The Case for Geomorphic Design

Presentation to Mineland Vision Partnership | Hybrid

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October 21, 2026

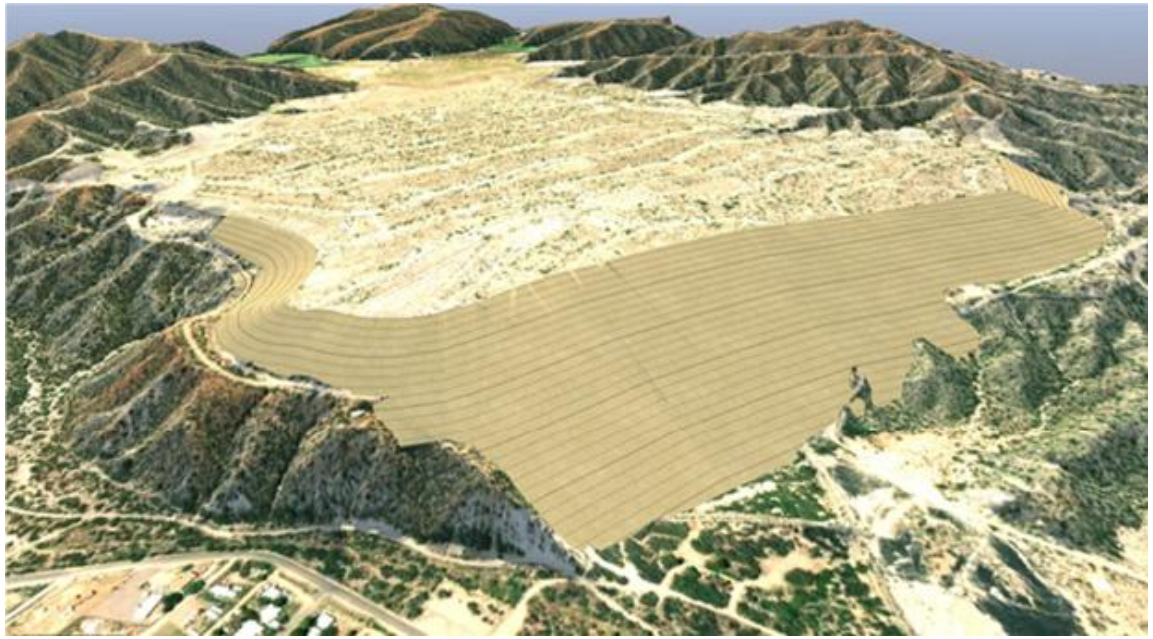
BARR

VAST

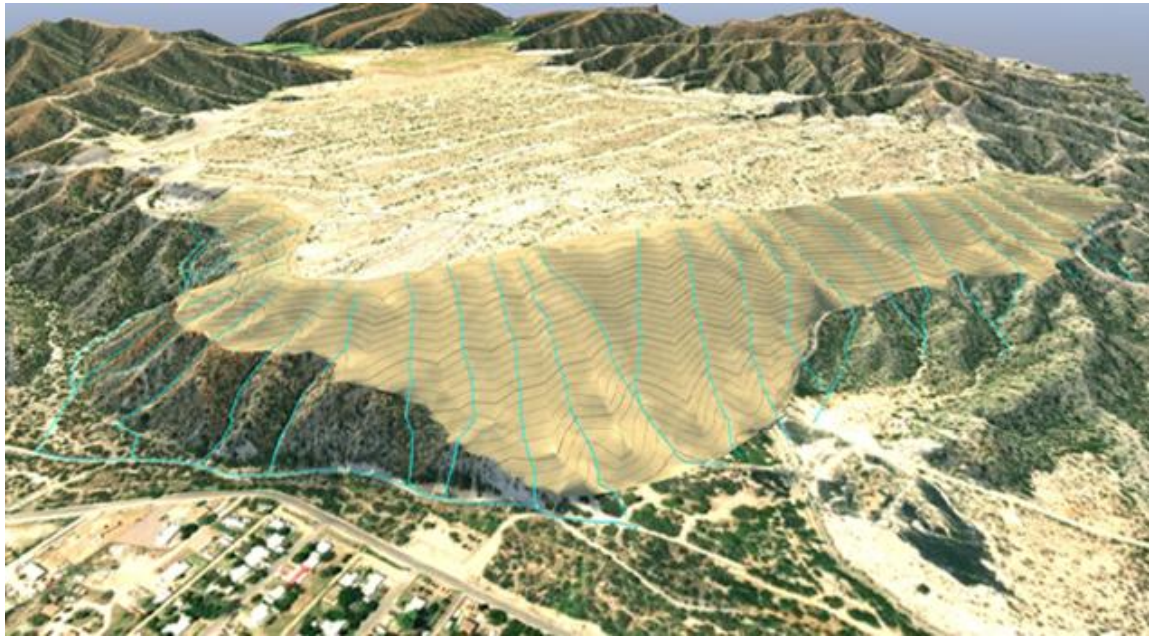
What should a mine landscape become after closure?

Geomorphic landform design uses natural landscapes as a reference for mine reclamation, with long-term erosion stability as a central goal.

Conventional closure



Geomorphic design

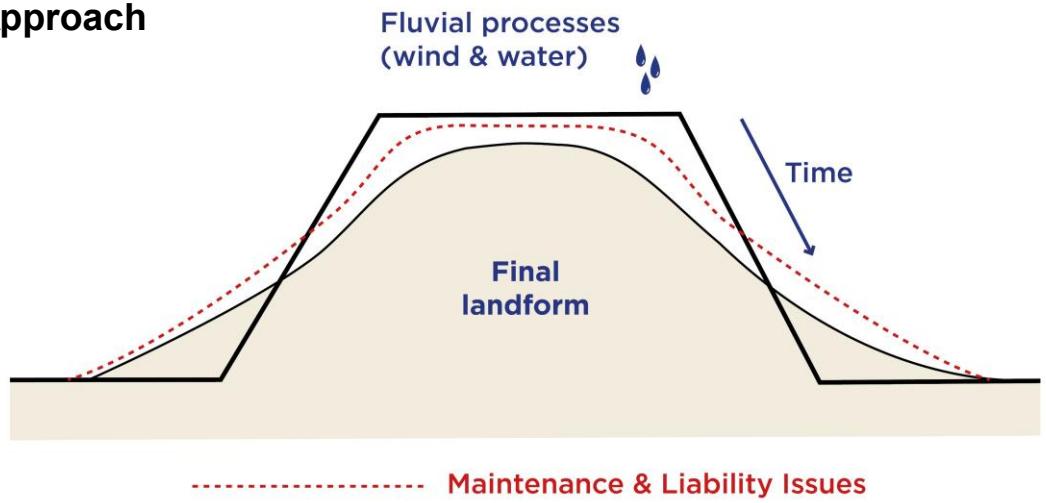


What could this approach offer the next generation of mineland reclamation?

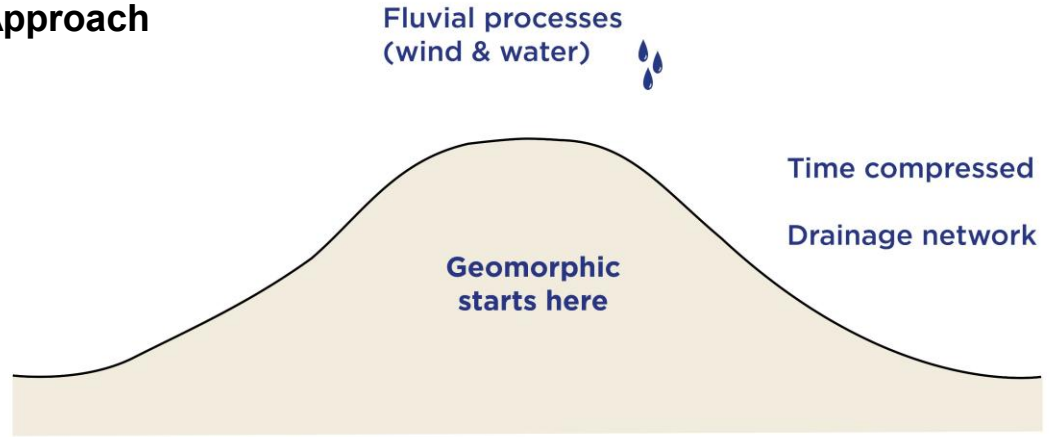
Illustrations: Ludwick and Buechler, 2023

Why geomorphic?

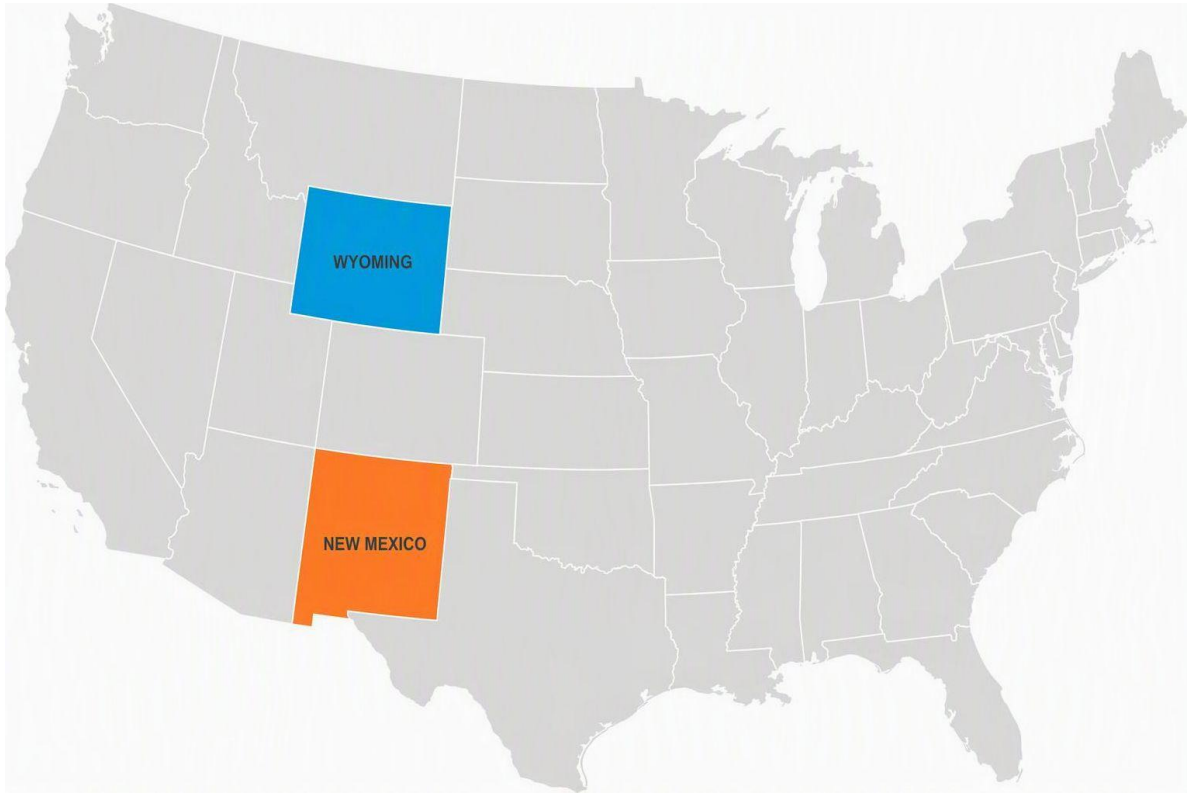
Conventional Approach



Geomorphic Approach



Where?



Lionkol, Wyoming

320 acres

Wyoming DEQ Abandoned Mine Land
Natural Regrade (GeoFluv)
5 miles of drainages reclaimed

La Plata Mine, New Mexico

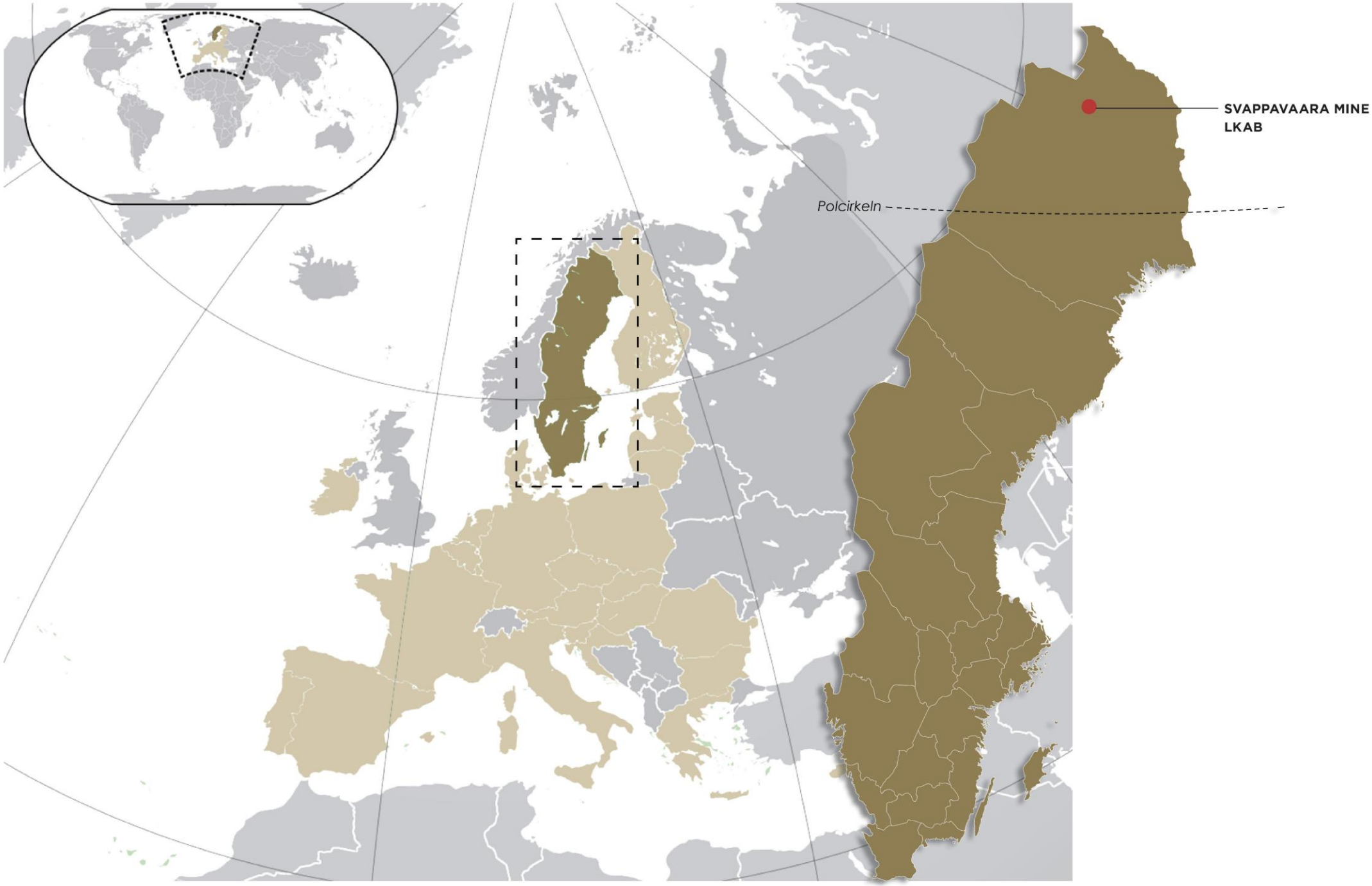
1,835 acres

GeoFluv reclamation
Final grading and seeding in 2008

Globally, led in places like Australia, Canada, Spain, and Sweden

Svappavaara mine's geomorphic journey.




SVAPPAVAARA MINE
LKAB
Polcirkeln

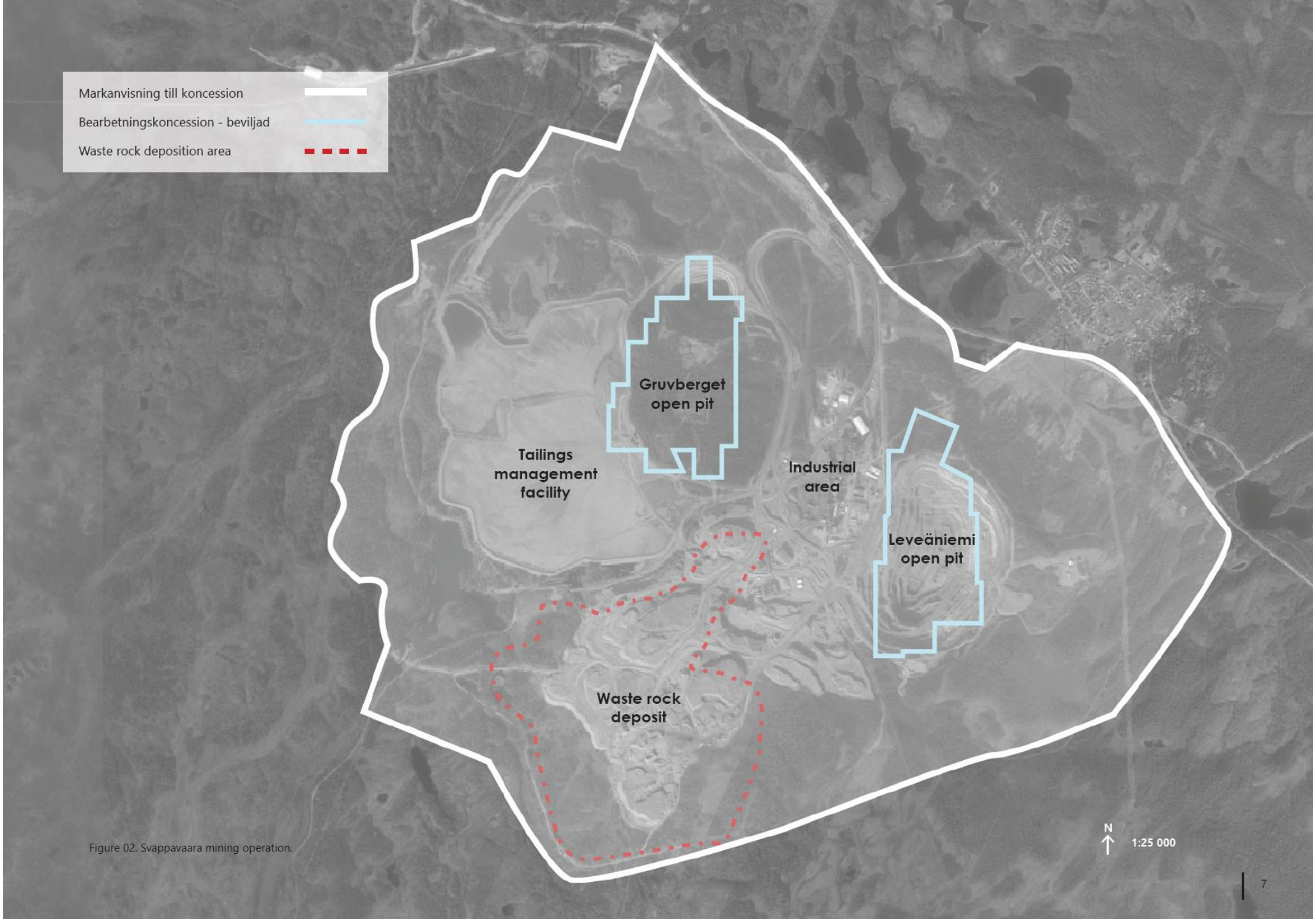
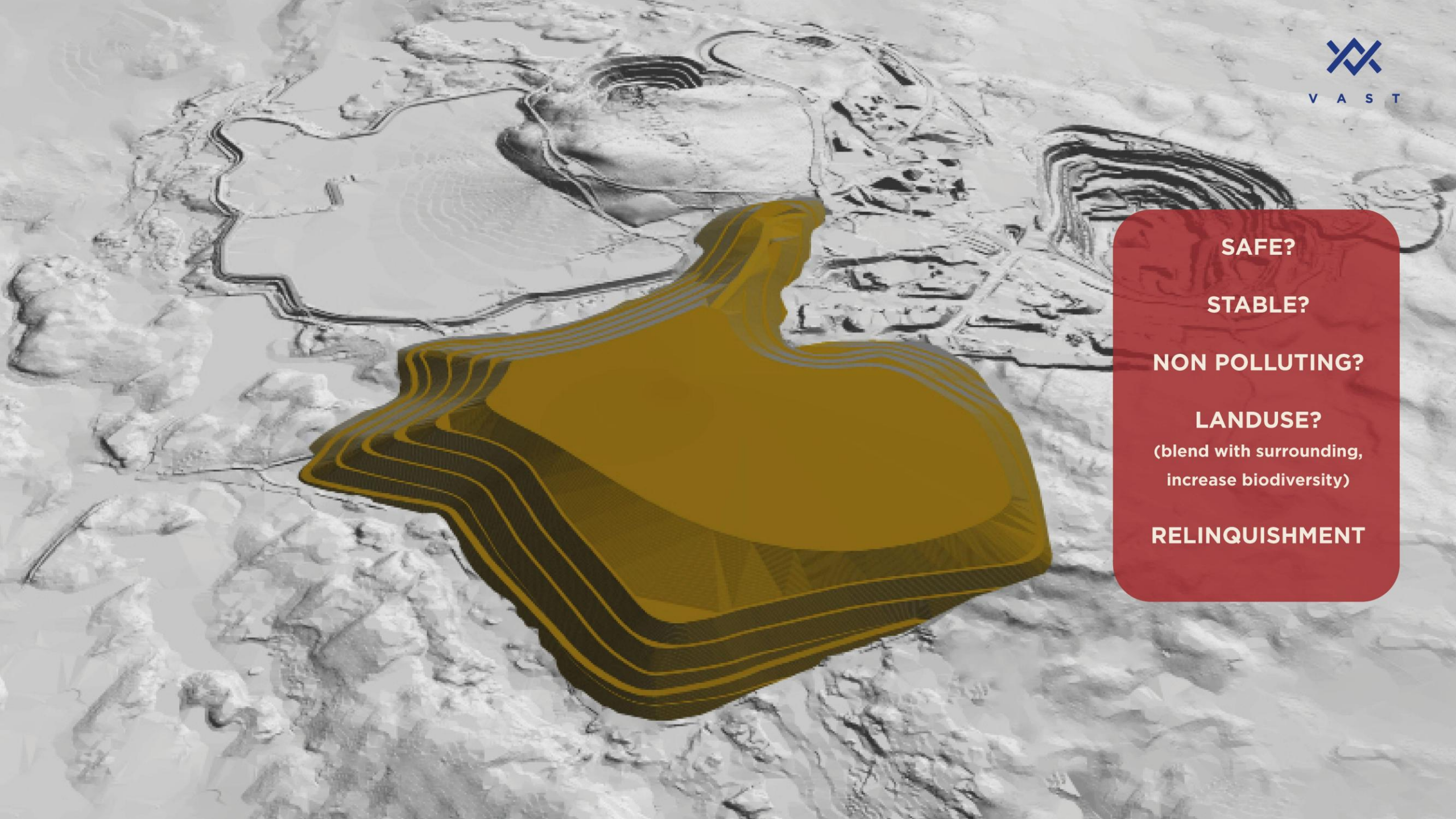
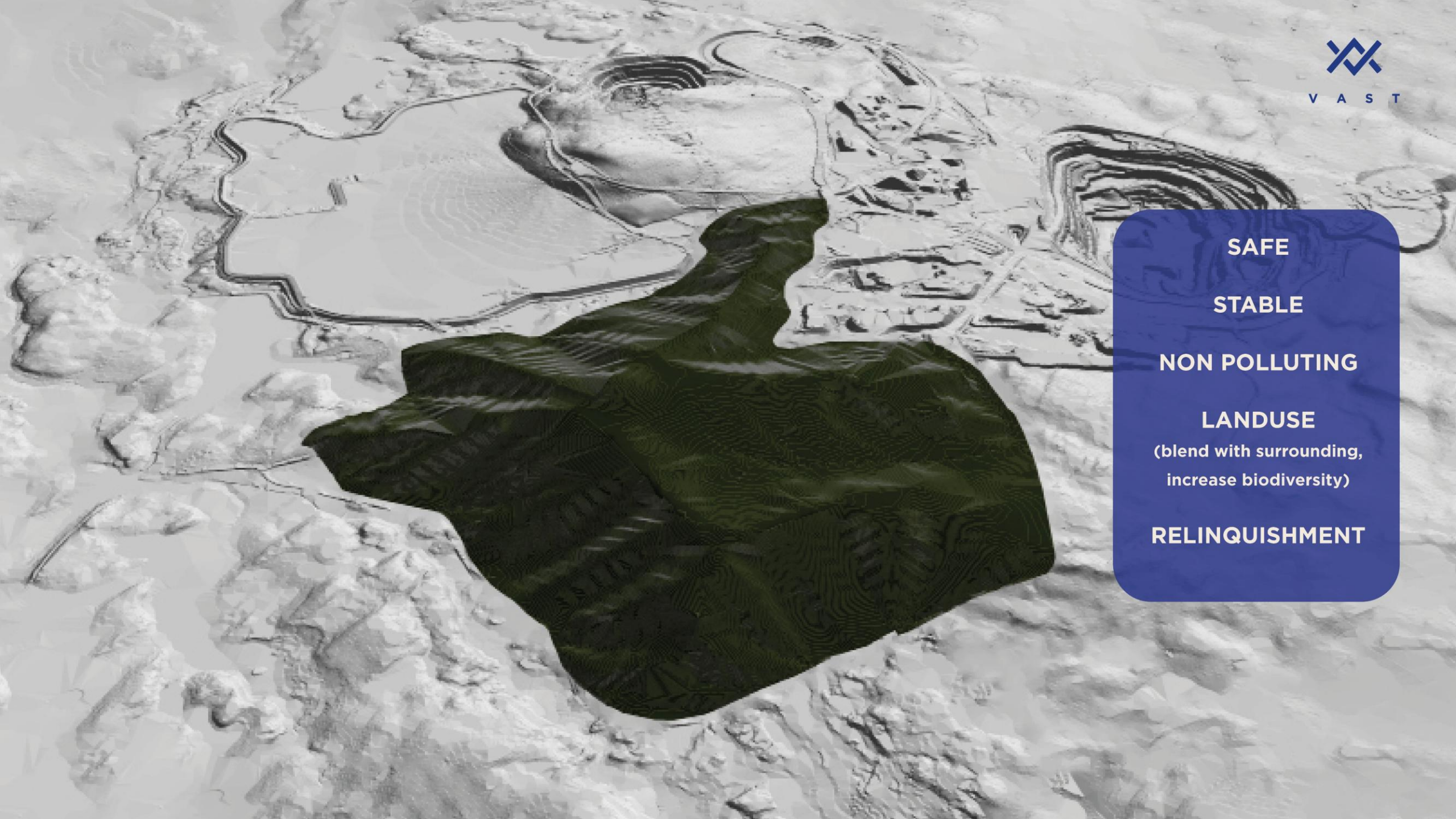
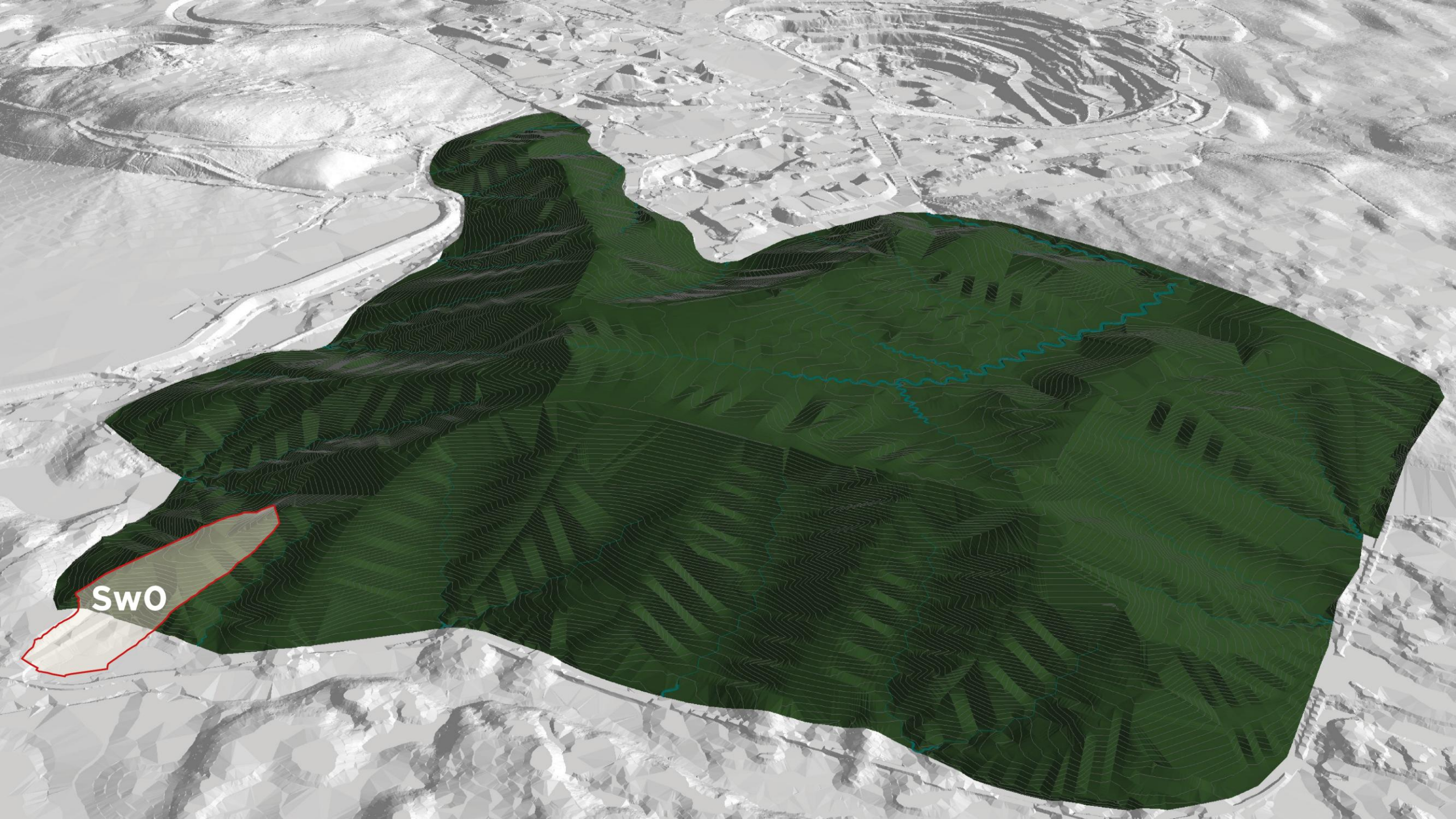


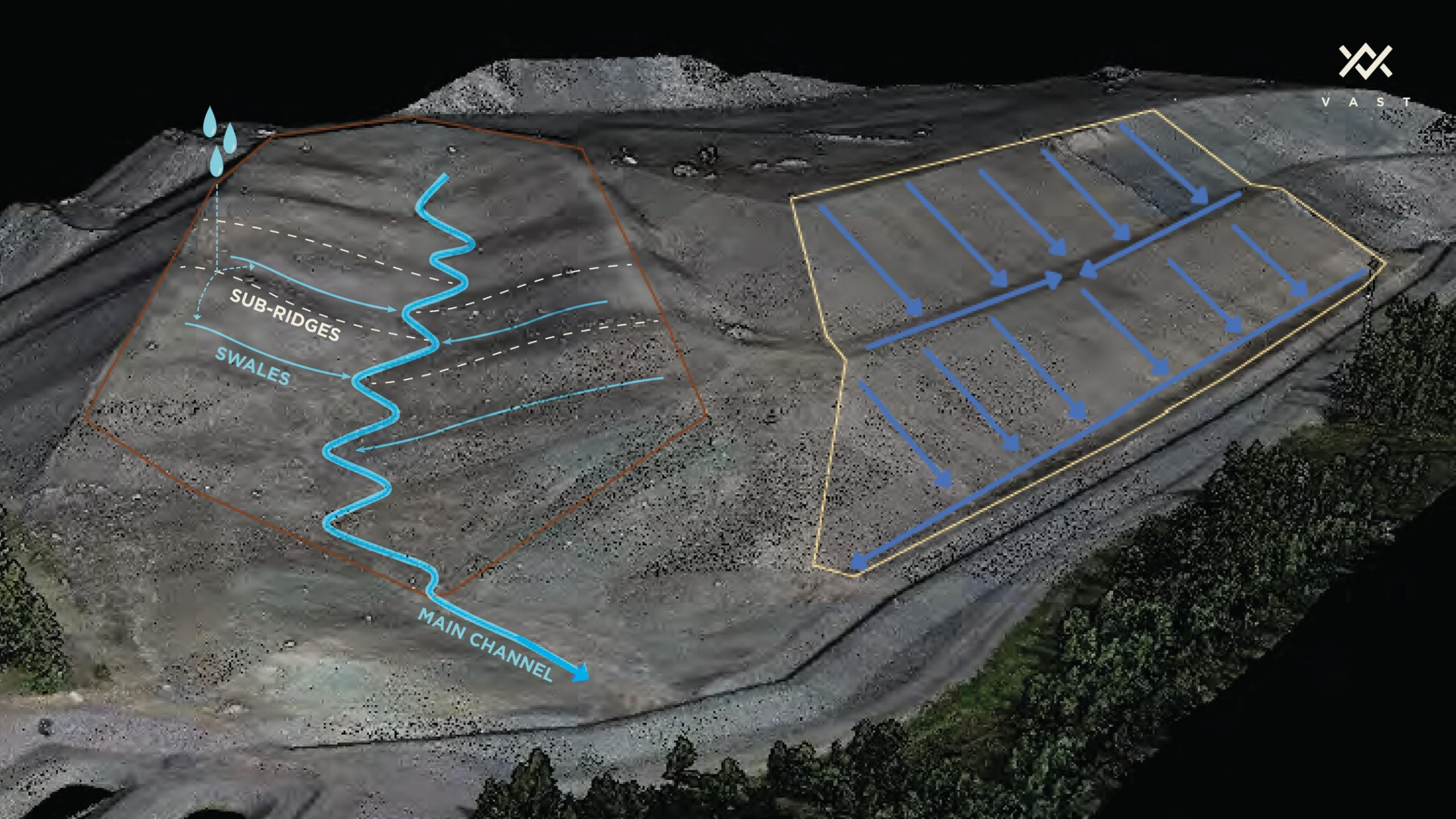
Figure 02. Svappavaara mining operation.


SAFE?
STABLE?
NON POLLUTING?
LANDUSE?
(blend with surrounding, increase biodiversity)
RELINQUISHMENT


VAST
SAFE
STABLE
NON POLLUTING
LANDUSE
(blend with surrounding, increase biodiversity)
RELINQUISHMENT

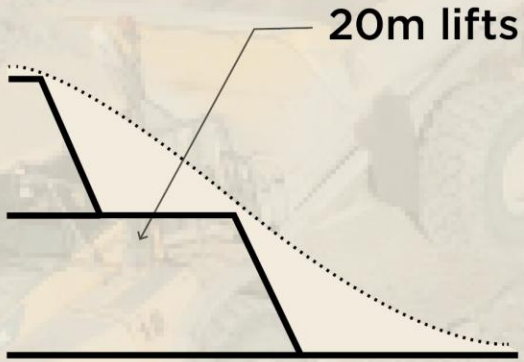

SwO



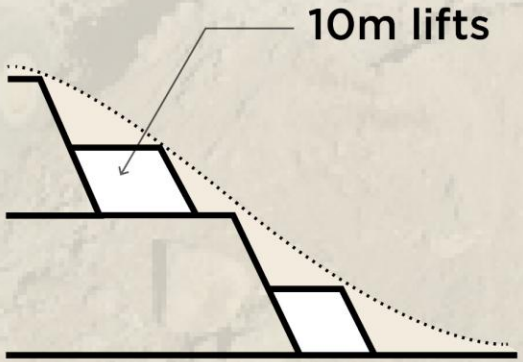

SUB-RIDGES
SWALES
MAIN CHANNEL


VAST
Geomorphic design makes stable landforms from day one.

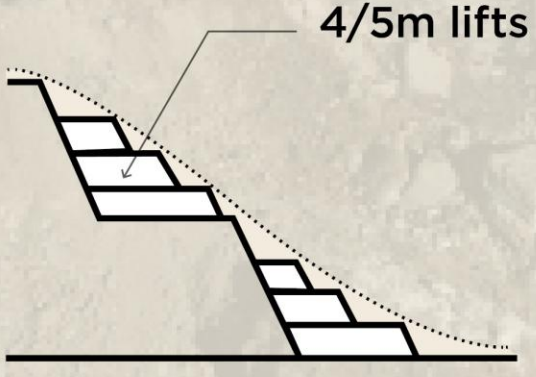
CONSTRUCTION



What we had



What we did



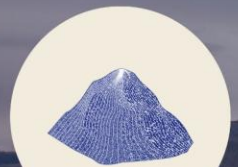
What we should have done

MATERIAL PLACEMENT



The standard approach in Sweden



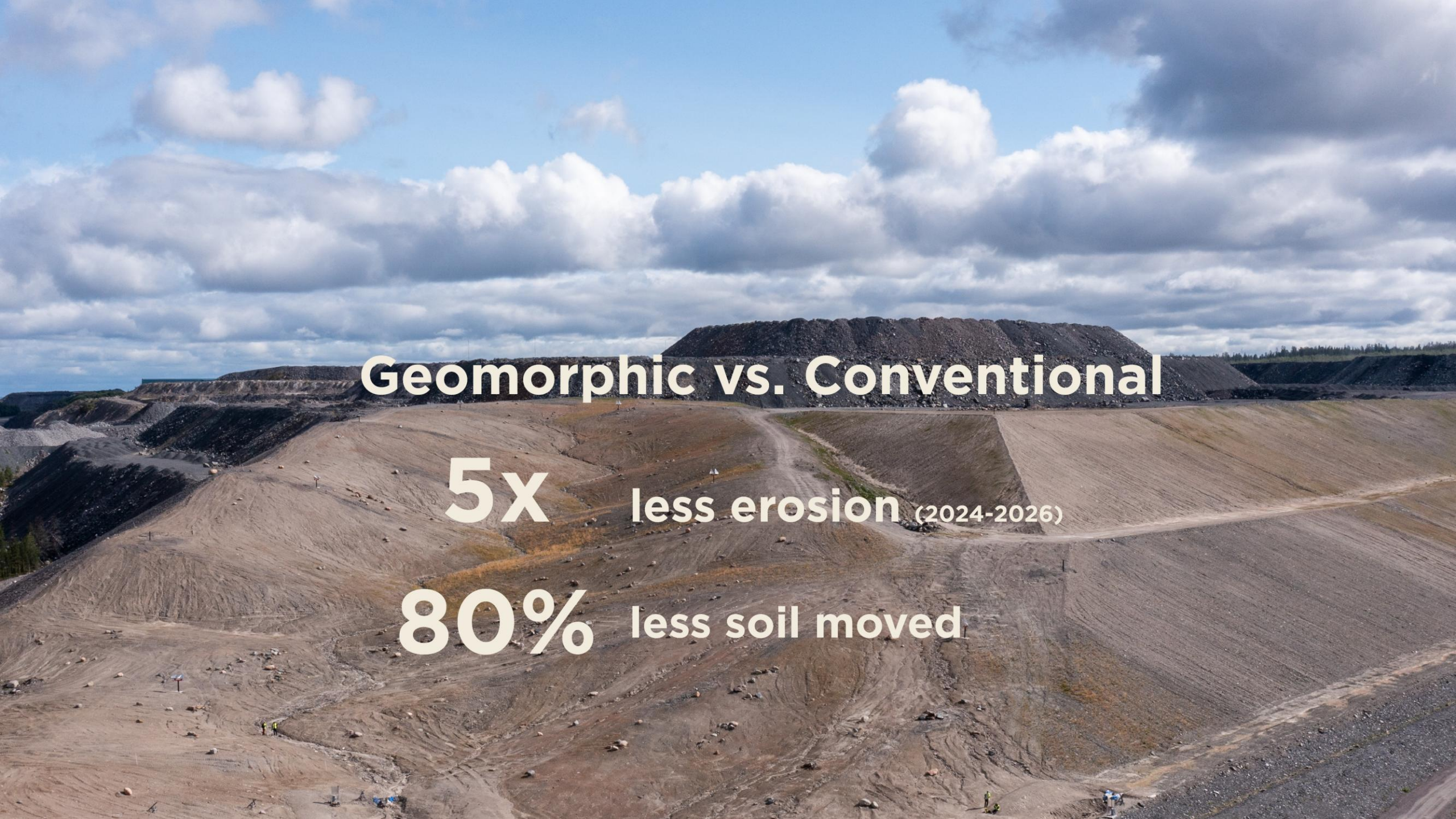


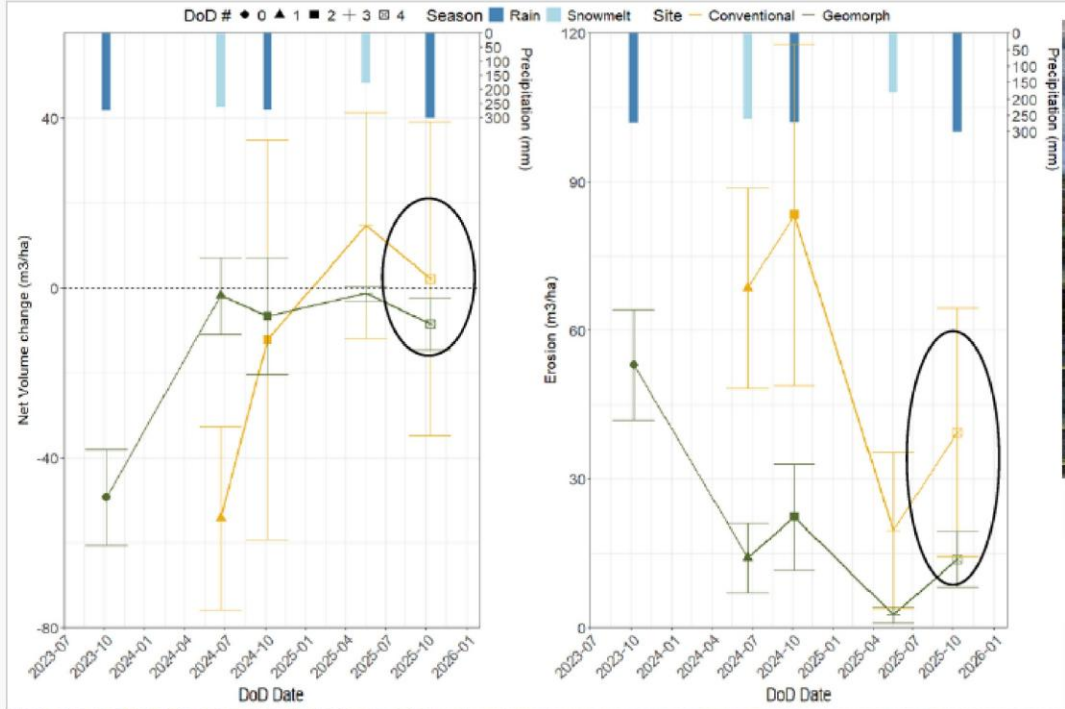
The Waste2Place approach



30%

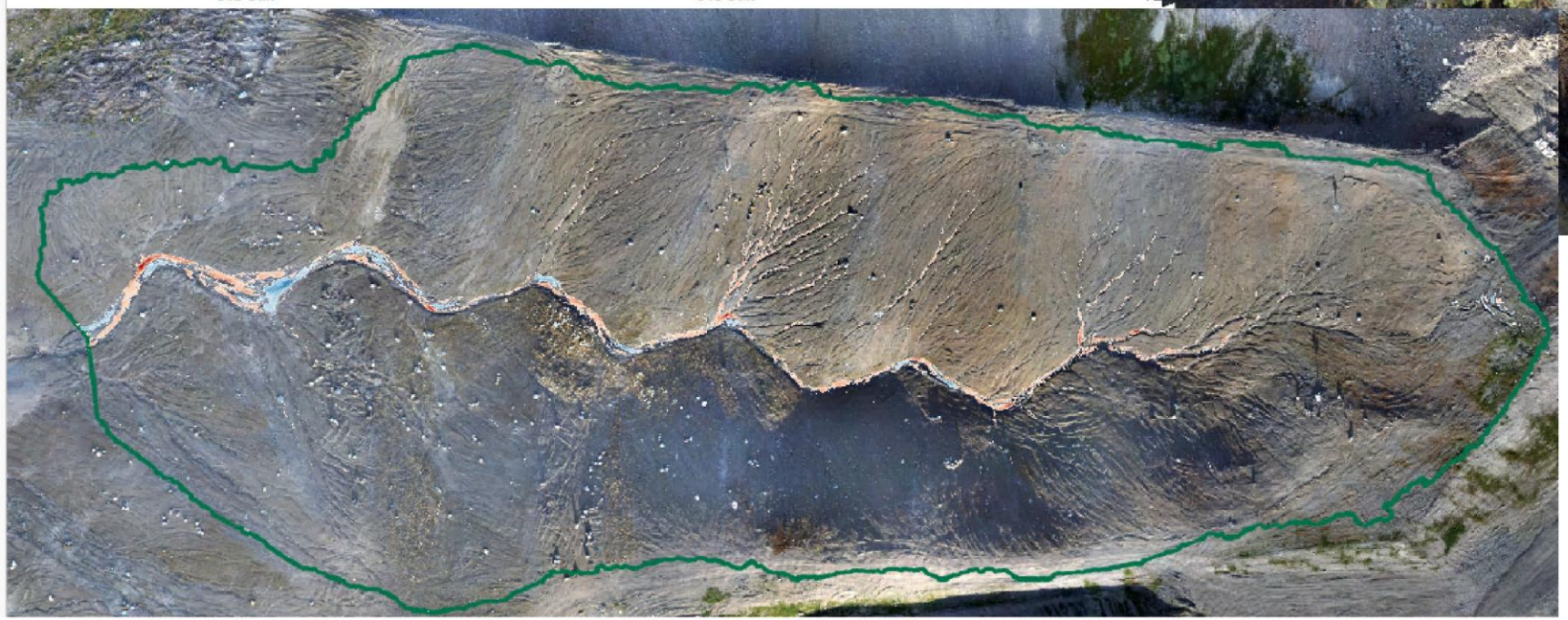
Resource efficiency and cost savings for cover material

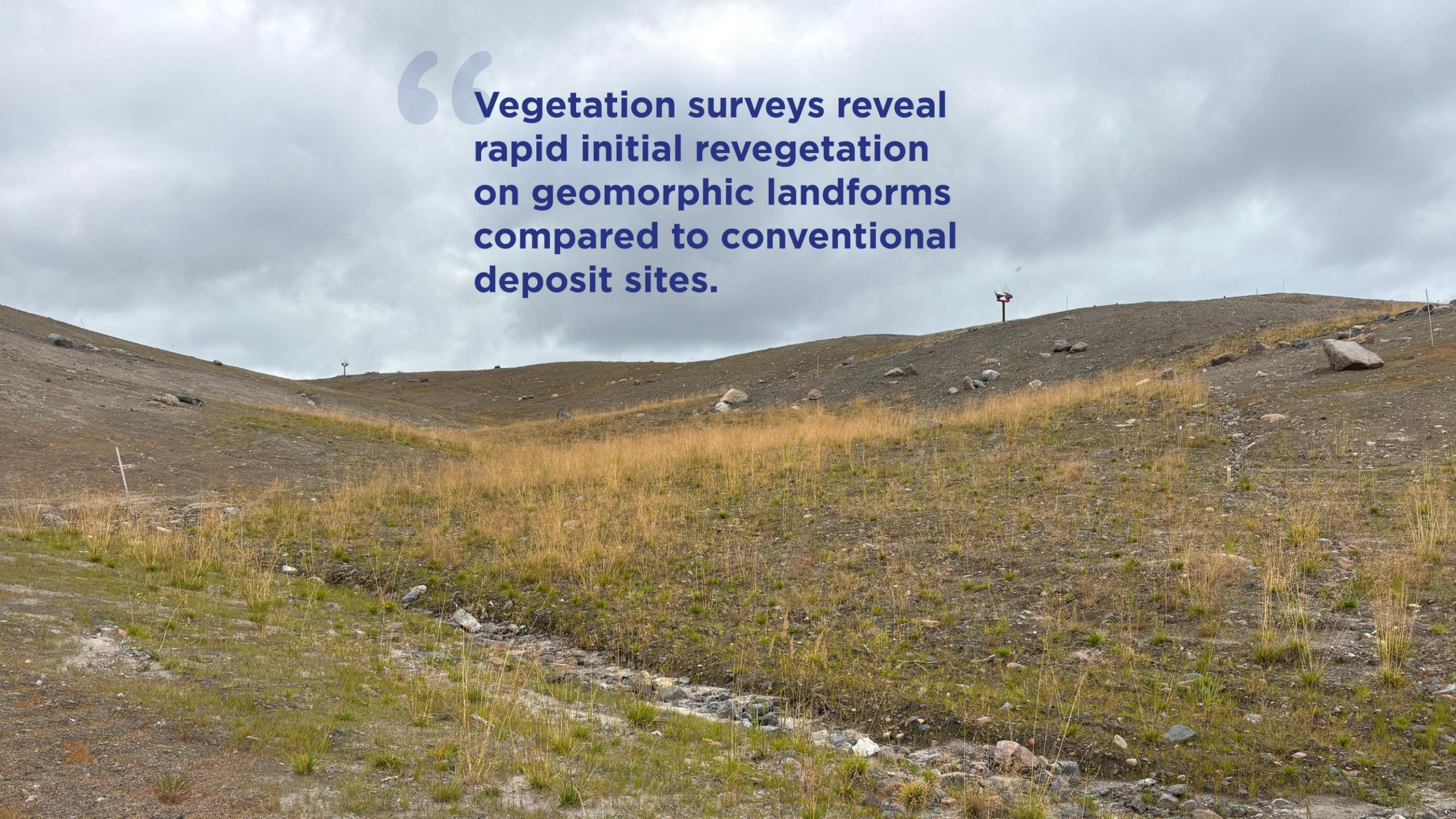

Geomorphic vs. Conventional
5x less erosion (2024-2026)
80% less soil moved


DoD # 0 1 2 3 4
Season Rain Snowmelt
Site Conventional Geomorph
Net Volume change (m3/ha)
Precipitation (mm)
DoD Date

Erosion (m3/ha)
Precipitation (mm)
DoD Date





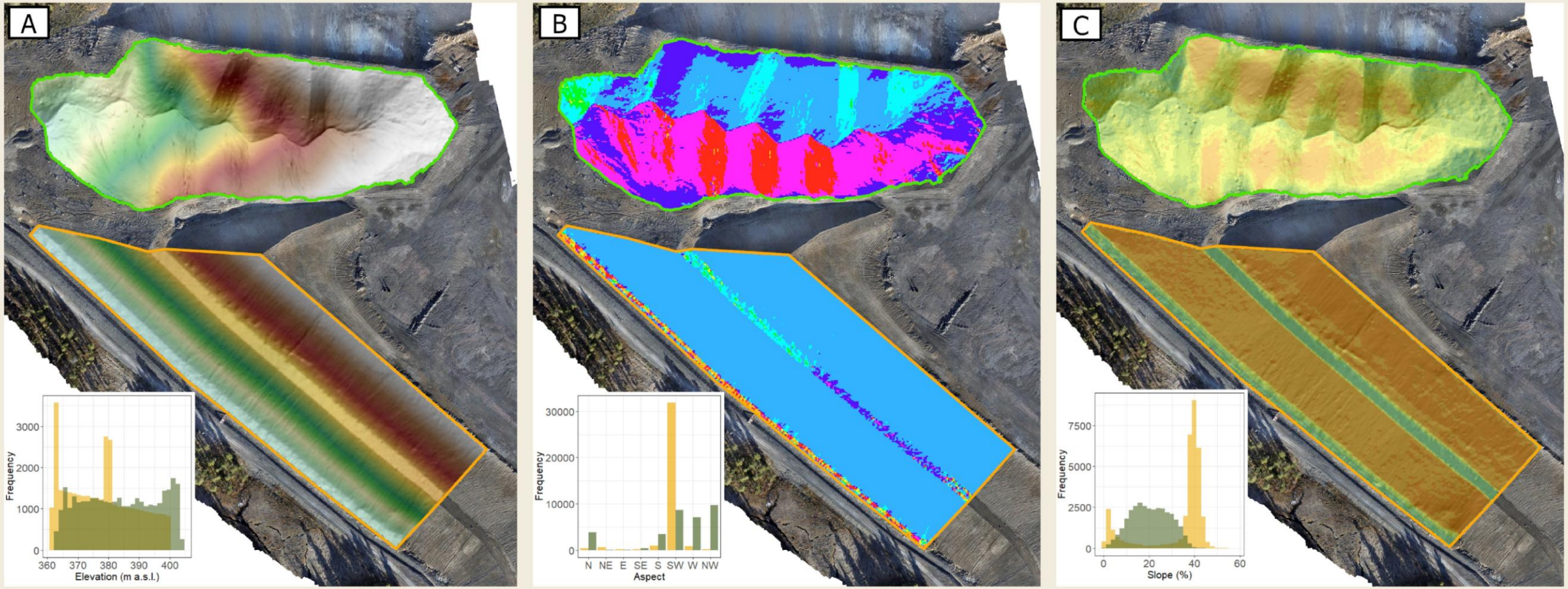


> **Vegetation surveys reveal rapid initial revegetation on geomorphic landforms compared to conventional deposit sites.**

Elevation

Aspect

Gradient



POST-MINING LANDUSE











Thank you

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