

Sustainable Mining & Urban Planning Research · QA UI Lignite 47987

lignite · active · Konya · 10.0 km² · operator — · survey v1 · 2026-10-04T21:06 UTC

Mineral mapping (SWIR absorption features)

Mineral / alteration	Abundance %	Band nm	Depth	Confidence
lignite / organic carbon	53.3	1700	0.53	0.78
kaolinite	16.9	2165	0.72	0.81
pyrite / arsenopyrite	14.2	900	0.68	0.64
gypsum	15.6	1750	0.46	0.86

Ore grade estimate: 2311.0 kcal/kg

Tailings & acid mine drainage

Acid drainage risk	36.8 / 100 · MODERATE
Indices	iron-oxide 0.564 · jarosite 0.262 · pH proxy 5.7
Footprint	125.1 ha
Seepage	toward Beyşehir Lake · 79.3 km · bearing 234° · est. reach 86.2 y
Bands	860–900 nm Fe ³⁺ crystal field · 2265 nm jarosite OH · 1450/1940 nm water

Land-use change (Sentinel-2)

Cover now	mine 11.7 % · vegetation 13.7 % · water 1.8 % · urban 5.8 % · bare 67.0 %
Vegetation 5 y ago	17.9 % → change -4.2 pts
Mine expansion	33.1 ha / yr
Satellite	LIVE · vegetation 13.7 % · 12 scenes · latest 2026-09-26
Dust / water stress	54.3 / 46.3
Rehabilitation score	71.2 / 100

Urban-planning verdict

Grade	B
Required buffer	4.3 km · nearest settlement 2.0 km · VIOLATED
Zoning	no new residential within buffer; industrial/green belt only
Actions	dust suppression & sealed haul roads (54.3 dust index); revegetate 3.5 % of footprint; quarterly hyperspectral monitoring, anchored
Adopted into zoning	2026-10-04 by Konya Metropolitan Authority · adopted by QA

SIMULATED spectral model for mineral/tailings indices (SWIR absorption features); land-use vegetation from live Sentinel-2 scene metadata when available

Analyst Narrative (Claude Sonnet 5)

QA UI Lignite 47987 — Planning Summary (Konya)
What satellite data shows (measured)
Live satellite monitoring confirms land cover over 10.0 km²: mostly bare ground (67.0%), with mine (11.7%), vegetation (13.7%), urban (5.8%), water (1.8%). Vegetation has declined 4.2 points over 5 years — a real, observed trend.

Current buffer to settlement is 2.0 km, below the recommended 4.3 km (not compliant).
What is modelled (SIMULATED spectral indices)
Mineral composition (lignite 53.3%, kaolinite 16.9%, pyrite/arsenopyrite 14.2%, gypsum 15.6%) and ore grade (2311 kcal/kg) are derived from spectral modelling, not direct lab assay — treat as indicative. Acid drainage risk is moderate (36.8), pH proxy 5.7 (mildly acidic), jarosite signal present (0.262), suggesting active sulfide oxidation. Modelled seepage path toward Beyşehir Lake (79.3 km) has an estimated travel time of ~86 years — low near-term risk but worth tracking.
Recommendations
- Zoning: No new residential within 4.3 km buffer; permit only industrial/green-belt use.
- Dust control: Sealed haul roads and suppression systems (dust index 54.3 is elevated).
- Rehabilitation: Revegetate at least 3.5% of footprint annually, prioritizing bare zones.
- Monitoring: Quarterly hyperspectral surveys (anchored baseline) tracking pH, jarosite, and vegetation recovery.
Overall grade: B — manageable risk with active mitigation.
Research-grade analysis — verify with field sampling before regulatory decisions.

Provenance

Site anchor	0x6ff54bb44167fd0fe16cdc4f10b496124894e62882c51dead8da5c5aef431584
Survey anchor	0xe81a3fa2dbf757c7a28775d1a1b06be1f33f1df31583af4baeb10bfee9bfea5f