N 80° 00' 00" E	3600.00'	3600.00	2700.00
1-10	N 80° 00' 00" E	4000.00'	4000.00	2700.00
1-11	N 80° 00' 00" E	4400.00'	4400.00	2700.00
1-12	N 80° 00' 00" E	4800.00'	4800.00	2700.00

1/8 MILE COURSE

POINT	BEARING	DISTANCE	ABSCISSA	ELEVATION
1-1	N 80° 00' 00" E	400.00'	400.00	2700.00
1-2	N 80° 00' 00" E	800.00'	800.00	2700.00
1-3	N 80° 00' 00" E	1200.00'	1200.00	2700.00
1-4	N 80° 00' 00" E	1600.00'	1600.00	2700.00
1-5	N 80° 00' 00" E	2000.00'	2000.00	2700.00
1-6	N 80° 00' 00" E	2400.00'	2400.00	2700.00
1-7	N 80° 00' 00" E	2800.00'	2800.00	2700.00
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1-10	N 80° 00' 00" E	4000.00'	4000.00	2700.00
1-11	N 80° 00' 00" E	4400.00'	4400.00	2700.00
1-12	N 80° 00' 00" E	4800.00'	4800.00	2700.00

CONTROL TRAVERSE

POINT	BEARING	DISTANCE	ABSCISSA	ELEVATION
1-1	N 80° 00' 00" E	400.00'	400.00	2700.00
1-2	N 80° 00' 00" E	800.00'	800.00	2700.00
1-3	N 80° 00' 00" E	1200.00'	1200.00	2700.00
1-4	N 80° 00' 00" E	1600.00'	1600.00	2700.00
1-5	N 80° 00' 00" E	2000.00'	2000.00	2700.00
1-6	N 80° 00' 00" E	2400.00'	2400.00	2700.00
1-7	N 80° 00' 00" E	2800.00'	2800.00	2700.00
1-8	N 80° 00' 00" E	3200.00'	3200.00	2700.00
1-9	N 80° 00' 00" E	3600.00'	3600.00	2700.00
1-10	N 80° 00' 00" E	4000.00'	4000.00	2700.00
1-11	N 80° 00' 00" E	4400.00'	4400.00	2700.00
1-12	N 80° 00' 00" E	4800.00'	4800.00	2700.00

Example # 3

Non Symmetrical - Two courses shown
 Unique Layout using spiral or 'Easement' curves
 [Curves replaced by Chords]
 5 buoys on one end; 7 buoys on the other
 All survey data shown in table form (preferred)

COURSE LAYOUT FROM CONTROL POINTS

POINT	BEARING	DISTANCE	ABSCISSA	ELEVATION
1-1	N 80° 00' 00" E	400.00'	400.00	2700.00
1-2	N 80° 00' 00" E	800.00'	800.00	2700.00
1-3	N 80° 00' 00" E	1200.00'	1200.00	2700.00
1-4	N 80° 00' 00" E	1600.00'	1600.00	2700.00
1-5	N 80° 00' 00" E	2000.00'	2000.00	2700.00
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1-11	N 80° 00' 00" E	4400.00'	4400.00	2700.00
1-12	N 80° 00' 00" E	4800.00'	4800.00	2700.00

APPROVED FOR RECORD *R.J.G.*
 Notary Public
 State of California

Ranito Forebay South
 Oroville California
 Power Canal Race Course
 Elevation = 260 ft.

Ron Graves & Associates
 SURVEYING
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 SOILS TESTS
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