STRATAPROBE

ML-Driven Mineral Exploration Analysis

Client Concession: Lubudi Mining Permit 13628

Central African Copperbelt — Lualaba Province, DRC

Report Date	30 April 2026
Report Reference	SP-2026-LB-001
Location	Lubudi, Lualaba Province, Democratic Republic of the Congo
Geological Setting	Central African Copperbelt (Lufilian Arc — Katanga Supergroup)
Total Area	1,353.86 ha (13.54 km²)
Permit Analysed	Mining Permit 13628 — Lubudi
Primary Commodities	Copper (Cu), Cobalt (Co), Polymetallic (U-Zn-Ag)
Sentinel-2 Scenes	29
Spectral Indices	12 mineral exploration indices
ML Methods	6 (PCA, SAM, IsoForest, XGBoost, Fuzzy, Ensemble)
Targets Identified	72
Classification	CONFIDENTIAL — CLIENT ONLY

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1. Executive Summary

Strataprobe has completed a comprehensive ML-driven mineral exploration analysis covering the Lubudi Mining Permit 13628, totalling 1,353.86 hectares (13.54 km²) in Lualaba Province, Democratic Republic of the Congo. The permit lies within the Central African Copperbelt — the world's largest sediment-hosted Cu-Co province, hosting roughly 10% of global Cu reserves and over 50% of global Co reserves — in the Katanga Supergroup of the Lufilian Arc fold-thrust belt.

Using 29 cloud-free Sentinel-2 satellite scenes (dry season 2024), we extracted 12 spectral indices at 10–20 metre spatial resolution and processed them through a six-method ML pipeline comprising PCA/Crosta mineral mapping, Spectral Angle Mapper lithology classification, Isolation Forest anomaly detection, XGBoost refinement, fuzzy logic prospectivity modelling, and structural lineament analysis.

The ensemble consensus identified **72 drill targets** within the permit area, of which **13 are Critical priority**, **12 are High**, **7 are Medium**, and **40 are Low**. All targets are located strictly within the Lubudi PE 13628 boundary. The dominant prospective commodity across the area is Copper, with strongly co-located Cobalt signatures consistent with the Mines Series stratigraphy of the Roan Group. Distinct gossan, clay-alteration, and Fe-Mn oxide responses suggest an oxidised cap over a sulfide-bearing root — the classic exploration target in this district.

We recommend a phased exploration programme beginning with ground-truthing and detailed mapping of the Critical and High priority targets, followed by core drilling at optimised angles calculated by the Strataprobe TargetMax algorithm to maximise ore body intersection.

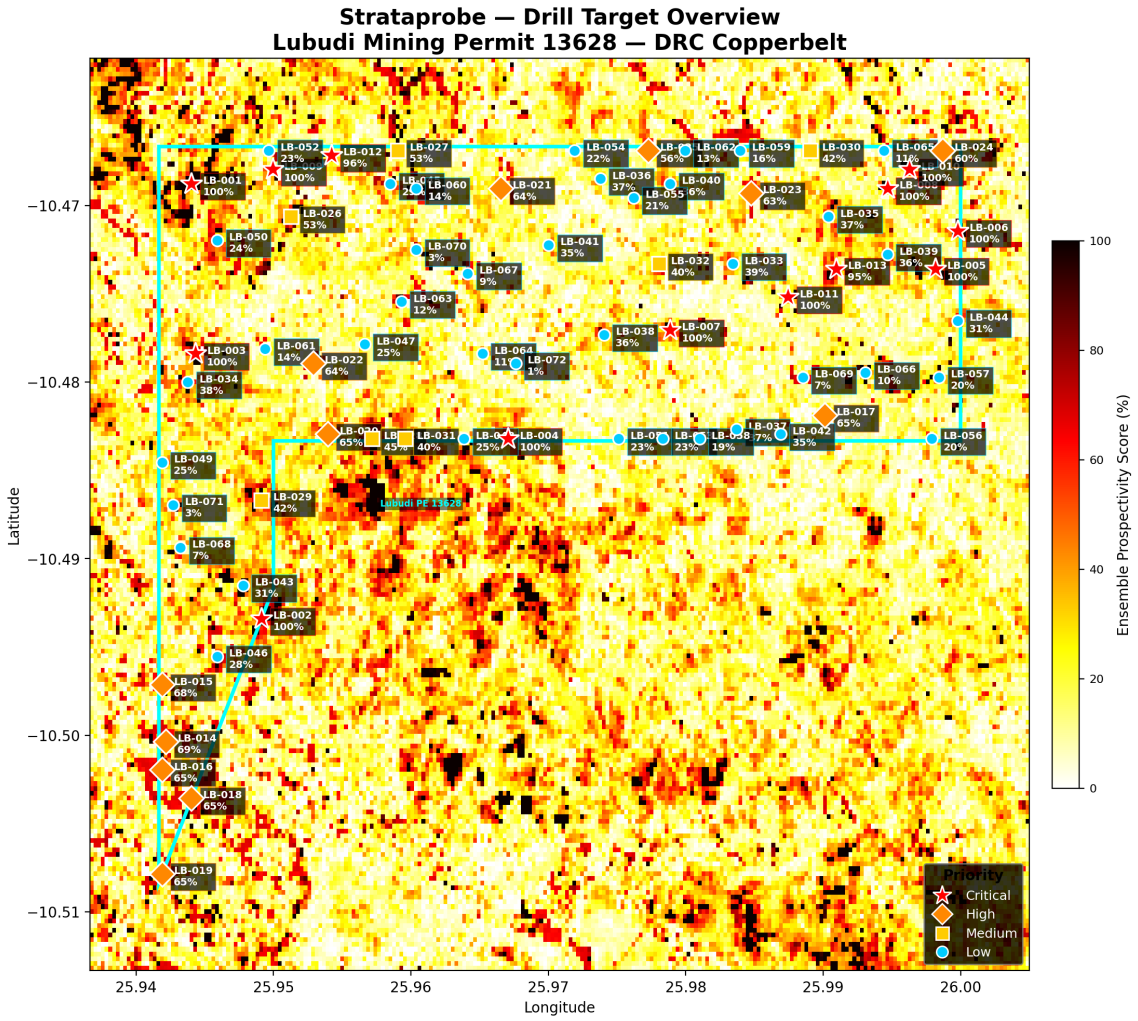

Figure 1: Ensemble prospectivity heatmap with drill target locations. Cyan outlines denote concession boundaries.

2. Concession Overview & Geological Context

2.1 Portion Details

Permit	Vertices	Area (ha)	Area (m²)
Lubudi PE 13628	**25.9417°E,-10.5083°S → 25.9417°E,-10.4667°S → 26.0000°E,-10.4667°S → 26.0000°E,-10.4833°S → 25.9500°E,-10.4833°S → 25.9500°E,-10.4917°S → 25.9417°E,-10.5083°S**	**1,353.86**	**13,538,600**

2.2 Geological Setting

The permit lies within the Central African Copperbelt of southern DRC — the world's premier sediment-hosted stratiform Cu-Co province. Mineralisation is hosted in the Neoproterozoic Katanga Supergroup, deformed by the Pan-African Lufilian Arc orogeny. The Copperbelt accounts for the majority of global Cobalt production and a significant share of global Copper output, with deposits typically grading 2–5% Cu and 0.1–0.5% Co.

The stratigraphic succession in this district comprises (from base upward): the Roan Group (R1–R4 — hosting the productive Mines Series including Roches Argilo-Talqueuses (R.A.T.), dolomitic shales (D.Strat), siliceous dolomites (R.S.F.), and the ore-bearing Black Mineralised Series), the Mwashya Group (post-ore reduced sediments), the Nguba Group (including the "Grand Conglomérat" diamictite), and the Kundelungu Group (post-glacial siliciclastics). Cu-Co mineralisation occurs predominantly as stratabound disseminations and replacements of carbonaceous, dolomitic siltstones and shales. Primary sulfides (chalcopyrite, bornite, chalcocite, carrollite) are typically weathered in the upper 30–100 m to oxide ore (malachite, chrysocolla, heterogenite), forming the high-grade supergene blankets that dominate current open-pit mining.

At the Lubudi PE 13628 location (centred near 25.97°E, 10.49°S), the area sits along the southern flank of the Lufilian Arc, with structural trends typically WNW–ESE. Surficial expression of mineralisation often includes vivid green malachite staining (visible in the SWIR/red ratios), black heterogenite crusts in karstic dolomite cavities, and Fe-Mn oxide gossans over sulfide roots. Lateritic weathering profiles can extend 30–120 m below surface, hosting significant Co-bearing oxide ore. Mineralised structures are commonly controlled by Lufilian-age thrust faults and intersecting NE–SW transfer structures — prime targets for drill-collar siting.

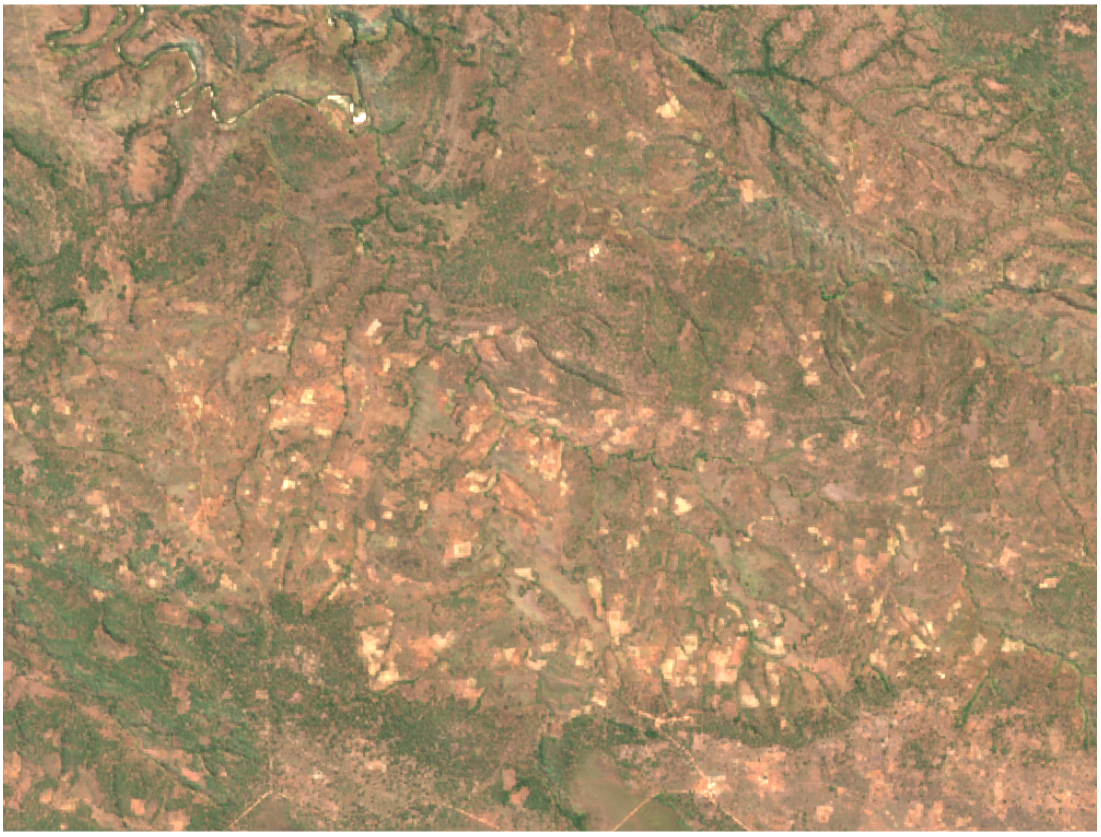

Figure 2: Sentinel-2 true colour composite (dry season 2024). Visible surface features include outcrop exposures, vegetation patterns, and anthropogenic disturbance from existing mine operations.

3. Data Acquisition & Processing

We acquired 29 cloud-free Sentinel-2 Level-2A (surface reflectance) scenes from the dry season window (April–October 2024) via Google Earth Engine. The cloud masking pipeline uses the SCL (Scene Classification Layer) band to exclude cloud, cloud shadow, and haze pixels before computing a per-band median composite. This approach minimises atmospheric interference and produces a consistent, analysis-ready surface reflectance mosaic.

3.1 Spectral Bands Used

Band	Wavelength (nm)	Resolution	Primary Use
B2 (Blue)	490	10 m	Iron oxide discrimination
B3 (Green)	560	10 m	Ferric iron detection
B4 (Red)	665	10 m	Iron oxide, gossan mapping
B5 (Red Edge 1)	705	20 m	Vegetation stress
B6 (Red Edge 2)	740	20 m	Canopy structure
B7 (Red Edge 3)	783	20 m	Vegetation vigour
B8 (NIR)	842	10 m	NDVI, biomass
B8A (NIR narrow)	865	20 m	Moisture index
B11 (SWIR 1)	1610	20 m	Clay, hydroxyl minerals
B12 (SWIR 2)	2190	20 m	Carbonate, silica mapping

3.2 Derived Spectral Indices

Twelve spectral indices were computed from the band ratios, each specifically designed to detect different mineralogical and lithological signatures relevant to Central African Copperbelt Cu-Co exploration:

Index	Formula	Target Signature
Ferric Iron (Fe^{3+})	B4 / B3	Oxidised sulfides, hematite, limonite
Ferrous Iron (Fe^{2+})	B12 / B8	Fresh mafic/ultramafic, pyroxene
Gossan Index	$B4^2$ / (B2 × B3)	Oxidised sulfide caps, gossans
Laterite Index	B4 / B2	Lateritic weathering, iron crusts
Iron Oxide	(B4+B3) / |B4-B3|	General iron oxide abundance
Clay / Hydroxyl	B11 / B12	Hydrothermal alteration, phyllosilicates
Silica Index	B12 / B11	Silicification, quartz veining
Mafic Index	B11 / B8A	Mafic rock indicator (pyroxene, olivine)
Carbonate	B11 / B12 (SWIR ratio)	Carbonate minerals, dolomite
NDVI	(B8-B4) / (B8+B4)	Vegetation cover (inverse mineral proxy)
Moisture	(B8A-B11) / (B8A+B11)	Soil/rock moisture content
Slope	SRTM DEM derivative	Structural control, outcrop exposure

4. Spectral Index Analysis

The 12 spectral indices reveal the spatial distribution of key mineralogical signatures across the concession. Each index highlights different geological features that, when combined, build a comprehensive picture of the subsurface mineralogy.

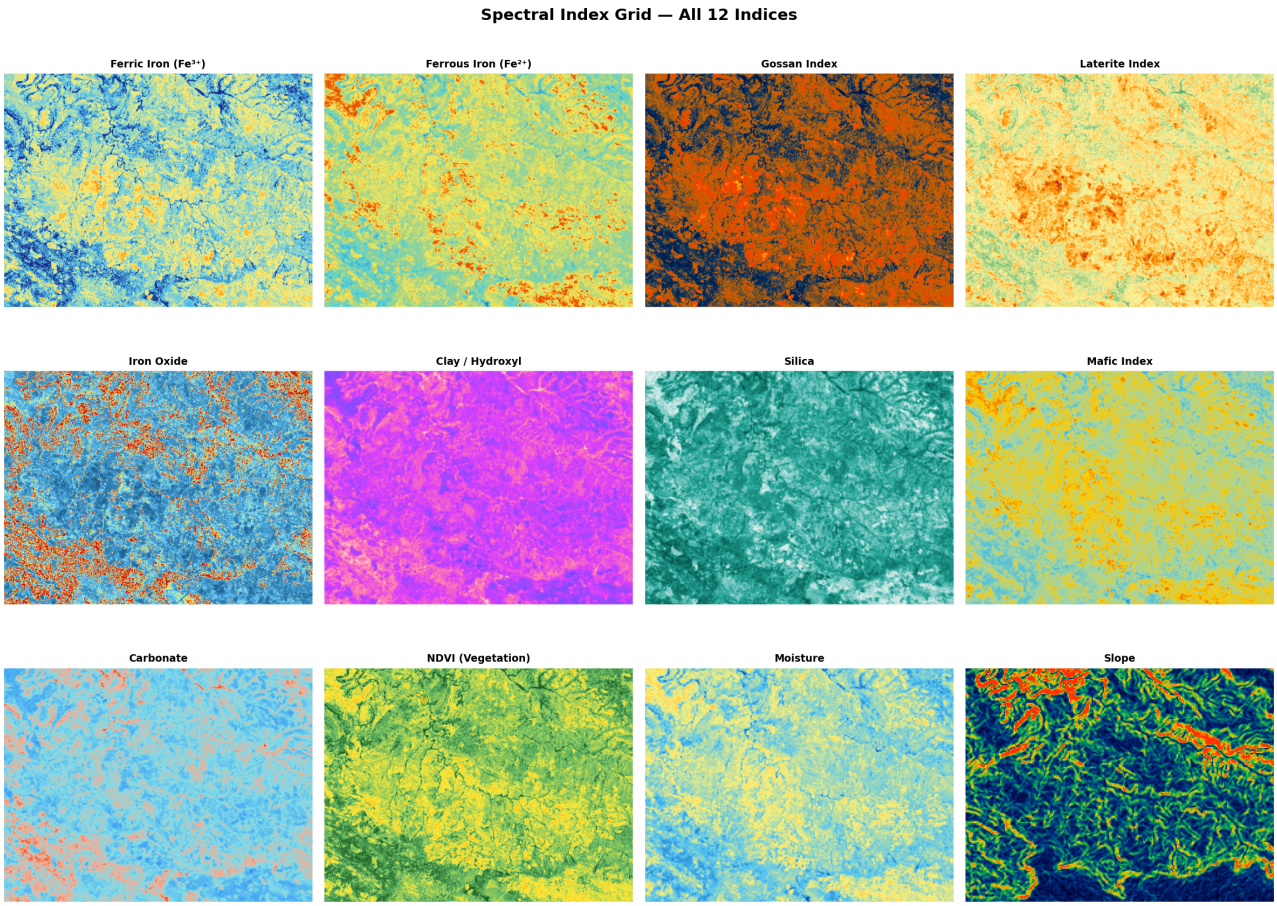

Figure 3: Twelve spectral index maps covering the analysis area. Warm colours indicate elevated values of each index.

4.1 Feature Statistics

Index	Min	Max	Mean	Std Dev
Ferric Index	0.6486	1.7251	1.2333	0.1466
Ferrous Index	0.2323	1.4890	0.7831	0.1620
Gossan Index	0.6548	4.2086	2.0442	0.4493
Laterite Index	1.0107	2.5635	1.7058	0.1779
Iron Oxide Index	3.6621	130.2000	12.5384	12.6100
Clay Index	1.0244	2.0166	1.4171	0.1405
Silica Index	0.4945	0.9755	0.7117	0.0700
Mafic Index	0.4920	1.5945	1.0028	0.1305
Carbonate Index	1.0244	2.0166	1.4171	0.1405
Ndvi	0.0911	0.7916	0.4402	0.0951

Moisture Index	-0.2295	0.3403	0.0026	0.0653
Slope	0.0000	35.2790	5.9236	3.7724

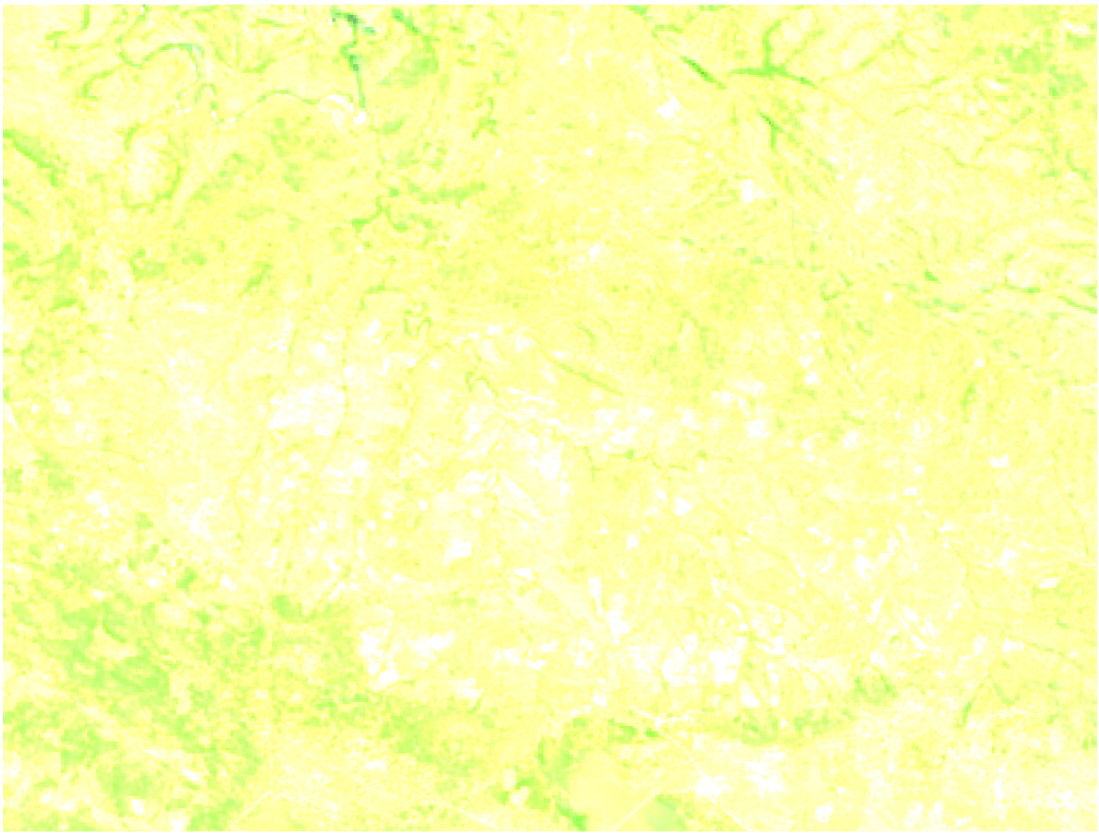

Figure 4: False colour geology composite (SWIR2/SWIR1/Red). Variations in colour indicate differences in rock composition and alteration intensity.

5. ML Anomaly Detection Results

5.1 Isolation Forest

The Isolation Forest algorithm (300 trees, 5% contamination) identifies multivariate anomalies in the spectral feature space. Pixels that are spectrally distinct from the background are scored as anomalous, regardless of which specific mineral signature causes the deviation. This unsupervised approach is particularly effective for detecting previously unknown mineralisation styles.

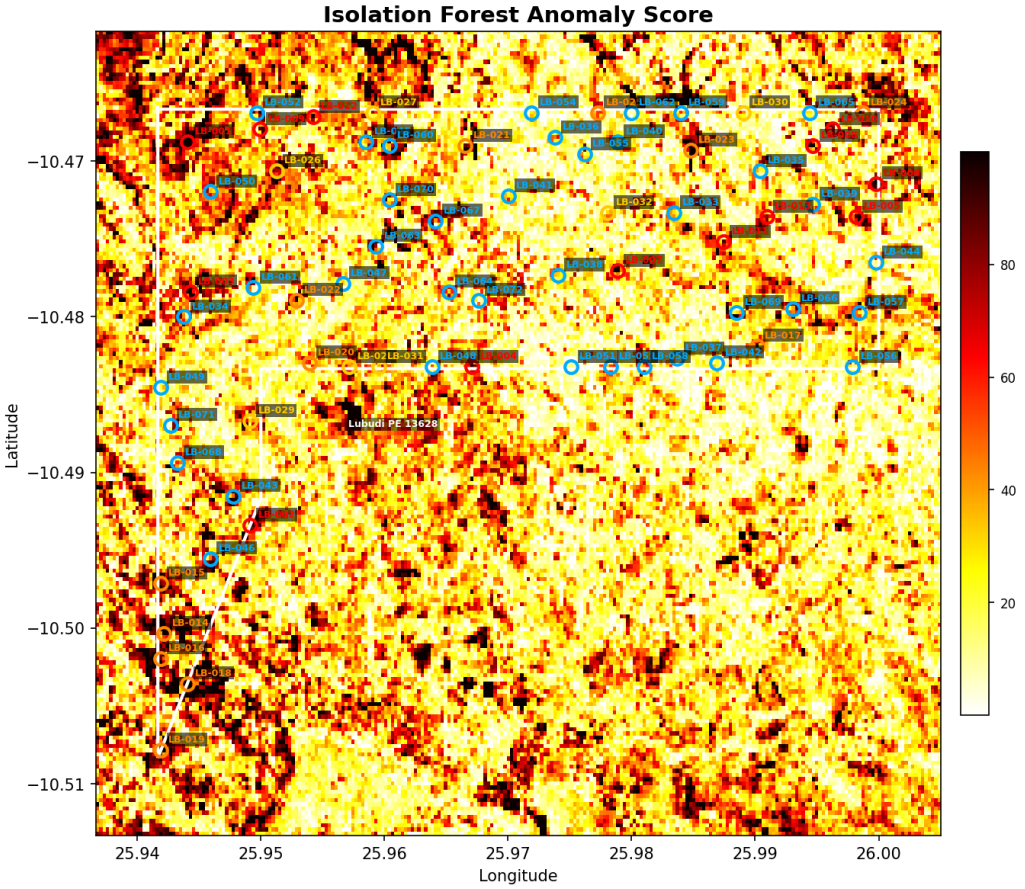

Figure 5: Isolation Forest anomaly map. Warm colours indicate spectrally anomalous areas with potential mineralisation.

5.2 XGBoost Refinement

The XGBoost classifier was trained on the Isolation Forest labels to learn the specific spectral patterns associated with anomalous pixels. This supervised refinement step reduces noise and produces sharper, more geologically coherent anomaly boundaries. The feature importance scores reveal which spectral indices most strongly distinguish mineralised from barren areas.

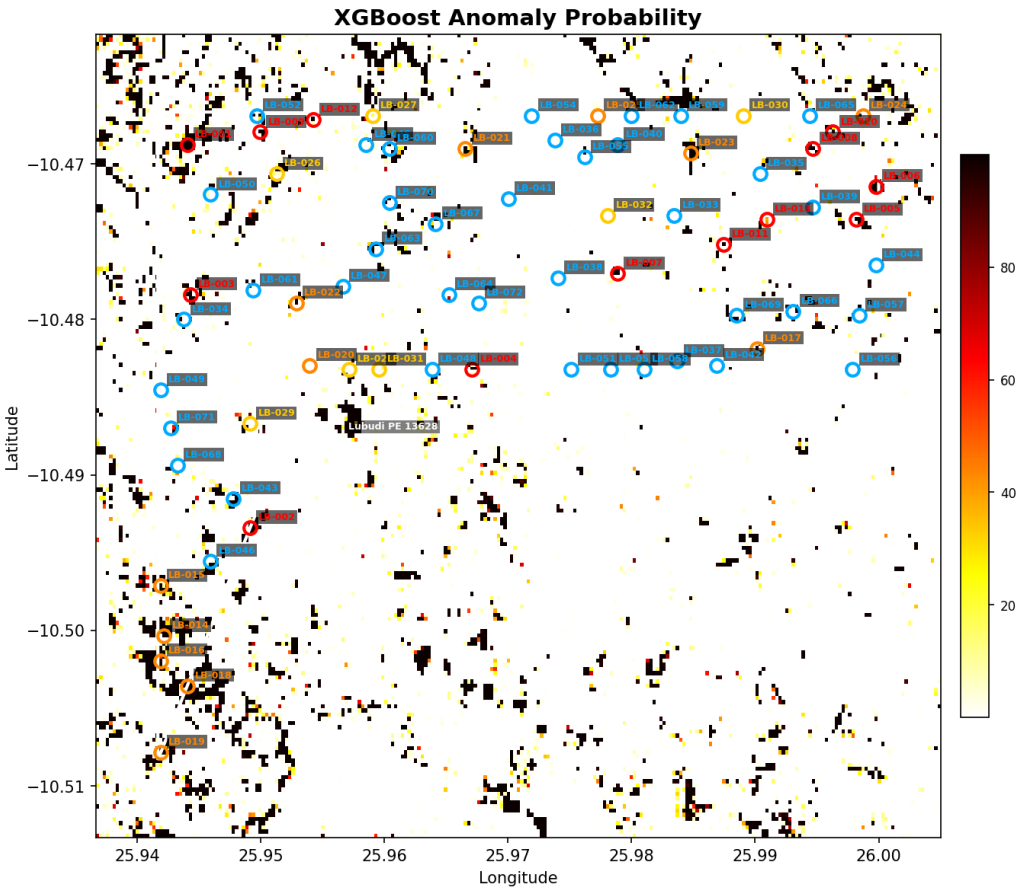

Figure 6: XGBoost anomaly probability map — refined from Isolation Forest labels.

5.3 Feature Importance (XGBoost)

Rank	Feature	Importance
1	Ferric Index	0.3247
2	Ferrous Index	0.1870
3	Gossan Index	0.1264
4	Moisture Index	0.0933
5	Carbonate Index	0.0570
6	Mafic Index	0.0402
7	Laterite Index	0.0345
8	Iron Oxide Index	0.0324
9	Clay Index	0.0301
10	Silica Index	0.0289
11	Ndvi	0.0235
12	Slope	0.0218

6. Prospectivity Modelling

Three commodity-specific fuzzy logic prospectivity models were constructed using weighted spectral index combinations calibrated for Central African Copperbelt mineralisation styles:

Copper (Cu): Weighted toward gossan index (sulfide weathering caps — 25%), ferric iron (oxidised Cu-bearing minerals — 20%), clay/hydroxyl (malachite, chrysocolla, sericitic alteration — 20%), iron oxide (15%), inverse NDVI (exposed rock — 10%), and slope (10%). This combination targets the supergene oxide blanket overlying primary sulfide mineralisation in the Mines Series.

Cobalt (Co): Emphasises iron oxide (Fe-Mn rich heterogenite zones — 25%), ferrous iron (20%), laterite index (Co-bearing oxide laterites — 20%), gossan index (15%), mafic index (10%), and inverse NDVI (10%). Heterogenite (CoOOH) and asbolane develop dark Mn-Fe-oxide crusts in karstic cavities and lateritic profiles, producing distinctive low-albedo, Fe-Mn rich spectral signatures.

Polymetallic (Cu-Co-U-Zn-Ag): Focuses on gossan (25%), clay alteration (20%), carbonate (dolomitic host indicator — 15%), silica (15%), ferric iron (10%), inverse NDVI (10%), and slope (structural control — 10%). This broader signal captures the full spectrum of stratiform Cu-Co with associated U, Zn, Pb and Ag commonly enriched in the Copperbelt sediment-hosted system.

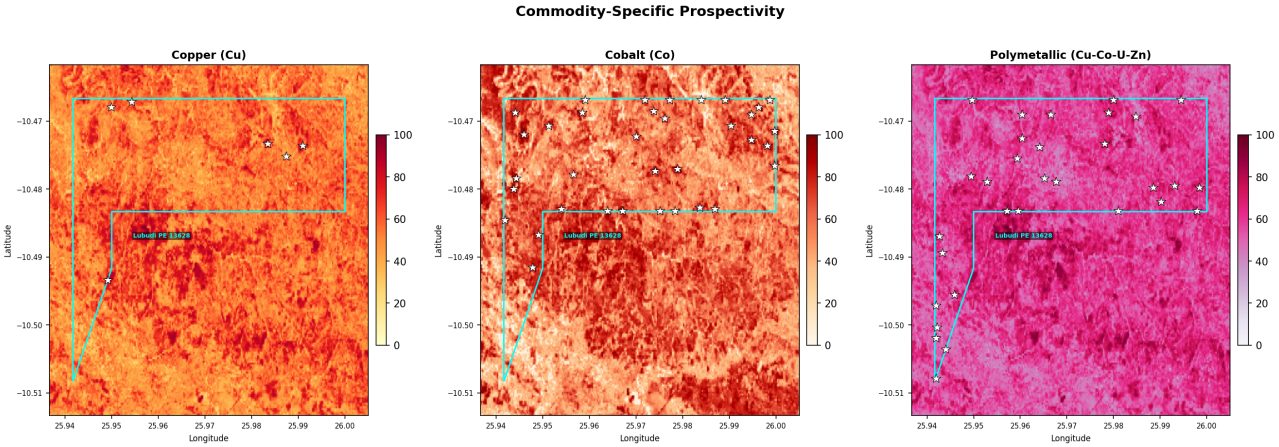

Figure 7: Side-by-side commodity prospectivity maps — Copper, Cobalt, and Polymetallic. Stars indicate targets whose dominant commodity matches the respective model.

7. Structural Analysis

Structural lineaments were extracted from the SRTM DEM slope derivative using Canny edge detection and probabilistic Hough line transform. Lineaments represent fractures, faults, and lithological contacts that often control fluid flow and ore deposition in the Lufilian Arc fold-thrust belt.

A total of **501 lineament segments** were detected across the analysis area. Lineament density is highest along structural corridors that may represent thrust contacts, transfer faults, or fold hinges — all known controls on Cu-Co fluid migration and deposition in the Copperbelt.

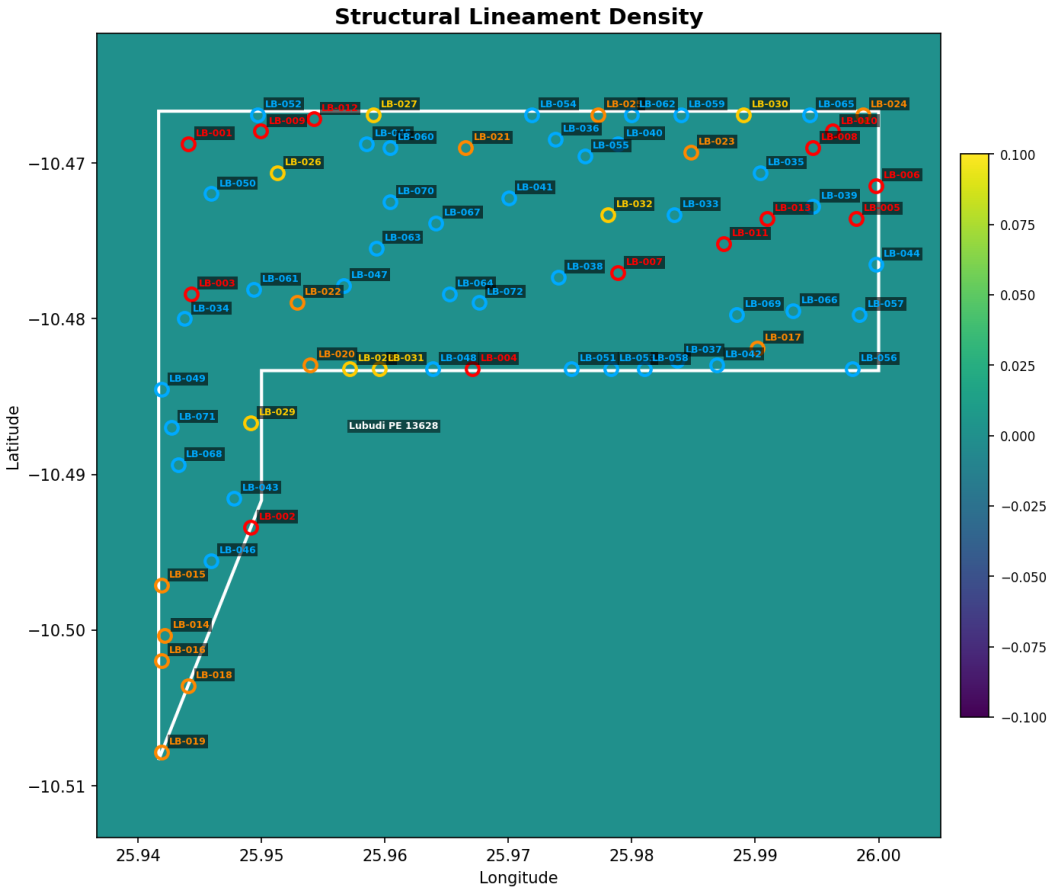

Figure 8: Lineament density map derived from DEM structural analysis.

8. Ensemble Consensus & Target Extraction

The final prospectivity map is an ensemble consensus of all six analytical methods, weighted as follows: Isolation Forest (20%), XGBoost (20%), Fuzzy Logic (20%), PCA/Crosta iron map (15%), SAM mineralised lithology match (15%), and lineament density (10%). This multi-method approach reduces single-method bias and produces higher-confidence targets.

Drill targets were extracted from the ensemble map by detecting local maxima within the concession boundary, with strict point-in-polygon verification to ensure all targets fall strictly within the PR area. Targets are ranked by ensemble score.

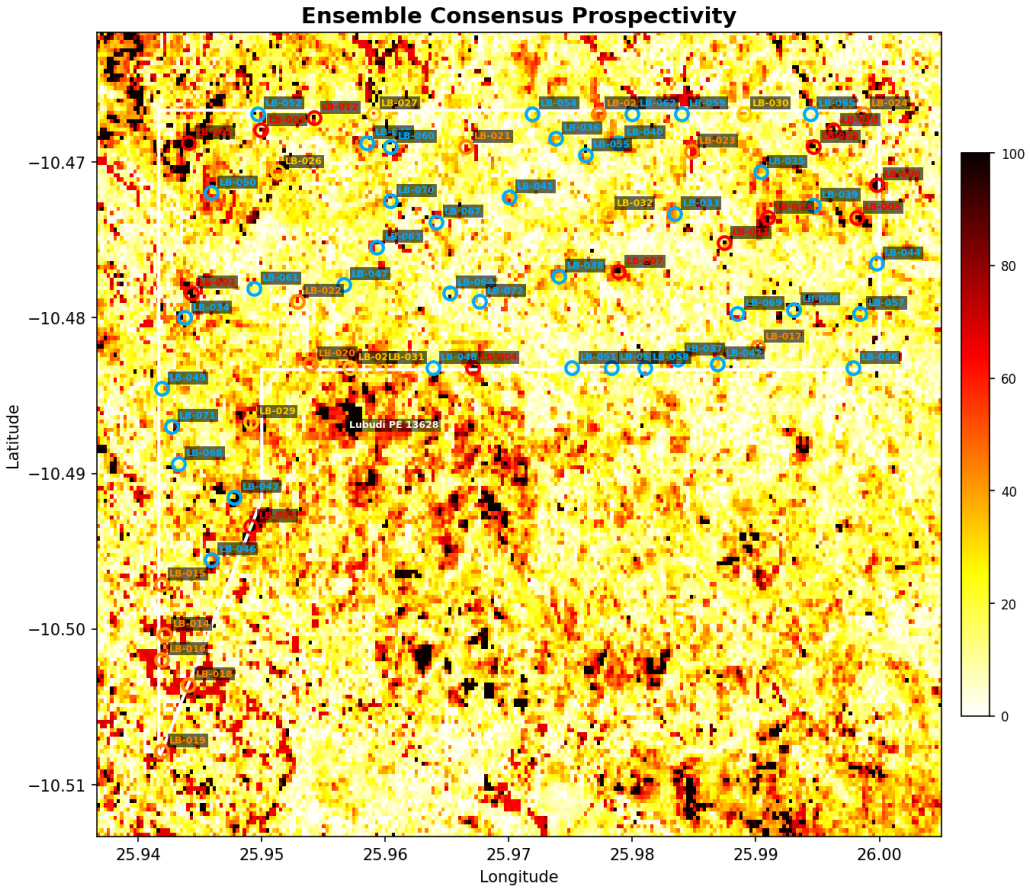

Figure 9: Ensemble consensus prospectivity map with target markers.

9. Drill Target Compendium

The following 72 targets are ranked by ensemble consensus score. Targets falling within the client's concession boundaries are highlighted. Each target includes GPS coordinates (WGS84), estimated depth range, dominant commodity potential, and recommended drilling approach.

ID	Lon	Lat	Score	Commodity	Priority	Portion	Est. Depth
LB-001	25.94404	-10.46876	100.0%	Cobalt	Critical	**Lubudi PE 13628**	106–206 m
LB-002	25.94913	-10.49339	100.0%	Copper	Critical	**Lubudi PE 13628**	82–182 m
LB-003	25.94430	-10.47840	100.0%	Cobalt	Critical	**Lubudi PE 13628**	54–154 m
LB-004	25.96708	-10.48322	100.0%	Cobalt	Critical	**Lubudi PE 13628**	73–173 m
LB-005	25.99817	-10.47358	100.0%	Cobalt	Critical	**Lubudi PE 13628**	56–156 m
LB-006	25.99977	-10.47144	100.0%	Cobalt	Critical	**Lubudi PE 13628**	56–156 m
LB-007	25.97887	-10.47706	100.0%	Cobalt	Critical	**Lubudi PE 13628**	96–196 m
LB-008	25.99468	-10.46903	100.0%	Cobalt	Critical	**Lubudi PE 13628**	81–181 m
LB-009	25.94993	-10.46796	100.0%	Copper	Critical	**Lubudi PE 13628**	66–166 m
LB-010	25.99629	-10.46796	100.0%	Cobalt	Critical	**Lubudi PE 13628**	54–154 m
LB-011	25.98745	-10.47519	100.0%	Copper	Critical	**Lubudi PE 13628**	86–186 m
LB-012	25.95422	-10.46715	95.5%	Copper	Critical	**Lubudi PE 13628**	120–220 m
LB-013	25.99093	-10.47358	95.4%	Copper	Critical	**Lubudi PE 13628**	66–166 m
LB-014	25.94216	-10.50035	68.7%	Polymetallic	High	**Lubudi PE 13628**	64–164 m
LB-015	25.94189	-10.49714	68.0%	Polymetallic	High	**Lubudi PE 13628**	113–213 m
LB-016	25.94189	-10.50196	65.4%	Polymetallic	High	**Lubudi PE 13628**	73–173 m
LB-017	25.99013	-10.48188	65.1%	Polymetallic	High	**Lubudi PE 13628**	73–173 m
LB-018	25.94404	-10.50356	64.9%	Polymetallic	High	**Lubudi PE 13628**	77–177 m
LB-019	25.94189	-10.50784	64.7%	Polymetallic	High	**Lubudi PE 13628**	83–183 m
LB-020	25.95395	-10.48295	64.7%	Cobalt	High	**Lubudi PE 13628**	79–179 m
LB-021	25.96655	-10.46903	64.4%	Polymetallic	High	**Lubudi PE 13628**	83–183 m
LB-022	25.95288	-10.47893	63.8%	Polymetallic	High	**Lubudi PE 13628**	87–187 m
LB-023	25.98477	-10.46930	63.1%	Polymetallic	High	**Lubudi PE 13628**	104–204 m
LB-024	25.99870	-10.46689	60.2%	Cobalt	High	**Lubudi PE 13628**	73–173 m
LB-025	25.97726	-10.46689	56.2%	Cobalt	High	**Lubudi PE 13628**	106–206 m
LB-026	25.95127	-10.47063	53.4%	Cobalt	Medium	**Lubudi PE 13628**	73–173 m
LB-027	25.95904	-10.46689	53.1%	Cobalt	Medium	**Lubudi PE 13628**	95–195 m
LB-028	25.95717	-10.48322	45.4%	Polymetallic	Medium	**Lubudi PE 13628**	81–181 m
LB-029	25.94913	-10.48670	41.7%	Cobalt	Medium	**Lubudi PE 13628**	56–156 m
LB-030	25.98906	-10.46689	41.5%	Cobalt	Medium	**Lubudi PE 13628**	83–183 m
LB-031	25.95958	-10.48322	40.2%	Polymetallic	Medium	**Lubudi PE 13628**	91–191 m
LB-032	25.97807	-10.47331	40.2%	Polymetallic	Medium	**Lubudi PE 13628**	68–168 m
LB-033	25.98343	-10.47331	38.8%	Copper	Low	**Lubudi PE 13628**	93–193 m

LB-034	25.94377	-10.48000	37.8%	Cobalt	Low	**Lubudi PE 13628** 60–160 m
LB-035	25.99039	-10.47063	37.3%	Cobalt	Low	**Lubudi PE 13628** 64–164 m
LB-036	25.97378	-10.46849	36.9%	Cobalt	Low	**Lubudi PE 13628** 50–150 m
LB-037	25.98370	-10.48268	36.7%	Cobalt	Low	**Lubudi PE 13628** 69–169 m
LB-038	25.97405	-10.47733	36.3%	Cobalt	Low	**Lubudi PE 13628** 60–160 m
LB-039	25.99468	-10.47278	35.6%	Cobalt	Low	**Lubudi PE 13628** 73–173 m
LB-040	25.97887	-10.46876	35.5%	Polymetallic	Low	**Lubudi PE 13628** 69–169 m
LB-041	25.97003	-10.47224	35.0%	Cobalt	Low	**Lubudi PE 13628** 82–182 m
LB-042	25.98691	-10.48295	34.7%	Cobalt	Low	**Lubudi PE 13628** 54–154 m
LB-043	25.94779	-10.49151	30.8%	Cobalt	Low	**Lubudi PE 13628** 64–164 m
LB-044	25.99977	-10.47652	30.7%	Cobalt	Low	**Lubudi PE 13628** 56–156 m
LB-045	25.95851	-10.46876	28.9%	Cobalt	Low	**Lubudi PE 13628** 73–173 m
LB-046	25.94591	-10.49553	27.9%	Polymetallic	Low	**Lubudi PE 13628** 116–216 m
LB-047	25.95663	-10.47786	25.4%	Cobalt	Low	**Lubudi PE 13628** 56–156 m
LB-048	25.96387	-10.48322	25.3%	Cobalt	Low	**Lubudi PE 13628** 63–163 m
LB-049	25.94189	-10.48456	25.2%	Cobalt	Low	**Lubudi PE 13628** 89–189 m
LB-050	25.94591	-10.47197	23.6%	Cobalt	Low	**Lubudi PE 13628** 120–220 m
LB-051	25.97512	-10.48322	23.1%	Cobalt	Low	**Lubudi PE 13628** 56–156 m
LB-052	25.94966	-10.46689	23.0%	Polymetallic	Low	**Lubudi PE 13628** 120–220 m
LB-053	25.97834	-10.48322	22.6%	Cobalt	Low	**Lubudi PE 13628** 54–154 m
LB-054	25.97190	-10.46689	22.4%	Cobalt	Low	**Lubudi PE 13628** 76–176 m
LB-055	25.97619	-10.46956	20.7%	Cobalt	Low	**Lubudi PE 13628** 87–187 m
LB-056	25.99790	-10.48322	20.1%	Polymetallic	Low	**Lubudi PE 13628** 96–196 m
LB-057	25.99844	-10.47974	19.5%	Polymetallic	Low	**Lubudi PE 13628** 96–196 m
LB-058	25.98102	-10.48322	19.4%	Polymetallic	Low	**Lubudi PE 13628** 66–166 m
LB-059	25.98396	-10.46689	16.5%	Cobalt	Low	**Lubudi PE 13628** 78–178 m
LB-060	25.96038	-10.46903	14.2%	Polymetallic	Low	**Lubudi PE 13628** 102–202 m
LB-061	25.94940	-10.47813	13.9%	Polymetallic	Low	**Lubudi PE 13628** 69–169 m
LB-062	25.97995	-10.46689	12.9%	Polymetallic	Low	**Lubudi PE 13628** 96–196 m
LB-063	25.95931	-10.47545	12.4%	Polymetallic	Low	**Lubudi PE 13628** 89–189 m
LB-064	25.96521	-10.47840	11.4%	Polymetallic	Low	**Lubudi PE 13628** 79–179 m
LB-065	25.99442	-10.46689	10.8%	Polymetallic	Low	**Lubudi PE 13628** 79–179 m
LB-066	25.99308	-10.47947	9.9%	Polymetallic	Low	**Lubudi PE 13628** 120–220 m
LB-067	25.96413	-10.47385	9.2%	Polymetallic	Low	**Lubudi PE 13628** 101–201 m
LB-068	25.94323	-10.48937	7.3%	Polymetallic	Low	**Lubudi PE 13628** 56–156 m
LB-069	25.98852	-10.47974	7.3%	Polymetallic	Low	**Lubudi PE 13628** 74–174 m
LB-070	25.96038	-10.47251	3.4%	Polymetallic	Low	**Lubudi PE 13628** 66–166 m
LB-071	25.94270	-10.48696	2.6%	Polymetallic	Low	**Lubudi PE 13628** 66–166 m
LB-072	25.96762	-10.47893	1.4%	Polymetallic	Low	**Lubudi PE 13628** 73–173 m

9.1 Target Details

LB-001 — Cobalt (Co) | Priority: Critical

Longitude	25.944036°E
Latitude	-10.468761°S
Ensemble Score	100.0%
PGM Score	57.6%
Chrome Score	81.2%
Base Metal Score	63.2%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	71.1%
Portion	Lubudi PE 13628
Est. Depth	106–206 m
Detection Method	In-concession peak extraction

LB-002 — Copper (Cu) | Priority: Critical

Longitude	25.949128°E
Latitude	-10.493389°S
Ensemble Score	100.0%
PGM Score	87.9%
Chrome Score	79.9%
Base Metal Score	87.3%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	83.3%
Portion	Lubudi PE 13628
Est. Depth	82–182 m
Detection Method	In-concession peak extraction

LB-003 — Cobalt (Co) | Priority: Critical

Longitude	25.944304°E
Latitude	-10.478398°S
Ensemble Score	100.0%
PGM Score	63.4%
Chrome Score	96.5%
Base Metal Score	64.5%
SAM Best Match	Background Soil
SAM Similarity	99.5%
Portion	Lubudi PE 13628
Est. Depth	54–154 m
Detection Method	In-concession peak extraction

LB-004 — Cobalt (Co) | Priority: Critical

Longitude	25.967082°E

Latitude	-10.483217°S
Ensemble Score	100.0%
PGM Score	85.5%
Chrome Score	89.0%
Base Metal Score	84.6%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	90.3%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

LB-005 — Cobalt (Co) | Priority: **Critical**

Longitude	25.998167°E
Latitude	-10.473580°S
Ensemble Score	100.0%
PGM Score	47.2%
Chrome Score	82.3%
Base Metal Score	52.8%
SAM Best Match	Background Soil
SAM Similarity	95.8%
Portion	Lubudi PE 13628
Est. Depth	56–156 m
Detection Method	In-concession peak extraction

LB-006 — Cobalt (Co) | Priority: **Critical**

Longitude	25.999775°E
Latitude	-10.471438°S
Ensemble Score	100.0%
PGM Score	60.6%
Chrome Score	92.3%
Base Metal Score	62.7%
SAM Best Match	Background Soil
SAM Similarity	99.1%
Portion	Lubudi PE 13628
Est. Depth	56–156 m
Detection Method	In-concession peak extraction

LB-007 — Cobalt (Co) | Priority: **Critical**

Longitude	25.978873°E
Latitude	-10.477060°S
Ensemble Score	100.0%
PGM Score	88.1%
Chrome Score	93.0%

Base Metal Score	87.2%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	71.4%
Portion	Lubudi PE 13628
Est. Depth	96–196 m
Detection Method	In-concession peak extraction

LB-008 — Cobalt (Co) | Priority: **Critical**

Longitude	25.994683°E
Latitude	-10.469029°S
Ensemble Score	100.0%
PGM Score	69.7%
Chrome Score	95.0%
Base Metal Score	70.7%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	84.1%
Portion	Lubudi PE 13628
Est. Depth	81–181 m
Detection Method	In-concession peak extraction

LB-009 — Copper (Cu) | Priority: **Critical**

Longitude	25.949932°E
Latitude	-10.467958°S
Ensemble Score	100.0%
PGM Score	45.3%
Chrome Score	40.8%
Base Metal Score	42.8%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	77.1%
Portion	Lubudi PE 13628
Est. Depth	66–166 m
Detection Method	In-concession peak extraction

LB-010 — Cobalt (Co) | Priority: **Critical**

Longitude	25.996291°E
Latitude	-10.467958°S
Ensemble Score	100.0%
PGM Score	58.6%
Chrome Score	90.1%
Base Metal Score	61.2%
SAM Best Match	Background Soil
SAM Similarity	98.9%
Portion	Lubudi PE 13628

Est. Depth	54–154 m
Detection Method	In-concession peak extraction

LB-011 — Copper (Cu) | Priority: **Critical**

Longitude	25.987448°E
Latitude	-10.475186°S
Ensemble Score	100.0%
PGM Score	42.5%
Chrome Score	39.6%
Base Metal Score	39.8%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	77.2%
Portion	Lubudi PE 13628
Est. Depth	86–186 m
Detection Method	In-concession peak extraction

LB-012 — Copper (Cu) | Priority: **Critical**

Longitude	25.954219°E
Latitude	-10.467155°S
Ensemble Score	95.5%
PGM Score	57.0%
Chrome Score	48.8%
Base Metal Score	56.3%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	78.0%
Portion	Lubudi PE 13628
Est. Depth	120–220 m
Detection Method	In-concession peak extraction

LB-013 — Copper (Cu) | Priority: **Critical**

Longitude	25.990931°E
Latitude	-10.473580°S
Ensemble Score	95.4%
PGM Score	86.4%
Chrome Score	83.3%
Base Metal Score	86.0%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	95.8%
Portion	Lubudi PE 13628
Est. Depth	66–166 m
Detection Method	In-concession peak extraction

LB-014 — Polymetallic (Cu-Co-U-Zn) | Priority: **High**

Longitude	25.942160°E
Latitude	-10.500350°S
Ensemble Score	68.7%
PGM Score	31.9%
Chrome Score	10.4%
Base Metal Score	44.7%
SAM Best Match	Background Soil
SAM Similarity	84.5%
Portion	Lubudi PE 13628
Est. Depth	64–164 m
Detection Method	In-concession peak extraction

LB-015 — Polymetallic (Cu-Co-U-Zn) | Priority: **High**

Longitude	25.941892°E
Latitude	-10.497137°S
Ensemble Score	68.0%
PGM Score	41.4%
Chrome Score	15.4%
Base Metal Score	50.9%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	78.2%
Portion	Lubudi PE 13628
Est. Depth	113–213 m
Detection Method	In-concession peak extraction

LB-016 — Polymetallic (Cu-Co-U-Zn) | Priority: **High**

Longitude	25.941892°E
Latitude	-10.501956°S
Ensemble Score	65.4%
PGM Score	35.8%
Chrome Score	14.3%
Base Metal Score	46.6%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	83.7%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

LB-017 — Polymetallic (Cu-Co-U-Zn) | Priority: **High**

Longitude	25.990128°E
Latitude	-10.481878°S
Ensemble Score	65.1%
PGM Score	30.7%

Chrome Score	5.5%
Base Metal Score	46.5%
SAM Best Match	Background Soil
SAM Similarity	85.6%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

LB-018 — Polymetallic (Cu-Co-U-Zn) | Priority: High

Longitude	25.944036°E
Latitude	-10.503562°S
Ensemble Score	64.9%
PGM Score	29.4%
Chrome Score	1.3%
Base Metal Score	47.3%
SAM Best Match	Background Soil
SAM Similarity	80.0%
Portion	Lubudi PE 13628
Est. Depth	77–177 m
Detection Method	In-concession peak extraction

LB-019 — Polymetallic (Cu-Co-U-Zn) | Priority: High

Longitude	25.941892°E
Latitude	-10.507845°S
Ensemble Score	64.7%
PGM Score	34.7%
Chrome Score	8.3%
Base Metal Score	48.7%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	82.6%
Portion	Lubudi PE 13628
Est. Depth	83–183 m
Detection Method	In-concession peak extraction

LB-020 — Cobalt (Co) | Priority: High

Longitude	25.953951°E
Latitude	-10.482949°S
Ensemble Score	64.7%
PGM Score	79.0%
Chrome Score	87.6%
Base Metal Score	78.0%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	84.9%

Portion	Lubudi PE 13628
Est. Depth	79–179 m
Detection Method	In-concession peak extraction

LB-021 — Polymetallic (Cu-Co-U-Zn) | Priority: High

Longitude	25.966546°E
Latitude	-10.469029°S
Ensemble Score	64.4%
PGM Score	36.2%
Chrome Score	11.3%
Base Metal Score	48.6%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	83.2%
Portion	Lubudi PE 13628
Est. Depth	83–183 m
Detection Method	In-concession peak extraction

LB-022 — Polymetallic (Cu-Co-U-Zn) | Priority: High

Longitude	25.952879°E
Latitude	-10.478934°S
Ensemble Score	63.8%
PGM Score	31.8%
Chrome Score	1.8%
Base Metal Score	49.4%
SAM Best Match	Background Soil
SAM Similarity	73.8%
Portion	Lubudi PE 13628
Est. Depth	87–187 m
Detection Method	In-concession peak extraction

LB-023 — Polymetallic (Cu-Co-U-Zn) | Priority: High

Longitude	25.984768°E
Latitude	-10.469296°S
Ensemble Score	63.1%
PGM Score	36.6%
Chrome Score	3.8%
Base Metal Score	53.1%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	68.4%
Portion	Lubudi PE 13628
Est. Depth	104–204 m
Detection Method	In-concession peak extraction

LB-024 — Cobalt (Co) | Priority: High

Longitude	25.998703°E
Latitude	-10.466887°S
Ensemble Score	60.2%
PGM Score	69.5%
Chrome Score	92.3%
Base Metal Score	70.0%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	89.8%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

LB-025 — Cobalt (Co) | Priority: High

Longitude	25.977265°E
Latitude	-10.466887°S
Ensemble Score	56.2%
PGM Score	83.5%
Chrome Score	87.7%
Base Metal Score	82.7%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	65.8%
Portion	Lubudi PE 13628
Est. Depth	106–206 m
Detection Method	In-concession peak extraction

LB-026 — Cobalt (Co) | Priority: Medium

Longitude	25.951272°E
Latitude	-10.470635°S
Ensemble Score	53.4%
PGM Score	48.8%
Chrome Score	86.2%
Base Metal Score	54.7%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	90.3%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

LB-027 — Cobalt (Co) | Priority: Medium

Longitude	25.959043°E
Latitude	-10.466887°S
Ensemble Score	53.1%

PGM Score	49.7%
Chrome Score	62.0%
Base Metal Score	46.9%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	80.0%
Portion	Lubudi PE 13628
Est. Depth	95–195 m
Detection Method	In-concession peak extraction

LB-028 — Polymetallic (Cu-Co-U-Zn) | Priority: Medium

Longitude	25.957167°E
Latitude	-10.483217°S
Ensemble Score	45.4%
PGM Score	80.8%
Chrome Score	77.3%
Base Metal Score	81.4%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	84.5%
Portion	Lubudi PE 13628
Est. Depth	81–181 m
Detection Method	In-concession peak extraction

LB-029 — Cobalt (Co) | Priority: Medium

Longitude	25.949128°E
Latitude	-10.486697°S
Ensemble Score	41.7%
PGM Score	64.5%
Chrome Score	82.8%
Base Metal Score	66.1%
SAM Best Match	Background Soil
SAM Similarity	98.5%
Portion	Lubudi PE 13628
Est. Depth	56–156 m
Detection Method	In-concession peak extraction

LB-030 — Cobalt (Co) | Priority: Medium

Longitude	25.989056°E
Latitude	-10.466887°S
Ensemble Score	41.5%
PGM Score	68.4%
Chrome Score	83.5%
Base Metal Score	69.4%
SAM Best Match	Roan Dolomitic Shale

SAM Similarity	81.3%
Portion	Lubudi PE 13628
Est. Depth	83–183 m
Detection Method	In-concession peak extraction

LB-031 — Polymetallic (Cu-Co-U-Zn) | Priority: Medium

Longitude	25.959579°E
Latitude	-10.483217°S
Ensemble Score	40.2%
PGM Score	79.8%
Chrome Score	71.5%
Base Metal Score	80.7%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	77.2%
Portion	Lubudi PE 13628
Est. Depth	91–191 m
Detection Method	In-concession peak extraction

LB-032 — Polymetallic (Cu-Co-U-Zn) | Priority: Medium

Longitude	25.978069°E
Latitude	-10.473312°S
Ensemble Score	40.2%
PGM Score	77.6%
Chrome Score	71.5%
Base Metal Score	77.8%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	93.6%
Portion	Lubudi PE 13628
Est. Depth	68–168 m
Detection Method	In-concession peak extraction

LB-033 — Copper (Cu) | Priority: Low

Longitude	25.983428°E
Latitude	-10.473312°S
Ensemble Score	38.8%
PGM Score	82.5%
Chrome Score	73.7%
Base Metal Score	81.8%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	75.1%
Portion	Lubudi PE 13628
Est. Depth	93–193 m
Detection Method	In-concession peak extraction

LB-034 — Cobalt (Co) | Priority: Low

Longitude	25.943768°E
Latitude	-10.480004°S
Ensemble Score	37.8%
PGM Score	51.3%
Chrome Score	84.9%
Base Metal Score	56.1%
SAM Best Match	Background Soil
SAM Similarity	95.5%
Portion	Lubudi PE 13628
Est. Depth	60–160 m
Detection Method	In-concession peak extraction

LB-035 — Cobalt (Co) | Priority: Low

Longitude	25.990395°E
Latitude	-10.470635°S
Ensemble Score	37.3%
PGM Score	68.1%
Chrome Score	81.8%
Base Metal Score	68.4%
SAM Best Match	Background Soil
SAM Similarity	96.4%
Portion	Lubudi PE 13628
Est. Depth	64–164 m
Detection Method	In-concession peak extraction

LB-036 — Cobalt (Co) | Priority: Low

Longitude	25.973781°E
Latitude	-10.468493°S
Ensemble Score	36.9%
PGM Score	51.4%
Chrome Score	83.0%
Base Metal Score	56.0%
SAM Best Match	Background Soil
SAM Similarity	94.8%
Portion	Lubudi PE 13628
Est. Depth	50–150 m
Detection Method	In-concession peak extraction

LB-037 — Cobalt (Co) | Priority: Low

Longitude	25.983696°E
Latitude	-10.482681°S

Ensemble Score	36.7%
PGM Score	69.4%
Chrome Score	82.8%
Base Metal Score	69.8%
SAM Best Match	Background Soil
SAM Similarity	93.4%
Portion	Lubudi PE 13628
Est. Depth	69–169 m
Detection Method	In-concession peak extraction

LB-038 — Cobalt (Co) | Priority: Low

Longitude	25.974049°E
Latitude	-10.477327°S
Ensemble Score	36.3%
PGM Score	55.5%
Chrome Score	83.3%
Base Metal Score	58.9%
SAM Best Match	Background Soil
SAM Similarity	97.3%
Portion	Lubudi PE 13628
Est. Depth	60–160 m
Detection Method	In-concession peak extraction

LB-039 — Cobalt (Co) | Priority: Low

Longitude	25.994683°E
Latitude	-10.472777°S
Ensemble Score	35.6%
PGM Score	73.3%
Chrome Score	79.1%
Base Metal Score	73.6%
SAM Best Match	Background Soil
SAM Similarity	90.6%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

LB-040 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.978873°E
Latitude	-10.468761°S
Ensemble Score	35.5%
PGM Score	68.1%
Chrome Score	64.9%
Base Metal Score	70.8%

SAM Best Match	Background Soil
SAM Similarity	93.6%
Portion	Lubudi PE 13628
Est. Depth	69–169 m
Detection Method	In-concession peak extraction

LB-041 — Cobalt (Co) | Priority: **Low**

Longitude	25.970030°E
Latitude	-10.472241°S
Ensemble Score	35.0%
PGM Score	74.3%
Chrome Score	81.0%
Base Metal Score	75.2%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	83.4%
Portion	Lubudi PE 13628
Est. Depth	82–182 m
Detection Method	In-concession peak extraction

LB-042 — Cobalt (Co) | Priority: **Low**

Longitude	25.986912°E
Latitude	-10.482949°S
Ensemble Score	34.7%
PGM Score	63.1%
Chrome Score	77.7%
Base Metal Score	64.4%
SAM Best Match	Background Soil
SAM Similarity	98.7%
Portion	Lubudi PE 13628
Est. Depth	54–154 m
Detection Method	In-concession peak extraction

LB-043 — Cobalt (Co) | Priority: **Low**

Longitude	25.947788°E
Latitude	-10.491515°S
Ensemble Score	30.8%
PGM Score	43.2%
Chrome Score	75.0%
Base Metal Score	50.0%
SAM Best Match	Background Soil
SAM Similarity	92.0%
Portion	Lubudi PE 13628
Est. Depth	64–164 m

Detection Method	In-concession peak extraction

LB-044 — Cobalt (Co) | Priority: Low

Longitude	25.999775°E
Latitude	-10.476524°S
Ensemble Score	30.7%
PGM Score	66.5%
Chrome Score	68.7%
Base Metal Score	66.7%
SAM Best Match	Background Soil
SAM Similarity	99.1%
Portion	Lubudi PE 13628
Est. Depth	56–156 m
Detection Method	In-concession peak extraction

LB-045 — Cobalt (Co) | Priority: Low

Longitude	25.958507°E
Latitude	-10.468761°S
Ensemble Score	28.9%
PGM Score	50.9%
Chrome Score	75.7%
Base Metal Score	56.5%
SAM Best Match	Background Soil
SAM Similarity	89.7%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

LB-046 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.945912°E
Latitude	-10.495531°S
Ensemble Score	27.9%
PGM Score	72.2%
Chrome Score	47.1%
Base Metal Score	77.1%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	68.0%
Portion	Lubudi PE 13628
Est. Depth	116–216 m
Detection Method	In-concession peak extraction

LB-047 — Cobalt (Co) | Priority: Low

Longitude	25.956631°E

Latitude	-10.477863°S
Ensemble Score	25.4%
PGM Score	50.2%
Chrome Score	70.3%
Base Metal Score	55.1%
SAM Best Match	Background Soil
SAM Similarity	95.6%
Portion	Lubudi PE 13628
Est. Depth	56–156 m
Detection Method	In-concession peak extraction

LB-048 — Cobalt (Co) | Priority: **Low**

Longitude	25.963866°E
Latitude	-10.483217°S
Ensemble Score	25.3%
PGM Score	41.0%
Chrome Score	42.3%
Base Metal Score	38.2%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	78.5%
Portion	Lubudi PE 13628
Est. Depth	63–163 m
Detection Method	In-concession peak extraction

LB-049 — Cobalt (Co) | Priority: **Low**

Longitude	25.941892°E
Latitude	-10.484555°S
Ensemble Score	25.2%
PGM Score	68.2%
Chrome Score	74.1%
Base Metal Score	71.0%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	79.1%
Portion	Lubudi PE 13628
Est. Depth	89–189 m
Detection Method	In-concession peak extraction

LB-050 — Cobalt (Co) | Priority: **Low**

Longitude	25.945912°E
Latitude	-10.471973°S
Ensemble Score	23.6%
PGM Score	60.0%
Chrome Score	72.0%

Base Metal Score	65.0%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	63.1%
Portion	Lubudi PE 13628
Est. Depth	120–220 m
Detection Method	In-concession peak extraction

LB-051 — Cobalt (Co) | Priority: **Low**

Longitude	25.975121°E
Latitude	-10.483217°S
Ensemble Score	23.1%
PGM Score	58.8%
Chrome Score	61.4%
Base Metal Score	60.8%
SAM Best Match	Background Soil
SAM Similarity	98.2%
Portion	Lubudi PE 13628
Est. Depth	56–156 m
Detection Method	In-concession peak extraction

LB-052 — Polymetallic (Cu-Co-U-Zn) | Priority: **Low**

Longitude	25.949664°E
Latitude	-10.466887°S
Ensemble Score	23.0%
PGM Score	53.9%
Chrome Score	55.7%
Base Metal Score	60.4%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	61.7%
Portion	Lubudi PE 13628
Est. Depth	120–220 m
Detection Method	In-concession peak extraction

LB-053 — Cobalt (Co) | Priority: **Low**

Longitude	25.978337°E
Latitude	-10.483217°S
Ensemble Score	22.6%
PGM Score	46.3%
Chrome Score	48.2%
Base Metal Score	46.4%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	79.7%
Portion	Lubudi PE 13628

Est. Depth	54–154 m
Detection Method	In-concession peak extraction

LB-054 — Cobalt (Co) | Priority: **Low**

Longitude	25.971905°E
Latitude	-10.466887°S
Ensemble Score	22.4%
PGM Score	49.7%
Chrome Score	74.1%
Base Metal Score	55.2%
SAM Best Match	Background Soil
SAM Similarity	88.4%
Portion	Lubudi PE 13628
Est. Depth	76–176 m
Detection Method	In-concession peak extraction

LB-055 — Cobalt (Co) | Priority: **Low**

Longitude	25.976193°E
Latitude	-10.469564°S
Ensemble Score	20.7%
PGM Score	59.6%
Chrome Score	68.4%
Base Metal Score	62.6%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	80.0%
Portion	Lubudi PE 13628
Est. Depth	87–187 m
Detection Method	In-concession peak extraction

LB-056 — Polymetallic (Cu-Co-U-Zn) | Priority: **Low**

Longitude	25.997899°E
Latitude	-10.483217°S
Ensemble Score	20.1%
PGM Score	68.5%
Chrome Score	63.5%
Base Metal Score	72.0%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	75.2%
Portion	Lubudi PE 13628
Est. Depth	96–196 m
Detection Method	In-concession peak extraction

LB-057 — Polymetallic (Cu-Co-U-Zn) | Priority: **Low**

Longitude	25.998435°E
Latitude	-10.479737°S
Ensemble Score	19.5%
PGM Score	69.3%
Chrome Score	52.0%
Base Metal Score	73.9%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	76.1%
Portion	Lubudi PE 13628
Est. Depth	96–196 m
Detection Method	In-concession peak extraction

LB-058 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.981016°E
Latitude	-10.483217°S
Ensemble Score	19.4%
PGM Score	52.1%
Chrome Score	48.8%
Base Metal Score	55.2%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	83.3%
Portion	Lubudi PE 13628
Est. Depth	66–166 m
Detection Method	In-concession peak extraction

LB-059 — Cobalt (Co) | Priority: Low

Longitude	25.983964°E
Latitude	-10.466887°S
Ensemble Score	16.5%
PGM Score	31.3%
Chrome Score	39.1%
Base Metal Score	33.5%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	81.4%
Portion	Lubudi PE 13628
Est. Depth	78–178 m
Detection Method	In-concession peak extraction

LB-060 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.960383°E
Latitude	-10.469029°S
Ensemble Score	14.2%
PGM Score	50.1%

Chrome Score	53.3%
Base Metal Score	56.6%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	76.6%
Portion	Lubudi PE 13628
Est. Depth	102–202 m
Detection Method	In-concession peak extraction

LB-061 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.949396°E
Latitude	-10.478131°S
Ensemble Score	13.9%
PGM Score	58.4%
Chrome Score	59.9%
Base Metal Score	62.3%
SAM Best Match	Background Soil
SAM Similarity	92.4%
Portion	Lubudi PE 13628
Est. Depth	69–169 m
Detection Method	In-concession peak extraction

LB-062 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.979945°E
Latitude	-10.466887°S
Ensemble Score	12.9%
PGM Score	68.2%
Chrome Score	54.0%
Base Metal Score	71.0%
SAM Best Match	Roan Dolomitic Shale
SAM Similarity	73.3%
Portion	Lubudi PE 13628
Est. Depth	96–196 m
Detection Method	In-concession peak extraction

LB-063 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.959311°E
Latitude	-10.475454°S
Ensemble Score	12.4%
PGM Score	36.8%
Chrome Score	9.9%
Base Metal Score	49.9%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	81.6%

Portion	Lubudi PE 13628
Est. Depth	89–189 m
Detection Method	In-concession peak extraction

LB-064 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.965206°E
Latitude	-10.478398°S
Ensemble Score	11.4%
PGM Score	50.0%
Chrome Score	44.8%
Base Metal Score	50.7%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	82.2%
Portion	Lubudi PE 13628
Est. Depth	79–179 m
Detection Method	In-concession peak extraction

LB-065 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.994415°E
Latitude	-10.466887°S
Ensemble Score	10.8%
PGM Score	54.2%
Chrome Score	31.3%
Base Metal Score	60.6%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	86.5%
Portion	Lubudi PE 13628
Est. Depth	79–179 m
Detection Method	In-concession peak extraction

LB-066 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.993075°E
Latitude	-10.479469°S
Ensemble Score	9.9%
PGM Score	55.3%
Chrome Score	34.8%
Base Metal Score	61.9%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	65.1%
Portion	Lubudi PE 13628
Est. Depth	120–220 m
Detection Method	In-concession peak extraction

LB-067 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.964134°E
Latitude	-10.473847°S
Ensemble Score	9.2%
PGM Score	48.9%
Chrome Score	26.2%
Base Metal Score	54.3%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	81.1%
Portion	Lubudi PE 13628
Est. Depth	101–201 m
Detection Method	In-concession peak extraction

LB-068 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.943232°E
Latitude	-10.489374°S
Ensemble Score	7.3%
PGM Score	30.8%
Chrome Score	21.6%
Base Metal Score	37.7%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	81.6%
Portion	Lubudi PE 13628
Est. Depth	56–156 m
Detection Method	In-concession peak extraction

LB-069 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.988520°E
Latitude	-10.479737°S
Ensemble Score	7.3%
PGM Score	48.4%
Chrome Score	29.7%
Base Metal Score	55.1%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	87.0%
Portion	Lubudi PE 13628
Est. Depth	74–174 m
Detection Method	In-concession peak extraction

LB-070 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.960383°E
Latitude	-10.472509°S
Ensemble Score	3.4%

PGM Score	46.2%
Chrome Score	30.7%
Base Metal Score	53.0%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	86.7%
Portion	Lubudi PE 13628
Est. Depth	66–166 m
Detection Method	In-concession peak extraction

LB-071 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.942696°E
Latitude	-10.486965°S
Ensemble Score	2.6%
PGM Score	45.1%
Chrome Score	46.5%
Base Metal Score	50.4%
SAM Best Match	Background Soil
SAM Similarity	92.0%
Portion	Lubudi PE 13628
Est. Depth	66–166 m
Detection Method	In-concession peak extraction

LB-072 — Polymetallic (Cu-Co-U-Zn) | Priority: Low

Longitude	25.967618°E
Latitude	-10.478934°S
Ensemble Score	1.4%
PGM Score	47.8%
Chrome Score	48.3%
Base Metal Score	53.4%
SAM Best Match	Heterogenite Co Oxide
SAM Similarity	89.2%
Portion	Lubudi PE 13628
Est. Depth	73–173 m
Detection Method	In-concession peak extraction

10. Recommended Drill Programme

Based on the ML analysis results, we recommend the following phased exploration programme:

Phase 1: Ground-Truthing (1–2 weeks)

• Geological mapping and surface sampling at all Critical and High priority targets
• Portable XRF analysis of surface samples for Cu, Co, Fe, Mn, U, Zn and pathfinder elements
• Detailed structural mapping to confirm thrust-fault and transfer-structure orientations
• Soil geochemistry sampling on 50 m grid spacing over target zones, supplemented by termite-mound sampling (a Copperbelt-proven technique for detecting buried mineralisation)

Phase 2: Core Drilling — Priority Targets (4–6 weeks)

Based on Phase 1 ground-truthing results, advance to diamond core drilling at the highest-priority in-permit targets identified by the ML ensemble analysis. All drill collars are positioned within the Lubudi PE 13628 boundary. Holes are oriented at azimuth 020° (NNE) with a dip of –60° to intersect the SSW-dipping Mines Series stratigraphy at near-orthogonal angles. NQ-size core (47.6 mm diameter) is recommended for full geological logging and Cu-Co assay sampling.

Target	Lon	Lat	Priority	Depth	Azimuth	Dip	Purpose
LB-001	25.94404	-10.46876	Critical	106–206 m	20°	-60°	Cobalt (Co)
LB-002	25.94913	-10.49339	Critical	82–182 m	20°	-60°	Copper (Cu)
LB-003	25.94430	-10.47840	Critical	54–154 m	20°	-60°	Cobalt (Co)
LB-004	25.96708	-10.48322	Critical	73–173 m	20°	-60°	Cobalt (Co)
LB-005	25.99817	-10.47358	Critical	56–156 m	20°	-60°	Cobalt (Co)
LB-006	25.99977	-10.47144	Critical	56–156 m	20°	-60°	Cobalt (Co)
LB-007	25.97887	-10.47706	Critical	96–196 m	20°	-60°	Cobalt (Co)
LB-008	25.99468	-10.46903	Critical	81–181 m	20°	-60°	Cobalt (Co)
LB-009	25.94993	-10.46796	Critical	66–166 m	20°	-60°	Copper (Cu)
LB-010	25.99629	-10.46796	Critical	54–154 m	20°	-60°	Cobalt (Co)
LB-011	25.98745	-10.47519	Critical	86–186 m	20°	-60°	Copper (Cu)
LB-012	25.95422	-10.46715	Critical	120–220 m	20°	-60°	Copper (Cu)
LB-013	25.99093	-10.47358	Critical	66–166 m	20°	-60°	Copper (Cu)
LB-014	25.94216	-10.50035	High	64–164 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-015	25.94189	-10.49714	High	113–213 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-016	25.94189	-10.50196	High	73–173 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-017	25.99013	-10.48188	High	73–173 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-018	25.94404	-10.50356	High	77–177 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-019	25.94189	-10.50784	High	83–183 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-020	25.95395	-10.48295	High	79–179 m	20°	-60°	Cobalt (Co)
LB-021	25.96655	-10.46903	High	83–183 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)

LB-022	25.95288	-10.47893	High	87–187 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-023	25.98477	-10.46930	High	104–204 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-024	25.99870	-10.46689	High	73–173 m	20°	-60°	Cobalt (Co)
LB-025	25.97726	-10.46689	High	106–206 m	20°	-60°	Cobalt (Co)
LB-026	25.95127	-10.47063	Medium	73–173 m	20°	-60°	Cobalt (Co)
LB-027	25.95904	-10.46689	Medium	95–195 m	20°	-60°	Cobalt (Co)
LB-028	25.95717	-10.48322	Medium	81–181 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-029	25.94913	-10.48670	Medium	56–156 m	20°	-60°	Cobalt (Co)
LB-030	25.98906	-10.46689	Medium	83–183 m	20°	-60°	Cobalt (Co)
LB-031	25.95958	-10.48322	Medium	91–191 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-032	25.97807	-10.47331	Medium	68–168 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-033	25.98343	-10.47331	Low	93–193 m	20°	-60°	Copper (Cu)
LB-034	25.94377	-10.48000	Low	60–160 m	20°	-60°	Cobalt (Co)
LB-035	25.99039	-10.47063	Low	64–164 m	20°	-60°	Cobalt (Co)
LB-036	25.97378	-10.46849	Low	50–150 m	20°	-60°	Cobalt (Co)
LB-037	25.98370	-10.48268	Low	69–169 m	20°	-60°	Cobalt (Co)
LB-038	25.97405	-10.47733	Low	60–160 m	20°	-60°	Cobalt (Co)
LB-039	25.99468	-10.47278	Low	73–173 m	20°	-60°	Cobalt (Co)
LB-040	25.97887	-10.46876	Low	69–169 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-041	25.97003	-10.47224	Low	82–182 m	20°	-60°	Cobalt (Co)
LB-042	25.98691	-10.48295	Low	54–154 m	20°	-60°	Cobalt (Co)
LB-043	25.94779	-10.49151	Low	64–164 m	20°	-60°	Cobalt (Co)
LB-044	25.99977	-10.47652	Low	56–156 m	20°	-60°	Cobalt (Co)
LB-045	25.95851	-10.46876	Low	73–173 m	20°	-60°	Cobalt (Co)
LB-046	25.94591	-10.49553	Low	116–216 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-047	25.95663	-10.47786	Low	56–156 m	20°	-60°	Cobalt (Co)
LB-048	25.96387	-10.48322	Low	63–163 m	20°	-60°	Cobalt (Co)
LB-049	25.94189	-10.48456	Low	89–189 m	20°	-60°	Cobalt (Co)
LB-050	25.94591	-10.47197	Low	120–220 m	20°	-60°	Cobalt (Co)
LB-051	25.97512	-10.48322	Low	56–156 m	20°	-60°	Cobalt (Co)
LB-052	25.94966	-10.46689	Low	120–220 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-053	25.97834	-10.48322	Low	54–154 m	20°	-60°	Cobalt (Co)
LB-054	25.97190	-10.46689	Low	76–176 m	20°	-60°	Cobalt (Co)
LB-055	25.97619	-10.46956	Low	87–187 m	20°	-60°	Cobalt (Co)
LB-056	25.99790	-10.48322	Low	96–196 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-057	25.99844	-10.47974	Low	96–196 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-058	25.98102	-10.48322	Low	66–166 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-059	25.98396	-10.46689	Low	78–178 m	20°	-60°	Cobalt (Co)
LB-060	25.96038	-10.46903	Low	102–202 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)

LB-061	25.94940	-10.47813	Low	69–169 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-062	25.97995	-10.46689	Low	96–196 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-063	25.95931	-10.47545	Low	89–189 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-064	25.96521	-10.47840	Low	79–179 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-065	25.99442	-10.46689	Low	79–179 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-066	25.99308	-10.47947	Low	120–220 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-067	25.96413	-10.47385	Low	101–201 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-068	25.94323	-10.48937	Low	56–156 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-069	25.98852	-10.47974	Low	74–174 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-070	25.96038	-10.47251	Low	66–166 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-071	25.94270	-10.48696	Low	66–166 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)
LB-072	25.96762	-10.47893	Low	73–173 m	20°	-60°	Polymetallic (Cu-Co-U-Zn)

All 72 in-permit targets are recommended for diamond core drilling. Each hole is oriented at azimuth 020° (NNE) with a dip of –60° to intersect the SSW-dipping Mines Series stratigraphy and any Lufilian thrust-controlled feeder structures. Estimated depths range from 50 to 250 m per hole depending on the local weathering profile (laterite to fresh sulfide), with most oxide ore expected in the upper 100 m and primary sulfide mineralisation potentially extending to 200–300 m. Core recovery should target NQ-size (47.6 mm) for full geological logging, density measurement, and Cu-Co assay sampling.

Phase 3: Follow-up Drilling (6–8 weeks)

Contingent on Phase 2 results, expand drilling to Medium priority targets and step-out holes to delineate ore body extent. Additional holes should be planned using the Strataprobe TargetMax algorithm, which calculates optimal collar positions, azimuths, and dip angles to maximise ore intersection length while minimising total metres drilled.

11. Conclusions & Next Steps

The Strataprobe ML analysis of the Lubudi Mining Permit 13628 has identified **72 prospective drill targets** within the 1,353.86-hectare permit boundary in the Central African Copperbelt of Lualaba Province, DRC. The analysis leveraged 29 satellite scenes, 12 spectral indices, and 6 independent ML methods to produce a robust, multi-method ensemble prospectivity assessment. All targets are confined strictly to within the permit boundary.

Key findings:
• **25 high-confidence targets** warrant immediate follow-up
• **Copper (Cu)** signatures are the dominant anomaly type, with widespread oxide-zone responses
• **Cobalt (Co)** signatures are co-located with Cu anomalies, consistent with stratiform Mines Series host
• **Structural lineaments** suggest Lufilian-aligned fluid corridors at several target locations
• **Spectral Angle Mapping** confirms lithological matches to malachite/chrysocolla, heterogenite, and Cu-Co gossan reference spectra
• The SSW dip of the Katanga succession supports angled drilling from NNE oriented at azimuth 020°

Recommended immediate actions:
1. Commission ground-truthing field visit to Critical and High priority targets
2. Collect surface XRF samples for Cu-Co pathfinder elements (Cu, Co, Fe, Mn, U, Zn, S)
3. Begin DRC environmental impact assessment (Étude d’Impact Environnemental) and drill permit applications
4. Engage Strataprobe for TargetMax drill planning optimisation
5. Plan Phase 2 core drilling programme (est. 8–12 holes, 100–250 m depth each)

This report was generated by Strataprobe's ML-driven mineral exploration platform. All satellite data sourced from Copernicus Sentinel-2 via Google Earth Engine. Terrain data from NASA SRTM 30m DEM. Analysis conducted on 30 April 2026.

Upon closure of the project, Strataprobe deletes all project-related information from its systems. A formal confirmation letter confirming deletion is provided upon client request.

Appendix A: Methodology Notes

PCA / Crosta Method

Principal Component Analysis transforms the multi-dimensional spectral data into uncorrelated components. The Crosta technique identifies which components are most loaded on iron oxide and hydroxyl mineral features, isolating mineralisation signals from background noise.

Spectral Angle Mapper (SAM)

SAM computes the spectral angle (cosine distance) between each pixel's spectral signature and reference endmember spectra for known DRC Copperbelt lithologies. Lower angles indicate higher similarity to mineralised rocks such as malachite/chrysocolla, heterogenite, and Cu-Co gossan caps overlying the Mines Series host.

Isolation Forest

An ensemble of 300 isolation trees identifies spectral outliers without requiring labelled training data. The contamination parameter (5%) controls the expected proportion of anomalous pixels. Higher anomaly scores indicate pixels that are more spectrally distinct.

XGBoost Classifier

A gradient-boosted decision tree classifier trained on the Isolation Forest anomaly labels learns the specific spectral patterns associated with anomalous areas. This supervised step produces probability estimates and feature importance rankings.

Fuzzy Logic Prospectivity

Expert-defined rules combine normalised spectral indices with geologically-informed weights for each target commodity (Copper, Cobalt, Polymetallic). This knowledge-driven approach complements the data-driven ML methods.

Structural Lineament Analysis

Canny edge detection on DEM slope derivatives identifies linear features corresponding to faults, fractures, and lithological contacts. Hough line transform parameterises detected edges into lineament segments, and Gaussian smoothing produces a lineament density surface.