BLUE LIGHTNING

sailboat designs by Keith Callaghan

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BLUE LIGHTNING
Principal Dimensions

Length Overall (excluding Rudder)	6.73m
Length on waterline	6.50m
Maximum Beam (inc rubbing strakes)	2.28m
Waterline Beam	1.67m
Draft (hull)	0.23m
Draft (Centreboard down)	1.45m
Beam/Length ratio	3.9
Sail Areas:	
Main	13.3 sq m
Jib	8.5 sq m
Spinnaker	26 sq m
Weights:	
Empty Weight	685kg
Sailing Displacement: 2 crew	1008kg
Boat weight for trailing (with all gear, except outboard and anchor)	780kg
Tow weight with trailer	1150kg approx
Displacement/length ratio	103
Sail Area/Displacement ratio – upwind	22
- downwind	48.3

BLUE LIGHTNING is one of a series of sports trailer-sailer designs ranging from 5.5 metres to 7 metres LOA. My design portfolio also includes high performance sailing dinghies

BLUE LIGHTNING is capable of speeds in excess of 20 knots, yet has 3 comfortable full size berths with sitting headroom, cooking facilities, an icebox, a toilet, electrics, and bags of stowage space. She is the culmination of over 20 years of thought into what makes the perfect trailer-sailer. There is nothing like her in production today (except *BLUESTORM!*). She could scare the pants off you, or she could be the performance estuary cruiser of your dreams!

BLUE LIGHTNING is designed for coastal and estuary cruising, where her fully retractable centreboard is a great benefit in shallow waters. She draws only 22cm with the board up.

She is constructed using Epoxy/wood/glass composite techniques, giving a stiff, light and very low maintenance boat. For my own boat, I used WEST epoxy resins and materials.

Mast and boom are by Z Spars. Sails by Number One Sails.

125kg of lead ballast is moulded into her fully retractable centreboard. Her empty weight is just 700Kg, the sailing displacement (2 crew) is 1000kg, and the full towing weight, including trailer and cruising inventory, is 1150Kg. Yes, she really can be towed behind an ordinary family car. I have towed her 300 miles behind a Citroen BX at an average speed of 50 mph.

BLUE LIGHTNING was designed as a fast yet easily sailed coastal cruiser
She is rigged for single handed sailing, with a self tacking, reefing foresail, and slab reefing on the mainsail.
The foresail incorporates a jib boom which enables a wide sheeting angle when off the wind. The foresail automatically goosewings when running before the wind.
Foresail twist is perfectly controlled by use of a kicking strap on the jib boom. There is just a single jib sheet.
Tacking is simply a matter of putting the helm down - no other action is required.
This system has been perfected after several years of experimentation on my earlier boat – LIVELY. This makes for effortless tacking when navigating rivers -especially when short tacking inshore to keep out of the tide.

All control lines are led to the aft face of the coachroof. These are:

Foresail furling line.
Foresail clew outhaul.
Foresail boom kicking strap.
Main kicking strap. (Z Spars rigid vang) (on swivel jammer)
Jibsheet. (on swivel jammer).
Centreboard hoist (with cam cleat).
There are 3 clutches for the halyards, and a Lewmar No.6 winch. The winch is used for halyards and raising the centreboard.

As you might expect with a lightly ballasted centreboarder, BLUE LIGHTNING's stability characteristics are not like that of a Contessa 32. Nonetheless, she is self righting until her mast is below the water, even with 2 crew perched on the gunwhale, where they would exercise a negative effect on righting moment. The stability curve is shown elsewhere in these study plans. The centreboard is assumed to be locked fully down.

Uffa Fox was well known for saying, 'The only place that weight ever did any good was in a steamroller', and certainly at moderate angles of heel a ballast keel is just dead weight, adding little to the stability of the boat.
Because she is so light (her CHS empty weight is 705kg and her displacement/length ratio (DLR) is 104) she FLIES off the wind. She is a true planing cruiser, needing just a force 4 breeze on a reach to take off. At any speed she remains beautifully balanced and light on the helm.
I tend to emphasise the offwind performance in my description of Blue Lightning, because it is here that speed differentials with other boats are most marked. Even Blue Lightning cannot plane to windward, so she is limited to her maximum displacement speed upwind. This maximum is the same for any boat of her waterline length, ie 1.4 x the square root of the waterline (in feet) = approx. 6.4 knots. (Handicapping systems weight waterline length very heavily for this reason).

A boat as light and “hydrodynamic” as Blue Lightning will approach this max readily in smooth water in a force 3, or in conditions where you can keep her heeling to less than 15-20 degrees. In these conditions I can generally outpace 30-35 footers to windward.

Another big advantage she has to windward is that tacking is just a matter of putting the helm down - thanks to her self tacking jib. Tactically, too, this is a big advantage, especially in restricted waters racing (eg river, or “round the cans”). BL will gain 10 yards per tack against opposition with genoas. Genoas are inefficient use of sail area, they are awful to tack, require sheet winches, useless on a run, and are just not needed. BL's sail area is 220 sq ft, efficiently distributed 30:70 between foresail and mainsail (like a dinghy). This is ample sail area for upwind sailing and close reaching. A non overlapping jib allows BL to point very high in light to moderate winds, as the sheeting angle is much narrower than possible with a genoa. Genoas only appeared because

the old rating rules were kind to them. They are now just a 20th century anachronism.

In rough water you have to use dinghy techniques to maximise speed made good to windward, but you have the advantage over a dinghy in that you can easily reef instead of having to spill wind from the sails. Reef early is the maxim if you want max speed to windward. BL only has 150kg of ballast - she can't be fastest boat on every point of sailing in all weathers, but she will hold her own in heavy airs to windward if sailed well. 20 knots of wind will be no problem, but 30 knots will require double-reefed main and reefed (furled) jib, and 4 blokes on the high side.

BL is really a big dinghy - have no delusions about this. There are a lot of compromises, of course. For example, BL has a more balanced heeled hull form than a dinghy, because inevitably she will not be sailing so upright to windward.

Being a dinghy in concept means (among other things) that BL is light. This brings numerous advantages - “trailersailability “, ease of handling afloat and ashore. No winches required for sail trimming, no excessive beef required to do anything on the boat - everything is light. She is a joy to sail, is highly manageable in all sailing conditions and genuinely has no vices whatsoever. I'm sure she will give her owner years of pleasure.

Towing Performance

Blue Lightning's all-up towing weight is 1130kg, and its draft with centreboard raised is 22cm.This makes it a genuinely towable and launchable trailer-sailer.

Many so-called trailer-sailers of similar or smaller size will have a similar towing weight quoted in their sales literature, but the weight does not include the trailer! Their problems are generally twofold: they carry around too much ballast, and this is often external, necessitating several feet of water to launch in. I was amused to see the picture on the front of the book 'Trailer Sailing' by JC Winters (Adlard Coles, 1994). It showed a Volvo backing a Beneteau First 210 down a slipway on its trailer. If you line up the waterline of the boat with the back of the car, it is immediately apparent that the car would be completely immersed before the boat floated off its trailer. And I'm sure that the 210 on its trailer exceeds the Volvo's safe towing weight limit. E-mail me with your comments if I'm wrong.

Blue Lightning's Weights

Here is a breakdown of Blue Lightning's weight:

Item	Weight Kg
Boat weight (empty)	705
Fuel, water, food	25
Cruising gear	45
Trailer	355
TOTAL	1130

Not included above are the outboard motor (21kg), anchor/chain (16kg) and personal clothing etc, which are stowed in the car boot when towing.
When I owned Blue Lightning my car was a Citroen Xantia 1.9 Turbo Diesel - an excellent tow car with its self-levelling suspension and gutsy engine.
Its recommended max. towing weight is 1500kg, so I had plenty to spare, and the car coped admirably. The rig is actually light enough to tow behind a VW Golf or similar size car.

Fully detailed PLANS of *BLUE LIGHTNING*, consisting of about 50 sheets, are available from the designer, Price £275.00 (€390.00, $525.00). (Approximately 40-50 man/weeks build time).
Price includes royalty for one boat, and free of charge comprehensive support for you during the planning and building of your boat

Support Policy

1. *Support is included as part of the package that you purchase with the boat plans.*
2. *I will answer all reasonable questions about how to build my design. As the builder, you are responsible for acquiring sufficient general knowledge about boatbuilding before you start your project. Many good books and other sources of information are available, and I can recommend such information sources.*
3. *The plans and other documentation that I supply are very detailed and contain a great deal of information. You do not get a step-by-step set of building instructions, however.*
   It will be useful for you to go through the data thoroughly before you start the project. This will help to minimise mistakes and will speed up the actual construction. If you cannot find the answers in the documentation and drawings, I'm here to help, so please ask me.
4. *I will endeavour to respond promptly to your enquiries. However, I cannot undertake to be available at all times.*

Contact Information

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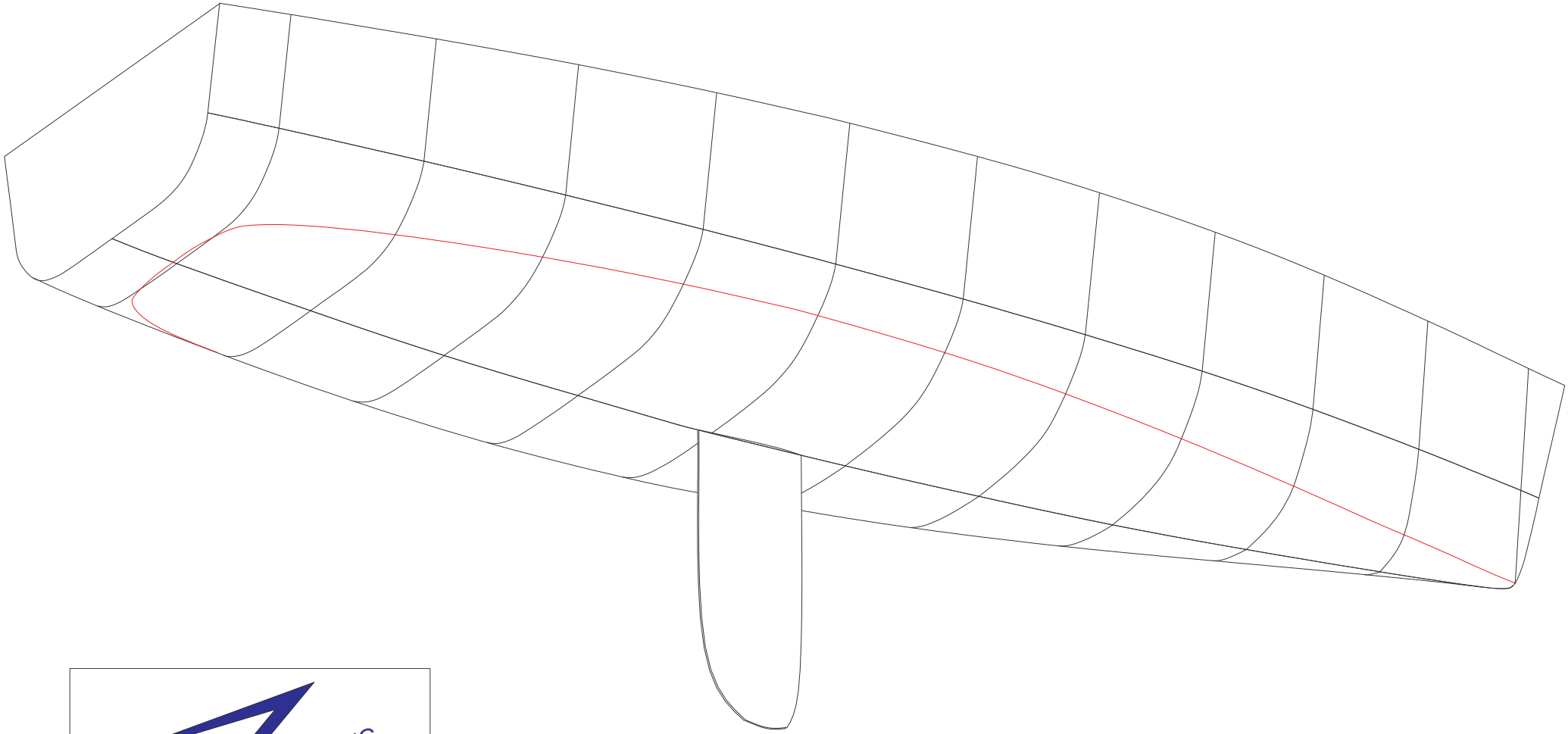

BLUE LIGHTNING

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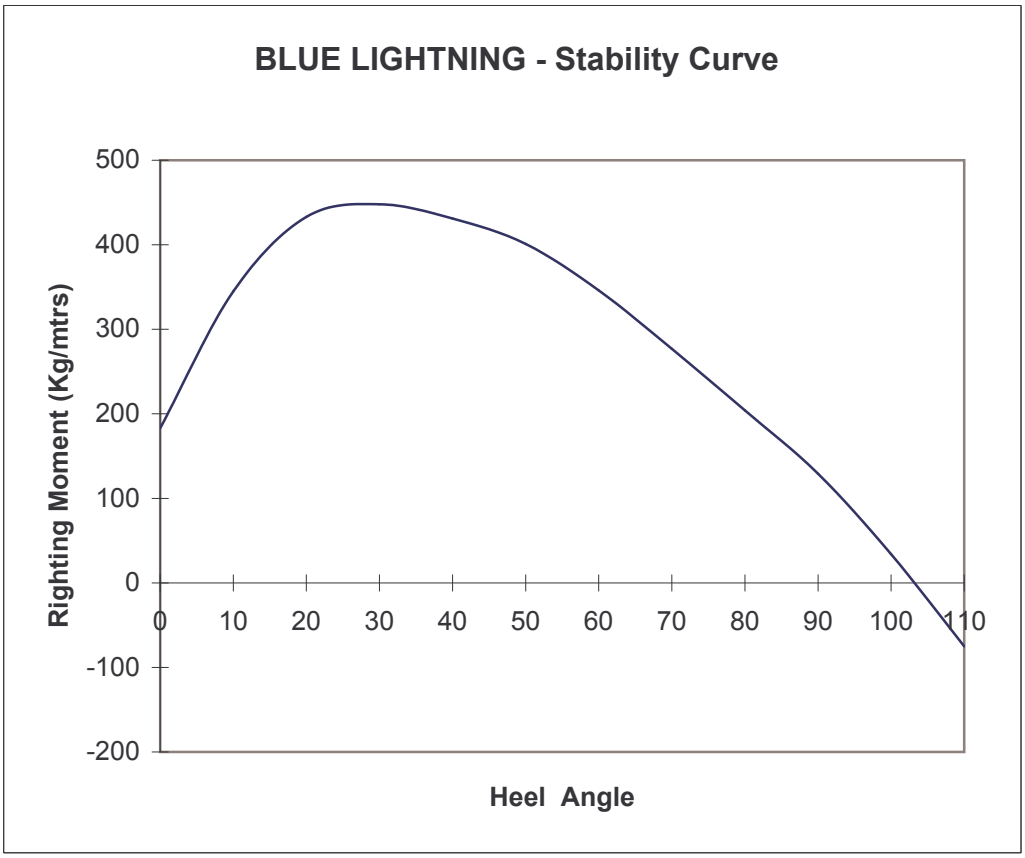
BLUE LIGHTNING *- stability*

Heel Angle (Degrees)	Righting Moment (Kg/Mtrs)
0	183
10	345
20	433
30	448
40	431
50	401
60	346
70	277
80	204
90	129
100	34
110	-75

In order to provide a realistic stability curve The data on this page is calculated using a centre of gravity of the yacht with two crew sitting in the cockpit on the weather side.

This has the effect of improving initial stability, but has a negative effect on ultimate stability



This data gives an indication only of theoretical stability in smooth water.

SAIL PLAN SCALE 1:40
& Spar Specification

BLUE LIGHTNING

Tel 01473 823587

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Recommended mast: Z SPAR Z170
boom: Z SPAR Z160
inertias: 24 ^{4} x 68cm ^{4}

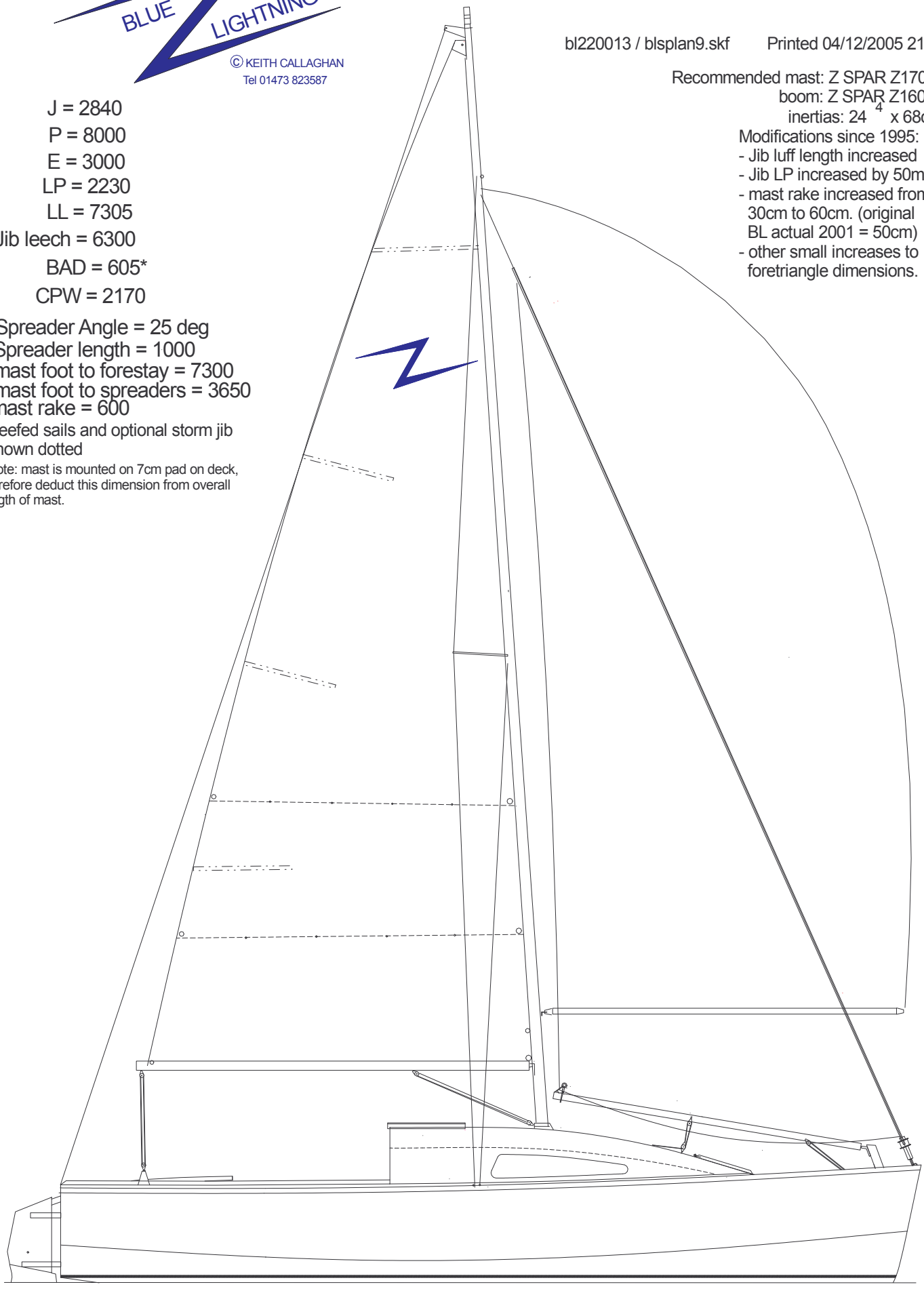
Modifications since 1995:
- Jib luff length increased
- Jib LP increased by 50mm
- mast rake increased from 30cm to 60cm. (original BL actual 2001 = 50cm)
- other small increases to foretriangle dimensions.

J = 2840
P = 8000
E = 3000
LP = 2230
LL = 7305
Jib leech = 6300
BAD = 605*
CPW = 2170

Spreader Angle = 25 deg
Spreader length = 1000
mast foot to forestay = 7300
mast foot to spreaders = 3650
mast rake = 600

Reefed sails and optional storm jib shown dotted

* note: mast is mounted on 7cm pad on deck, therefore deduct this dimension from overall length of mast.



SCALE (metres)

BLUE LIGHTNING

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BLUE LIGHTNING
SPORTS RIG

SAIL PLAN SCALE 1:40

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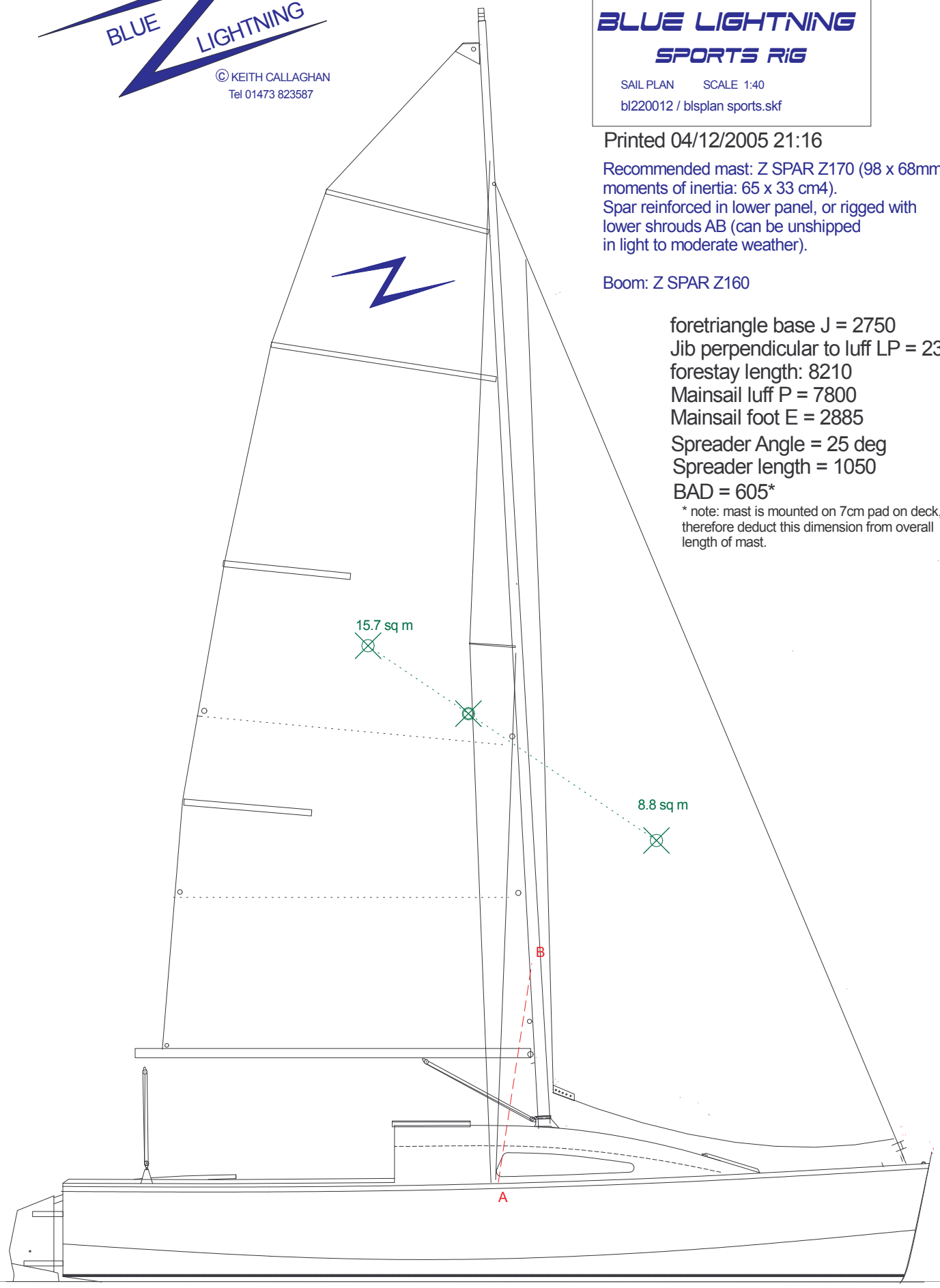
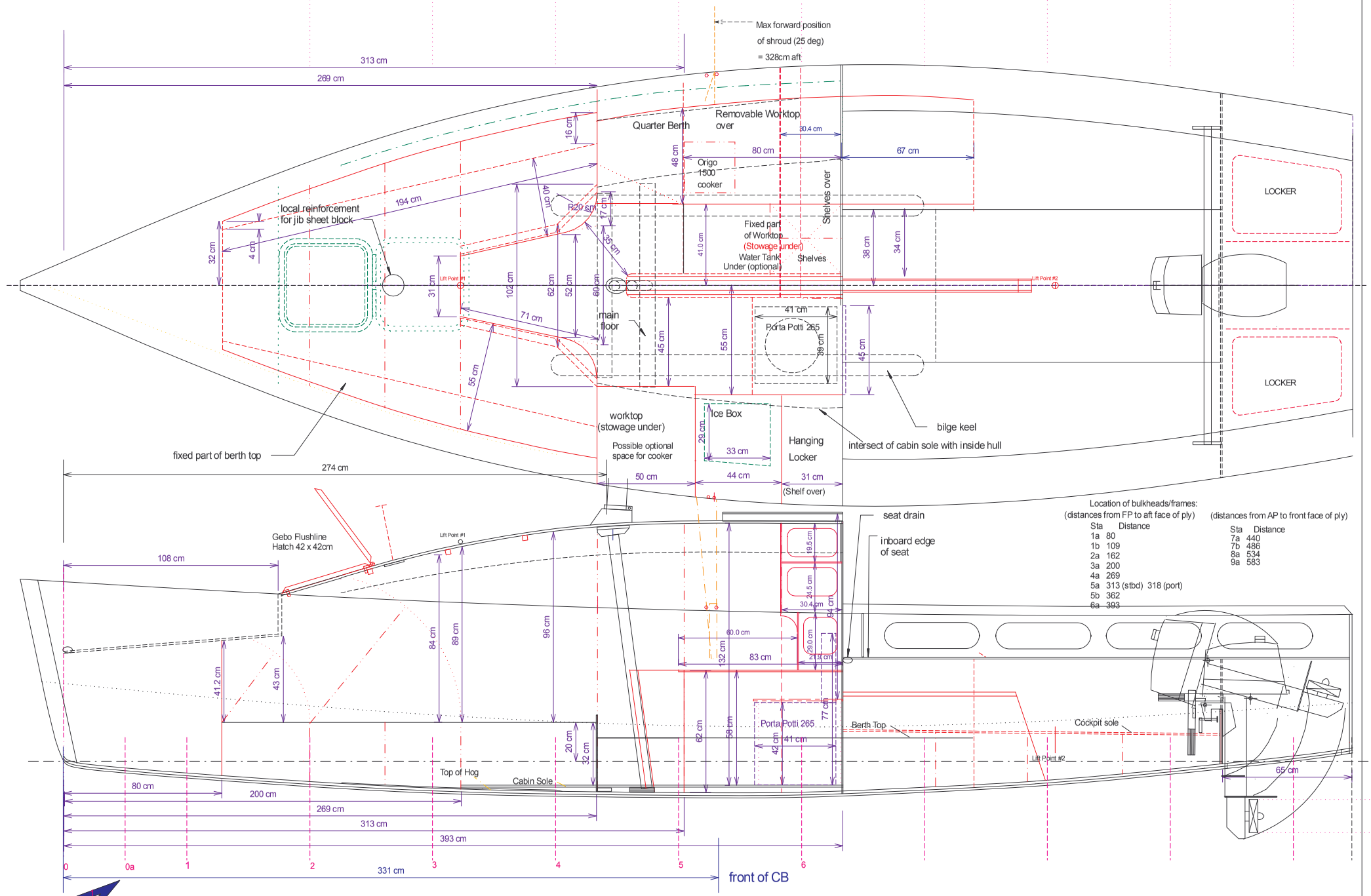
Recommended mast: Z SPAR Z170 (98 x 68mm, moments of inertia: 65 x 33 cm4).
Spar reinforced in lower panel, or rigged with lower shrouds AB (can be unshipped in light to moderate weather).

Boom: Z SPAR Z160

foretriangle base J = 2750
Jib perpendicular to luff LP = 2340
forestay length: 8210
Mainsail luff P = 7800
Mainsail foot E = 2885
Spreader Angle = 25 deg
Spreader length = 1050
BAD = 605*

* note: mast is mounted on 7cm pad on deck, therefore deduct this dimension from overall length of mast.





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INTERIOR ACCOMMODATION LAYOUT
(3 Berths in Cabin)

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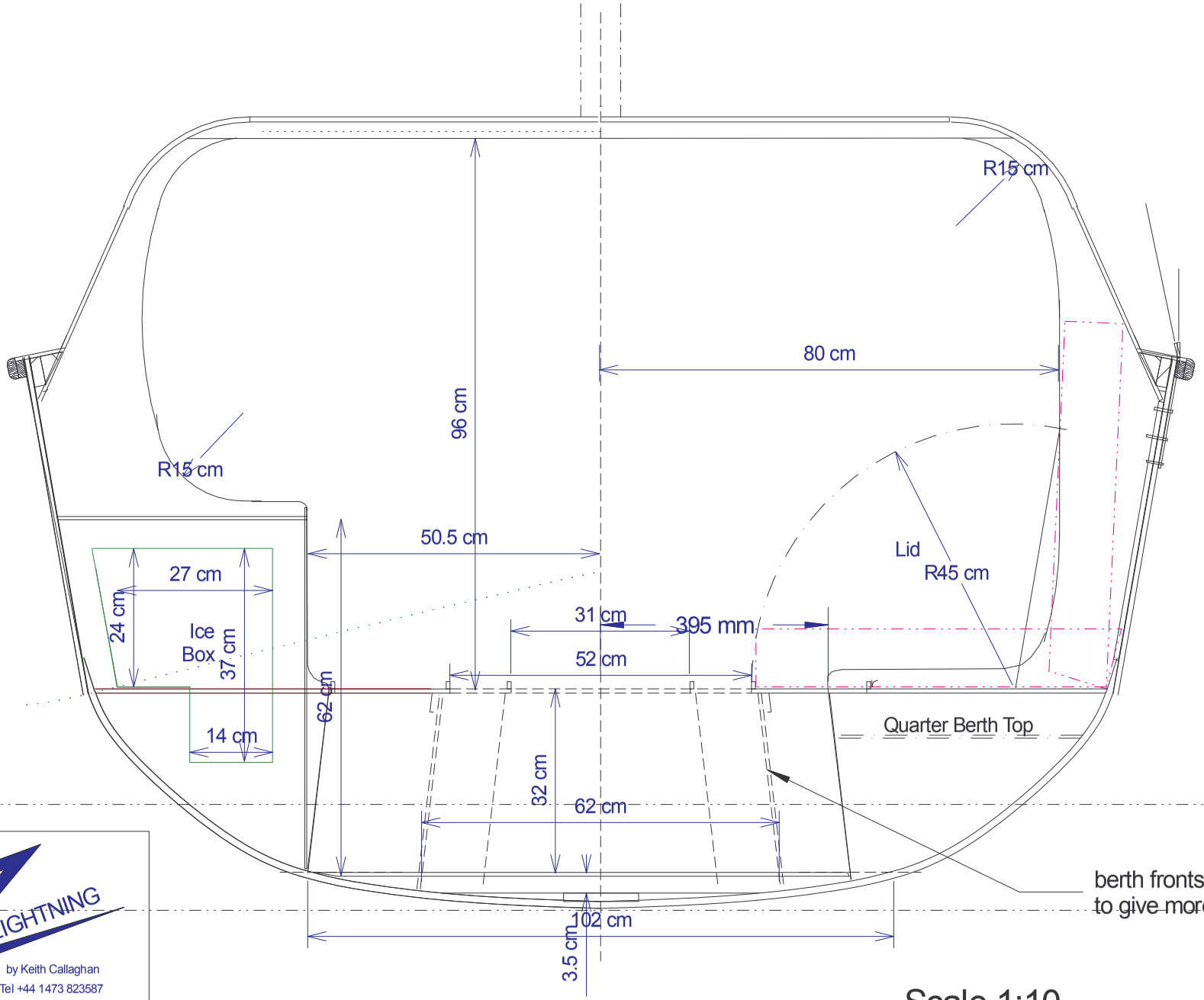

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Scale 1:10

SECTION 4a (269cm aft)

from aft, looking forward

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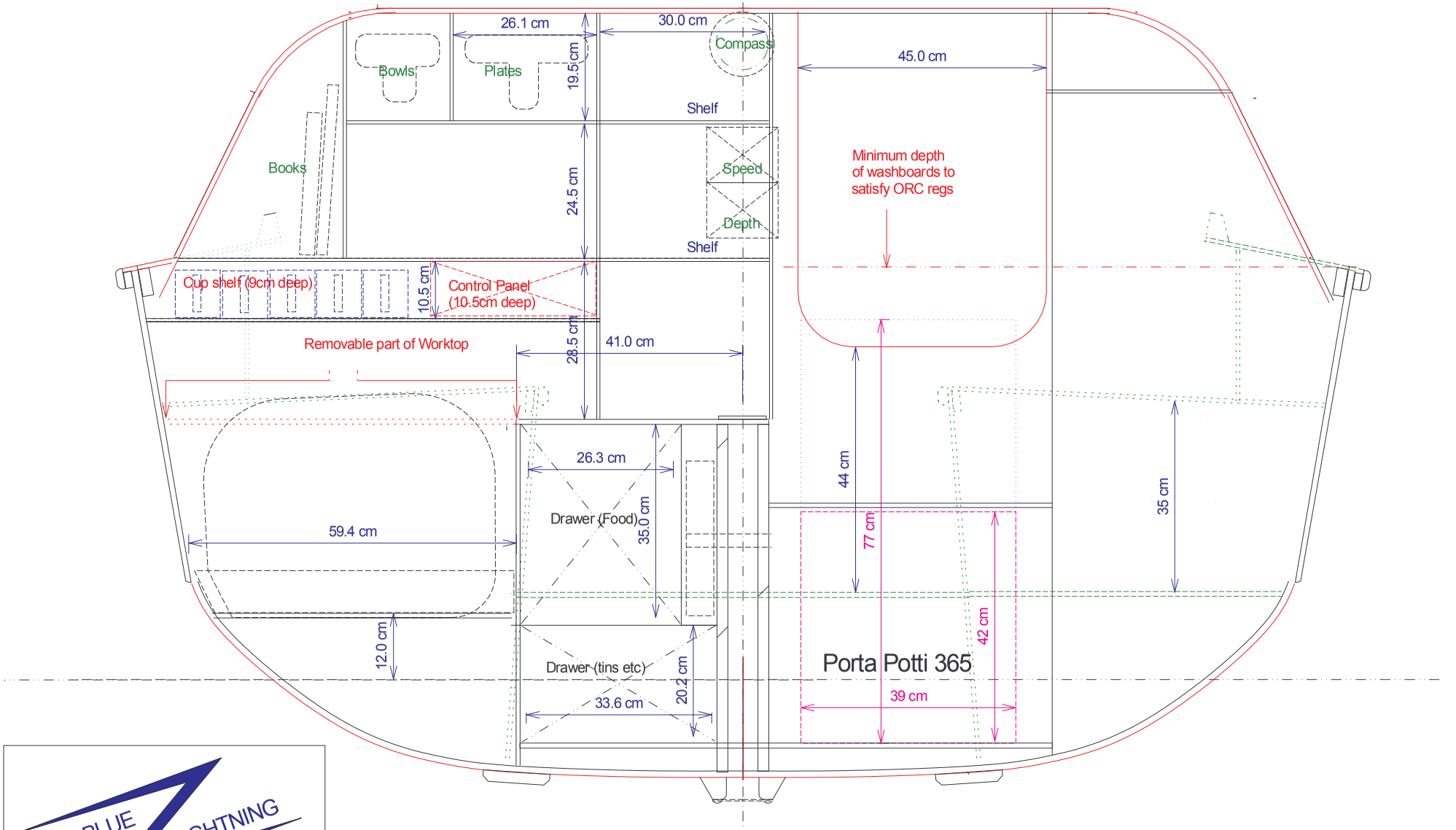

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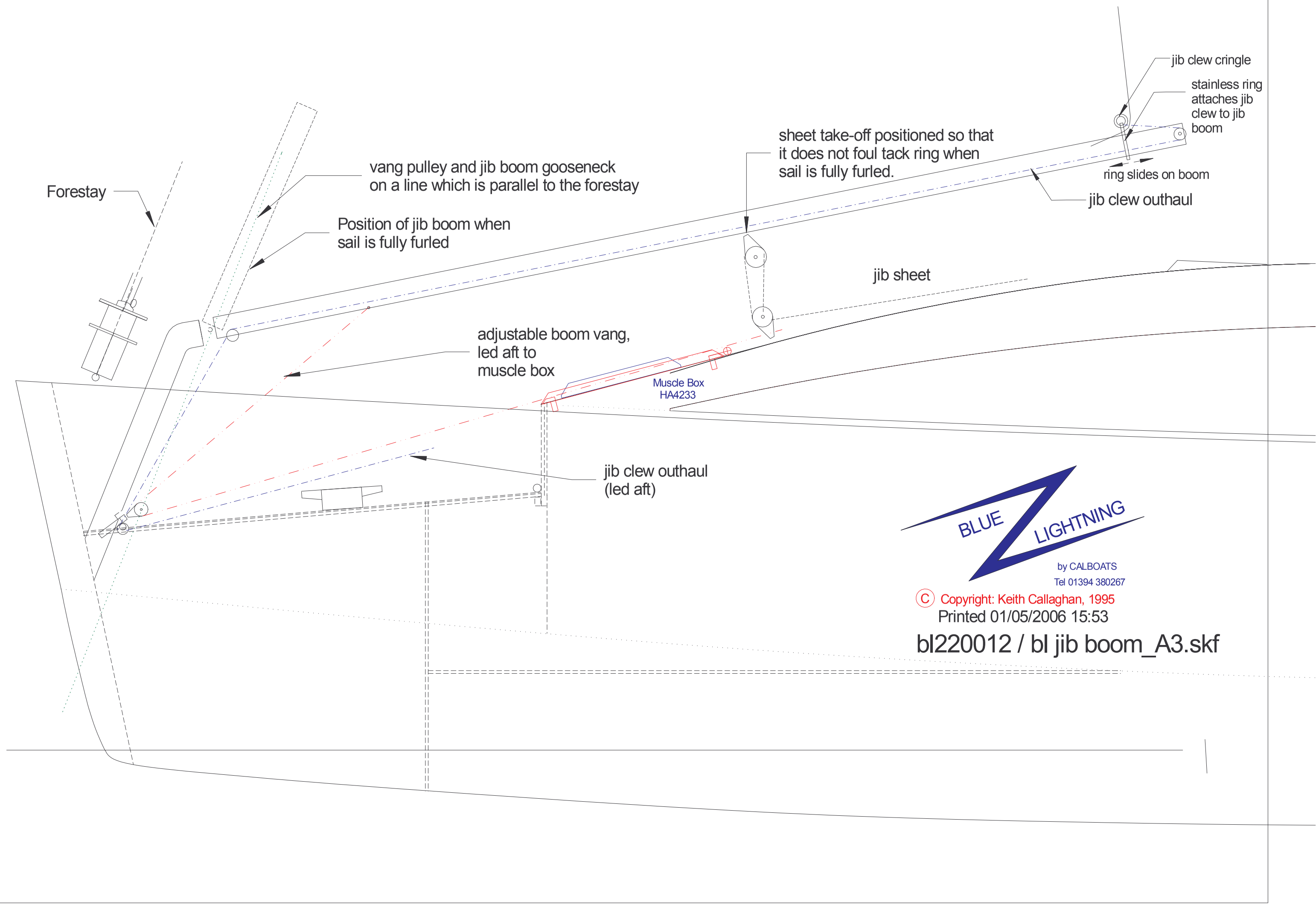
MAIN BULKHEAD FROM FORWARD - LOOKING AFT

(393cm aft) bl220013 / blsec6aa.skf scale 1:10 25 SEP 95



BLUE LIGHTNING

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