



AMERICA'S CUP RACE MANAGEMENT

AC45 Handling Manual Version 1

Lifting Equipment

All lifting equipment required for stepping the wing and launching and recovery of the AC45 will be supplied by ACRM.

All lifting operations will be planned with a site-specific method statement and risk assessment. Copies of which will be available on request.

The wing is lifted using a sling attached to the masthead headsail halyard. A retrieval line is required both to steady the wing during standing, and also to recover the halyard when the wing is securely stepped. A second tag line is also used to steady the wing during lifting. See drawing. Detailed procedures are being developed during the test sailing period and will be made available in due course. The wing counter balance is being refined and further details of this will be available when the design is finalised.

The platform is lifted using a 2 leg dyneema sling passing through a guide ring hoisted on the masthead headsail halyard and secured to two endless webbing slings choked at either end of the main beam. As with the wing stepping a retrieval line is required. See drawing.

Teams will be required to provide their own tag lines whilst lifting the platform. Typically this would be 8 individual lines of 30m each, no less than 10mm diameter.

Team Ribs - Any lifting gear supplied by the teams for their RIBs must be clearly marked with its Safe Working Load and come with manufacturers certificates.

Towing

Team ribs should be equipped to tow the AC45 from alongside and from astern of the RIB. Suitable fendering should be used when towing alongside or whilst coming alongside the AC45. To assist towing from ahead a towing strop / bridal with snap shackle (Tylaska T12 or similar is recommended) should be permanently mounted on the forward beam.

Mooring

A mooring strop will be supplied to enable the AC45 to be moored from a near-central position, below the mast rotation point. A drogue will be required to dampen the movement of the boat on the mooring.

Further details and a mooring process statement will be provided in due course when more experience of mooring the AC45 has been gained.

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NOTE: IT IS CRITICAL THAT THE WING CAMBER AND TWIST CONTROLS REMAIN LOCKED OUT DURING THE WING LIFTING PROCESS

NOMINAL WING LIFT FROM GENNAKER HALYARD = 370kg W/ BALLAST

USE TAG LINES FROM WING TIP IN DIFFICULT CONDITIONS

NOMINAL PLATFORM LIFT = 1094kg

NOMINAL TENSION IN AFT LIFTING STROP = 170 kgf

NOMINAL TENSION IN EACH FWD LIFTING STROP = 468 kgf

DO NOT ATTACH TAG LINES TO CLEW. THESE COULD INADVERTANTLY SHEET ON THE WING AND CAUSE TROUBLE

FWD STROPS ATTACHED NEAR FWD BEAM CONNECTION TO HULLS

AFT STROP ATTACHED NEAR CONNECTIONS OF AFT BEAM TO SPINE

AERO CE 190mm AFT OF BALLASTED PICK AXIS

WING CG

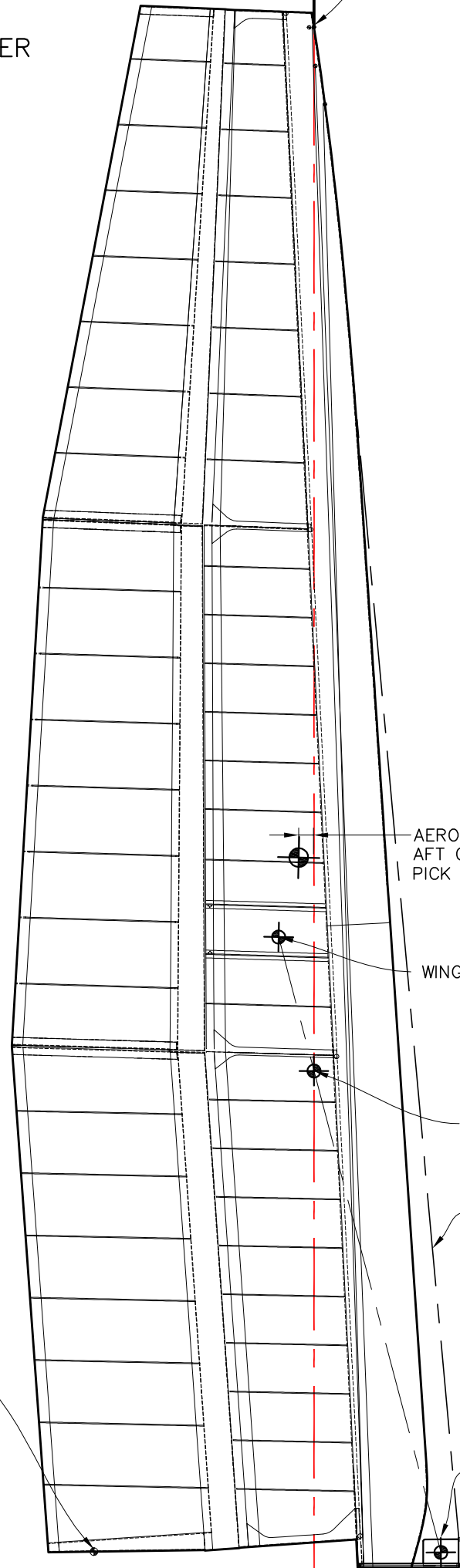
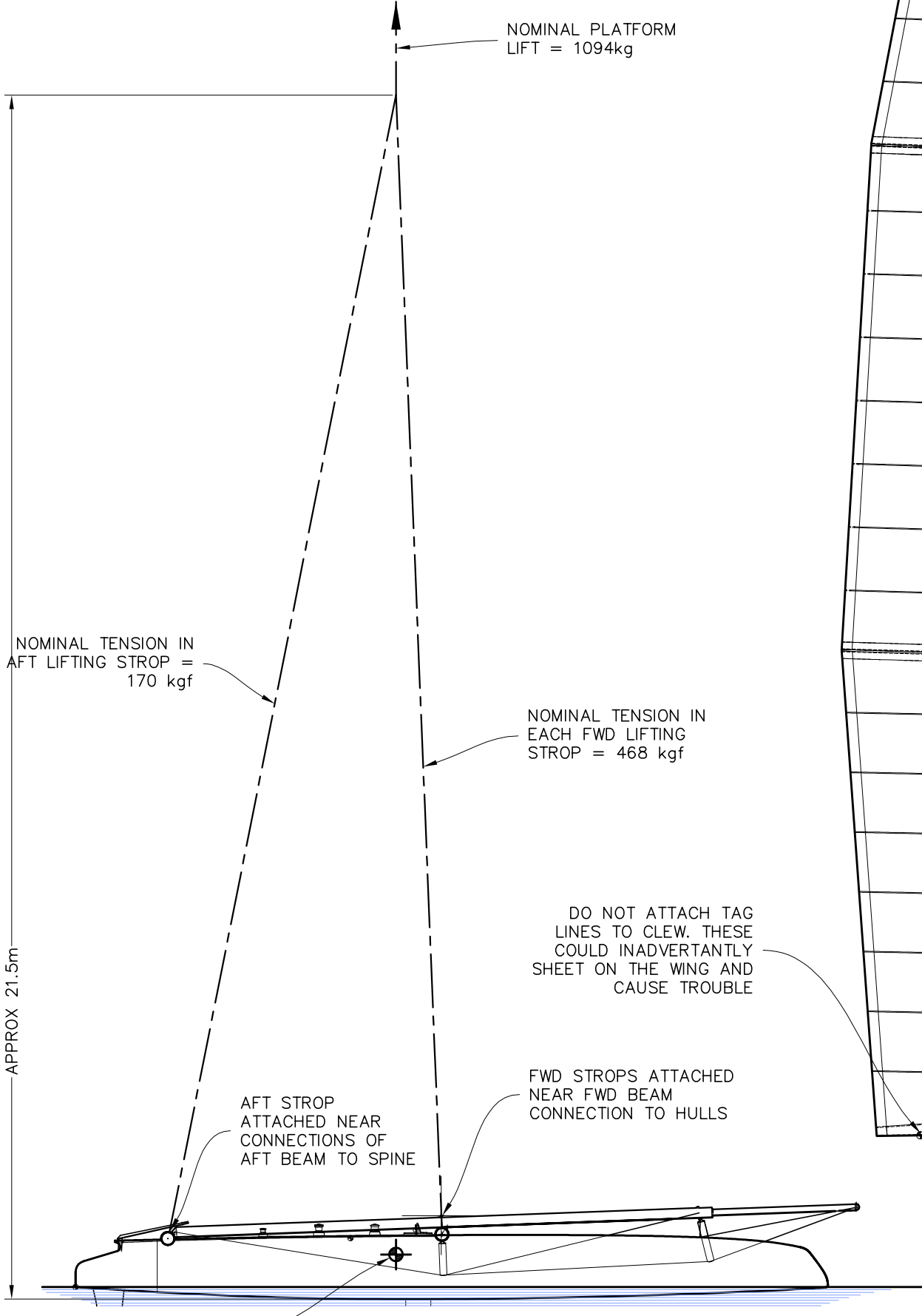
BALLASTED CG APPROX 410kg W/ BALLAST

JIB HALYARD SUPPORTS COUNTERWEIGHT VERTICALLY

COUNTERWEIGHT APPROX 90kg PINNED TO WING

TAG LINES ATTACHED TO FWD CORNERS OF THE COUNTERWEIGHT

APPROX 21.5m



WING LIFT
WITH COUNTERWEIGHT
1:100

PLATFORM LIFT
PRELIMINARY HOOK HEIGHT
1:100

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CKD	EEJ	DATE	10/1/11
CON	-	DATE	-
APVD	-	DATE	-

PSPACE SHEET NAME		SHEET	
WING OFF PICKS		4 OF 1	
SIZE		SCALE	
A3		AS NOTED	

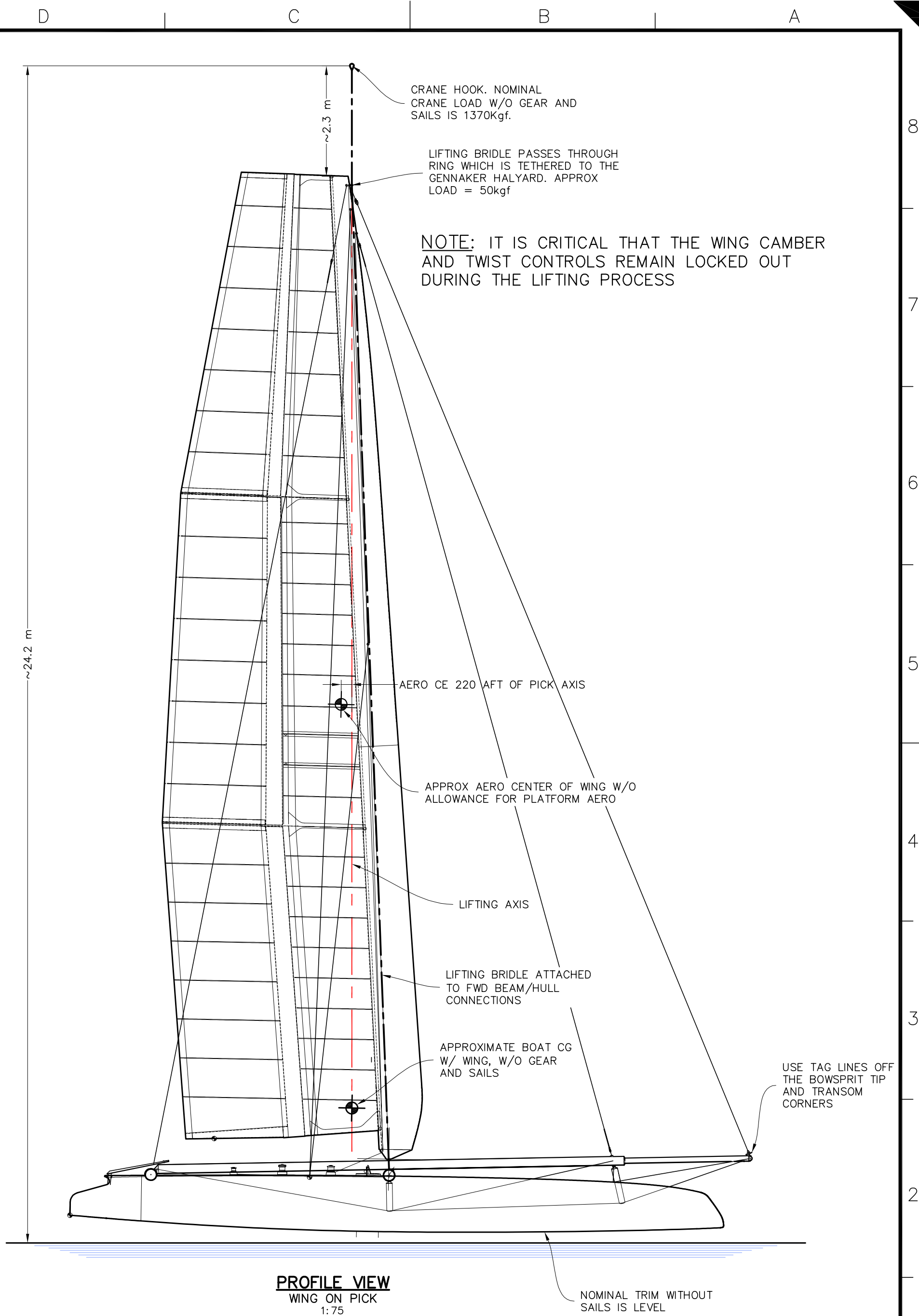
DRAWING DIRECTORY PATH
CONSTRUCTION\...

DRAWING NUMBER/TITLE
AC 45 LIFTING ARRANGEMENTS

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Wing Trolleys

A system for handling the wing whilst on the ground, and during standing is currently under evaluation.

Three trolleys with castor wheels will support the wing at the head, foot and clew positions. These will allow the wing to be easily moved around and aligned in the appropriate position for lifting. These also allow for the wing to be tilted vertically (leading edge down).

The foot trolley will remain attached during the wing standing operation.

See drawing for details of the lifting system / standing operation.

These trolleys can either be purchased through ACRM, or copies of the drawings can be made available for Teams to manufacture their own wing trolleys.

Hull Trolleys

A set of hull trolleys has been developed to handle the AC45 whilst on the ground. They feature lockable castor wheels that can be locked in set orientations whilst the wing is in the boat, allowing the assembled wing and platform to rotate about the centre of the platform. This allows the sterns to be pushed from side to side to keep the wing aligned with the wind. See drawing for details.



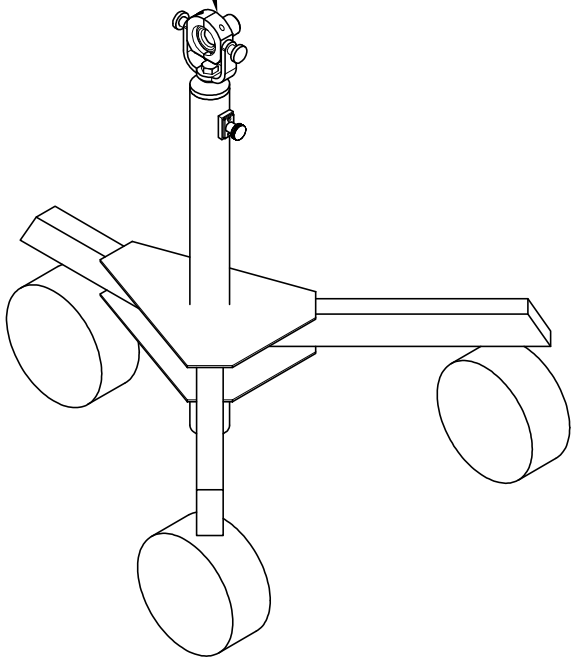
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NOTES:

1. IT IS CRITICAL THAT THE WING CAMBER AND TWIST CONTROLS REMAIN LOCKED OUT AND THE WING COUNTERWEIGHT ATTACHED AND BALLASTED WITH WATER PRIOR TO COMMENCING WITH THE WING LIFTING PROCESS.

2. A PERSON MUST BE STATIONED AT EACH TROLLEY SO THAT IT MAY BE STEERED AS NECESSARY AND PREVENTED FROM HITTING SOMETHING AND TIPPING OVER.

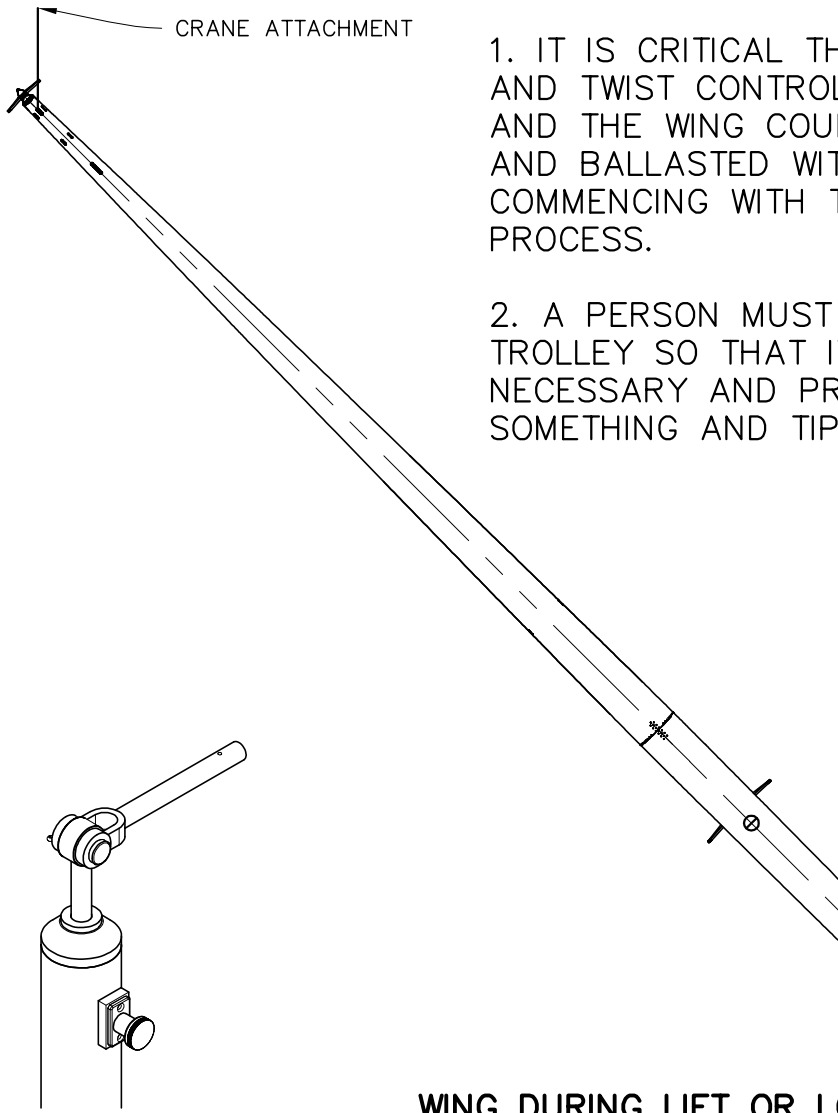
COLLAR CLAMPS TO OUTSIDE OF WING CUP



WING STEP TROLLEY

ROUGH ISOMETRIC
OTHER TROLLEYS SIMILAR
NO SCALE

CRANE ATTACHMENT



THE PROCESS IS SAFER IF CLEW END TROLLEY IS REMOVED DURING LIFT SO CREW CAN ADJUST WING ANGLE OF ATTACK DURING PROCESS

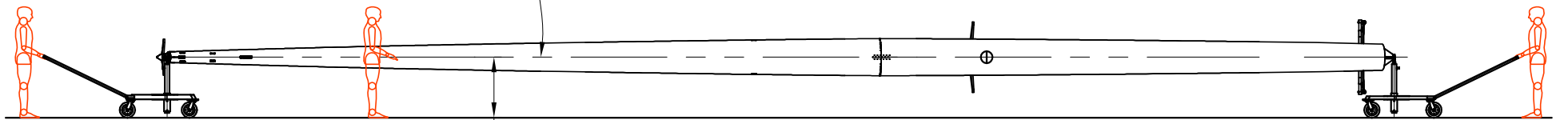
WING DURING LIFT OR LOWER

FRONT VIEW
TAG LINES NOT SHOWN
1:100

TROLLEY END FITTING

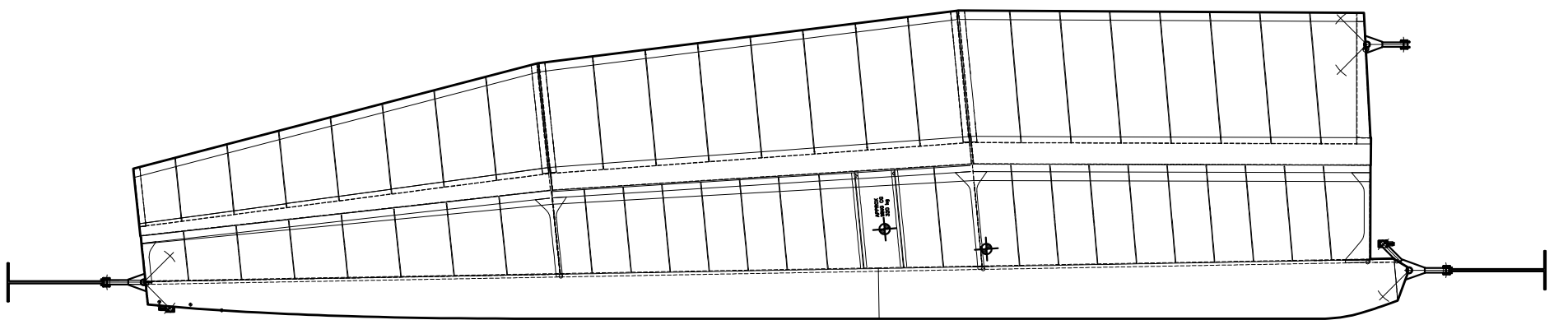
CLEW & TIP
INSERT INTO WING & SECURE
NO SCALE

WING TROLLEYS CAN BE EXTENDED TO RAISE WING 200mm IF NECESSARY FOR MAINTENANCE



WING ON TROLLEYS

PROFILE VIEW
ATTACH COUNTERWEIGHT BEFORE LIFTING
1:100



WING ON TROLLEYS

PLAN VIEW
ATTACH COUNTERWEIGHT BEFORE LIFTING
1:100

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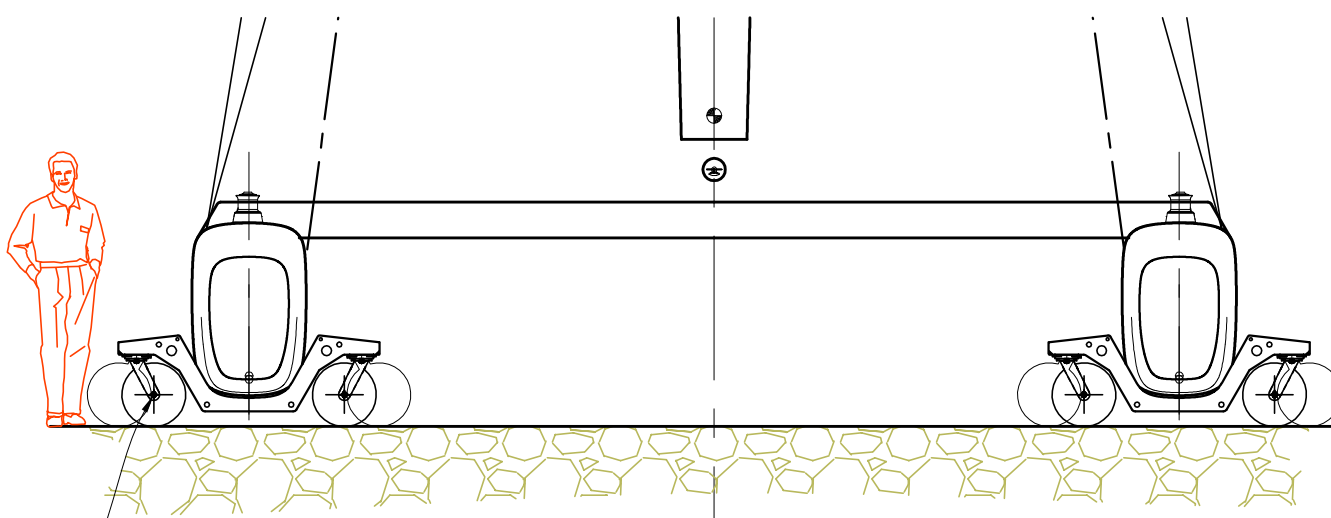
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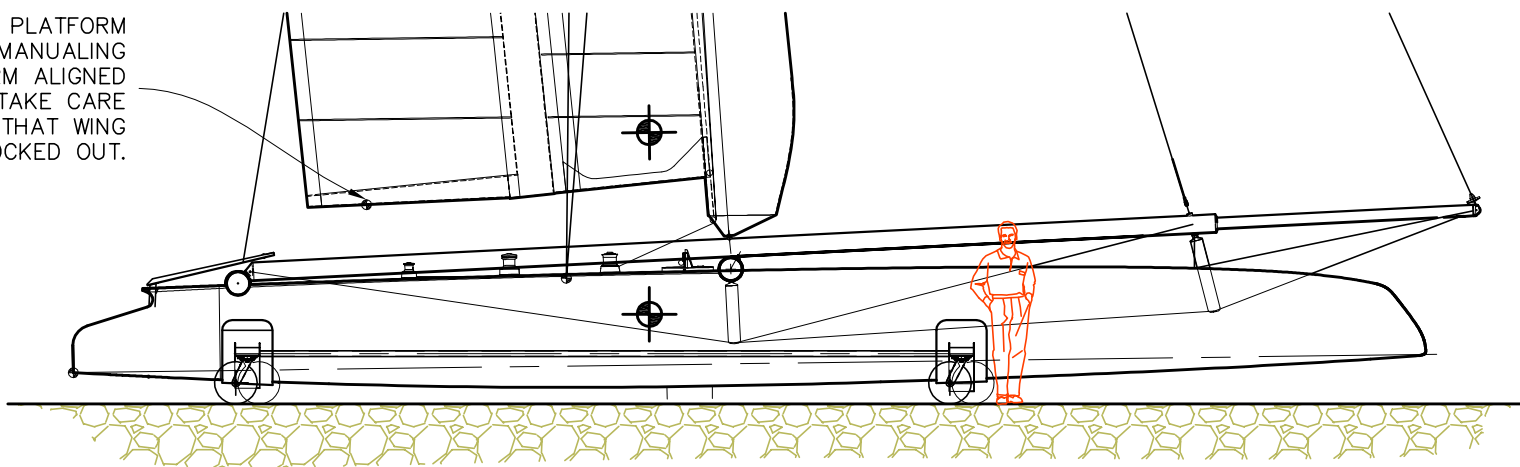
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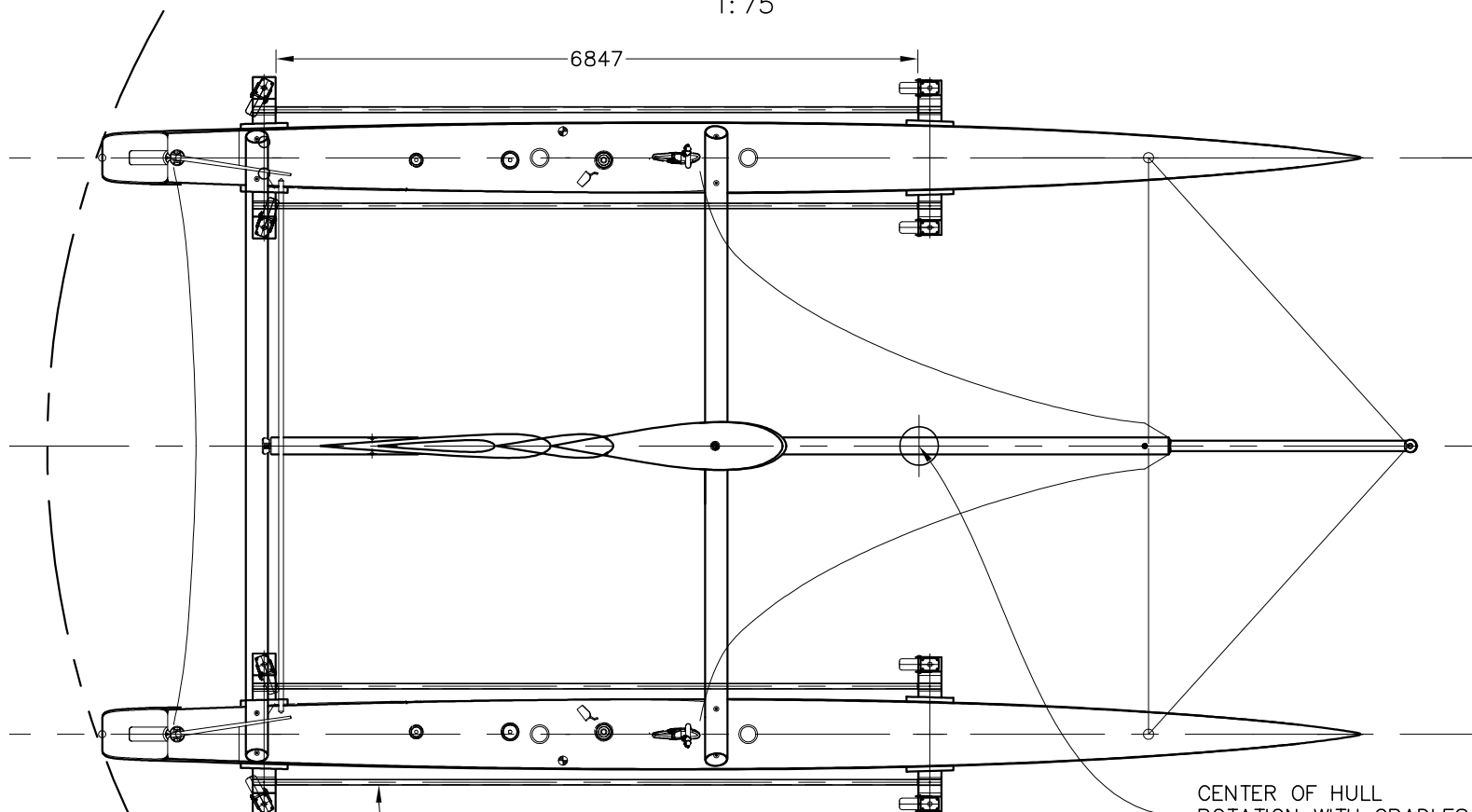
AFT CRADLE WHEEL ALIGNMENT IS CORRECT WITH CASTERS LOCKED WITH WHEELS TURNED TOWARDS HULL AS SHOWN

AFT VIEW
CRADLE WHEELS LOCKED FOR FEATHERING
1:50

CENTER WING ON PLATFORM WITH SHEETS OR MANUALING KEEP PLATFORM ALIGNED INTO THE WIND. TAKE CARE TO ENSURE THAT WING CAMBER IS LOCKED OUT.



SIDE VIEW
BOAT WITH WING ON CRADLES
1:75



THE BOAT REQUIRES AN 18.6m DIAMETER CLEAR AREA FOR 360° ROTATION WITH THE CRADLES SET UP FOR FEATHERING

ALUMINUM TUBES SET CRADLE SPACING

CENTER OF HULL ROTATION WITH CRADLES SET FOR FEATHERING

TOP VIEW
BOAT WITH WHEELS LOCKED FOR FEATHERING
1:75

NOTE: PAVEMENT MUST BE LEVEL AND RELATIVELY SMOOTH FOR PROPER FEATHERING

AMERICA'S CUP RACE MANAGEMENT

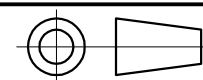


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PSPACE SHEET NAME
HULL CRADLES

SHEET
1 OF 1



SIZE
A3

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AC 45 HULL CRADLES

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Hull Splashes

For transport in the container a pair of cradles will be supplied for each hull.

Wing and Flap Splashes

For each individual wing element or flap a pair of slashes will be supplied to facilitate packing in a container. See pictures below.



Packing in Containers

We are currently finalising details of the platform and wing packaging into a container. Below is a diagram showing the pack of the wing into a 40' High Cube Container.

