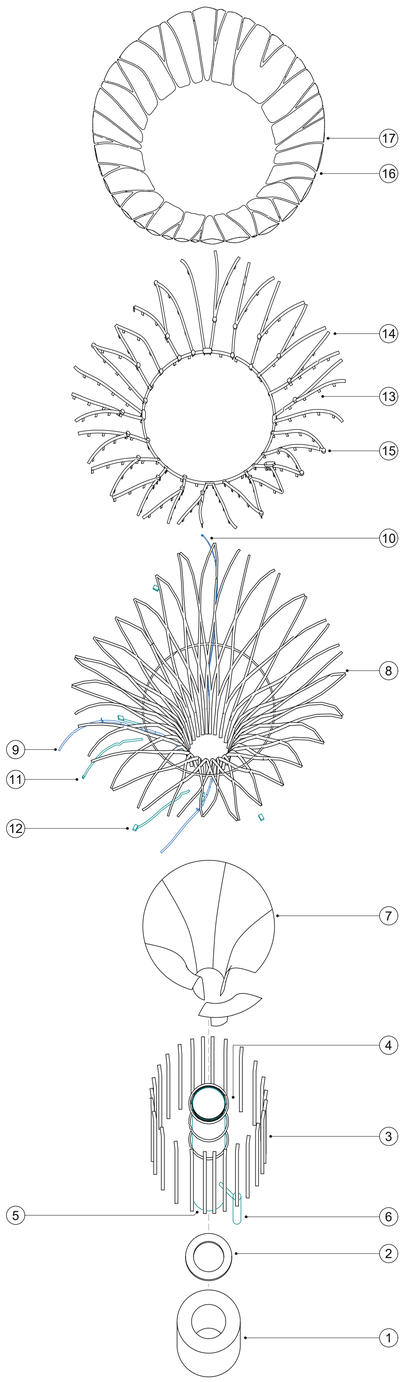
EXPLODED AXONOMETRIC

NTS: drawn at 1:50 and reduced to fit the sheet (about 1:115); the gaps between the parts are not to scale. Tree B3, the whole tree, as a plan oblique 45/45 (the true plan turned 45 degrees, verticals at true length). Each part is moved the way it is fitted: the trunk members out from around the downpipe, one collar segment out, the canopy layers straight up. The steel is lifted only slightly, so the services under it show.



ASSEMBLY KEY

Numbers follow the assembly order, from the footing up.

1 CONCRETE FOOTING D2400 x 900
2 RING BASE PLATE 300 x 40
3 TRUNK MEMBER CHS 114.3 x 6.0 (26), moved out to show the downpipe
4 HOOP CHS 60.3 x 4.5
5 GLASS DOWNPIPE D1240, stainless throat clamp at the top
6 FIRST-FLUSH DIVERTER
7 MOULDED FUNNEL COLLAR: six segments, one moved out
8 RIBS: primary CHS 88.9 x 5.0 and field CHS 60.3 x 4.5 (field ribs taper to 88.9 where they meet a primary rib: cone or cast lens-tip node); collar ring CHS 48.3 x 3.2; cast branch node (A) at each of the 26 trunk tops; see detail A
9 AIR MAIN 50 (ETFE inflation)
10 AIR HOSE 25 to each cushion
11 SADDLE DRAIN 50
12 SADDLE OUTLET, stainless
13 FIN BRACKET, steel 10 mm, welded to the rib, 600 centres
14 KEDER EXTRUSION, aluminium 80 x 55, on every cushion edge and around the collar rim
15 EXTRUSION JUNCTION PIECE
16 ETFE CUSHION: upper and lower foil, inflated; frosted
17 CUSHION CUT: shows the two foils; depth indicative (rise and sag each 9% of the cushion span)

NOTES

1. Cushion depth is indicative: rise and sag each 9% of the cushion span, after the published example of a 3 m panel with a 270 mm rise (Skyspan, LSAA 2002). To be confirmed by the ETFE contractor.
2. The collar is drawn as a smooth surface from the model's profile (approved simplification, 10 Oct 2026). The air-main entry through the collar is not yet resolved.
3. The canopy layers are cut short so each one shows: cushions 4.4 m and ribs and keder extrusions 5.2 m from the tree centre.
4. Services shown are those modelled in the representative bay; they repeat in every bay.

INTERIOR VIEW

Camera AB3, eye height 1.6 m. Rhino model v11k (steel, ETFE cushions, collars, downpipes) with one Nano Banana pass for materials, light, people, planting and the buildings beyond. Representative-bay fixings and services omitted (approved change, 10 Oct 2026).

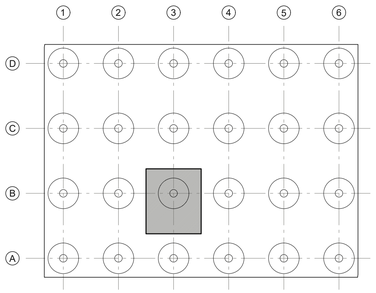


Ⓐ CAST BRANCH NODE 1:20

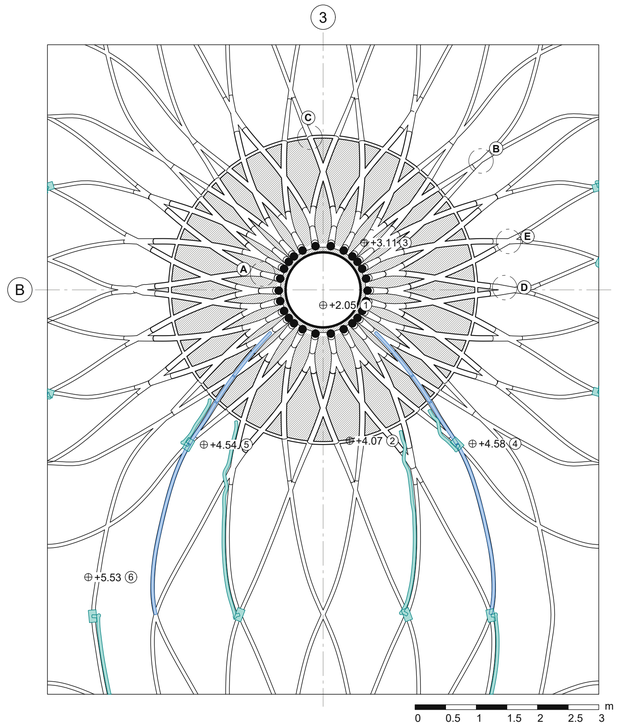


Seen square to its two ribs. The trunk taper (114.3 to 88.9) and both rib arms are cast in ONE piece: the casting is drawn as one outline, the tubes it is welded to in a lighter line. The shop welds at the three casting ends are ground flush. One at every trunk top, 26 per tree.

RCP KEY PLAN



1:500. The whole canopy (outline of the simulation model). Hatched box: the 1:50 enlargement on this sheet.



REFLECTED CEILING PLAN — ENLARGEMENT

1:50 Tree B3 (representative bay) to the south saddle. Looking up; cut plane 1.50 m.

LEGEND

CUT AT 1.50 M
Glass downpipe D1240 and 26 trunk members CHS 114.3 x 6.0.

PRIMARY RIB CHS 88.9 X 5.0; COLLAR RING CHS 48.3 X 3.2

FIELD RIB AND HOOP CHS 60.3 X 4.5; TRUNK CHS 114.3 X 6.0 ABOVE THE CUT

FROSTED ETFE CUSHIONS (THE CEILING SURFACE)
Each cushion spans between the ribs.

MOULDED FUNNEL COLLAR
Six segments per tree, from the downpipe throat to the collar ring.

RAIN: SADDLE OUTLET AND SADDLE DRAIN 50
Outlet at the low point of the saddle joint; drain on the side of the steel, steady fall to the collar.

AIR MAIN 50 (ETFE INFLATION)
Runs on the underside of the shared ribs.

STRUCTURAL GRID
On the tree centres.

SPOT LEVELS

⊕ Metres above finished floor level (FFL 0.00).

① +2.05 Throat: top of the glass downpipe
② +4.07 Underside of the collar ring
③ +3.11 Branch node, centreline (trunk members meet the primary ribs)
④ +4.58 Underside of saddle outlet
⑤ +4.54 Underside of saddle outlet
⑥ +5.53 Crown: highest point of the ETFE cushions in this bay

NODES

One typical node of each type is tagged; every node of that type is the same.

Ⓐ **CAST BRANCH NODE**
Trunk taper and both rib arms cast in one piece; shop-welded to the tubes and ground flush (seam lines). Enlarged as node A beside the exploded axonometric.

Ⓑ **WELDED CROSSING**
The continuing rib runs through; the crossing rib is laser-cut to fit, welded and ground smooth.

Ⓒ **COLLAR-RING JOINT**
The rib runs through; the collar ring is cut to fit and welded to it. Where a primary rib carries on as a field rib, a 750 mm fabricated cone (88.9 to 60.3) makes the change in size.

Ⓓ **CAST TREE-BOUNDARY NODE**
Where neighbouring trees meet on a grid line: two primary ribs in, two field ribs out, the joints merged into one casting.

Ⓔ **CAST LENS-TIP NODE**
Two primary ribs meet and two field ribs leave; the field arms taper from 88.9 to 60.3 within the casting.

NOTES

1. Reflected ceiling plan: the canopy seen from below, drawn in the same orientation as the floor plan. Cut plane 1.50 m above FFL.
2. Steel is drawn as built: cast nodes at the trunk tops, the lens tips and the tree boundaries; all other joints welded (see NODES).
3. Not shown on this plan (see exploded axonometric): keder extrusions, fin brackets, extrusion junction pieces, air hoses to each cushion, throat clamp.
4. Collar segment joints (flanged, radial) are not drawn: their positions are still to be set out.
5. Saddle outlet levels vary from bay to bay; the two next to the collar are given.
6. Lighting: no ceiling-mounted lighting at this stage. Lighting design to follow.
7. Wall thicknesses are provisional (structural sizing by Karamba, v11g).
8. The 1:100 general arrangement is not issued (approved change, 10 Oct 2026); the KEY PLAN locates this enlargement in the whole canopy.

AMENDMENTS

REV	DESCRIPTION	DATE	CHK
A	ISSUED FOR ASSESSMENT (A4)	11.10.2026	SR

GENERAL NOTES

1. Do not scale from drawings. Figured dimensions take precedence.
2. Steel frame v11g: designer's proposal, PROVISIONAL (Karamba S4), subject to structural engineer's review and sign-off.
3. ETFE system, fixings and services: typical-system sizes and assumptions, to be confirmed by the ETFE contractor.
4. Wetted parts (extrusions, gaskets, outlets, drains, collar, downpipe): AS/NZS 4020 or tested (research R3).
5. Services are modelled in the representative bay and repeat in every bay (580 hose connections, 211 saddle outlets).
6. Skin: ETFE cushions. Glass tested and rejected (R4).
7. No north point: site not yet selected.

PROJECT

COMMON GROUND

Concept: BETWEEN RAIN

Element: Integrated Water-Catchment Canopy

AI for Architects — Assignment 4: Design Resolution

DRAWING TITLE

RCP enlargement 1:50, key plan 1:500, exploded axonometric and interior view

SCALE 1:50, 1:500, 1:20, axo NTS @ A1

DRAWN BY: Sharon Robinson

NORTH POINT site not yet selected

SHEET SIZE: A1

DATE: 11.10.2026

DRAWING NUMBER: **A4-01**

1 STRUCTURE: KARAMBA3D FRAME CHECK

PROVISIONAL design-development check: loads and limits assumed (AS/NZS 1170), to be verified by a structural engineer.

TESTED
The full steel frame (24 trees, about 19,200 beam elements, S355) in Karamba3D under assumed loads: ETFE 0.12 kPa or glass 0.50 to 0.65 kPa including fixings, roof live load 0.25 kPa, wind uplift 0.50 kPa, temperature ±25 °C. Four options (A to D) for the collar ring and end ribs, then a shorter short-end overhang.

SHOWED
Strength was never the limit: with the slim collar ring every member stays well below capacity. Without the ring the hoops at the throat fail (1.17). Sag governs, and only at the two 4.5 m short-end overhangs: 41 to 136 mm against a guide of about 36 mm.

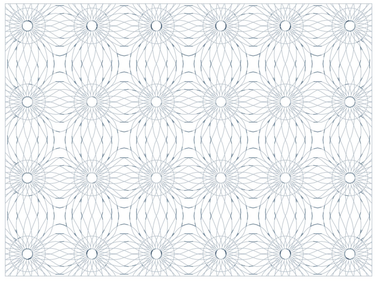
CHANGED
Slim collar ring CHS 48.3 kept. Short-end overhang cut from 4.5 to 3.1 m (outline 51.2 x 38.0 m) with end ribs CHS 76.1. Adopted frame v11g: highest utilisation 0.61; short-end sag 17 mm under ETFE (28 mm under glass at 0.50 kPa, 33 mm at 0.65 kPa); thermal movement 7 mm, so no movement joint; 84.2 t of steel.

0.61
highest utilisation (1.0 = capacity)

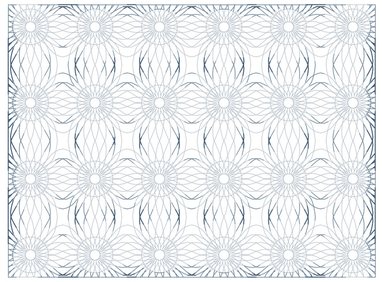
17 mm
short-end sag under ETFE (guide about 36)

84.2 t
steel in the members

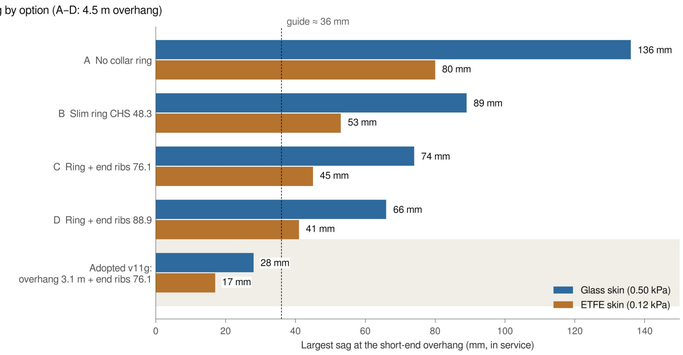
Utilisation, worst strength case (1.0 = capacity)
highest 0.61



Sag under the ETFE skin (in service)
short ends 17 mm, bays 13 mm



Short ends: sag by option (A–D: 4.5 m overhang)



2 WATER: DOES THE SKIN DRAIN?

Geometry checks on the model, not a rain simulation. Cushion rise and the weight of water are not included.

TESTED
A priority-flood over all 86,004 points of the smooth skin: water may leave only at the edge or into a funnel. Repeated with the Karamba sag of the frame laid over the skin (ETFE, twice ETFE, glass). Then the 43 cushion joints of the representative bay.

SHOWED
No hollow holds water in any case (deepest 0.17 mm; 0.3 mm with the sag, which is grid noise). But the saddles midway between the trees are almost flat (about 0.5° along the crown), so water leaves them slowly, and 13 points along the cushion joints in the bay sit 10 mm or more below their surroundings.

CHANGED
A drained saddle node: a stainless outlet under the keder at each joint low point, with a 50 mm drain along the side of the steel to the nearest collar at a steady fall of at least 1:100. 13 outlets per bay, 211 over the whole roof.

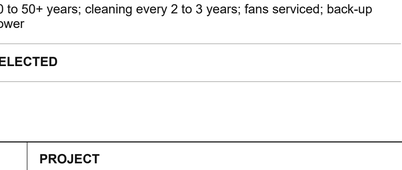
0
hollows that hold water

0.17 mm
deepest dip found (grid noise)

211
drained saddle outlets over the roof

Slope of the whole ETFE skin (86,004 points)
hollows that hold water: none (largest 0.17 mm)

Along the crown: corner → saddle → corner



Across the crown: funnel → saddle → funnel

ETFE cushions, representative bay: where water collects

3 SKIN: GLASS OR ETFE?

Desk research (R1, R3, R4) and the same water test; not yet confirmed by a glazing or ETFE contractor.

TESTED
Laminated frosted glass against fritted ETFE cushions on weight, the frame check, solar heat gain, fit to the doubly curved form, watertightness, the experience of rain and the quality of the harvested water. The water test was run on a flat-faceted glass version of the same bay.

SHOWED
The frame can carry glass; the problem is water. On this shape 17 % of the glass would be flatter than the 7° glass-roof minimum, 527 of its 613 joints lie across the flow, and 21 star-junctions collect water. Hot-bent glass would need a mould for each of the 580 doubly curved panels.

CHANGED
ETFE cushions selected: frosted and fritted for solar control; rain is heard and seen as soft shadows. Three conditions for the stored water: a first-flush diverter at each downpipe, AS/NZS 4020 compliance or leaching data for every wetted part, and testing the stored water before use. A back-up fan and emergency power are required.

17 %
of the glass flatter than 7°

21
low star-junctions in one glass bay

0.12 kPa
ETFE load (glass 0.65 kPa)

	Laminated glass (frosted, fritted)	ETFE cushions (fritted)
Weight (incl. fixings)	25 to 60 kg/m²; 0.65 kPa in the frame check	2 to 3.5 kg/m²; 0.12 kPa in the frame check
Frame check (adopted v11g)	short-end sag 33 mm (guide 36); highest utilisation 0.70	short-end sag 17 mm; highest utilisation 0.38
Solar heat gain (SHGC)	about 0.27 (coated, fritted double glazing)	about 0.35 to 0.48 (fritted 2 to 3 layer cushions)
Doubly curved form	flat facets or cold-bent panels; hot-bent needs one mould per panel (580)	follows the curvature cushion by cushion
Watertightness (bay test)	17 % below the 7° minimum; 527 joints across the flow; 21 low star-junctions: not shown to be feasible	sealed cushions in a capped keder frame; 13 low points along joints at the saddles: drained outlets
Rain experience	rain seen; quiet	rain heard; seen as soft shadows through the frit
Harvested water	not assessed (R3 covered ETFE)	fluoropolymer (PFAS family); runoff risk unquantified: three conditions
Upkeep	very durable; cleaning	30 to 50+ years; cleaning every 2 to 3 years; fans serviced; back-up power
Outcome	**REJECTED (flat faceted and hot-bent)**	**SELECTED**

Flat faceted glass, same bay (rejected)

AMENDMENTS

REV	DESCRIPTION	DATE	CHK
A	ISSUED FOR ASSESSMENT (A4)	11.10.2026	SR

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6. Skin: ETFE cushions. Glass tested and rejected (R4).
7. No north point: site not yet selected.

PROJECT
COMMON GROUND
Concept: BETWEEN RAIN
Element: Integrated Water-Catchment Canopy
AI for Architects — Assignment 4: Design Resolution

DRAWING TITLE
Simulations: structure (Karamba3D), water and skin choice

SCALE NTS @ A1

DRAWN BY: Sharon Robinson
NORTH POINT site not yet selected
SHEET SIZE: A1
DATE: 11.10.2026
DRAWING NUMBER: **A4-02**