winglines

concept proposal for **turning the pages**

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‘Winglines’

proposed wind activated sculpture

by Jennifer Turpin & Michaelie Crawford © 2010

For : ‘Turning the Pages’

Client : Hunter & Central Coast Regional Environmental Management Strategy

concept

A covey of three wind sculptures inspired by the wing forms of majestic raptors ‘gather’ beside the Pages River in the Upper Hunter Town of Murrurundi. Nestling between its hills, their paired counterbalanced ‘*winglines*’ hover, flutter, float and glide on local eddies as they turn into the wind.

Two counterbalanced intersecting lines pivot vertically in a controlled scissor - like action. The long primary ‘arm’ is connected to a tilted support post and turns just off the horizontal through 360 degrees whilst scribing gliding vertical arcs in the air. A secondary, slightly smaller paired ‘arm’ pivots off the lower counterbalanced end of the primary ‘arm’.

The focal kinetic intersection is made airborne by a ‘mid air’ point of pivot creating a heightened sense of free gliding floatation. Whilst both arms respond to the movements of the wind, the smaller secondary arm also moves in a delayed push and return response to the movement of the primary arm. The combination and inter-relationship of the horizontal and vertical movements of the paired arms create an intriguing complexity to the slow, gliding, hovering motion of the ‘*winglines*’ sculptures.

Experienced in relationship to each other, their individual dynamics will at times be idiosyncratic with the vagaries of unexpected eddies and at others fall into unison with a strong prevailing wind. The sculptural suite’s kinetic medley juxtaposes one to the other and highlights the intrigue of their movements.

Themselves a grouping, ‘*winglines*’ suggests a gathering place beside the river for residents and visitors to Murrurundi. Gently dynamic in their turning airborne intersections, the sculptures draw the community to them with their mesmerizing movements and then onwards to follow the line of the new Pages River Walk.

animated form

At this concept stage the ‘*winglines*’ concept design proposal shows three variations of the ‘arm’ design;

- Variation 1 has two single continuous arms;
- Variation 2 has articulated pivoting counterbalanced ‘tips’ that suggest the wings of a raptor in gliding formation and
- Variation 3 has further articulation with a second counterbalanced pivot point on each arm, expressive of wings in flight.

Each of these variations offers a different quality of and focus to the wind driven movement and the most desirable option will be determined during the design development phase.

colour

The colour of the ‘*winglines*’ sculptures is inspired by the Sulphur-Crested Cockatoo. A combination of one or all of: the sulphur yellow of its crest, the white of its body with the grey of its beak will provide the palette for the sculptures. The drawings show a number of possible variations and again, the most desirable combination will be realized in conjunction with its final form during design development.

engineering + materials outline

Preliminary engineering analysis has resulted in the following materials and methods being considered the most suitable;

Footings

Most suitable and cost efficient is a concrete slab construction 20mpa with reinforced steel mesh cage connected to a mounting plate.

Masts

Tapered steel tube, painted.

Moving Arms

The primary structural sub-frame

Steel CHS (Circular Hollow Steel) section size to suit the structural adequacy.

Along the CHS members Steel plate and gussets would accept the mounting of mechanical bearings and profile stations to bond and connect a body shroud external skin.

External Skins

A fibreglass outer shroud / skin will be created from a moulding process, which when bonded to the stations and armature is incorporated into the structural and dynamic ability. The fibreglass would be coated with a high quality UV resistent paint finish.

Bearings

Thrust, Tapered and potentially spherical or slew off-the-shelf bearings, with some small customised constraints.

Damper control

Peak wind events and the potential end-stops to movement will be managed using

1. Rate control units (hydraulic flow chambers)
2. Viscose coupling rotational dampers
3. Energy absorbent elastomeric units

The above come in a varied design and will be customised to suit the weight of each arm, the rotational ability and force potentials.

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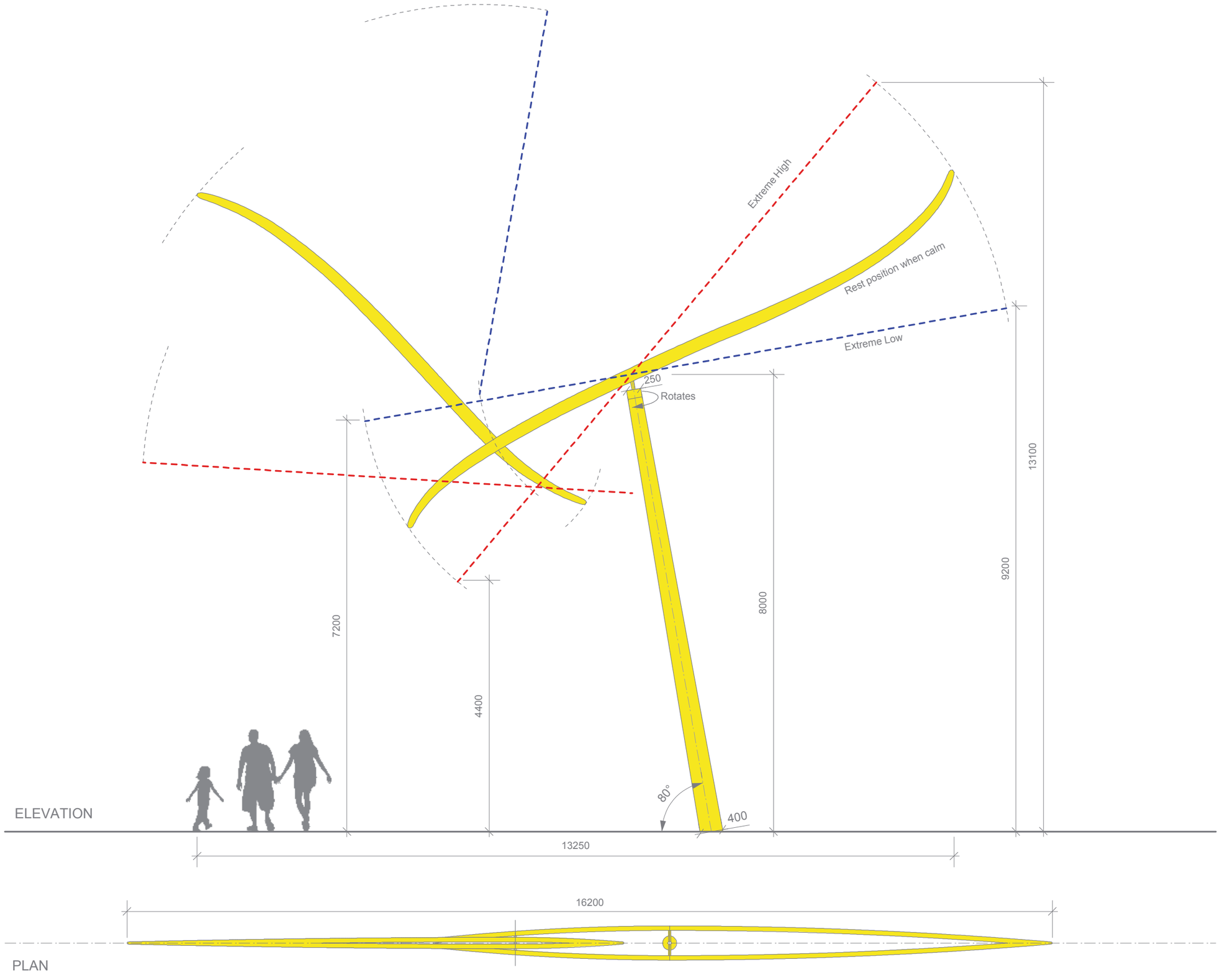
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Rest position when calm
Extreme Low
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Rotates
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9200
8000
7200
4400
80°
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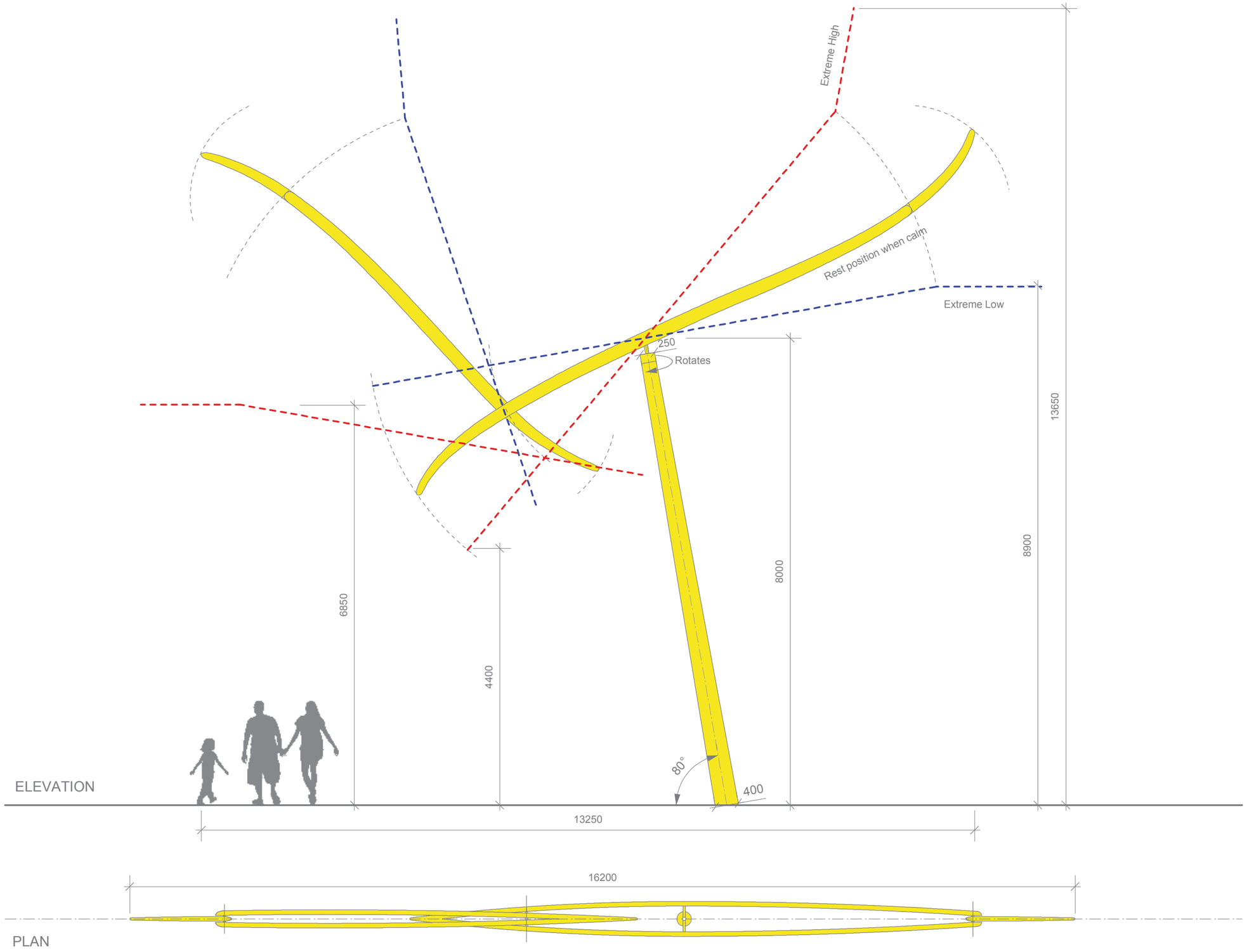
13250
ELEVATION
16200
PLAN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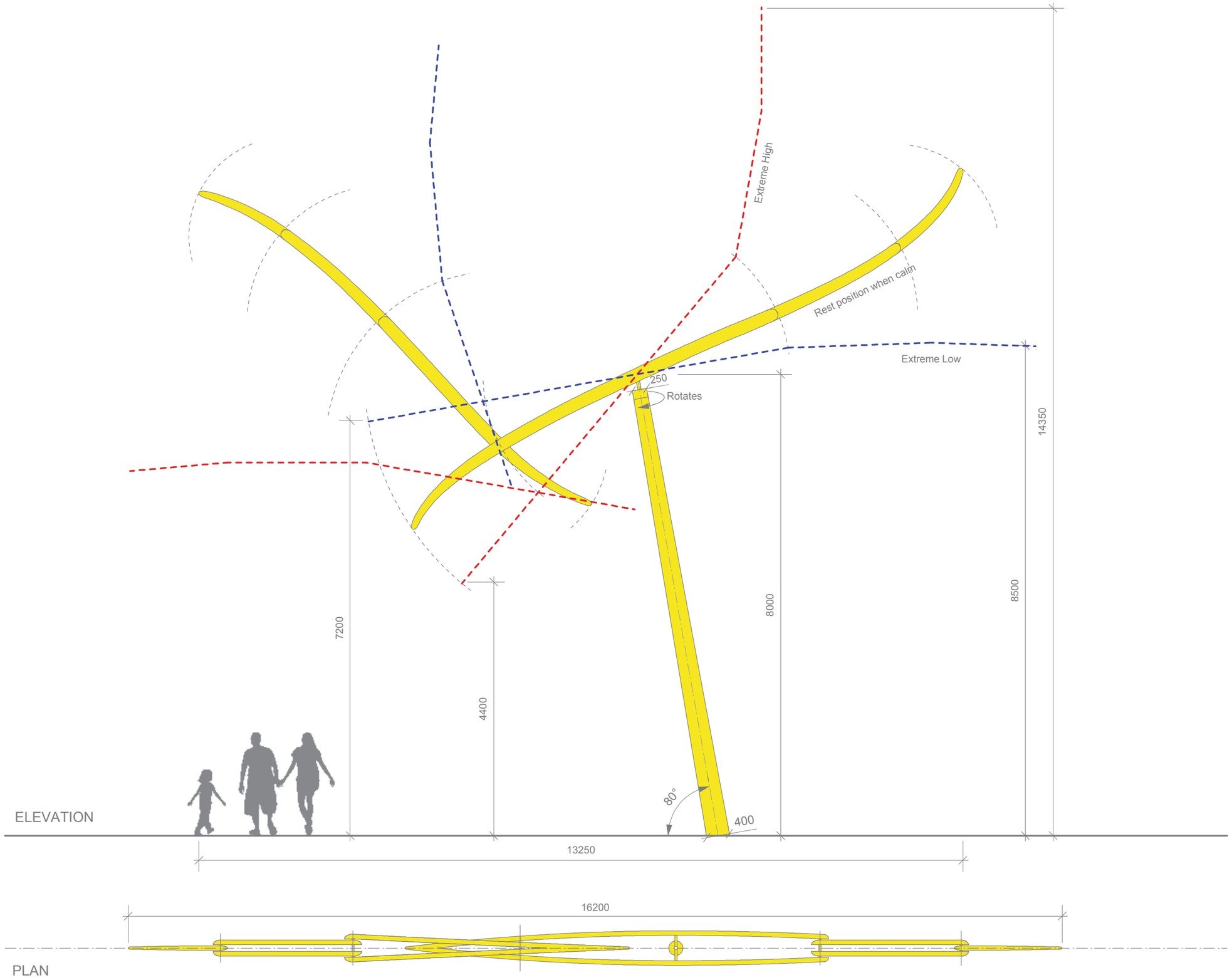
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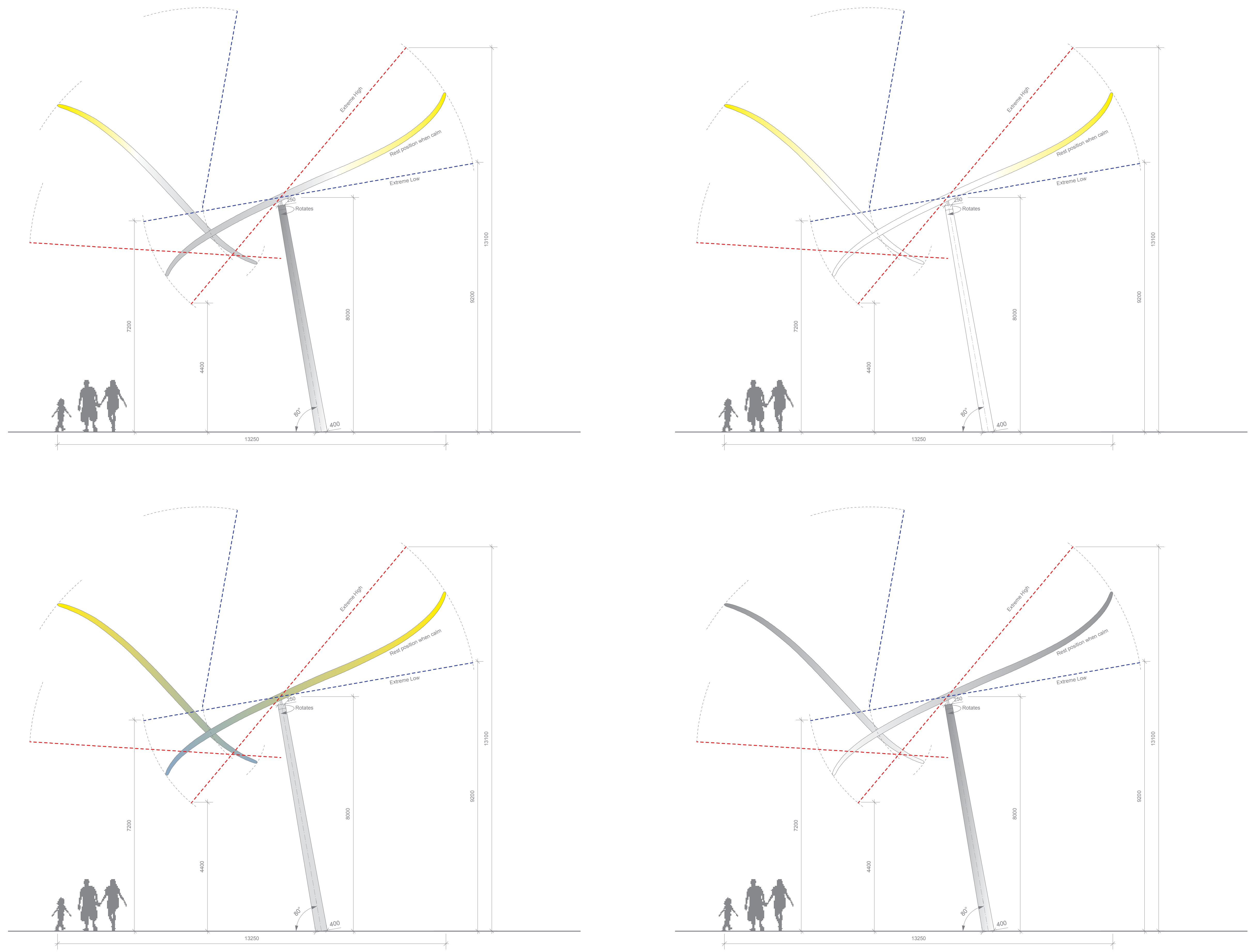
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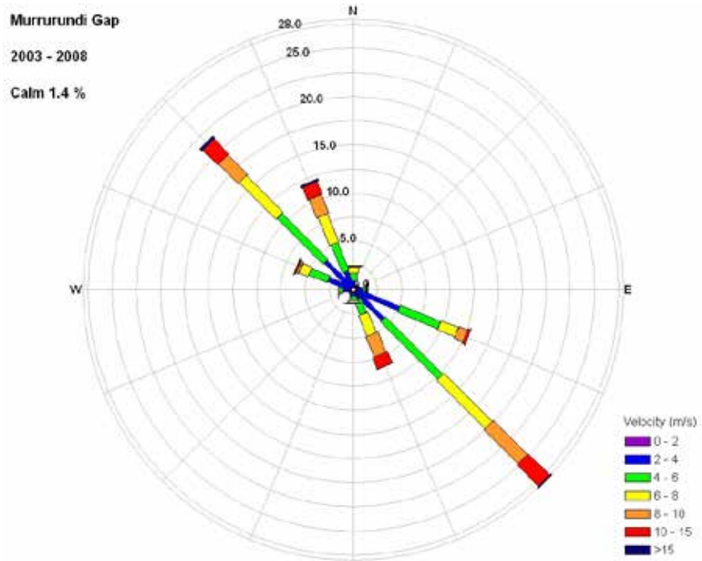
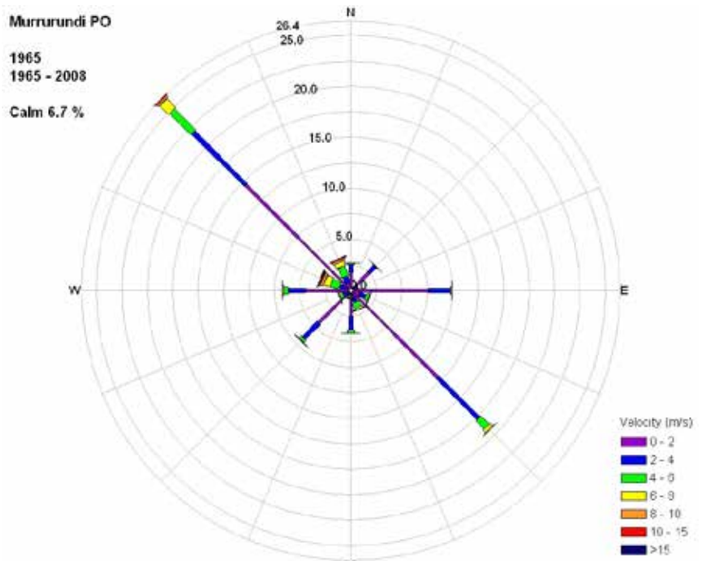

Murrurundi Gap
2003 - 2008
Calm 1.4 %
N
W
E
28.0
25.0
20.0
15.0
10.0
5.0
Velocity (m/s)
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 15
>15


Murrurundi PO
1965
1965 - 2008
Calm 6.7 %
N
W
E
26.4
25.0
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5.0
Velocity (m/s)
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10 - 15
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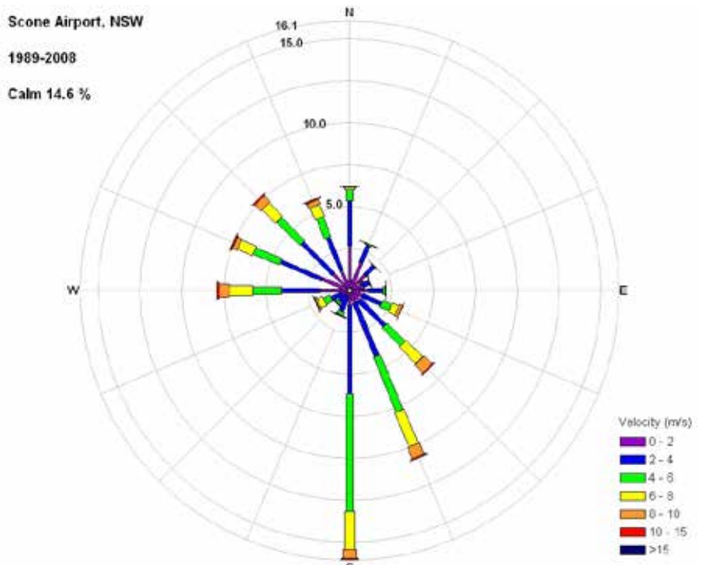
Scone Airport, NSW
1989-2008
Calm 14.6 %
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16.1
15.0
10.0
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Velocity (m/s)
0 - 2
2 - 4
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8 - 10
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