Mount Shadwell Scoria Quarry

General Summary.

Location.
Mount Shadwell Scoria Quarry on the lower northern slopes of Mount Shadwell is located on a cropping and grazing property at 19 Steeles Lane, approximately 3.5km north of Mortlake. The proposed quarry is located on Lots 1, 2 & 4, an area of 31.6 ha. An existing old quarry, approximately 2ha in area is located on Lot 1, (TP870063G). Lot 4, an area of 24.3 ha is in the same ownership, as Lots 1 & 2 and lies immediately southwest of Lot 1. (Please refer to Plan 1. Page 6.). The whole of the area is devoid of native vegetation.

Historic Land Use.
19 Steeles Lane is a high intensity cropping and fat lamb production property.
Lot 1 has been partially quarried by previous land owners. Several years ago an application to license the old quarry lapsed, at this time ERR designated the application as WA1478. The current land owner, and applicant accesses scoria from this site for the maintenance of his farm tracks and hard stands. The site is not contaminated, e.g. pests, weeds, historic rubbish dumps, abandoned machinery and the like on site. {Please refer to photo 1. Page 8).

Current Land Use.
The site for the proposed quarry on Lots 1, 2 & 4 is currently used for intensive agriculture, cropping and fat lamb production. The property is well managed, there is no evidence of pest animals and weeds.
(Please refer to Photos No. 2, 3 & 4. Pages, 8 & 9).

Geology. The proposed quarry is located within the Western Plains geomorphological unit, specifically within the Volcanic Plains. The volcanic plains were built up by sporadic volcanic eruptions over a period of about 5 million years, are known geologically as the Newer Volcanic Group, and form the Newer Volcanic Province of Victoria. Much of the plains were formed from lobes of lava which flowed from the eruption points, overlapping to form a veneer of basalt lava flows. The flow varies in thickness according to both the underlying topography and the present-day surface. The flows are interleaved in places with pyroclastic deposits (scoria and tuff) and discontinuous buried palaeosols of variable thickness. The geology comprises scoria from the explosive eruption of Mt Shadwell, a magmatic volcanic complex with a number of overlapping craters, which is located directly south of the quarry, (Boyce 2013: 458; Ollier & Joyce 1964: 358; Rosengren 1994: 238). The scoria deposits directly overly stony rise basalt, which occurred as a first phase of eruption of Mt Shadwell before the final, more explosive phase of eruption took place (Ollier & Joyce 1964: 367; Welch et al. 2011). The volcanic material produced by Mt Shadwell has not been subject to dating, and so definitive ages of the eruption period is not available. However, based on ages of basalts in the surrounding region, it is likely that Mt Shadwell erupted between 1.1-2.15 Ma BP (Gray & McDougall 2009: 248). The proposed quarry is located within the geomorphological subdivision 6.1.1 - Eruption points: maars, scoria cones and lava shields, including associated ash and scoria deposits (Lake Purrumbete, Mt. Elephant, Mt Cottrell). This subdivision consists of scoria cones, lava shields, composite cones (of both scoria and lava), and maars. Associated soil types include shallow to friable (black, red or brown) gradational soils (Dermosols, Ferrosols) (VRO Online accessed May 2021). The soils are generally thinner on more elevated areas due to slope processes, and increase in depth with decreasing elevation. Lava from the volcanic eruptions was generally very fluid and flowed along the lowest points in the landscape often resulting in blocked drainage systems (VRO Online accessed May 2021). This has created a relatively poorly developed drainage system in the region, with a high density of swamp and lake deposits formed by drainage disruption (Welch et al 2011). Blind Creek is the only watercourse that dissects the geographic region and it is situated 1.5-2 km north and west of the proposed quarry. (Please refer to Figure 1. Page 7).

Proposal.
The proposed quarry site is a part of an intensively managed grazing and cropping property. The site is devoid of native vegetation. The proposed quarry, an area of 31.6 ha, on Lots 1, 2, & 4 located at 19 Steeles Lane. Approximately 2 ha. of Lot 1 was historically excavated under a previous ownership. A small section of the extracted southern face within Stage 1 of Lot I approximately 30m wide has reduces the mandatory buffer from 20m to approximately 6-8m in width. Moyne Shire Council has advised that this matter will be considered when a planning application is received. (Please refer to Council correspondence via email, 28th Nov 23). Lot 4, an area of 24.3ha lies immediately south and west of Lot 1. (Please refer to Site and Location Plans). The material to be quarried is volcanic scoria. There is no evidence of waste rock, clay seams, or faults on the exposed 10m face of the area that has been extracted within Lot 1. (Please refer to Douglas Partners Geotechnical Report, Sections 2 and 4 and extract from Mount Shadwell Scoria Quarry Mortlake Cultural Heritage Management Plan. Mt Shadwell Scoria Quarry Geology report). All of the extracted scoria will be processed and stockpiled on the quarry floor for sale. The intended use of the product is for general road and farm track base.

Available Resource and Estimated Quarry Life.
Recoverable scoria is estimated at 2,861,497m3. Quarry life is expected to be 50+- years. This estimation is based on current expected use. The estimate cannot account for unknowns such as materials required for road recovery after major impacts, e.g. flooding, or future projects, e.g. windfarm infrastructure and etc.(Please refer to Work Plan sheets 9/27 & 25/27 for volumes).

Top Soil and Overburden Management
Generally topsoil layers are 0-200mm deep and mixed with overburden, clay and rock.
This depth is consistent across the area and has been determined during the field study for the CHMP. Overburden varies from 0 to 1m deep. This knowledge has been provided by the land owner and observed in the face of the extraction in Lot 1 and the test pits dug during the field study for the CHMP. A bulldozer will scrape top soil and overburden off the area to be excavated and stockpiled within the buffers for re-use during rehabilitation of that particular stage. Volumes are calculated by computer software, "Autodesk Civil 3D". Using known site data, (3D surface model, bore logs etc), this system creates a series of small planes on the modelled surface and interpolates the height difference between comparative surfaces at the middle of these plane shapes. It then calculates area x height of each plane, all added to create a solid total volumes".
(Please refer to, Work Plan volume tables, sheets 9/27 & 25/27. Figure 2 Soil Profile page 10, & photo 6, page 9).

Mobile Plant.
- As required portable machinery e.g. bulldozer, front end loader and crushing/screening plant will be bought on site to extract, stockpile and crush and load the product into customer trucks.
- Equipment will be refuelled by a service vehicle fitted with a certified fuel tank.
- If required a water truck will be bought on site for dust suppression.

Infrastructure Plant and Equipment
- No fixed structures or buildings will be erected on site.
- Power is not provided.
- No fixed plant on site.
- No fuel and lubricants storage on site.
- A designated parking area is provided for staff vehicles, (2-3 places). (Please refer to Work Plan sheet 1/27).

Method of Extraction and Product Preparation.
- As required a bulldozer will be bought on site. Scoria will be bladed to the quarry floor and stockpiled for crushing.
- As required a portable crusher will be bought on site to crush scoria to predetermined sizes and stockpile on the quarry floor accordingly.

Extraction Stages.

- Initial extraction will be within the old quarry, the western face of Lot 1. Extraction will then progress into Lot 4.
- As each stage in Lot 4 is extracted the area will be rehabilitated.
- When Lot 4 is finalised the eastern face of Lot 1 will be extracted and rehabilitated.

(Please refer to Work Plans).

Maximum area open.

- 2ha.

Operating Hours

- Operating hours, Monday to Friday, 7am-6pm, 7am-12 noon on Saturdays. Mount Shadwell Scoria Quarry will be closed on Sundays and public holidays.

Traffic.

- It is expected that 6 trucks per day, will be accessing the site.

Batter profile.

- Working 1V:2H-1V:3H: Dependant on face height, 1V:3H up to15m, 1V:3H 15M+
- Rehabilitation batters 1V:3H.
- Some rehabilitated batters will be less steep than 1V:3H to reduce slope angle to mimic the existing slopes of Mount Shadwell as much as is practical.

Benching.

- The work face will not be benched.

(Please refer to Douglas Partners Geotechnical Report 11 November 2021).

Method of Processing.

- Scoria will be excavated by bulldozer pushing downslope with rippers and stockpiled on the quarry floor for crushed and screening.
- A portable crusher will be bought on site as required.
- Finished product will be stockpiled on the quarry floor for loading into customer trucks.

(Please refer to Work Plan sheets,1/27 &11/27).

Blasting.

- Blasting will not be undertaken.

Access.

- The existing access off the Mortlake Ararat Road will be retained.

Depth on Title.

- No depth limit on title.

Quarry Depth.

- Working depths to the quarry floor varies from 0-6m, Stage 1 Lot 4, to 24.98m at the deepest point of Stage 3 in Lot 4.

(Please refer to Work Plan for details of depth variations).

Erosion/Sedimentation.

- The extraction area is lower than the surrounding ground levels preventing water runoff onto the adjoining farming land.
- Apart from a small section of Blind Creek, approximately 1.5-2km west of the work site, there are no waterways or wetlands within 2km of the work site.

(Please refer to Receptor Plan Page 10).

- No waterways/catchments or drains will receive sediment laden discharge water from the quarry.
- All surface water will be contained within the work site.

(Please refer to Work Plans, Sheets 3/27 & 12/27).

- Sediment ponds will be dug in each stage as extractions progress. These ponds are designed to contain runoff from a 1:10 year flood event.

(Please refer to Work Plan, sheets 1/27 & 11/27).

- A 1m high berm will be constructed on the upslope faces of each stage to prevent storm water from flowing into the work site.

(Please refer to Work Plan sheets 10/27 & 26/27 and Risk Management Plans No`s 7, 11 & 12).

Water.

- It is not proposed to wash scoria on site.
- If water is required for dust suppression it will be sourced from the sediment pond.
- The SRW registered bore will not be used for this purpose.
- Ground water will not be intercepted. Average separation of quarry floor depth and groundwater table is 58-60m.
  (Please refer indicative water table depth shown on Work Plan cross section sheets and Mt Shadwell Quarry Geotechnical Inspection Report, Section 5, No 5.).

Housekeeping/Waste.

- Staff day waste only will be produced. No industrial waste will be produced.
- A sealed rubbish container will be kept on site and emptied into a licensed facility as required.
- A portable toilet will be provided by service contractors.
- No fuels or lubricants will be stored on site.
- Equipment will be refuelled by a service vehicle fitted with a certified fuel tank.
- A fuel spills kit will be kept on site.

Vermin and Noxious Weeds.

- There is no evidence of vermin, e.g. rabbit warrens and/or weed invasion on the property.
- The site is cultivated annually for crop or pasture production preventing colonisation by pests.
- The quarry area is intensively cultivated farm land.
- There are no suitable habitats for vermin to occupy.
- Equipment for use in the quarry prior to entering the site will be pre cleaned to remove any weed seed.
  (Please refer to WA1478 Pest Management Plan and to Risk Treatment Plans No`s 9, 13 & 14).

Heritage.

- The site is located within an area of declared Aboriginal Heritage Sensitivity, (Volcanic cones of Western Victoria). A Cultural Heritage Management Plan, (CHMP) has been completed.
  (Please refer to attached Aboriginal area of cultural sensitivity plan. Page 7).
- Eastern Maar Aboriginal Corporation, (EMAC) assessed and endorsed this CHMP in 2021.
  (Please refer to Mount Shadwell Scoria Quarry Mortlake CHMP No. 17781, 7 December 21 and RMP No. 2).
- A designated Aboriginal cultural site is located within the south east corner of Lot 4. This site will be buffered out of the extraction area.
  (Please refer to WA1478 CEP Figure 2, and Work Plan).
- There are no other known heritage values within or nearby to the worksite.

Environment.

- Lots 1, 2, & 4 are devoid of native vegetation. All have been extensively grazed and cropped for many years. (Please refer to attached photos of Lots1, & 4, pages 8 & 9).
- DELWP advised that the existing quarry face in Lot 1 may contain nesting sites for avian species. This face will be extracted in accord with DELWP recommendations.
- DELWP advised that Southern Bent-wing Bats, (SBWB) may frequent a rocky outcrop on Mount Shadwell approximately 100m south of Lot 4. This site was investigated by a DELWP officer, no evidence of suitable SBWB habitats were found.
  (Please refer to Risk Management Plan No. 2, Figure 2 and DELWP report, 4th May 2021 ref. SP474756).

- DELWP advised that there may be SBWB habitats within the quarry area, (i.e. lava tubes, caves or rocky outcrops). There is no evidence of these features within Lots 1, 2, & 4. These areas have all been extensively cultivated for many years, any suitable habitats have been destroyed by farming activities. A walk over inspection determined there are no suitable habitat for SBWB`s as described by DELWP. (Please refer to site photos, pages 8 & 9).
- The tree plantation proposed for the north face of Lot 4 will use endemic species as prescribed by DELWP.

Rehabilitation.

The proposed use of the work site following extraction is that the area is returned to agricultural productivity that is consistent with the current use. Sediment ponds will be filled in. Stockpiled topsoil and overburden will be respread over each stage as it is exhausted. The stage will then be resown to pasture/crop. Note that the average depth of topsoil is 0-200mm and overburden 0-1m. Topsoil and overburden is naturally generally mixed across the area with no definitive separation, (please refer to site photos, pages, 6, 7, 8 & 9 and diagram 1, page 9). Agriculturally it is generally accepted that this natural mixture of volcanic soils is some of the most productive land within Victoria. (Volcanic soil is highly fertile with Olsen phosphorus levels at 40ppm and Potassium levels of 300ppm). Following rehabilitation, monitoring will be undertaken for a minimum of 3 months to ensure successful germination of pasture grasses or crop. If required weed and pest animal control measures will be undertaken by the owner. This is the normal annual cropping/pasture rotation undertaken by the owner.

(Please refer to Rehabilitation Plan and Noxious Weeds and Pest Animal Control Plan).

Aboriginal Heritage.

As the quarry is located within an area of declared Aboriginal Sensitivity, to minimise the possible random distribution of heritage, stockpiles will be located within the buffer adjacent to the site to be excavated, that is Stages 1 & 2 of Lot 1 and Stages 1, 2, 7 & 8 within Lot 4. Buffers to be utilised for this purpose are a part of the working farm and are annually ploughed and sown to crop or pasture. As previously stated there is no native flora and fauna that will impacted by this activity.

(Please refer to Mount Shadwell Scoria Quarry Mortlake Cultural Heritage Management Plan).

Topsoil and Overburden Stockpiles.

Topsoil depth averages 0-200mm, estimated at 62,987m3. Overburden depth is variable, 0-1m depending on the underlying scoria, estimated at 314,937m3.

(Please refer to, Site photo. Test pit pages 10. Figure 2. Soil profile page 10. Work Plans. sheets 9/27 & 25/27).

Amenity.

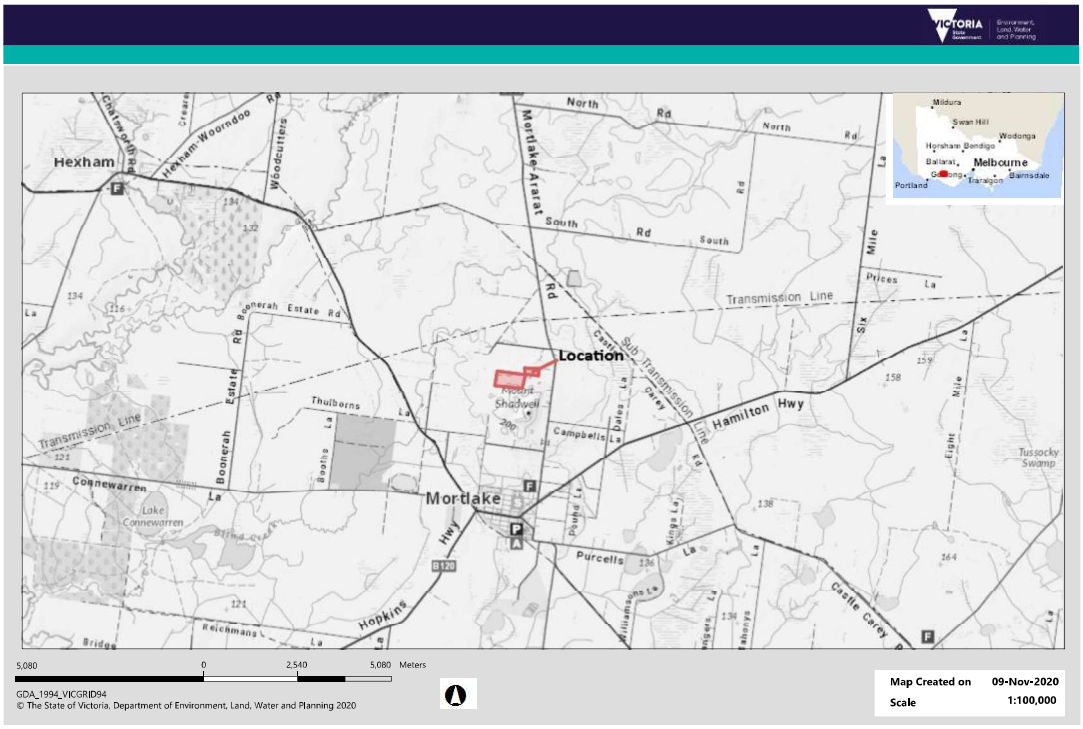
The existing quarry is screened from view to commuters travelling on the Mortlake-Terang Road. Lot 4 is partially visible to south bound commuters. In accord with DELWP and MSC directions, an indigenous tree plantation will be established on the northern face of Lot 4 to screen this area from view.

Receptors within 2km.

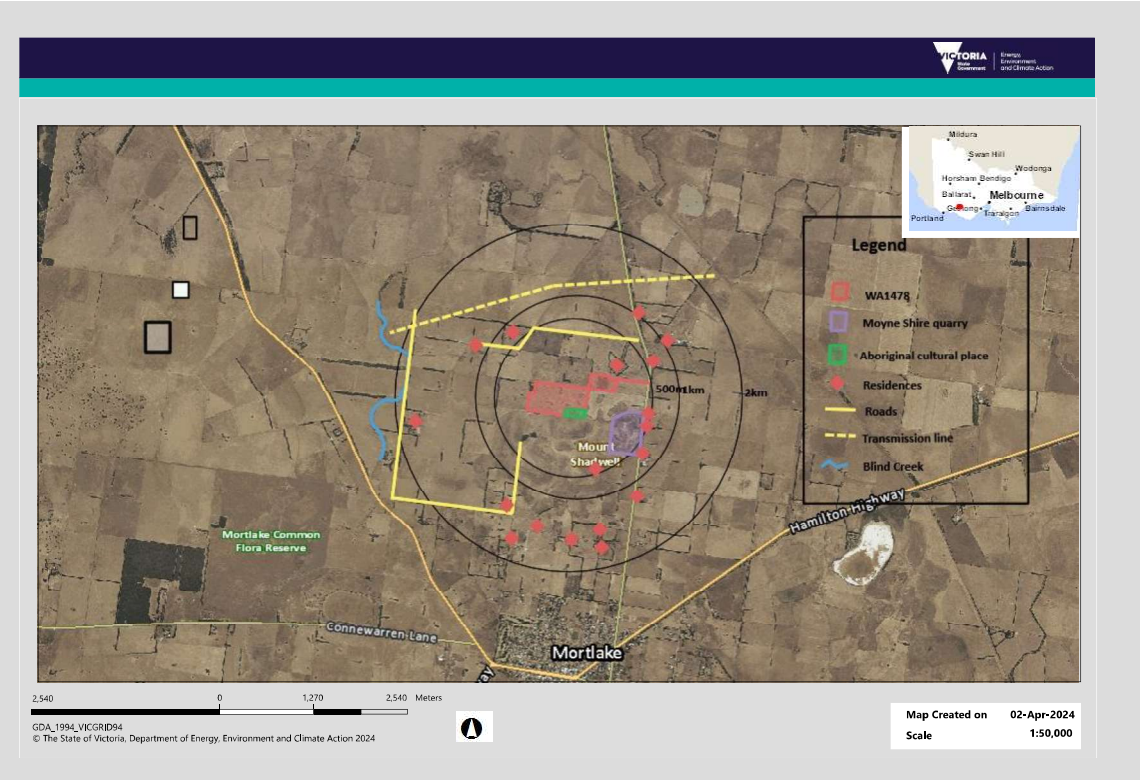
(Please refer to Receptor Plan. Page 6).

- There are 18 residence within a 2km. radius. Lots 1 & 2 are screened by natural rises from the residences within 1km to east. Lot 4 is visible to the two residences 700m,1km to the northwest. The eight residences within 1-2km of the quarry site are located on the southern and western slopes of Mount Shadwell on the outskirts of Mortlake. The bulk of Mount Shadwell obscures views of the quarry site from these residences.
- There are no wetlands, public land or reserves within 2km.
- A small section of Blind Creek is approximately 1.5-2km west of Lot 4.
- Moyne Shire Council operates a scoria quarry approximately 500m southeast of WA1478.
- A declared Aboriginal Cultural Area, Mount Shadwell Stony Rises is located in the south east corner of Lot 4. This site is buffered out of the quarry.

- All of the proposed quarry area lies within an area of Declared Aboriginal Heritage Sensitivity. (Please refer to Aboriginal Heritage Sensitivity area plan, page 11).
- Mortlake Ararat Road is approximately 500m east of the quarry.
- A major east west transmission line is approximately 1.1 km north of the site,
- A north south power line is located within the Mortlake-Ararat Road reserve.



Plan 1. Mount Shadwell Quarry location



Plan 2. Mount Shadwell Quarry Receptor Plan

Plan3. WA1478 Aboriginal Area of Cultural Heritage Sensitivity

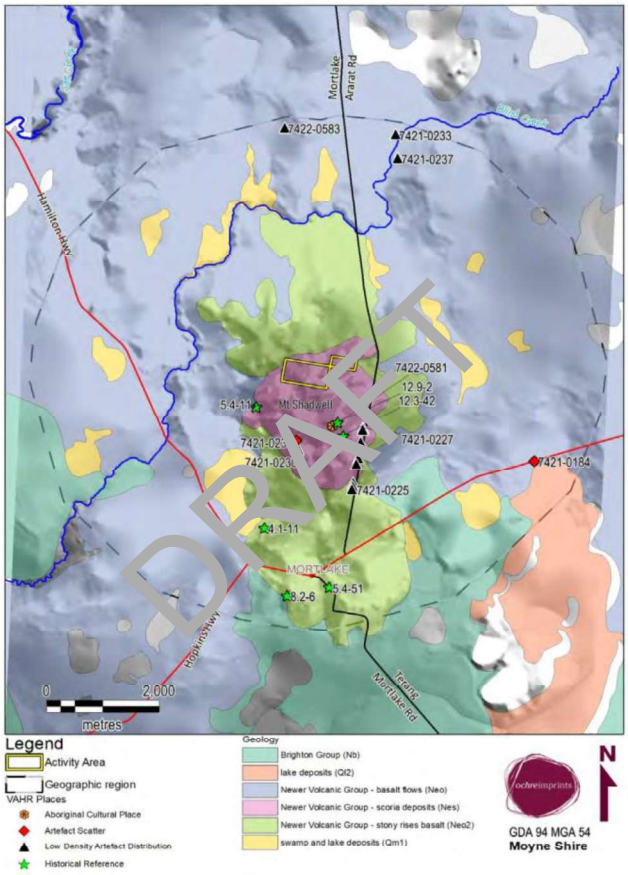


Figure 5: Geographic region showing geology and VAHR places.

Figure 1. Mount Shadwell Geology

Mount Shadwell Scoria Quarry Site photos.

Photo1. Lot 1. Old quarry face. View south to Mt Shadwell.

Photo 2. Lot 4. East side view south. Note cleared agricultural land.

Photo 3. Lot 4. View west. Note land surface following harvesting of crop.

Photo 4. Lot 4. View southwest. Ploughed surface showing mixture of top soil and overburden.

Photo 5. Lot 1 Old quarry face profile.

Photo 6. Test Pit during CHMP field work. Note soil profile.

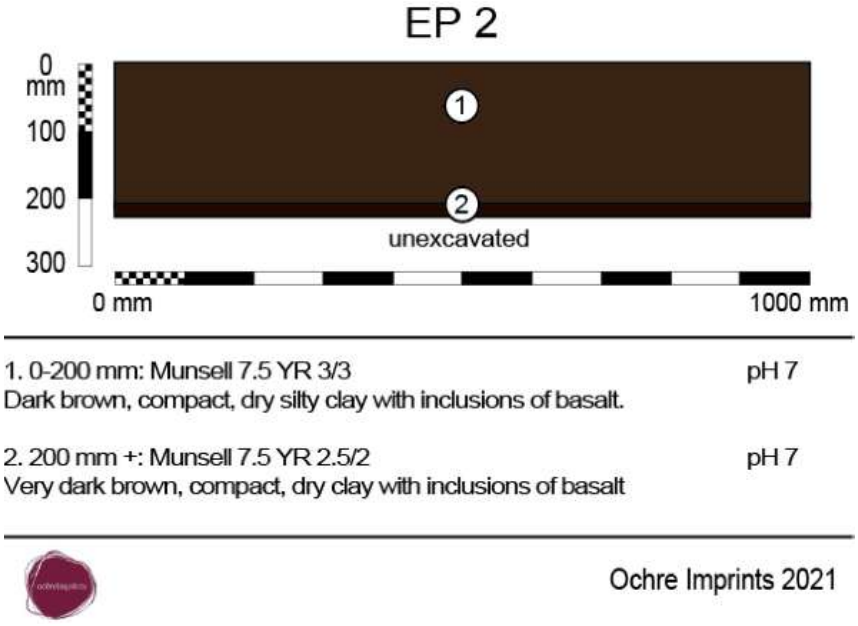


Figure 2. Soil Profile, Lot 4