



## RNZYS Race Management

### Mark Laying Guidelines

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#### Introduction

The Royal New Zealand Yacht Squadron is one of, if not the most, active Yacht Club in the world. There is racing at the club in excess of 80 days per year. This will often include up to three different types of racing happening either straight after each other, or at the same time on different parts of the Harbour and Hauraki Gulf.

The RNZYS also run the prestigious Youth Training and Performance Programme. The YTP has formal training session every weekend, and extra training on weeknights. The RNZYS run the largest Learn To Sail programme in New Zealand, which delivers courses to over 300 students per year.

The RNZYS Racing programme is delivered by a dedicated group of 40 volunteers, who are supported by the RNZYS staff in the Sailing office.

These guidelines cover the standard procedures for the laying marks and setting courses with the RNZYS.

**Insert basic calendar**



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RNZYS Mark Laying

## Royal New Zealand Yacht Squadron's Race Management Resources

### Vessels

#### Te Kouma



Te Kouma is a 12 meter custom built committee boat which was built for the 2003 Americas Cup. This vessel is usually used as a committee boat, but is also capable of laying and retrieving marks. It is also used as a changeover boat for some of our larger regattas. Te Kouma has an electric winch on the starboard side which can be used to pick up marks.

#### Pembles Bay



Pembles Bay is a 9 meter vessels which can be used as both a committee boat and a Mark boat. Pembles Bay is powered by a Yanmar diesel engine with a stern leg, and has a bow thruster. Pembles Bay has a removable flag rack that can be fitted when needed to be used as a committee boat. Pembles has an electric winch on the starboard side to pick up marks.



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## RNZYS Mark Laying

### Tiri



Tiri is an 8 meter vessel which is used as a Mark laying boat. Tiri is powered by a 200hp outboard engine and has an electric winch on the starboard side to pick up marks.

### RIBs

The RNZYS owns three 5.5 meter, and one 6.5 meter Smuggler RIBs. These are primarily used as safety boats for the Youth Training Programme, Performance Programme and Learn to Sail courses, but are also used for umpiring and mark laying.



Figure 1 RNZYS Three Smuggler Ribs with 60hp engines

### Marks

The RNZYS owns a number of Marks. The main type used are Tetrahedral, and the RNZYS has 14 of these Marks (insert photos)

- 4 \* Yellow (used as Top Marks (1 and 1a) for sprint racing)
- 3 \* Orange (used as Start Marks and outer 1 & 1a for the winter series W/L)
- 1 \* Black and White (used as a top mark for Match racing)
- 1\* Yellow and Black (used as a top mark for Match racing)
- 2 \* Red (used as the Gate Marks)
- 1\* Green (Used as a change of course mark)
- 1\* Blue (Used as a top mark for Match racing and as a finish Mark for some W/L Racing)
- 1\* Black (Used as a top mark for Match racing)



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## RNZYS Mark Laying

The RNZYS also has 5 pillar marks

- Black and White
- Green
- Yellow
- Red
- Blue

Most of the marks are kept in the dock box next to Te Kouma. The code for dock boxes is 1871. The pillar marks are kept in the wash room in the Youth Training Building. To enter the Youth Training Building through the garage door, enter the code 1397, then turn the handle to the left. Once you have entered the building the wash room is on the left.

- Each mark has a length of warp with chain on it connected to the mark of which the total combined length is 5m. This is to stop the mark getting caught on the keels of race yachts.
- Shackles are always kept connected to the chain when put away **and not left on the warp**
- Marks need to be deflated and folded correctly before putting in the dock box.
- Pillar marks **require** a lead weight to be connected to the bottom of the mark to ensure the mark is kept upright, these are located in the dock box.
- There are spare shackles in the dock box.



Figure 2 Dock Box with Marks, Anchors and Warps



Figure 3 Youth Training Programme Building (between the Coastguard and PCC) two buildings west of RNZYS main club house

## Anchors

The RNZYS use 2kg sand anchors for most racing at the club. These are kept in the dock box and there is 5 meters of 6mm chain connected to each anchor. There are heavier anchors if required, which are kept in the wash room of the Youth Training Building. (See photo below). A 2kg anchor with the correct chain and warp will hold in most conditions, but there are times in strong wind with the tide in the same direction, where the anchors will not hold in certain places in the middle of the harbour. There have been times where even two of the large anchors connected together will not hold, in these situations it is best for the Race Officer to move the course slightly to shallower water with better holding.

- Shackles are always kept on the anchor chain and not left on the warps
- If an anchor is lost please make sure you inform the Sailing Office so that it can be replaced.
- Anchors need to be put away as shown. There should be 10 kept in the dock box with spares kept in the washroom in the Youth Training Building.



Figure 4 Pillar Mark Lead weights



Figure 5 Spare Anchors, and chain in the YTP building



Figure 6 Anchors and Warps in the Dock Box next to Te Kouma

## Warps

The RNZYS runs a system with two different lengths of warp. 10 meter warps which are identified by Green heat shrink at each end and 20 meter warps which are identified by Blue heat shrink. There should always be 14, 10m and 14, 20m warps in the dock box. It is important to have the right amount of line on a mark to ensure it holds position, but if it is too long it will get caught on a racing yachts keel and the mark will move around too much with changes in wind pressure. A good rule of thumb is in 10 meters of water use a green 10 meter warp, in 20 meters of water use a blue 20 meter warp. You have to remember there is an extra 10m of scope already in the anchor and mark tackle. In the middle of the harbour with a strong wind and tide in the same direction you will need to use an extra warp.

- In 10 meters of water use a Green 10 meter warp, in 20 meters use a Blue 20 meter warp
- If the mark is not holding you may need to add an extra warp (usually a 10m)
- If laying a mark in less than 10 meters you can double over a Green 10 warp to be 5m (in Big Shoal Bay for example), in 3-5 meters of water you can just connect the anchor chain directly to the chain on the mark.
- Warps need to be coiled correctly and put away neatly in the dock box after each race day. The exception is during a regatta when the same marks are being use the next day. In this case they need to be coiled and neatly stored on the mark boat (they can be left connected).
- Shackles must always be left on the Anchor chain and chain connected to the mark, NOT on the warps.



Figure 7 Anchor Warp correctly coiled



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## RNZYS Mark Laying



*Figure 8 Anchors and Warps can be left in the mark boat only during a regatta and when being used the next morning, but must be coiled neatly as shown*

## Types of Racing

The RNZYS runs many different types of racing at the club,

### Harbour courses

For these races we use the permanently laid Harbour Racing Buoys as rounding marks. These races are our Club Marine Insurance Wednesday Series and Winter Series, Havana Club Rum Races, occasional Barfoot and Thomsen Ladies series, occasional S34 series and the occasional Youth Training Programme races. Most of these races require the start line to be laid, normally the large Orange Tetrahedral. The exception is the Havana Club Rum Races and Barfoot and Thompson Ladies series & S34 series, which start from the Westhaven tower and don't require any marks to be laid. The finish is either between the committee boat and the ODM or from the Race Tower.

### Passage Races

These races are our 36 Degrees Brokers Commodores Cup series and Club Marine Cruising Series, which are longer distance races. They either start or finish off the Tower or the Committee boat, and use permanently laid Harbour Racing Buoys or channel marks, or Islands with no laid marks required. The exemption is the Around Kawau Island race which may require a laid windward mark.

### Windward Leeward Racing

Club Marine Winter Series (Windward /Leewards course), City of Sails Auckland Regatta, National Championships (The Land Open Keelboat, Barfoot and Thompson Women's Keelboat, Harken Y88, Etchells), 50-50 Regatta.

These races require up to eight marks to be laid, plus a change of course Mark, these courses are bigger than our weeknight sprint racing and can have two sets of top marks for different divisions. These events are run near northern leading or off the east coast bays.

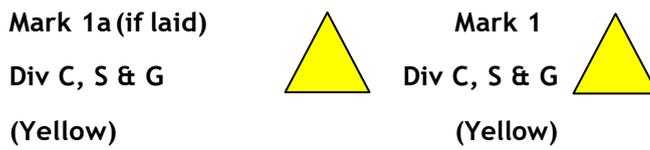
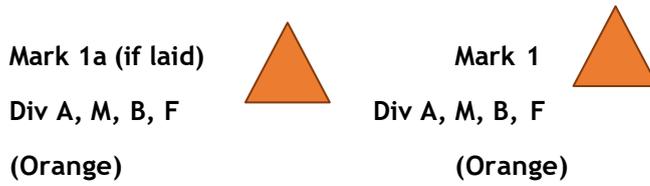


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# RNZYS Mark Laying

- Course 1** Start 1, 1a (if laid) to finish.
- Course 2** Start 1, 1a (if laid), 2s/2p (gate if laid), 1, 1a (if laid) to finish.
- Course 3** Start 1, 1a (if laid), 2s/2p (gate if laid), 1, 1a (if laid), 2s/2p (gate if laid), 1, 1a (if laid) to finish.

*All mark rounding's to Port except at a gate*



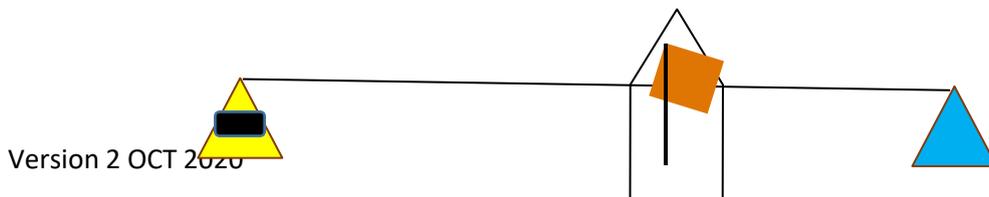
Start Mark

Race Committee Boat

Finish Mark

## CHANGE OF COURSE

For a change of course, a single (GREEN) buoy will be used to replace mark 1.





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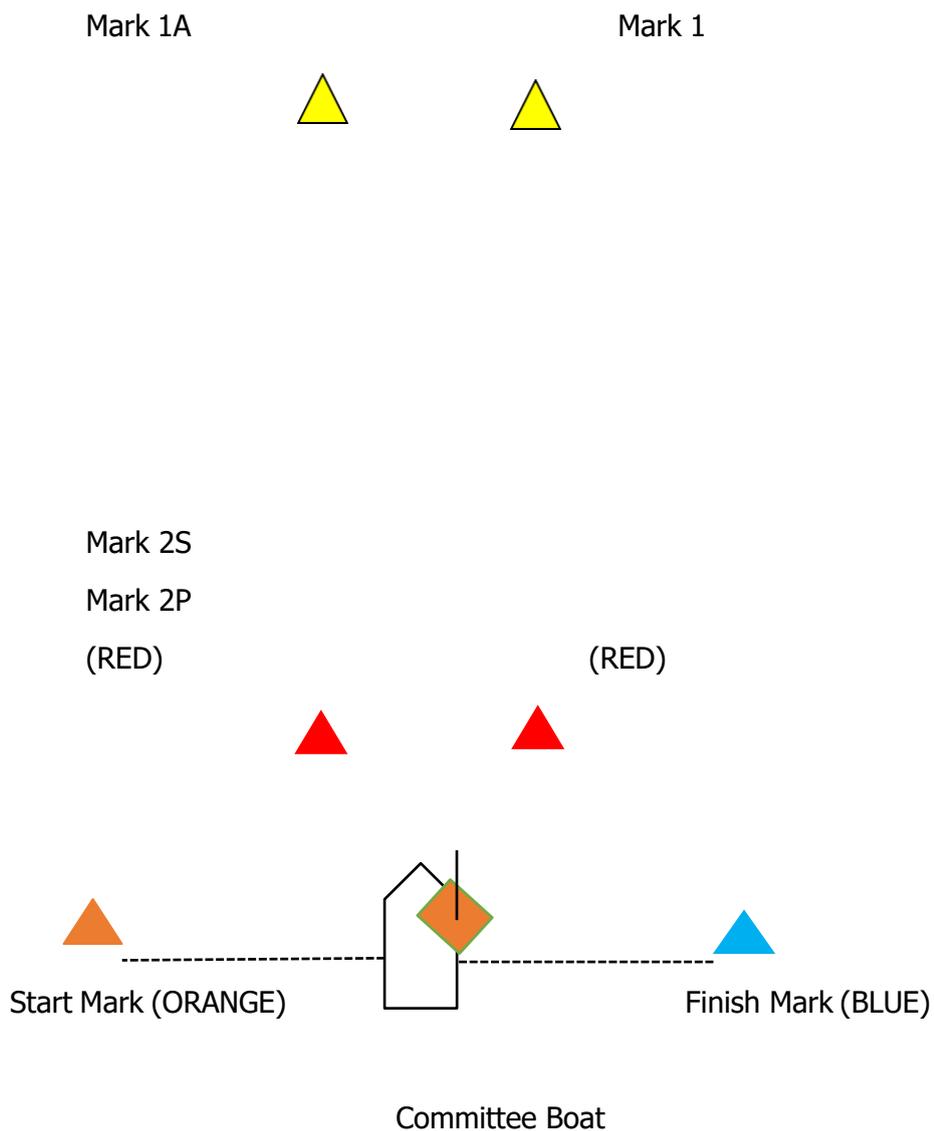
(Yellow/Black)

RNZYS Mark Laying

(Blue)

### Weeknight Sprint Racing

This includes our Elliot 7, North Sails Young 88, Etchells, Stewart 34 and most of the Barfoot and Thompson Ladies racing series. This requires up to six marks to be laid plus a change of course mark, run outside the RNZYS.



### CHANGE OF COURSE

For a change of course, a single (GREEN) buoy will be used to replace mark 1.



## Match Racing

Our Match Racing events are all run outside the RNZYS. They require seven marks, four of which are different top marks set to different wind directions.

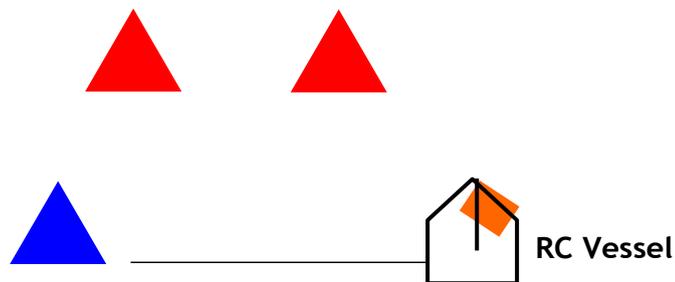
## Mark W

**MAY NOT BE IN THIS SEQUENCE**



**Mark L**

**Gate (If laid)**



- ***There is a copy of the sailing instructions on each boat which will tell you which marks are required for each type of racing.***

## Laying and Retrieving Marks from RNZYS Vessels

First before you leave the dock ensure you have the correct marks for the racing you are doing. Ensure you have enough warps and anchors for all the marks. It is good practice to take one spare anchor and warp with you. Please be aware that there may be other racing on also, so don't take more anchors and warp than you need (other than a reasonable number of spares). There is a spare 20m warp already on both Pemples and Tiri (this has black shrink wrap on it) please leave this on board.



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## RNZYS Mark Laying

The Marks can be inflated by using the leaf blower. There is a leaf blower located on all RNZYS patrol vessels. Please be aware that the leaf blower can only be used while the engine is running. If it is used while the engine is not running you will damage the batteries.

It is best to connect all the anchors and warps before you leave the dock and ensure the shackles are done up tight. If you are unsure what depth you will be laying the marks in, you can wait until you are on the water, but you should connect the marks to the anchors as soon as possible, when the Race Officer asks for you to lay a mark they will not like having to wait for you to connect the lines.

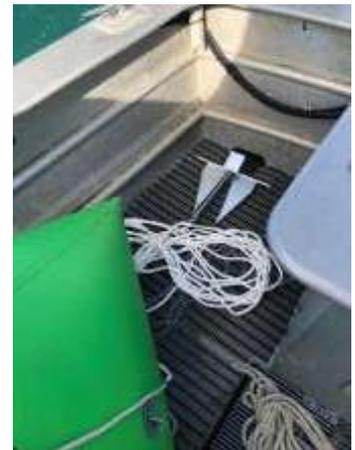
There are three different ways of laying the marks at the right position. This is detailed in how to set the course.

### Laying Marks

It is important to know what the wind direction is and what the tide times are. Have the mark ready to go with the correct warp and anchor attached, and laid out cleanly on the cockpit floor.

- **Note which way Te Kouma is hanging on her anchor, this will tell you which way to stream the mark**

You will start by pinging the position of the Race Committee vessel on the GPS (instructions below on how to do this). Then motor directly upwind, the easiest way to do this is to look at the burgee on the bow of the mark boat. Once you get to the right distance away from the committee boat you should be close to the right position for the top mark. Position yourself approximately two boat lengths down tide of where you want the mark and at the correct distance away from the committee boat (as advised by the Race Officer), drop the mark over the side, while leaving the anchor and warp in the boat. Motor forward slowly, feeding out the



*Figure 9 keep the warps and anchors tidy on the mark boat to avoid becoming tangled*

warp that is connected to the mark, ensure the warp is well away from the propeller. Once you have all the warp out of the boat and the crewman is now holding the anchor you are at 'full stream'. The crew man must hold the anchor tightly while the skipper motors forward slowly until at the right *back bearing* to the committee boat (as advised by the Race officer) once the boat is on the correct *back bearing* the skipper calls to the crewman to drop, the crewman will drop the anchor, carefully to ensure it doesn't become tangled in the anchor chain.

- Ensure you are streaming into the tide
- Aim to start streaming two boat lengths from where you want the anchor to end up (do not stream the mark for a long distance as this will be a slow process)

### Retrieving the Marks

Approach the mark from down tide, bring the mark up on the side of the boat with the winch (starboard side). Have the crewman go to the bow to grab the mark, aim to hit the mark gently with starboard side of the bow. The crewman should be there to grab the mark and then drag it back to the winch. The crewman will need to pull up the first part of the warp until after the chain which is attached to the mark, the crewman can then wrap this around the winch, the crewman should only use one or two wraps around the winch. Once the crewman has the warp around the winch the skipper needs to turn the bow away from the mark, this is to ensure the warp does not go under the vessel and be in danger of becoming fouled in the propeller.

- Approach from down tide



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## RNZYS Mark Laying

- Once the warp is on the winch, turn the bow away from the mark then put the engine into neutral

If the mark does become fouled on the propeller, you will need to stop the vessel (if not already stopped) and lift the engine (if on Tiri). If on Pembroes Bay or Te Kouma you will need to anchor the vessel and then the crewman will need to go swimming to clear the line. The Skipper may radio the committee boat or shore base if they need support.

## Setting the course

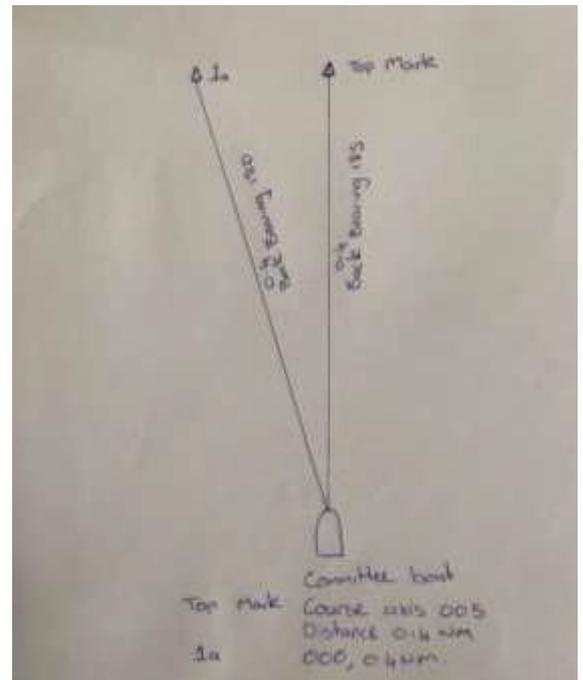
There are three ways of laying marks to set the course that the RNZYS use, each one is for a certain type of mark.

### Top marks

The first way is using GPS with a back bearing and distance to the committee boat. This is used to lay the top marks. The Race Officer will give a course axis, (this will need to be changed to the back bearing (+or-180°)) and distance of where they want the top marks to be. This is where the Mark layer will drop the ANCHOR of the top mark.

### Start Line

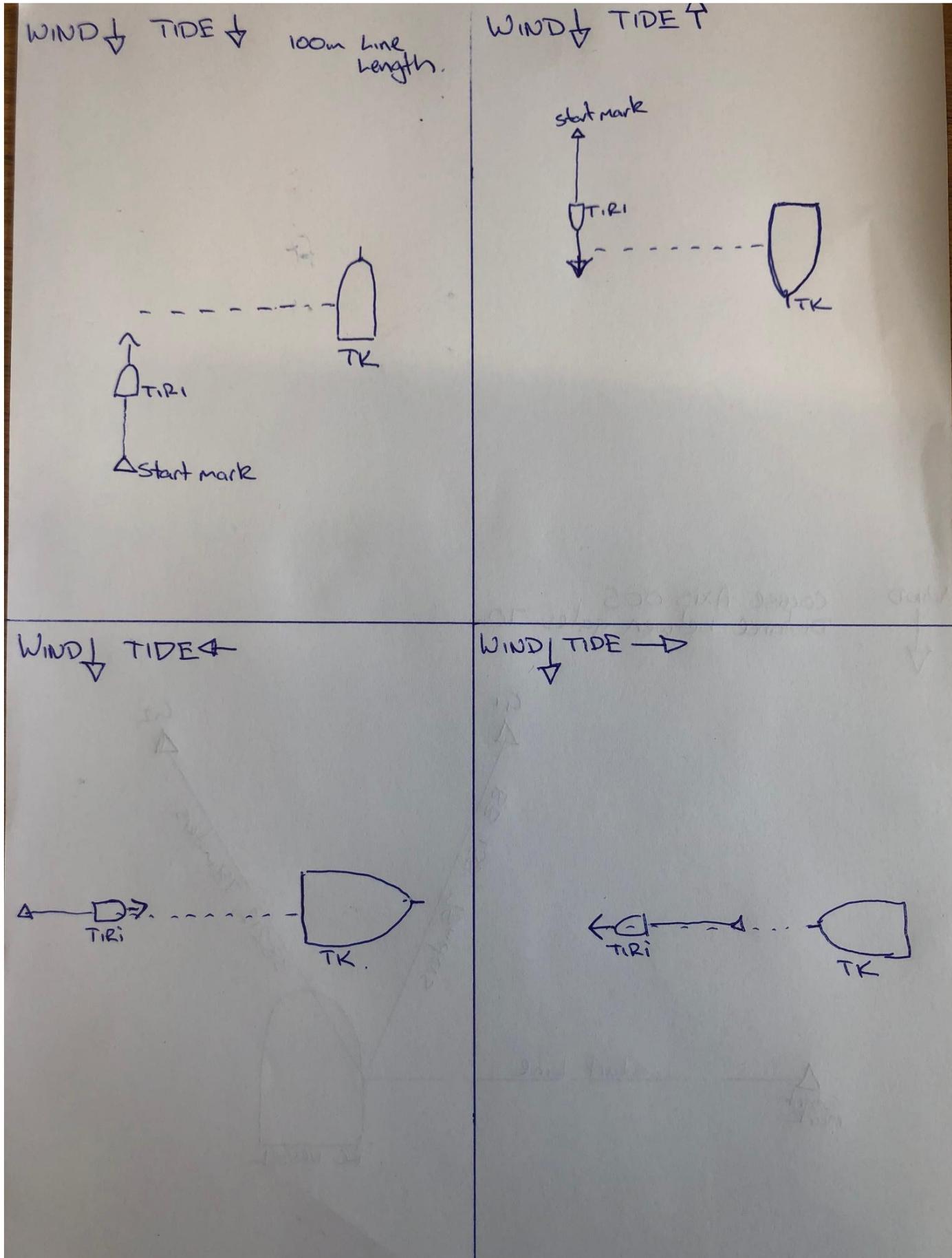
For the Start line (and finish line if using a separate finish line) the Race Officer will give a distance from the committee boat. The skipper of the mark boat will position the boat at this distance via the GPS, and down tide or downwind (whichever is the strongest and has the most effect on the mark). The skipper will then slowly stream the mark into the tide or wind. The Race Officer will tell the mark boat when to drop the mark. Note this is harder when laying the course across the current. Here the mark boat needs to start streaming from directly down tide of where the mark needs to end up and will be given further direction from the Race Officer via simple instructions such as 'turn to port or turn to starboard'





# RNZYS Mark Laying

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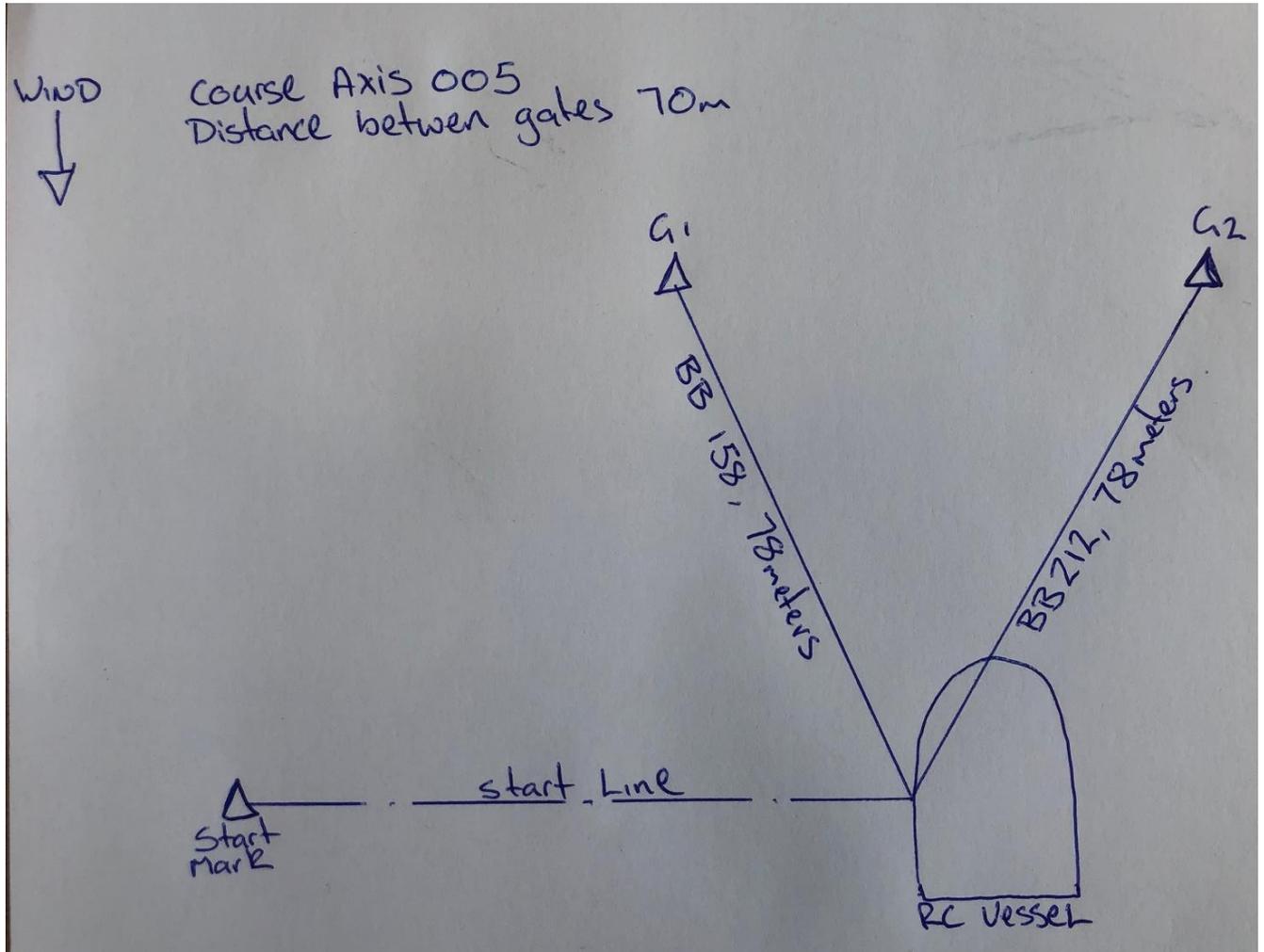
## RNZYS Mark Laying

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### Gate Marks

For the gate the Mark layer will use the table below to lay the gates with the GPS to a certain Course Axis. The Course Axis (CA) and distance between the gates will be given by the Race Officer.

Distance between gates	Distance from committee boat	Bearing from committee boat	L (windward gauge from CB)
70 meters	78 meters	CA +/-27 degrees	70 meters
80 meters	81 meters	CA +/-30 degrees	70 meters



## Change of Course

The Race Officer may decide to change the course during a race. For all RNZYS racing we only ever change the position of the top mark. If the Race Officer decides to change the course, they will give you a compass bearing and distance to put in the new mark. For all our sprint racing and windward leeward racing this will be the Green mark. Once the change of course mark is in position you will need to inform the committee boat, as they need to signal the change of course to the yachts at the gate. Note when you change the course to the Green mark there is no need for a 1a mark.



Normally you will then go and pick up the original mark, which can be used if there is another change of course. It is important that you are always ready to deploy the change of course mark, as this is often done under time pressure as the mark has to be in the water and the yacht signalled before they round the gate mark.

For Match Racing the system is different. In match racing there are 4 different top marks. The Race Officer will decide which mark to send the yachts to. Best practice is to have 3 marks in the water with the fourth mark on the boat ready to be deployed in a major wind shift.



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## RNZYS Mark Laying

For match racing and major events there will be a bottom mark boat responsible for laying the pin and gate marks. This boat will also signal the change of course at the gate if there is one.

To signal a change of course you need to display flag C with repetitive sound signals. For major events (not weeknight sprint racing or match racing) you also need to display the compass bearing and a + or -, depending on if the course has been extended or shortened. If the change only applies to some divisions and not all, you can signal this by displaying the divisional flag under the C flag.

For match racing you also need to display the colour of the new mark, the number of the match(s) that the change applies to (unless it applies to all matches), and if there is an off set or not (this is code flag O) (insert photo) under the mark colour if there is an offset)

The RNZYS does not change the course for Harbour Racing

### Shortening the Course

There are times when the Race Officer may decide to shorten the course. This is most likely to happen in Harbour Courses, Passage courses and in the longer windward leeward courses. If you are required to shorten the course, you need to position the mark boat on the side of the mark that the boats are rounding (Insert diagram), display flag S and sound two horns as the leading boat approaches the finish. (Note this should be done for the leading boat of each division). You will also need to record the finishers and, if it is a handicapped fleet, include the finish times. Remember the first boat in each division will also get a sound signal when they cross the line.

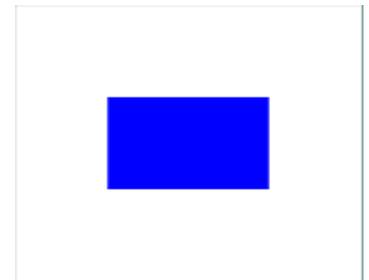


Figure 11 S flag used to shorten the course (with 2 sounds signals)

If you are shortening at the gate, position the boat close to the gate as the finish line is between the gate marks.

If the shortened course only applies to some of the divisions and not all, you can signal this by displaying the divisional flag under the C flag.

### Using the GPS

The function you are using on the GPS is to get a distance and bearing from the committee vessel, for the RNZYS racing the committee vessel is the **reference point**.

To do this you first need to 'ping' the committee vessel. You can do this in two ways, first you can drive next to the committee boat and set the way point on the vessel, or you can ask the committee boat for their GPS position and enter this in as a way point.

To set a waypoint on Tiri, swipe right on the right side of the screen, select the waypoint you want (mark or boat) then click on it. Then click on 'Go to' button. On the bottom left side of the screen it will now give you the bearing and distance to the committee boat. Note this bearing is the *Back Bearing*.

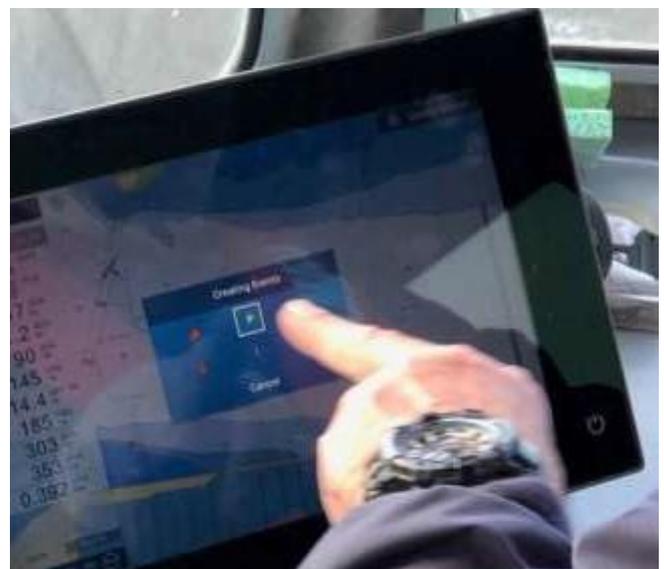


Figure 12 setting a waypoint on Tiri



Figure 14 bearing and distance to committee boat on Tiri

To set a way point on Pembroes Bay there is two options, one is to set a **way point** and other is to select **go to cursor**

To set a waypoint click on the top right menu, click new waypoint then *new way point at vessel*. To Go To the way point, click on the top left menu, then click Waypoints, select the latest waypoint then select Go TO.

To use the go to Cursor, click the screen on the boat, this will set the cursor onto your current location, then click on the top right of the screen this will bring up the menu, click on GO TO and then select *cursor*. An alert will come up that you have reached your destination, click ok, another alert will ask you if you want to *cancel*

*route or continue navigation*, click *continue navigation*. The distance and Bearing from the waypoint are at the bottom right of the screen. To cancel this waypoint click on navigation from the menu then click cancel.



Figure 13 Pembroes Bay select new waypoint or goto cursor



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## RNZYS Mark Laying

From here what you are looking at is the distance and bearing. Be aware that the committee boat will be giving you a 'Course Axis' which you will then need to change into a back bearing by adding or subtracting 180°. For example if the course axis is 005° the back bearing will be 185° (course axis + 180°). If the course axis is 330° the back bearing will be 150° (course axis - 180°). There are back bearing cards in each of the Mark boats which will make this easier.



Figure 15 Distance and Bearing from committee boat on Pembroes Bay

## Roles and Communication

The Race Officer will be trying to lay the course square to the wind. For this the race officer will require the following information

- True wind direction
- True wind strength

It is best if this information is given slightly to windward of the top marks and directly to windward of the committee boat. While waiting and not actively laying marks the Mark vessel shall hold station in this position with the change of course mark ready to go. Note that if the wind changes then the mark boat should move to position themselves directly upwind of the committee boat, and inform the committee boat of the wind shift. Often the easiest way to position the mark boat directly upwind of the committee boat is to look at the RNZYS burgee on the bow when the mark boat is into the wind.

- ***The Mark boat needs to always be ready to lay the change of course mark if required and should not anchor, wind readings are best given from a drifting vessel.***

Once the Race Officer decides on the Course Axis, which will be what they think is the average wind direction, they will give a distance and heading for the Mark Boat to lay the top mark. The Communication will be as follows

Race Officer    *'Tiri Tiri this is Te Kouma do you copy'*

Mark layer      *'Te Kouma- Tiri copy'*

Race Officer    *'Please lay the Yellow top mark at 005 degrees, 0.34NM'*

Mark layer      *'Copy, 005 degrees, 0.34NM'*

The order of laying the marks is normally the top mark, then 1A, which will be close to the top mark and laid with the same instructions (by the Race Officer giving a bearing and distance). It will be a slightly different heading +/- 3-10 degrees, but normally the same distance. The start line is next to be laid and finally the gate. Note the gate can be laid after the yachts have started the race, but must be in the water before the first yacht rounds Mark 1a. If there is a separate finish line this will be laid last and does not need to be in the water until the boats are on the last leg.

The communication when laying the start line is

Race Officer    *'Tiri Tiri, Te Kouma do you copy'*



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- Mark Layer     *'Te Kouma, Tiri Copy'*
- Race Officer   *'We will put in the start line now, can you start streaming, the distance is 100 meters'*
- Mark Layer     *'Copy 100 meters, I will start streaming'*
- Mark Layer     *'Full stream'*
- Race Officer   *'Boat is on'*
- Race Officer   *'Half way'*
- Race Officer   *'Hold, hold'*
- Race Officer   *'Drop, Drop, Drop'*
- Mark Layer     *'Mark is in'*

The Mark boat will lay the gate marks without any communication from the race committee using the same course axis as the top mark, and using the gate table to get the back bearings and distance from the committee boat.

### Race Officer Notes

Laying the course with a Cross Current

For the Y88, E7 sprints and all match racing events, the yachts need to always round the top mark into the current. This means the Race Officer will change the rounding to port or starboard to suit. For the S34, Etchells and the Ladies sprints, the yachts will always round the top mark to Port.

Off Set Lengths in a cross current (The wind strength is based off E7 Match racing. For weeknight sprint racing the distances will be between 0.3-0.4NM)

Course Length			
NM	Wind strength	Degrees off set	Off Set length M
0.25	4 to 6 knots	17	130
0.3	6 to 9 knots	10	100
0.35	9 to 13 knots	9	100
0.4	13 plus	6	80



Off Set lengths no current, or rounding with current.

Course Length NM	Degrees off set	Off Set length M
0.25	5	40
0.3	4	40
0.35	4	40
0.4	3	40
0.6	2	40
0.7	2	40
0.8	2	40
1	1	40

### Laying the Start Line

When Laying the Start line the goal is to have an even line. This means that a boat starting at either end of the line has the same chance of winning the race. Normally this means square to the wind for a windward leeward course, but when the tide is strong it also has to be taken into account.

- Harbour Course guidelines for laying the start line: Te Kouma will always be anchored on the southern side of the Harbour

Wind Direction	Bearing from committee boat to start mark
110-70	90 degrees to the wind direction
070-340	340 degrees
340-225	90 degrees to the wind direction
225-110	020 degrees

- Effects of tide on the start line when taking the wind readings from anchored committee boat

Wind with the tide	Slight Committee Boat Bias	3-5 Degrees
Wind against the tide	Slight Pin bias	3-5 Degrees
Tide Left to right	Pin bias	3-5 Degrees
Tide right to left	Committee Boat Bias	3-5 Degrees

- If one side of the course is obviously favoured, which can happen often in the Harbour with the tide,( for example in a SW and outgoing tide the left side of the course is going to be favoured). You should aim to have the other end of the line slightly biased, in this example a slight committee boat bias.

- Start line length guide

- The Start line should be the length of the yacht times 1.5 the number of yachts

Winter Series	250m
Wednesday nights	250m
Sprints nights	150m

- For Match Racing, the line length should be set so the a yacht will take 30 seconds to sail along the line, therefore shorter in the lighter wind and longer in heavier wind.