Rehabilitation

Our rehabilitation commitment

We will restore the mined land for future use, leaving a safe, stable, and sustainable site, according to a comprehensive Mine Rehabilitation Plan. This will include:

- Land safe for machinery, people, and animals
- Land geotechnically stable beyond mine closure
- An environment non-polluting to air, land, water, and biological receptors
- Rehabilitation aligning with the principles of sustainable development
- Land able to sustain the agreed end land use

Rehabilitation regulation in Victoria

In Victoria, the *Mineral Resources (Sustainable Development) Act 1990 (MRSDA)* regulates mine rehabilitation. For projects, like the Donald Project, which need an Environment Effects Statement (EES), the *Environment Effects Act 1978* sets out additional requirements.

Mining companies must lodge rehabilitation bonds with the Victorian Government before a mine can proceed. The rehabilitation bond is a financial security which must reflect 100 per cent of the estimated third-party rehabilitation cost if an operator defaults on obligations.

Working with our community

We understand how interested community members are in post-mine land productivity.

We will periodically refine the Mine Rehabilitation Plan, so it is fit-for-purpose over the project lifespan. And we will consult with community during mining operations and rehabilitation to share what we have learned and how we are meeting expectations and achieving rehabilitation results.

Soil assessment

The rehabilitation process begins before we disturb the topsoil. A qualified soil scientist records physical features and soil chemistry in pits excavated to a depth of 1.4 metres (m) Typically, they excavate the pits on a 100m x 100m grid (i.e. one pit per hectare) to establish a baseline for rehabilitation based on original soil conditions. The scientist appraises:

- **Physical features**
  - Soil horizon thickness
  - Texture
  - Structure
  - Presence of roots
  - Colour of each soil horizon
  - Presence of soil mottling
  - Presence of carbonates and other coarse fragments (estimated percentage, size, and type)
  - Particle size analysis
  - In-situ bulk density (i.e. soil density)
- **Soil chemistry**
  - Electrical conductivity
  - pH and calcium chloride (CaCl2)
  - Organic carbon content
  - Chloride, nitrate, and boron
  - Exchangeable cations (i.e. positively charged ions): Calcium (Ca), magnesium (Mg), potassium (K), and sodium (Na)
  - Macronutrients: Nitrogen (N), phosphorus (P), potassium (K), and sulphur (S)
  - Trace elements: Zinc (Zn), copper (Cu), manganese (Mn), and iron (Fe)
  - Slaking/dispersion observations (i.e. soil stability in water)

Soil survey analysis data gives the depths for the various topsoil and subsoil horizons, so we can separately remove and stockpile them.

The data also gives baseline physiochemical information used during and after soil replacement, in particular, what the various soil horizon depths should be in the post-mining landform. Mimicking the pre-mining soil horizons in the post-mining landform gives us the best chance of achieving successful rehabilitation outcomes.

Soil removal

Topsoil removal will happen only during the day to guarantee the process is precise.

We will use agricultural tractors towing a laser bucket (see photo below). A qualified rehabilitation specialist will supervise the process. They will optimise topsoil recovery by instructing the machinery operators.

The tractors will use precision GPS machine guidance to remove soil layers according to soil survey mapping results displayed on screen. We will place the topsoil in stockpiles up to 2m high.

Multiple distinct layers make up the subsoil. Each layer will have different physiochemical characteristics.

We will separately strip and store these subsoil layers in stockpiles up to 5m high. Agricultural tractors towing a laser bucket, or self-propelled scrapers will remove the horizons (see photo below).

Soil quality control

A rehabilitation specialist will oversee and approve the removal of each soil layer. The mine surveyor will also carefully measure the land at three stages:

- Before mining begins
- After removing each soil layer
- After stockpiling the soil

The surveyor's measurements allow us to track soil volumes in each layer. We will record this information in a soil register, and number each topsoil and subsoil stockpile for identification. The stockpile identifier will link to a geographical information system (GIS) map. The map will identify the stockpile location and the area we took it from. The soil register will guide precise soil return.

We will restrict vehicle access near stockpiles to minimise the risk of soil compaction, or erosion resulting from damage to any cover vegetation.

Soil return

After we extract the valuable ore from a given mining block, we will fill the hole with tailings. Tailings are the non-valuable solids (i.e. fine quartz sand and clays) left over after processing.

When we have filled the hole with tailings, we will wait three to six months for the in-pit tailings to settle. Then we will cover the tailings with overburden (i.e. material excavated from beneath the subsoil but above the ore) and contour it to the desired landform.

We will allow the overburden to settle over two to three years. Then we will cover the overburden with the overlying soil layers, in the same order as we removed them. This exacting process will help recreate the original soil horizons. We will break up any hard-packed site roads.

We may add gypsum on top of the final soil layer. At this stage, we will have rebuilt the soil horizons to be chemically as they were before mining. The way we use the land after mining will further restore the soil structure, boost its carbon content, and foster biological activity.

Landform after mining

Before we have the first block ready to refill, we will keep tailings in an above-ground Tailings Storage Facility (TSF) for about a year. As we excavate and process ore blocks, we will return the tailings. This way, rehabilitation happens progressively through the life of mine. This means we can rehabilitate the above-ground TSF and most of the mine voids during mining operations.

The loosened material we return to the ground will use more space than in its original compacted form. So, returned areas may be higher after mining. The rehabilitated above-ground TSF will leave a permanent mound up to 12m high. We will reinstate surface water catchments and drainage paths so surface water flow mimics pre- mining flow paths.

Land use after mining

Our mine rehabilitation method will restore the land to sustainable land use, suitable for agriculture (i.e. pasture and livestock grazing, or cropping) and native vegetation. We will carefully and methodically rebuild soil and landscape diversity and function.

Improving soil begins with maintaining groundcover by planting and managing a range of pasture species. Living plants restore beneficial soil chemistry and biology and encourage symbiotic soil microorganisms.

Year-round use of green plants will increase the soil's organic carbon content. This improves soil structure moisture storage capacity. Continued pasture planting, including deep-rooted species such as lucerne, will begin to dry out the soil profile. This then initiates soil-cracking, creating root paths. We can use these early pastures for grazing and hay harvesting.

Rehabilitation timing

We expect each rehabilitated mine block to become productive agricultural land within one to five years after we replace the topsoil and sow vegetation. These paddocks will be suitable for growing crops and pasture and raising livestock. We will regularly sample the soil to understand how the soil's physical and chemical condition is progressing. If necessary, we can then add materials like gypsum and fertiliser to further improve the soil.

Donald Project test pit rehabilitation

We have successfully rehabilitated a test pit (excavated initially in 2005 and again in 2018), near the Donald Project work plan area to productive farmland. Since 2021 the farmer managing the land on DMS's behalf has included the test pit area into the crop rotation occurring in the broader paddock. We continue to monitor test site progress. And we are collaborating with agronomist and soil experts to refine and evolve our approach, which we will then apply to future project stages.

About the Donald Project

The Donald Rare Earth and Mineral Sands Project is near Minyip and Donald, 300 km north-west of Melbourne.

Discovered in the 1980s, the site is a world-class source of minerals essential for everyday industries. These include critical minerals like zirconium and titanium, along with rare earth elements such as neodymium and praseodymium.

Donald Project Pty Ltd, trading as Donald Mineral Sands (DMS), is the joint venture between Astron Limited and Energy Fuels Inc developing the project.

Through responsible resource development, DMS will create long-term regional benefits including economic growth, jobs, and infrastructure improvements.

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