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I. Executive summary

Original objective

MANDATE AS GIVEN

Target shallow LCT pegmatites (0-300m)

AOI as provided: Pilbara MVP AOI · WAMEX evidence aoi, 9,215 km²; 118.550–119.350°E, 20.400–21.400°S (WGS84) · E 660 670–745 250 · N 7 631 760–7 743 490 (MGA z50)

Autonomy: automatic · rebuild brief

Objective as expanded for the run

Target shallow (0–300 m) lithium-caesium-tantalum (LCT) pegmatites at district scale across the 9,215 km² Pilbara AOI. The AOI lies almost entirely within the Pilbara Craton and includes Paleoproterozoic–Mesoproterozoic granitoid, leucogranite, orthogneiss and monzogranite units, several of which are mapped as containing pegmatite or pegmatitic granite, alongside greenstone, volcanic and sedimentary belts. The primary target is spodumene-bearing LCT pegmatite swarms and their shallow extensions; tin-, tantalum-, caesium-, rubidium- and beryllium-enriched variants are relevant by-products and vectors. District-scale work should identify evolved fertile granites, suitable host-rock contacts and structural corridors, then progress to 5–20 km target areas for field validation and shallow drilling. The operating Pilgangoora lithium–tin–tantalum mines demonstrate local LCT-system fertility but will require tenure and status screening before any target recommendation. [B36 B37](#)

Deposit class	Lithium-caesium-tantalum (LCT) pegmatites — Spodumene-bearing LCT pegmatites, Tantalum-tin-caesium enriched LCT pegmatites, Pegmatite swarms and shallow extensions of known LCT systems
Commodities	Lithium, Tantalum, Tin, Caesium, Rubidium, Beryllium · by-products Tantalum, Tin, Caesium, Rubidium, Beryllium
Scale	district, targets 5.0–20.0 km
Depth	0.0–300.0 m
Province	Pilbara Craton; East Pilbara Terrane; West Pilbara Superterrane
Belts and suites	Mallina Basin; Soanesville Basin; Gorge Creek Basin; Croydon Group; Soanesville Group; Warrawoona Group; Sulphur Springs Group; Kelly Group
Named structures	—

What is already known here

mature camp. The AOI contains at least 172 registered lithium–tantalum–tin mines, deposits and prospects, including operating Pilgangoora and Wodgina LCT operations, resource-definition drilling and advanced development at Tabba Tabba, plus numerous historical workings. The register and tenure results show intensive prior exploration and 65.9% live-title coverage; this is a mature LCT camp, not greenfield ground.

The register lists 16 known sites in the AOI; they are tabulated with their positions in [Appendix A](#), and the tenure position in [Appendix B](#).

Known areas excluded from the analysis (24)

Operating mines and resources held by others under live title were placed out of bounds: a target may not coincide with them. Any other known mineralisation stayed in play as brownfield ground.

- **Pilgangoora (C1 E1 N1 S1)** — mine · Operating, Lithium, Tantalum, Tin
- **Central - Far East** — mine · Operating, Lithium, Tantalum, Tin
- **Eastern Pegmatites - Pilgangoora** — mine · Proposed / resource-definition drilling, Lithium, Tantalum, Tin
- **Wodgina Group** — mine · Operating, Lithium, Tantalum, Tin
- **Cassiterite** — mine · Operating, Lithium, Tantalum, Tin
- **Cassiterite North East Node** — mine · Care and Maintenance, Lithium, Tantalum, Tin
- **Tinstone**
- **Tinstone South**
- **Wodgina Main Lode North**
- **Chewy** — deposit · Advanced exploration / resource declared, Lithium, Tantalum, Tin
- **Leia** — deposit · Advanced exploration / resource declared, Lithium, Tantalum, Tin
- **Luke** — deposit · Advanced exploration / resource declared, Lithium, Tantalum, Tin
- **Han** — deposit · Advanced exploration, Lithium, Tantalum, Tin
- **Hutt Pegmatite** — deposit · Advanced exploration, Lithium, Tantalum, Tin
- **Boba** — prospect · Drilled, Lithium, Tantalum, Tin
- **Lynas Find Main Pegmatite** — deposit · Undeveloped; Pilbara Minerals proposed project, Lithium, Tantalum, Tin
- **Lynas Find Alluvials**
- **Coffin Bore North** — mine · Shut, Lithium, Tantalum, Tin

- **Creek 1**
- **Creek 2**
- **Creek 13**
- **Creek 7**
- **Western Domain**
- **Lynas Find Track Pegmatite**

The run in numbers

Information available to the run

drilling (2 layers), elevation (11 layers), geochemistry (13 layers), geology (2 layers), gravity (5 layers), magnetics (6 layers), multispectral (20 layers), occurrences (1 layer), radiometrics (6 layers), structure (5 layers), tenure (1 layer). Documents: 4,684 registered, 3,226 indexed, 117,779 pages, 246,804 passages, 30 processing, 9 failed, 4,468 located in ao.

422

claims analysed: 355 for, 16 against, 51 cannot tell

23

questions to specialists, 11 on candidate areas

5

hypotheses generated: 3 retained, 2 rejected, 0 under review

2

targets ranked

\$16.07

spend, 205 model calls

1 s

wall clock

399

claims tied to a place

running

run state

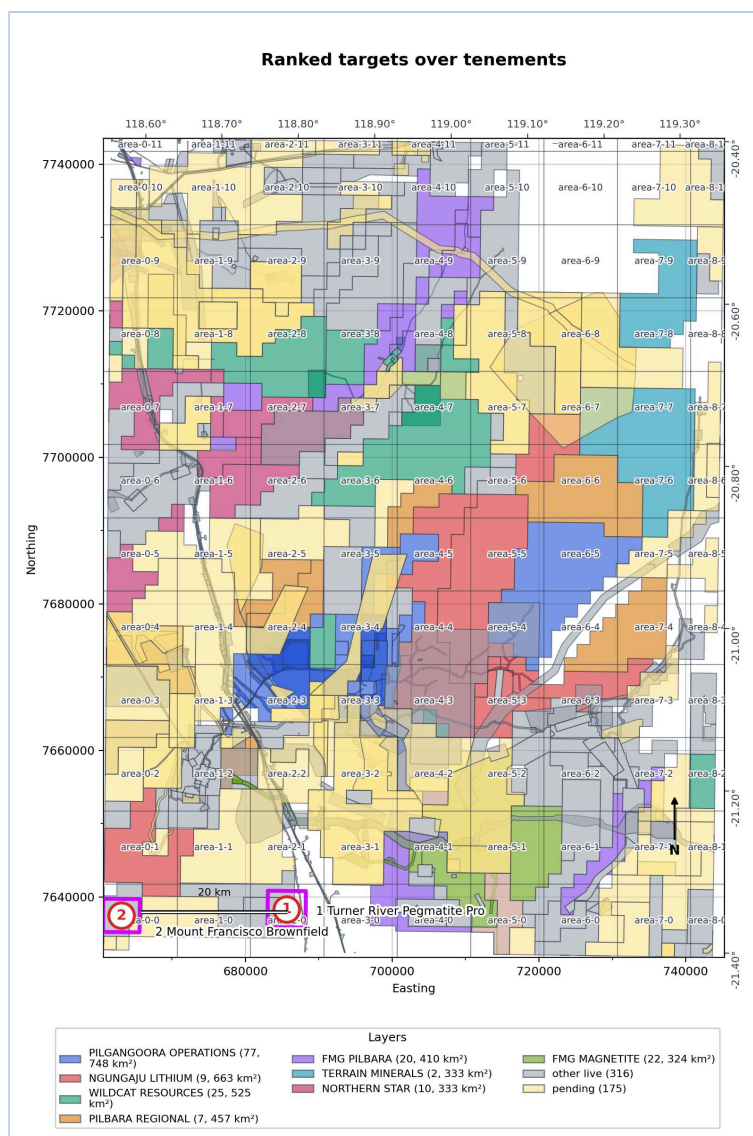
Generated targets

(1) Turner River Pegmatite Provenance Target centre E 685 620 · N 7 638 340

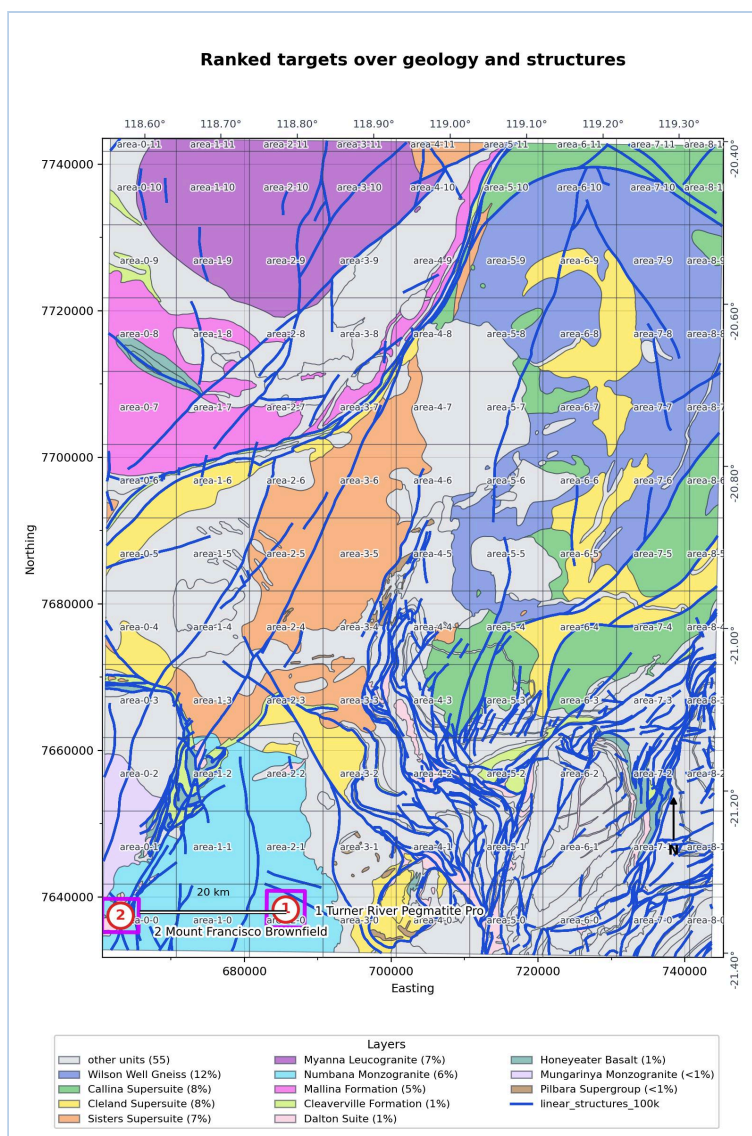
Turner River Pegmatite Provenance Target is a 0–300 m shallow LCT-pegmatite target in area-2-0, centred on pegmatite-labelled drill-chip geochemistry near E 683 910 · N 7 638 410. ^{S2} Two enriched drill-chip records show coincident Li-Cs-Rb-Sn-Ta-Be enrichment, but they are co-located and close to the shut Turner River Alluvial 1 mine, leaving in-situ pegmatite versus transported material unresolved. ^{S2} Bedrock mapping, provenance-controlled fresh-rock sampling away from the alluvial working, and mineralogical confirmation of lithium- and Ta-Sn-bearing phases would support the target; failure to find in-situ pegmatite or reproduce the association would reject it. ^{S2S7}

(2) Mount Francisco Brownfield Expression Target centre E 663 100 · N 7 637 470

Mount Francisco Brownfield Expression Target is a shallow (0–300 m) LCT pegmatite target centred on the historic Mount Francisco Li-Ta-Sn field, where pegmatite-labelled outcrops, historic workings and shallow RC drilling coincide. ^{S2S3S18} Strong multi-element pathfinder highs support local fertility, but the principal anomaly is in a brownfield cell and the strongest Li-Cs-Rb sample is labelled hydrothermal rock, so a primary continuous LCT body is not established. ^{S3S20} Confirmation requires repeatable LCT mineralisation in fresh mapped pegmatite beneath or beside the workings; the target would be weakened if enrichment proves alluvial or hydrothermal, or drilling shows only discontinuous narrow stringers. ^{S1S2S3S16}



Ranked targets, numbered, over the tenement layer. (1) Turner River Pegmatite Provenance Target, centre E 685 620 · N 7 638 340 ·
 (2) Mount Francisco Brownfield Expression Target, centre E 663 100 · N 7 637 470.



Ranked targets, numbered, over geology and mapped structures. (1) Turner River Pegmatite Provenance Target, centre E 685 620 · N 7 638 340 · (2) Mount Francisco Brownfield Expression Target, centre E 663 100 · N 7 637 470.

II. Targets

1 Turner River Pegmatite Provenance Target

near known occurrence

25.8 km²

0.0–300.0 m

next test: cheap

E 683 000–688 240 · N 7 635 820–7 640 860 (MGA z50) · centre E 685 620 · N 7 638 340

TARGET LOGIC — SUMMARISED AT WRAP-UP

Turner River Pegmatite Provenance Target is a 0–300 m shallow LCT-pegmatite target in area-2-0, centred on pegmatite-labelled drill-chip geochemistry near E 683 910 · N 7 638 410.^{S2} Two enriched drill-chip records show coincident Li-Cs-Rb-Sn-Ta-Be enrichment, but they are co-located and close to the shut Turner River Alluvial 1 mine, leaving in-situ pegmatite versus transported material unresolved.^{S2} Bedrock mapping, provenance-controlled fresh-rock sampling away from the alluvial working, and mineralogical confirmation of lithium- and Ta-Sn-bearing phases would support the target; failure to find in-situ pegmatite or reproduce the association would reject it.^{S2S7}

Why it holds this rank

AS RANKED

Ranked first because it has the most compact surviving unexcluded LCT-style raw geochemical evidence and can be tested cheaply by provenance-controlled field mapping and sampling; it is explicitly not a drill-priority target until that test succeeds.

Evidence by critical process

FERTILE EVOLVED MELT

LCT mineralisation requires a highly fractionated, volatile-rich granitic melt capable of concentrating Li, Cs, Ta, Sn, Rb and Be into pegmatitic residual fractions.

SUMMARISED AT WRAP-UP

At E 683 070 · N 7 639 960, two pegmatite-labelled drill-chip samples contain Li 352–451 ppm, Ta 14.5–15.75 ppm, Sn 44.8–81.6 ppm, Cs 18.65–41.1 ppm, Rb 482–1,420 ppm and Be 4.18–8.81 ppm, providing a locally coherent LCT-style pathfinder association.^{S2S8} Three pegmatite-labelled drill-chip records share one coordinate, however, and the third record is materially lower in Li-Cs-Rb-Sn-Ta-Be values, so the data do not establish a fractionation halo, extent or independent spatial repetition.^{S2} The nearby shut alluvial Li-Ta-Sn mine and absence of sample provenance, mineral identification and analytical metadata mean that transported material or another alteration/mineral phase remains possible.^{S2S6}

HOST REACTION AND ORE DEPOSITION

Economic LCT pegmatites require retention of evolved melt and crystallisation into Li- and Ta-bearing mineral assemblages within receptive host settings.

SUMMARISED AT WRAP-UP

The south-central cell contains five samples, including pegmatite-labelled drill chips with Li to 451 ppm, Cs to 41.1 ppm, Rb to 1,420 ppm, Sn to 81.6 ppm, Ta to 15.75 ppm and Be to 8.81 ppm.^{S2S9} Cell c0_1 is the only full-pathfinder data-bearing 5 km cell in area-2-0 and ranks anomalous for all six elements, but its thresholds are based on only five samples and cannot establish district-scale anomaly strength.^{S10S2} No sample-level mineralogy, petrography, core log or mapped margin-parallel vein identifies tantalite, cassiterite or another Ta-Sn-bearing phase, so the assays remain proxy evidence rather than confirmation of ore mineral assemblages.^{S2}

SHALLOW PRESERVATION AND GEOMETRY

For the 0–300 m mandate, LCT bodies must be preserved at shallow levels and have geometry amenable to detection and testing beneath limited cover.

SUMMARISED AT WRAP-UP

Pegmatite-labelled drill-chip samples at E 683 910 · N 7 638 410 support a local pegmatitic material source, but the supplied records provide neither verified bedrock relation nor depth information.^{S2} Turner River Alluvial 1 is a shut tin-tantalum-lithium mine close to this sample cluster, creating a competing transported-mineralisation explanation without a demonstrated bedrock source.^{S2 S7} No drill collars were returned inside area-2-0, and no supplied evidence establishes pegmatite depth, thickness, continuity, attitude or preservation within 0–300 m.^{S1 S2}

Confidence

bedrock provenance	low: all enriched drill-chip records are co-located and near a shut alluvial Li-Ta-Sn mine.
geochemical proxy	moderate: two enriched pegmatite-labelled drill-chip records show six-element co-enrichment.
mineralogy and geometry	low: no mineral identification, mapped dyke trace, thickness, attitude or drill intersection is available.
tenure	low: the candidate-scale tenure summary reports mixed live, pending and open ground but does not resolve status of this polygon.

Known mineralisation

SUMMARISED AT WRAP-UP

Turner River Alluvial 1, a shut tin-tantalum-lithium mine, lies inside the candidate area near E 683 910 · N 7 638 410 and demonstrates that mineralisation of the target commodity class occurred locally.^{S6 S7} Its alluvial character means it is also a competing explanation for the nearby drill-chip signature rather than proof of an in-situ bedrock LCT body.^{S2 S7} The nearest listed occurrences are the shut Mt Francisco / Sherlock and Parker (45) mine at 1,357 m, the shut Mt Francisco / Sherlock and Parker Beryl (45) mine at 1,492 m, and the Wodgina drilling programme at 3,423 m.^{S6}

INSIDE THE OUTLINE	TYPE · STAGE	COMMODITIES
Turner River Alluvial 1	mine · Shut	Tin, Tantalum, Lithium

What the claims say

SUMMARISED AT WRAP-UP

The strongest positive evidence is the two co-located pegmatite-labelled drill-chip analyses with six-element Li-Cs-Rb-Sn-Ta-Be enrichment, supported by anomalous c0_1 chemistry and an untested Li-Ta interpolation coincidence.^{S2 S8 S10 S11} The strongest adverse evidence is the nearby shut Turner River Alluvial 1 mine, which leaves transported or mine-related material as an unresolved alternative, together with the lack of independent spatial repetition.^{S2 S6 S7} The strongest cannot-tell evidence is that no mineralogy, mapped pegmatite geometry, drill intersection, depth control or calibrated LCT prospectivity validation is available, so a coherent shallow LCT system is not yet demonstrated.^{S1 S2 S11}

7 for

4 against

8 cannot tell

Recommended follow-on

CHEAPEST TEST THAT WOULD FLIP IT (CHEAP)

Verify polygon-level tenure, then map bedrock, pegmatite exposure and alluvial workings; collect spatially separated fresh-rock/channel samples on traverses away from Turner River Alluvial 1 with documented

QA/QC, followed by petrography or automated mineralogy of anomalous material.

PREDICTED OBSERVATIONS

- In-place pegmatite should be exposed or encountered immediately beneath shallow cover near the anomalous locality.
- Independent samples should reproduce a spatially coherent Li-Cs-Rb-Sn-Ta-Be association outside alluvial workings.
- If the target is viable, mineralogical work should identify spodumene and/or primary Ta-Sn-bearing phases rather than only transported heavy-mineral concentrations.

Kill criteria

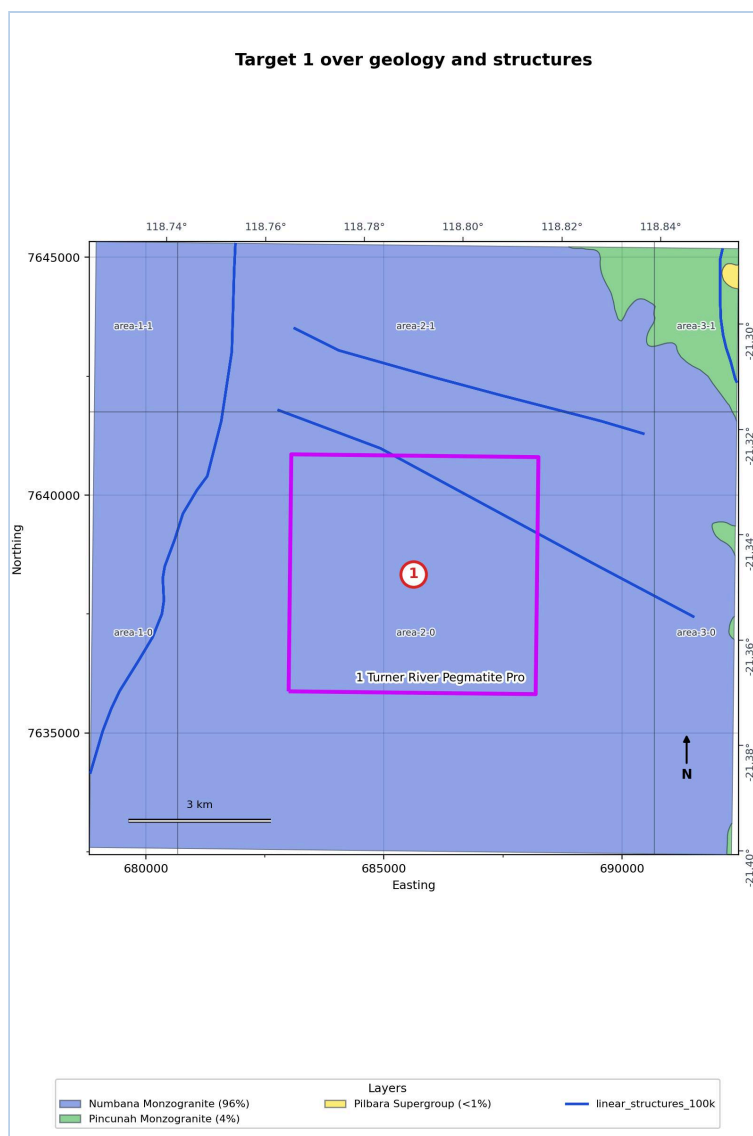
- Fresh bedrock mapping and trench/channel sampling show no in-situ pegmatite at or adjacent to the sample locality.
- Systematic fresh-rock samples away from Turner River Alluvial 1 fail to reproduce co-incident Li-Cs-Rb-Sn-Ta-Be enrichment.
- Petrography or automated mineralogy identifies no lithium-bearing or Ta-Sn-bearing phase and demonstrates that the anomaly is alluvial, mine-derived or non-pegmatitic alteration.
- Tenure verification shows the polygon is unavailable or overlaps excluded active/resource ground.

Assumptions

- The pegmatite lithology labels on drill-chip records represent sampled pegmatitic material.
- The raw assays are sufficiently comparable for local screening despite absent laboratory-method and QA/QC metadata.
- The target polygon does not overlap an excluded operating or resource site; this requires title-level confirmation.

Limitations

- The Li and Ta surfaces are unlevelled IDW products, not measurements.
- Five full-pathfinder samples occur in only one data-bearing 5 km cell.
- No direct shallow preservation, dyke continuity or thickness evidence exists.
- Candidate-specific tenure status is unresolved.



Target 1 over geology and mapped structures; outline E 683 000–688 240 · N 7 635 820–7 640 860 (MGA z50). Units under the outline: Numbana Monzogranite 100%.

Sources cited for this target

S1 GIS layer: drillhole_collars

S2 GIS layer: geochemistry

S3 GIS layer: li_ppm_idw_log10 (derived)

S4 GIS layer: linear_structures_100k

S5 GIS layer: ta_ppm_idw_log10 (derived)

S6 Known mineralisation register

S7 Register entity: Turner River Alluvial 1

S8 Analysis: layer query

S9 Analysis: locate anomalies

S10 Analysis: locate anomalies

S11 Analysis: prospectivity model

2 Mount Francisco Brownfield Expression Target

near known occurrence

22.6 km²

0.0–300.0 m

next test: cheap

E 660 590–665 620 · N 7 635 180–7 639 760 (MGA z50) · centre E 663 100 · N 7 637 470

TARGET LOGIC — SUMMARISED AT WRAP-UP

Mount Francisco Brownfield Expression Target is a shallow (0–300 m) LCT pegmatite target centred on the historic Mount Francisco Li-Ta-Sn field, where pegmatite-labelled outcrops, historic workings and shallow RC drilling coincide. ^{S2S3S18} Strong multi-element pathfinder highs support local fertility, but the principal anomaly is in a brownfield cell and the strongest Li-Cs-Rb sample is labelled hydrothermal rock, so a primary continuous LCT body is not established. ^{S3S20} Confirmation requires repeatable LCT mineralisation in fresh mapped pegmatite beneath or beside the workings; the target would be weakened if enrichment proves alluvial or hydrothermal, or drilling shows only discontinuous narrow stringers. ^{S1S2S3S16}

Why it holds this rank

AS RANKED

Ranked second because shallow pegmatitic material and historical drilling are more extensive than at the first target, but the key body-continuity proposition is unresolved and the high-value geochemical signal has a credible hydrothermal and transported-material alternative.

Evidence by critical process

FERTILE EVOLVED MELT

LCT mineralisation requires a highly fractionated, volatile-rich granitic melt capable of concentrating Li, Cs, Ta, Sn, Rb and Be into pegmatitic residual fractions.

SUMMARISED AT WRAP-UP

The southwestern cell at E 665 670 · N 7 636 760 contains 35 samples with maxima of Li 3,220 ppm, Cs 437 ppm, Rb 2,980 ppm, Sn 48.1 ppm, Ta 46.6 ppm and Be 22.5 ppm, with a full-set score of 0.9922 and a Li-Cs-Rb score of 0.9971. ^{S3S20S21} This coherent raw multi-element anomaly supports locally evolved mineralising signatures, but it is principally brownfield calibration because the cell contains 12 shut mines. ^{S3S20} At E 662 580 · N 7 637 330, high-Ta samples of 41.6–46.6 ppm Ta are not accompanied by the full Li-Cs-Rb-Sn vector, and the strongest Li-Cs-Rb result at the Mount Francisco locality is labelled hydrothermal rock rather than pegmatite. ^{S3} These observations leave the source and meaning of the pathfinder signature unresolved. ^{S3}

HOST REACTION AND ORE DEPOSITION

Economic LCT pegmatites require retention of evolved melt and crystallisation into Li- and Ta-bearing mineral assemblages within receptive host settings.

SUMMARISED AT WRAP-UP

The multi-element high in the southwestern cell provides evidence of LCT-pathfinder enrichment, but no contact relation or receptive host setting was tested. ^{S3} The cell includes historic mines and a nearby high-Li hydrothermal-rock sample, providing competing explanations for the anomaly rather than demonstrating ore deposition in primary pegmatite. ^{S3}

SHALLOW PRESERVATION AND GEOMETRY

For the 0–300 m mandate, LCT bodies must be preserved at shallow levels and have geometry amenable to detection and testing beneath limited cover.

SUMMARISED AT WRAP-UP

At E 665 890 · N 7 638 480, ten OUTC samples logged as pegmatite provide direct surface expression, with maxima of Li 81.5 ppm, Sn 22.7 ppm, Ta 43.3 ppm, Cs 15.5 ppm, Rb 453 ppm and Be 22.5 ppm.^{S3} The Mount Francisco cluster has 125 distinct RC collar IDs targeting Li-Ta-Sn, with recorded maximum depths of 10–160 m and a median of 64 m.^{S2} Historic Li-Ta-Sn workings and the undeveloped Cisco prospect support shallow mineralisation expression, but the available drilling records do not establish pegmatite intersections, grade, continuity or preservation at depth.^{S2 S5 S18} The retrieved report identifies subsurface pegmatite shape and continuity as follow-up questions, and no supplied evidence establishes stacked sheets, dyke attitude, thickness or predictable geometry.^{S1 S18}

Confidence

geometry and scale	low: no drill intervals, mapped dyke traces, attitude data or correlated sections are available.
primary lct interpretation	low: the strongest multi-element result is hydrothermal-rock labelled and Ta values are locally decoupled from Li-Cs-Rb-Sn.
shallow expression	moderate: historic Li-Ta-Sn workings, pegmatite-labelled outcrops and shallow RC collar context coincide.
tenure	low: polygon-level title status and holder were not resolved.

Known mineralisation

SUMMARISED AT WRAP-UP

At least 11 shut or undeveloped Li–Ta–Sn mine and prospect register entries occur in the southwestern part of the target, including Comet ML 192 (45), Mt Francisco / Crow Yegarla (45), Mt Francisco / McLeod (47), Mt Francisco / Nomads (45), Mt Francisco / McPherson and Fetwadjeffa (45), Cisco and the Mt Francisco Alluvials 3 working.^{S4 S5 S6 S8 S9 S11 S12 S16 S18} Mt Francisco 1, Mt Francisco 3 and Mt Francisco 4 are also shut Tin-Tantalum-Lithium mines within the target.^{S4 S13 S14 S15} These occurrences demonstrate that Li-Ta-Sn mineralisation operated locally, but they are brownfield evidence rather than proof of an untested continuous LCT pegmatite body; the alluvial working also leaves a transported-material alternative unresolved.^{S3 S16 S18}

INSIDE THE OUTLINE	TYPE · STAGE	COMMODITIES
Comet ML 192 (45)	mine · Shut	Tin, Tantalum, Lithium
Mt Francisco / Otway 1 (45)	mine · Shut	Industrial Pegmatite Minerals
Mt Francisco / Hooley Rodgers and Radley (45)	mine · Shut	Industrial Pegmatite Minerals
Mt Francisco Gemstones	mine · Shut	Gem, Semi-Precious Stones
Mt Francisco 4	mine · Shut	Tin, Tantalum, Lithium
Mt Francisco Alluvials 3	mine · Shut	Tin, Tantalum, Lithium
Mt Francisco / Otway 2 (45)	mine · Shut	Industrial Pegmatite Minerals
Mt Francisco / Nomads (45)	mine · Shut	Tin, Tantalum, Lithium
Mount Francisco drilling programme	project · Drilled	Lithium, Tantalum, Tin
Mt Francisco 1	mine · Shut	Tin, Tantalum, Lithium
Mt Francisco / Hall AE (45)	mine · Shut	Industrial Pegmatite Minerals
Cisco	prospect · Undeveloped	Tin, Tantalum, Lithium

What the claims say

SUMMARISED AT WRAP-UP

The strongest evidence for the target is the 35-sample multi-element anomaly at E 665 670 · N 7 636 760, together with pegmatite-labelled outcrop samples and shallow Li-Ta-Sn-targeted RC drilling around the historic field.^{S2S3S20} The strongest evidence against a straightforward fertile-pegmatite interpretation is that the highest Li-Cs-Rb sample is labelled hydrothermal rock and nearby high-Ta samples lack a matching Li-Cs-Rb-Sn vector.^{S3} The strongest cannot-tell evidence is that the prospectivity result is untested with zero independently grouped LCT sites, while the report and register records do not establish body continuity, architecture or drill intersections.^{S1S18S22}

30 for

2 against

7 cannot tell

Recommended follow-on**CHEAPEST TEST THAT WOULD FLIP IT (CHEAP)**

Verify tenure and compile historical collars, logs and drill-chip locations; map pegmatite, hydrothermal and alluvial material separately, then resample fresh bedrock and available RC chips on traverses across the historic working trend with mineralogical checks.

PREDICTED OBSERVATIONS

- Fresh bedrock exposures and/or relogged RC chips should identify pegmatite intervals beneath or adjacent to historical workings.
- Primary LCT mineral phases should be identifiable in anomalous fresh samples if the system is bedrock-derived.
- A viable target should show repeatable LCT pathfinder patterns across more than one mapped pegmatite exposure, rather than isolated hydrothermal or alluvial anomalies.

Kill criteria

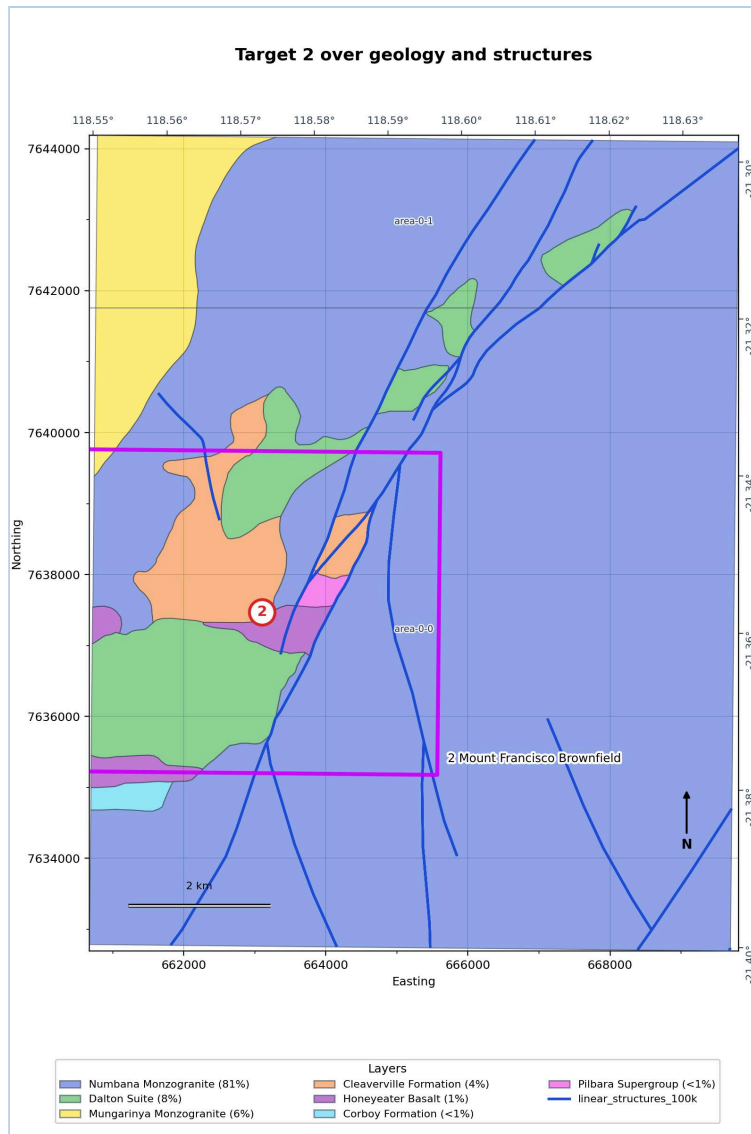
- Fresh bedrock mapping and re-logging identify no coherent pegmatite body beneath or beside the historical workings.
- Trenching or re-sampling shows pathfinder enrichment is confined to transported/alluvial or hydrothermal material rather than fresh pegmatite.
- Historical RC material or new shallow fences establish only discontinuous narrow stringers without repeated LCT mineralisation.
- Title verification demonstrates conflict with excluded active/resource ground.

Assumptions

- Historic shut workings remain legitimate evidence rather than excluded active-resource sites.
- Pegmatite-labelled outcrop samples are representative of in-situ bedrock.
- Historical RC collar depth is only drilling context and is not treated as an intersection result.

Limitations

- No downhole lithology, interval assay, recovery or mineralogical data are available for the RC collars.
- The strongest southwest geochemical anomalies have competing hydrothermal and alluvial explanations.
- No constrained strike, dip, thickness or continuity information supports a drill design yet.
- Candidate-specific tenure remains unresolved.
- Polygon extends outside the target-delivery AOI. (pipeline note)



Target 2 over geology and mapped structures; outline E 660 590–665 620 · N 7 635 180–7 639 760 (MGA z50). Units under the outline: Numbana Monzogranite 51%, Dalton Suite 26%, Cleaverville Formation 15%, Honeyeater Basalt 5%, Pilbara Supergroup 1%, Mungarinya Monzogranite 0%.

Sources cited for this target

S1 Stockman, P R (2011). Annual Report for the Period 21st August 2010 – 20th August 2011, Mt Francisco Project, E45/1246. Geological Survey of Western Australia open-file exploration report A91698 (WAMEX), p. 14 [source](#)

S2 GIS layer: drillhole_collars

S3 GIS layer: geochemistry

S4 Known mineralisation register

S5 Register entity: Cisco

S6 Register entity: Comet ML 192 (45)

S7 Register entity: Mount Francisco drilling programme

S8 Register entity: Mt Francisco / Crow Yegarla (45)

S9 Register entity: Mt Francisco / McLeod (47)

S10 Register entity: Mt Francisco / McLeod DW (45)

S11 Register entity: Mt Francisco / McPherson and Fetwadjeffa (45)

S12 Register entity: Mt Francisco / Nomads (45)

S13 Register entity: Mt Francisco 1

S14 Register entity: Mt Francisco 3

S15 Register entity: Mt Francisco 4

S16 Register entity: Mt Francisco Alluvials 3

S17 Register entity: Mt Francisco Sundry Persons Crown Lands

S18 Analysis: known mineralisation

S19 Analysis: locate anomalies

S20 Analysis: locate anomalies

S21 Analysis: locate anomalies

S22 Analysis: prospectivity model

III. Exploration approach

Lithium-caesium-tantalum (LCT) pegmatites — Shallow spodumene-bearing and Ta-Sn-Cs enriched pegmatite swarms in Archean granite–greenstone belts

The AOI is a mature LCT camp. The model requires evolved, volatile-rich pegmatitic melt; structural migration and emplacement; suitable greenstone/metasedimentary host architecture; and preservation of shallow pegmatite sheets and dykes. Pilgangoora calibrates kilometre-scale, east-dipping spodumene-bearing dykes associated with D3 shear fabrics and later cross faults. Wodgina calibrates host-rock diversity, including metavolcanic, metasedimentary and metagreywacke hosts, and stacked or fault-bound sheet geometries. These local examples establish favourable associations, not a unique district-wide source pluton, emplacement age, or universal structural timing.

Fertile evolved melt

LCT mineralisation requires a highly fractionated, volatile-rich granitic melt capable of concentrating Li, Cs, Ta, Sn, Rb and Be into pegmatitic residual fractions.

Local calibration. At Wodgina, published interpretation proposes that an albite-type pegmatite was derived from an albite–spodumene pegmatite group through separation of a highly fluxed, volatile-enriched melt fraction. Pilgangoora is demonstrably spodumene rich, but the supplied evidence does not establish a unique parental pluton, melt age, or fertility signature for all AOI granitoids.

Fractionation and volatile enrichment generate compositionally evolved pegmatite melt rather than barren quartz veins or simple pegmatites.

- LCT-compatible internal assemblages or zonation, particularly spodumene- or albite-rich evolved units and Ta-Sn-Cs bearing phases, indicate evolved melt products. ^{B12B17} Against it: Only barren quartz veins, simple unfractionated pegmatites, or mineralogy incompatible with LCT evolution would count against this element.
- Pegmatite swarms close to late Archean granitic intrusions or leucogranitic/migmatitic source domains are a source proxy, subject to geochemical confirmation. ^{B8B14} Against it: A demonstrably unrelated, compositionally infertile source or absence of any plausible fertile granitic association would count against this element.

Melt batches must be sufficiently voluminous and repeatedly delivered to form swarms rather than isolated narrow veins.

- Clusters of multiple sheets, dykes or composite bodies indicate repeated magma delivery and are more favourable than single isolated veins. ^{B9B12} Against it: A solitary, discontinuous barren vein with no related pegmatite swarm would count against this element.
- Sn-Ta-Cs-Rb-Be mineralisation or pegmatite-margin vein systems can vector toward evolved pegmatite bodies, while recognising that tin veins may have low tantalum. ^{B2B6} Against it: Geochemical patterns showing only non-LCT pathfinders without pegmatitic affinity would count against this element.

Structural transport emplacement

Fertile pegmatite melt requires permeable structures and/or contacts that focus migration, then local dilation or mechanical contrasts that permit dyke and sheet emplacement.

Local calibration. At Pilgangoora, drilling shows east-dipping dykes parallel to or subparallel with NNW D3 schistosity; Central and Western bodies occupy dip-slip D3 shears and Eastern bodies strike-slip D3 shears. The 2025 account also describes D4 faults as passive emplacement guides, with Lynas Find and Monster on cross faults. At Wodgina, Main Lode and Cassiterite pegmatites show east to southwest dips and stacked/fault-bound sheets. Structural histories remain locally variable rather than a single required sequence.

Regional to district structures guide melt migration into greenstone belts and across pre-existing fault architecture.

- Major shear zones, cross faults, fault intersections or fold-related structural corridors that coincide with pegmatites are prospective pathways.^{B12 B14 B21} Against it: No structural corridor, or mapped structures demonstrably younger than and unrelated to pegmatite emplacement, would count against this element.
- Pegmatites that breach older faults or occupy cross-cutting faults demonstrate structural permeability at emplacement.^{B4 B13} Against it: Cross-cutting relations proving structures only offset or destroy pegmatites after emplacement, without an emplacement role, would count against this element.

Local dilation and competency contrasts provide physical traps for thick, stacked or composite pegmatite bodies.

- Contacts between metasedimentary and metavolcanic packages, folded greenstones, and contrasting competent units are favourable physical traps where pegmatites localise.^{B6 B14} Against it: Uniform host rocks lacking contacts, competency contrasts or any localised pegmatite accommodation would count against this element.
- Stacked sheets, thickened dyke segments, plunging tongues and changes in dyke attitude near structures indicate local melt ponding or mechanical traps.^{B3 B9 B12} Against it: Consistently thin, unthickened dykes with no structural or host-rock control would count against a sizeable shallow target.

Host reaction and ore deposition

Economic LCT pegmatites require retention of evolved melt and crystallisation into Li- and Ta-bearing mineral assemblages within receptive host settings.

Local calibration. Pilgangoora reports spodumene units as more than 85% of dyke volume with consistent grades above 1.5 wt% Li₂O in the cited historical drilling account. Wodgina includes Ta-hosting pegmatites in metavolcanics, metasediments and pyrrhotite-rich metagreywacke. The available material does not establish that any one host lithology is necessary across the AOI.

Host lithology and pegmatite-wallrock interaction influence emplacement, internal zoning and mineral expression.

- Mafic greenstone, metavolcanic, metasedimentary or metagreywacke hosts adjacent to plausible granite are favourable where they contain mapped pegmatites or structural traps.^{B6 B7 B9} Against it: Host rocks shown to contain only barren quartz veins or no pegmatite intrusions despite equivalent structural exposure would count against this element.
- Pegmatite-margin albite, mica or biotite alteration selvages and related quartz-tourmaline-mica-cassiterite veins may identify reactive contacts and distal vectors.^{B2 B9 B13} Against it: Alteration demonstrably attributable only to unrelated weathering or hydrothermal systems, without pegmatite association, would count against this element.

Internal pegmatite fractionation must crystallise recoverable spodumene and/or Ta-Sn-Cs mineral phases rather than solely barren quartz-feldspar assemblages.

- Spodumene-bearing units and internal zoning in pegmatite dykes are direct evidence for lithium deposition.^{B4 B13} Against it: Mineralogy proving petalite-, mica- or quartz-feldspar-dominant pegmatites without lithium-bearing phases would count against the spodumene subtype, although not necessarily against other LCT variants.
- Tantalum- and tin-bearing pegmatites or associated margin-parallel vein systems provide evidence for rare-metal deposition and fractionation vectors.^{B2 B7} Against it: Assays and mineralogy showing no rare-metal enrichment in a mapped pegmatite swarm would count against this element.

Shallow preservation and geometry

For the 0–300 m mandate, LCT bodies must be preserved at shallow levels and have geometry amenable to detection and testing beneath limited cover.

Local calibration. Pilgangoora drilling defines dykes up to 1.4 km long, mostly 1–30 m thick and locally 70 m thick, dipping east at 20–60°. At Wodgina, Mt Cassiterite sheets are exposed intermittently over 300 × 400 m, up to 30 m thick, and shallowly south- to south-west-dipping. These examples demonstrate shallowly exposed or drilled geometries but do not demonstrate preservation beneath cover throughout the AOI.

Pegmatite bodies must survive erosion and weathering at, or below, the present shallow search level.

- Outcrop, shallow drill intersections, historical workings, or coherent near-surface geochemical/mineralogical evidence for pegmatite bodies indicate preservation within the target depth range.^{B9B12} Against it: Drilling demonstrating basement erosion below the pegmatite-bearing level, or showing only transported alluvial enrichment with no bedrock source, would count against this element.
- Preserved spodumene or primary Ta-bearing mineralogy, with limited destructive alteration at dyke contacts, supports shallow economic relevance.^{B13} Against it: Pervasive alteration that has destroyed diagnostic lithium minerals and no primary mineralogy remains would count against this element.

Shallow bodies need sufficient thickness, continuity and predictable attitude for practical targeting.

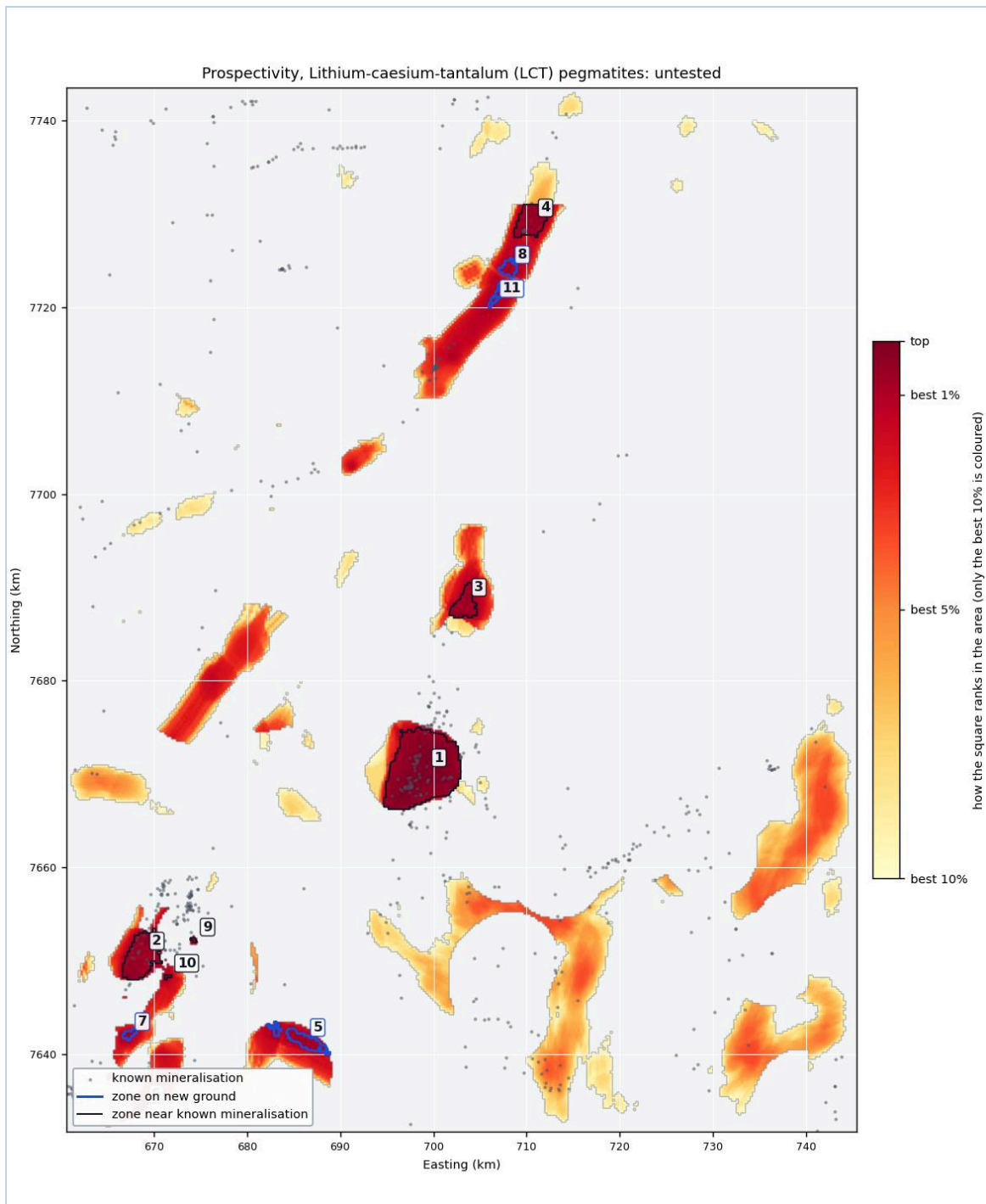
- Mapped or drilled continuous dykes, sheets or stacked bodies with constrained strike, dip and thickness are favourable shallow targets.^{B9B12} Against it: Drilling that establishes only short, discontinuous, sub-economic stringers would count against this element.
- Along-strike, down-dip or structurally repeated extensions of exposed pegmatite sheets are plausible where geometry is constrained, but require drilling confirmation.^{B3B21} Against it: Drilling or mapping that closes pegmatite bodies against faults without continuation, or shows no coherent structural repetition, would count against this element.

Limits of the model

- The reference-library query for “LCT pegmatite fractionation” returned no permitted indexed passages; deposit-process support therefore relies on local report-corpus evidence and standard mineral-systems interpretation.
- Several Wodgina passages are historical reports with OCR quality flags; their host and geometry observations are used conservatively.
- The evidence does not establish a single fertile source granite, absolute emplacement ages, or one structural event applicable to all LCT occurrences in the AOI.
- Pilgangoora structural terminology varies between reports (D2/D3 versus D3/D4 descriptions); structures should be treated as local controls requiring field-scale timing verification.
- Shallow exposure or historic workings do not prove continuity, grade, or preservation at depth elsewhere in the AOI.

Prospectivity map

The mineral systems geologist built a prospectivity map of the area for the question “At district scale, build a shallow-LCT system-coherence prospectivity map for the AOI using at most seven granted layers, including the strongest available LCT...” The map gives every 250 m square (151,533 in all) a score for how closely its evidence resembles the ground at the known Lithium-caesium-tantalum (LCT) pegmatites deposits. It shows where to look; it is not evidence that an ore-forming process operated there. It combines 3 evidence layers: Li IDW log10 ppm, Ta IDW log10 ppm, mapped structure density with the weights the geologist gave; too few known deposits of the class lie inside the area to learn from (0 groups found), so it is untested.



Prospectivity map. Coloured ground is the best 10% of the area on the map's score. Numbered outlines are the strongest zones. Triangles are the known deposits of the class the map learned from; dots are other known mineralisation.

The geologist wrote 4 claims from the map (1 for, 1 against, 2 cannot tell), and targets [1](#), [2](#) rest partly on them. Its best 1% of the area formed 11 zones, 4 of them on new ground more than 3 km from known mineralisation, which the run took as leads to test.

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B36 GIS layer: geology_100k

B37 Known mineralisation register

Appendix

A. Known mineralisation register

KNOWN SITE	TYPE · STAGE	COMMODITIES	SIZE / HOST	POSITION (MGA2020 ZONE 50 (EPSG:7850))
Pilgangoora (C1 E1 N1 S1) ^{B22 B24}	mine · Operating	Lithium, Tantalum, Tin	Pilbara Minerals reported a 214 Mt Ore Reserve at 1.19% Li ₂ O and 103 ppm Ta ₂ O ₅ in 2023; the individual register node is part of the operating Pilgangoora project. · Pegmatite-hosted LCT mineralisation; the Eastern Pegmatites domain is reported in D3 strike-slip shear zones.	—
Central - Far East ^{B31}	mine · Operating	Lithium, Tantalum, Tin	At 30 June 2023, Central was reported at 162.2 Mt at 1.29% Li ₂ O and 103 ppm Ta ₂ O ₅ ; Far East was 8.6 Mt at 1.34% Li ₂ O and 93 ppm Ta ₂ O ₅ . · LCT pegmatite.	—
Eastern Pegmatites - Pilgangoora ^{B22 B23}	mine · Proposed / resource- definition drilling	Lithium, Tantalum, Tin	No standalone size was extracted; it is described as a principal domain within the Pilgangoora operation, for which a 446 Mt resource at 1.28% Li ₂ O and 122 ppm Ta ₂ O ₅ was reported in 2025. · Spodumene-bearing pegmatites with associated tantalum minerals.	—
Wodgina Group ^{B10 B18}	mine · Operating	Lithium, Tantalum, Tin	A 2025 technical-report summary cited in the register gives the broader Wodgina operation 78.6 Mt Mineral Resources at 1.2% Li ₂ O and 104.8 Mt Probable Reserves at 1.3% Li ₂ O; this is project-level rather than node-specific. · Pegmatite-hosted lithium–tin–tantalum mineralisation.	—
Cassiterite	mine · Operating	Lithium, Tantalum, Tin	The October 2018 Cassiterite Pit estimate was 259.2 Mt at 1.17% Li ₂ O Mineral Resources and 151.9 Mt at 1.17% Li ₂ O Ore Reserves. · Pegmatite.	—
Cassiterite North East Node ^{B10}	mine · Care and Maintenance	Lithium, Tantalum, Tin	No standalone size found; material reviewed relates it to the wider Wodgina resource and reserve area. · Pegmatite-hosted Li–Sn–Ta mineralisation.	—
Lynas Find Main Pegmatite ^{B19 B20}	deposit · Undeveloped; Pilbara Minerals proposed project	Lithium, Tantalum, Tin	Reported mineral resource of 7.3 Mt at 1.25% Li ₂ O and 85 ppm Ta ₂ O ₅ ; a 2023 presentation reported an Ore Reserve of 2.5 Mt at 1.73% Li ₂ O and 86 ppm Ta ₂ O ₅ . · Hard-rock spodumene- and tantalite-bearing pegmatite.	—

KNOWN SITE	TYPE · STAGE	COMMODITIES	SIZE / HOST	POSITION (MGA2020 ZONE 50 (EPSG:7850))
Chewy ^{B5 B27}	deposit · Advanced exploration / resource declared	Lithium, Tantalum, Tin	Chewy was reported at 6.0 Mt at 0.92% Li ₂ O, comprising 5.5 Mt Indicated and 0.5 Mt Inferred resources. · Stacked LCT pegmatites.	—
Leia ^{B30 B34}	deposit · Advanced exploration / resource declared	Lithium, Tantalum, Tin	Part of Tabba Tabba's reported 74.1 Mt at 1.00% Li ₂ O resource and 46.3 Mt at 0.99% Li ₂ O probable reserve; the reserve includes underground material from Luke and Leia. · LCT pegmatite.	—
Luke ^{B11 B34}	deposit · Advanced exploration / resource declared	Lithium, Tantalum, Tin	Included in the Tabba Tabba 74.1 Mt at 1.00% Li ₂ O resource and 46.3 Mt at 0.99% Li ₂ O probable reserve; drilling includes 43.0 m at 1.4% Li ₂ O and 54.4 m at 1.2% Li ₂ O. · Blind spodumene pegmatite beneath Leia.	—
Han ^{B28 B32}	deposit · Advanced exploration	Lithium, Tantalum, Tin	No standalone resource found; Han is described as a petalite-dominant domain within the 74.1 Mt at 1.00% Li ₂ O Tabba Tabba resource, and is excluded from the reported 46.3 Mt reserve. · Petalite-dominant LCT pegmatite.	—
Hutt Pegmatite ^{B26 B35}	deposit · Advanced exploration	Lithium, Tantalum, Tin	No standalone resource found in the permitted material reviewed. · LCT pegmatite adjacent to mapped granite, sediments and a late mafic dyke in the cited project figure.	—
Boba ^{B29 B33}	prospect · Drilled	Lithium, Tantalum, Tin	No resource or reserve found in the reviewed material. · Not found in the permitted material reviewed.	—
Bore Creek ^{B1 B15}	mine · Shut	Lithium, Tantalum, Tin	Historical probable reserves of 0.18 Mt were reported for an alluvial/eluvial Sn–Ta–Li deposit; no modern JORC resource was found. · Alluvial/eluvial Sn–Ta–Li deposit; nearby reports identify pegmatite, feldspar and muscovite as exploration context.	—
Crawford Bore ^{B16}	deposit · Undeveloped	Lithium, Tantalum, Tin	An inferred tantalum resource of 0.19 Mt at 0.004% Ta ₂ O ₅ , estimated from costeaning, was reported; no drilling-based reserve was found. · Alluvial/eluvial tantalum occurrence.	—
Coffin Bore North ^{B15 B25}	mine · Shut	Lithium, Tantalum, Tin	No resource or reserve was found. · Old tantalum workings in pegmatite.	—

B. Tenure across the AOI

The permitted tenure layer records 663 titles: 488 live and 175 pending. Live titles cover 65.9% of the AOI, pending applications cover 23.8%, and mapped open ground covers 10.3%. The largest mapped open-ground areas are 384.4 km² in the northeast (119.067–119.317°E, 20.583–20.400°S) and 221.3 km² along the southern AOI margin (118.55–119.35°E, 21.40–21.241°S). Major live-title holders include FMG Pilbara, Wildcat Resources, Ngungaju Lithium Operations, Pilgangoora Operations and Albemarle Wodgina. Open-ground status does not establish prospectivity.

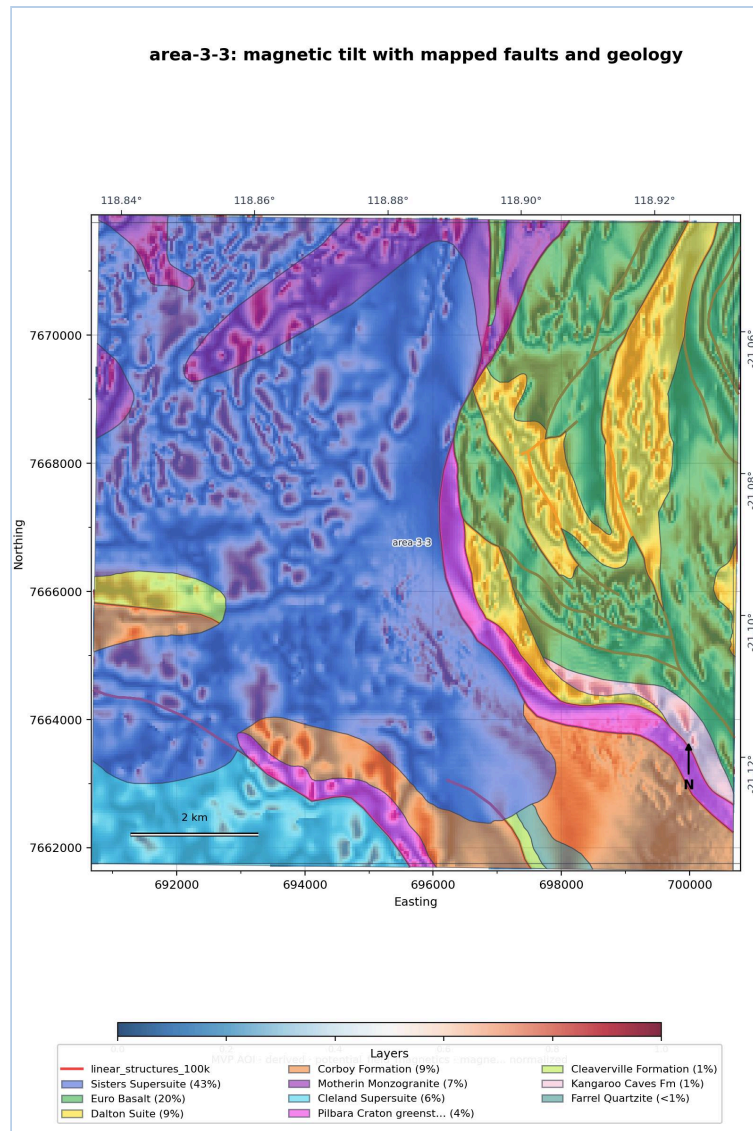
C. Dominant map units

UNIT	AGE	LITHOLOGY	SHARE
Wilson Well Gneiss	Paleoarchean	Heterogeneous tonalitic orthogneiss and schlieric hornblende granodiorite; migmatitic	12%
Callina Supersuite	Paleoarchean	Metadiorite to metasyenogranite; massive to gneissic	8%
Cleland Supersuite	Paleoarchean	Tonalitic orthogneiss; locally includes veins of granitic pegmatite or greenstone xenoliths	8%
Sisters Supersuite	Mesoarchean	Biotite monzogranite; massive to weakly foliated	8%
Myanna Leucogranite	Mesoarchean	Biotite–muscovite monzogranite; massive to weakly foliated	7%
Numbana Monzogranite	Mesoarchean	Feldspar–quartz porphyritic monzogranite with local garnet-bearing pegmatite and granite dykes	6%

D. Maps drawn during the run

The specialists and the manager drew 1 map while working; the wrap-up's own maps are not listed.

#	MAP	DRAWN BY	LAYERS	SHOWN WITH
1	area-3-3: magnetic tilt with mapped faults and geology	structural geologist	magnetics_tilt (derived), linear_structures_100k, geology_100k	below



area-3-3: magnetic tilt with mapped faults and geology. Drawn by the structural geologist for the question “In candidate area-3-3, test whether mapped faults, shear fabrics, contacts and any documented pegmatite geometry support a targetable along-strike, down-dip or...” Layers: magnetics_tilt (derived), linear_structures_100k, geology_100k. Close-up.

E. Method note

Coordinates are MGA2020 zone 50 (EPSG:7850), to 10 m. Map grids are WGS84 UTM zone 50S, which coincides with it to within a metre. Paragraphs marked *summarised at wrap-up* were written by the run's model (gpt-5.6-terra) from the ledger claims and may cite only the sources listed; every other sentence is the run's own record, printed as written. Run eebf03e8-39b5-40da-b654-e2e1b9e12d22 · release b1f5cffbd3969857 · page generated 2026-10-11T20:52:56 UTC.

F. Sources and licences

Everything this report rests on is listed here with the terms under which it was used. Sections II and III cite each work in their reference lists. Nothing in this report reproduces a page, figure or table of a cited work; the maps are Oregon's own drawings of the data listed below.

Exploration reports

13 open-file exploration reports are cited, all held by the Geological Survey of Western Australia (WAMEX). Copyright in each remains with the company or author that wrote it; the survey publishes it once the statutory confidentiality period has lapsed (in Western Australia the Mining Act 1978). Reports are cited by report num-

ber and page; their text was read, not reproduced. The surveys' indexes and footprints are licensed CC BY 4.0, which does not extend to the content of the reports.

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Geoscience data

Every catalogue layer the run read, under the source dataset it came from. A layer marked derived was computed by Oregon from the source named and carries its licence.

SOURCE DATASET	CUSTODIAN AND LICENCE	LAYERS USED
geochemistry GSWA Geochemistry (DMIRS-047)	State of Western Australia (DMIRS) Creative Commons Attribution 4.0	geochemistry, li_ppm_idw_log10 (derived), ta_ppm_idw_log10 (derived)
copernicus_dem_30m (bands dem_utm50s_30m) produced using Copernicus WorldDEM-30 © DLR e.V. 2010-2014 and © Airbus Defence and Space GmbH 2014-2018 provided under COPERNICUS by the European Union and ESA; all rights reserved	Copernicus DEM and Sentinel data (EU/ESA) Copernicus DEM public licence	lineaments_topographic (derived)
magnetics_20m_2026 Brett, JW 2026, magnetics merged grids of Western Australia, Geological Survey of Western Australia.	State of Western Australia (DMIRS) Creative Commons Attribution 4.0 International	lineaments_magnetic_density (derived), magnetics_tilt (derived)
sentinel2_surface_reflectance (bands blue, green, nir, red, scl, swir16, swir22) Contains modified Copernicus Sentinel data (2026), processed by Oregon; ESA Level-2A source data, public COGs via Earth Search.	Copernicus DEM and Sentinel data (EU/ESA) Copernicus Sentinel data terms	clay_hydroxyl (derived)
bedrock_lines_100k Interpreted bedrock geology lines 1:100 000 (DMIRS-052)	State of Western Australia (DMIRS) Creative Commons Attribution 4.0	bedrock_lines_100k
drillhole_collars Mineral exploration drillholes (open file) (DMIRS-046)	State of Western Australia (DMIRS) Creative Commons Attribution 4.0	drillhole_collars
geology_100k Interpreted bedrock geology 1:100 000 (DMIRS-038)	State of Western Australia (DMIRS) Creative Commons Attribution 4.0	geology_100k
linear_structures_100k Linear structures 1:100 000 (DMIRS-053)	State of Western Australia (DMIRS) Creative Commons Attribution 4.0	linear_structures_100k

SOURCE DATASET	CUSTODIAN AND LICENCE	LAYERS USED
tenements Mining Tenements (DMIRS-003)	State of Western Australia (DMIRS) Creative Commons Attribution 4.0	tenements

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