landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

CLAY EXTRACTION MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

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Appendices

Executive summary

Land Insights act for Midland Brick Pty Ltd (the "applicant") and [redacted] (the "owners") and lodge this application on their behalf. The purpose of the application is to seek a renewal of the Development Approval and Extractive Industry Licence for an existing clay quarry located at Lot 11 (768) Chitty Road, Hoddys Well known as the "Hoddys Well" ("Bardya") clay quarry.

Approvals were issued for the operation in 2014 for a period of ten years. Excavation within the quarry has been ongoing since the 1990's and there are substantial resources remaining on the site. This application requests that approvals are reissued for the quarry for a further 10 years. This report and the attachments address the requirements of various state and local government policies and guidelines.

A summary of the proposal is outlined in the table below.

SUBJECT	DESCRIPTION
Operating times	The hours of operation will be from 07:00 to 18:00 hours from Monday to Saturday. No operation will occur on Sundays or Public Holidays.
Life of project	There are resources on site for an estimated 20 years, depending on market demand.
Volume extracted	A peak of up to 200,000 tonnes annually depending on market demand and other clay resources available.
Site preparation	Limited site preparation is required as the site is already established for clay extraction. Some clearing of native vegetation ("parkland cleared" and degraded in condition) may be required in new extraction areas. Drainage management systems are already in place. Road access, signage and fencing has already been established.
Operation Area	The quarry operation area is approximately 49 hectares.

SUBJECT	DESCRIPTION
Excavation location	Excavation will continue within the existing excavation area located at the southern end of the quarry and will generally move in a southerly direction. The area subject to this application includes the current quarry footprint as well as the new areas of operation.
Depth	The depth of topsoil is approximately 200mm. The depth of overburden varies across the site but can be up to a few metres in depth. The total depth of excavation is up to approximately 30 metres and varies depending on site topography and the quality of the resource.
Excavation process	Excavation of clay takes place in a sequence of steps which can be broadly broken down into; the Excavation Campaign (i.e. removal of topsoil and overburden, excavation of clay to stockpile) and Carting Campaign (transport of clay from stockpiles to the factories) and Rehabilitation. In general, the steps will involve the following: • Overburden and topsoil will be removed from excavation area. It will be stockpiled in bunds around the perimeter of the pit to be used as part of land recontouring during rehabilitation. • Excavation involves moving clay with an excavator and dump trucks and placing into stockpiles located on the site. • Stockpiles will be located at the northern end of the operation, closest to the site access and alongside the haul road for easy access. • Previously excavated areas will be utilised as water detention basins for drainage management and to access other parts of the quarry. Recontouring will take place where it is safe and possible to do so. • Clay will be transported off-site during a carting campaign and as required by the company.
Stockpiling	Clay is stockpiled at the northern side of the operations, alongside the haul road for easy access.
Access	Access to the site will continue to be from Salt Valley Road which runs along the northern boundary of Lot 11. The access is at the north-west corner of Lot 11.
Workforce	2-6 people on site during the excavation and carting campaigns.

SUBJECT	DESCRIPTION
Vehicle movements	It is expected that there will be approximately 5-10 truck loads per hour on days when carting is occurring. Carting will take place for the equivalent of approximately 3.5 to 4.5 months of the year, taking place intermittently during carting campaigns running for a few days or weeks for each campaign. Truck numbers may vary slightly from the above depending on demand.
Refuelling	The operation will use mobile refuelling for excavation equipment only (not cartage trucks). There will be no storage of fuel on site. A Refuelling Management Plan is provided.
Environmental management	The proposed excavation operation has been subject to a rigorous environmental assessment (this is presented in Chapter 5) which has considered ways to avoid, reduce and mitigate environmental impact. This is in accordance with the Policy Objective (e) from State Planning Policy 2.4 which states that "extraction of basic raw materials avoids, minimises or mitigates any adverse impacts on the community, water resources and biodiversity values." As such, the clay extraction operation will comply with a range of management procedures as presented in the following management plans included with this report: • Rehabilitation Management Plan • Dust Management Plan • Noise Management Plan • Water Management Plan • Refuelling Management Plan • Weed Management Plan • Dieback Management Plan • Waste Management Plan • Visual Amenity Management Plan.

SUBJECT	DESCRIPTION
Water Management	All rainwater is retained within the operation area and is collected in the drainage basins and at the base of the pit. A Water Management Plan is provided.
Structures	No permanent structures are required. A temporary lunchroom may be placed on the site if the site will be operated for a period of time.
Decommissioning	The pit will be recontoured to a safe and stable condition covered with pasture. A dam will be formed at the lowest point. A Rehabilitation Management Plan is provided.

1 Introduction

1.1 Background

Land Insights act for Midland Brick Pty Ltd (the "applicant") (previously Brikmakers) and [redacted] (the "owners") and lodge this application on their behalf. The purpose of the application is to seek a renewal of the Development Approval (ref 11CHI/A4273) and Extractive Industry Licence for an existing clay quarry located at Lot 11 (768) Chitty Road, Hoddys Well known as the "Hoddys Well" ("Bardya") clay quarry. The Hoddys Well quarry ("the site") is located on the northern portion of Lot 11. The quarry name has been updated to include the Noongar word for "quartz". This name was selected following consultation with Aboriginal elders who visited the site with representatives from Midland Brick.

Approvals were issued for the operation in 2014 for a period of ten years. Excavation within the quarry has been ongoing since the 1990's and there are substantial resources remaining on the site. This application requests that approvals are reissued for the quarry for a further 10 years. The area subject to this application includes the current quarry footprint as well as the proposed new areas of operation. This report and the attachments address the requirements of various state and local government policies and guidelines.

The proposed excavation operation has been subject to a rigorous environmental assessment (this is presented in Chapter 5) which has considered ways to avoid, reduce and mitigate environmental impact. This is in accordance with the Policy Objective (e) from State Planning Policy 2.4 which states that "extraction of basic raw materials avoids, minimises or mitigates any adverse impacts on the community, water resources and biodiversity values." The environmental assessment has also considered the mitigation hierarchy as set out in the EPA's *Statement of environmental principles, factors, objectives and aims of EIA* (2023).

Midland Brick takes a holistic approach to consideration of its environmental and social impacts and undertakes environmental impacts assessments and consideration of offsets (including land acquisition

and restoration projects) to result a nature positive outcome for all projects and operations. Midland Brick also acknowledges its social responsibility and is involved in and supports community projects and events. The business is currently developing an updated sustainability policy/ESG (environmental, social, and governance document) to keep up with current environmental and social expectations. The ESG will guide environmental and social responsibility into the future.

It should be noted that with clay excavation, the operator is not on the site every day. For large stretches of time and for a majority of the year there will be no activity on the site (i.e. it will be dormant). Excavation, carting and rehabilitation only take place over a certain period of time or at scattered times throughout the year.

1.2 Importance of the resource

Clay is an essential basic raw material used in the manufacture of roof tiles, bricks and paving blocks. As such, the extraction of clay is an important process in the supply of bricks and other construction materials for the community.

The Perth housing industry is almost entirely reliant on the supply of economic and quality bricks and Midland Brick has provided the bricks for a large proportion of all homes in Perth. This resource is a critical part of the production of these bricks and therefore homes for Western Australians.

The site is located in close proximity to the Perth Metropolitan Area and comprises important clay resources which will supply the Midland Brick factories. Clay has been excavated at this site since the 1990s and the clay has been identified as a priority resource for decades.

Clay resources on site provide a source of clay for bricks and three different types of clay are located within this quarry. Deposits of this type of clay in close proximity to Perth are restricted by geology, regolith and environmental and access factors. The proximity of resource close to the Perth metropolitan area significantly contributes to lowering development costs and transport costs.

It should also be noted that the application is for the continued excavation within the current pit area and excavation in new areas. New equipment and technology enables harder schist to be removed from deeper within the resource profile. Previously excavated areas can be reworked to take better advantage of the resource on site.

The importance of clay to the community is reflected in *State Planning Policy 2.4: Basic Raw Materials* (WAPC, 2021). The Policy maps "Significant Geological Supplies" on the site as clay resources.

1.3 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

1.4 Ownership

Ownership details are in Table 1.1 below.

Table 1.1 – Ownership Details

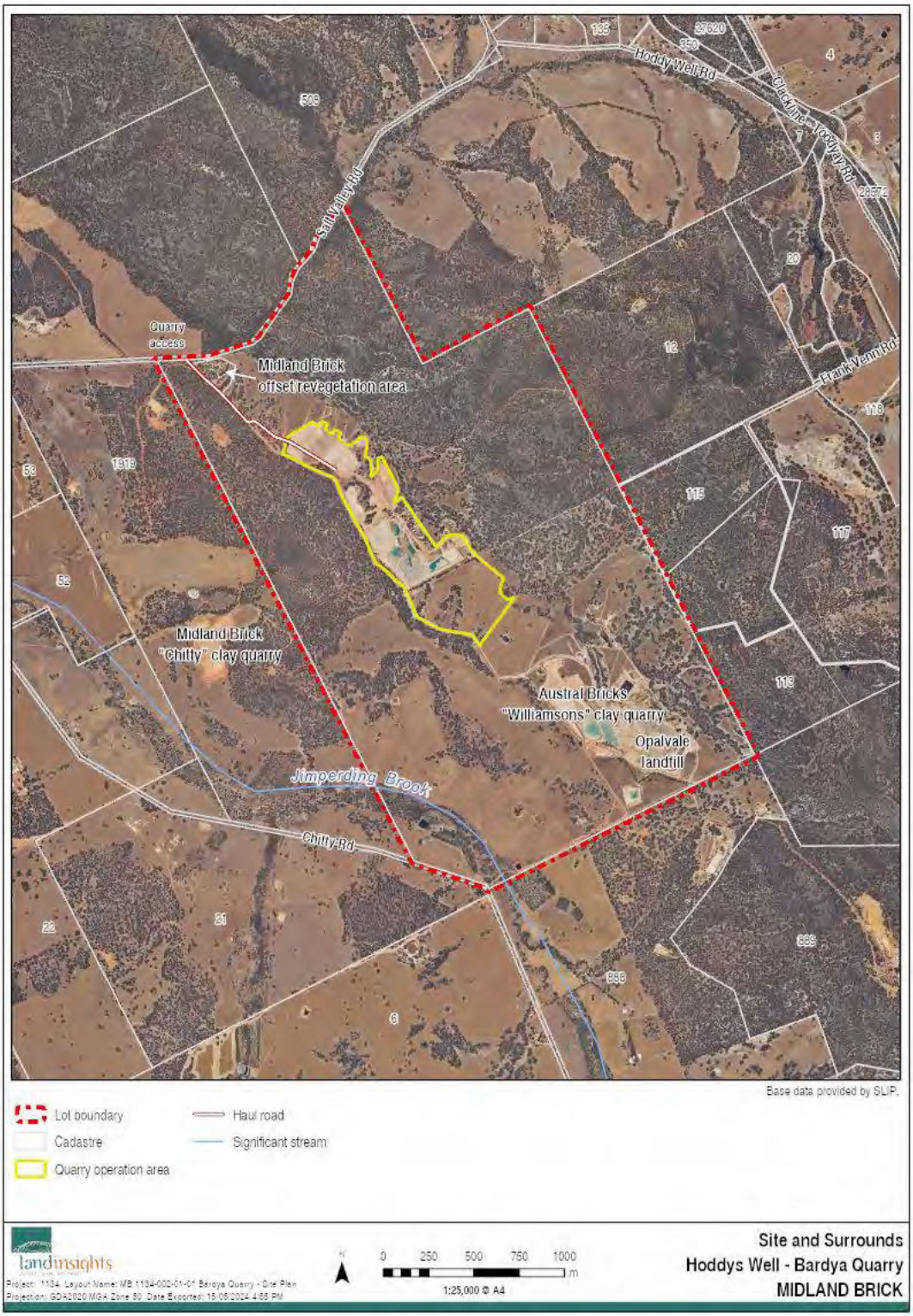
LOT #	PLAN	VOLUME	FOLIO	OWNER
11	DP34937	2535	391	[redacted]

1.5 Surrounding uses

Land uses immediately surrounding and adjacent to the quarry include other clay extraction (operated by a separate company) and a landfill both located at the southern end of Lot 11, clay extraction (also operated by Midland Brick) to the west and rural properties.

A Site Context Plan is provided below at Figure 1.1.

Figure 1.1 – Site Context Plan



2 Works and excavation program

2.1 Excavation procedure

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile, processing (crushing and screening if required))
- Carting Campaign (transport of clay from the excavation area or stockpiles to the factories)
- Rehabilitation.

Further information on the excavation process is below.

The proposed excavation operation has been subject to a rigorous environmental assessment (this is presented in Chapter 5) which has considered ways to avoid, reduce and mitigate environmental impact. This is in accordance with the Policy Objective (e) from State Planning Policy 2.4 which states that "extraction of basic raw materials avoids, minimises or mitigates any adverse impacts on the community, water resources and biodiversity values."

It should be noted that for a typical clay operation such as this, the operator is not on the site every day undertaking the activities listed above. For large stretches of time and for a majority of the year there will be no activity on the site (i.e. it will be dormant). Excavation, carting and rehabilitation only take place over a certain period of time or at scattered times throughout the year (as described further below).

Earthworks campaigns

The "Earthworks Campaign" refers to the excavation and stockpiling of material. Put simply, earthworks refers to the removal of topsoil and overburden and the excavation of clay. Topsoil and clay are placed onto stockpiles and overburden is used to create bunds or placed onto stockpiles. The Operation Area (as shown on the Excavation Plan at Appendix B) includes all excavation areas (existing and new) and the stockpiling areas.

An earthworks campaign will take place for the equivalence of approximately 4 to 5 months each year. Each campaign usually lasts for a few weeks each time. During each campaign excavation will generally take place for six days a week during the approved operation times. It should be noted that for much of the year (the equivalent of 7 to 8 months) there will be no extraction taking place.

It is estimated that there will a peak of approximately 200,000 tonnes of clay excavated and carted each year, although this number will depend on demand for material and the extraction of clay from other clay pits. Provision should therefore be made for the tonnage to vary from this depending on market demand.

The excavation process is undertaken as an “inside out” operation. For example, excavation of the first part of the active pit becomes the water detention pond so that drainage management can commence straight away. Vehicles work on the floor of the excavation and work towards the edges of the excavation. Excavated clay is either placed directly onto clay transport trucks or it is placed within the Stockpile Area. This excavation process can be seen in the current operation where the water detention basins have been formed from the first part of the excavation area (at the northern end of the site) and the excavation has progressively moved in a southerly direction.

As there are three different types of clays located within the operation, there will be a need to keep current pit areas open while the excavation progresses. It should be noted that the extent and exact location of excavation will vary depending on the demand for different types of clay.

As vehicles usually operate from the pit floor, the walls of the pit also act as a noise and dust barrier for most of the excavation process. There will be a relatively short period where vehicles are located at the ground level (when clearing vegetation and stripping topsoil and overburden in a new extraction area), however the existing pit walls (which can be between 10-15 metres high) and overburden bunds around the pit area provide a physical noise and dust barrier for a majority of the operation. In addition, a Dust

Management Plan and Noise Management Plan will be in place providing additional management actions to address noise and dust.

There will be no processing of resource (screening and crushing) and no blasting will be required.

Machinery and vehicles used for the excavation campaign includes:

- Excavator
- Dozer
- Dump truck
- Wheel loader
- Water cart
- Haul trucks.

Cartage campaigns

The "Cartage Campaign" refers to the removal or transport of clay from the site where it is taken to the brickmaking factories located in the Perth Metropolitan area. Loading and carting from the site will occur throughout the year for the equivalent of 3.5 to 4.5 months total per year. Carting will be spread out into cartage campaigns throughout the year. For most of the year (7-8 months) there will be no carting/truck movements in and out of the site.

It is estimated that up to 200,000 tonnes of clay could potentially be carted from the site annually. The volume is almost entirely dependent on market demand and availability of resources at other clay pits. Carting from the site depends on the market demand for bricks, as well as the types of clay and colour of clay. Therefore, there may be some variation from the truck numbers and the number of days that carting will be required each month (i.e. some months will have more carting days than other months). Further detail regarding truck numbers is provided below.

The Stockpile Area will be located at the northern end of the operation, alongside the haul road. This allows for ease of access and to reduce the distance trucks need to travel along internal access roads

through the site. This is a management technique used to help mitigate potential dust and noise impacts by reducing the access route through the site.

The stockpile area will also be used to blend clays. Blending and loading of clay in the stockpile area will use a front end loader.

Rehabilitation

The quarry will be recontoured to a safe and stable condition with a dam or two being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some tree belts planted with native vegetation.

It is the intention of Midland Brick to progressively rehabilitate as the resource is being removed. In terms of timing of progressive rehabilitation, this will depend on timing of extraction, areas required for water management and access. Spatially, the intent of progressive rehabilitation is to have approximately 15 hectares of pit area open at any one time and to progressively recontour and rehabilitate areas as the extraction moves along. As was stated in the 2013 application ("Extractive Industries Licence Variation Application", Brikmakers, 2013a), the bulk of the rehabilitation will be undertaken at the completion of quarry. This includes the remaining pit area, stockpiling areas, access roads etc.

It should also be noted that the rehabilitation and closure of the quarry will also be reviewed by the Department of Mines, Industry Regulation and Safety in accordance with the *Mines Safety and Inspection Act 1994*. Further details relating to rehabilitation is provided in the Rehabilitation Management Plan.

2.2 Hours of operation

The hours of operation will be from 07:00 to17:00 hours from Monday to Saturday. A six-day working week is required to maintain efficiency which in turn reduces the brick manufacturing cost. No operation will occur on Sundays or Public Holidays. Further information on the length of time required annually for excavation and carting is provided above.

2.3 Extent of excavation

The operation comprises of different areas which serve a different purpose as follows:

- Excavation areas (existing and new)
- Stockpiling areas
- Water detention basins
- Haul road
- Overburden bunds
- Topsoil stockpiles

Most of these areas are shown on the Excavation Plan at Appendix B can be seen on the aerial photography of the site.

The deposit contains three clay types characterised by colour; white, off white and red. Each of these types are mined in varying amounts depending on production demands at the factory. Figure 2.1 below indicates the parts of the quarry that contain predominantly each of the 3 clay types. In reality there is a combination of all three clays throughout most of the quarry however the areas indicated are dominated by either of these types. Therefore, up to three areas of the quarry will be worked simultaneously.

Existing approval

The 2014 application identified an excavation area of 21.5 hectares. It identified the general location of the three different clay types found across the quarry, as well as the current stockpiling area.

Existing operation description

The existing excavation operation is located at the northern end of Lot 11, occupying an area of approximately 31 hectares (including approximately 12 hectares for the pit area). The haul road leads from Salt Valley Road, north of the quarry, into the site. There is further resource located within the existing pit area at depth and the existing pit area will continue to be excavated.

Proposed operation description

The existing pit area contains further resource and it is expected that this area will continue to be excavated. Concurrently, the excavation will gradually move in a southerly direction, with some expansion to the north-east into previously excavated areas. It is anticipated that the existing haul road, stockpiling areas and transportable will continue to used in their current location. Existing water detention basins will continue to be used with new basins established or existing basins expanded as required. The new excavation areas will extend the pit area by approximately 18 hectares.

Figure 2.1 – Clay Types

2.4 Depth of excavation

The current pit has been excavated to a depth of approximately 30 metres, although the depth across the quarry can vary. The depth of excavation varies across the site depending on the geology, the depth of overburden and the depth of the resource.

It is important to note that despite the careful planning and onsite investigations which help determine the location of the resource, the depth can vary slightly from the areas depicted on the plans.

2.5 Topsoil and overburden

Topsoil and overburden, consisting of gravel and sand is removed prior to excavation commencing in new areas. The depth of overburden is up to a few metres in depth, depending on the location.

Topsoil is scraped from the top of the area to be excavated to a depth of approximately 0.5 metres. It is either transferred directly to an area being rehabilitated or pushed to form low stockpiles of approximately 1 to 2 metres in height for later use in rehabilitation.

Overburden is scraped from the surface and used to create bunds along the perimeter of the excavation/pit area. This practice will continue as the excavation progresses. Overburden bunds assist with drainage management and noise and dust reduction. It is generally placed around the perimeter of the excavation area, so it is ready to be pushed back into the excavation area for future recontouring. Overburden will also be used to construct bunds to assist with noise attenuation, particularly around the stockpiling and processing areas.

2.6 Site preparation

Minimal additional site preparation will be required as the site is already used for extractive industry. Signage, fencing, gates, security, site access, bunding, internal access roads, stockpiling area and drainage management is already in place.

Some clearing of native vegetation will be required to facilitate the new extraction areas. A Clearing Permit will be applied for from the Department of Water and Environmental Regulation.

Drainage management, bunding, internal access roads and stockpiling areas will be established and rearranged across the site as excavation progresses.

2.7 Access arrangements

Access to the site will continue to be from Salt Valley Road. The haul road is not sealed, and its use is shared with the landfill. Trucks and vehicles for both the Hoddys Well quarry and the Opalvale Landfill use the same access point and haul road.

Unauthorised access to the site is restricted by a locked gate at the entrance to the property and the site is fenced around the boundary.

2.8 Truck movements

Trucks are used to cart clay from the site to the factories. All trucks travel down the haul road and enter Salt Valley Road by turning left. There will be no need to turn right onto Salt Valley Road. Trucks travel west towards Toodyay Road and continue to travel west to the Perth metropolitan area where the factories are located. Trucks turn left at the intersection of Fernie Road and Toodyay Road. Salt Valley Road and Fernie Road is sealed along the parts the trucks drive along. Midland Brick contributes an annual road maintenance fee to the Shire of Toodyay in accordance with the Shire's "Local Planning Policy 7 – Extractive Industries Road Contributions". This fee is placed into a fund for capital works and for regular maintenance which is undertaken by the Shire.

Loading and carting from the site will occur throughout the year for the equivalent of 3.5 to 4.5 months total per year. Carting will be spread out into cartage campaigns throughout the year. For most of the year (7-8 months) there will be no carting/truck movements in and out of the site.

It is estimated that up to 200,000 tonnes of clay could potentially be carted from the site annually.

It is anticipated that there will be approximately 5 to 10 truck loads per hour on carting days. This is the equivalence of approximately 5,000 truck loads each year, although this may vary depending on demand. An approximate number is provided because there may be some variation in truck numbers due to the cyclic demand for clay building products. The number of trucks will also vary depending on the weather and demand for a particular type of clay.

Trucks used for the extraction are RAV 2 truck and dog combination with a payload of 42 tonnes.

2.9 Plant and on-site equipment

No permanent structures are required. Onsite facilities comprise a temporary lunchroom and ablution facilities. These will be in the quarry if the site will be operated for a period of time.

The equipment required for excavation will be brought in on an as-required basis and will include a dozer, excavator, water truck, haul trucks, dump truck, and front end loader. This equipment is removed at the end of each campaign.

No bulk storage of fuel and oil is required on site and no chemicals are stored on site. A Refuelling Management Plan (Land Insights, 2024) is attached.

All supplies will be delivered. Rubbish bins will be provided for site workers to use. A Waste Management Plan is attached.

2.10 Controls

Excavation activities on site will be conducted in accordance with the *Mines Safety and Inspection Act 1994* and the *Mines and Safety and Inspection Act Regulations 1995.* Operation inspections are regularly carried out by the Department of Mines, Industry Regulation and Safety (DMIRS) who inspect safety, operational procedures, and workplace health such as dust and noise.

Operations are managed by a licensed Quarry Manager and inspections occur on a daily basis during the excavation and cartage campaigns. Midland Brick has procedures in place to manage safety, health, environmental impact, site completion and rehabilitation.

In terms of occupational health and safety, Midland Brick requires full personal protection be required for all persons on site at all times. All workers are required to wear full protective safety and high visibility gear when on site. There is a site entry "call up" procedure in place. The site is within mobile phone contact and all vehicles are equipped with two-way radios.

Site closure and decommissioning will also be regulated by the Department of Mines, Industry Regulation and Safety. DMIRS will also require Midland Brick to prepare a Mine Closure Plan once they have completed site rehabilitation and they will inspect the site to ensure it is safe and stable (as required by the *Mines Safety and Inspection Act 1994*). Similarly, should the quarry be temporarily unused for a period of time, the excavation will be made safe to comply with the Act such as maintaining pit faces in a stable manner and ensuring surface water runoff continues to be retained on site within detention basins.

Fences, gates, and warning signs required by DMIRS, and the Shire will be maintained.

2.11 Public Safety

Public access to the site is restricted and appropriate warning signs are located at the entrance regarding quarrying and restricted entrance. The property has locked gates when it is not being used by either the quarry or landfill operators.

Work on site (excavation and cartage) will be discontinuous and there will be periods of time throughout the year when no activity will take place on site. This reduces the risk to public safety from machinery and truck movements. When the site is not operational, the Quarry Manager periodically checks to ensure the site is secure and safe.

2.12 Workforce

Workers associated with the excavation will be on site primarily during the earthworks campaign. At such times the workforce will vary from 1-6 workers in addition to the truck drivers who enter and leave the site.

2.13 Bushfire

The entire extent of Lot 11 is located within a *Bushfire Prone Area* as mapped by the DPLH.

A review of bushfire risk and a description of current operational management is provided below. It should be noted that a Bushfire Management Plan and Bushfire Attack Level Assessment is not required for extractive industry as stated in Clause 2.6 of the "Guidelines for Planning in Bushfire Prone Areas" (Version 1.4) (WAPC, 2021) prepared under State Planning Policy 3.7 (WAPC, 2015). This Clause states that there is an exemption from the requirements of SPP 3.7 where there is no intensification of land use such as "a development application for an extractive industry where the extraction is undertaken in an open cleared area (for example, quarries and open cut mining) and no habitable buildings are proposed." The Shire of Toodyay has supported this approach for past extractive industry applications.

The greatest risk of starting a fire from operations on site are during clearing of vegetation and stripping of topsoil, particularly during hot and windy conditions. This type of work in summer can generate sparks which when combined with dry grasses and leaves may lead to fire. Clearing and stripping of topsoil is only conducted in campaigns once every 2-5 years.

Standard Operating Practices.

There are a range of activities documented (known as "Standard Operating Practices" – SOP) within Midland Brick to assist staff in carrying out work in a safe and efficient manner.

Many SOP's linked with mobile equipment have actions for operators to check around and under the machine for sources of fuel that could be a problem. All staff are trained to carry out daily pre-start checks on their machinery. One of the checks is for hydrocarbon leaks. Staff are trained on how to contain a hydrocarbon leak.

Each year in spring, the company uses a grader to cut fire breaks around all properties used for mining or buffers. Fire breaks will be inspected during the summer to ensure the 3m x 4m rule and mineral earth rule are in place.

Machine maintenance and refuelling is carried out in areas free from fuel burdens. The mobile mining equipment is nearly always in the mine area, hence well away from dry grass and leaves.

Pre-Start Meetings

The Quarry Managers in control of Midland Brick mining and transport teams hold briefing sessions for their work crews every morning. The points of discussion will always cover:

- Safety – issues from yesterday and anything likely to be aware of today, including hazards, incidents/near misses.
- Production – what we are doing, where and quality. Allocation of water trucks to sites will be discussed at this time.
- Issues for today – weather conditions and warnings, possible visitors to the site, maintenance of any plant etc.

To prepare for the next day's quarrying activities, the Quarry Manager will review forecasts from Bureau of Meteorology daily to check for temp and wind plus check warnings from DFES during extremely hot windy days. All staff are briefed at the morning pre-start meeting about likely fire dangers and the possibility of lightning developing and compliance with Lightning Procedures. Midland Brick comply with warnings prepared by DFES.

Fuel load reduction

Midland Brick encourages the owners of land used for clay mining to graze the paddocks to reduce the fuel loads from winter annual grasses. It should be noted that Midland Brick does not own any of the land where they mine clay.

Fire response

The Midland Brick team have developed an Emergency Management Plan and have trained their staff in what to do in all types of emergencies. Should there be a small fire associated with any quarrying equipment it will be treated immediately.

All mobile plant carries at least one portable fire extinguisher. Operators are trained in the correct use of various types of handheld fire extinguishers.

Stormwater is retained within the operation area in a dam for internal use. This source of water is suitable for large tankers in case of fire. Midland Brick have been in communication with the Local Bush Fire Brigade who are aware of the quarry location, access gates and water storage.

The Hoddys Well quarry has mobile phone coverage for Emergency Procedures. The Midland Brick staff/team are briefed on what they should do in case of Fire Emergency.

3 Site description

3.1 Climate

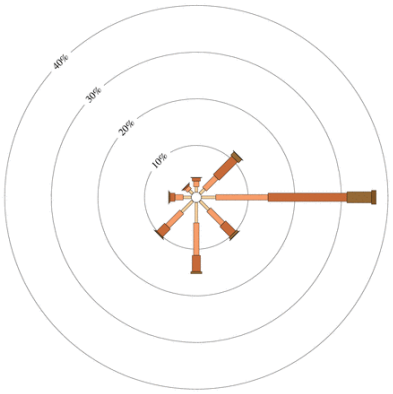
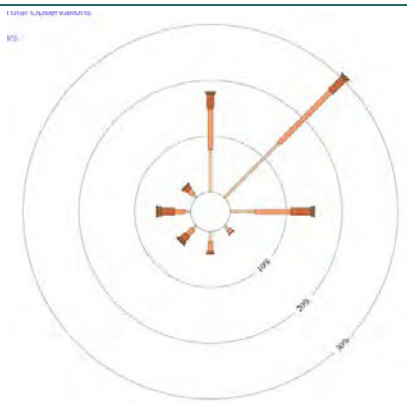
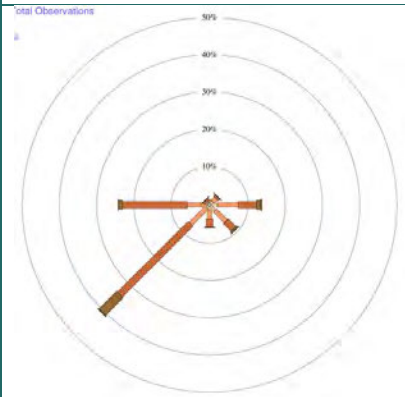
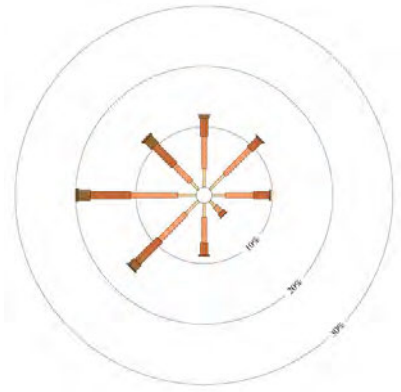
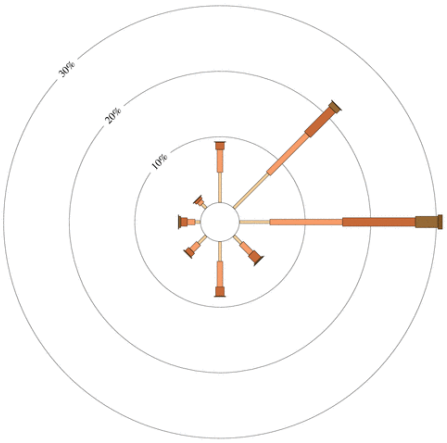
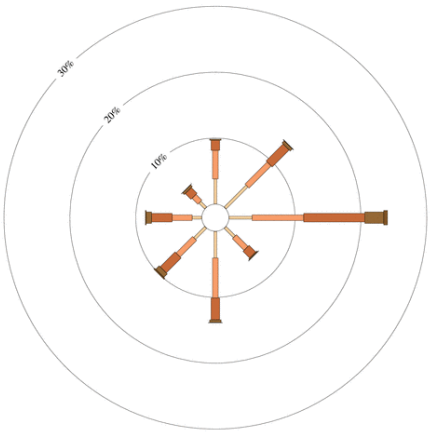
The south-west of Western Australia experiences a Mediterranean climate which is characterised by warm, dry summers and cool, wet winters.

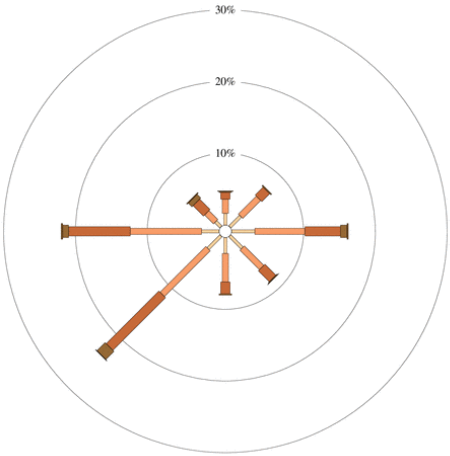
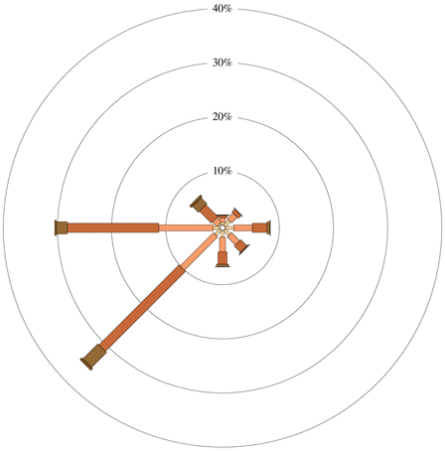
The rainfall and temperature data for the region has been obtained from the Bureau of Meteorology "Climate Data Online" services. The average rainfall from the closest station which is the Toodyay station is 520.7mm. A majority of rainfall is from May to August.

The mean temperature information is from the closest station which is the Northam station. It states that the hottest month is January with an average maximum of 34.3°C and the coldest month is July with an average minimum of 5.3°C.

The prevailing winds throughout the majority of the year are predominantly from the east (morning) and the south-west (afternoon) (Bureau of Meteorology, 2024). Wind roses for the Perth Airport are shown below.

Table 3.1 – Wind Roses for the Perth Airport

TIME OF YEAR	WIND ROSE	TIME OF YEAR	WIND ROSE
Summer 9am		Winter 9am	
Summer 3pm		Winter 3pm	
Autumn 9am		Spring 9am	

TIME OF YEAR	WIND ROSE	TIME OF YEAR	WIND ROSE
Autumn 3pm		Spring 3pm	

3.2 Topography and landform

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD). It may reach depths of up to 30 metres.

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

3.3 Geology

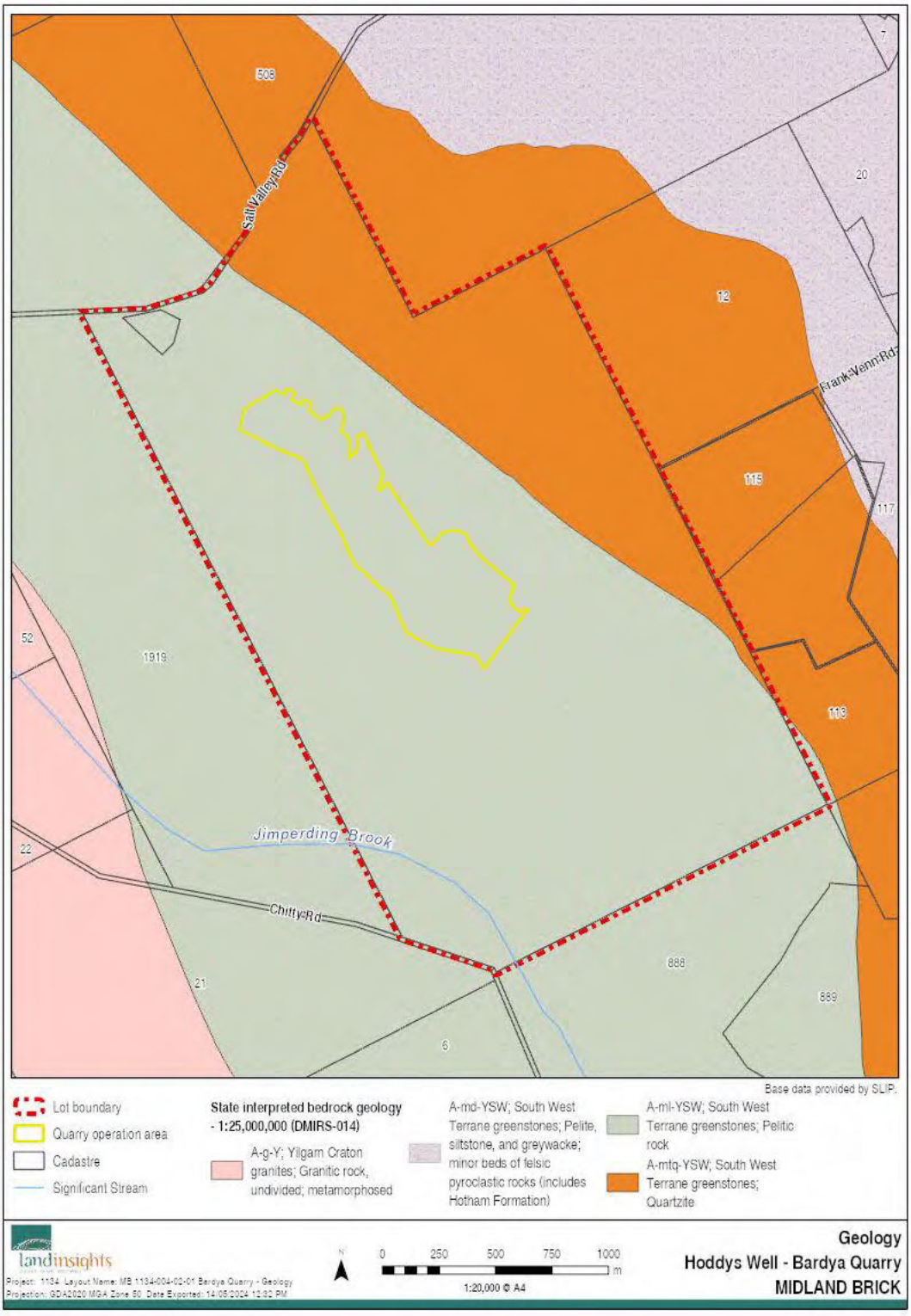
The site sits on the Darling Plateau which lies east of the Darling Scarp and the Swan Coastal Plain. The geology of this area can be described as “deeply weathered mantle over granitic rocks”. More specifically, the site is located within the Eastern Darling Range which is described in the DPIRD database as “moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys” with soils that are “formed in laterite colluvium or weathered in-situ granite”.

Geologically, the area is part of the Pre-Cambrian meta sedimentary complex referred to as the Jimperding Metamorphic Belt. It extends as a 120 kilometre long belt in a north-westerly direction from York to Clackline, to Jimperding and then Chittering, where it becomes the higher grade metamorphic Chittering Metamorphic Belt. The Jimperding Series consists of inter-bedded schists, quartzites and minor metamorphosed volcanics. They are steeply dipping and trend northerly and then north-westerly. Extensive weathering has formed the regolith profile that includes gravel/laterite and the highly altered, kaolin dominated, micaceous clay over unaltered micaceous schist (Brikmakers, 2013a).

The 500 metres grid Regolith of WA as mapped by DPIRD identifies the geology “exposed rock, saprolite and saprock”. The bedrock geology is “South West Terrane greenstones” which are described as “Quartz--mica schist”.

The site is mapped by DMIRS as having “regionally significant basic raw materials” for clay. This is also reflected in SPP 2.4 which maps the site as a “Significant Geological Supply”.

Figure 3.1 – Geology



3.4 Soils

The site is located within the "Leaver" soil landscape system 253ByLV. The soil-landscape units are mapped by the Department of Primary Industries and Regional Development (DPIRD). It is described as "gravelly slopes and ridges of the western Darling Plateau. Gravelly yellow and red duplexes, gravelly deep clayey sands and sandy loams over laterite and clay".

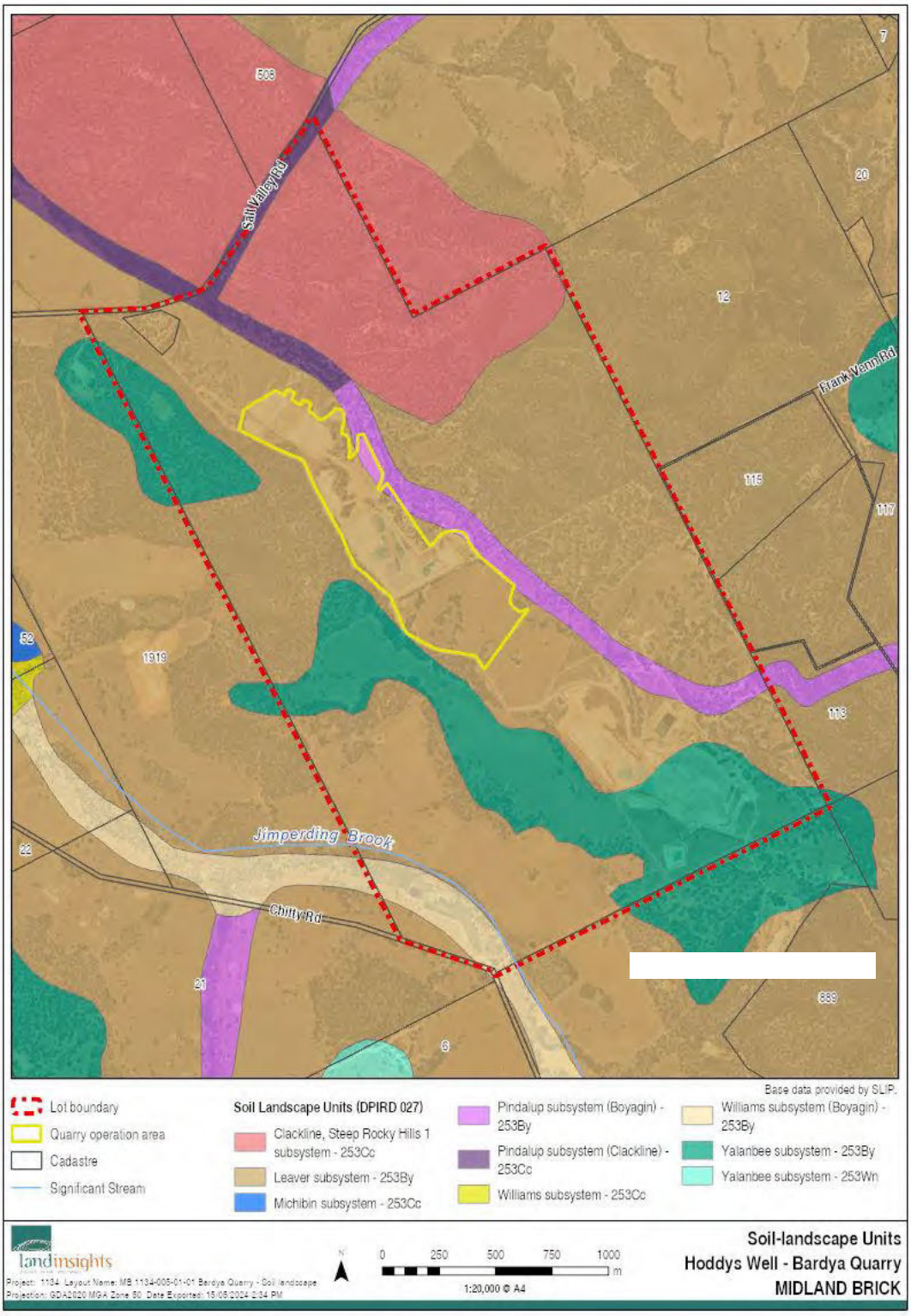
Generalised soil qualities of each soil-landscape unit as mapped by DPIRD are described in the table below.

Table 3.2 – Soil Qualities

SOIL-LANDSCAPE UNIT	WATER EROSION	WIND EROSION	WATERLOGGING	FLOOD	SALINITY
Leaver subsystem	Low risk	High risk	Low risk	Low risk	Low risk

Source: DPIRD, 2024

Figure 3.2 – Soil-landscape units



3.5 Vegetation

Existing vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry. Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

Historic photos from 1995 onwards are provided in Figures 3.4 to 3.6 below which show the past level of disturbance prior to the quarry development.

Figure 3.3 – Native vegetation extent

Figure 3.4 – Historic aerial photo 1995

Aerial Photo – 1995 (Source: Landgate)

Figure 3.5 – Historic aerial photo 2000

Aerial photo – 2000 (Source: Landgate)

Figure 3.6 – Historic aerial photo 2010

Aerial photo – 2010 (Source: Landgate)

Regional vegetation

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into "bioregions" based on major biological and geographical/geological attributes. Western Australia has 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation. The site is located within the Northern Jarrah Forest (NJF) subregion of the Jarrah Forest Bioregion.

The site is located in the Drummond Botanical Subdistrict within the the Southwest Botanical Province as described by Beard (1990). Flora composition has been described by Beard (1990) as predominantly consisting of low Banksia Woodlands on leached sands with Melaleuca swamps where ill drained and Woodlands of Eucalyptus spp. on less leached soils.

Vegetation Mapping

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as “Bannister 4” which is described as “Jarrah, Marri and Wandoo.”

The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is “Michibin” which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones.

There are no Bush Forever Areas located on the site.

A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.

The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as “Cleared Paddocks”.

The Allocasuarina woodland was classified in the Survey as “Degraded” condition and the remainder of the survey area was classified as “Completely Degraded”.

Figure 3.7 – Vegetation complexes

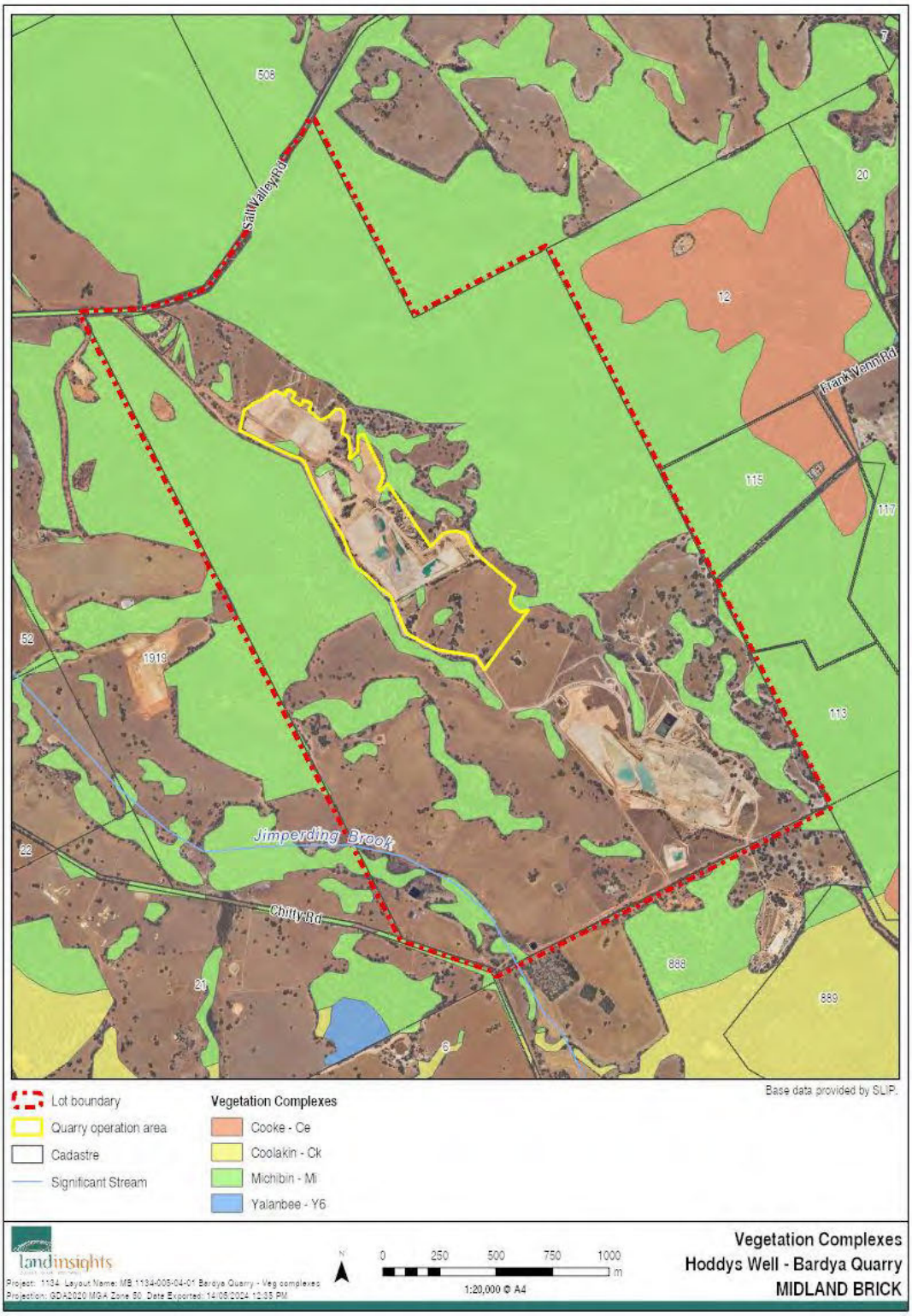


Figure 3.8 – Vegetation Communities (based off Del Botanics, 2024)

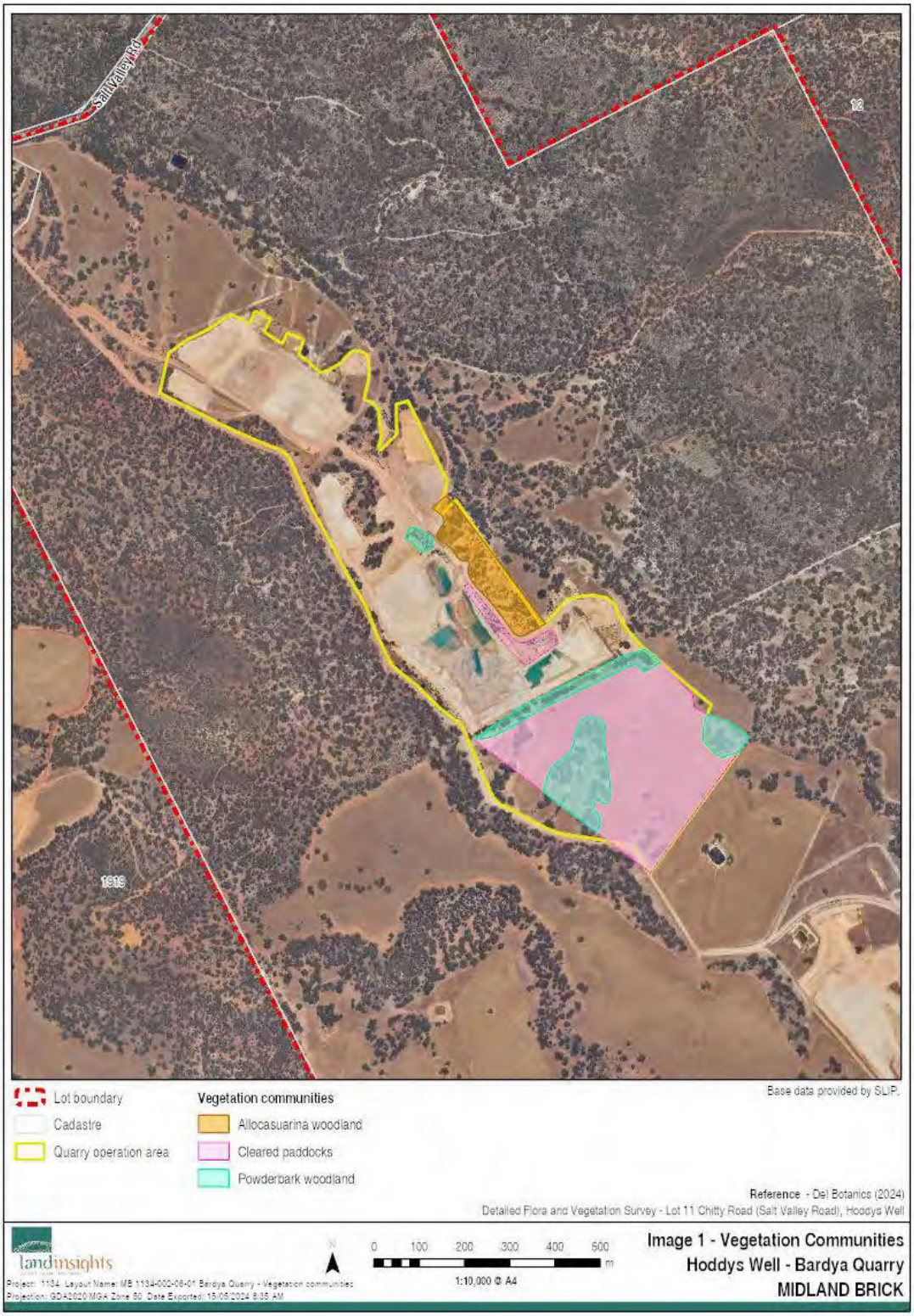
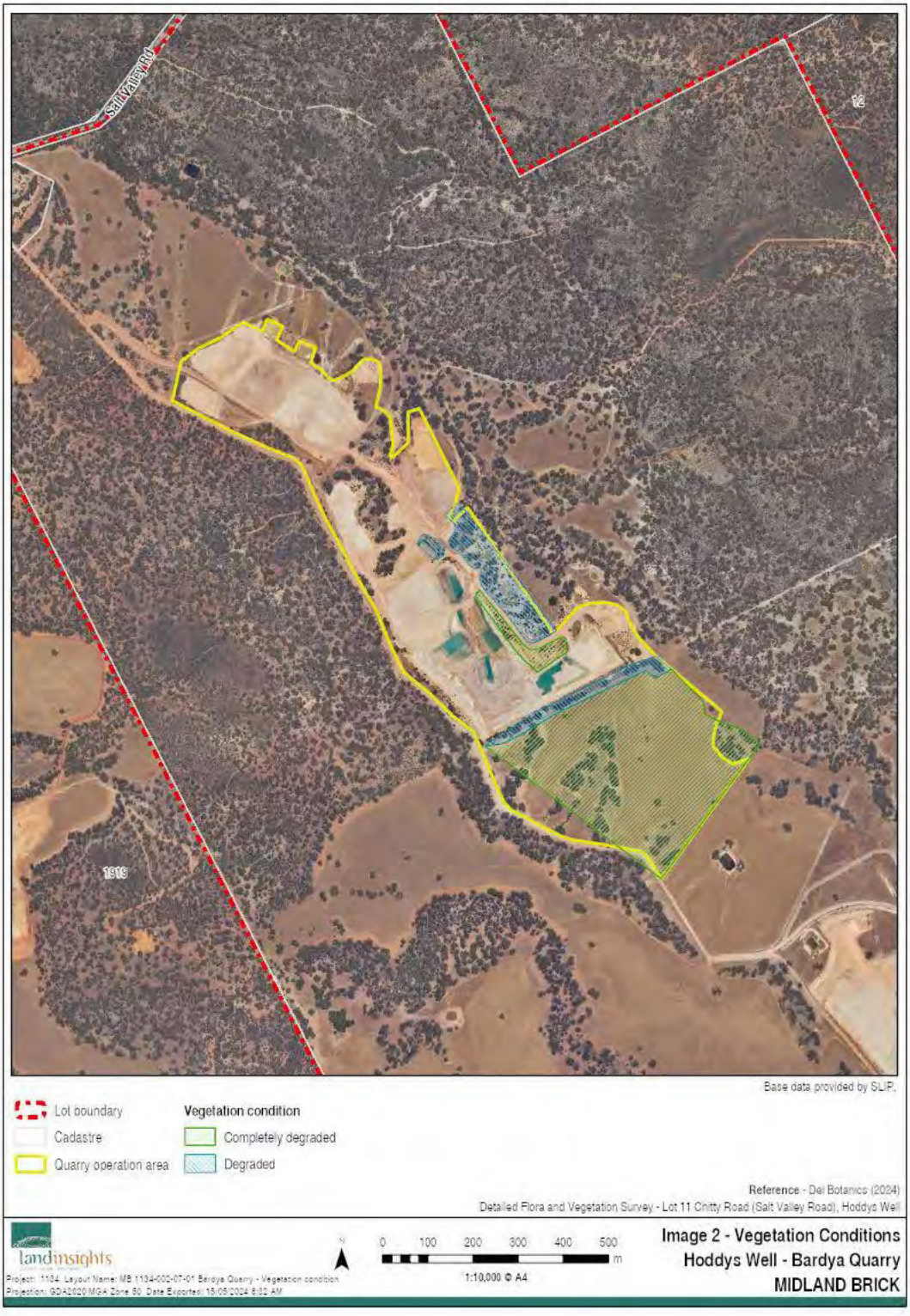


Figure 3.9 – Vegetation Condition (based off Del Botanics, 2024)



Threatened Species and Communities

The Flora Survey by Del Botanics stated that no species of Threatened, or Priority Flora pursuant to the *Biodiversity and Conservation Act* 2016 and the *Environment Protection and Biodiversity Conservation* Act 1999 were located during the time of the survey. No Threatened Ecological Communities (TECs) listed by Department of Climate Change, Energy, the Environment and Water (DCCEEW) or Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey.

Clearing Permits

There have been two Clearing Permits previously issued for the clearing of native vegetation for the quarry:

- CPS 5881/1 – 3.52 hectares – Issued 6th September 2014 and expires 6th September 2024
- CPS 2217/1 – 1.8 hectares – Issued 8th June 2008 and expired 8th June 2012

Both Permits were issued to BGC (Brikmakers) for clearing for the purpose of clay extraction. A majority of CPS 2217/1 was cleared and only a portion of CPS 5881/1 was cleared. Permit 5881/1 required an offset area to be placed under a Conservation Covenant. A portion at the north-western potion of Lot 11 was set aside as an offset when the permit was issued and revegetated by BGC. Clearing Permits will be applied for if further clearing of native vegetation is required.

Environmentally Sensitive Areas

There are no “Environmentally Sensitive Areas” (ESA) located on or adjacent to Lot 11. The closest ESA is located approximately 3.5 kilometres to the south-east of the quarry, associated with the Clackline Nature Reserve.

3.6 Fauna

The operation area has been historically cleared of native vegetation and disturbed, even prior to clay extraction operations commencing. Some areas of remnant vegetation surrounding the quarry are likely to be used by native fauna.

A *Hoddys Well Quarry Targeted Conservation Significant Fauna Survey 2024* was undertaken by Western Wildlife in 2024. The survey area comprised the new excavation area adjacent to the south of the quarry and the vegetation at the eastern side of the quarry where some regrowth may require clearing. The study identified the following fauna habitats across the surveyed areas. The report states that "all of the habitats are disturbed, either by grazing or by past quarry activities".

- Wandoo-marri woodland
- Regrowth woodland
- Pit
- Cleared

In general, the Wandoo-Marri Woodland is located in the paddock area adjacent to the southern quarry boundary and the Regrowth Woodland describes the vegetation habitat on the eastern boundary of the quarry.

With regards to the Wandoo-Marri Woodland, Western Wildlife (2024) states that "The understory is disturbed by grazing and generally absent, but stands of shrubby *Banksia sp*. persist in patches, and there are accumulations of leaf litter and woody debris that may provide shelter for reptiles. The Marri and Jarrah trees and patches of shrubby *Banksia* sp. are important foodplants for black cockatoos."

With regards to the Regrowth Woodland, Western Wildlife (2024) states that "this habitat consists of Wandoo, Marri, Sheoak (*Allocasuarina* sp.) and various understory shrubs on a highly modified ground surface. There are occasional remnant native trees, and areas of regrowth Wandoo with little understory.

There are a few scattered shrubby *Banksia* sp. in the understory towards the northern end. Marri and shrubby *Banksia* sp. Are important food-plants for black-cockatoos, and Sheoak is a secondary food-plant for the Forest Red-tailed Black-cockatoo, however, these food-plants are sparsely distributed in this habitat."

Overall commentary of the fauna assemblage by Western Wildlife (2024) is provided below:

> *Overall, the faunal assemblage of the study area is likely to be relatively species poor as the habitats of the study area are disturbed and occur in small patches. The proximity of other native vegetation, however, means that fauna from these larger bushland areas is likely to range onto the study area. Even isolated paddock trees can provide habitat for birds and a small number of arboreal reptiles and bats. The cleared areas are likely to support very few species.*
> *The birds observed on the site visit included those that forage on the nectar, seeds or invertebrates available in the eucalypt canopy, omnivorous species that forage on the ground, and mid-level foragers. Frogs may occur in the pit and burrowing frogs may forage in terrestrial habitats. Few reptiles are likely to occur as the ground surface is disturbed and understory mostly absent, but larger species may range into the study area from adjacent vegetation. Small terrestrial native mammals are likely to be rare or absent due to the lack of understory vegetation, but some may occur on occasion due to the proximity of large areas of vegetation adjacent to the study area.*
> *Native bats are likely to occur throughout the study area, roosting in tree hollows.*

With regards to conservation significant fauna, the Western Wildlife report concludes that "The study area is unlikely to provide important habitat for most fauna of conservation significance known to occur in the region, although the Chuditch, Fork-tailed Swift and Peregrine Falcon potentially occur, and the Red-tailed Phascogale, Brush-tailed Phascogale, Masked Owl (southwest population), Quenda and Carpet Python possibly occur. The only conservation significant fauna for which the study area is likely to have importance are Carnaby's Cockatoo (recorded in the study area), Baudin's Cockatoo (likely to occur) and the Forest Red-tailed Black-cockatoo (likely to occur)."

A Black Cockatoo habitat assessment was undertaken as part of the survey by Western Wildlife. The survey concluded that "The study areas contain 4.6ha of high quality cockatoo foraging habitat in Wandoo - Marri woodlands and Regrowth woodlands and 135 'potential nesting trees' were recorded. Carnaby's Cockatoo is known to breed within 12km of the study area, and although no evidence of roosting was recorded in the study area cockatoos are known to roost nearby."

The closest conservation area is the Panorama Reserve (approximately 3.0km to the north-east) and the Clackline Nature Reserve (approximately 3.5km to the south).

3.7 Water resources

Hydrological mapping

The site sits within the Eastern Darling Range hydrogeological zone which is described as "Moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys."

The site is located within a "Proclaimed Surface Water Area" under the *Rights in Water and Irrigation (RIWI) Act 1914* (the Avon River Catchment Area). It is not located within a "Proclaimed Groundwater Area".

In a regional context, the site is located within the Avon River Surface Water Area.

Additional hydrological mapping relating to the site (as mapped by DWER) are listed below:

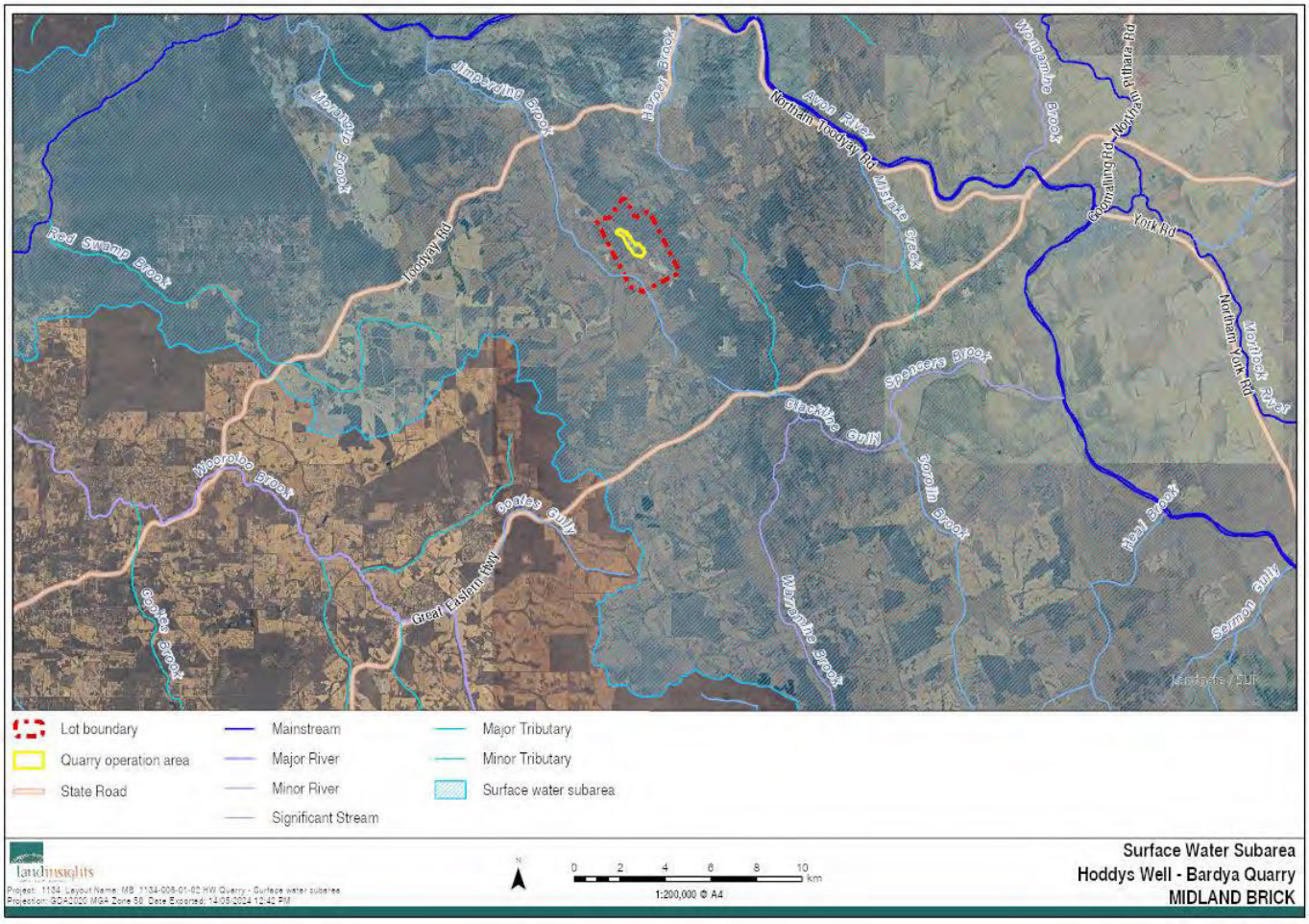
- Surface Water Area – "Avon River"
- Surface Water Subarea – "Avon River"
- Hydrographic Catchment Basin – "Swan Coastal"
- Hydrographic Catchment – "Swan Avon – Main Avon"
- Hydrographic Sub catchment – "Avon River"
- Surface Water Management Area – "Avon River"

- Surface Water Management Subarea – “Ellen Brook”
- Groundwater Area – “Karri”
- Groundwater subarea – “Karri”

The site is not located within or in close proximity to a Public Drinking Water Source Areas (PDWSA’s).

There are no wetlands, floodplain areas or Floodplain Development Control Areas located on or surrounding the property.

Figure 3.11 – Surface Water Subarea



Surface water features

The surface water hydrology is generally described as a deeply dissected lateritic plateau. The watercourses in the area do not contain water through all seasons and usually only flow during rainfall events and winter periods. As is mentioned above, the surface water catchment area is the Avon River which means that the surface water drainage is naturally to the north towards the River.

The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon

River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Road and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

It should be noted that the operation is separated hydrologically from surrounding watercourses and all stormwater is retained on site within drainage basins. The quarry operations do not intercept the watercourse and does not discharge water. There are no drainage lines from the quarry towards any watercourses and there are no watercourses or drainage lines leading into the quarry.

There are no wetlands located on the site. There are no wetlands as mapped by the “Directory of Important Wetlands in Australia” or the DWER Geomorphic Wetlands database.

Figure 3.12 –Watercourses

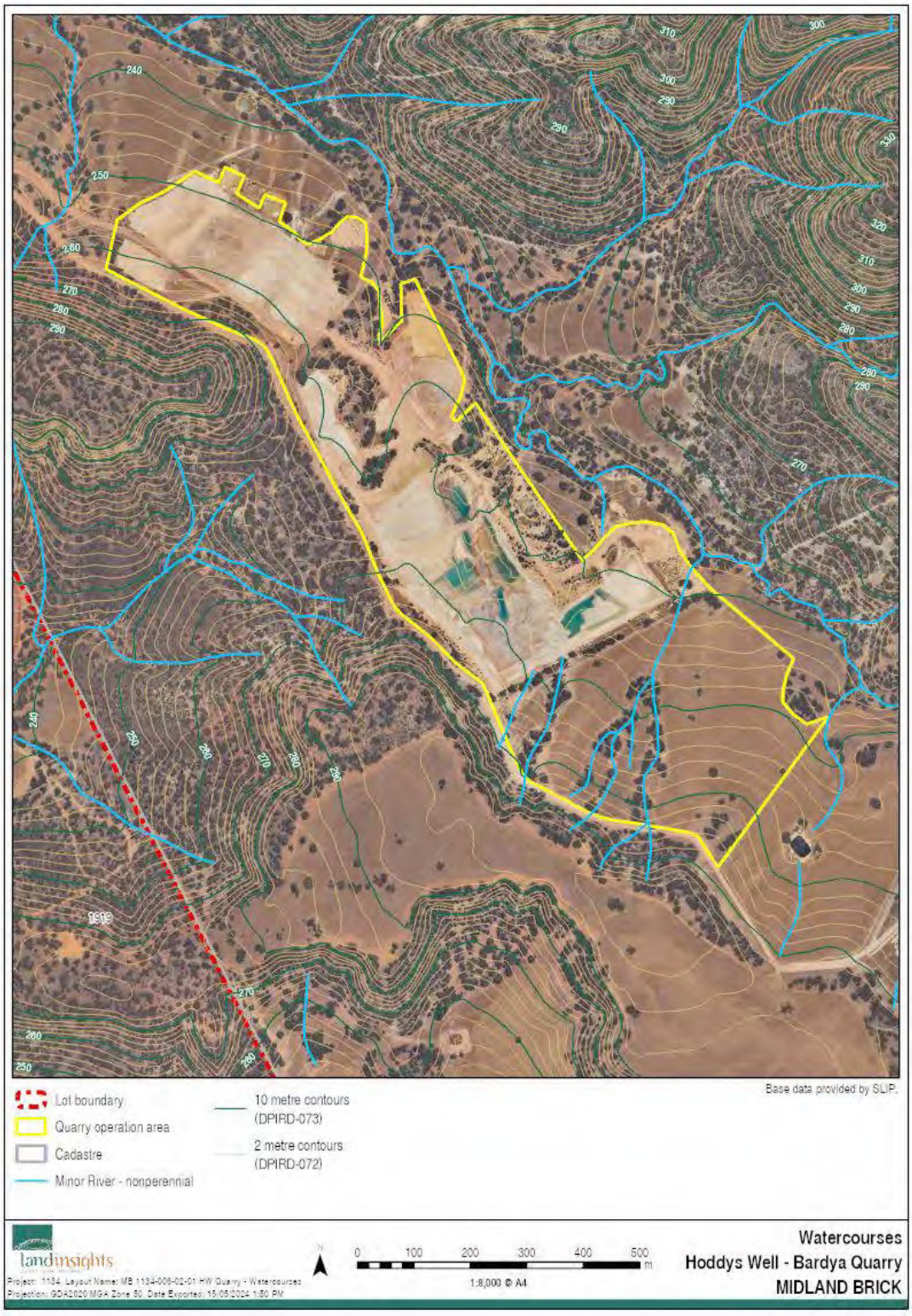
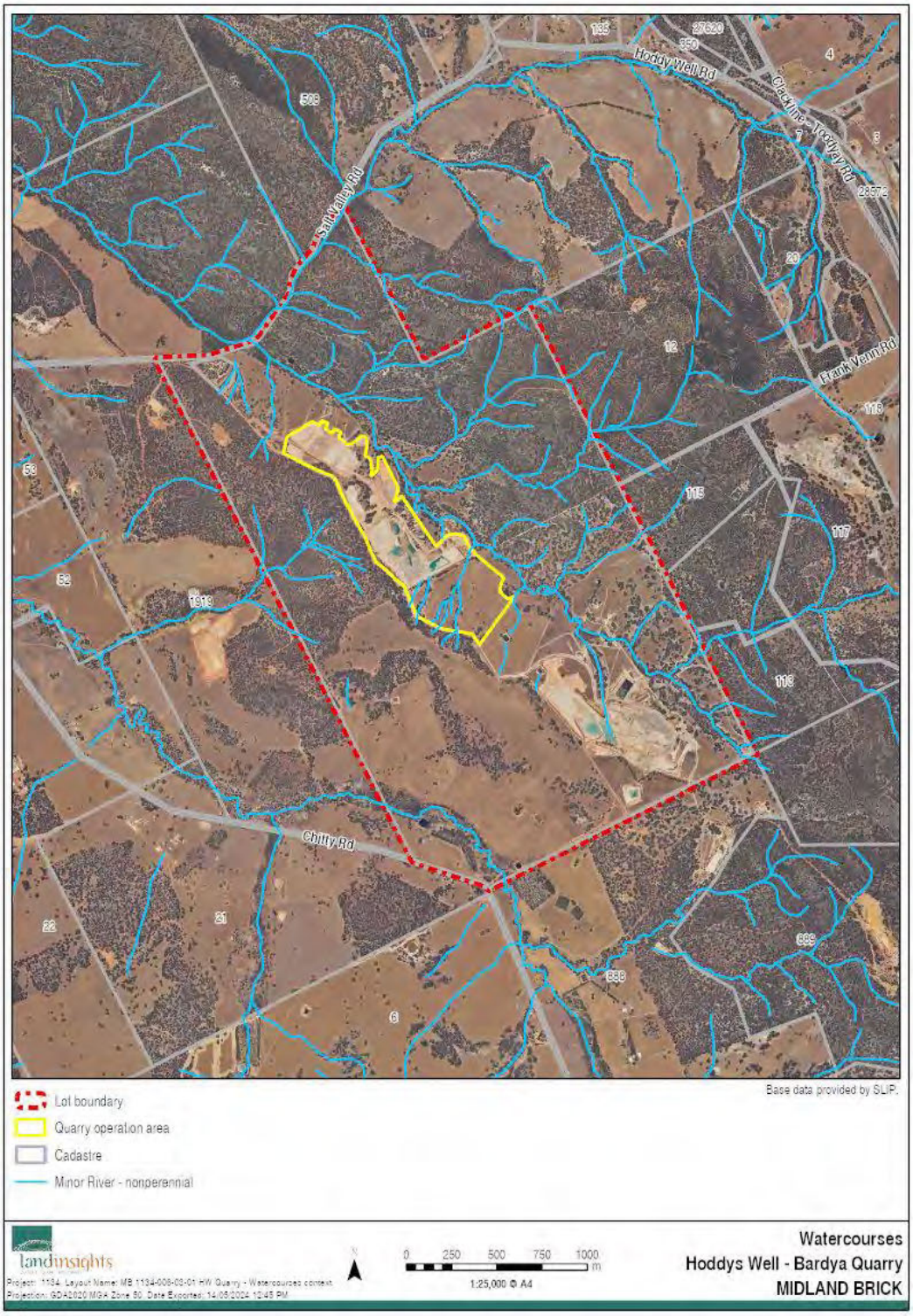


Figure 3.13 – Watercourses Context



Groundwater

The site is underlain by a confined aquifer/aquitard of limited extent which is confined by thick beds of clays and weathered schist/quartzite (Stass Environmental, 2011). Ground water flows in a south-westerly direction. The site is not located within a Proclaimed Groundwater Area.

Online mapping by DPIRD identifies the site as being located in the Eastern Darling Range hydrological zone. The groundwater is described by DPIRD as “mainly low-yielding saprolite aquifers (brackish to saline).” It also states that Palaeochannels and sandy aquifers occur in some valleys which can be fresh to brackish. Groundwater discharge may occur in drainage lines and on valley floors in cleared catchments.

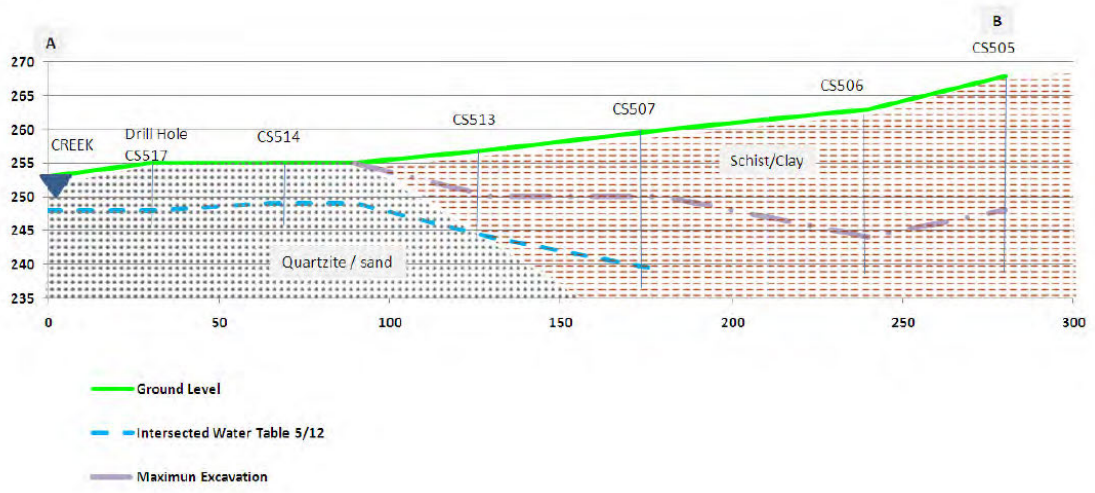
The general geology of the area is highly weathered rocks that have a high clay content and therefore do not allow for significant flows. There are no sedimentary sands in the area that would produce an interconnected ground water table with in the deposit. The weathered schists have a low to very low permeability. The groundwater is more accurately described as an aquiclude which indicates that groundwater is present however there is no defined/connected aquifer system within the schist (Brikmakers, 2013a).

Over 100 exploration holes either within the proposed extraction area or adjacent to it have been completed by Brikmakers in the past. No significant groundwater has been located at the depths proposed to excavate to a maximum of 30m below ground level apart from groundwater previously intercepted in drilling on the eastern side of the proposed extraction (as can be seen in Figure 3.13 below). This water is contained within the fractured quartzite (Toodyay stone) that forms the eastern contact of the schist. No water table or perched water tables have been intercepted during significant drilling of the deposit and the extraction area.

Figure 3.14 below (extracted from Brikmakers, 2013a) demonstrates the relationship between the water table, schist and quartzite. A minimum of 5m will exist between the water table and the finished pit floor.

The cross section is an east to west section showing measured water table and proposed excavation depths.

Figure 3.14 – Generalised Geology and Hydrogeology (from Brikmakers, 2013a)



3.8 Contaminated sites

No contaminated sites, including "contaminated – remediation required", "contaminated – restricted use" and "remediated for restricted use" are mapped on or adjacent to the site.

3.9 Heritage

A search of the Aboriginal Cultural Heritage Inquiry System (managed by the DPLH) shows there are no mapped Aboriginal Cultural Heritage sites located within or directly adjoining/surrounding the quarry. One mapped "ACH Registered Site" is located on Lot 11. The heritage site is the Jimperding Brook which is a tributary of the Avon River. The site is listed as "Avon River" (ID 15979) which is described as a "Camp; Creation / Dreaming Narrative; Landscape / Seascape Feature; Other; Water Source" site. The quarry is approximately 900 metres from the Jimperding Brook at the shortest distance. There are no "ACH Lodged Places" or "ACH Historic Records" mapped across the site and the surrounding area.

No heritage sites listed by the Heritage Council of WA, or the Shire of Toodyay are located on the site.

Figure 3.14 – Heritage

3.10 Separation distances

There are no sensitive receptors with 1,000 metres from the quarry (including the landowner). The following closest sensitive receptors have been identified from the quarry.

- Owner's dwelling to the south – Approximately 1,100 metres
- Nearest rural dwelling to the east – Approximately 1,400 metres
- Nearest rural dwelling to the south – Approximately 2,400 metres
- Nearest rural dwelling to the west – Approximately 1,800 metres
- Nearest rural dwelling to the north-west – Approximately 1,600 metres (note that this is to the site entrance as this is the closest point)

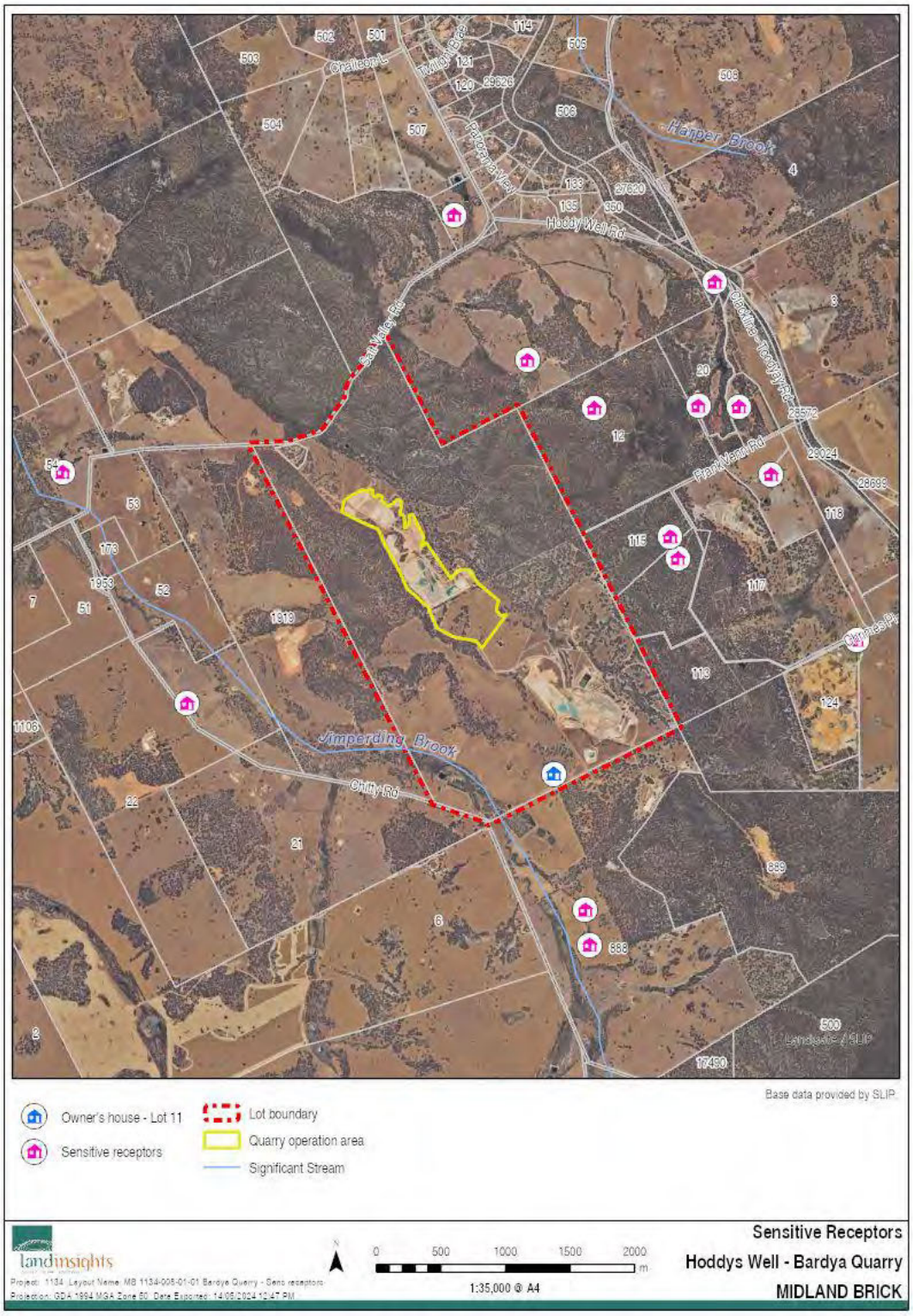
The location of surrounding sensitive receptors in relation to the quarry is shown in the figure below.

The EPA's Guidance Statement No. 3 provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses (such as residential dwellings). It should be noted that the distances in the policy assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category "clay extraction or processing". The potential impacts are listed as "noise" and "dust". The separation distance is "500-1000 metres, depending on size and processing", however this can be less with appropriate environmental management. All surrounding sensitive receptors are over 1,000 metres from the quarry.

A Dust Management Plan, Noise Management Plan and Visual Amenity Management Plan have also been prepared for the operation.

Figure 3.15 – Sensitive Receptors



4 Statutory framework

4.1 State Planning Policy 1 – State Planning Framework

The *State Planning Framework* was prepared by the WAPC in 2017. It sets out the key principles relating to environment, community, economy, infrastructure, regional development and governance to guide the way in which future planning decisions are made. More specifically, the Framework identifies relevant policies and strategies used by the Commission in making decisions.

State Planning Policy 2.4 – Planning for Basic Raw Materials is recognised under the Framework. This is discussed below.

4.2 State Planning Policy 2.0 – Environment and Natural Resources Policy

State Planning Policy 2.0 was prepared by the WAPC in 2003. It aims to integrate environment and natural resource management with broader land use planning and to protect, conserve and enhance the natural environment.

Basic Raw Materials are included within Policy Measure 5.7 which states that "mineral resources, petroleum resources and basic raw materials are important natural resource assets and are a vital part of the economy*".* The importance of basic raw materials located in close proximity to the metropolitan area is also recognised in the Policy. It states that "A ready supply of basic raw materials close to developing areas is required in order to keep down the cost of land development and the price of housing." The continuation of extraction at the Hoddys Well quarry is of significance to the local economy and construction industry as it supplies essential basic raw materials located close to brickmaking factories.

The Policy sets out a list of principles which should be considered by decision-makers including the following relating to basic raw materials. The principles from the Policy are below:

- "The identification and protection of important and economic mineral resources to enable mineral exploration and mining in accordance with acceptable environmental standards.

- The identification and protection of important basic raw material resources and provide for their extraction and use.
- Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.
- Support, where possible, improved efficiencies in the production and consumption of mineral and basic raw material resources to ensure their availability for future environmental and human uses."

SPP 2 supports the identification, protection and extraction of basic raw materials. Protection of basic raw materials is also provided in SPP 2.4 (discussed below).

4.3 State Planning Policy 2.4 – Planning for Basic Raw Materials

State Planning Policy 2.4 – Planning for Basic Raw Materials was prepared by the WAPC and gazetted in July 2021. It "enables the responsible extraction of BRM, while ensuring the protection of people and the environment*".* The Policy provides guidance to operators and decision makers regarding applications for BRM extraction, as well as other types of planning applications that can potentially impact on extraction sites or significant geological supplies. The associated *Planning for Basic Raw Materials Guidelines* (WAPC, 2021) provide further information on the specific requirements that need to be met for extractive industry (including operational and environmental protection requirements).

The SPP 2.4 mapping database identifies areas of "Significant Geological Supplies" across a majority of Lot 11. The entire Hoddys Well quarry is mapped as a Significant Geological Supply for clay.

This application for extractive industry is consistent with the principles and objectives of the Policy as discussed in Table 4.1 below.

Figure 4.1 – SPP 2.4

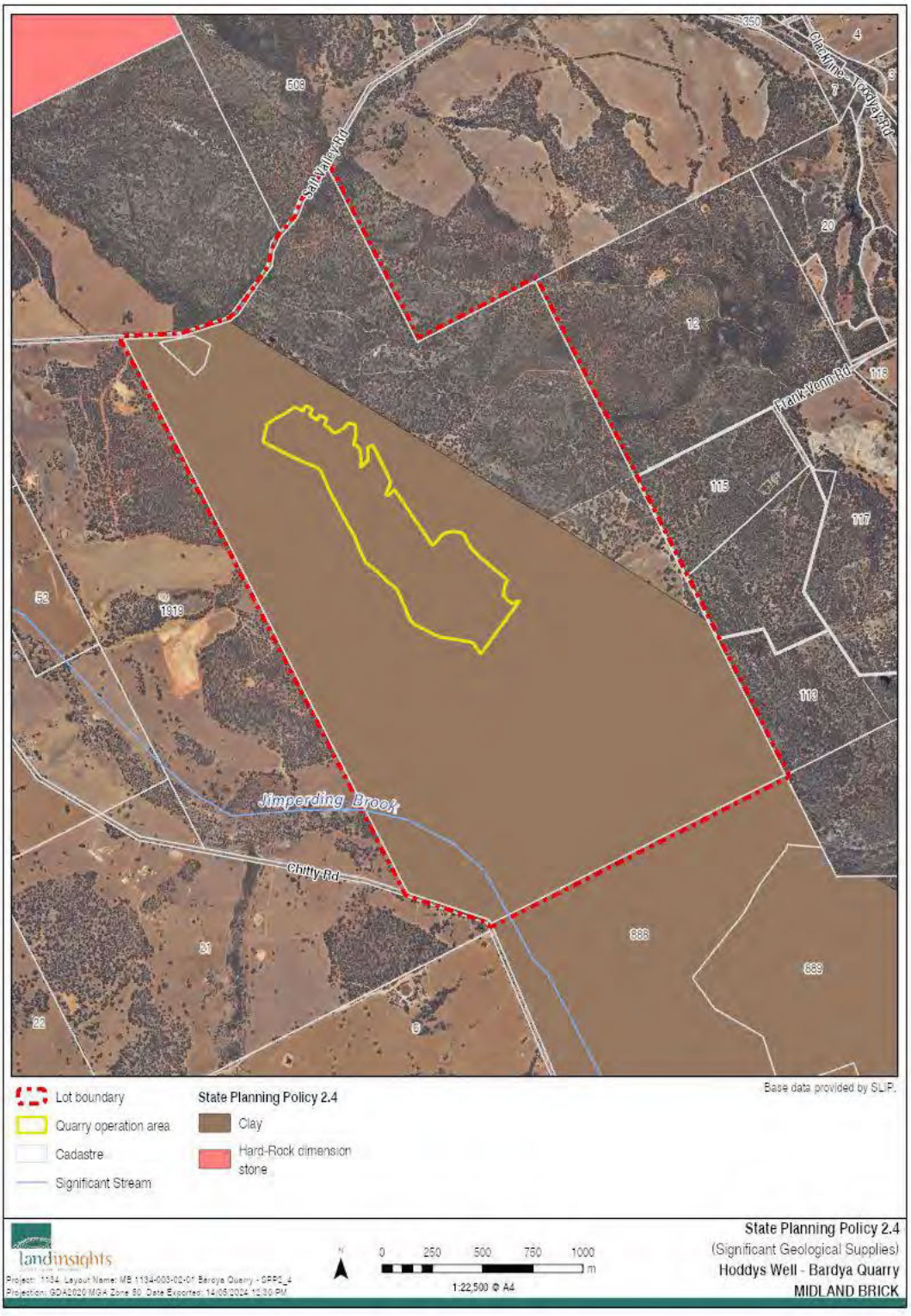


Table 4.1 – Objectives of SPP 2.4

POLICY OBJECTIVES	COMMENT
Ensure BRM and its regional importance is considered at the earliest stages of the planning process.	The Shire of Toodyay Local Planning Scheme does not recognise the basic raw materials or extractive industries on the site (despite the site being recognised in SPP 2.4 and being used for extractive industry for the last 60 years). However, the Shire's Local Planning Strategy reflects the SPP 2.4 basic raw material mapping and identifies the importance of the site for extractive industry.
Protect BRM in SGS areas and ES by avoiding encroachment from incompatible land uses.	There is no intensification of land uses proposed in the Shire of Toodyay Scheme or Strategy. The Strategy includes the basic raw material mapping from SPP 2.4. This application complies with this objective by proposing excavation of resources prior to encroachment of incompatible land uses.
Ensure BRM resources are used efficiently in land use planning and development.	This application complies with this objective by proposing excavation of resources prior to encroachment of incompatible land uses.
Identify BRM extraction opportunities through sequential land use without compromising the final intended land use.	The final intended land use will be recontouring the land with some revegetation to return the use to farming and the extraction of basic raw materials supports this use.
Ensure the extraction of BRM avoids, minimises, or mitigates any adverse impacts on the community, water resources and biodiversity values.	This application complies with this objective by providing a number of detailed management plans.

The *SPP 2.4 Planning for Basic Raw Materials Guidelines* (WAPC, 2021) provide support for decision-making authorities, proponents and referral agencies to implement SPP 2.4. Section 4 of the Guidelines provides advice on the assessment of proposals for extractive industries.

The Guidelines suggest the type and content of information to be submitted with an application for extractive industry including operational information, separation distances, environmental management, surface and groundwater, noise, dust, landscaping, access, and rehabilitation. The information recommended by the Guidelines is included in this application.

4.4 State Planning Policy 2.9 – Water Resources

State Planning Policy 2.9 – Water Resources was prepared by the WAPC in 2006. The objectives of the Policy are to protect, conserve and enhance water resources, assist in ensuring the availability of suitable water resources and promote the sustainable use of water resources. It provides a range of policy measures to guide and assist decision-makers in the consideration of water resources in decision-making. Policy Measures are provided for surface water, groundwater, wetlands, waterways, estuaries and total water cycle management.

Policy Measures of relevance to this application include those related to surface water and groundwater. Further information on the water resources on the site are provided in the Water Management Plan (Land Insights, 2024).

4.5 Draft State Planning Policy 2.9 – Planning for Water

The *draft State Planning Policy 2.9 – Planning for Water* was prepared by the WAPC in 2021. The intent of the Policy is "ensure that planning and development considers water resource management and includes appropriate water management measures to achieve optimal water resource outcomes". It provides guidance for the consideration of water resources for planning applications and decision-makers. The Policy Measures include consideration of environmental values, social and cultural values, riverine flooding, infrastructure, and supply.

The associated SPP 2.9 Guidelines provide further detail as to how the Policy Measures can be considered and the information to be provided in an application. It should be noted that no "important environments" (including "Sensitive Water Resource Areas") are mapped on the site under the draft Policy.

There are no "Sensitive Water Resource Areas" mapped on Lot 11 or adjoining the lot.

4.6 State Planning Policy 3.7 – Planning in Bushfire Prone Areas

State Planning Policy 3.7 – Planning in Bushfire Prone Areas was prepared by the WAPC in 2015. It provides the foundation for land use planning to address bushfire risk management in Western Australia and to inform and guide decision-makers, referral agencies and landowners to help achieve acceptable bushfire protection outcomes. It applies to development in designated bushfire prone areas.

The latest DPLH mapping (2021) identifies *Bushfire Prone Areas* across the entire of Lot 11.

A bushfire risk assessment and management actions are provided in Chapter 2.13 above. It should be noted that a Bushfire Management Plan and Bushfire Attack Level Assessment is not required for extractive industry as stated in Clause 2.6 of the "Guidelines for Planning in Bushfire Prone Areas" (Version 1.4) (WAPC, 2021) prepared under State Planning Policy 3.7 (WAPC, 2015). This Clause states Clause 2.6 of the Guidelines states that:

> *Decision-makers can apply exemptions from the requirements of SPP 3.7 and these Guidelines where there is no intensification of land-use, and/or the proposal is not increasing the bushfire threat.*

An example given in the Guidelines for the type of proposal/development which could be exempt includes extractive industries as follows:

> *A development application for an extractive industry where the extraction is undertaken in an open cleared area (for example, quarries and open cut mining) and no habitable buildings are proposed.*

The requirement for a Bushfire Management Plan is at the discretion of the Local Government and as no habitable building are located on the site, the requirement for a Bushfire Management Plan could be waived. The Shire of Toodyay has supported this approach for past extractive industry applications.

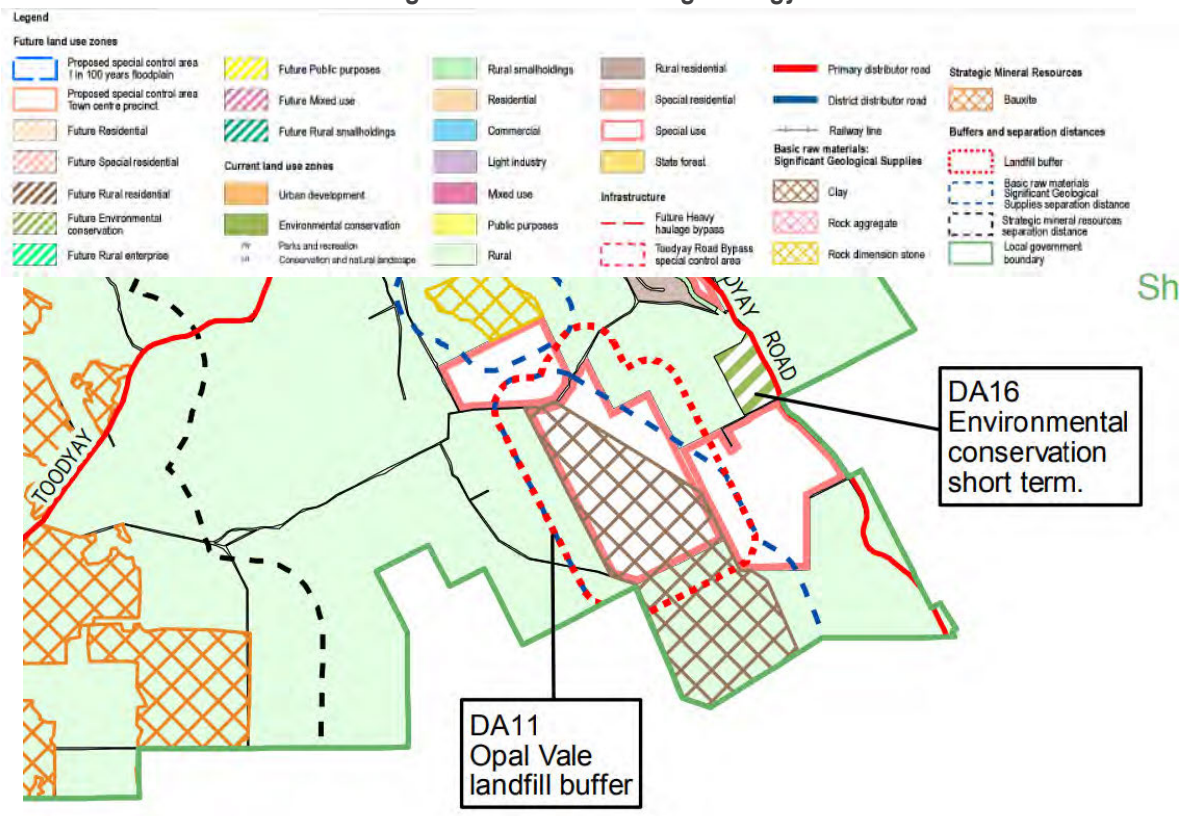
Figure 4.2 – Bushfire Prone Areas

4.7 *Shire of Toodyay Local Planning Strategy*

The *Shire of Toodyay Local Planning Strategy* was prepared by the Shire in 2018. It "sets out the Shire's long-term planning directions and objectives for future planning and development."

The site is identified on the Strategy Map as "Special Use", reflecting the current zone in the Scheme. The SPP 2.4 State Geological Supply mapping is also included in the Strategy maps and the quarry is located within "Clay Significant Geological Supplies". A buffer has also been applied in the Strategy maps.

Figure 4.3 – Local Planning Strategy



Source: WAPC

Chapter 6.7 of the Strategy addresses extractive industry in the Shire. It states the following in relation of basic raw materials in Shire decision-making and planning:

Extractive industries are important to the growth and economy of Toodyay; however, appropriate strategic planning and management in regards to these activities is essential. This may include providing buffers to separate mining operations from sensitive land uses in order to minimise impacts on the community. Where basic raw materials are present, it is important to consider the zoning and land use of the area, and provisions for the protection, access, and use of the resources.

As is demonstrated throughout this document, the requirements of the Strategy are met as there is no intensification of land uses proposed and appropriate separation distances are provided.

The strategies listed in the Strategy for basic raw materials are addressed in the table below.

Table 4.2 – Strategies for Basic Raw Materials

STRATEGIES	COMMENT
Facilitate the extraction of basic raw materials, subject to appropriate precautions to minimise any adverse impact on adjacent property, or on the natural environmental resources.	This strategy supports this application for continued excavation at the site. A variety of environmental management plans are also included with this application.
Encourage the definition of suitable buffers within LPS5 to limit the impact on adjacent property, and to avoid encroachment of sensitive development into areas subject to reduced air quality, noise, or risk.	A basic raw materials separation distance buffer is mapped in the Strategy around the Significant Geological Supplies mapping.
Identify and protect basic raw materials including gravel and sand resources from inappropriate developments that would prevent their future use.	Not applicable to this application.
Identify natural resource priority areas and significant geological supplies and buffers to avoid encroachment of sensitive development into areas subject to reduced air quality, noise, or other risks.	The significant geological supplies on the site are identified in the Strategy.

STRATEGIES	COMMENT
Establish appropriate controls for extractive industries to minimise impacts on the environmental and local amenity, including roads	The operation is already subject to a variety of environmental management plans including dieback, dust, noise, bushfire etc.

4.8 Shire of Toodyay Environmental Management Strategy

The *Shire of Toodyay Environmental Management Strategy* was adopted by Council in 2015. It "provides a framework for the achievement of better environmental management outcomes, consistent with the overall vision and mission of the Shire". It identifies five "themes", each of which have objectives, strategies and actions prescribed to them in the Strategy. The five themes are governance and communication, land, biodiversity, water and energy and waste. Most relevant to this application for extractive industry are the themes of land, biodiversity, and water.

Extractive industries are not specifically mentioned in the Strategy and many of the actions are the responsibility of the Shire to implement. However, the general principles of environmental management can be applied to this application. An environmental assessment is included in Chapter 5 of this report and various management plans are attached.

4.9 Shire of Toodyay Local Planning Scheme No. 4

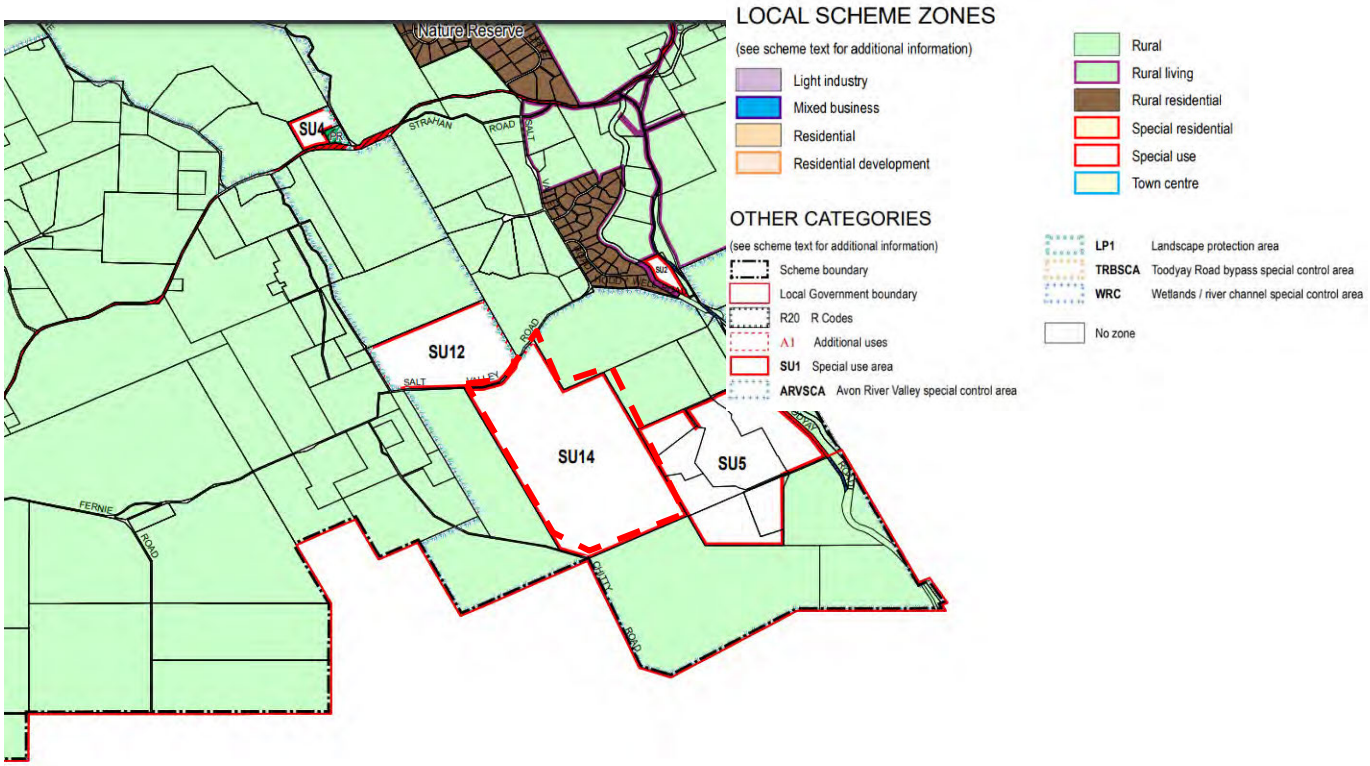
The *Shire of Toodyay Local Planning Scheme No. 4* was endorsed by the WAPC on 10 February 2017. The site is zoned "Special Use 14 (SU14)". The uses set out in Schedule 4 of the Scheme are:

1. Waste Disposal and treatment
2. Rural Uses.

Conditions listed in Schedule 4 include:

1. Development of the site is to be in accordance with SAT Decision [2013] WASAT88 in regard to Matter Number DR292 2012.
2. As per the requirements for the "Rural" zone.

Figure 4.5 – Shire of Toodyay Local Planning Scheme No. 4



Source: DPLH

Extractive industry on site is to be considered in accordance with the requirements of the 'Rural' zone. The land use 'Industry – Extractive' is a 'D' use in the Rural zone. This means that the use is not permitted unless the local government has exercised its discretion by granting development approval. This application addresses the requirements of the Local Planning Scheme and requests a renewal of the Development Approval for the operation.

Lot 11 is also included within the following:

- Landscape Protection Area
- Avon River Valley Special Control Area.

The purpose of the Avon River Valley Special Control Area is "to promote the objectives of the Avon Arc Sub-Regional Strategy (January 2001) by identifying areas within the Avon Arc of high landscape value and by conserving and enhancing the significant values and features that exist within this landscape area." The relevant considerations as stated in Clause 5.2.3 of the Scheme are addressed in the table below.

Table 4.3 – Relevant Considerations for the Avon River Valley SCA

STRATEGIES	COMMENT
To preserve and enhance the status of this area as a major scenic and recreation resource the local government will: (a) encourage the retention and enhancement of the vegetation cover; (b) encourage rural uses to continue in a manner consistent with good land management practice and the enhancement of the environment; (c) exercise controls over the subdivision and development of land so that the siting and design of buildings or works will enhance the visual character of the area; (d) acquire, where appropriate, foreshore land to protect critical areas of landscape or recreational value and to ensure public access; and, (e) permit appropriate uses of a recreational or tourist nature subject to adequate controls on the level of activity and siting of such uses.	a) The application of the mitigation hierarchy has been used to determine the future extraction and development areas. b) The quarry already exists on the site, however the final use following extraction will be for rural use. c) N/A – no subdivision is proposed d) N/A – no foreshore areas on major or significant watercourses are located on the property. e) N/A – no tourist or recreational uses are proposed in this application.

STRATEGIES	COMMENT
The local government in considering development proposals on land identified on the Scheme Map as being within the special control area will consider the following before making a determination: (a) the effects of the proposal on catchment management and the measures to be taken to mitigate such effects; (b) whether the proposed development will materially and seriously effect any wetland or native flora, native wildlife refuge or habitat, especially when such is rare, endangered or a priority species; (c) whether the proposed development will effect any identified site of known Aboriginal importance; (d) the effects of the development to the natural environment including: i) effects of clearing for development, especially for roads and services; and, ii) habitat disturbance; (e) the actions to be taken to ameliorate any adverse effects the development may have on the environment which shall include but not be limited to; i) landscaping and tree planting on road verges and boundaries; ii) provision of habitat corridors; iii) fencing of areas of environmental value; and, iv) the removal from the site of all waste materials resulting from land clearing and the levelling and planting of all earth works and spoil heaps; and, (f) whether the proposed development is compatible with the existing rural and scenic character of the Shire of Toodyay	a) A Water Management Plan is included with this application which considers the current water resources and catchment areas and management of potential impacts. b) No wetlands are located on or adjoining the quarry. Flora and Fauna surveys have been undertaken to determine potential impacts to threatened and priority flora and fauna and this is further addressed in this report. c) Aboriginal heritage is discussed in this report. d) An environmental impact assessment (EIA) is provided in this report. e) A suite of management plans are provided in this application to address potential impacts. f) Visual amenity and management is addressed in this application.

STRATEGIES	COMMENT
Where development within the special control area is likely to substantially detract from the visual amenity of the district, taking into account the cumulative visual effect of that development and other development that may be anticipated in the locality and in the area generally, local government may: (a) refuse to grant its approval to the development, or (b) grant development approval subject to conditions regarding size, siting or materials to be used.	Noted – visual amenity and management is addressed in the Visual Management Plan.
A person shall not fill, clear, drain, excavate or otherwise alter by earthworks, any land within the special control area or on any such land, construct any dam, building or levee for any purpose or restrict or partially or totally divert the natural flow of water or natural stormwater run-off or cause any storm water or other water or any other liquid from any source to flow into any creek, watercourse, lake or wetland without the written approval of the local government.	This application also seeks approval in accordance with this Clause.

STRATEGIES	COMMENT
A person shall not without the approval of local government, ringbark, cut down, lop, top, prune, injure or destroy by any other means a tree on any land to which this clause applies unless: • the tree is less than one metre high and has a girth of less than 15 millimetres at a height of 400 millimetres from the ground; • the tree is dying, dead or has become dangerous; • the tree is not a protected native plant; • the tree is not located within 20 metres of a watercourse, or • it is for the purpose of agricultural activities such as the clearing of fence lines and firebreaks and the removal of re-growth under the age of two years.	Noted – Appropriate clearing permits and permissions will be obtained prior to any clearing.
In considering any application for approval to clear land pursuant to subclause 5.2.3.5, the local government will take into account the possible effects on the landscape of the area, the possibility of erosion or other ecological consequences and may, at its discretion, refer the application to the Department of Environment and Conservation, the Conservation Commission of Western Australia or any other Government Department or Authority with a request for advice or, where considered appropriate, with a recommendation that the area concerned, or any part thereof, be considered for acquisition as National Park or Public Use Reserve.	Noted.

STRATEGIES	COMMENT
The local government may require the preparation of a statement of environmental impacts, which shall accompany a development application for any land subject to this clause to enable the local government to fully consider the possible environmental effects of the proposal.	An Environmental Impact Assessment is included in this report and a suite of management plans are attached.
Without limiting the power of the local government to grant approval, the local government may grant approval to develop land to which this clause applies where it is satisfied that; (a) the characteristics of the land are different from the general characteristics on which the classification of the land was based; and (b) there are no other reasonable or practicable alternatives in the circumstances.	Noted.

4.10 Strategic Community Plan Toodyay 2028

The *Strategic Community Plan Toodyay 2028* was prepared by the Shire of Toodyay in 2018. It outlines community priority areas within the planning period from 2018 to 2028 which include social, economic, natural environment, built environment and governance.

Extractive industry is mentioned under the priority area “natural environment”. It states that extractive industries are “permitted and supported through State Planning Policies. Within the limitations of the State policy framework, the Shire seeks to regulate these activities through its Local Planning Scheme and an Extractive Industry Local Law. The Shire has the capacity to influence days and hours of operation, transport routes and conditions (including contributions) and rehabilitation requirements. All Shire decision making is subject to review by the State Administrative Tribunal.”

4.11 Shire of Toodyay Local Planning Policies (LPP7) Extractive Industries – Road Contributions

The *Shire of Toodyay Local Planning Policy (LPP 7) Extractive Industries – Road Contributions* was adopted by Council in 2014. It provides a framework for contributions by Extractive Industries to help the Shire to recover the additional costs incurred from road use that will result from that land use. The Policy states that monetary contributions are for both "construction and rehabilitation" and "repairs and maintenance" of local roads used by trucks.

Road contributions will be negotiated between the Shire and Midland Brick through the determination of the application, using LPP7 as a guide.

4.12 Shire of Toodyay Extractive Industry Local Law

The *Shire of Toodyay Extractive Industries Local Law* was endorsed by Council on the 24 June 1999. It sets out the licencing requirements for an extractive industry, including the information which is required in an application and determination of the application. This application for a renewal of the extractive industry licence renewal is submitted in accordance with the Local Law.

The information required for a renewal of a licence is set out in Clause 4.3 of the Local Law. This clause specifies that a renewal document needs details of "*the works, excavation and rehabilitation stages reached and of any changes or proposed changes with respect to any of the things referred to in clauses 2.3(1) (b) and (c).*"

It should be noted that in addition to the information required by Clause 2.3 of the Local Law, information has also been provided in this application such as detailed information on the operation and planning context as well as additional management plans.

4.13 EPA Guidance Statement 3 – Separation Distances between Industrial and Sensitive Land Uses

The EPA's *Guidance Statement No. 3* (GS3) provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses (such as residential dwellings). It should be noted that the distances in GS3 assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category "clay extraction or processing". The potential impacts are listed as "noise" and "dust". The separation distance is "500-1000 metres, depending on size and processing", however this can be less with appropriate environmental management.

There are no sensitive receptors with 1,000 metres from the quarry (including the landowner).

The following closest sensitive receptors have been identified from the quarry.

- Owner's dwelling to the south – Approximately 1,100 metres
- Nearest rural dwelling to the east – Approximately 1,400 metres
- Nearest rural dwelling to the south – Approximately 2,400 metres
- Nearest rural dwelling to the west – Approximately 1,800 metres
- Nearest rural dwelling to the north-west – Approximately 1,600 metres (note that this is to the site entrance as this is the closest point)

4.14 Water Quality Protection Note 15 – Basic Raw Materials Extraction

Water Quality Protection Note No 15 – Basic Raw Materials Extraction was prepared by DWER in 2019. The Note applies to extraction of basic raw materials and associated processing activities (stockpiling, crushing, screening etc.) It provides a comprehensive list of recommendations for a variety of situations and scenarios where protection of water resources needs to be considered for extractive industry.

The recommendations from the WQPN have been incorporated into the Water Management Plan (Land Insights, 2024) for the operation, a copy of which is attached. A detailed review of the recommendations from the WQPN are included in the Water Management Plan.

5 Environmental risk assessment

5.1 Introduction

Environmental management is achieved through implementation of a variety of management plans throughout the duration of the operation. Compliance with these environmental management commitments can also be monitored by Local Government through the Development Approval and Extractive Industry Licence.

The primary aim of the management plans is to ensure the clay extraction activities have minimal environmental impacts and to help return the land to an appropriate end use. The following management plans are included with this report:

- Dust Management Plan
- Noise Management Plan
- Water Management Plan
- Visual Amenity Management Plan
- Refuelling Management Plan
- Waste Management Plan
- Dieback Management Plan
- Weed Management Plan
- Rehabilitation Management Plan

An environmental risk assessment is included in this chapter to determine the risk to different elements of the environment. The assessment considers impact on relevant factors from the EPA's "Statement of environmental principles, factors, objectives and aims of EIA". The purpose of the assessment is to assist with determining the appropriate management of operations. Many of the conclusions made in the below risk assessment are based off detailed site assessments prepared for the site (such as flora and fauna surveys).

5.2 Risk Matrix

The risk assessment for the Hoddys Well – Bardya quarry is summarised in the risk matrix below (Table 5.1). It lists the feature, the risk if the operation is not managed and the residual risk once avoidance, mitigation and management is considered. The assessment is based on the criteria in DWER's "Guidance Statement: Risk Assessments" (2017) with integration of relevant components from the relevant policies and guidelines. The exemption is the risk assessment for potential impacts to Threatened species and communities which has used the Department of Biodiversity, Conservation and Attractions (DBCA's) *Guideline for assessing risks to the conservation of biodiversity associated with threatened species and threatened ecological communities* (2023).

The risk rating is determined by considering the likelihood and consequence of environmental and amenity impact. The likelihood and consequence criteria are defined in Tables 5.2 and 5.3. The risk matrix criteria are set out in Table 5.4. It should be noted that Tables 5.2 – 5.4 are sourced from "Guidance Statement: Risk Assessments" (DWER, 2017).

The "inherent" risk rating is determined in the first part of Table 5.1. It considers the likelihood and consequence of impact if the operation was unmanaged. That is, if there was no avoidance of impact, mitigation or reduction of impact, complaints procedures and training. The "residual" risk rating in the second part of the table is determined by considering the likelihood and consequence of impact if the operation is managed in accordance with the various management plans which apply to the operation.

The purpose of the risk assessment is to demonstrate that inherent risk identified as "medium", "high" or "extreme" can be effectively managed. Management of the operation has the potential to reduce the likelihood of an impact occurring (i.e., the frequency) as well as the consequence of what this impact will be.

In general, given the operation is located on rural land there is minimal impact on the natural environment. The greatest risk associated with the operation is with regards to the potential impact on amenity. As a

result, this is the focus of the Management Plans. Several management plans are in place to address potential impacts such as dust, noise, water, and waste. It should be noted that more detailed risk assessments are provided in the respective management plans for dust, noise, water, refuelling etc.

Table 5.1 – Risk Assessment

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Native vegetation may be cleared or disturbed to facilitate excavation.	The likelihood of impact without management (avoidance and mitigation) is considered to be "likely" as the event will probably occur and the consequence of impact without management is considered "moderate" as there could be impacts on site and low levels impacts off site.	Likely	Moderate	High	There are some selected areas of remnant vegetation on the site proposed to be cleared (Parkland Cleared and regrowth) to facilitate continued operation and extraction. Native vegetation to be avoided and retained have also been identified as a mitigation strategy. Other mitigation strategies will be used such as: 1. Only clearing when necessary 2. Reviewing extraction plans to determine if clearing is required before undertaking the action 3. Staff training 4. Clearly marking out areas approved for clearing. The likelihood of native vegetation being impacted with management in place (avoidance and mitigation) is considered to be "likely" as the event will probably occur and the consequence of impact with management is considered "minor" as the on-site impact is considered to be minimal.	Likely	Minor	Med

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Weeds may be introduced to areas of native vegetation adjoining the quarry.	The likelihood of impact without management is considered to be "possible" as the event could occur at some time and the consequence of impact without management is considered "minor" as there is considered to be low level on site impacts without management.	Possible	Minor	Med	Refer to the Weed Management Plan for management actions. The likelihood of weeds being introduced with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the onsite impact is considered to be low level. Note that no introduced species were identified in the "Detailed Flora and Vegetation Survey" (Del Botanics, 2024) as Declared Pest species.	Rare	Minor	Low
Dieback may be introduced and impact on native vegetation. Refer to the risk assessment in the Dieback Management Plan.	N/A	N/A			Refer to the Dieback Management Plan for the risk assessment and management actions.	N/A		

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Fragmentation to vegetation and impact to ecological linkages.	The likelihood of impact without management (avoidance and mitigation) is considered to be "possible" as the event could occur at some time and the consequence of impact without management is considered "moderate" as there is considered to be low level off site impacts without management.	Possible	Moderate	Med	There are some selected areas of remnant vegetation on the site (Parkland Cleared and regrowth) proposed to be cleared to facilitate continued operation and extraction. Vegetation outside of these areas will be retained, including intact areas of remnant vegetation. The likelihood of ecological linkages being impacted with management (avoidance and mitigation) is considered to be "unlikely" as the event will probably not occur and the consequence of impact with management is considered "minor" as the on-site impact is considered to be low level and the local scale impact is considered to be minimal.	Unlikely	Minor	Low
Native fauna (individuals and communities) significantly impacted by the operation through land clearing, introduction of weeds and disease and activities on site.	The likelihood of impact without management (avoidance and mitigation) is considered to be "likely" as the event will probably occur and the consequence of impact without management is considered "minor" as there is considered to be low level on site impacts without management.	Likely	Minor	Med	There are some selected areas of remnant vegetation on the site proposed to be cleared to facilitate continued operation and extraction (Parkland Cleared and regrowth). Vegetation outside of these areas will be retained, particularly the intact areas of remnant vegetation adjoining the quarry. The likelihood of habitat and fauna being impacted with management (avoidance and mitigation) is considered to be "possible" as the event could occur and the consequence of impact with management is considered "slight" as the on-site impact is considered to be minimal.	Likely	Slight	Low

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Impact to surface water catchment areas including reduction in surface water catchment volumes due to quarry areas being hydrological removed from the surrounding area.	The likelihood of hydrological regimes being impacted without management is considered to be "possible" as the event will could occur and the consequence of impact without management is considered "minor" as the on-site impact is considered to be low level and off site impacts to be minimal.	Possible	Minor	Med	Refer to the Water Management Plan (Land Insights, 2024) for more detailed management information. The likelihood of hydrological regimes being impacted with management (avoidance and mitigation) is considered to be "possible" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the on-site impact is considered to be low level.	Rare	Minor	Low
Intersection with the groundwater table which could potentially lead to dewatering requirements and contamination.	The likelihood of groundwater being impacted without management is considered to be "unlikely" as the event will probably not occur in most circumstances and the consequence of impact without management is considered "minor" as the on-site impact is considered to be low level.	Unlikely	Minor	Med	The operation lies above the groundwater table and quarry management will ensure that extraction does not intersect or impact on groundwater. There will be no pumping, dewatering, changes to recharge or alterations to flow as a result of the operation. Refer to the Water Management Plan (Lan d Insights, 2024) for further detailed information. The likelihood of groundwater being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the on-site impact is considered to be low level.	Rare	Minor	Low

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Impact to surface water quality due to erosion and transport of sediment to watercourses and wetlands. Sedimentation can result in higher turbidity levels and suspended solids.	The likelihood of surface water being impacted without management is considered to be "possible" as the event could occur at some time and the consequence of impact without management is considered "moderate" as the on-site impact is considered to be mid-level.	Possible	Moderate	Med	There are no significant surface water features on or adjoining the site, however some minor watercourses are located in close proximity (within 100m) of the operation area. All stormwater within the operation area will be retained on site and not permitted to drain into surrounding areas. Refer to the Water Management Plan (Land Insights, 2024) for detail on management. The likelihood of water resources being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the on-site impact is considered to be minimal.	Rare	Minor	Low
Impact to surface water and groundwater from hydrocarbons (fuel and oil) and chemicals as a result of spills and leaks from equipment and machinery used.	The likelihood of water resources being impacted from hydrocarbons without management is considered to be "unlikely" as the event will probably not occur in most circumstances and the consequence of impact without management is considered "moderate" as the on-site impact is considered to be mid-level.	Unlikely	Moderate	Med	Refer to the Refuelling Management Plan (Land Insights, 2024) for the operation. The likelihood of water resources being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the on-site impact is considered to be minimal.	Rare	Minor	Low

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Risk to surface water and groundwater from acid sulphate soils.	The likelihood of acid sulphate soils forming without management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact without management is considered "slight" as the on-site impact is considered to be minimal.	Rare	Slight	Low	Midland Brick have standard management practices in place at all their clay pits if any acid sulphur conditions are detected, because acidic conditions can impact on clay processing and brick making. Further information is contained within the Water Management Plan (Land Insights, 2024). The likelihood of water resources being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "slight" as the on-site impact is considered to be minimal.	Rare	Slight	Low
Pathogens from staff amenities posing a risk to water quality and public health.	The likelihood of water resources being impacted from pathogens without management is considered to be "unlikely" as the event will probably not occur in most circumstances and the consequence of impact without management is considered "slight" as the on-site impact is considered to be minimal.	Unlikely	Slight	Low	If a portable toilet is brought onto the site it will be serviced in accordance with the manufacturer's instructions. The likelihood of water resources being impacted from pathogens with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "slight" as the on-site impact is considered to be minimal.	Rare	Slight	N/A

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Soils subject to significant water and wind erosion can cause land degradation.	The likelihood of land degradation occurring without management is considered to be "possible" as the event could occur at some time and the consequence of impact without management is considered "minor" as the on-site impact is considered to be low level.	Possible	Minor	Med	Wind erosion can be managed through the Dust Management Plan. Water erosion is managed through the Water Management Plan (Land Insights, 2024). The likelihood of land degradation occurring with management is considered to be "unlikely" as the event will probably not occur in most circumstances and the consequence of impact with management is considered "slight" as the on-site impact is considered to be minimal.	Unlikely	Slight	Low
Local landform not being recontoured to be compatible with the surrounding landscape.	The likelihood of landform impact occurring without management is considered to be "possible" as the event could occur at some time and the consequence of impact without management is considered "moderate" as the on-site impact is considered to be mid-level.	Possible	Moderate	Med	Land recontouring and rehabilitation is provided for in the Rehabilitation Management Plan (Land Insights, 2024). The likelihood of landform impact occurring with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the on-site impact is considered to be low level.	Rare	Minor	Low

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Impact to Aboriginal Heritage Sites.	The likelihood of heritage sites being impacted without management is considered to be "unlikely" as the event will probably not occur in most circumstances and the consequence of impact without management is considered "minor" as the on-site impact is considered to be low level.	Unlikely	Minor	Med	The operation is appropriately setback from the Jimperding Brook (the closest Aboriginal Cultural Heritage site) and operates in accordance with a Water Management Plan which requires that all water is retained on site and will not flow into or impact the Brook. The likelihood of heritage sites being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the on-site impact is considered to be low level.	Rare	Slight	Low
Impact to sites of European heritage.	N/A	N/A			No European heritage sites are located on site.	N/A		
Noise levels exceed the assigned noise levels as prescribed by the Noise Regulations to noise sensitive premises. Refer to the risk assessment in the Noise Management Plan.	N/A	N/A			Refer to the Noise Management Plan for management actions.	N/A		

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Dust emissions cause impact to sensitive land uses (such as residential properties). Refer to the risk assessment in the Dust Management Plan.	N/A	N/A			Refer to the Dust Management Plan for management actions.	N/A		
Buffers and separation distances are not adequate enough to reduce impact on sensitive land uses.	The likelihood of sensitive receptors being impacted without management is considered to be "unlikely" as the event will probably not occur due to the existing separation distances and the consequence of impact without management is considered "minor" as the offsite impact is considered to be low level.	Unlikely	Minor	Med	Environmental management plans (attached to this report) will reduce impact to nearby sensitive land uses. The likelihood of sensitive receptors being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances due to the existing separation distances and the consequence of impact with management is considered "minor" as the off-site impact is considered to be minimal.	Rare	Minor	Low

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Impact of truck use on local and regional roads and traffic.	The likelihood of traffic being impacted without management is considered to be "Possible" as the event could occur and the consequence of impact without management is considered "moderate" and the off-site impacts are considered to be mid-level .	Possible	Moderate	Med	All trucks will use appropriately registered roads on the RAV network and truck drivers are instructed to adhere to traffic rules within the site. The operator will pay road contributions to the Shire for road maintenance and repair. The likelihood of roads and local traffic being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the offsite site impact is considered to be low level.	Rare	Minor	Low
Impact of the operation on visual amenity and that the pit area can be seen from the public realm.	The likelihood of visual amenity being impacted without management is considered to be "possible" as the event could occur at some time and the consequence of impact without management is considered "moderate" as the off-site impact is considered to be low level.	Possible	Moderate	Med	The site will be rehabilitated in accordance with the Rehabilitation Management Plan (Land Insights, 2024). Visual management is provided for in the Visual Management Plan (Land Insights, 2024). The likelihood of visual amenity being impacted with management is considered to be "rare" as the event will only occur in exceptional circumstances and the consequence of impact with management is considered "minor" as the on-site impact is considered to be low level.	Rare	Minor	Low

Table 5.2 – Risk Assessment (Threatened Species)

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Threatened and Priority Communities (TEC's and PEC's) may be impacted if present on site.	The likelihood of impact without management (avoidance and mitigation) is considered to be "remote" as the Detailed Flora and Vegetation Survey undertaken by Del Botanics did not record any TECs and PECs in the survey area. The consequence of impact is "negligible".	Remote	Negligible	Insignificant	No specific management is required.	Remote	Negligible	Insignificant
Threatened and Priority Flora Species may be impacted if present on site.	The likelihood of impact without management (avoidance and mitigation) is considered to be "Remote" as the Detailed Flora and Vegetation Survey undertaken by Del Botanics did not record any Threatened or Priority Flora in the survey area. The consequence is "negligible".	Remote	Negligible	Insignificant	No specific management is required.	Remote	Negligible	Insignificant

POTENTIAL IMPACT WITHOUT MANAGEMENT	CONSIDERATION OF INHERENT RISK	INHERENT RISK			MANAGEMENT	RESIDUAL RISK		
		L	C	Risk		L	C	Risk
Threatened and Priority Fauna disturbed and impacted by the operation (predominantly through clearing).	The likelihood of impact to habitat and threatened fauna without management (avoidance and mitigation) is "possible" and the consequence of impact without management is "moderate". A Targeted Conservation Significant Fauna Survey was undertaken by Western Wildlife to inform the impact assessment.	Possible	Moderate	Med	There are some selected areas of remnant vegetation on the site proposed to be cleared to facilitate continued operation and extraction. Vegetation outside of these areas will be retained, particularly vegetation to the east of the pit area. The likelihood with management is considered to be "unlikely" event will probably occur and the consequence of impact without management is considered "moderate".	Unlikely	Moderate	Low

The criteria used to determine the likelihood and consequence are shown in Tables 5.2 and 5.3 respectively. The risk matrix is defined in Table 5.4 below.

The tables are based on the criteria in the Department of Water and Environmental Regulation's *Guidance Statement: Risk Assessments (2017).*

Table 5.3 – Likelihood Criteria

Almost certain	Likely	Possible	Unlikely	Rare
The risk event is expected to occur in most circumstances.	The risk event will probably occur in most circumstances.	The risk event could occur at some time.	The risk event will probably not occur in most circumstances.	The risk event may only occur in exceptional circumstances.

Table 5.4 – Consequence Criteria

	Slight	Minor	Moderate	Major	Severe
Environment	• On-site impact: minimal (No discernible adverse impact).	• On-site impacts: low level (discernible effect on the environment but no adverse impact) • Off-site impacts local scale: minimal • Off-site impacts wider scale: not detectable • Minor number of individuals of species may be affected locally.	• On-site impacts: mid-level (Minor adverse effect to the environment) • Off-site impacts local scale: low level • Off-site impacts wider scale: minimal • Moderate loss of individuals of species locally.	• On-site impacts: high level (moderate impact to the environment) • Off-site impacts local scale: mid-level • Off-site impacts wider scale: low level • Short term impact to an area of high conservation value or special significance^ • Moderate damage to ecosystem function and major loss of individuals of species locally.	• On-site impacts: catastrophic (significant impact to the environment) • Off-site impacts local scale: high level or above • Off-site impacts wider scale: mid-level or above • Mid to long term or permanent impact to an area of high conservation value or special significance^ • Significant long-term damage/loss of ecosystem function and loss of individuals of species locally.
Public Health and Amenity	• Local scale: minimal to amenity.	• Local scale impacts: low level impact to amenity.	• Adverse health effects: low level or occasional medical treatment • Local scale impacts: mid-level impact to amenity.	• Adverse health effects: mid-level or frequent medical treatment • Local scale impacts: high level impact to amenity.	• Loss of life • Adverse health effects: high level or ongoing medical treatment • Local scale impacts: permanent loss of amenity.

^ Determination of areas of high conservation value or special significance should be informed by the Guidance Statement: Environmental Siting.

*'onsite' means within the Lot boundary.

Table 5.5 – Risk Matrix Criteria

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

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APPENDIX A

Application forms

APPENDIX B

Plans

Base data provided by SLIP.

Lot boundary
Cadastre
Quarry operation area
Haul road
Significant stream

landinsights
PLANNING DESIGN ENVIRONMENT

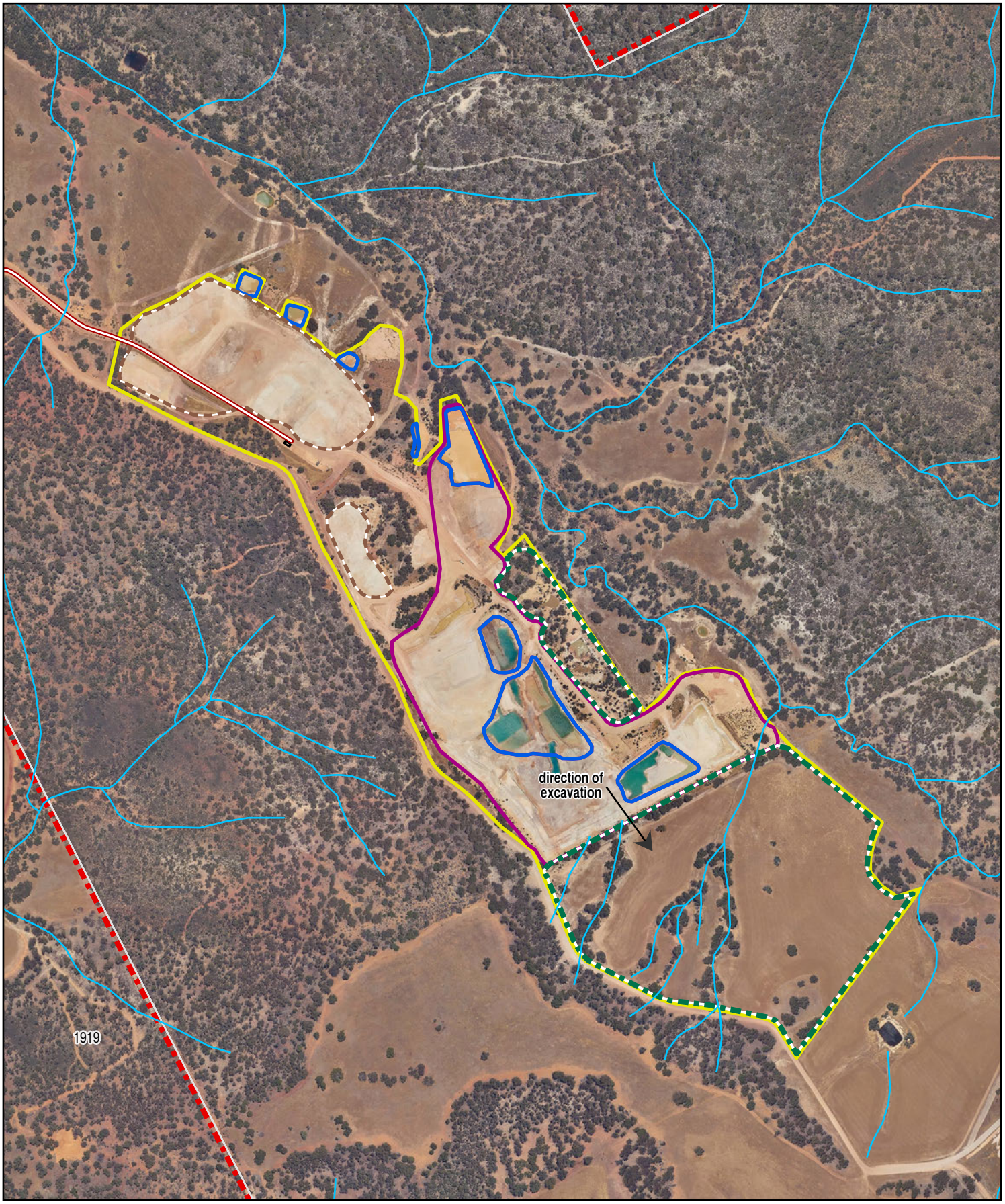
Project: 1134 Layout Name: MB 1134-002-01-01 Bardya Quarry - Site Plan
Projection: GDA2020 MGA Zone 50 Date Exported: 15/05/2024 4:55 PM

N

0 250 500 750 1000 m

1:25,000 @ A4

Site and Surrounds
Hoddys Well - Bardya Quarry
MIDLAND BRICK



Lot boundary
Cadastre
Quarry operation area
Haul road

Minor river - nonperennial

Excavation work

Current pit activity area
Drainage basin

New excavation area
Stockpiling area
Transportable lunchroom

Base data provided by SLIP.

landinsights
PLANNING DESIGN ENVIRONMENT

Project: 1134 Layout Name: MB 1134-002-08-01 HW Quarry - Excavation
Projection: GDA2020 MGA Zone 50 Date Exported: 15/05/2024 4:45 PM

N

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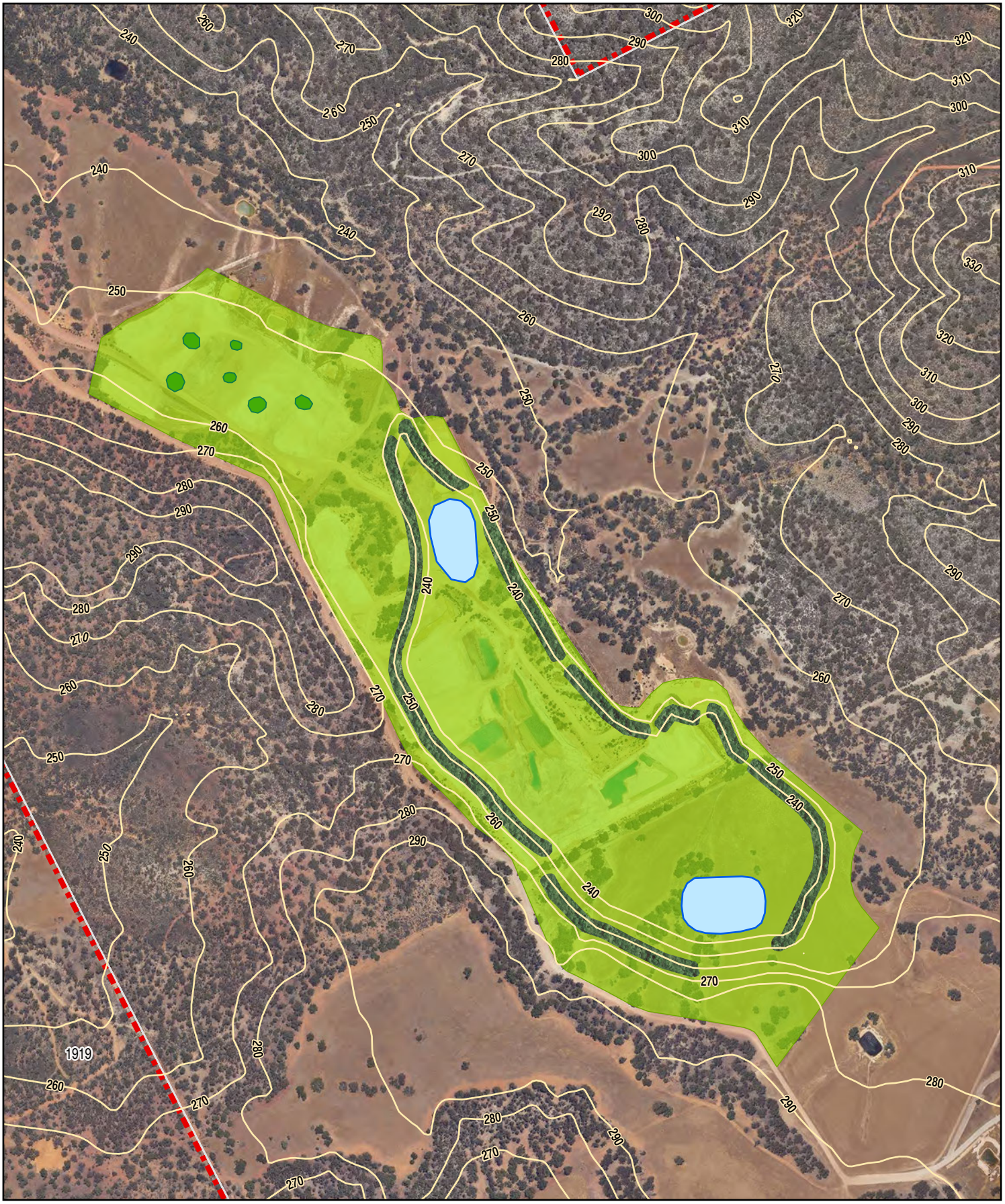
1:8,000 @ A4

Excavation
Hoddys Well - Bardya Quarry
MIDLAND BRICK



Base data provided by SLIP.

- Lot boundary
- Cadastre
- Indicative contours
- Recontoured to pasture
- Vegetation belt
- Vegetation clumps
- Dam

landinsights
PLANNING DESIGN ENVIRONMENT

N

0 100 200 300 400 500 m

1:8,000 @ A4

Project: 1134 Layout Name: MB 1134-002-04-01 Bardya Quarry - Rehabilitation
Projection: GDA2020 MGA Zone 50 Date Exported: 17/05/2024 12:12 PM

Rehabilitation Concept Plan
Hoddys Well - Bardya Quarry
MIDLAND BRICK

APPENDIX C

Certificate of Title

APPENDIX D

Rehabilitation Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

REHABILITATION MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

Prepared by:

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Document details:

Document History:

Date	Document Name	Document Manager	Summary of Document Revision	Client Delivered
May-24	1134 – Hoddys Well – Bardya Quarry Rehabilitation Management Plan	SR	Initial Draft for client review	May-24
May-24	1134 – Hoddys Well – Bardya Quarry Rehabilitation Management Plan	SR	Final	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Rehabilitation Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers) located at Lot 11 Chitty Road, Hoddys Well. The Hoddys Well quarry ("the site") is located on the northern portion of Lot 11. It applies to the operational area used for the clay extraction and associated activities. The purpose of the Rehabilitation Management Plan is to set out the obligations and requirements to satisfy rehabilitation in relation to the Hoddys Well-Bardya clay quarry.

The Rehabilitation Management Plan has been prepared in accordance with the "Guidelines for the Management and Rehabilitation of Basic Raw Material Pits" prepared by the then Department of Environment and Conservation in 2008. This is the guideline recommended for use in the "State Planning Policy 2.4 – Planning for Basic Raw Materials Guidelines" (WAPC, 2021). It should also be noted that quarry operators are also obligated to rehabilitate and make safe all slopes in accordance with the Department of Mines, Industry Regulation and Safety (DMIRS) requirements under the *Mines Safety and Inspection Act 1994*. It also provides an update to the "Rehabilitation Plan Lot 11 Salt Valley Road, Hoddys Well" (Brikmakers, 2013b) prepared to support the Development Application and Extractive Industry Licence application in 2013. This Rehabilitation Management Plan incorporates the new excavation areas, the current operation area and incorporates the outcomes of the latest flora survey (Del Botanics, 2024).

In summary, the quarry will be recontoured to a safe and stable condition with dams being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some vegetation. A majority of the Operation Area will be planted with pasture, with vegetation belts on some of the recontoured slopes (i.e. the pit areas) and vegetation clumps on some of the flatter areas to provide tree cover (i.e. within the stockpile areas).

It is the intention of Midland Brick to progressively rehabilitate the site as the resource is being removed, although the timing of progressive rehabilitation will depend on timing of extraction, areas required for water management and access. As was stated in the 2013 application ("Extractive Industries Licence Variation Application", Brikmakers, 2013), the bulk of the rehabilitation will be undertaken at the completion of quarry.

A Concept Plan is provided at Figure 1.3 which provides an indicative illustration of how the clay quarry may appear following rehabilitation. Note that contours are indicative only as the exact depths and slopes can vary once the site has been excavated and rehabilitated.

1.2 Objectives and completion criteria

The objectives and completion criteria of the Rehabilitation Management Plan are listed in Table 1.1 below. They have been developed in accordance with EPA "Guidance Statement No. 6 Rehabilitation of Terrestrial Ecosystems" (2006) and DWER's "A Guide to Preparing Revegetation Plans for Clearing Permits" (2018). The completion criteria provide a measurable outcome so that the effectiveness of the rehabilitation can be assessed over time.

Table 1.1 – Rehabilitation Objectives and Completion Criteria

OBJECTIVE	COMPLETION CRITERIA
Recontour the land surface within the Operation Area to a safe and stable condition.	All recontoured slopes are safe and stable in compliance with DMIRS requirements.
Ensure water erosion is controlled within the post excavation surface.	A dam is created from the lowest part of the landscape and the post excavation surface is recontoured to direct water into the dam.
No Declared Weeds are located within the decommissioned clay quarry.	No Declared Weeds are located within the decommissioned clay quarry following completion of rehabilitation and during the post-rehabilitation monitoring period.
Plant pasture across all recontoured and rehabilitated areas.	Pasture has been established across a majority of the rehabilitated area.
Plant native vegetation in vegetation belts and vegetation clumps.	Native vegetation within the vegetation belts and vegetation clumps has an 80% survival rate.

1.3 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan

1.4 Operation

The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Information on the operation and how it relates to risk of dieback spread and management is provided below.

Earthworks campaign

The "Earthworks Campaign" refers to the excavation and stockpiling of material. During the earthworks campaign, topsoil and overburden is removed and clay is excavated and placed into stockpiles located within the Operation Area.

Earthworks take place as and when required throughout the year but generally during the dry months. The timing of excavation depends on weather conditions, market demand and operational requirements (such as the rate of excavation of other clay quarries). During Excavation Campaigns, excavation will generally take place for six days a week during the approved operation times. A number of excavation campaigns can occur throughout the year to the equivalence of 4 to 5 months each year. It should be noted that for large stretches of time there will be no excavation activities on site.

The current pit area (where a majority of the excavation currently takes place) is surrounded by the pit walls. Vehicles and machinery usually operate from the pit floor and the walls of the pit act as a dust barrier for most of the excavation process. The depth of the quarry is up to 20 metres. There will be a relatively short period where vehicles are located at the ground level (when clearing vegetation and stripping topsoil and overburden for new areas), however for a majority of time they will be located below

ground levels and behind the pit walls. Dust management will be in place for the operation as set out in this report.

There will be no processing of resource (screening and crushing) and no blasting will be required.

Cartage campaigns

The "Cartage Campaign" refers to the removal or transport of clay from the site where it is taken to the Midland Brick brickmaking factories. Loading and carting from the site will occur throughout the year for the equivalent of 3.5 to 4.5 months total per year. Carting will be spread out into cartage campaigns throughout the year.

Carting from the site depends on the market demand for bricks, as well as the types of clay and colour of clay. Therefore, there may be some variation from the truck numbers and the number of days that carting will be required each month (i.e. some months will have more carting days than other months).

The Stockpile Area (and the area where trucks will be loaded with clay) is located in the pit area, close to the access/haul road for ease of access.

Rehabilitation

The quarry will be recontoured to a safe and stable condition with a dam or two being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some tree belts planted with native vegetation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Figure 1.2 – Excavation Plan

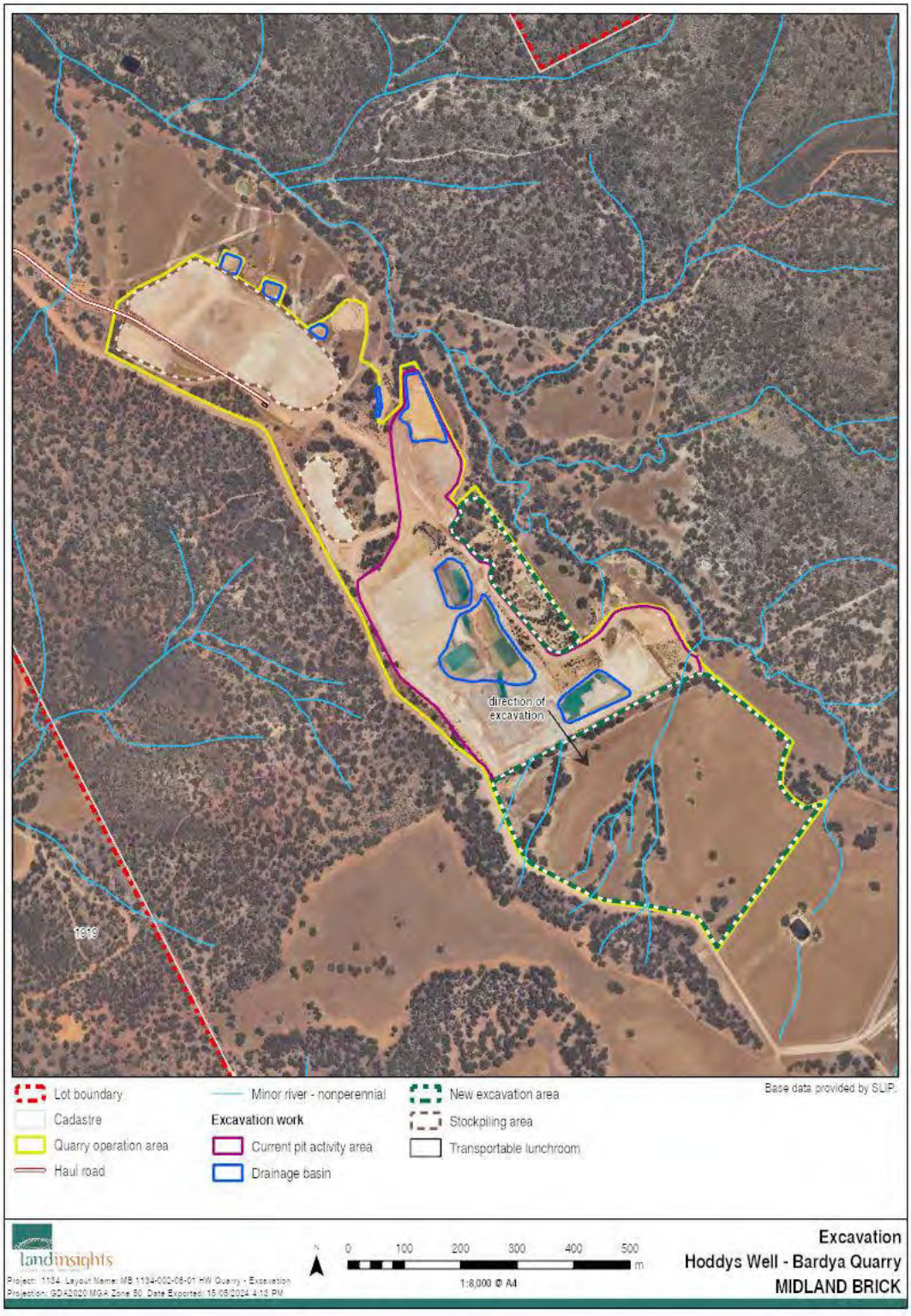
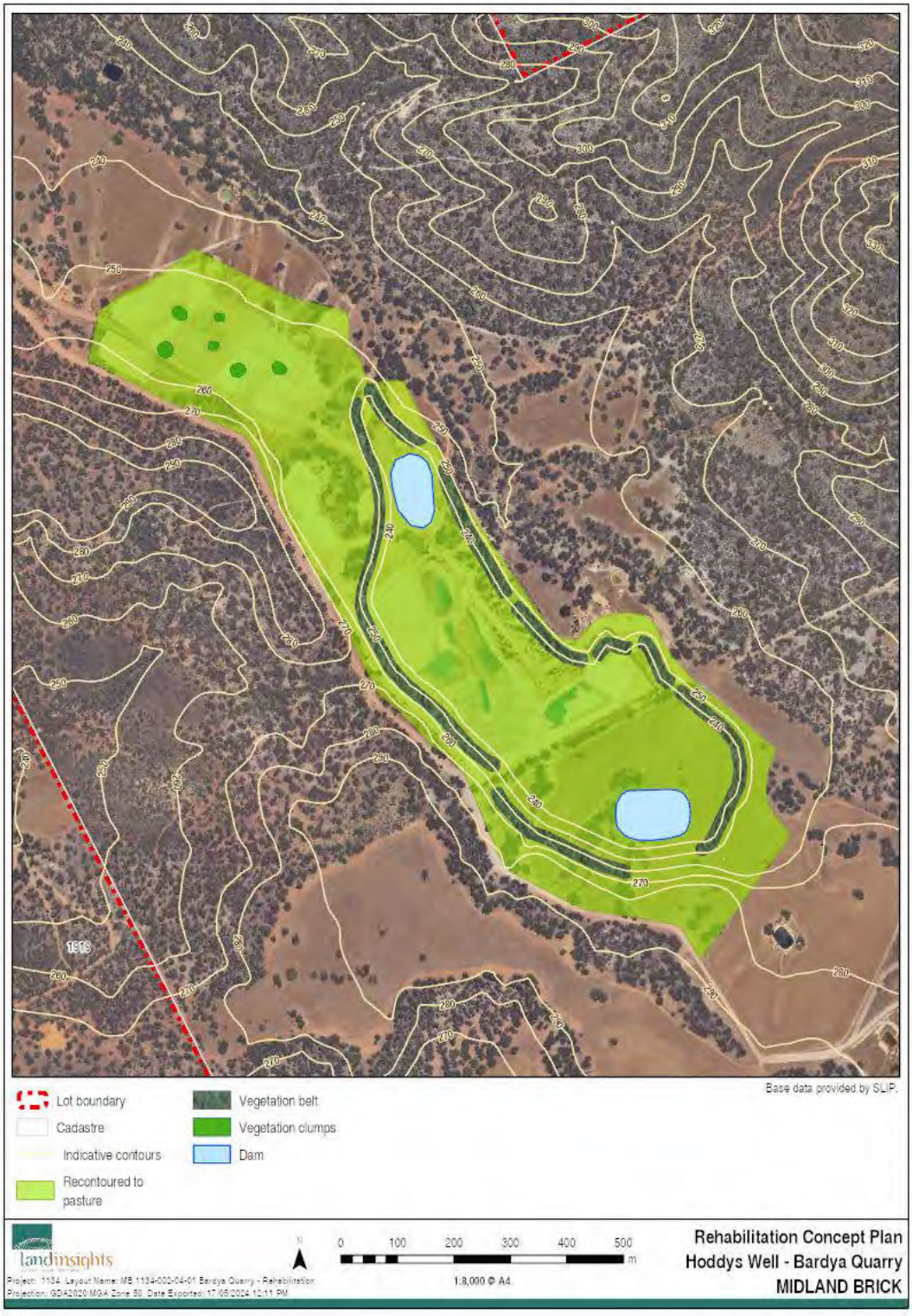


Figure 1.3 – Rehabilitation Concept Plan



2 Site Description

2.1 Climate

The south-west of Western Australia experiences a Mediterranean climate which is characterised by warm, dry summers and cool, wet winters.

The rainfall and temperature data for the region has been obtained from the Bureau of Meteorology "Climate Data Online" services. The average rainfall from the closest station which is the Toodyay station is 520.7mm. A majority of rainfall is from May to August.

The mean temperature information is from the closest station which is the Northam station. It states that the hottest month is January with an average maximum of 34.3°C and the coldest month is July with an average minimum of 5.3°C.

The prevailing winds throughout the majority of the year are predominantly from the east (morning) and the south-west (afternoon) (Bureau of Meteorology, 2024). Wind roses for the Perth Airport are shown below.

2.2 Topography and landform

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD). It may reach depths of up to 30 metres.

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

2.3 Geology

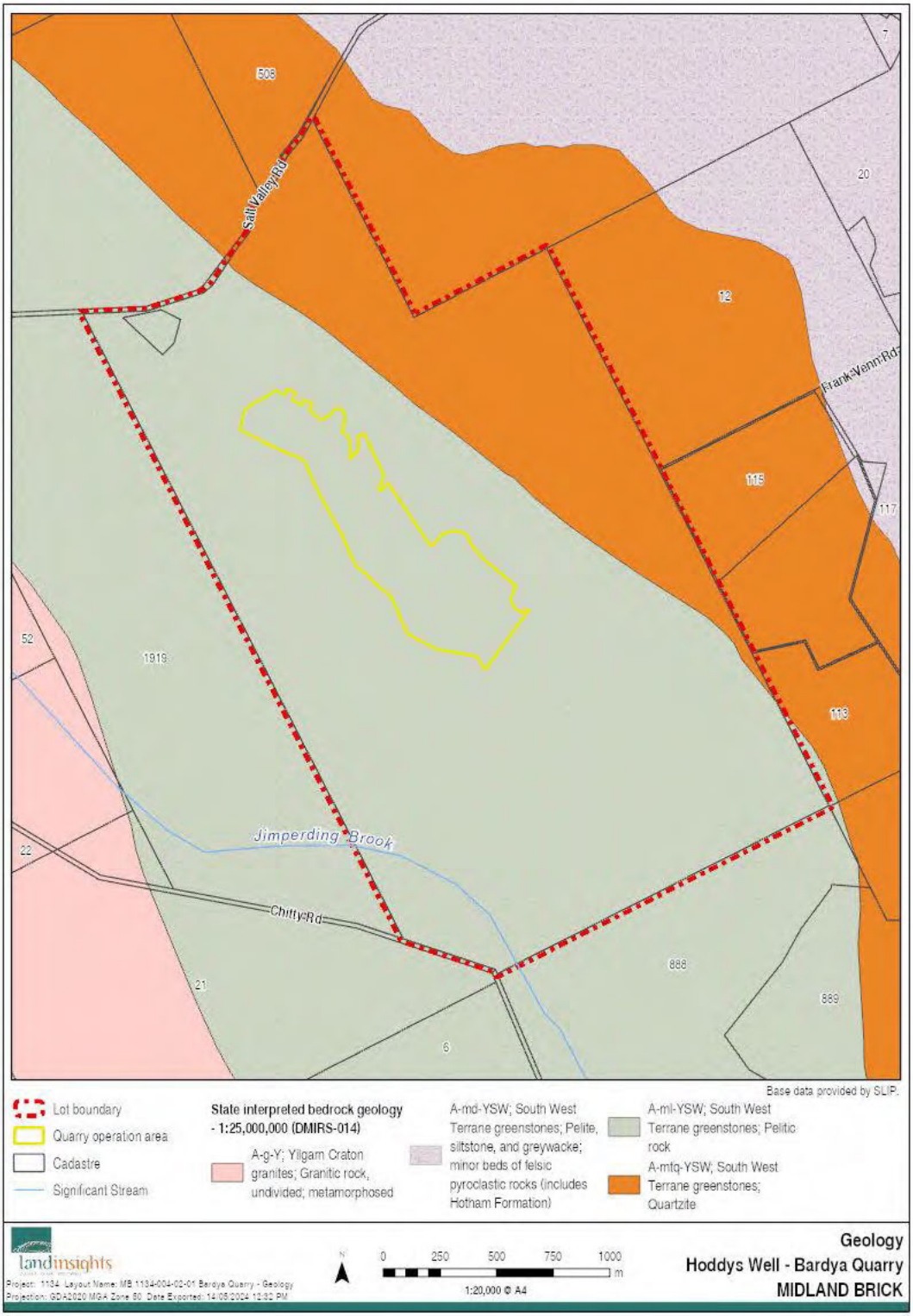
The site sits on the Darling Plateau which lies east of the Darling Scarp and the Swan Coastal Plain. The geology of this area can be described as “deeply weathered mantle over granitic rocks”. More specifically, the site is located within the Eastern Darling Range which is described in the DPIRD database as “moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys” with soils that are “formed in laterite colluvium or weathered in-situ granite”.

Geologically, the area is part of the Pre-Cambrian meta sedimentary complex referred to as the Jimperding Metamorphic Belt. It extends as a 120 kilometre long belt in a north-westerly direction from York to Clackline, to Jimperding and then Chittering, where it becomes the higher grade metamorphic Chittering Metamorphic Belt. The Jimperding Series consists of inter-bedded schists, quartzites and minor metamorphosed volcanics. They are steeply dipping and trend northerly and then north-westerly. Extensive weathering has formed the regolith profile that includes gravel/laterite and the highly altered, kaolin dominated, micaceous clay over unaltered micaceous schist (Brikmakers, 2013a).

The 500 metres grid Regolith of WA as mapped by DPIRD identifies the geology “exposed rock, saprolite and saprock”. The bedrock geology is “South West Terrane greenstones” which are described as “Quartz--mica schist”.

The site is mapped by DMIRS as having “regionally significant basic raw materials” for clay. This is also reflected in SPP 2.4 which maps the site as a “Significant Geological Supply”.

Figure 2.1 – Geology



2.4 Soils

The site is located within the "Leaver" soil landscape system 253ByLV. The soil-landscape units are mapped by the Department of Primary Industries and Regional Development (DPIRD). It is described as "gravelly slopes and ridges of the western Darling Plateau. Gravelly yellow and red duplexes, gravelly deep clayey sands and sandy loams over laterite and clay".

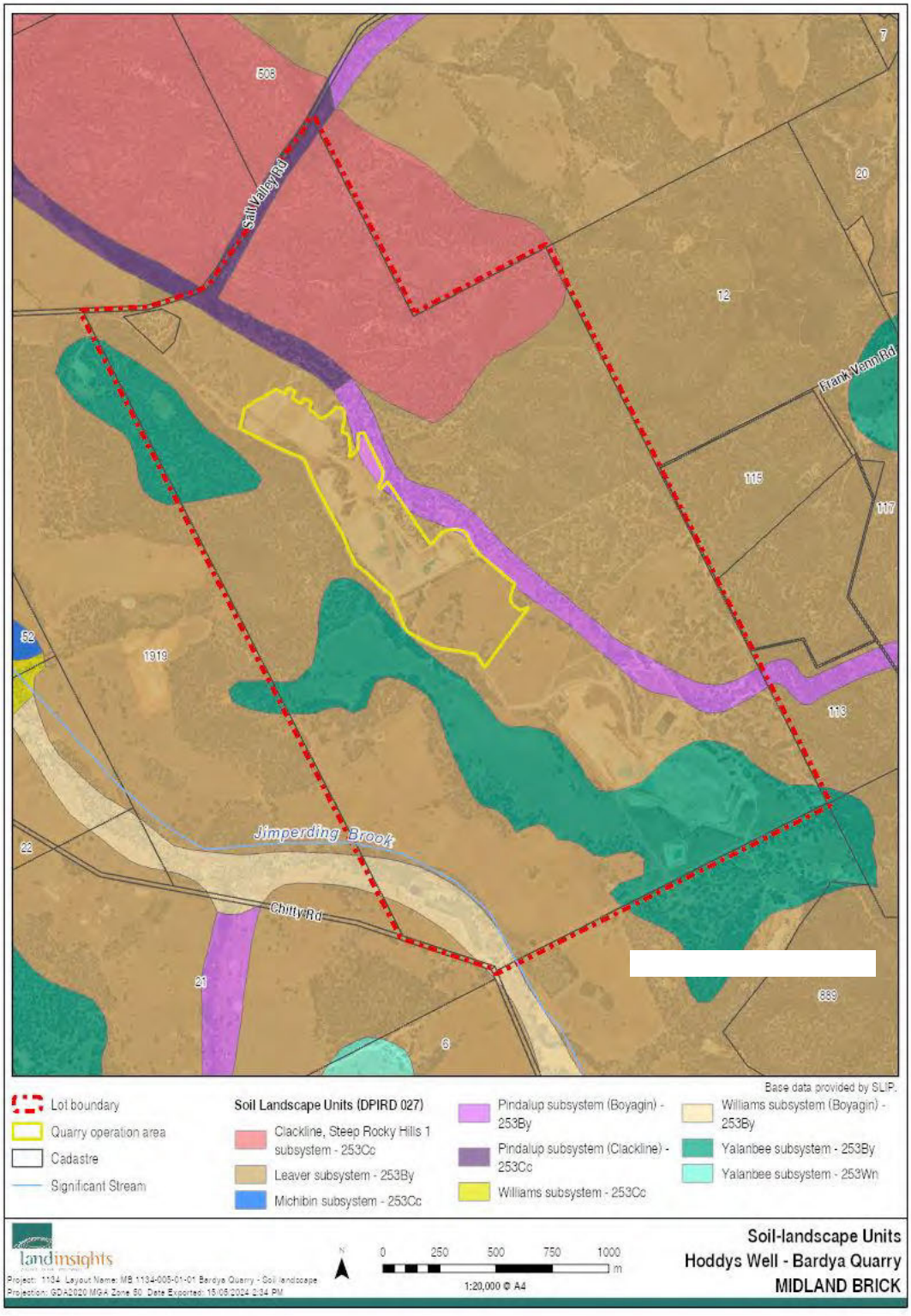
Generalised soil qualities of each soil-landscape unit as mapped by DPIRD are described in the table below.

Table 2.2 – Soil Qualities

SOIL-LANDSCAPE UNIT	WATER EROSION	WIND EROSION	WATERLOGGING	FLOOD	SALINITY
Leaver subsystem	Low risk	High risk	Low risk	Low risk	Low risk

Source: DPIRD, 2024

Figure 2.2 – Soil-landscape units



2.5 Vegetation

Existing vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry (such as the Stockpile Area). Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

Historic photos from 1995 onwards are provided in Figures 2.4 to 2.6 below which show the past level of disturbance prior to the quarry development. This helps to support the rehabilitation concept to return the site to pasture with some trees.

Figure 2.3 – Native vegetation extent

Figure 2.4 – Historic aerial photo 1995

Aerial Photo – 1995 (Source: Landgate)

Figure 2.5 – Historic aerial photo 2000

Aerial photo – 2000 (Source: Landgate)

Figure 2.6 – Historic aerial photo 2010

Aerial photo – 2010 (Source: Landgate)

Regional vegetation

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into "bioregions" based on major biological and geographical/geological attributes. Western Australia has 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation. The site is located within the Northern Jarrah Forest (NJF) subregion of the Jarrah Forest Bioregion.

The site is located in the Drummond Botanical Subdistrict within the the Southwest Botanical Province as described by Beard (1990). Flora composition has been described by Beard (1990) as predominantly consisting of low Banksia Woodlands on leached sands with Melaleuca swamps where ill drained and Woodlands of Eucalyptus spp. on less leached soils.

Vegetation Mapping

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as "Bannister 4" which is described as "Jarrah, Marri and Wandoo."

The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is "Michibin" which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with

some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones.

There are no Bush Forever Areas located on the site.

A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.

The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as “Cleared Paddocks”.

The Allocasuarina woodland was classified in the Survey as “Degraded” condition and the remainder of the survey area was classified as “Completely Degraded”.

Figure 2.7 – Vegetation complexes

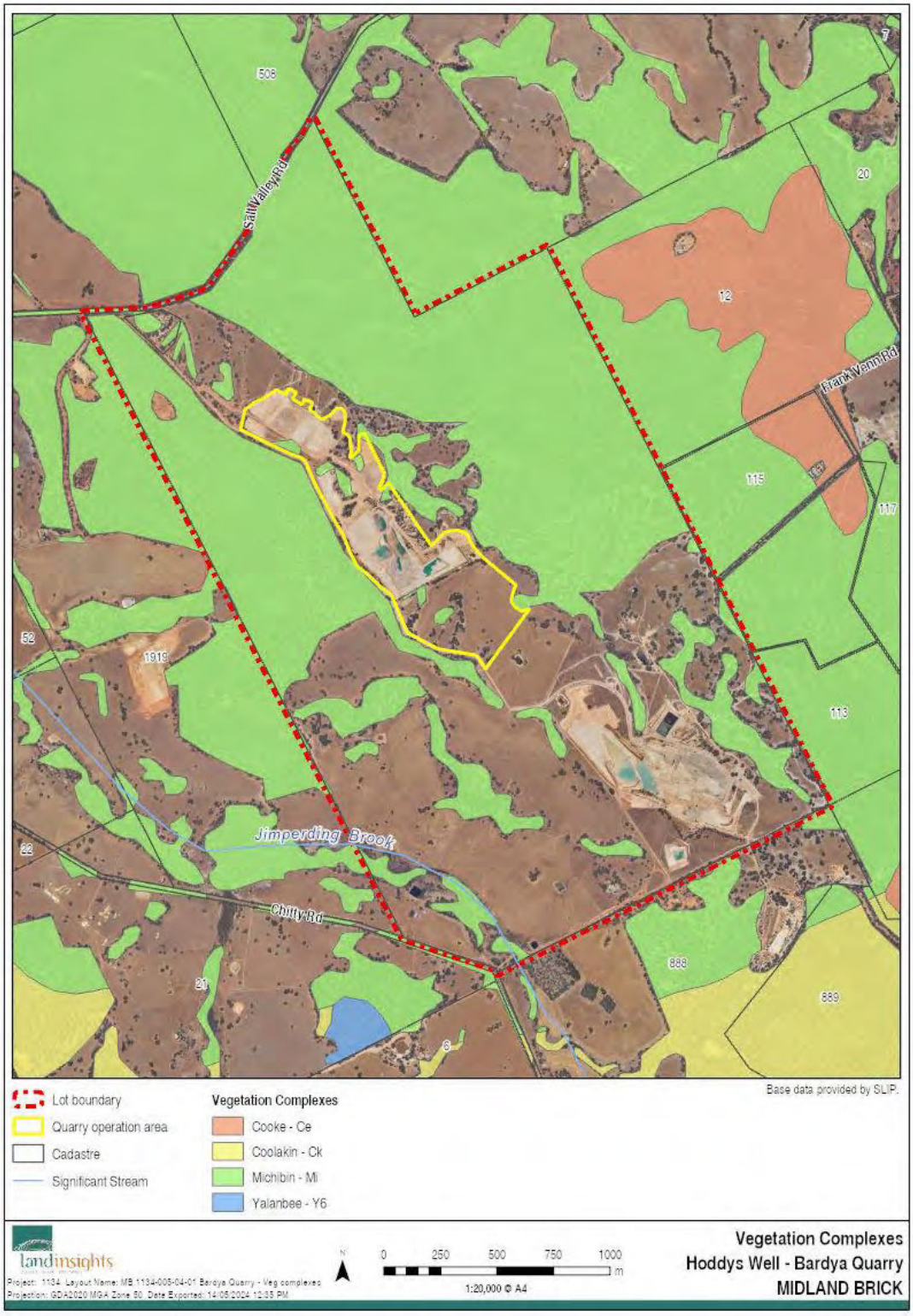


Figure 2.8 – Vegetation Communities (based off Del Botanics, 2024)

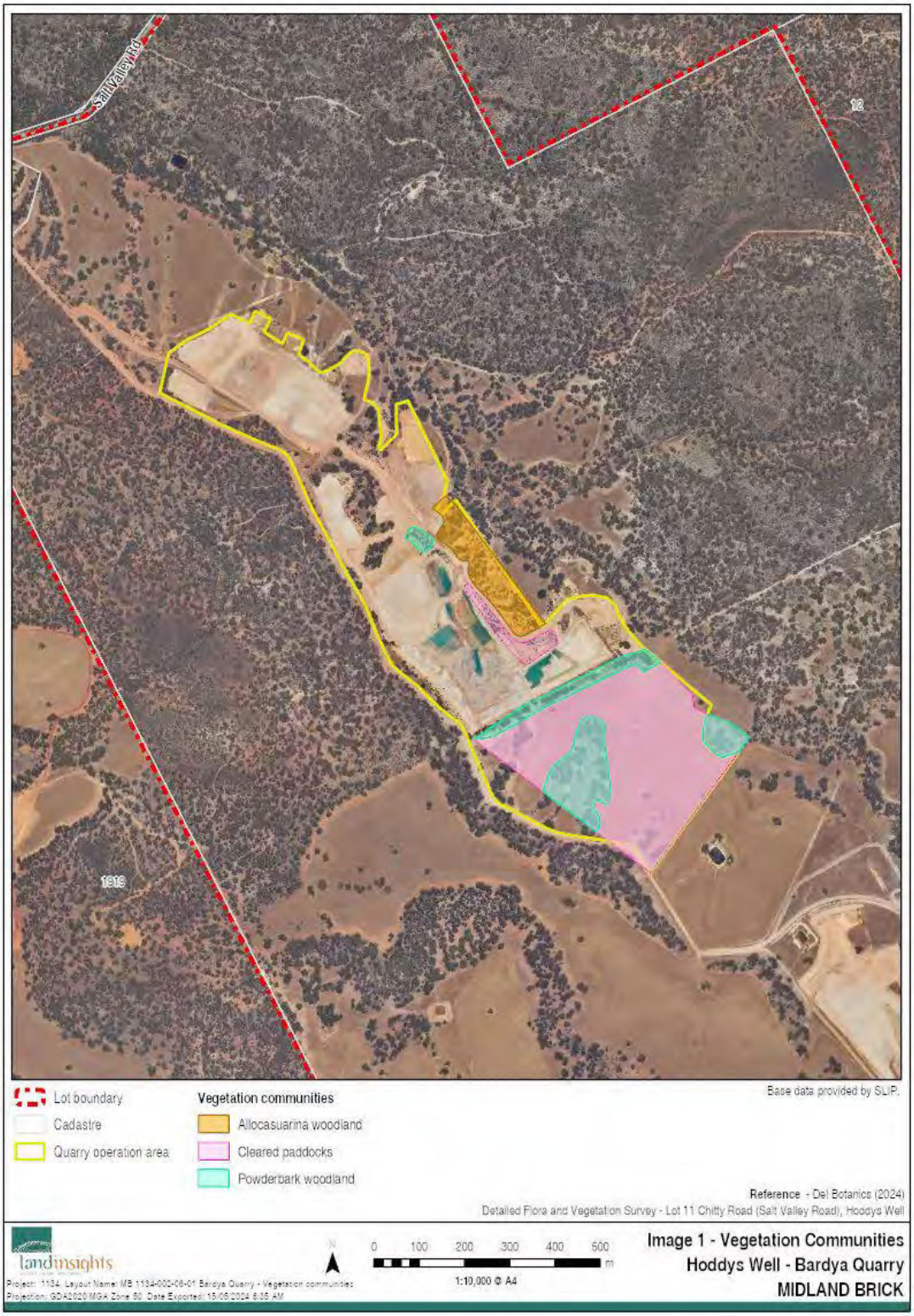
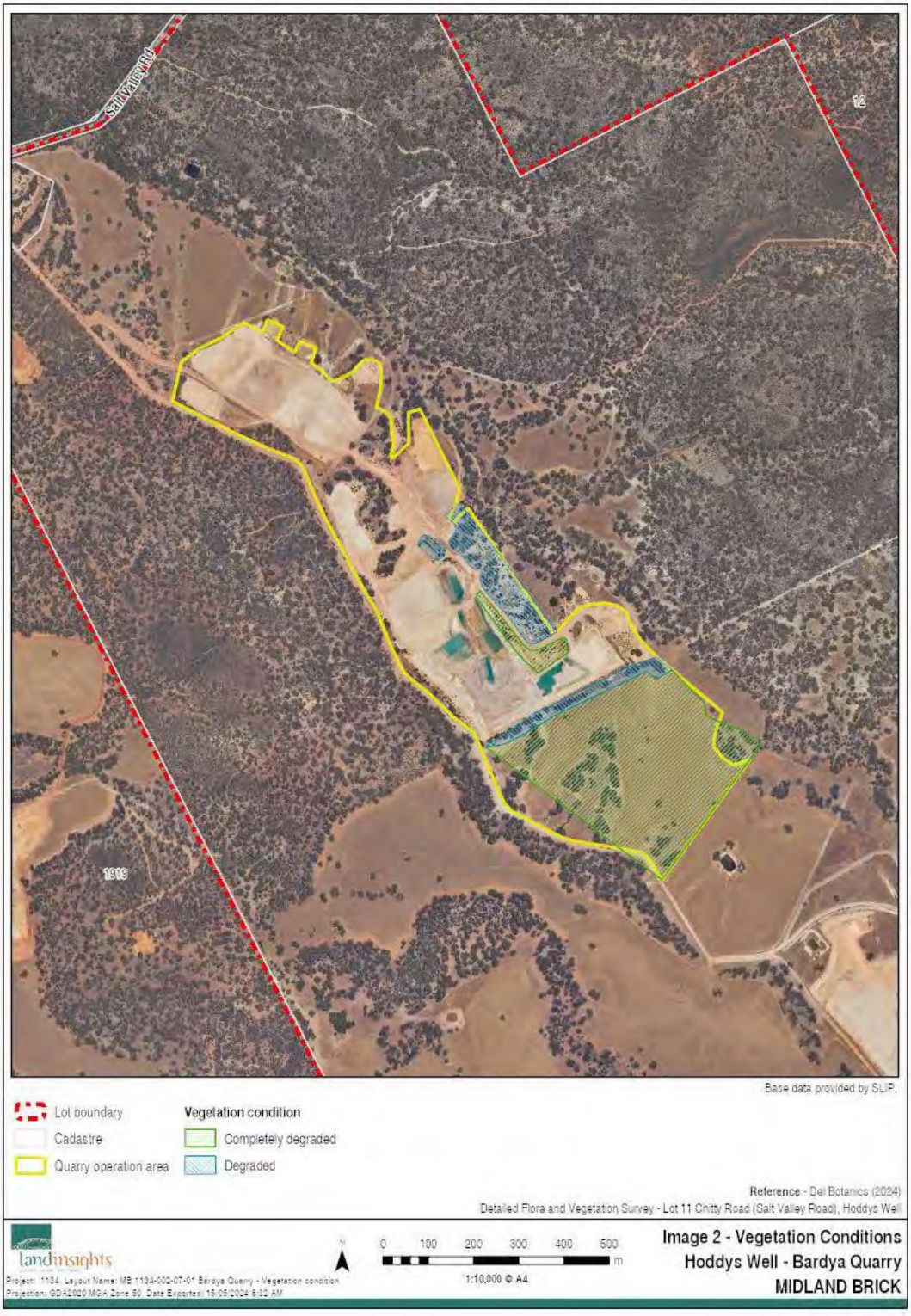


Figure 2.9 – Vegetation Condition (based off Del Botanics, 2024)



2.6 Fauna

The operation area has been historically cleared of native vegetation and disturbed, even prior to clay extraction operations commencing. Some areas of remnant vegetation surrounding the quarry are likely to be used by native fauna.

A *Hoddys Well Quarry Targeted Conservation Significant Fauna Survey 2024* was undertaken by Western Wildlife in 2024. The survey area comprised the new excavation area adjacent to the south of the quarry and the vegetation at the eastern side of the quarry where some regrowth may require clearing. The study identified the following fauna habitats across the surveyed areas. The report states that "all of the habitats are disturbed, either by grazing or by past quarry activities".

- Wandoo-marri woodland
- Regrowth woodland
- Pit
- Cleared

In general, the Wandoo-Marri Woodland is located in the paddock area adjacent to the southern quarry boundary and the Regrowth Woodland describes the vegetation habitat on the eastern boundary of the quarry.

With regards to the Wandoo-Marri Woodland, Western Wildlife (2024) states that "The understory is disturbed by grazing and generally absent, but stands of shrubby *Banksia sp*. persist in patches, and there are accumulations of leaf litter and woody debris that may provide shelter for reptiles. The Marri and Jarrah trees and patches of shrubby *Banksia* sp. are important foodplants for black cockatoos."

With regards to the Regrowth Woodland, Western Wildlife (2024) states that "this habitat consists of Wandoo, Marri, Sheoak (*Allocasuarina* sp.) and various understory shrubs on a highly modified ground surface. There are occasional remnant native trees, and areas of regrowth Wandoo with little understory. There are a few scattered shrubby *Banksia* sp. in the understory towards the northern end. Marri and shrubby *Banksia* sp. Are important food-plants for black-cockatoos, and Sheoak is a secondary food-plant for the Forest Red-tailed Black-cockatoo, however, these food-plants are sparsely distributed in this habitat."

Overall commentary of the fauna assemblage by Western Wildlife (2024) is provided below:

> *Overall, the faunal assemblage of the study area is likely to be relatively species poor as the habitats of the study area are disturbed and occur in small patches. The proximity of other native*

vegetation, however, means that fauna from these larger bushland areas is likely to range onto the study area. Even isolated paddock trees can provide habitat for birds and a small number of arboreal reptiles and bats. The cleared areas are likely to support very few species.

The birds observed on the site visit included those that forage on the nectar, seeds or invertebrates available in the eucalypt canopy, omnivorous species that forage on the ground, and mid-level foragers. Frogs may occur in the pit and burrowing frogs may forage in terrestrial habitats. Few reptiles are likely to occur as the ground surface is disturbed and understory mostly absent, but larger species may range into the study area from adjacent vegetation. Small terrestrial native mammals are likely to be rare or absent due to the lack of understory vegetation, but some may occur on occasion due to the proximity of large areas of vegetation adjacent to the study area. Native bats are likely to occur throughout the study area, roosting in tree hollows.

With regards to conservation significant fauna, the Western Wildlife report concludes that "The study area is unlikely to provide important habitat for most fauna of conservation significance known to occur in the region, although the Chuditch, Fork-tailed Swift and Peregrine Falcon potentially occur, and the Red-tailed Phascogale, Brush-tailed Phascogale, Masked Owl (southwest population), Quenda and Carpet Python possibly occur. The only conservation significant fauna for which the study area is likely to have importance are Carnaby's Cockatoo (recorded in the study area), Baudin's Cockatoo (likely to occur) and the Forest Red-tailed Black-cockatoo (likely to occur)."

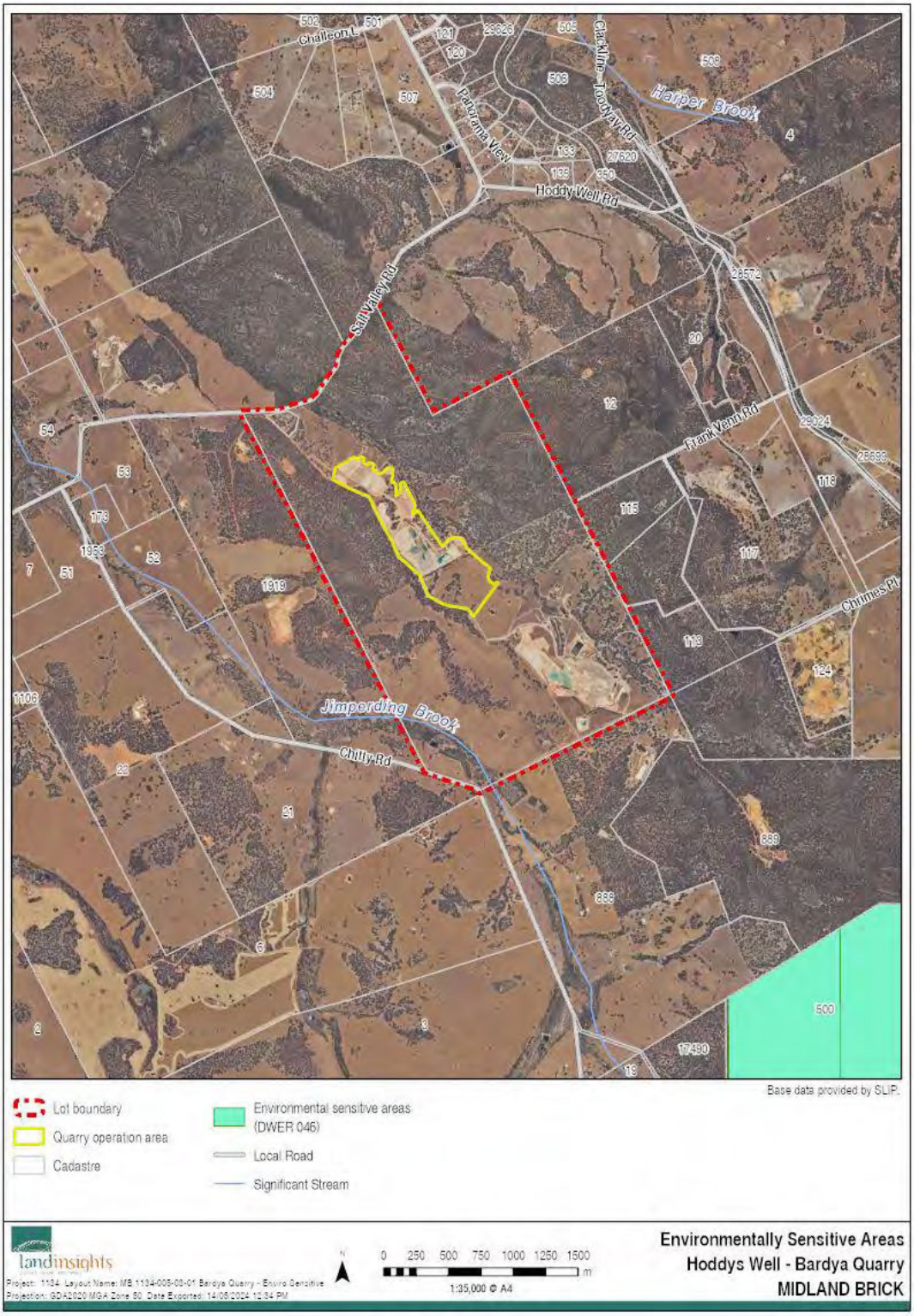
A Black Cockatoo habitat assessment was undertaken as part of the survey by Western Wildlife. The survey concluded that "The study areas contain 4.6ha of high-quality cockatoo foraging habitat in Wandoo - Marri woodlands and Regrowth woodlands and 135 'potential nesting trees' were recorded. Carnaby's Cockatoo is known to breed within 12km of the study area, and although no evidence of roosting was recorded in the study area cockatoos are known to roost nearby."

The closest conservation area is the Panorama Reserve (approximately 3.0km to the north-east) and the Clackline Nature Reserve (approximately 3.5km to the south).

2.7 Environmentally Sensitive Areas

There are no "Environmentally Sensitive Areas" (ESA) located on or adjacent to Lot 11. The closest ESA is located approximately 3.5 kilometres to the south-east of the quarry, associated with the Clackline Nature Reserve.

Figure 2.10 – Environmentally Sensitive Areas



2.8 Water resources

Hydrological mapping

The site sits within the Eastern Darling Range hydrogeological zone which is described as "Moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys."

The site is located within a "Proclaimed Surface Water Area" under the *Rights in Water and Irrigation (RIWI) Act 1914* (the Avon River Catchment Area). It is not located within a "Proclaimed Groundwater Area".

In a regional context, the site is located within the Avon River Surface Water Area.

The site is not located within or in close proximity to a Public Drinking Water Source Areas (PDWSA's).

There are no wetlands, floodplain areas or Floodplain Development Control Areas located on or surrounding the property.

Surface water features

The surface water hydrology is generally described as a deeply dissected lateritic plateau. The watercourses in the area do not contain water through all seasons and usually only flow during rainfall events and winter periods. As is mentioned above, the surface water catchment area is the Avon River which means that the surface water drainage is naturally to the north towards the River.

The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

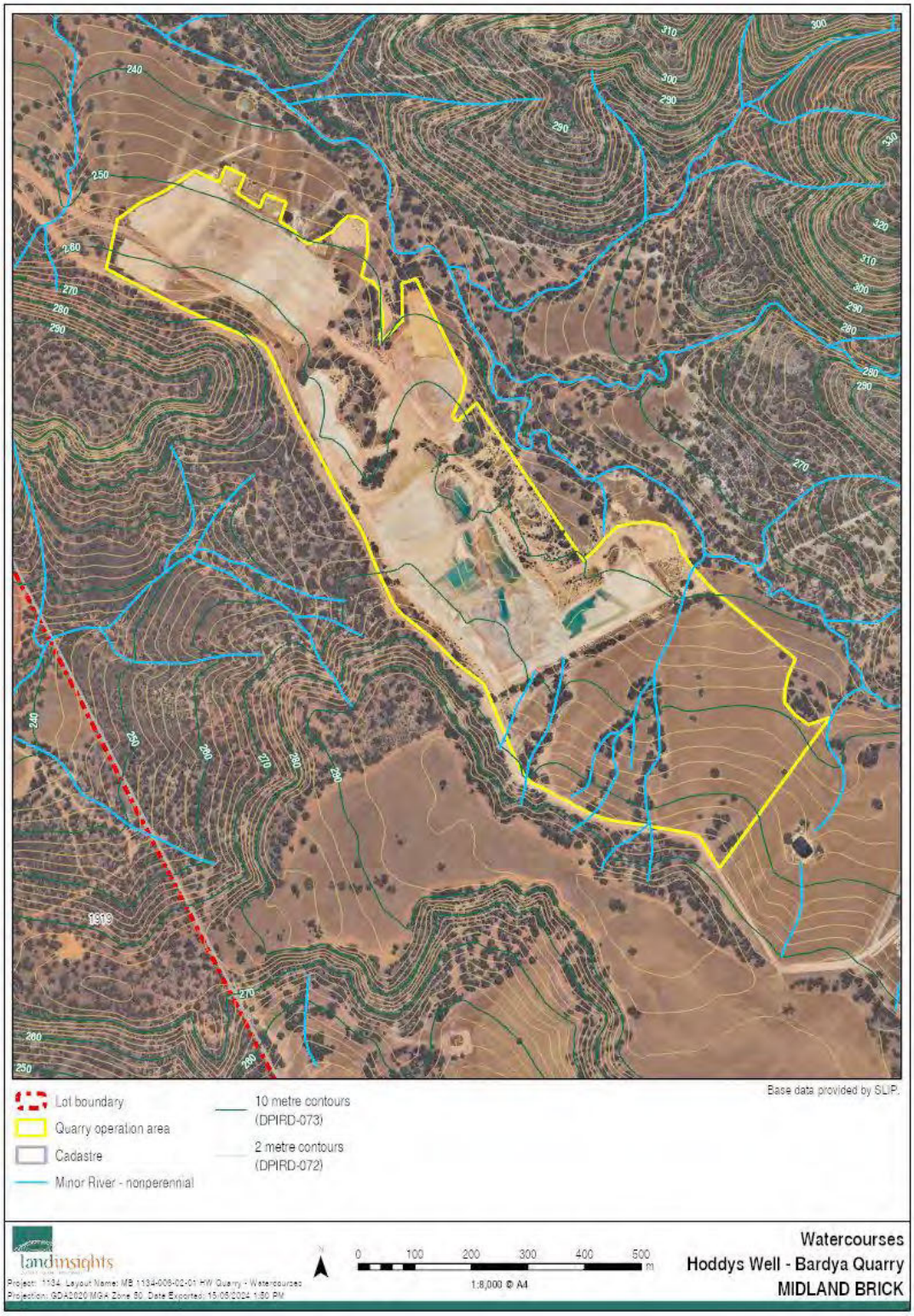
A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Road and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

It should be noted that the operation is separated hydrologically from surrounding watercourses and all stormwater is retained on site within drainage basins. The quarry operations do not intercept the watercourse and does not discharge water. There are no drainage lines from the quarry towards any watercourses and there are no watercourses or drainage lines leading into the quarry.

There are no wetlands located on the site. There are no wetlands as mapped by the “Directory of Important Wetlands in Australia” or the DWER Geomorphic Wetlands database.

Figure 2.11 –Watercourses



Groundwater

The site is underlain by a confined aquifer/aquitard of limited extent which is confined by thick beds of clays and weathered schist/quartzite (Stass Environmental, 2011). Ground water flows in a south-westerly direction.

The site is not located within a Proclaimed Groundwater Area.

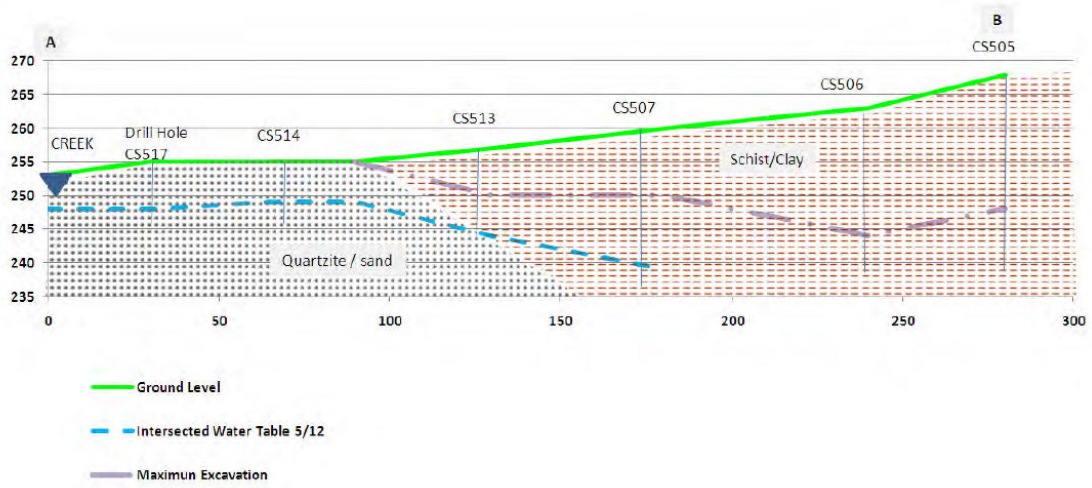
Online mapping by DPIRD identifies the site as being located in the Eastern Darling Range hydrological zone. The groundwater is described by DPIRD as “mainly low-yielding saprolite aquifers (brackish to saline).” It also states that Palaeochannels and sandy aquifers occur in some valleys which can be fresh to brackish. Groundwater discharge may occur in drainage lines and on valley floors in cleared catchments.

The general geology of the area is highly weathered rocks that have a high clay content and therefore do not allow for significant flows. There are no sedimentary sands in the area that would produce an interconnected ground water table within the deposit. The weathered schists have a low to very low permeability. The groundwater is more accurately described as an aquiclude which indicates that groundwater is present however there is no defined/connected aquifer system within the schist (Brikmakers, 2013a).

Over 100 exploration holes either within the proposed extraction area or adjacent to it have been completed by Brikmakers in the past. No significant groundwater has been located at the depths proposed to excavate to a maximum of 30m below ground level apart from groundwater previously intercepted in drilling on the eastern side of the proposed extraction (as can be seen in Figure 3.13 below). This water is contained within the fractured quartzite (Toodyay stone) that forms the eastern contact of the schist. No water table or perched water tables have been intercepted during significant drilling of the deposit and the extraction area.

Figure 3.12 below (extracted from Brikmakers, 2013a) demonstrates the relationship between the water table, schist and quartzite. A minimum of 5m will exist between the water table and the finished pit floor. The cross section is an east to west section showing measured water table and proposed excavation depths.

Figure 2.12 – Generalised Geology and Hydrogeology (from Brikmakers, 2013a)



2.9 Surrounding Land Uses

Land uses immediately surrounding and adjacent to the quarry include other clay extraction (operated by a separate company) and a landfill both located at the southern end of Lot 11, clay extraction (also operated by Midland Brick) to the west and rural properties.

3 Rehabilitation Methods

3.1 Introduction

This chapter provides a description of the rehabilitation and mine closure process. It sets out rehabilitation of the Hoddys Well-Bardya Quarry Operation Area in broad steps comprising recontouring and shaping the land, planting (pasture and native vegetation) and monitoring. Detailed actions and timing are provided in Chapter 4 below.

In summary, the quarry will be recontoured to a safe and stable condition with dams being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some vegetation. A majority of the Operation Area will be planted with pasture, with vegetation belts on some of the recontoured slopes (i.e. the pit areas) and vegetation clumps on some of the flatter areas to provide tree cover (i.e. within the stockpile areas). These areas are shown on the Rehabilitation Concept Plan in Figure 1.3.

It is the intention of Midland Brick to progressively rehabilitate the site as the resource is being removed, although the timing of progressive rehabilitation will depend on timing of extraction, areas required for water management and access. As was stated in the 2013 application ("Extractive Industries Licence Variation Application", Brikmakers, 2013), the bulk of the rehabilitation will be undertaken at the completion of quarry.

3.2 Recontouring

Recontouring within the Operation Area starts with bulk earthworks. Generally, a large bulldozer will be used to form the basic new slope angle by removing the mine bench structure. This is done by pushing from the top bench. Survey markers are placed at set positions back from the face to indicate where the dozer is to work to. The dozer operator cuts the face down slice by slice until they have worked back to the markers. Each bench is recontoured in the same manner. Once the clay benches have been reshaped, the overburden is spread over the entire face.

Contour banks will be used to control surface water runoff from the rehabilitated landform. The purpose of the contour banks is to reduce the effect of rain from causing excessive soil movement. Water management will continue throughout recontouring and rehabilitation with water directed from disturbed areas into the basins located within the pit areas.

Recontouring can sometimes take place during the quarry operation as excavation progresses. Progressive recontouring depends on the size of the quarry, the type of clay located within the pit, water management and the amount of overburden available. The Hoddys Well quarry contains different types of

clay within the pit area, and this will require different parts of the pit to remain open at any one time to allow access to all types of clay. Different types of clay across the operation area might also require the need to have multiple active pit areas open at one time. In addition, exhausted pit areas might not be able to be completely rehabilitated before new areas are opened to provide a basin for water drainage. The specifics will be worked out as operations continue. Final recontouring will take place at site decommissioning.

Following decommissioning of each area, Midland Brick will complete mine closure documents as required by the Department of Mines, Industry Regulation and Safety (DMIRS). These documents demonstrate to DMIRS that slopes are recontoured to a safe and stable condition.

Geotechnical stability

The slopes will be made as gentle as possible, but because of a lack of overburden, it will be steeper in some locations. Recontoured slopes comprising of weathered rock and soil will be recontoured to slopes of up to 1:2. Contour/interceptor banks will be constructed on the reformed surfaces to prevent rain from causing excessive soil movement in susceptible areas of the reconstructed land surface.

In between excavation campaigns (i.e. the quarry will not be operated on for a period of time), the pit area will be made safe in compliance with the *Mines Safety and Inspection Act 1994*, and will include maintaining faces in a stable manner, providing fencing above vertical edges of the pit and the use of warning signs. The slopes of the pit will be maintained to enable the continued capture of surface water to the detention basin in compliance with the Water Management Plan (Land Insights, 2024).

3.3 Site preparation

Site preparation comprises soil preparation and weed control prior to planting taking place. Recontouring and establishment of overburden and topsoil is an important step in achieving successful rehabilitation.

Following recontouring with overburden (described above), the topsoil will be spread across areas which will be planted. Soil will be ripped if required.

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species. As the post-excavation land use is pasture, it is not anticipated that weed control will be other than normal agriculture practice. Weed control (if required) will be undertaken in the Autumn months, prior to planting. This will allow enough time for weed growth after the first rains and enough time to reduce weed density before planting. Weed control is most likely only required to be undertaken once topsoil has been spread and any seeds have been allowed to germinate (usually if there has been some rain). Weed management is further addressed in the Weed Management Plan (Land Insights, 2024).

Arrangements will be made with a contractor to cultivate the land with pasture following site recontouring.

The recontoured slopes within the pit area will be planted with "vegetation belts" and the flatter portions of the site (i.e. the Stockpile Area) will be planted with a few "vegetation clumps". Site preparation within these areas will involve ripping the soil (where possible) and weed control (if required).

Orders will be made with the appropriate suppliers (such as nurseries) for the plants to be used for rehabilitation in the summer months prior to planting. Arrangements will also be made with contractors and/or landcare groups for undertaking the planting.

3.4 Planting

A majority of the Operation Area will be planted with pasture, with vegetation belts on some of the recontoured slopes (i.e. the pit areas) and vegetation clumps on some of the flatter areas to provide tree cover (i.e. within the stockpile areas). These areas are shown on the Rehabilitation Concept Plan in Figure 1.3. Pasture will be cultivated across the recontoured areas to establish groundcover across the decommissioned operation area. Pasture will also assist in erosion control, especially in areas which do not have native vegetation planted.

The species of pasture to be planted may vary depending on the preference of the landowner however, is likely to include the usual varieties planted in the local area including grasses and legumes.

Native vegetation will be planted as "vegetation belts" along the recontoured slopes within the pit areas and "vegetation clumps" on the flatter areas (i.e. the stockpile areas). Species and recommended numbers are listed in Table 3.1 below. Note that the number of plants in column 3 is a recommendation/guide only and the actual number will vary depending on availability. The general density of planting along the slopes ("vegetation belts") will be approximately one plant per square metre. Vegetation belts along the slopes will be approximately 20m in width. These areas should primarily be planted with shrubs (rather than trees) to assist with erosion control. The density of planting within the "vegetation clumps" should be approximately 50 plants per hectare.

Table 3.1 – Suggested Species for Planting

SPECIES NAME	TYPE	NUMBER
Vegetation Belt		
Viminaria juncea	Shrub	2000
Acacia microbotrya	Shrub	2000
Acacia pulchella	Shrub	2000
Gastrolobium calycinum	Shrub	1000
Gastrolobium retusum	Shrub	1000
Gastrolobium capitatum	Shrub	1000
Gastrolobium villosum	Shrub	1000
Hibbertia acerosa	Shrub	2000
Hibbertia hypericoides	Shrub	2000
Banksia armata	Shrub	2000
Vegetation clumps		
Allocasuarina huegeliana	Tree	100
Eucalyptus wandoo	Tree	100
Eucalyptus accedens	Tree	100
Corymbia calophylla	Tree	100

It is anticipated that revegetation will occur by planting of seedlings. It is not anticipated that irrigation will be required to re-establish vegetation, however water should be available from the detention basins on site if required. Planting would occur during late autumn/early winter, with a review and further planting being undertaken as required 12 months later.

3.5 Erosion control

Erosion is more likely if soil particles are disturbed by wind or water and there is no protection from vegetation. The significance of water erosion also depends on the slope of the land, with gentle slopes less likely to be susceptible to erosion. As is mentioned above, contour banks will be used to control

surface water runoff from the rehabilitated landform. The purpose of the contour banks is to reduce the effect of rain from causing excessive soil movement. The final land surface will be internally draining and direct runoff to the dams created.

The soil types found on site (clay, gravel, and loam soils) are not susceptible to water erosion and planting pasture over rehabilitated areas will assist is wind erosion control.

3.6 Monitoring and completion

The completion criteria is set out in Table 1.1 above. The progress of rehabilitation will be monitored to assess against the completion criteria.

The progress and success of rehabilitation within the rehabilitated clay quarry will be monitored for two years following site decommissioning. It should also be noted that quarry operators are also obligated to rehabilitate and make safe all slopes in accordance with DMIRS requirements as required under the *Mines Safety and Inspection Act 1994*.

The progress and success of planting will be monitored for two years following planting. The success of rehabilitation will be assessed in late summer following planting. Attributes to be assessed include:

- Plant density
- Plant cover
- Plant deaths or survival rate
- Weed density.

If necessary, supplementary planting will be undertaken if the minimum cover of 80% is not achieved. This will include weed control (if required) and additional planting.

Monitoring of the site will be achieved through site inspection (to observe the survival of plants, weed occurrence and erosion). While it is expected that some weeds will be present on the site, monitoring will target Declared Weeds and Weeds of National Significance and, should any be observed, these will be removed (in accordance with the Weed Management Plan).

Reports can be provided to the Shire of Toodyay annually to advise of the progress of planting and rehabilitation.

3.7 Timing

As is discussed above, progressive rehabilitation will take place where possible. As is discussed above, progressive recontouring will take place where possible and final rehabilitation over the entire operation will occur once extraction activities have been completed. The timing for progressive rehabilitation has not been determined as there are many variables which can influence this.

At the end of excavation, it is likely that some clay stockpiles will remain for a short period. This will allow for recontouring to take place as the final stages of carting occur. After all resource is moved off the site this area will be rehabilitated also.

Timing for each action is provided in Table 4.1 below.

3.8 Final site clean-up

All wastes on site will be appropriately managed during and after operation of the site in accordance with the Waste Management Plan. They will either be recycled or taken to an approved waste disposal site. Rubbish will be stored in bins, which will be emptied at an appropriate rubbish tip. Clay excavation activities do not require the use of chemicals apart from lubrication materials and fuel.

After clay extraction activities have ceased, all equipment will be removed from the site and the final stages of rehabilitation will occur.

4 Rehabilitation Methods and Schedule

4.1 Introduction

This chapter sets out the rehabilitation schedule in detailed steps with an associated responsibility and timing recommended. The intent of this is to provide a working document for Midland Brick to use to help guide rehabilitation and responsibilities.

4.2 Rehabilitation Schedule

The Rehabilitation Management Plan actions, responsibilities and timing is presented in Table 4.1 below.

Table 4.1 – Rehabilitation Management Plan

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
1. Remove all equipment and machinery not required for rehabilitation.	Quarry Manager	At site decommissioning.
2. Undertake bulk mining/dozing of benches to create new landform using overburden.	Quarry Manager	When possible during operations and complete recontouring at site decommissioning.
3. Maintain water drainage throughout the site – direct water from the disturbed areas into the dam located within the pit area.	Quarry Manager	Ongoing
4. Construct contour/interceptor banks on the recontoured surfaces to control erosion.	Quarry Manager	During recontouring
5. Ensure slopes are safe and stable in accordance with DMIRS requirements.	Quarry Manager	During recontouring
6. Form a dam at the lowest point of the recontoured pit areas.	Quarry Manager	During recontouring
7. Spread topsoil over areas to be planted.	Quarry Manager	Prior to planting.
8. Order seedlings from nursery.	Quarry Manager, Environmental Manager	Summer, following recontouring
9. Rip soils within the “vegetation belts” and “vegetation clumps” to prepare them for planting.	Quarry Manager	Prior to planting.
10. Undertake weed control (if required) prior to planting pasture. Ensure that no Declared Weeds and Weeds of National Significance are located within the Operation Area. Comply with the Weed Management Plan for the site.	Quarry Manager, Environmental Manager	Prior to pasture cultivation.

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
11. Establish pasture across the recontoured parts of the site.	Quarry Manager, Environmental Manager	Following site recontouring.
12. Undertake planting of native vegetation during late autumn/early winter to allow seedlings to benefit from natural rainfall.	Quarry Manager, Environmental Manager	Late autumn/early winter.
13. Plant seedlings in vegetation clumps to the equivalent of 20 plants per hectare within the rehabilitated stockpile area.	Quarry Manager, Environmental Manager	Late autumn/early winter
14. Plant seedlings in vegetation belts to the equivalence of one plant per square metre around the rehabilitated pit area.	Quarry Manager, Environmental Manager	Late autumn/early winter
15. Ensure vehicles and machinery used for rehabilitation keep to access tracks and the operational areas to avoid spread of weeds and disease. Comply with the Dieback Management Plan and Weed Management Plan for the site.	Quarry Manager	Ongoing
16. No weed contaminated or suspect soil or plant particles will be brought on site for rehabilitation.	Quarry Manager	Ongoing
17. Keep the site secure with perimeter fencing, signs, and locked gates to avoid rubbish dumping from trespassers.	Quarry Manager	Ongoing
18. Monitor the rehabilitated areas for a period of two years to ensure the completion criteria are met.	Quarry Manager	Annually after rehabilitation for a period of two years.

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APPENDIX E

Dust Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

DUST MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

Prepared by:

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Document details:

Document History:

Date	Document Name	Document Manager	Summary of Document Revision	Client Delivered
May-24	1134 – Hoddys Well – Bardya Quarry Dust Management Plan	SR	Initial Draft for client review	May-24
May-24	1134 – Hoddys Well – Bardya Quarry Dust Management Plan	SR	Final	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Dust Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers) located at Lot 11 Chitty Road, Hoddys Well. The Hoddys Well quarry ("the site") is located on the northern portion of Lot 11. The Dust Management Plan outlines the appropriate procedures implemented by Midland Brick to manage any potential for dust generation. It has been prepared to accompany the Clay Excavation Management Plan prepared by Land Insights to support an application for renewal of the Development Approval and Extractive Industry Licence.

Dust management was previously addressed in the "Extractive Industries Licence Variation Application" report prepared by Brikmakers to support a previous renewal in 2013. This Dust Management Plan presents an update to the 2013 report. It has been prepared for the following reasons:

- To incorporate best practice dust management actions.
- To incorporate relevant recommendations from the "Draft Guideline: Dust Emissions" released by the Department of Water and Environmental Regulation (DWER) in 2021, as well as recommendations from "A Guideline for Managing the Impacts of Dust and Associated Contaminants From Land Development Sites, Contaminated Sites, Remediation and Other Related Activities" (Department of Environment and Conservation, 2011).
- To accompany an application for a renewal of the approvals for the operation.

1.2 Objectives

The objectives of the Dust Management Plan are:

- To manage the potential for dust generation
- To minimise the likelihood of any dust created dispersing past the lot boundaries
- To provide a process in the event of a dust-related complaint.

1.3 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan

1.4 Context

Dust is particulate matter (PM) comprising very small solid particles that may become airborne by natural forces (such as wind) or mechanical forces (earth-moving, stockpiling, haulage) (DWER, 2021). Dust particles are generally referred to as either "fine" or "course". According to the "Draft Guidelines: Dust Emissions" (DWER, 2021), fine dust particles (PM10 and PM2.5) that are readily inhaled are associated with a range of chronic health effects and fine and course dust particles can cause acute health effects (such as eye or breathing irritation).

In terms of guidelines and best practice dust management in Western Australia, there are two main documents which can be referred to for dust management controls. The current guideline for dust management is "A Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites, Remediation and Other Related Activities" (Department of Environment and Conservation, 2011). However, the recommendations from this document are not specific to extractive industries and therefore have only been used where relevant. It has therefore been supplemented with the information from the draft "Guidelines: Dust Emissions" (DWER, 2021) where appropriate. In addition, the risk assessment has been undertaken based on DWER's "Guidance Statement: Risk Assessments" (2017).

1.5 Operation

The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Information on the operation and how it relates to risk of dieback spread and management is provided below.

Earthworks campaign

The "Earthworks Campaign" refers to the excavation and stockpiling of material. During the earthworks campaign, topsoil and overburden is removed and clay is excavated and placed into stockpiles located within the Operation Area.

Earthworks take place as and when required throughout the year but generally during the dry months. The timing of excavation depends on weather conditions, market demand and operational requirements (such as the rate of excavation of other clay quarries). During Excavation Campaigns, excavation will generally take place for six days a week during the approved operation times. A number of excavation campaigns can occur throughout the year to the equivalence of 4 to 5 months each year. It should be noted that for large stretches of time there will be no excavation activities on site.

The current pit area (where a majority of the excavation currently takes place) is surrounded by the pit walls. Vehicles and machinery usually operate from the pit floor and the walls of the pit act as a dust barrier for most of the excavation process. The depth of the quarry is up to 20 metres. There will be a relatively short period where vehicles are located at the ground level (when clearing vegetation and stripping topsoil and overburden for new areas), however for a majority of time they will be located below ground levels and behind the pit walls. Dust management will be in place for the operation as set out in this report.

There will be no processing of resource (screening and crushing) and no blasting will be required.

Cartage campaigns

The "Cartage Campaign" refers to the removal or transport of clay from the site where it is taken to the Midland Brick brickmaking factories. Loading and carting from the site will occur throughout the year for the equivalent of 3.5 to 4.5 months total per year. Carting will be spread out into cartage campaigns throughout the year.

Carting from the site depends on the market demand for bricks, as well as the types of clay and colour of clay. Therefore, there may be some variation from the truck numbers and the number of days that carting will be required each month (i.e. some months will have more carting days than other months).

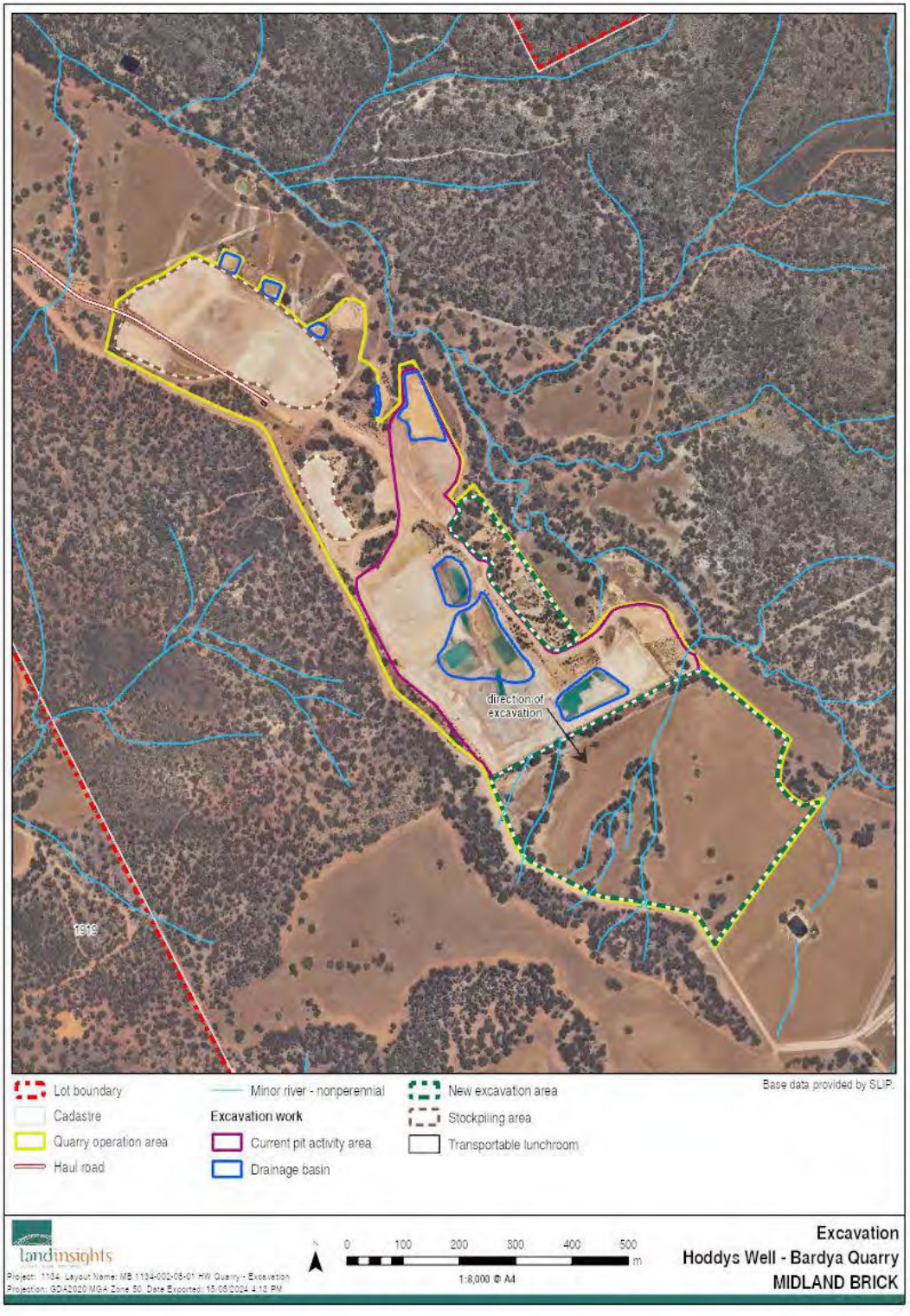
The Stockpile Area (and the area where trucks will be loaded with clay) is located in the pit area, close to the access/haul road for ease of access.

Rehabilitation

The quarry will be recontoured to a safe and stable condition with a dam or two being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some tree belts planted with native vegetation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Figure 1.2 – Excavation Plan



2 Site description

2.1 Surrounding Land Uses

Land uses immediately surrounding and adjacent to the quarry include other clay extraction (operated by a separate company) and a landfill both located at the southern end of Lot 11, clay extraction (also operated by Midland Brick) to the west and rural properties.

2.2 Separation Distances

There are no sensitive receptors with 1,000 metres from the quarry (including the landowner). The following closest sensitive receptors have been identified from the quarry.

- Owner's dwelling to the south – Approximately 1,100 metres
- Nearest rural dwelling to the east – Approximately 1,400 metres
- Nearest rural dwelling to the south – Approximately 2,400 metres
- Nearest rural dwelling to the west – Approximately 1,800 metres
- Nearest rural dwelling to the north-west – Approximately 1,600 metres (note that this is to the site entrance as this is the closest point)

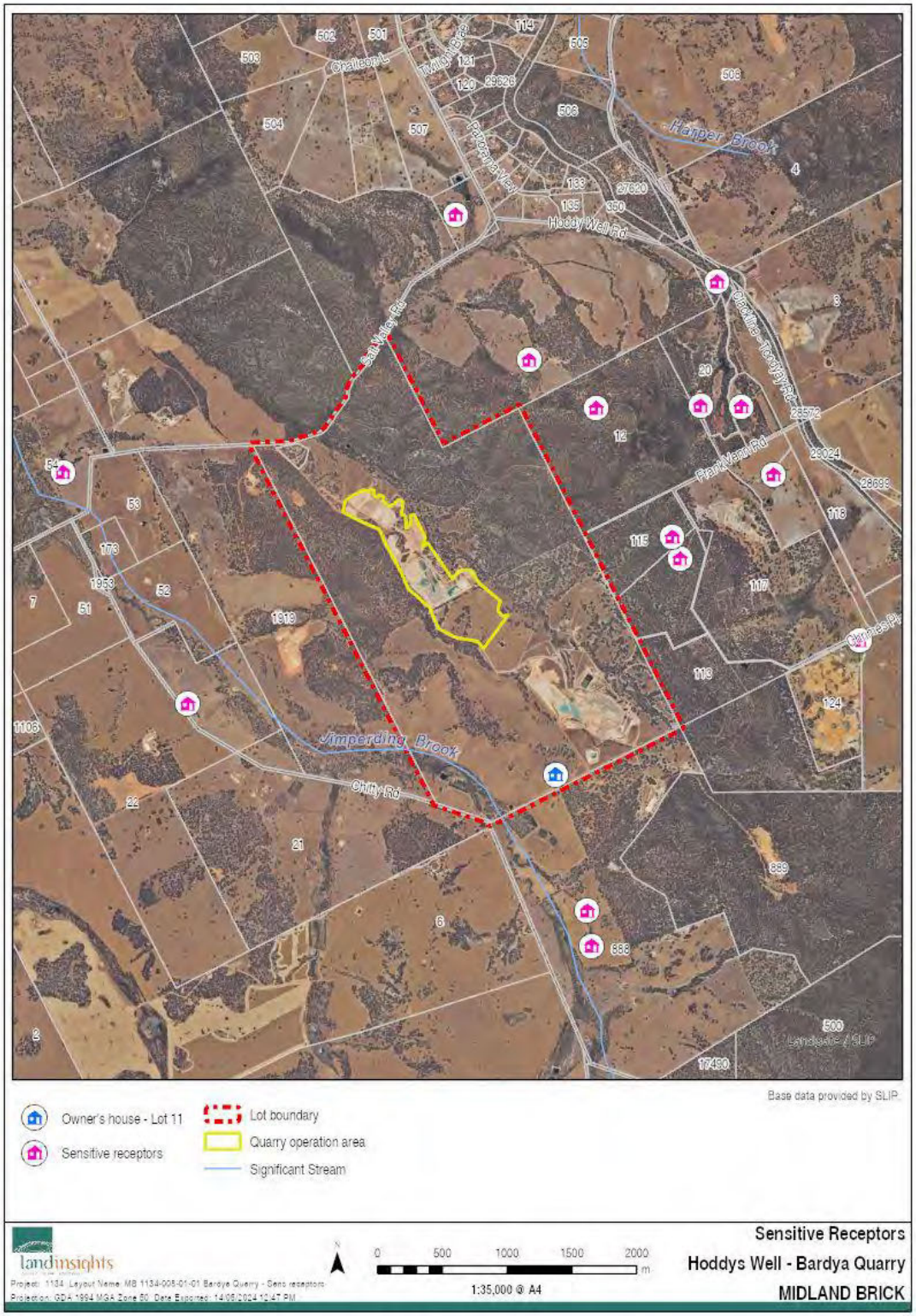
The location of surrounding sensitive receptors in relation to the quarry is shown in Figure 2.1 below.

The EPA's Guidance Statement No. 3 provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses (such as residential dwellings). It should be noted that the distances in the policy assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category "clay extraction or processing". The potential impacts are listed as "noise" and "dust". The separation distance is "500-1000 metres, depending on size and processing", however this can be less with appropriate environmental management. All surrounding sensitive receptors are over 1,000 metres from the quarry.

Although there are no sensitive receptors within 1,000 metres of the quarry, the Visual and Amenity Management Plan has been prepared to provide an outline of best practice visual management used at the site.

Figure 2.1 – Surrounding Sensitive Receptors



2.3 Climate

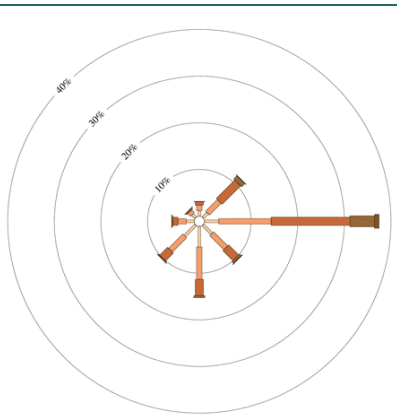
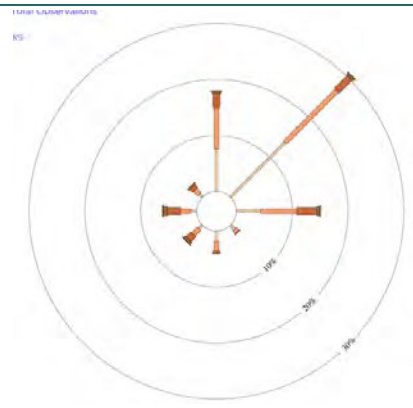
The south-west of Western Australia experiences a Mediterranean climate which is characterised by warm, dry summers and cool, wet winters.

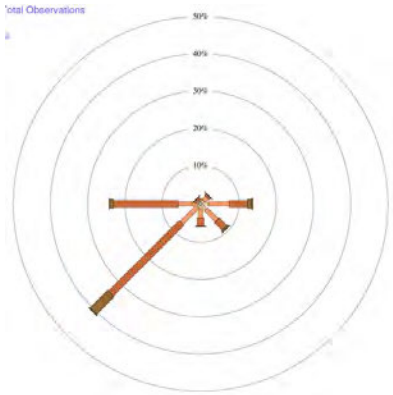
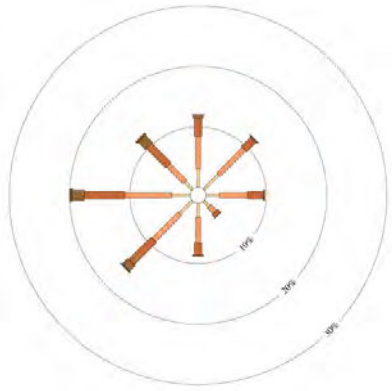
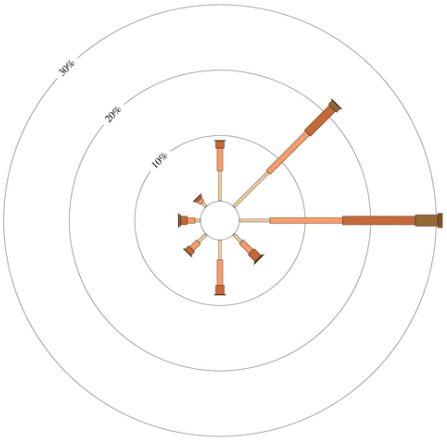
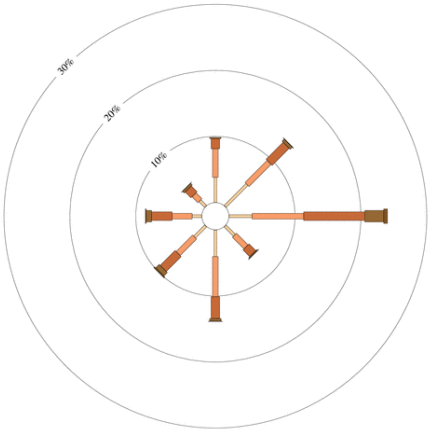
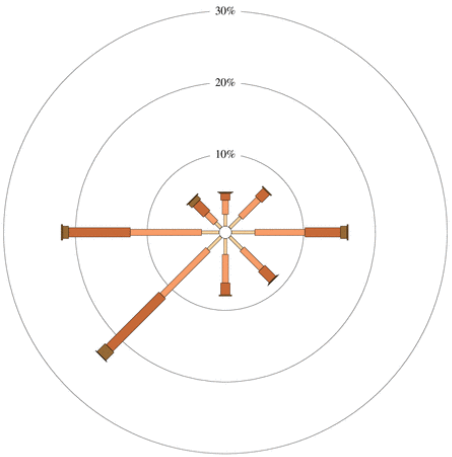
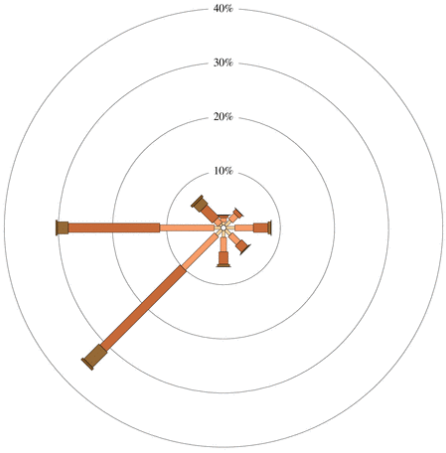
The rainfall and temperature data for the region has been obtained from the Bureau of Meteorology "Climate Data Online" services. The average rainfall from the closest station which is the Toodyay station is 520.7mm. A majority of rainfall is from May to August.

The mean temperature information is from the closest station which is the Northam station. It states that the hottest month is January with an average maximum of 34.3°C and the coldest month is July with an average minimum of 5.3°C.

The prevailing winds throughout the majority of the year are predominantly from the east (morning) and the south-west (afternoon) (Bureau of Meteorology, 2023). Wind roses for the Perth Airport are shown below.

Table 3.1 – Wind Roses for the Perth Airport

TIME OF YEAR	WIND ROSE	TIME OF YEAR	WIND ROSE
Summer 9am		Winter 9am	

TIME OF YEAR	WIND ROSE	TIME OF YEAR	WIND ROSE
Summer 3pm		Winter 3pm	
Autumn 9am		Spring 9am	
Autumn 3pm		Spring 3pm	

2.4 Topography and landform

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD).

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

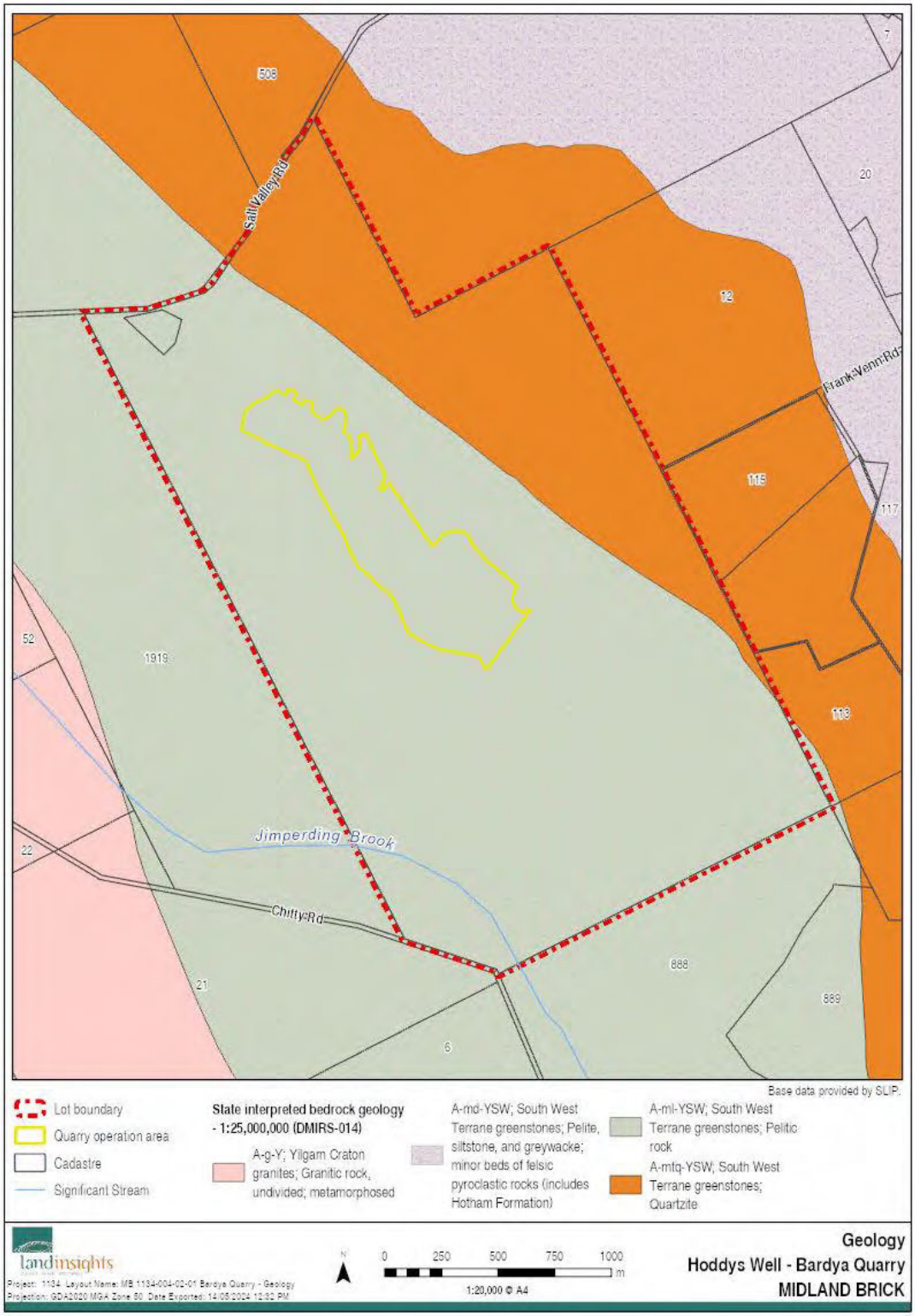
2.5 Geology

The site sits on the Darling Plateau which lies east of the Darling Scarp and the Swan Coastal Plain. The geology of this area can be described as “deeply weathered mantle over granitic rocks”. More specifically, the site is located within the Eastern Darling Range which is described in the DPIRD database as “moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys” with soils that are “formed in laterite colluvium or weathered in-situ granite”. Extensive weathering has formed the regolith profile that includes gravel/laterite and the highly altered, kaolin dominated, micaceous clay over unaltered micaceous schist (Brikmakers, 2013).

The 500 metres grid Regolith of WA as mapped by DPIRD identifies the geology “exposed rock, saprolite and saprock”. The bedrock geology is “South West Terrane greenstones” which are described as “Quartz--mica schist”.

The site is mapped by DMIRS as having “regionally significant basic raw materials” for clay. This is also reflected in SPP 2.4 which maps the site as a “Significant Geological Supply”.

Figure 2.2 – Geology



2.6 Soils

The site is located within the "Leaver" soil landscape system 253ByLV. The soil-landscape units are mapped by the Department of Primary Industries and Regional Development (DPIRD). It is described as "gravelly slopes and ridges of the western Darling Plateau. Gravelly yellow and red duplexes, gravelly deep clayey sands and sandy loams over laterite and clay".

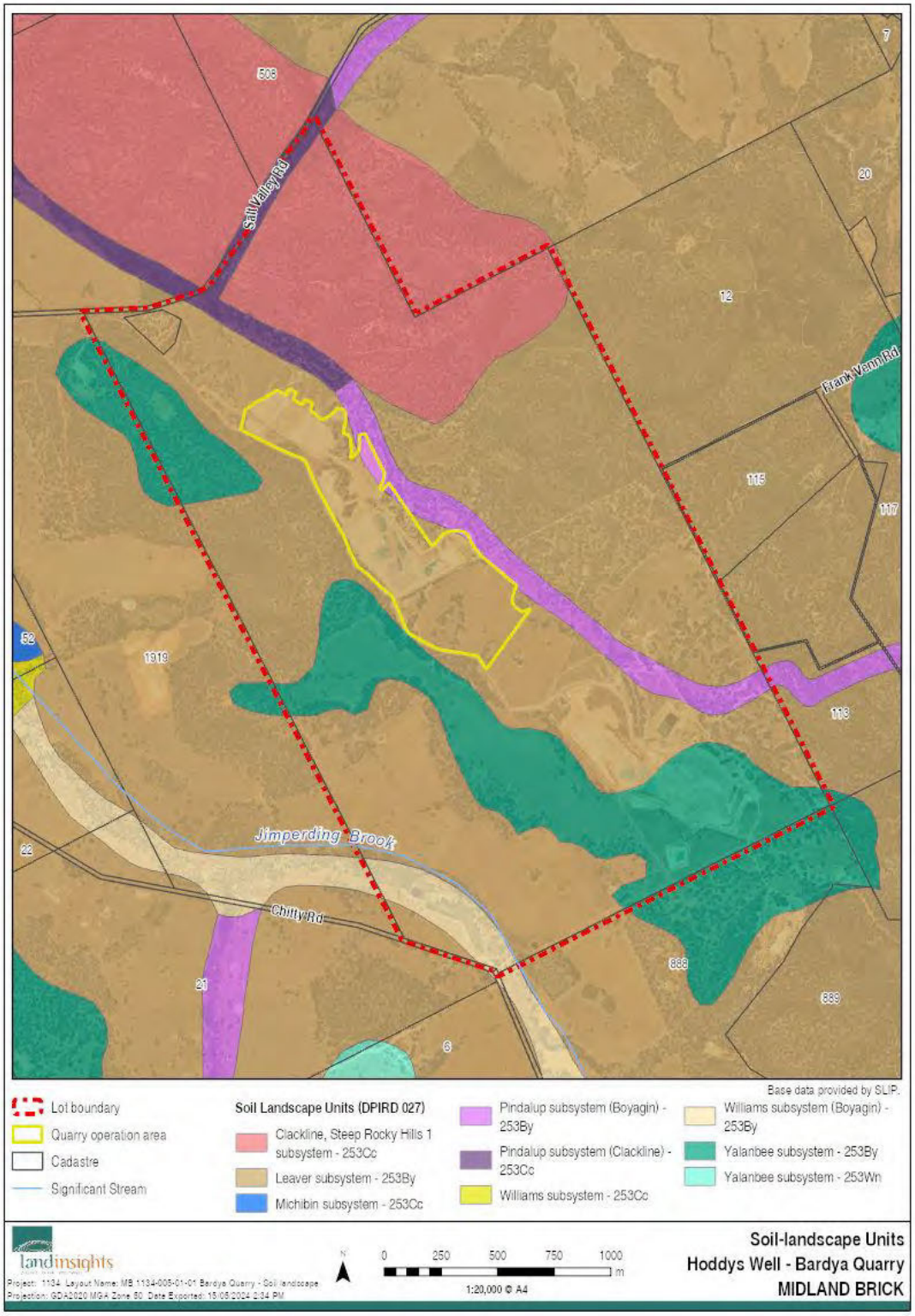
Generalised soil qualities of each soil-landscape unit as mapped by DPIRD are described in the table below.

Table 3.2 – Soil Qualities

SOIL-LANDSCAPE UNIT	WATER EROSION	WIND EROSION	WATERLOGGING	FLOOD	SALINITY
Leaver subsystem	Low risk	High risk	Low risk	Low risk	Low risk

Source: DPIRD, 2024

Figure 2.3 – Soil-landscape units



2.7 Vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry. Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as "Bannister 4" which is described as "Jarrah, Marri and Wandoo." The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is "Michibin" which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones.

A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.

The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as "Cleared Paddocks".

The closest sensitive receptors in all directions are separated from the clay quarry by substantial areas of established vegetation which provide an adequate visual screen (in addition to the natural topography and bund walls).

Some clearing of native vegetation will be required in the proposed excavation areas at the southern half of the site. These areas are shown on the plan at Figure 1.2. It is not expected that this will have an impact on visual amenity as there will be substantial areas of vegetation remaining.

Figure 2.4 – Current Native Vegetation Extent

2.8 Water resources

Hydrological mapping

The site sits within the Eastern Darling Range hydrogeological zone which is described as "Moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys." In a regional context, the site is located within the Avon River Surface Water Area.

The site is located within a "Proclaimed Surface Water Area" under the *Rights in Water and Irrigation (RIWI) Act 1914* (the Avon River Catchment Area). It is not located within a "Proclaimed Groundwater Area".

The site is not located within or in close proximity to a Public Drinking Water Source Areas (PDWSA's).

There are no wetlands, floodplain areas or Floodplain Development Control Areas located on or surrounding the property.

Surface water features

The surface water hydrology is generally described as a deeply dissected lateritic plateau. The watercourses in the area do not contain water through all seasons and usually only flow during rainfall events and winter periods. As is mentioned above, the surface water catchment area is the Avon River which means that the surface water drainage is naturally to the north towards the River.

The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Road and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

It should be noted that the operation is separated hydrologically from surrounding watercourses and all stormwater is retained on site within drainage basins. The quarry operations do not intercept the watercourse and does not discharge water. There are no drainage lines from the quarry towards any watercourses and there are no watercourses or drainage lines leading into the quarry.

There are no wetlands located on the site. There are no wetlands as mapped by the "Directory of Important Wetlands in Australia" or the DWER Geomorphic Wetlands database.

Groundwater

The site is underlain by a confined aquifer/aquitard of limited extent which is confined by thick beds of clays and weathered schist/quartzite (Stass Environmental, 2011). Ground water flows in a south-westerly direction.

The site is not located within a Proclaimed Groundwater Area.

Online mapping by DPIRD identifies the site as being located in the Eastern Darling Range hydrological zone. The groundwater is described by DPIRD as "mainly low-yielding saprolite aquifers (brackish to saline)." It also states that Palaeochannels and sandy aquifers occur in some valleys which can be fresh to brackish. Groundwater discharge may occur in drainage lines and on valley floors in cleared catchments.

The general geology of the area is highly weathered rocks that have a high clay content and therefore do not allow for significant flows. There are no sedimentary sands in the area that would produce an interconnected ground water table within the deposit. The weathered schists have a low to very low permeability. The groundwater is more accurately described as an aquiclude which indicates that groundwater is present however there is no defined/connected aquifer system within the schist (Brikmakers, 2013).

3 Screening Analysis

3.1 Introduction

Appendix B of the "Draft Guidelines: Dust Emissions" (DWER, 2021) provides a questionnaire to help determine if additional and more detailed information is required for a proposed development. The outcomes of the questionnaire are provided below.

3.2 Results

Question 1 – Description of dust emissions

A description of the activities, potential dust sources and proposed controls (the Management Plan) are provided in Table 5.1 below.

Question 2 – Identification of current dust impacts

No community complaints have been received. No other records of dust impacts (such as ambient monitoring, negative community feedback or dust diaries) have occurred throughout the quarry's operation.

Question 3 – Changes to emissions

There are no proposed changes to the existing operation that are likely to increase the dust emissions or change the configuration of any dust source, apart from the slow progression of excavation in a southerly direction. There are no proposed changes to the intensity of the operation or the rate of extraction.

Question 4 – Separation Distances

All sensitive receptors (rural dwellings) are located over 1,000 metres from the quarry (including the new extraction areas). This is above the recommended separation distances in "Guidance Statement No. 3 – Separation Distances Between Industrial and Sensitive Land Uses" (EPA, 2005) which is between 500-1,000 metres (depending on scale and processing).

Question 5 – Special case factors

The draft Guidelines lists the "special case factors" to be considered for new and existing sites. The special case factors do not apply in this instance.

Conclusion

The result of the above questionnaire is that a detailed dust assessment is not required for the proposed development. Therefore, an operational dust analysis and an assessment of the existing dust levels and dust characteristics has not been undertaken.

4 Risk Assessment

4.1 Introduction

A dust risk assessment for the Hoddys Well Quarry is presented in this chapter. It considers the potential for dust generation and the potential impact off-site. The assessment has considered in detail the activities associated with the operation, the risk factors, and the proposed controls.

There are three different components to the below risk assessment which provide a thorough consideration of the potential issues and risks as follows:

1. The assessment commences with a review of the "factors" from Chapter 7 of the "Draft Guidelines: Dust Emissions" (DWER, 2021). This provides an overarching look of the factors that are considered in a dust emission assessment and helps lead into the site classification and the overall risk assessment.
2. The "site classification" has been determined using the current guideline for dust management – "A Guideline for Managing the Impacts of Dust and Associated Contaminants from land Development Sites, Contaminated Sites, Remediation and Other Related Activities" (Department of Environment and Conservation, 2011). It should be noted that the recommendations from this document are not specific to extractive industries and therefore a more detailed management plan is provided in this document.
3. Following this is a more detailed risk assessment of the specific activities that take place for the operation. The assessment has been prepared based on the consequence, likelihood and risk definitions provided in "Guidance Statement: Risk Assessments" (Department of Environment Regulation, 2017).

4.2 Dust Emission Assessment

The "Draft Guideline: Dust Emissions" (DWER, 2021) provides information on the "factors" to be considered in a dust emission assessment. Each of the factors listed in Chapter 7 of the Guidelines is provided in Table 4.1 below. Commentary on the operation against these factors is also provided in the table below.

Table 4.1 – Dust emission assessment

FACTOR	COMMENT	CONCLUSION
Location and proximity to sensitive receptors	There are no sensitive receptors with 1,000 metres from the quarry (including the landowner). The following closest sensitive receptors have been identified from the quarry. • Owner's dwelling to the south – Approximately 1,100 metres • Nearest rural dwelling to the east – Approximately 1,400 metres • Nearest rural dwelling to the south – Approximately 2,400 metres • Nearest rural dwelling to the west – Approximately 1,800 metres • Nearest rural dwelling to the north-west – Approximately 1,600 metres (note that this is to the site entrance as this is the closest point) In accordance with the EPA's Guidance Statement No. 3, operations on site fit into the category "clay extraction or processing". The potential impacts are listed as "noise" and "dust". The separation distance is "500-1000 metres, depending on size and processing", however this can be less with appropriate environmental management. All surrounding sensitive receptors are over 1,000 metres from the quarry.	It is considered that there are adequate separation distances to sensitive receptors and the risk of impact is low.
Management of dust sources and activities.	Management of dust sources and activities (proposed controls) are set out in Table 5.1 below.	It is considered that there is a low risk of dust affecting nearby sensitive receptors when the Dust Management Plan is implemented as is demonstrated in the dust risk assessment in Table 4.3.

FACTOR	COMMENT	CONCLUSION
Characteristics of the dust.	As is explained above, the Screening Analysis for the proposed operation concluded that a detailed analysis of the dust is not required. Clay soils are particularly prone to "soil crusting" which is when moisture in the soil turns surface aggregates into crusts. It requires a much higher wind speed for particle dislodgment. And wind erosion is likely to be negligible until a disturbance significant enough to generate new erodible material occurs.	It is considered that there is a low risk of dust being created when the site is inactive due to soil crusting.
Potential dust impacts from other nearby sources.	Other potential nearby sources of dust are the nearby clay quarries and the landfill (i.e. within 2,000 metres of the site). It is not considered that these operations will have a cumulative effect of dust as each operation has their own Dust Management Plan and they are sufficiently separated from each other.	The potential risk from other sources is considered to be low.
Topography and complexity of terrain.	The topography of Lot 11 is complex with the land rising to both the east and west, providing significant differences in height between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. The current pit is approximately 20m deep. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.	The clay extraction operation is well screened from nearby sensitive receptors by the topography and vegetation.
Size and/or complexity of the facility.	The existing Operation Area (including the area cleared for the next stage) is approximately 31 hectares. The operation is not complex as there is only extraction, carting and rehabilitation, with no processing of the resource on site. Operation only occurs intermittently throughout the year.	The scale and complexity of the operation is considered to have a low risk on nearby sensitive receptors.
Whether the proposal is in a Strategic Industrial Area.	The site is not located within a Strategic Industrial Area.	N/A – This factor is not relevant.
Whether the proposal is in an area that has an established risk-based approach and regulatory context.	The proposal is not within an area with an established risk-based approach and regulatory context.	N/A – This factor is not relevant.

FACTOR	COMMENT	CONCLUSION
Compliance history of existing premises.	No community complaints have been received since the site commenced operation over 30 years ago. No other records of dust impacts (such as ambient monitoring, negative community feedback or dust diaries) have occurred throughout the site's operation.	The compliance history for the site is good and therefore is not a concern.
Other considerations	The local area experiences a Mediterranean climate which experiences cool, wet winters and hot dry summer. A majority of rain occurs in the Winter months (May-August) and summer months can be typically dry. The prevailing winds throughout the majority of the year are predominantly from the east (morning) and the south-west (afternoon) (Bureau of Meteorology, 2024).	Considering the terrain, surrounding vegetation and separation distances, it is considered unlikely that there will be dust impact from the prevailing wind on nearby sensitive residences.

4.3 Site classification

The site classification has been prepared for the site in accordance with DWER's Guidelines (2011) and has been classified as "medium risk". This is due to the fact that there is a large area exposed or open at one time, the activities largely involve earthworks, the separation distances to sensitive land uses are below 500m in some instances. The classification is provided in the table below. The table below is reproduced from Appendix 1 of the Guidelines. The total score is 161 which fits into "Classification 1 – score under 199 – considered negligible risk".

Table 4.2 – Site classification assessment

ITEM	SCORE	COMMENT
PART A – Nature of site		
Nuisance potential of soil, when disturbed	Medium – 4	The activities on site that will likely "disturb" the soil are excavation activities, loading trucks with clay, recontouring and vehicles moving across the site. For the remainder of the time (when the site is not operational) the soil will not be disturbed.
Topography and protection provided by undisturbed vegetation	Sheltered and screened - 1	The quarry sits down in the landscape and there is a significant natural barrier (undulating terrain) between the operation and surrounding residences. Mature vegetation also provides additional screening on all sides. Most disturbance activities take place at depth and are surrounded by the quarry walls.
Area of site disturbed by the works	More than 10ha – 9	This includes the current quarry and future areas.
Type of work being done	Bulk earthworks – 9	Extraction activities.
PART B – Proximity of site to other land uses		
Distance of other land uses from site	More than 1km – 1	All surrounding sensitive receptors are over 1,000m from the operation.
Effect of prevailing wind direction on other land uses	Isolated uses affected by one wind direction – 6	It is considered that the nearest sensitive receptors could be in the path of one prevailing wind direction.

Source: *A Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites, Remediation and Other Related Activities* (Department of Environment and Conservation, 2011)

Reflecting the very low risk of dust impact on a site classified as "negligible risk", the Guidelines do not recommend that any management provisions or contingency actions are required.

4.4 Dust risk assessment

The overall dust risk assessment in Table 4.3 below is based on the criteria defined in "Guidance Statement: Risk Assessments" (DWER, 2017). The risk assessment below lists the activity(s) which have the potential to cause dust impact, the inherent risk (i.e. with no controls) and the residual risk (with controls in place). It uses the outcomes of the "Dust Emission Assessment" from the draft "Guidelines: Dust Emissions" in Chapter 4.2 above and the "Site Classification Assessment" from the 2011 Guidelines as a base. The "likelihood" and "consequence" determined in the below risk assessment can be supported by both of the assessments in Chapters 4.2 and 4.3 above.

The “risk” is determined by considering the likelihood and consequence of the environmental impact. The likelihood and consequence criteria are defined in the Guidance Statement. A copy of the criteria has been provided in Tables 4.4 and 4.5 below. The matrix used to determine the risk rating is also based on the matrix used in the Guidance Statement and a copy of this table is provided in Table 4.6 below.

The purpose of the risk assessment is to demonstrate that risk identified as “medium”, “high” or “extreme” can be effectively managed. As is stated in the “Guidance Statement: Risk Assessments” (DWER, 2017), a “low risk” is considered acceptable and generally not controlled through regulation.

Table 4.3 – Dust risk assessment

ACTIVITY/DUST SOURCE	POTENTIAL IMPACT WITHOUT MANAGEMENT AND CONSEQUENCE	CONSIDERATION OF LIKELIHOOD (WITHOUT MANAGEMENT)	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Vehicle and truck movements entering and exiting the site.	Dust and mud tracked onto Salt Valley Road. When dry, the mud and dust on the road can be disturbed and dispersed into the air when vehicles drive over. The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact without any dust management is considered to be "Possible" as the haul road is not sealed.	Possible	Minor	Med	Refer to Table 5.1 – Dust Management Plan. Following implementation of dust management, the likelihood of impact is considered to be "unlikely". It should be noted that the haul road and access is also used by more than one operator who accesses another part of the lot.	Rare	Minor	Med
Machinery and vehicle movements on internal access tracks throughout the site.	Dust can be generated by machinery and vehicles driving along internal dirt access tracks. Traffic through the extraction site and along the access roads has potential to generate dust lift-off and move off site. The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact without any dust management is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 5.1 – Dust Management Plan. Following implementation of dust management, the likelihood of impact is considered to be "rare" as dust impact is considered to occur only under exceptional circumstances.	Rare	Minor	Low

ACTIVITY/DUST SOURCE	POTENTIAL IMPACT WITHOUT MANAGEMENT AND CONSEQUENCE	CONSIDERATION OF LIKELIHOOD (WITHOUT MANAGEMENT)	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Clearing vegetation and stripping topsoil and overburden	Dust can be generated from clearing vegetation and moving topsoil and overburden to stockpiles. Dust particles in the air could potentially move off-site (i.e. outside of the property boundaries). The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact without any dust management is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 5.1 – Dust Management Plan. Following implementation of dust management, the likelihood of impact is considered to be "rare" as clearing vegetation and topsoil only occurs for a relatively short period of time and dust management will be in place.	Rare	Minor	Low
Excavation of clay and tipping clay onto stockpile.	Dust can be generated by the excavation of clay and tipping onto stockpiles. Dust particles in the air could potentially move off-site (i.e. outside of the property boundaries). The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact without any dust management is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 5.1 – Dust Management Plan. Following implementation of dust management, the likelihood of impact is considered to be "rare" as dust impact is only considered to occur only under exceptional circumstances.	Rare	Minor	Low

ACTIVITY/DUST SOURCE	POTENTIAL IMPACT WITHOUT MANAGEMENT AND CONSEQUENCE	CONSIDERATION OF LIKELIHOOD (WITHOUT MANAGEMENT)	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Loading clay onto trucks during carting campaign.	Dust can be generated by moving raw material (clay) from the stockpile onto trucks. Dust particles in the air could potentially move off-site (i.e. outside of the property boundaries). The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact without any dust management is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 5.1 – Dust Management Plan. Following implementation of dust management, the likelihood of impact is considered to be "rare" as dust impact is only considered to occur only under exceptional circumstances.	Rare	Minor	Low
Recontouring and rehabilitation of the operation area.	Dust can be generated by earthworks (moving overburden to batter slopes) and machinery/vehicles driving along access tracks. The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact without any dust management is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Low	Refer to Table 5.1 – Dust Management Plan. Following implementation of dust management, the likelihood of impact is considered to be "rare" as dust impact is only considered to occur only under exceptional circumstances.	Rare	Minor	Low
Exposed excavation areas and other open areas	Dust generated from exposed areas could move off the property. The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact is considered to be "rare" as dust impact is considered to occur only under exceptional circumstances. Soil crusts on the surface of exposed areas. Some groundcover also tends to grow over areas that haven't been worked in a while.	Rare	Minor	Low	No particular dust control required as the clay soil is particularly prone to soil crusting.	Rare	Minor	Low

ACTIVITY/DUST SOURCE	POTENTIAL IMPACT WITHOUT MANAGEMENT AND CONSEQUENCE	CONSIDERATION OF LIKELIHOOD (WITHOUT MANAGEMENT)	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Stockpiles (overburden and clay)	Dust generated from stockpiles of resource could move off property. The consequence is considered to be "minor" with low level impacts to amenity.	The likelihood of impact is considered to be "rare" as dust impact is considered to occur only under exceptional circumstances. The stockpiles form a crust when they haven't been disturbed in a while.	Rare	Minor	Low	No particular dust control required as the clay soil is particularly prone to soil crusting.	Rare	Minor	Low

Table 4.4 – Likelihood Criteria

Almost certain	Likely	Possible	Unlikely	Rare
The risk event is expected to occur in most circumstances.	The risk event will probably occur in most circumstances.	The risk event could occur at some time.	The risk event will probably not occur in most circumstances.	The risk event may only occur in exceptional circumstances.

Source: DWER 2017

Table 4.5 – Consequence Criteria – Public Health and Amenity

Slight	Minor	Moderate	Major	Severe
• Local scale: minimal to amenity.	• Local scale impacts: low level impact to amenity.	• Adverse health effects: low level or occasional medical treatment • Local scale impacts: mid-level impact to amenity.	• Adverse health effects: mid-level or frequent medical treatment • Local scale impacts: high level impact to amenity.	• Loss of life • Adverse health effects: high level or ongoing medical treatment • Local scale impacts: permanent loss of amenity.

Source: DWER 2017

^ Determination of areas of high conservation value or special significance should be informed by the Guidance Statement: Environmental Siting.

* 'onsite' means within the Lot boundary.

Table 4.6 – Risk Matrix Ratings

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Source: DWER 2017

5 Dust Control Actions

5.1 Introduction

The Dust Management Plan aims to describe the measures that will be used by Midland Brick to reduce the creation and effect of dust. It includes actions relating to dust control measures, corrective procedures and complaints protocol. This chapter describes the dust control actions in detail to provide context on how these methods operate to reduce the creation and have more effective control of dust. The specific actions relating to each dust source is then listed in Table 5.1. The purpose of the actions set out in Table 5.1 is to provide items which can be efficiently and effectively understood and actioned by Midland Brick staff and contractors.

The plan has been prepared in accordance with the following:

- "A Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites, Remediation and Other Related Activities" (Department of Environment and Conservation, 2011),
- "Draft Guideline: Dust Emissions" (DWER, 2021)
- Best practice in mine/quarry management
- Industry experience.

5.2 Site layout/design

The quarry is at the central and northern portions of Lot 11, although setback from Salt Valley Road and certainly from Chitty Road for some distance. This physical setback from the local roads reduces the risk of dust moving off the property and off-site.

The topography of Lot 11 is undulating with sloping land on all sides of the quarry, providing physical barrier between the quarry and surrounding areas.

The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

The main haul/access road runs alongside an area of remnant vegetation and a hill, providing an effective physical barrier to the movement of dust from vehicles travelling along the road.

The above considerations have meant that there is little else that needs to be done to manage or reduce noise from a site layout or design perspective.

5.3 Complaints procedure

The complaints procedure is described below. It is also important that all complaints are recorded. The following activities will be conducted:

- Complaints made to the operator will be documented and dealt with expeditiously.
- Complaints received either directly from the complainant or via the Shire of Toodyay will be reviewed by the operator to assess:
    (i) the legitimacy of the complaint;
    (ii) the aspects of the operation that triggered the complaint.
    (iii) management actions required to address the issues raised to bring operations into line with conditions imposed on the extractive operation by the Shire of Toodyay under the Planning Approval and Extractive Industries Licence.
- Actions deemed necessary to bring operations into line with relevant legislation, regulation and license conditions will be undertaken immediately and before works are recommenced.
- Summaries of complaints and actions taken to address each specific issue will be recorded in the Complaints Register.

If any complaints are received, necessary action will take place to help rectify the issue. It should be noted that the sooner a complaint is made, the sooner it can be investigated. Complaints made several days after a perceived event may not be able to be actioned due to the time lapsed. Complainants and the Shire of Toodyay will be notified in writing of the results of the investigation, remedial actions undertaken (if required) and date and time of recommencement of works.

The complaints response is applicable at all times (i.e. not just during site operation) and there will always be a prompt response from Midland Brick whether onsite or not. Complaints are generally sent to the Shire of Toodyay. The Shire will then contact Midland Brick as required should a complaint be received by them. It should be noted that this complaints procedure has worked very well for Midland Brick at numerous other sites in the past.

5.4 Dust suppression

Dust suppression is generally achieved through the use of a “dust suppression agent”, most commonly water. The application of water over areas prone to the generation of dust helps to reduce the likelihood that small dust particles which will be picked up by the wind. Water will be used as a dust supressing agent on days where excavation and carting take place. Chemical dust suppressants (such as Dustex) can be used on unsealed tracks that are planned to be unused for extended periods if required.

Water will be available from the detention basins located at the base of the pit area. There is a substantial amount of water available in the basins and it is very unlikely that the basins will dry. Watering will be undertaken as required utilising a water cart. The water cart will have a capacity of at least 12,000 litres. The frequency and amount of water applied will be dependent upon local conditions and observable dust generation and will vary as conditions will change from day to day.

5.5 Monitoring weather conditions

The Quarry Manager will review the predicted weather conditions from the Bureau of Meteorology on the day before excavation and carting is scheduled to take place. The purpose is to check whether strong winds or adverse weather conditions are predicted. The Quarry Manager will make a decision at the pre-start meeting on the morning of operation to advise whether the scheduled activities will occur.

During the course of the day, the Quarry Manager will check weather conditions. If weather conditions are adverse (i.e. particularly strong winds are making dust management difficult), then operations will stop until the weather improves.

5.6 Visual inspections

The Quarry Manager visits the site each day that the site is operational (i.e. excavating or carting). When the site is not being worked it is attended every quarter for inspection by the Quarry Manager. The visual monitoring is undertaken when required. It is in the interest of Midland Brick to make sure that dust management is adequate, and they are committed to this.

5.7 Description of activities and dust control

Vehicle movements

There are several different mobile pieces of equipment moving around a clay quarry at any one time. These can vary from slow moving dozers and excavators to all types of trucks. Internal roads are often constructed from natural ground. When vehicles drive over an unsealed surface, they break it down into smaller particles which eventually is fine enough to become airbourne dust. Small particles that are wet don't become a dust issue, but when trafficked, the truck wheels generate friction, and this dries the fine particles. Truck wheels moving over loose dry particles tend to generate dust clouds when large areas of road are not maintained.

The normally accepted practice is to have a water truck spraying water on the internal roads throughout the day during the dry summer months when trucks are active on a site. Truck speed also makes a difference in reducing dust from a trafficked road. Vehicle speeds vary slightly from clay quarry to clay quarry and are well sign posted. The speed limit for trucks and vehicles is reduced throughout the site. Staff and contractors will be trained on keeping speeds low.

The stockpile area is located close to the haul road to reduce the amount of truck movement required through the quarry.

All trucks will be covered by a tarp to control dust generation during transport.

Clearing of vegetation and stripping topsoil

The activity of clearing vegetation and topsoil from a clay mine is only performed once every 2-5 years depending on the depth of the clay deposit. In most cases a bulldozer on tracks will be used for this task as it has the necessary power and traction to handle the trees being removed. Often, the dozer is assisted by a rubber tyre front end loader and a truck to move the vegetation and topsoil to another position. All of these mining vehicles have the potential to generate dust. On a hot windy day in summer, this dust might be clearly visible. However, with proper management procedures in place, the potential for dust to move off-site is minimised.

At Midland Brick, the Quarry Manager plans his mining sequence well in advance. The clearing and stripping activities are conducted during late winter and spring when there is sufficient moisture in the soil to prevent any dust generation.

Regardless of timing and weather, operators on site have delegated authority to stop work immediately if visible dust is generated.

Excavation of clay and loading onto trucks

Clay is excavated and stockpiled or is loaded direct into trucks for transport to the brick making factories in the metropolitan area. When stockpiled on the site, damp clay is excavated via an excavator or bulldozer. Dump trucks then take the clay to prepared stockpile areas for later loading into road trucks.

Mostly, freshly excavated clay is damp and has no dust however, when loading road trucks from a stockpile, the clay has dried slightly and can generate dust if the loader operator drops the load into the truck without any care. At Midland Brick, operators are trained to carefully place each load into the truck body by keeping the bucket low and tipping slowly. When loading from a stockpile into road trucks, operators are encouraged to load from one end only. When loaded, the truck drivers can then close their tarps.

Loading takes place within the operational area which is setback from the road and screened from surrounding areas by the surrounding topography and vegetation (as well as adequate separation distances to the nearest sensitive receptors).

Tipping clay onto stockpiles

On all Midland Brick clay quarries, stockpiles are created so that road trucks can be loaded throughout the year. To create the stockpiles, off highway dump trucks are loaded by an excavator. The clay is generally damp however the movement of the dump trucks can create dust.

The disciplines of a water truck wetting the roads being used by the dump trucks and also dump truck drivers being cautious of their speeds will alleviate most of the issues with dust generation.

Stockpiles are located within the operational area which is setback from the road and screened from surrounding areas by the surrounding topography and vegetation (as well as adequate separation distances to the nearest sensitive receptors).

Dust management during non-operational periods

Excavation is expected to occur for approximately 4-5 months annually and carting will be over 3.5 to 4.5 months of the year. For the rest of the year the site will be non-operational.

During non-operational times Midland Brick will adhere to the following procedures:

- Continue to respond to complaints as described above
- Visually inspect the site each month by the Quarry Manager.

During non-operational times wind erosion of an undisturbed clay pit is unlikely to present a significant risk as the clay soil is particularly prone to soil crusting and the development of a “skin” which means that the wind erosion is likely to be negligible. Therefore, no additional dust management is required during non-operational times except for those listed above.

Stockpiles and bunding

Clay stockpiles and perimeter bunding have the potential to be a source of dust generation in dry windy conditions.

As above, experience has shown that after a heavy rain event, a “skin” is formed on the surface of the stockpile/bund which protects fine dust from escaping, providing there is no mechanical disturbance. Also, most perimeter bunds and areas not used for operation are covered with grass which also helps protect fine dust escaping. Stockpiles are located in the pit area and are screened with high quarry walls and bunding.

Drilling

All extractive industry starts with the exploration drilling activity. Drills are used to explore and for quality control purposes. The activity of the air core drill provides a <3mm clay sample. The potential for this material to become airbourne is low due to the small quantity however, the operators do have some exposure to possible silica dust.

The drilling Standard Operating Procedure (SOP) requires all drill operators to use dust masks whilst drilling. This is also a requirement in Midland Brick's Health and Hygiene Management Plan.

5.8 Dust Management Plan

The Dust Management Plan actions, responsibilities and timing is presented in Table 5.1 below. A majority of the dust management procedures apply at all times and are included under the heading 'general'. Specific actions relating to a certain activity are also listed in Table 5.1 below. These actions have also been considered in the overall dust risk assessment presented in Table 4.3.

It should be noted that the risk assessment from Chapter 4 demonstrated that all activities can be managed to a "low" risk of impact (except for managing dust on the road). In accordance with the DWER Guidance Statement on risk assessments, a "low risk" is considered acceptable and generally not controlled through regulation. Therefore, the dust controls measures set out below are considered suitable for the risk of impact. Additional dust control and dust monitoring is not considered necessary given the low risk of impact.

Table 5.1 – Dust Management Plan

ACTIVITY	MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
General	Quarry Manager to review the Bureau of Meteorology forecast regarding wind and temperature at the pre-start team meeting and discuss the likely weather impacts (and to decide whether the conditions mean that operations should not commence for the day or should be monitored for worsening conditions). QM's use the latest weather technology apps to review weather conditions, particularly wind.	Quarry Manager	Ongoing
	When winds are sufficiently strong to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. The team have authority to stop work if they see visible dust issues, especially if wind conditions deteriorate.	Quarry Manager, Team	Ongoing
	Maintain all equipment in good condition.	Raw Materials Manager, Quarry Manager	Ongoing
	Keep vehicle speed limits low throughout the quarry and on the haul road.	Quarry Manager, Team	Ongoing
	Continue training programmes on dust control requirements to all workers and contractors.	Quarry Manager, Environmental Manager	Ongoing
	All non-conformances and dust related complaints immediately reported to the Quarry Manager.	Quarry Manager, Environmental Manager	Ongoing
	Comply with the “Complaints Procedure” at all times.	Quarry Manager, Environmental Manager	Ongoing
	Following complaints, the source of any excessive dust will be identified, and work practices will be modified or re-scheduled to reduce or eliminate the risk of future events.	Quarry Manager, Environmental Manager	Ongoing
	A notice is placed on site with contact details of the Quarry Manager and details as to where dust complaints are to be addressed. It will be displayed at all times.	Quarry Manager	Ongoing
	Maintain regular communication with the owners of the nearest sensitive receptors.	Quarry Manager	Ongoing
	Ensure that all site operators are trained to observe whether dust is leaving the property boundary or if adverse weather conditions are present.	Quarry Manager, Environmental Manager	Ongoing

ACTIVITY	MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
	Ensure that all site operators are trained in procedures should dust be observed leaving the boundary or if there are adverse weather conditions such as when to stop operations or when to increase dust management measures (such as wetting down areas etc.)	Raw Materials Manager, Quarry Manager, Environmental Manager, Team	Ongoing
	Should dust visibly cross the site boundary at any time, dust suppression measures shall be increased immediately and if works are taking place they shall be modified accordingly. Should dust continue to be generated all works shall cease immediately and the site shall be sufficiently stabilised by application of water until the wind conditions are appropriate to resume works.	Quarry Manager, Team	Ongoing
Vehicle and truck movements entering and exiting the site.	Vehicle and machinery exiting the site should be inspected to ensure they are not carrying clods/slurry of soil (this is also part of the dieback management for the site).	Quarry Manager, Team	Ongoing
	Cover truck loads with a tarp before exiting the site.	Quarry Manager, Team	Ongoing – during carting.
	Quarry Manager to inspect the site on excavation and carting days to review dust management.	Quarry Manager	Ongoing – On excavation and carting days
Machinery and vehicle movements throughout the site.	Watercarts will be utilised to wet down access tracks to prevent dust generation. Water for the carts should be obtained from the pond onsite.	Quarry Manager, Team	Ongoing
	Chemical dust suppressants (such as Dustex) can be used on unsealed areas if they are planned to be unused for extended periods.	Quarry Manager	Ongoing
	Quarry Manager to inspect the site on excavation and carting days to review dust management.	Quarry Manager	Ongoing – during operations
	Train and discuss the impacts of vehicle speeds on dust generation.	Quarry manager, Team	Ongoing
Clearing of vegetation and stripping topsoil and overburden	Plan to conduct activity during late winter and spring when the soil is moist.	Raw Materials Manager, Quarry Manager	Late winter and spring
	The team have authority to stop work if they see visible dust issues, especially if wind conditions deteriorate.	Quarry Manager, Team	Ongoing
	Operators in air-conditioned cabins.	Quarry Manager, Team	Ongoing
	Check conditions of door seals to cabins.	Quarry Manager, Team	Prior to operations.

ACTIVITY	MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
	Watercarts will be utilised at all times to wet down areas to prevent dust generation. Water for the carts should be obtained from the pond onsite.	Quarry Manager, Team	Ongoing – during activities.
	Quarry Manager to inspect the site to review dust management during clearing and stripping activities.	Quarry Manager	Ongoing – during activities.
Excavation of clay and loading onto trucks.	Watercarts will be utilised during dry weather conditions to wet down excavation areas to prevent dust generation where required. Water for the carts should be obtained from the pond onsite.	Quarry Manager, Team	Ongoing – during excavation.
	Quarry Manager to inspect the excavation area to review dust management.	Quarry Manager	Ongoing – during excavation.
	Train team on how to reduce dust via sensible placement of loads into trucks.	Quarry Manager, Team	Ongoing
	Excavate clay behind barriers like trees and surface bunds (where possible).	Quarry Manager	Ongoing
	Freshly excavated clay is normally damp. This can be checked by the Quarry Manager.	Quarry Manager, Team	Ongoing
Excavation of clay and tipping clay onto stockpile.	Watercarts will be utilised during dry weather conditions to wet down areas to prevent dust generation when required. Water for the carts should be obtained from the pond onsite.	Quarry Manager, Team	When excavating.
	Ensure vehicles slow down as they approach the dump zone.	Quarry Manager, Team	Ongoing
	Freshly excavated clay is normally damp. This can be checked by the Quarry Manager.	Quarry Manager, Team	Ongoing
	Consider wind direction when tipping and make adjustments if necessary.	Quarry Manager, Team	Ongoing
Loading clay onto trucks during carting campaign.	Watercarts will be utilised during dry weather conditions to wet areas to prevent dust generation where required. Water for the carts should be obtained from the pond onsite.	Quarry Manager, Team	Ongoing – during carting

ACTIVITY	MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
	Ensure operators place each load into the truck carefully by keeping the bucket low and tipping slowly in order to reduce the potential for dust generation from loading trucks.	Quarry Manager, Team	Ongoing – during loading.
	Limit stockpile disturbance by only loading from one face.	Quarry Manager, Team	Ongoing
	Train team on how to reduce dust via sensible placement of loads into trucks.	Quarry Manager, Team	Ongoing
	Quarry Manager to inspect the stockpiling area on carting days to review dust management.	Quarry Manager	Ongoing – during carting.
Recontouring and rehabilitation of the operation area.	Watercarts will be utilised during dry weather conditions to wet down areas to prevent dust generation. Water for the carts should be obtained from the pond onsite.	Quarry Manager, Team	Ongoing – during rehabilitation.
	Quarry Manager to inspect the operation area to review dust management.	Quarry Manager	Ongoing – during rehabilitation.
Exposed excavation areas and other open areas.	Allow a dry crust to form on the exposed operation areas and the stockpile surface.	Quarry Manager, Team	Ongoing
	Use the cannon on water truck to wet down any stockpiles that are causing dust, hence forming a skin.	Quarry Manager, Team	Ongoing
	Quarry Manager inspect the site each quarter when non-operational to check that a crust has formed on the surface and that there are no obvious dust issues.	Quarry Manager	Every 3-4 months when non-operational.
Drilling	All drill rig operators to wear dust masks during drilling activity.	Quarry Manager, Team	When drilling.
	Ensure vehicles are driven slowly through paddocks.	Quarry Manager, Team	When drilling.
	All operators monitored for silica dust exposure as per HHMP & SRS.	Quarry Manager, Team	When drilling.
	Ensure drilling does not occur during hot weather.	Quarry Manager, Team	When drilling.

6 References

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APPENDIX F

Noise Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

NOISE MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

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Document History:

Date	Document Name	Document Manager	Summary of Document Revision	Client Delivered
May-24	1134 – Hoddys Well – Bardya Quarry Noise Management Plan	SR	Initial Draft for client review	May-24
May-24	1134 – Hoddys Well – Bardya Quarry Noise Management Plan	SR	Final	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Noise Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers). The quarry is located at Lot 11 Chitty Road, Hoddys Well. The Hoddys Well quarry ("the site") is located on northern portion of Lot 11.

This report has been prepared to accompany the Clay Excavation Management Plan prepared by Land Insights to support an application for renewal of the Development Approval and Extractive Industry Licence. This Noise Management Plan outlines the appropriate procedures implemented by Midland Brick to manage any potential for noise generation and to reduce the creation and effect of noise.

In this report, noise-generating activities are considered in the context of their potential impact on noise sensitive premises, such as residential dwellings. The potential for noise generation can be managed through the implementation of appropriate noise management procedures adopted as part of a Noise Management Plan.

Noise management was previously addressed in the "Extractive Industries Licence Variation Application" report prepared by Brikmakers to support a previous renewal in 2013. This Noise Management Plan presents an update to the 2013 report. It has been prepared for the following reasons:

- To incorporate best practice noise management actions.
- To incorporate relevant recommendations from the "Draft Assessment of Environmental Noise Emissions Guideline" released by the Department of Water and Environmental Regulation (DWER) in 2021 (in addition to the existing requirements of the *Environmental Protection (Noise) Regulations 1997*).
- To accompany an application for a renewal of the approvals for the operation.

1.2 Objectives

The objectives of the Noise Management Plan are:

- To manage the potential for noise generation to ensure compliance with the *Environmental Protection (Noise) Regulations 1997*
- To reduce the potential for noise to impact on noise sensitive premises
- To provide a process in the event of a noise-related complaint.

1.3 Legislation and guidelines

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

Regulation 7 of the Regulations defines the prescribed standard for noise emissions as follows:

7. (1) Noise emitted from any premises or public place when received at other premises –

(a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) Must be free of –

i. tonality.
ii. impulsiveness; and
iii. modulation,

when assessed under Regulation 9.

Regulation 7(2) states that a "noise emission is taken to significantly contribute to a level of noise if the noise emission…exceeds a value which is 5 dB below the assigned level".

"Noise sensitive premises" are set out in Schedule 1, Part C of the Regulations. They include, but are not limited to, premises occupied solely or mainly for residential or accommodation purposes and rural premises. Furthermore, a "highly sensitive area" is defined in the Regulations as an area of noise sensitive premises comprising a building used for a noise sensitive purpose (such as a residential or accommodation building). Therefore, the assigned noise levels applicable to this site are those set out in Regulation 8 (3) Table 1 of the Regulations for "noise sensitive premises: highly sensitive area".

A range of facts sheets have been prepared by DWER to assist with the interpretation of the Regulations. The "Draft Assessment of Environmental Noise Emissions Guideline" (DWER, 2021) was prepared to provide further guidance.

The other guideline used to determine impact on sensitive land uses is the Environmental Protection Authority's "Guidance Statement No. 3 Separation Distances Between Industrial and Sensitive Landuses" (EPA, 2005). It states that "land uses considered to be potentially sensitive to emissions from industry and infrastructure include residential developments, hospitals, hotels, motels, hostels, caravan parks, schools, nursing homes, childcare facilities, shopping centres, playgrounds, and some public buildings".

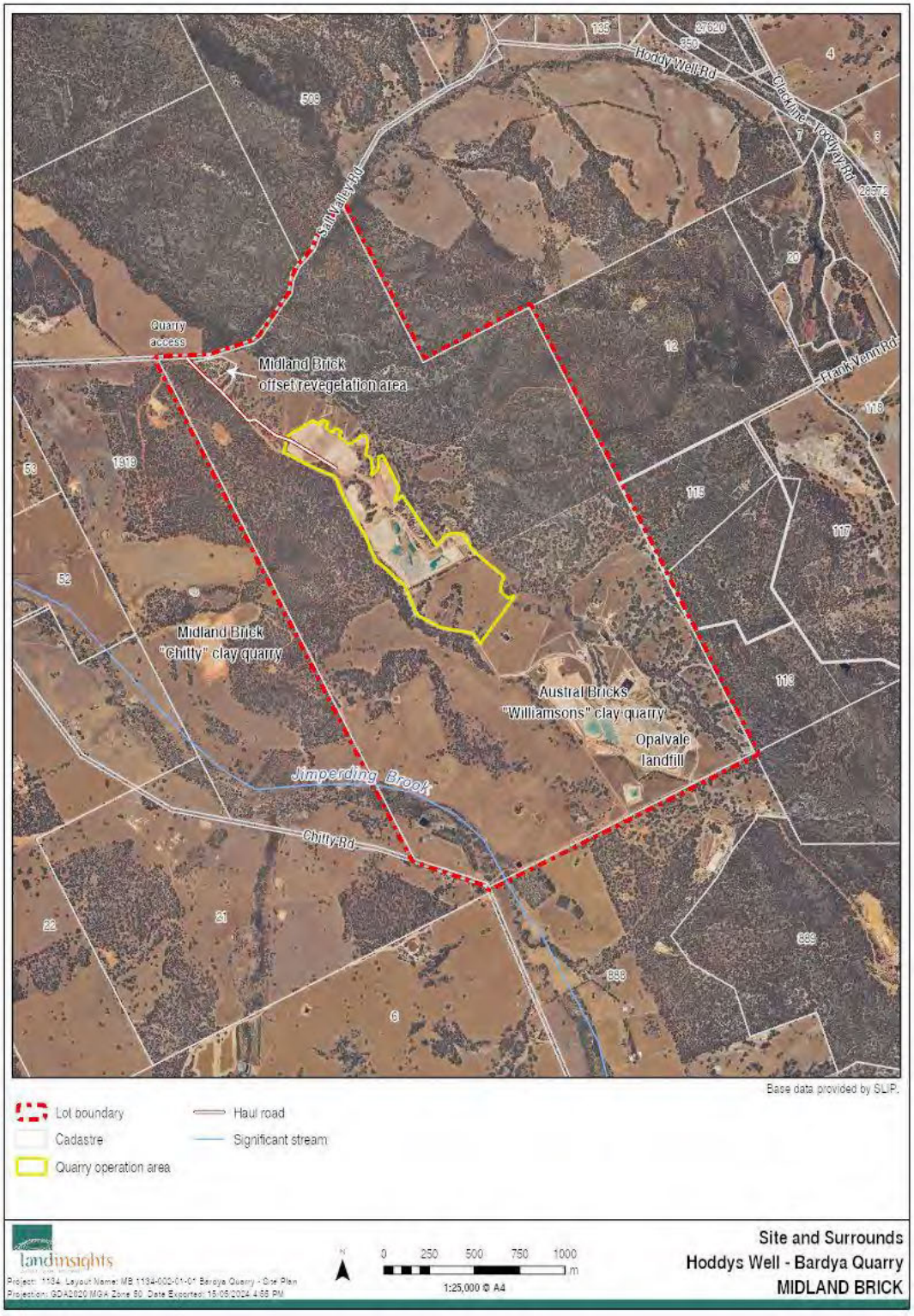
The separation distance for "clay extraction" is 500-1,000 metres. These distances are guidelines only depending on size and scale of a proposal. Lesser separation distances can be supported with site specific assessments. This Noise Management Plan provides management actions to address potential noise impacts from the operation.

1.4 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan



1.5 Operation

The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Information on the operation and how it relates to risk of dieback spread and management is provided below.

Earthworks campaign

The "Earthworks Campaign" refers to the excavation and stockpiling of material. During the earthworks campaign, topsoil and overburden is removed and clay is excavated and placed into stockpiles located within the Operation Area.

Earthworks take place as and when required throughout the year but generally during the dry months. The timing of excavation depends on weather conditions, market demand and operational requirements (such as the rate of excavation of other clay quarries). During Excavation Campaigns, excavation will take place for approximately six days a week during the approved operation times. A number of excavation campaigns can occur throughout the year to the equivalence of 4 to 5 months each year. It should be noted that for large stretches of time there will be no excavation activities on site.

The current pit area (where a majority of the excavation currently takes place) is surrounded by the pit walls. Vehicles and machinery usually operate from the pit floor and the walls of the pit act as a dust barrier for most of the excavation process. The depth of the quarry is up to 20 metres. There will be a relatively short period where vehicles are located at the ground level (when clearing vegetation and stripping topsoil and overburden for new areas), however for a majority of time they will be located below

ground levels and behind the pit walls. Dust management will be in place for the operation as set out in this report.

There will be no processing of resource (screening and crushing) and no blasting will be required.

Cartage campaigns

The "Cartage Campaign" refers to the removal or transport of clay from the site where it is taken to the Midland Brick brickmaking factories. Loading and carting from the site will occur throughout the year for the equivalent of 3.5 to 4.5 months total per year. Carting will be spread out into cartage campaigns throughout the year.

Carting from the site depends on the market demand for bricks, as well as the types of clay and colour of clay. Therefore, there may be some variation from the truck numbers and the number of days that carting will be required each month (i.e. some months will have more carting days than other months).

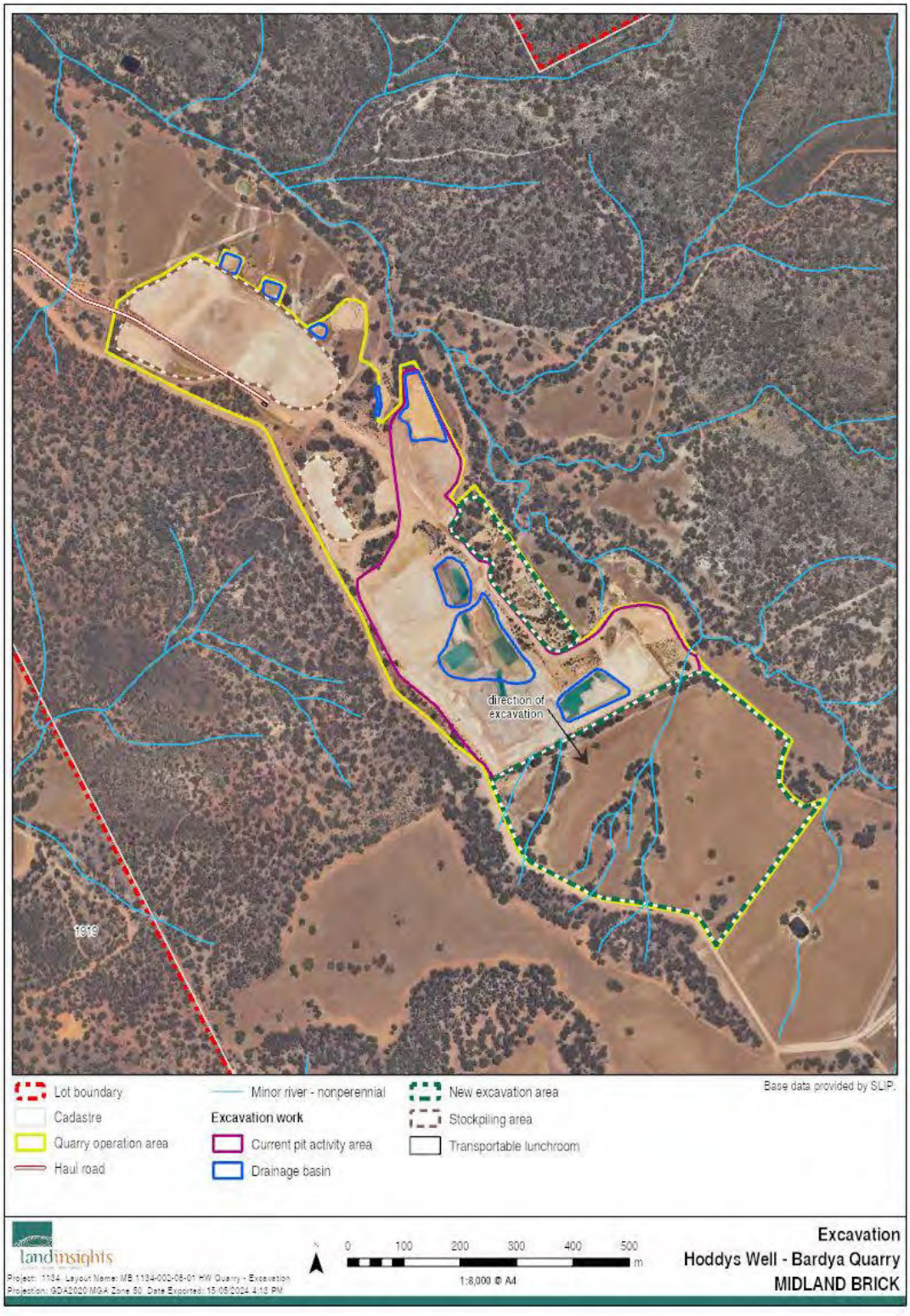
The Stockpile Area (and the area where trucks will be loaded with clay) is located in the pit area, close to the access/haul road for ease of access.

Rehabilitation

The quarry will be recontoured to a safe and stable condition with a dam or two being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some tree belts planted with native vegetation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Figure 1.2 – Excavation Plan



1.6 Compliance history

It should be noted that no valid complaints have been received in the past 30 years of operation regarding noise impacts.

2 Site description

2.1 Surrounding Land Uses

Land uses immediately surrounding and adjacent to the quarry include other clay extraction (operated by a separate company) and a landfill both located at the southern end of Lot 11, clay extraction (also operated by Midland Brick) to the west and rural properties.

2.2 Separation Distances

There are no sensitive receptors with 1,000 metres from the quarry (including the landowner). The following closest sensitive receptors have been identified from the quarry.

- Owner's dwelling to the south – Approximately 1,100 metres
- Nearest rural dwelling to the east – Approximately 1,400 metres
- Nearest rural dwelling to the south – Approximately 2,400 metres
- Nearest rural dwelling to the west – Approximately 1,800 metres
- Nearest rural dwelling to the north-west – Approximately 1,600 metres (note that this is to the site entrance as this is the closest point)

The location of surrounding sensitive receptors in relation to the quarry is shown in Figure 2.1 below.

The EPA's Guidance Statement No. 3 provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses (such as residential dwellings). It should be noted that the distances in the policy assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category "clay extraction or processing". The potential impacts are listed as "noise" and "dust". The separation distance is "500-1000 metres, depending on size and processing", however this can be less with appropriate environmental management. All surrounding sensitive receptors are over 1,000 metres from the quarry.

Although there are no sensitive receptors within 1,000 metres of the quarry, the Visual and Amenity Management Plan has been prepared to provide an outline of best practice visual management used at the site.

Figure 2.1 – Surrounding Sensitive Receptors

2.3 Climate

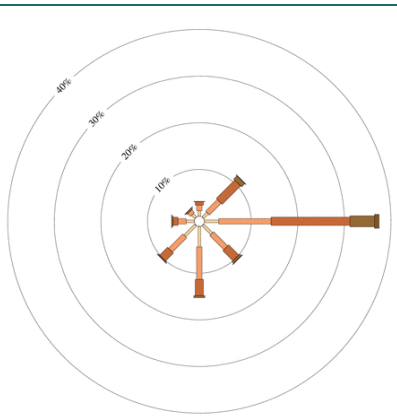
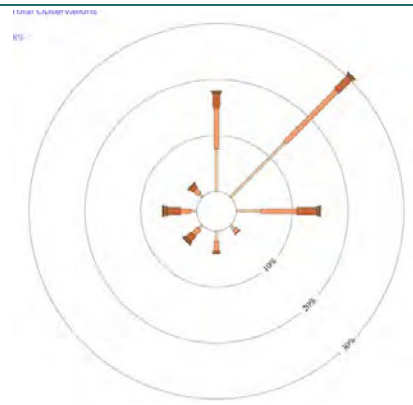
The south-west of Western Australia experiences a Mediterranean climate which is characterised by warm, dry summers and cool, wet winters.

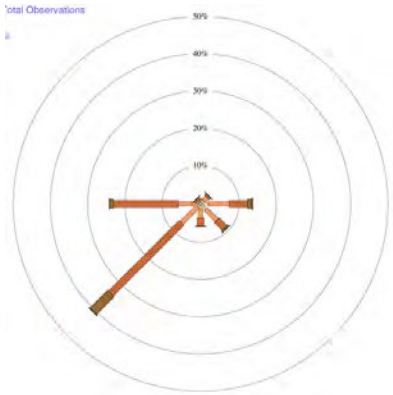
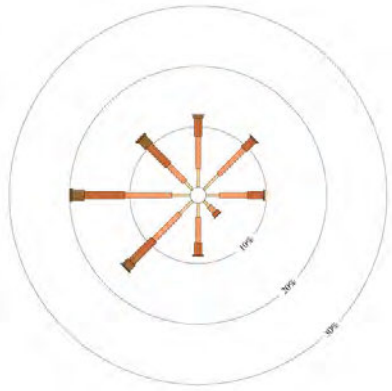
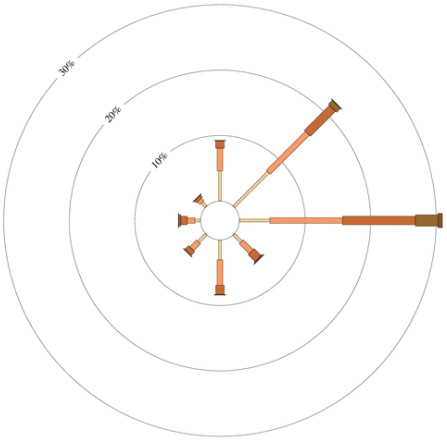
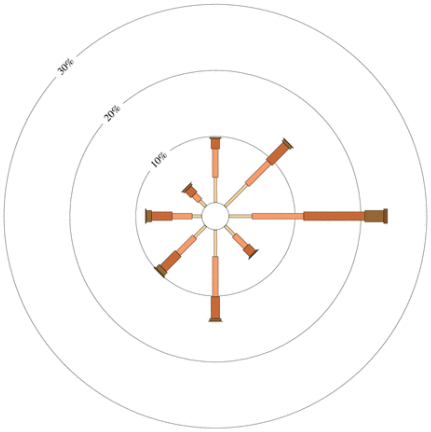
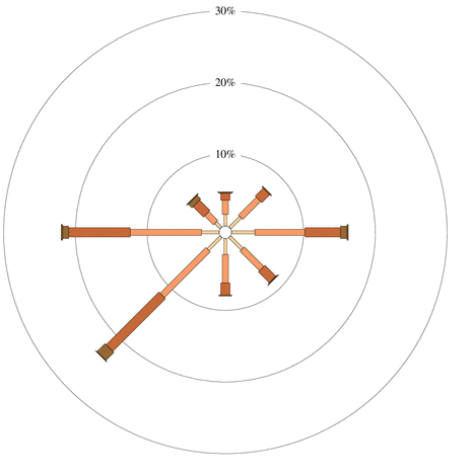
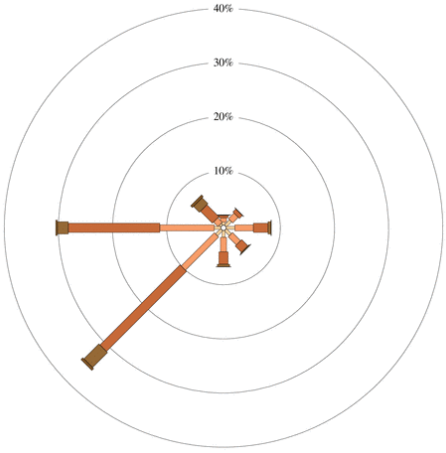
The rainfall and temperature data for the region has been obtained from the Bureau of Meteorology "Climate Data Online" services. The average rainfall from the closest station which is the Toodyay station is 520.7mm. A majority of rainfall is from May to August.

The mean temperature information is from the closest station which is the Northam station. It states that the hottest month is January with an average maximum of 34.3°C and the coldest month is July with an average minimum of 5.3°C.

The prevailing winds throughout the majority of the year are predominantly from the east (morning) and the south-west (afternoon) (Bureau of Meteorology, 2024). Wind roses for the Perth Airport are shown below.

Table 2.1 – Wind Roses for the Perth Airport

TIME OF YEAR	WIND ROSE	TIME OF YEAR	WIND ROSE
Summer 9am		Winter 9am	

TIME OF YEAR	WIND ROSE	TIME OF YEAR	WIND ROSE
Summer 3pm		Winter 3pm	
Autumn 9am		Spring 9am	
Autumn 3pm		Spring 3pm	

2.4 Topography and landform

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD).

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

2.5 Vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry. Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as “Bannister 4” which is described as “Jarrah, Marri and Wandoo.” The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is “Michibin” which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones.

A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.

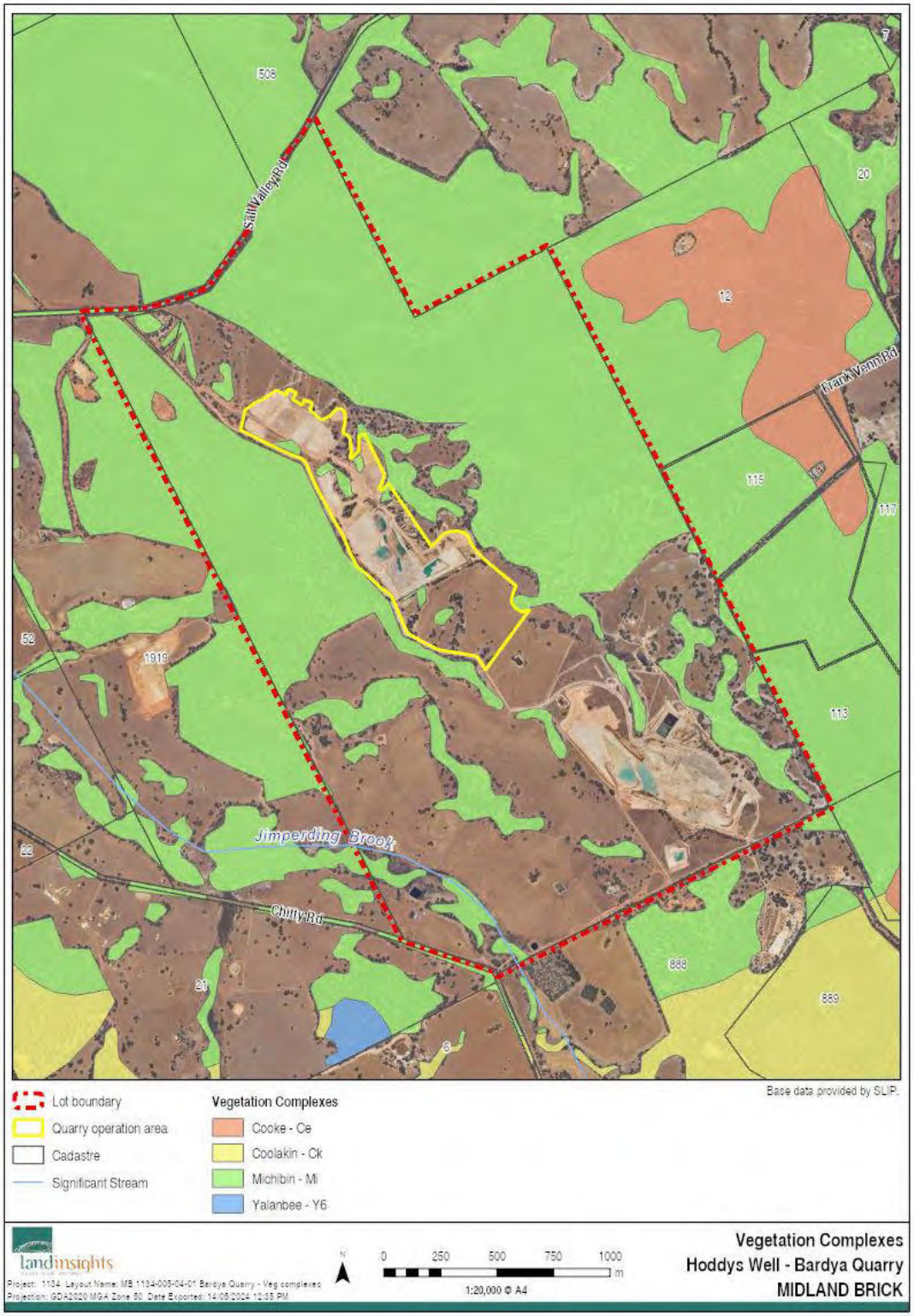
The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as “Cleared Paddocks”.

The closest sensitive receptors in all directions are separated from the clay quarry by substantial areas of established vegetation which provide an adequate visual screen (in addition to the natural topography and bund walls).

Some clearing of native vegetation will be required in the proposed excavation areas at the southern half of the site. These areas are shown on the plan at Figure 1.2. It is not expected that this will have an impact on visual amenity as there will be substantial areas of vegetation remaining.

Figure 2.2 – Current Native Vegetation Extent

Figure 2.3 – Vegetation Complexes



3 Risk Assessment

3.1 Introduction

A noise risk assessment for the Hoddys Well-Bardya Quarry is presented in this chapter. It considers the potential for noise generation and the potential impact off-site. The assessment has considered in detail the activities associated with the operation, the risk factors, and the proposed controls.

There are three different assessments undertaken for the operation as follows:

1. A screening analysis based on Appendix A of the "Draft Guideline: Assessment of Environmental Noise Emissions" (DWER, 2021).
2. The assessment commences with a review of the "factors" from the "Draft Guideline: Assessment of Environmental Noise Emissions" (DWER, 2021). This provides an overarching look of the factors that are considered in a noise emission assessment and helps lead into the site classification and the overall risk assessment.
3. Following this is a more detailed risk assessment of the specific activities that take place for the operation. The assessment has been prepared based on the consequence, likelihood and risk definitions provided in "Guidance Statement: Risk Assessments" (Department of Environment Regulation, 2017).

3.2 Screening Analysis

The Draft Assessment of Environmental Noise Emissions Guideline (DWER, 2021) includes a "screening analysis" which is used to help determine if detailed noise assessments are required for a proposed development. As the minimum separation distances are not met for a few surrounding sensitive receptors, a detailed noise assessment has been undertaken, as recommended by the draft Guideline.

3.3 Noise Emission Assessment

The "Draft Guideline: Assessment of Environmental Noise Emissions" (DWER, 2021) provide information on the factors to be considered in a noise emission assessment. This includes the following:

- The context of the noise emissions
- The nature of the noise emissions
- The control and management of noise emissions
- Known or demonstrated compliance.

A review of the above factors is provided in Table 3.1 below. It should be noted that the below is based on the excavation and carting operations (as the construction noise from removal of topsoil and construction of noise bunds does not need to comply with Regulation 7/operational noise).

Table 3.1 – Noise emission assessment

FACTOR	COMMENT	CONCLUSION
The context of the noise emissions: • Background noise • Time of day and activity of the receiver • Distance, topography and meteorological conditions between the emitter and receivers • The types of receptors, including current and potential • Contributing and cumulative noise sources.	There are no sensitive receptors with 1,000 metres from the quarry (including the landowner). All surrounding sensitive receptors are over 1,000 metres from the quarry as recommended by EPA's Guidance Statement No. 3. The operation sits at a depth of up to 30 metres and is surrounded by high pit walls on most sides. In addition, the natural topography of the surrounding area also provides a physical barrier. Operation of the quarry will be between daylight hours of between 7am and 6pm Monday to Saturday. There are other operations (such as other extractive industry and the landfill) in the nearby (2m radius) which could contribute to some cumulative noise, however it should be noted that the other extractive industries are also intermittent land uses and do not have any activity taking place at the same time.	It is considered that there is a low risk that noise will impact on noise sensitive receptors as the separation distances are considered adequate.
The nature of the noise emissions • The characteristics of the noise emission • Received noise/vibration levels • How the noise emission is perceived by receivers.	The noise emissions associated with extractive industry relate to use of machinery (i.e. dozer, loader, excavator etc) and haul trucks.	It is considered that there is a low risk that noise will impact on noise sensitive receptors as the separation distances are considered adequate and all equipment will be maintained as appropriate.

FACTOR	COMMENT	CONCLUSION
The control and management of noise emissions • Whether the noise management measures set out in a detailed noise emission assessment are acceptable, reasonable and practical • Whether the noise management measures are likely to be effective in reducing noise levels to meet the Noise Regulations or other standards and noise values outlined in the guideline.	The noise management measures set out in this management plan are industry standard and best practice and can realistically be implemented. It is also considered that the noise management as set out in this plan will be effective at reducing noise levels because, similar to the above, the measures are industry standard and have been demonstrated to be effective.	It is considered that there is a low risk of noise affecting nearby sensitive receptors when the Noise Management Plan is implemented due to the separation distances being adequate and here being no history of noise complaints.
Known or demonstrated compliance: • By the occupier and premises with the provisions of the EP Act • With the Noise Regulations or other standards and noise values outlined in the guideline with the screening and detailed noise emission assessment process set out in the guideline.	The site has historically been used for extractive industry for over 30 years and no noise complaints have been received.	The compliance history for the site is good and therefore is not a concern.

3.4 Noise risk assessment for operation

The risk assessment for the noise generating activities on the site is provided in Table 3.2 below. The assessment criteria is based on that set out in "Guidance Statement: Risk Assessments" (DWER, 2017). It lists the activity(s) which have the potential to cause noise impact and the residual risk. It should be noted that the risk assessment is based on the impact on the nearest noise sensitive residence (located at the south-east of the site). The risk of impact to residences located further away will be less.

The "risk" is determined by considering the likelihood and consequence of the environmental impact. The likelihood and consequence criteria are defined in Tables 3.3 and 3.4 below.

Table 3.2 – Noise risk assessment

ACTIVITY OR SCENARIO	POTENTIAL IMPACT AND CONSEQUENCE	CONSIDERATION OF LIKELIHOOD (WITHOUT MANAGEMENT)	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Clearing vegetation ("construction noise")	Noise from machinery could exceed acceptable day-time levels and impact on the nearest noise sensitive premises. The consequence of impact without management is minor as it could have low scale impact to amenity.	The likelihood of noise impact on sensitive premises without any noise management is likely, as noise impact could occur in most circumstances. Clearing vegetation is considered to have the greatest risk of noise impact as it is on the natural surface level. The likelihood is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 4.1 – Noise Management Plan. Following implementation of noise management, the likelihood of impact is considered to be "Rare".	Rare	Minor	Low
Stripping topsoil and overburden to construct bunds ("construction noise").	Noise from machinery could exceed acceptable day-time levels and impact on the nearest noise sensitive premises. The consequence of impact without management is minor as it could have low scale impact to amenity.	The likelihood of noise impact on sensitive premises without any noise management is likely, as noise impact could occur in most circumstances. Stripping topsoil/overburden is considered to have the greatest risk of noise impact as it is on the natural surface level. The likelihood is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 4.1 – Noise Management Plan. Following implementation of noise management, the likelihood of impact is considered to be "Rare".	Rare	Minor	Low

ACTIVITY OR SCENARIO	POTENTIAL IMPACT AND CONSEQUENCE	CONSIDERATION OF LIKELIHOOD (WITHOUT MANAGEMENT)	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Excavation of clay and stockpiling within the stockpile area ("operational noise").	Noise from machinery could exceed acceptable day-time levels and impact on the nearest noise sensitive premises. The consequence of impact without management is minor as it could have low scale impact to amenity.	The likelihood of noise impact on sensitive premises without any noise management is likely, as noise impact could occur in most circumstances. The consequence of impact without management is minor as it could have low scale impact to amenity. The likelihood is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 4.1 – Noise Management Plan. Following implementation of noise management, the likelihood of impact is considered to be "Rare".	Rare	Minor	Low
Loading and carting clay ("operational noise").	Noise from machinery could exceed acceptable day-time levels and impact on the nearest noise sensitive premises. The consequence of impact without management is minor as it could have low scale impact to amenity.	The likelihood of noise impact on sensitive premises without any noise management is likely, as noise impact could occur in most circumstances. The consequence of impact without management is minor as it could have low scale impact to amenity. The likelihood is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 4.1 – Noise Management Plan. Following implementation of noise management, the likelihood of impact is considered to be "Rare".	Rare	Minor	Low

ACTIVITY OR SCENARIO	POTENTIAL IMPACT AND CONSEQUENCE	CONSIDERATION OF LIKELIHOOD (WITHOUT MANAGEMENT)	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Transport into and out of the site ("operational noise")	Noise from trucks from the site could exceed acceptable day-time levels and impact on the nearest noise sensitive premises. The consequence of impact without management is minor as it could have low scale impact to amenity.	The likelihood of noise impact on sensitive premises without any noise management is likely as noise impact could occur in most circumstances. The consequence of impact without management is minor as it could have low scale impact to amenity. The likelihood is considered to be "unlikely" as the recommended separation distances to the nearest sensitive receptors have already been met.	Unlikely	Minor	Med	Refer to Table 4.1 – Noise Management Plan. Following implementation of noise management, the likelihood of impact is considered to be "Rare".	Rare	Minor	Low

Table 3.3 – Likelihood Criteria

Almost certain	Likely	Possible	Unlikely	Rare
The risk event is expected to occur in most circumstances.	The risk event will probably occur in most circumstances.	The risk event could occur at some time.	The risk event will probably not occur in most circumstances.	The risk event may only occur in exceptional circumstances.

Source: DWER 2017

Table 3.4 – Consequence Criteria (Public Health and Amenity)

Slight	Minor	Moderate	Major	Severe
• Local scale: minimal to amenity.	• Local scale impacts: low level impact to amenity.	• Adverse health effects: low level or occasional medical treatment • Local scale impacts: mid-level impact to amenity.	• Adverse health effects: mid-level or frequent medical treatment • Local scale impacts: high level impact to amenity.	• Loss of life • Adverse health effects: high level or ongoing medical treatment • Local scale impacts: permanent loss of amenity.

Source: DWER 2017

^ Determination of areas of high conservation value or special significance should be informed by the Guidance Statement: Environmental Siting.

* 'onsite' means within the Lot boundary.

Table 3.5 – Risk Matrix Ratings

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Source: DWER 2017

4 Noise Control Actions

4.1 Introduction

The Noise Management Plan aims to describe the measures that will be used by Midland Brick to reduce the creation and effect of noise at the Hoddys Well-Bardya Quarry. It includes actions relating to noise control measures, corrective procedures, and complaints protocol. Specific actions relating to each noise source is provided in Table 4.1. This chapter provides further information and elaborates on what these actions entail.

The plan has been prepared in accordance with the following documents, as well as best practice in mine/quarry management and experience:

- "Draft Assessment of Environmental Noise Emissions Guideline" (DWER, 2021)
- *Environmental Protection (Noise) Regulations 1997*
- "State Planning Policy 2.4 – Planning for Basic Raw Materials Guidelines" (WAPC, 2021).

4.2 Site layout/design

The quarry is at the central and northern portions of Lot 11, although setback from Salt Valley Road by approximately 550 metres and from Chitty Road by approximately 1,300 metres. This physical setback from the local roads reduces the risk of noise emissions affecting surrounding areas.

The topography of Lot 11 is undulating with sloping land on all sides of the quarry, providing physical barrier between the quarry and surrounding areas.

The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

The main haul/access road runs alongside an area of remnant vegetation and a hill, providing an effective physical barrier to the movement of noise from vehicles travelling along the road.

The above considerations have meant that there is little else that needs to be done to manage or reduce noise from a site layout or design perspective.

4.3 Complaints procedure

The complaints procedure is described below. It is also important that all complaints are recorded. The following activities will be undertaken should a complaint be received:

- Complaints made to the operator will be documented and dealt with expeditiously.
- Complaints received either directly from the complainant or via the Shire of Toodyay will be reviewed by the operator and interested parties to assess:

(i) the legitimacy of the complaint;
(ii) the aspects of the operation that triggered the complaint;
(iii) management actions required to address the issues raised to bring operations into line with conditions imposed on the extractive operation by the Shire of Toodyay under the Extractive Industries Licence.

- Actions deemed necessary to bring operations into line with relevant legislation, regulation and license conditions will be undertaken immediately and before works are recommenced.
- Summaries of complaints and actions taken to address each specific issue will be recorded in the Complaints Register.

Complainants and the Shire of Toodyay will be notified in writing of the date, time and nature of the complaint received, results of the investigation, remedial actions undertaken and date and time of recommencement of works. If any complaints are received, necessary action will take place to help rectify the issue.

The complaints response is applicable at all times (i.e. not just during site operation) and there will always be a prompt response from Midland Brick whether onsite or not. Complaints are generally sent to the Shire of Toodyay. The Shire will then contact Midland Brick as required should a complaint be received by them.

It should be noted that this complaints procedure has worked very well for Midland Brick at numerous other sites in the past.

4.4 Operational controls

Midland Brick are aware of their responsibilities to reduce potential impact from noise and already undertake the following:

- Carting and excavation will not be continuous throughout the year – there will be long periods of inactivity at the clay quarry.
- Construct noise bunds with the use of overburden and resource stockpiles.
- All equipment used for excavation is well maintained which aims to minimise noise generation.
- All vehicles use broadband reversing beepers to reduce noise emissions.
- Operations will only take place during the approved hours of operation which are within the hours stipulated by the Regulations.

- Comply with the complaints procedure as described above.

Other operational controls as wet out below will also be implemented.

4.5 Noise Management Plan

The Noise Management Plan actions, responsibilities and timing is presented in Table 4.1 below.

Table 4.1 – Noise Management Plan

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
General		
1. Adhering to the "daylight hours" as set out in the Regulations, with work conducted in the hours identified in the application or on the approval.	Quarry Manager, Team	Ongoing
2. All machinery and vehicles being fitted with appropriate noise suppression equipment to reduce noise levels so far as is practicable, with machines the quietest reasonably available.	Quarry Manager, Environmental Manager	Ongoing
3. Maintain all equipment in good condition.	Quarry Manager	Ongoing
4. Purchasing staff need clear policy guidelines for procurement of new plant to ensure that noise levels do not increase significantly over time.	Raw Materials Manager, purchasing staff	When purchasing equipment
5. Maintenance staff may need to implement a maintenance programme to prevent noise levels increasing significantly over time.	Raw Material Manager, maintenance staff	Ongoing
6. Continue training programmes on noise control requirements to all workers and contractors, including any new methods as proposed by this plan.	Raw Materials Manager, Quarry Manager, Environmental Manager	Ongoing
7. All noise and vibration related complaints immediately reported to the Quarry Manager.	Quarry Manager, Environmental Manager, Team	Ongoing
8. Following substantiated complaints, the source of any excessive noise or vibration will be identified and work practices will be modified or re-scheduled to reduce or eliminate the risk of future events.	Quarry Manager, Environmental Manager	Ongoing

5 References

Bureau of Meteorology (2024), Climate Data Online, Accessed from http://www.bom.gov.au/climate/data/

Del Botanics, (2024), *Detailed Flora and Vegetation Survey, Lot 11 Chitty Road (Salt Valley Road) Hoddys Well*, Del Botanics, WA.

Department of Water and Environmental Regulation, (2017), *Guidance Statement: Risk Assessments,* Department of Water and Environmental Regulation, Perth, WA.

Department of Water and Environmental Regulation, (2021). *Draft Assessment of Environmental Noise Emissions Guideline*, Department of Water and Environmental Regulation, Perth, WA.

Environmental Protection Authority, (2005), *Guidance Statement No.3: Separation Distances Between Industrial and Sensitive Land Uses,* Environmental Protection Authority, Perth, WA.

Government of Western Australia, (2024), *SLIP Portal*, Accessed from https://maps.slip.wa.gov.au/landgate/locate/

Land Insights, (2024), *Clay Excavation Management Plan – Hoddys Well Bardya Quarry,* Land Insights, WA.

Western Australian Planning Commission, (2021), *State Planning Policy 2.4 – Planning for Basic Raw Materials Guidelines*, Western Australian Planning Commission, WA.

APPENDIX G

Water Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

WATER MANAGEMENT PLAN

LOT 11 CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

Prepared by:

Land Insights

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Document details:

Document History:

Date	Document Name	Document Manager	Summary of Document Revision	Client Delivered
May-24	1134 – Hoddys Well – Bardya Quarry Water Management Plan	SR	Initial Draft for client review	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Water Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers) located at Lot 11 Chitty Road, Hoddys Well. The Hoddys Well quarry ("the site") is located on northern portion of Lot 11. It sets out the drainage management procedures during normal operation and the guidelines in the event of a storm or emergency. It has been prepared to accompany the Clay Excavation Management Plan prepared by Land Insights to support an application for renewal of the Development Approval and Extractive Industry Licence.

Water management was previously addressed in the "Extractive Industries Licence Variation Application" report prepared by Brikmakers to support a previous renewal in 2013. This Water Management Plan presents an update to the 2013 report. It has been prepared for the following reasons:

- To incorporate best practice water management
- To incorporate relevant recommendations from Guidelines and policies prepared since 2013
- To accompany an application for a renewal of the approvals for the operation.

1.2 Objectives

The objectives of the Water Management Plan are to:

- Ensure that extractive industry activities do not have an adverse impact on surface water and groundwater resources
- Provide for management of water within the operation area.

1.3 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan

1.4 Context

This Water Management Plan has been prepared in accordance with the following policy documents:

- "State Planning Policy 2.4 – Planning for Basic Raw Materials Guidelines" (WAPC, 2014)
- "State Planning Policy 2.9 – Water Resources" (WAPC, 2006)
- "Draft State Planning Policy 2.9 – Planning for Water" (WAPC, 2021)
- "Draft State Planning Policy 2.9 – Planning for Water Guidelines" (WAPC, 2021)
- "Water Quality Protection Note (WQPN) No. 15 – Basic Raw Materials Extraction" (DWER, 2019)

Further information on the above policies is provided in Chapter 3 of this document.

1.5 Operation

The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Information on the operation and how it relates to risk of dieback spread and management is provided below.

Earthworks campaign

The "Earthworks Campaign" refers to the excavation and stockpiling of material. During the earthworks campaign, topsoil and overburden is removed and clay is excavated and placed into stockpiles located within the Operation Area.

Earthworks take place as and when required throughout the year but generally during the dry months. The timing of excavation depends on weather conditions, market demand and operational requirements (such as the rate of excavation of other clay quarries). During Excavation Campaigns, excavation will generally take place for six days a week during the approved operation times. A number of excavation campaigns can occur throughout the year to the equivalence of 4 to 5 months each year. It should be noted that for large stretches of time there will be no excavation activities on site.

The current pit area (where a majority of the excavation currently takes place) is surrounded by the pit walls. Vehicles and machinery usually operate from the pit floor and the walls of the pit act as a dust barrier for most of the excavation process. The depth of the quarry is up to 20 metres. There will be a relatively short period where vehicles are located at the ground level (when clearing vegetation and stripping topsoil and overburden for new areas), however for a majority of time they will be located below ground levels and behind the pit walls. Dust management will be in place for the operation as set out in this report.

There will be no processing of resource (screening and crushing) and no blasting will be required.

Cartage campaigns

The "Cartage Campaign" refers to the removal or transport of clay from the site where it is taken to the Midland Brick brickmaking factories. Loading and carting from the site will occur throughout the year for the equivalent of 3.5 to 4.5 months total per year. Carting will be spread out into cartage campaigns throughout the year.

Carting from the site depends on the market demand for bricks, as well as the types of clay and colour of clay. Therefore, there may be some variation from the truck numbers and the number of days that carting will be required each month (i.e. some months will have more carting days than other months).

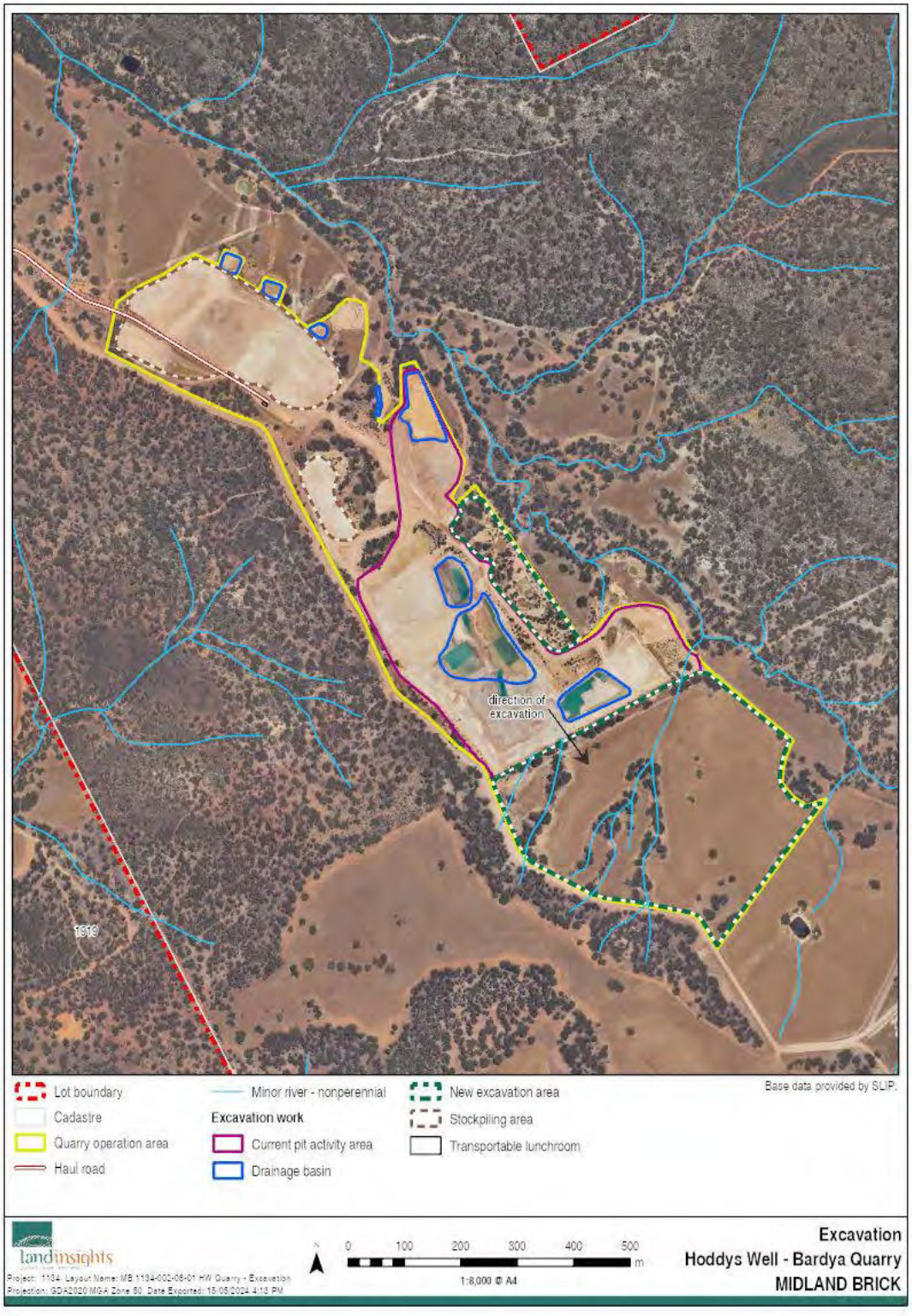
The Stockpile Area (and the area where trucks will be loaded with clay) is located in the pit area, close to the access/haul road for ease of access.

Rehabilitation

The quarry will be recontoured to a safe and stable condition with a dam or two being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some tree belts planted with native vegetation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Figure 1.2 – Excavation Plan



2 Site description

2.1 Climate

The south-west of Western Australia experiences a Mediterranean climate which is characterised by warm, dry summers and cool, wet winters.

The rainfall and temperature data for the region has been obtained from the Bureau of Meteorology "Climate Data Online" services. The average rainfall from the closest station which is the Toodyay station is 520.7mm. A majority of rainfall is from May to August.

The mean temperature information is from the closest station which is the Northam station. It states that the hottest month is January with an average maximum of 34.3°C and the coldest month is July with an average minimum of 5.3°C.

The prevailing winds throughout the majority of the year are predominantly from the east (morning) and the south-west (afternoon) (Bureau of Meteorology, 2024).

2.2 Topography and landform

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD).

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

2.3 Geology

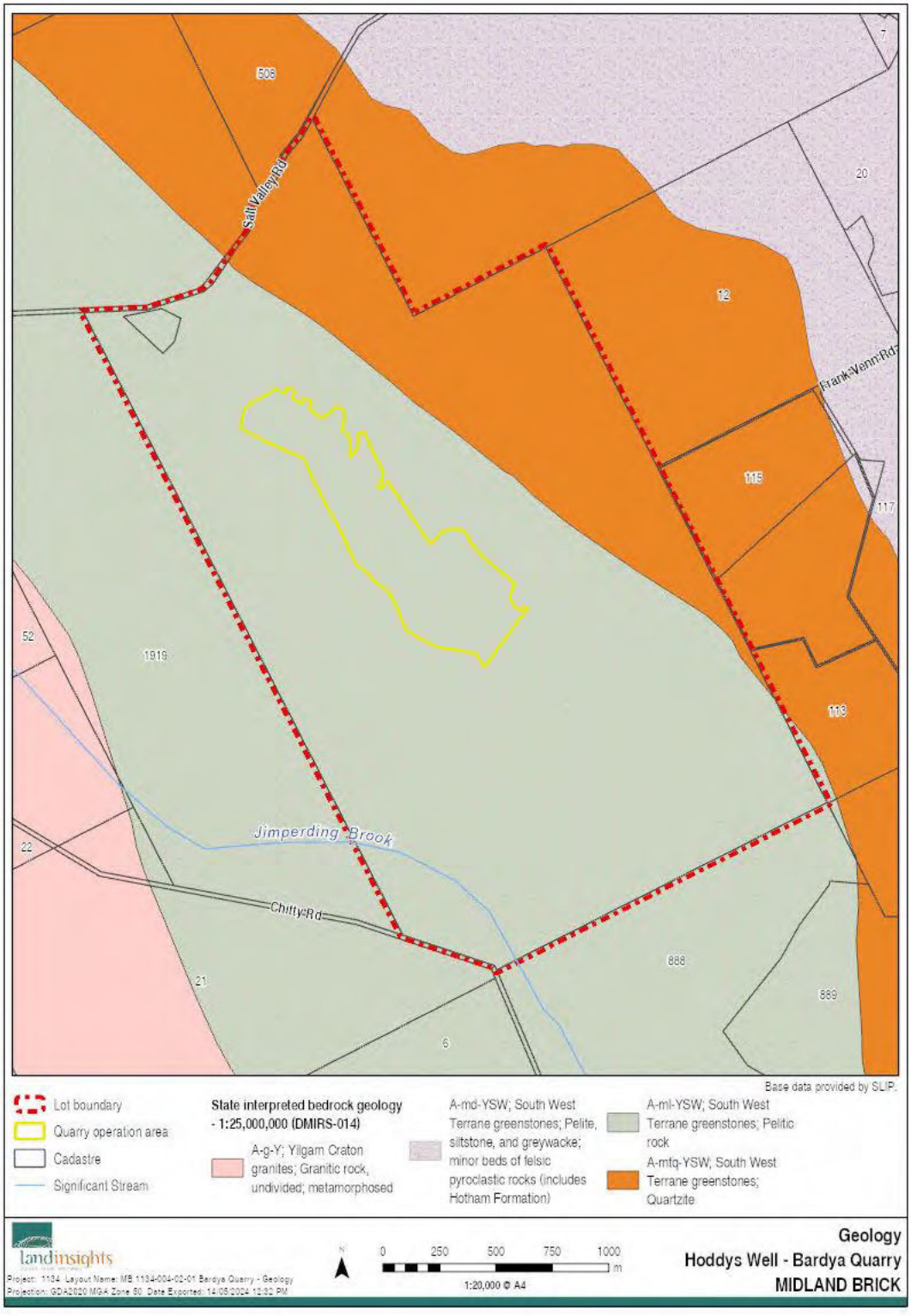
The site sits on the Darling Plateau which lies east of the Darling Scarp and the Swan Coastal Plain. The geology of this area can be described as "deeply weathered mantle over granitic rocks". More specifically, the site is located within the Eastern Darling Range which is described in the DPIRD database as

“moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys” with soils that are “formed in laterite colluvium or weathered in-situ granite”.

The 500 metres grid Regolith of WA as mapped by DPIRD identifies the geology “exposed rock, saprolite and saprock”. The bedrock geology is “South West Terrane greenstones” which are described as “Quartz--mica schist”.

The site is mapped by DMIRS as having “regionally significant basic raw materials” for clay. This is also reflected in SPP 2.4 which maps the site as a “Significant Geological Supply”.

Figure 2.1 – Geology



2.4 Soils

The site is located within the "Leaver" soil landscape system 253ByLV. The soil-landscape units are mapped by the Department of Primary Industries and Regional Development (DPIRD). It is described as "gravelly slopes and ridges of the western Darling Plateau. Gravelly yellow and red duplexes, gravelly deep clayey sands and sandy loams over laterite and clay."

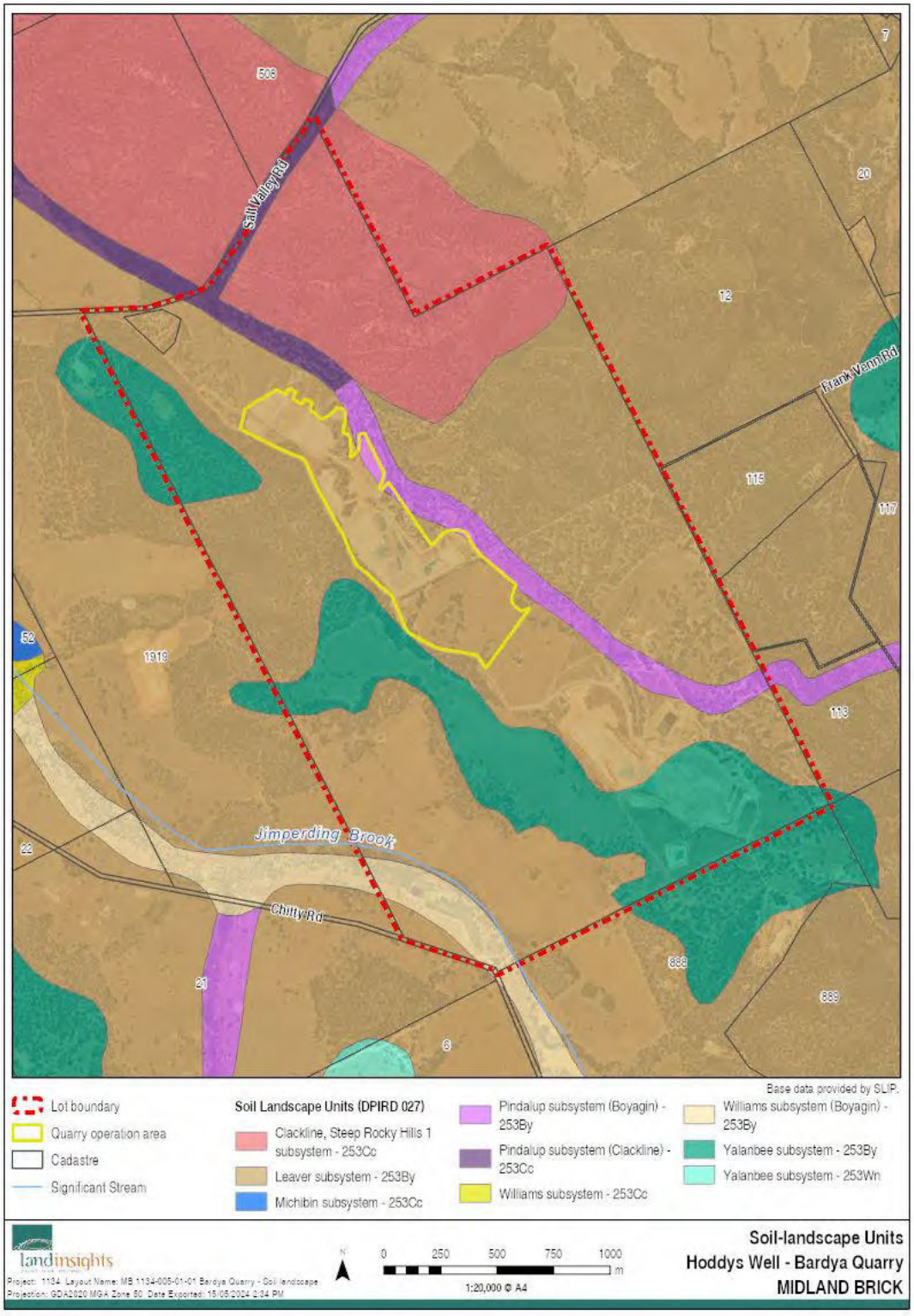
Generalised soil qualities of each soil-landscape unit as mapped by DPIRD are described in the table below.

Table 2.1 – Soil Qualities

SOIL-LANDSCAPE UNIT	WATER EROSION	WIND EROSION	WATERLOGGING	FLOOD	SALINITY
Leaver subsystem	Low risk	High risk	Low risk	Low risk	Low risk

Source: DPIRD, 2024

Figure 2.2 – Soil-landscape units



2.5 Site hydrology

Hydrological mapping

The site sits within the Eastern Darling Range hydrogeological zone which is described as "Moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys."

The site is located within a "Proclaimed Surface Water Area" under the *Rights in Water and Irrigation (RIWI) Act 1914* (the Avon River Catchment Area). It is not located within a "Proclaimed Groundwater Area".

In a regional context, the site is located within the Avon River Surface Water Area.

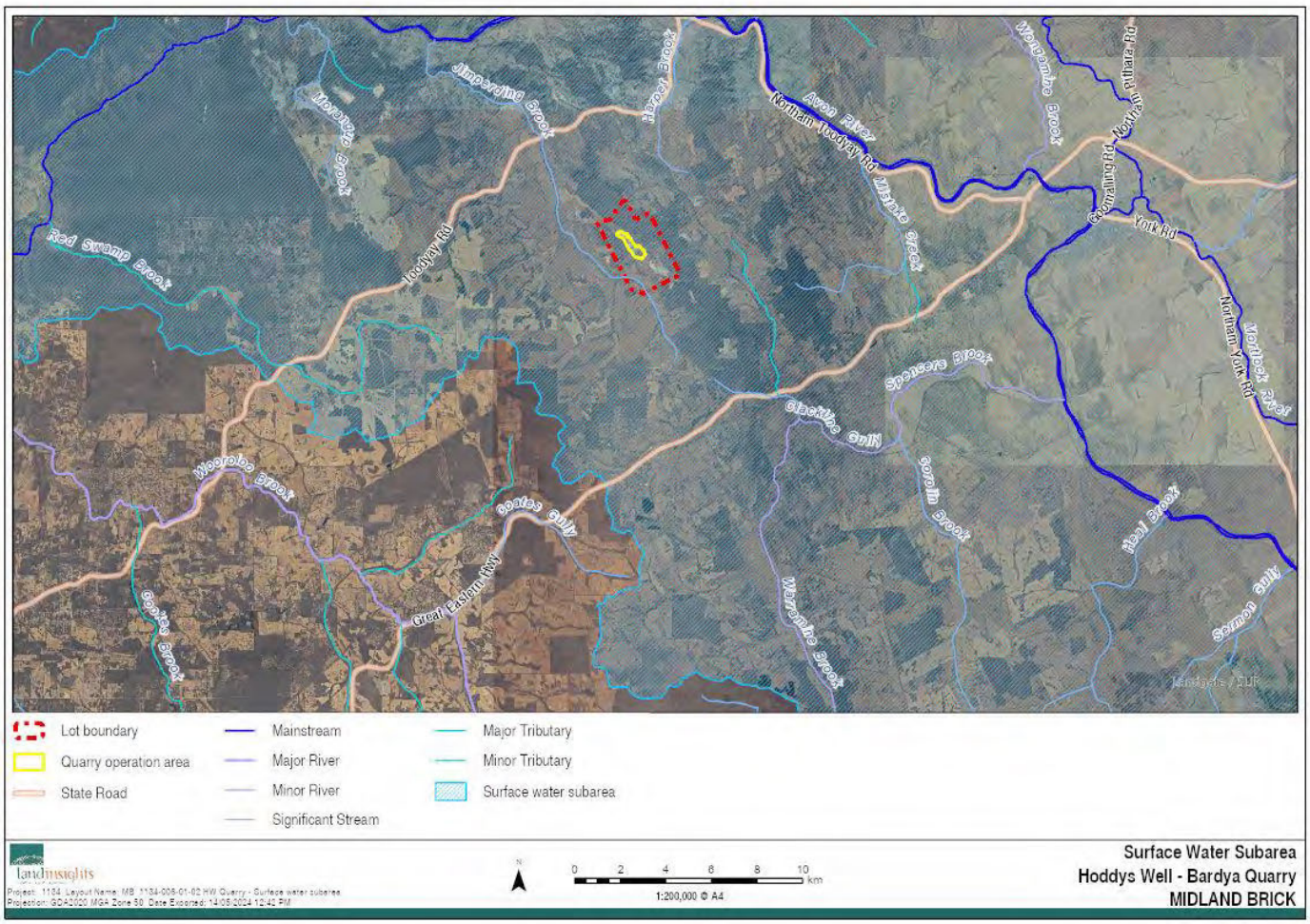
Additional hydrological mapping relating to the site (as mapped by DWER) are listed below:

- Surface Water Area – "Avon River"
- Surface Water Subarea – "Avon River"
- Hydrographic Catchment Basin – "Swan Coastal"
- Hydrographic Catchment – "Swan Avon – Main Avon"
- Hydrographic Sub catchment – "Avon River"
- Surface Water Management Area – "Avon River"
- Surface Water Management Subarea – "Ellen Brook"
- Groundwater Area – "Karri"
- Groundwater subarea – "Karri"

The site is not located within or in close proximity to a Public Drinking Water Source Areas (PDWSA's).

There are no wetlands, floodplain areas or Floodplain Development Control Areas located on or surrounding the property.

Figure 2.3 – Surface Water Subarea



Surface water features

The surface water hydrology is generally described as a deeply dissected lateritic plateau. The watercourses in the area do not contain water through all seasons and usually only flow during rainfall events and winter periods. As is mentioned above, the surface water catchment area is the Avon River which means that the surface water drainage is naturally to the north towards the River.

The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Rod and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor, highly modified drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

It should be noted that the operation is separated hydrologically from surrounding watercourses and all stormwater is retained on site within drainage basins. The quarry operations do not intercept the watercourse and does not discharge water. There are no drainage lines from the quarry towards any watercourses and there are no watercourses or drainage lines leading into the quarry.

There are no wetlands located on the site. There are no wetlands as mapped by the “Directory of Important Wetlands in Australia” or the DWER Geomorphic Wetlands database.

Figure 2.4–Watercourses

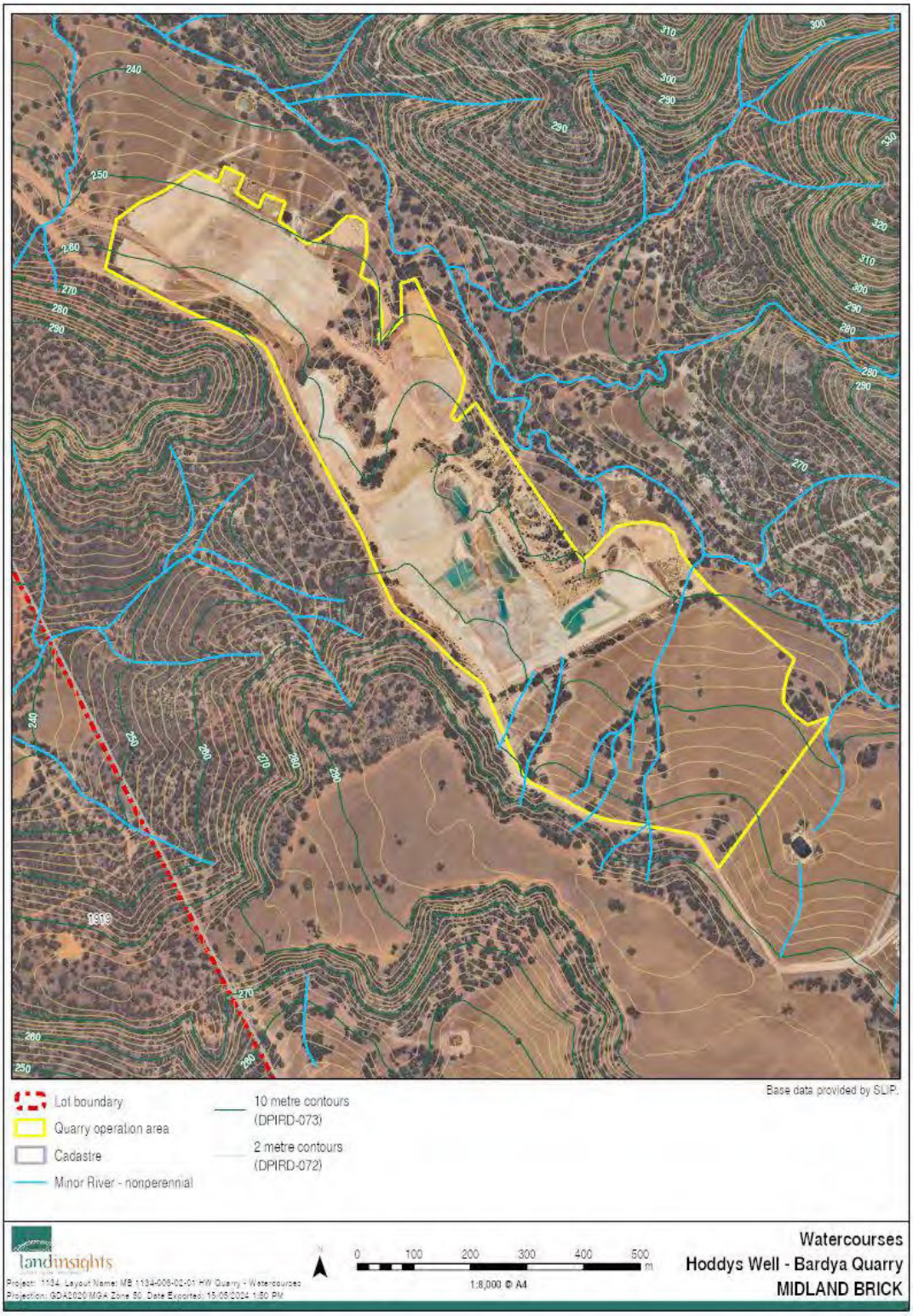
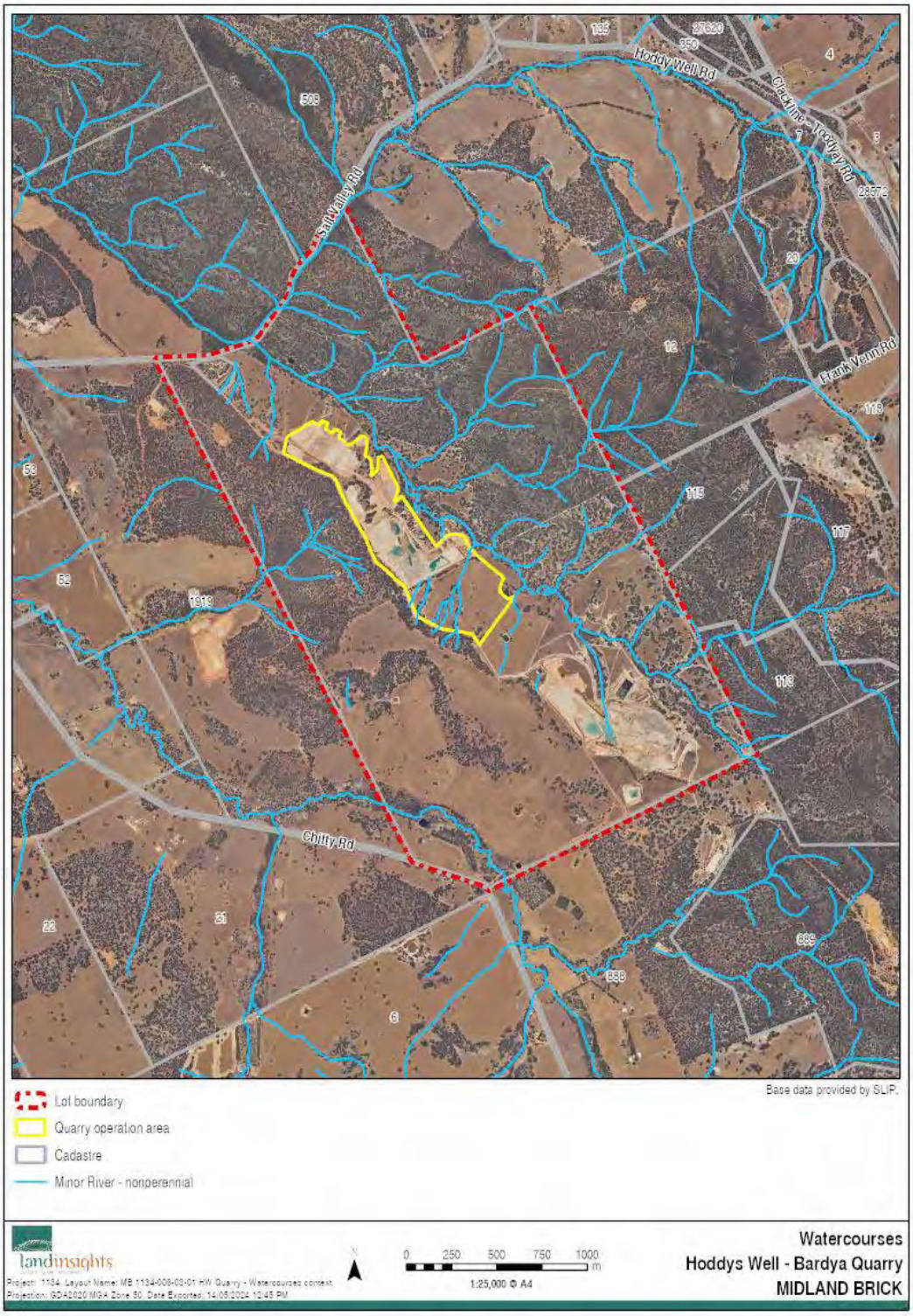


Figure 2.5 – Watercourses Context



Groundwater

The site is underlain by a confined aquifer/aquitard of limited extent which is confined by thick beds of clays and weathered schist/quartzite (Stass Environmental, 2011). Ground water flows in a south-westerly direction.

The site is not located within a Proclaimed Groundwater Area.

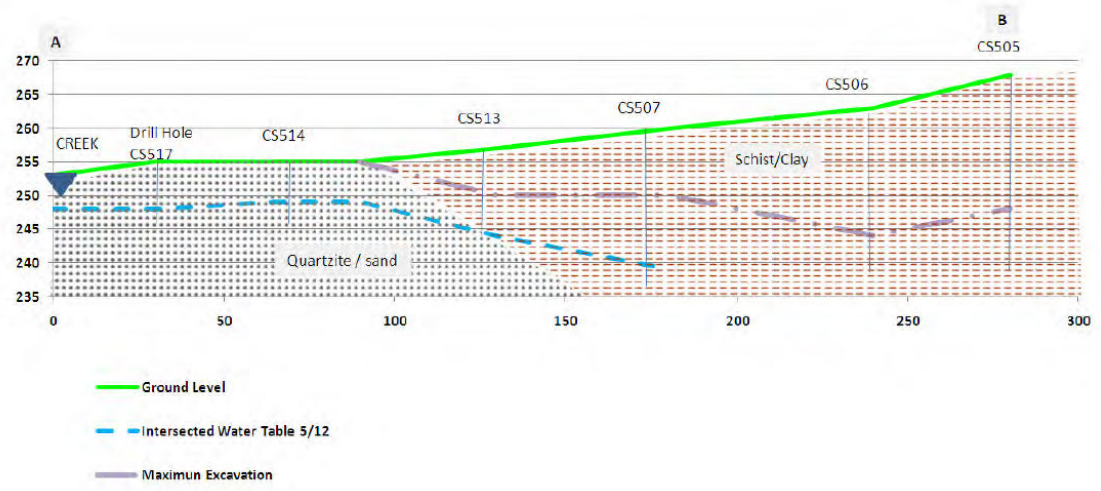
Online mapping by DPIRD identifies the site as being located in the Eastern Darling Range hydrological zone. The groundwater is described by DPIRD as “mainly low-yielding saprolite aquifers (brackish to saline).” It also states that Palaeochannels and sandy aquifers occur in some valleys which can be fresh to brackish. Groundwater discharge may occur in drainage lines and on valley floors in cleared catchments.

The general geology of the area is highly weathered rocks that have a high clay content and therefore do not allow for significant flows. There are no sedimentary sands in the area that would produce an interconnected ground water table with in the deposit. The weathered schists have a low to very low permeability. The groundwater is more accurately described as an aquiclude which indicates that groundwater is present however there is no defined/connected aquifer system within the schist (Brikmakers, 2013).

Over 100 exploration holes either within the proposed extraction area or adjacent to it have been completed by Brikmakers in the past. No significant groundwater has been located at the depths proposed to excavate to a maximum of 30m below ground level apart from groundwater previously intercepted in drilling on the eastern side of the proposed extraction (as can be seen in Figure 3.13 below). This water is contained within the fractured quartzite (Toodyay stone) that forms the eastern contact of the schist. No water table or perched water tables have been intercepted during significant drilling of the deposit and the extraction area.

Figure 2.6 below (extracted from Brikmakers, 2013) demonstrates the relationship between the water table, schist and quartzite. A minimum of 5m will exist between the water table and the finished pit floor. The cross section is an east to west section showing measured water table and proposed excavation depths.

Figure 2.6 – Generalised Geology and Hydrogeology (from Brikmakers, 2013)



2.6 Vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry. Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as "Bannister 4" which is described as "Jarrah, Marri and Wandoo." The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is "Michibin" which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones.

A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp.* over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp.* over very open grassland of **Avena barbata*.

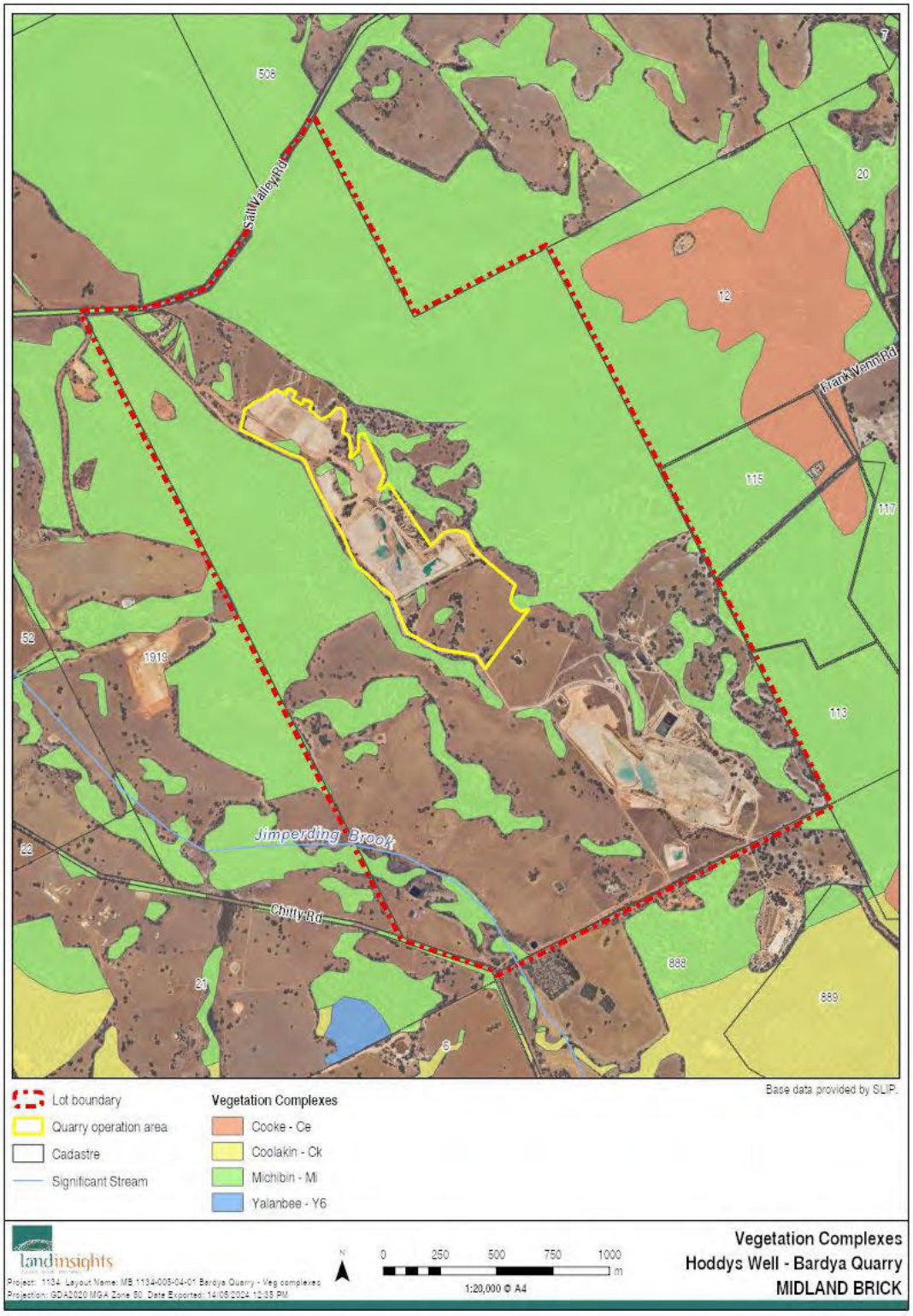
The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as “Cleared Paddocks”.

The closest sensitive receptors in all directions are separated from the clay quarry by substantial areas of established vegetation which provide an adequate visual screen (in addition to the natural topography and bund walls).

Some clearing of native vegetation will be required in the proposed excavation areas at the southern half of the site. These areas are shown on the plan at Figure 1.2. It is not expected that this will have an impact on visual amenity as there will be substantial areas of vegetation remaining.

Figure 2.7 – Current Native Vegetation Extent

Figure 2.8 – Vegetation Complexes



2.7 Surrounding Land Uses

Land uses immediately surrounding and adjacent to the quarry include other clay extraction (operated by a separate company) and a landfill both located at the southern end of Lot 11, clay extraction (also operated by Midland Brick) to the west and rural properties.

2.8 Separation Distances

There are no sensitive receptors with 1,000 metres from the quarry (including the landowner). The following closest sensitive receptors have been identified from the quarry.

- Owner's dwelling to the south – Approximately 1,100 metres
- Nearest rural dwelling to the east – Approximately 1,400 metres
- Nearest rural dwelling to the south – Approximately 2,400 metres
- Nearest rural dwelling to the west – Approximately 1,800 metres
- Nearest rural dwelling to the north-west – Approximately 1,600 metres (note that this is to the site entrance as this is the closest point)

The location of surrounding sensitive receptors in relation to the quarry is shown in Figure 2.1 below.

The EPA's Guidance Statement No. 3 provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses (such as residential dwellings). It should be noted that the distances in the policy assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category "clay extraction or processing". The potential impacts are listed as "noise" and "dust". The separation distance is "500-1000 metres, depending on size and processing", however this can be less with appropriate environmental management. All surrounding sensitive receptors are over 1,000 metres from the quarry.

Although there are no sensitive receptors within 1,000 metres of the quarry, the Visual and Amenity Management Plan has been prepared to provide an outline of best practice visual management used at the site.

Figure 2.9 – Surrounding Sensitive Receptors

3 Policy Context

3.1 State Planning Policy 2.9 – Water Resources

"State Planning Policy 2.9 – Water Resources" was prepared by the WAPC in 2006. The objectives of the Policy are to protect, conserve and enhance water resources, assist in ensuring the availability of suitable water resources and promote the sustainable use of water resources. It provides a range of policy measures to guide and assist decision-makers in the consideration of water resources in decision-making. Policy Measures are provided for surface water, groundwater, wetlands, waterways, estuaries and total water cycle management.

The Policy makes specific reference to decision-making and advises that "where there is demonstratable adverse and unacceptable impact on the quality and quantity of significant water resources, planning decisions-makers should ensure that planning proposals and applications either do not proceed or are modified so that significant water resources are protected, conserved and enhanced".

Policy Measures of relevance to this application include those related to surface water and groundwater. They are addressed in Table 3.1 below.

Table 3.1 – Relevant Policy Measures from SPP 2.9

POLICY MEASURE	COMMENT
Recognise the hydrological importance of groundwater and surface catchments with regards to water management and the associated value of catchment planning on a regional, district and local scale.	The hydrological importance of the catchment area has been reviewed in this report. In addition, the risk assessment in Chapter 4 has been undertaken against WQPN 15.
Protect, manage, conserve and enhance surface and groundwater catchments and recharge areas supporting significant ecological features or having identified environmental values, by ensuring, where possible, appropriate management or limiting inappropriate land use/s to maintain water quality and quantity for existing and future environmental and human uses.	The site is not located within a PDWSA and no significant water features are located on the site. A risk assessment has been undertaken against WQPN No 15 which specifically relates to basic raw materials. This management plan provides for the protection of surface and groundwater to achieve this policy measure.
Ensure the availability of water resources is compatible with the future requirements of the proposed and surrounding land use through an assessment of quantity and quality requirements for both the development and the environment.	A review of the compatibility and risk assessment has also been undertaken in Chapter 4 for the current and future operation. The operation already exists on the site and this management plan provides for the continued use of the land for this purpose. There have been no issues to date with regards to the availability of water resources.

POLICY MEASURE	COMMENT
Take into account the potential adverse impacts that development may have on catchment areas and encourage development to participate in catchment management activities.	As above.

3.2 Draft State Planning Policy 2.9 – Planning for Water

The "draft State Planning Policy 2.9 – Planning for Water" was prepared by the WAPC in 2021. The intent of the Policy is "ensure that planning and development considers water resource management and includes appropriate water management measures to achieve optimal water resource outcomes". It provides guidance for the consideration of water resources for planning applications and decision-makers. The Policy Measures include consideration of environmental values, social and cultural values, riverine flooding, infrastructure and supply.

It should be noted that no "important environments" (including "Sensitive Water Resource Areas") are mapped on the site under the draft Policy.

3.3 Draft State Planning Policy 2.9 – Planning for Water Guidelines

The "Draft State Planning Policy 2.9 – Planning for Water Guidelines" were prepared by the WAPC in 2021. The draft Guidelines provide support for decision-makers, planners, proponents and referral agencies in the following:

1. "Determining appropriate land use planning practices in relation to water resources across Western Australia
2. Specifying the requirements to be met at each stage of the planning process
3. Ensuring that necessary water resource management measures are incorporated into land development."

It should be noted however that a majority of the Guidelines apply to land development (residential, rural residential, industrial etc) and intensification of land use, and does not specifically include recommendations for extraction of basic raw materials. More relevant information relating to extraction of basic raw materials is provided in WQPN No. 15.

The most relevant parts of the Guidelines to this site are Chapter 5 (which provides information relating to the purpose and content of a water management report) and Chapter 9 (which refers to PDWSAs). Chapter 5 states that "The information contained within a WMR should demonstrate achievement of the SPP 2.9 outcomes".

3.4 Water Quality Protection Note 15 – Basic Raw Materials Extraction

"Water Quality Protection Note No 15 – Basic Raw Materials Extraction" was prepared by DWER in 2019. The Note applies to extraction of basic raw materials and associated processing activities (stockpiling, crushing, screening etc.) It provides a comprehensive list of recommendations for a variety of situations and scenarios where protection of water resources needs to be considered for extractive industry.

The recommendations from the WQPN have been incorporated into this management plan.

3.5 Water Quality Protection Note No. 77 – Risk assessment process for public drinking water source areas

"Water Quality Protection Note No. 77" was prepared by DWER in 2022. It describes how to assess risks to water quality in public drinking water source areas and can be applied to other drinking water sources. The risk assessment process in the note is based on the preventive approach advocated by the Australian drinking water guidelines.

The risk assessment process recommended by WQPN No 77 is to:

1. Identify hazards, likelihood of impact, consequence of impact
2. Determine maximum risk
3. Identify barriers and their effectiveness
4. Determine residual risk
5. Determine management to address residual risk
6. Review.

Although there are no PDWSAs within or surrounding the quarry, the risk assessment provided in WQPN No 77 has been used in this Water Management Plan. The risk assessment for development in a PDWSA is one of high quality and standard, therefore it is considered that the use of this guideline for the site goes beyond the requirements for this site.

4 Risk Assessment

4.1 Introduction

A risk assessment for the Hoddys Well (Bardya) Quarry is presented in this chapter. It considers the risks to water quality and the potential impact to water sources off-site. The assessment has considered in detail the potential hazards, the risk factors and the proposed controls in accordance with the risk assessment guideline from WQPN No. 77 (DWER, 2022).

There are two different components to the below risk assessment which provide a thorough consideration of the potential issues and risks as follows:

1. A review against the 'water management considerations' from WQPN No. 15 which is a policy which specifically relates to the potential impacts from extraction of basic raw materials.
2. A risk assessment against the potential 'hazards' as identified in WQPN No. 77.

The criteria used for the determination of "likelihood", "consequence" and "risks" is from WQPN No. 77. This Policy was prepared by DWER in 2022 to provide a risk assessment process for the consideration of risks to water quality in PDWSAs. A copy of the criteria has been provided in Tables 4.4, 4.5 and 4.6 below.

The purpose of the risk assessment is to demonstrate that risk identified as "medium", "high" or "extreme" can be effectively managed.

4.2 Water Quality Protection Note 15 – Risk Assessment

Table 4.1 below presents the risk assessment on the "water management considerations" from WQPN No. 15 (DWER, 2019). The purpose of this risk assessment is to provide a clear link between the Policy considerations and the management controls. It also demonstrates the effectiveness of the management controls through the assessment of the residual risk. It should be noted that some considerations from the WQPN (such as dust, site rehabilitation, refuelling, waste management etc.) are addressed in their own separate management plans. The considerations that are identified as being relevant to the site (such as management of surface water, stormwater runoff etc.) are considered further in the management section.

Table 4.1 – Risk assessment on WQPN No. 15

WQPN 15 CONSIDERATIONS	WQPN 15 POLICY RECOMMENDATION	POTENTIAL IMPACT	CONTEXT	PROPOSED CONTROL	RESIDUAL RISK		
					L	C	Risk
Public drinking water source areas.	The Policy makes recommendations if an operation is proposed within a public drinking water source area.	N/A	The site is not located within a PDWSA.	N/A	N/A		
Clearing control catchments (Country Areas Water Supply Act 1947).	BRM activities within clearing control catchments need to be assessed for potential salinity impacts.	N/A	The site is not located within a Clearing Control Catchment.	N/A	N/A		
Near waterways.	The Policy states that extraction should be above the 1 in 100 flood level, outside of areas subject to waterlogging or flooding and to have adequate buffers to waterways.	Potential for impact on waterways (turbidity, salinity etc) if an operation is inadequately separated.	The operation area is not located in an area prone to waterlogging and flooding. The operation is sufficiently separated from the nearest watercourses. All stormwater will be retained on site and not permitted to drain into surrounding areas.	Actions 1 and 4 – Maintain current separation distances and water control	Unlikely	Minor	Low
BRM extraction within waterways (in-stream mining).	The Policy provides recommendations for BRM operations which extract from riverbeds or from pits in floodplains.	N/A	Not applicable – in-stream mining or extraction in waterways is not proposed.	N/A	N/A		
Wetlands.	The Policy recommends contacting DBCA to discuss wetlands.	N/A	Not applicable – There are no wetlands located on the site.	N/A	N/A		

WQPN 15 CONSIDERATIONS	WQPN 15 POLICY RECOMMENDATION	POTENTIAL IMPACT	CONTEXT	PROPOSED CONTROL	RESIDUAL RISK		
					L	C	Risk
Groundwater.	Assessment of groundwater requires consideration of acid sulphate soils and the maintenance of a vertical separation to the groundwater table.	Potential impact to groundwater quality (such as salinity, hydrocarbons).	Extraction will be least 2m above the watertable at all times. No dewatering of groundwater will be required. There is low risk of acid sulphate soils occurring.	Actions 5 and 6	Rare	Minor	Low
Landscape.	The Policy recommends that land selected should be gently sloping (between 1 in 20 and 1 in 50) so runoff and wastes can be more easily managed, but erosion is avoided. It also recommends that rocky and steep slopes, and land prone to erosion should be avoided.	Potential for exacerbated erosion which can also potentially lead to turbidity in surface water features.	The slope of the pit walls is steep, however all runoff is retained on site. Wind erosion risk will be low for the pit area as the clay soils form a crust when dry and stick together when wet. The final landform will be recontoured to safe and stable slopes.	Action 16 – Refer to Rehabilitation Management Plan	Rare	Minor	Low
Other land uses.	This aspect relates to separation distances to sensitive land uses and the avoidance of infrastructure.	N/A	Not applicable – No permanent infrastructure is located on site. Separation distances and off-site impacts are addressed in other management plans.	N/A	N/A		

WQPN 15 CONSIDERATIONS	WQPN 15 POLICY RECOMMENDATION	POTENTIAL IMPACT	CONTEXT	PROPOSED CONTROL	RESIDUAL RISK		
					L	C	Risk
Construction.	The Policy recommends that existing tracks and roads should be used where possible, that any waterway crossings are constructed appropriately and that access should be designed to have the least impact on surface water features and vegetation.	N/A	Not applicable - No waterway crossings are proposed.	N/A	N/A		
Solid waste.	The Policy makes reference to the requirements of the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.	Inadequate control of waste on site can have detrimental impact on surface water and their environs.	Midland Brick stores and appropriately disposes of wastes from the site in accordance with the Waste Management Plan.	Action 12 – Refer to Waste Management Plan	Rare	Minor	Low
Water supply.	The Policy refers to the need for a licence under the *Rights in Water and Irrigation Act 1914* to construct a bore, and abstract groundwater or surface water in a Proclaimed Surface or Groundwater Area. It also makes recommendations regarding water supply.	Potential for impact on a proclaimed groundwater resource through intersection of groundwater, filtration to the watertable etc. Potential for impact on a proclaimed surface water resource through water contamination and consideration of the requirement for a licence to abstract surface water from a watercourse or wetland.	The site is located in a Proclaimed Surface Water Area and is not within a Proclaimed Groundwater Area. There is no need for abstraction of surface or groundwater for the operation. Water to be used for the operation (primarily dust suppression) is captured within the onsite dams. There is no intersection with the groundwater and, due to the clay soils on the site, low likelihood of infiltration affecting water supply.	Action 5 and 6	Unlikely	Minor	Low

WQPN 15 CONSIDERATIONS	WQPN 15 POLICY RECOMMENDATION	POTENTIAL IMPACT	CONTEXT	PROPOSED CONTROL	RESIDUAL RISK		
					L	C	Risk
Wastewater.	The Policy makes recommendations relating to wastewater treatment and management.	Potential impact largely relates to pathogens and nutrients on water supplies.	Ablution facilities will be managed in accordance with the manufacture's specifications. There will be no discharge to the environment.	Action 12 – Refer to Waste Management Plan	Rare	Minor	Low
Stormwater.	This aspect of the Policy aims to ensure that stormwater from the operational areas is retained on site. It also recommends that ponds are used to manage turbidity (i.e. settling ponds) and that they are designed to handle up to a 2 hour, 1 in 10 (10 per cent) annual exceedance probability event.	Potential impact of stormwater runoff relates to impacts on surface water quality (e.g. turbidity, salinity etc) and impacts on hydrological regimes (such as surface water quantity, flow rates, groundwater recharge etc).	All stormwater is retained onsite and is diverted to the detention basins throughout the operation. The pit area is large enough to accommodate water from a storm event and basins can be increased in size and new basins constructed within the operational area as the operation progresses. There are basins to capture run off from the stockpile areas and from the pit area itself.	Actions 1, 2, 3 and 4	Rare	Minor	Low
Dust	The Policy refers to the obligations of a proponent under the EP Act 1984 and mentions the DWER *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (2011).	Potential impact to water quantity if bore or surface water is required for dust suppression.	Water for dust suppression is taken from the onsite water basins and use of surface or groundwater is not required. Dust is managed on site in accordance with the Dust Management Plan.	Refer to the Dust Management Plan.	Rare	Minor	Low

WQPN 15 CONSIDERATIONS	WQPN 15 POLICY RECOMMENDATION	POTENTIAL IMPACT	CONTEXT	PROPOSED CONTROL	RESIDUAL RISK		
					L	C	Risk
Toxic and hazardous substances.	The Policy makes recommendations for the storage and handling of chemicals, pesticides and fuel.	Potential for impact from hydrocarbons.	Refuelling is managed in accordance with the Refuelling Management Plan. No fuels or oils are stored on site.	Action 10 – Refer to Refuelling Management Plan.	Rare	Minor	Low
Vehicles.	This aspect relates to the cleaning and maintenance of vehicles.	Potential for impact from hydrocarbons and chemicals.	Cleaning and maintenance of vehicles is in accordance with the Refuelling Management Plan.	Action 10 – Refer to Refuelling Management Plan.	Rare	Minor	Low
Accidents and emergency response.	The Policy makes recommendations about spills and the need for a contingency plan.	Potential impact from hydrocarbons and chemicals.	No chemicals are used in the clay extraction operation and Midland Brick operates within a Refuelling Management Plan for the site which includes procedures for spills.	Action 10 – Refer to Refuelling Management Plan.	Rare	Minor	Low
Monitoring.	The Policy recommends that monitoring occurs as appropriate for the site (i.e. monitoring of surface water if required etc.)	Potential for impact if there are issues which go unnoticed.	Regular monitoring of the pH and salinity in the basins takes place.	Actions 8 and 9	N/A		
Closure, rehabilitation and subsequent land uses.	This section of the Policy makes recommendations with regards to mine closure plans and the consideration of the end use of a site.	Potential for impact to water sources if the site is not properly rehabilitated, such as erosion and turbidity.	Closure, decommissioning and site rehabilitation is provided in the Rehabilitation Management Plan.	Action 16 – Refer to Rehabilitation Management Plan.	Rare	Minor	Low

4.3 Water Quality Protection Note 77 – Risk Assessment

Table 4.2 below presents the risk assessment against the "hazards" recommended in WQPN No. 77 (DWER, 2022). It lists the potential impact (without any management), the inherent risk (i.e. with no controls) and the residual risk (with management controls in place).

Table 4.2 – Water risk assessment

POTENTIAL IMPACT WITHOUT MANAGEMENT	CIRCUMSTANCES OR EVENT	CONSIDERATION FOR LIKELIHOOD (WITHOUT MANAGEMENT)	LIKELIHOOD	CONSEQUENCE	MAXIMUM RISK	PROPOSED CONTROL	EFFECTIVENESS	RESIDUAL LIKELIHOOD	RESIDUAL RISK
Surface water source									
Salinity Increase in surface water salinity levels due to the extraction of clay soils with a high salt content ("liberation" of salt from the soil) which has the potential to runoff into the surface water.	Water runoff.	Unknown frequency but potential with rainfall events.	Possible	Minor	Moderate	Water runoff will be retained within the operation area. Clay and water testing will continue to take place. Clay which exceeds desired salinity levels is not excavated.	Adequate	Rare	Low
Turbidity Increase in turbidity levels due to water runoff from the disturbed/operational areas.	Water runoff	Unknown frequency but potential with rainfall events.	Possible	Minor	Moderate	Water runoff will be retained within the operation area.	Adequate	Rare	Low
Pathogens Wastewater and pathogens entering water sources.	Ablution facility leak	Unknown frequency	Possible	Minor	Moderate	Ablution facilities (if required) will be maintained and managed in accordance with the manufacturer's specifications. There will be no intentional wastewater runoff.	Adequate	Rare	Low

POTENTIAL IMPACT WITHOUT MANAGEMENT	CIRCUMSTANCES OR EVENT	CONSIDERATION FOR LIKELIHOOD (WITHOUT MANAGEMENT)	LIKELIHOOD	CONSEQUENCE	MAXIMUM RISK	PROPOSED CONTROL	EFFECTIVENESS	RESIDUAL LIKELIHOOD	RESIDUAL RISK
Changes to hydrological regimes such as water runoff from the surface water catchment.	Intersection of water features and capturing water from surface water catchment.	Minor, highly modified drainage lines will be directly intercepted, but the excavation area (existing and proposed) encompasses a portion of the surface water catchment area.	Possible	Minor	Medium	Ensure the operation area doesn't expand outside of the approved area. Avoid disturbance to major drainage lines surrounding the quarry. Only minor, highly disturbed drainage lines to be disturbed.	Adequate	Unlikely	Low
Direct disturbance and modification to surface water features.	Physical disturbance of surface water features.	Disturbance to watercourses and drainage lines.	Possible	Minor	Medium	Ensure the operation area doesn't expand outside of the approved area. Avoid disturbance to major drainage lines surrounding the quarry. Only minor, highly disturbed drainage lines to be disturbed.	Adequate	Unlikely	Low
Groundwater source									
Hydrocarbons Hydrocarbons from fuel spills and leaks from refuelling entering water sources.	Fuel spill or leak	Only during excavation and carting times.	Possible	Minor	Moderate	Refer to the Refuelling Management Plan. No fuels and oils are stored on site.	Adequate	Rare	Low

POTENTIAL IMPACT WITHOUT MANAGEMENT	CIRCUMSTANCES OR EVENT	CONSIDERATION FOR LIKELIHOOD (WITHOUT MANAGEMENT)	LIKELIHOOD	CONSEQUENCE	MAXIMUM RISK	PROPOSED CONTROL	EFFECTIVENESS	RESIDUAL LIKELIHOOD	RESIDUAL RISK
Salinity Increase in groundwater salinity levels due to the extraction of clay soils with a high salt content ("liberation" of salt from the soil) which has the potential to infiltrate into permeate into groundwater.	Infiltration into the groundwater.	Unknown frequency.	Unlikely	Minor	Low	The clay on the base of the operation area provides an impermeable barrier. Clay and water testing will continue to take place. Clay which exceeds desired salinity levels is not excavated.	Adequate	Rare	Low
Interception of groundwater which can lead to contamination.	If excavation digs to the groundwater table.	Unknown frequency	Unlikely	Minor	Low	The operation lies above the groundwater table and does not intersect or impact on groundwater. There will be no pumping, dewatering, changes to recharge or alterations to flow as a result of the operation.	Adequate	Rare	Low

Table 4.3 – Likelihood Criteria

Almost certain	Likely	Possible	Unlikely	Rare
Is expected to occur in most circumstances.	Will probably occur in most circumstances.	Might or should occur at some time.	Could occur at some time.	May occur in exceptional circumstances.

Source: DWER, 2022

Table 4.4 – Consequence Criteria

Insignificant	Minor	Moderate	Major	Catastrophic
Insignificant impact, little disruption to operation, low increase in operating cost.	Minor impact for small population, some manageable operation disruption, some increase in operating cost.	Minor impact for large population, significant modification to normal operation but manageable, operating cost increased, increased monitoring.	Major impact for small population, system significantly compromised and abnormal operation (if at all), high level of monitoring required, significant increase in operating cost, source may require remediation (at significant cost).	Major impact for large population, complete failure of system, source may require complete replacement (huge costs associated).

Source: DWER, 2022

Table 4.5 – Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Moderate	High	Very High	Very High	Very High
Likely	Moderate	High	High	Very High	Very High
Possible	Low	Moderate	High	Very High	Very High
Unlikely	Low	Low	Moderate	High	Very High
Rare	Low	Low	Moderate	High	High

Source: DWER, 2022

5 Water and Drainage Management

5.1 Introduction

This chapter describes the various drainage control and water management actions implemented at the Hoddys Well (Bardya) quarry. It has been set out to provide actions which can be efficiently and effectively understood and actioned by Midland Brick staff and contractors.

5.2 Site location and separation distances

There are no major or significant watercourses within or directly adjoining the quarry. The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Rod and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor, highly modified drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

Schedule 2 of the SPP 2.9 provides guidance for the determination of appropriate waterway buffers. It states that existing mechanisms for identifying foreshore management and protection areas is generally based on a setback of 30 metres for waterways. The operation is therefore considered to be sufficiently separated from the nearest minor and major surface water features.

5.3 Surface water runoff

All stormwater drainage will be contained within the operation area and is not permitted to flow into surrounding vegetation or the watercourse. Rainwater which falls into the operation will be directed into existing pit areas and drainage basins. This method is consistent with the recommendations from WQPN No. 15.

Water detention basins have already been established throughout the quarry, as can be seen on the Excavation Plan at Figure 1.2 above. Basins are located within the pit area to capture water runoff. These

are created from previously extracted areas. As extraction progresses the old pit areas are used as water detention basins before they are recontoured and rehabilitated. Water detention basins are also located downslope from the stockpile areas to capture stormwater runoff from these areas. The basins are effective of capturing runoff from the operation area so that runoff does not leave the site and drain into the watercourse to the north.

Overburden excavated from the pit is used to create bunds around the pit area and water diversion drains (where required). These serve to prevent runoff from leaving the excavation area and to direct water to the drainage basins. The perimeter of the pit area is protected by bund walls which provide a physical barrier to water runoff. The bunds will be maintained throughout the life of the operation.

Water which lands within the excavation area flows down the batter slopes and is directed to the detention ponds at the lowest part of the pit. This ensures that rainwater which falls within the operation area is not permitted to flow into surrounding vegetation and the surrounding watercourse.

5.4 Monitoring

Midland Brick have commenced a monitoring regime in which water within the operation area will be tested annually for salinity and pH. These parameters will continue to be tested from the dams located within the operation area. The purpose of monitoring salinity and pH is to inform the brick-making process and to monitor for issues relating to salinity or acidic conditions.

5.5 Refuelling

The operation operates in accordance with a Refuelling Management Plan (Land Insights, 2024) for the operation. The objective of the plan is to minimise risk to surface water and groundwater from fuel spills and leaks.

5.6 Management of waste

The operation operates in accordance with a Waste Management Plan (Land Insights, 2024) for the operation. The objective of this plan is to provide actions to manage and dispose of waste appropriately.

5.7 Water Management Plan

The water management actions, responsibilities and timing are presented in Table 5.1 below.

Table 5.1 – Water management plan

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
1. Ensure run-off from clay extraction operational areas is contained within the operation area through the placement of bunds and diversion drains.	Quarry Manager, Team	Ongoing
2. Clay stockpiles continue to be placed on a compacted clay base.	Quarry Manager, Team	Ongoing
3. Water runoff from the stockpile area is directed into the existing detention basins through the maintenance of clay bunds and diversion drains around the stockpile area (where required).	Quarry Manager, Team	Ongoing
4. Maintain current separation distances to the watercourse flowing to the north of the operation (at least 50 metres separation from the edge of the operation area to the centre of the watercourse).	Quarry Manager	Ongoing
5. Ensure groundwater table is not intercepted throughout excavation.	Quarry Manager	Ongoing
6. Maintain the excavation surface at least 2 metres above the groundwater table.	Quarry Manager	Ongoing
7. Ensure that there is capacity in the detention basins for high rainfall events.	Quarry Manager	Ongoing
8. Test the water quality of the basins (pH and salinity) at least annually.	Quarry Manager, Environmental Manager	Twice a year
9. Test the salt content and pH of clay as part of Midland Brick's quality assurance standard procedures.	Raw Materials Manager, Quarry Manager	Ongoing
10. Undertake refuelling in accordance with the Refuelling Management Plan.	Quarry Manager, Team	Ongoing
11. Undertake waste management in accordance with the Waste Management Plan.	Quarry Manager, Team	Ongoing
12. Ensure any ablution facilities are maintained in accordance with the manufacturer's specifications.	Quarry Manager	If required.
13. Continue training programmes on water management requirements to all workers and contractors.	Quarry Manager, Environmental Manager, Team	Ongoing
14. Any significant adverse water management issues to be recorded, investigated and remediated internally.	Quarry Manager, Environmental Manager, Team	Ongoing

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
15. Water retained on site can be used for dust suppression if required.	Quarry Manager, Team	Ongoing
16. Rehabilitate the site in accordance with the Rehabilitation Management Plan.	Quarry Manager, Environmental Manger, Team	When required.

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APPENDIX H

Refuelling Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" QUARRY CLAY QUARRY

REFUELLING MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

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May-24	1134 – Hoddys Well – Bardya Quarry Refuelling Management Plan	SR	Initial Draft for client review	May-24
May-24	1134 – Hoddys Well – Bardya Quarry Refuelling Management Plan	SR	Final	May-24

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1 Introduction

1.1 Background and purpose

This report presents the Refuelling Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers) located at Lot 11 Chitty Road, Hoddys Well. The Hoddys Well quarry ("the site") is located on northern portion of Lot 11.

The purpose of the plan is to outline the procedures to follow to reduce the risk of spills and leaks and the response in the event of a hydrocarbon spill. It has been prepared to accompany the Clay Excavation Management Plan prepared by Land Insights to support an application for renewal of the Development Approval and Extractive Industry Licence.

Hydrocarbon leaks and spills have the potential to adversely impact on the environment and human health. Spills and leaks can pollute groundwater and surface water, impacting native flora and fauna and other users of water resources. In addition, spills and leaks can result in the site being classified as a contaminated site and higher closure/remediation costs. It is therefore in the best interests of everyone that hydrocarbon spills and leaks are cleaned and treated appropriately and in a timely manner.

While no fuel, chemicals or lubricants are stored within the operation area, machinery and vehicles used for the operation are refuelled within the quarry using mobile service trucks. This management plan provides a list of actions should any spills or leaks occur during refuelling and servicing.

1.2 Objectives

The objectives of the Refuelling Management Plan are:

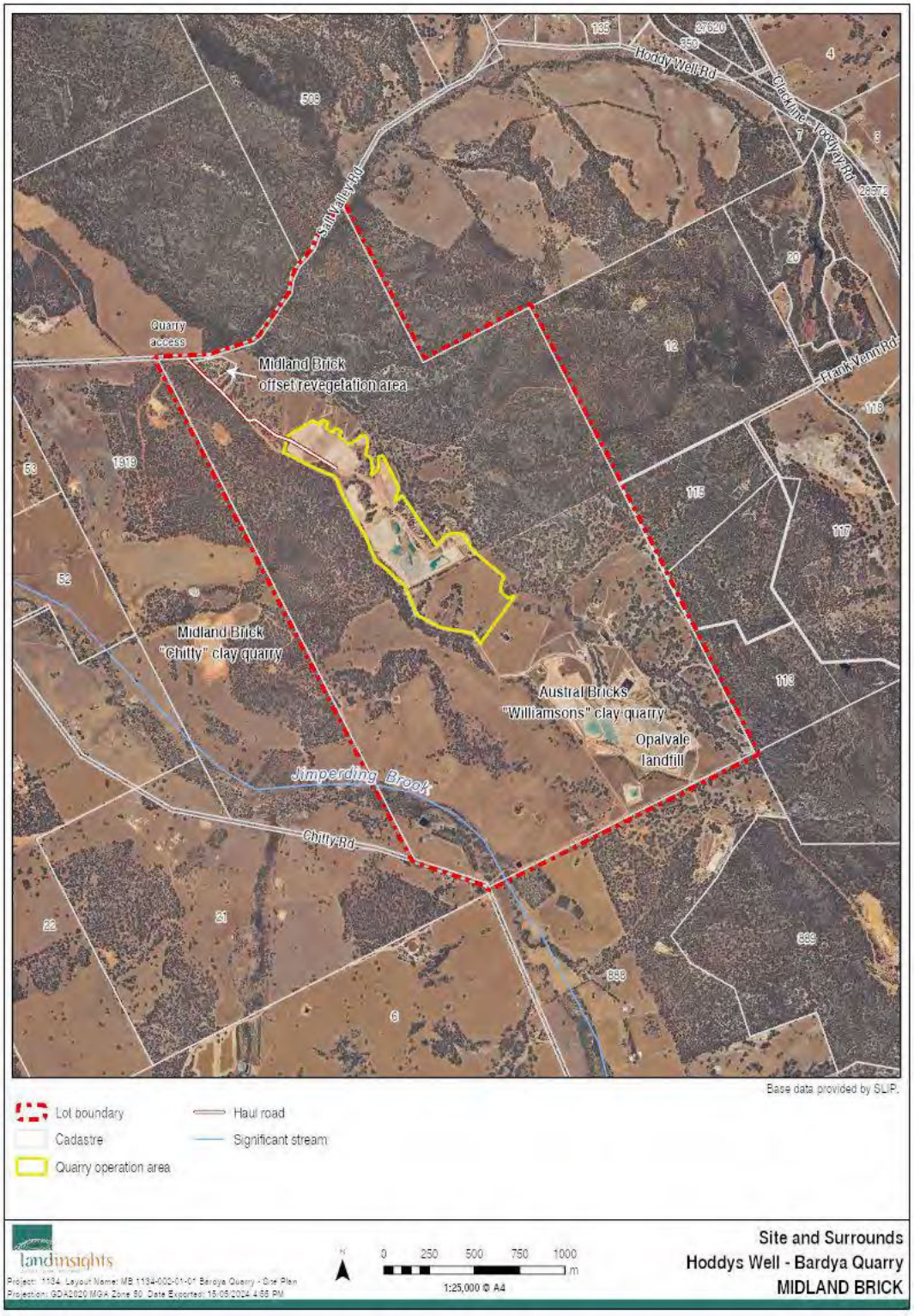
- To reduce the potential for a fuel spill or leak
- To protect soil and water resources from fuels
- To provide a procedure to clean any fuel spills and leaks.

1.3 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan



1.4 Operation

The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Information on the operation and how it relates to risk of dieback spread and management is provided below.

Earthworks campaign

The "Earthworks Campaign" refers to the excavation and stockpiling of material. During the earthworks campaign, topsoil and overburden is removed and clay is excavated and placed into stockpiles located within the Operation Area.

Earthworks take place as and when required throughout the year but generally during the dry months. The timing of excavation depends on weather conditions, market demand and operational requirements (such as the rate of excavation of other clay quarries). During Excavation Campaigns, excavation will generally take place for six days a week during the approved operation times. A number of excavation campaigns can occur throughout the year to the equivalence of 4 to 5 months each year. It should be noted that for large stretches of time there will be no excavation activities on site.

The current pit area (where a majority of the excavation currently takes place) is surrounded by the pit walls. Vehicles and machinery usually operate from the pit floor and the walls of the pit act as a dust barrier for most of the excavation process. The depth of the quarry is up to 20 metres. There will be a relatively short period where vehicles are located at the ground level (when clearing vegetation and stripping topsoil and overburden for new areas), however for a majority of time they will be located below

ground levels and behind the pit walls. Dust management will be in place for the operation as set out in this report.

There will be no processing of resource (screening and crushing) and no blasting will be required.

Cartage campaigns

The “Cartage Campaign” refers to the removal or transport of clay from the site where it is taken to the Midland Brick brickmaking factories. Loading and carting from the site will occur throughout the year for the equivalent of 3.5 to 4.5 months total per year. Carting will be spread out into cartage campaigns throughout the year.

Carting from the site depends on the market demand for bricks, as well as the types of clay and colour of clay. Therefore, there may be some variation from the truck numbers and the number of days that carting will be required each month (i.e. some months will have more carting days than other months).

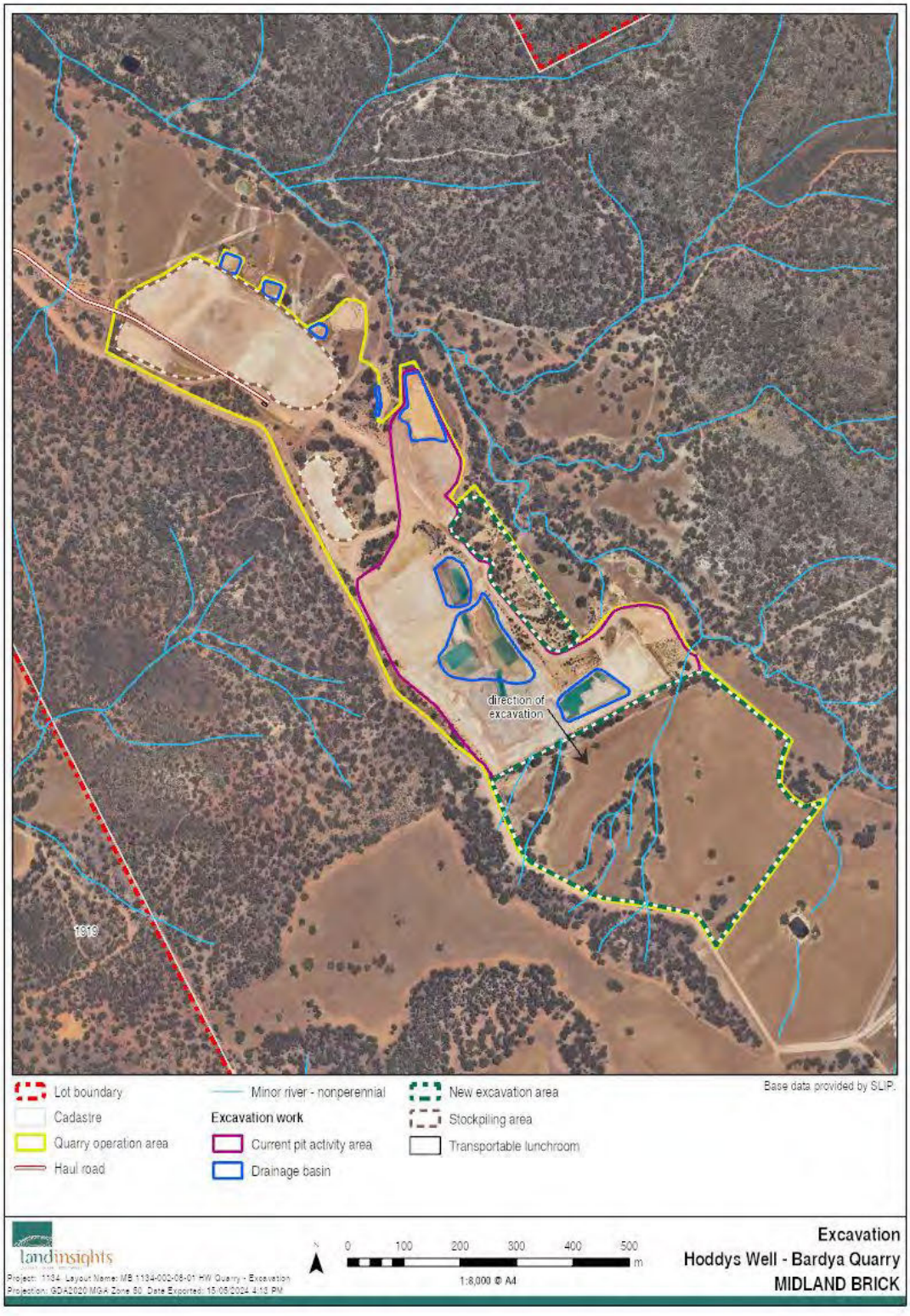
The Stockpile Area (and the area where trucks will be loaded with clay) is located in the pit area, close to the access/haul road for ease of access.

Rehabilitation

The quarry will be recontoured to a safe and stable condition with a dam or two being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with pasture and some tree belts planted with native vegetation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Figure 1.2 – Excavation Plan



2 Site Context

2.1 Topography and landform

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD).

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

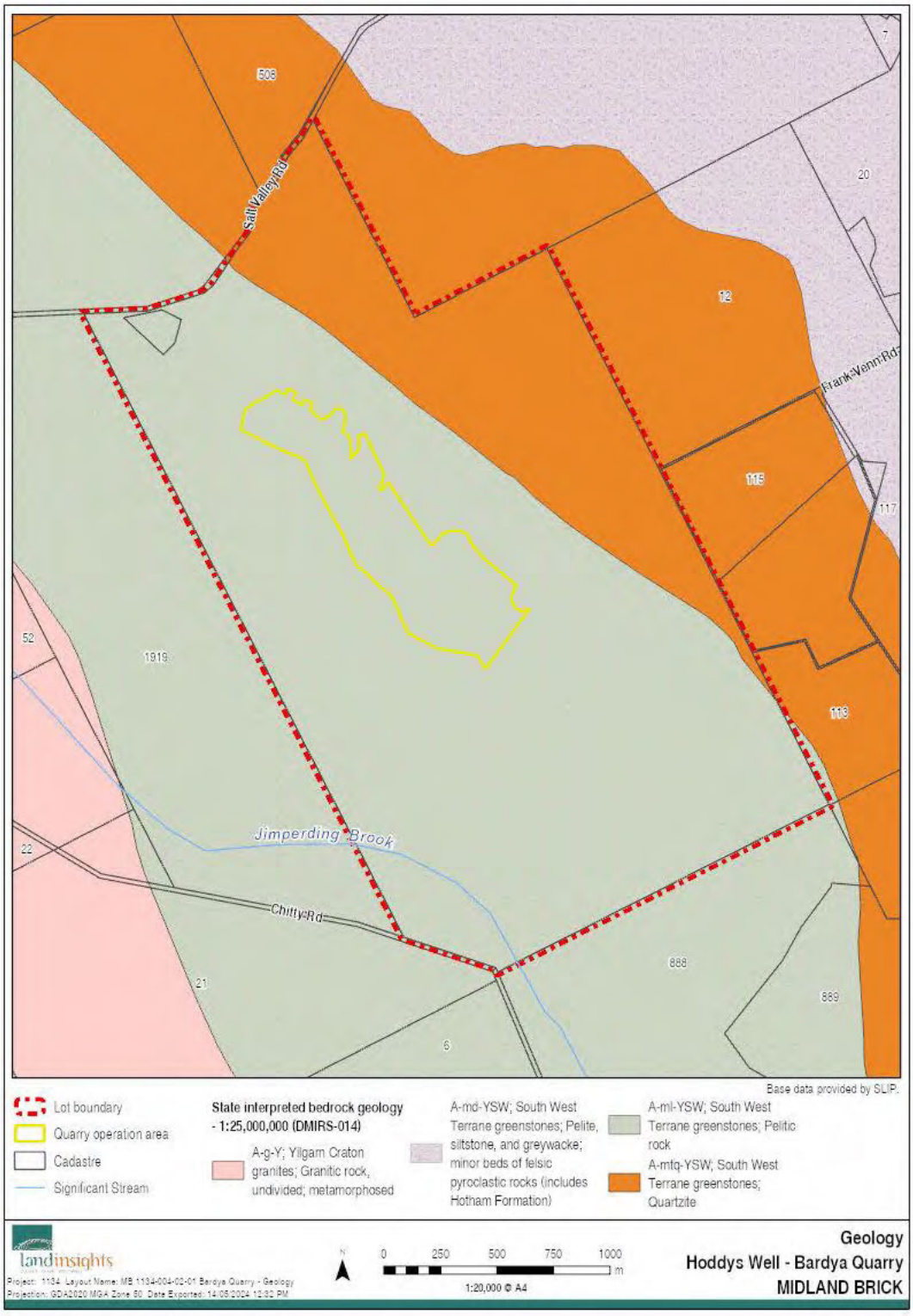
2.2 Geology

The site sits on the Darling Plateau which lies east of the Darling Scarp and the Swan Coastal Plain. The geology of this area can be described as “deeply weathered mantle over granitic rocks”. More specifically, the site is located within the Eastern Darling Range which is described in the DPIRD database as “moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys” with soils that are “formed in laterite colluvium or weathered in-situ granite”.

The 500 metres grid Regolith of WA as mapped by DPIRD identifies the geology “exposed rock, saprolite and saprock”. The bedrock geology is “South West Terrane greenstones” which are described as “Quartz--mica schist”.

The site is mapped by DMIRS as having “regionally significant basic raw materials” for clay. This is also reflected in SPP 2.4 which maps the site as a “Significant Geological Supply”.

Figure 2.1 – Geology



2.3 Soils

The site is located within the "Leaver" soil landscape system 253ByLV. The soil-landscape units are mapped by the Department of Primary Industries and Regional Development (DPIRD). It is described as "gravelly slopes and ridges of the western Darling Plateau. Gravelly yellow and red duplexes, gravelly deep clayey sands and sandy loams over laterite and clay."

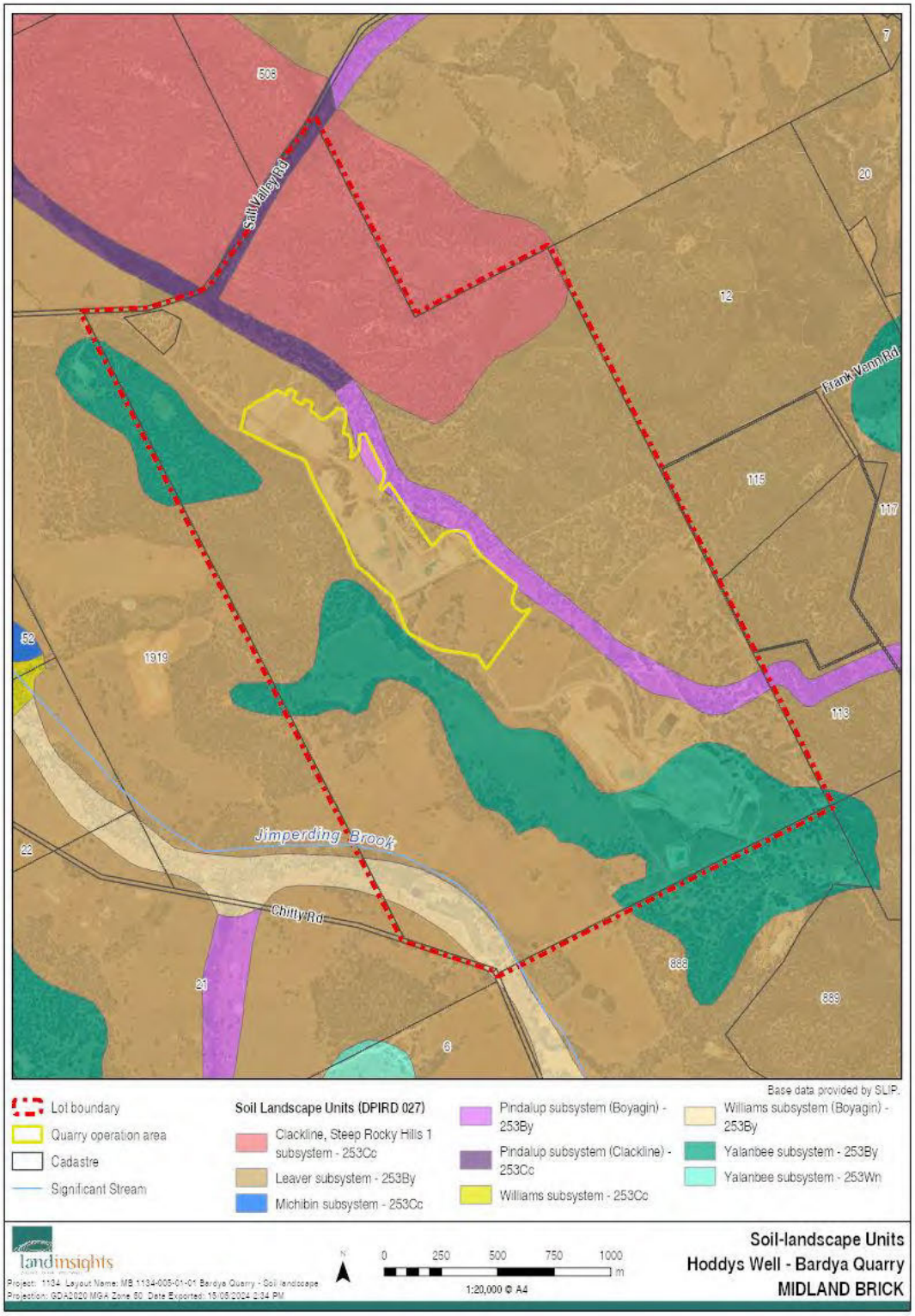
Generalised soil qualities of each soil-landscape unit as mapped by DPIRD are described in the table below.

Table 2.1 – Soil Qualities

SOIL-LANDSCAPE UNIT	WATER EROSION	WIND EROSION	WATERLOGGING	FLOOD	SALINITY
Leaver subsystem	Low risk	High risk	Low risk	Low risk	Low risk

Source: DPIRD, 2024

Figure 2.2 – Soil-landscape units



2.4 Site hydrology

Hydrological mapping

The site sits within the Eastern Darling Range hydrogeological zone which is described as "Moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys."

The site is located within a "Proclaimed Surface Water Area" under the *Rights in Water and Irrigation (RIWI) Act 1914* (the Avon River Catchment Area). It is not located within a "Proclaimed Groundwater Area".

In a regional context, the site is located within the Avon River Surface Water Area.

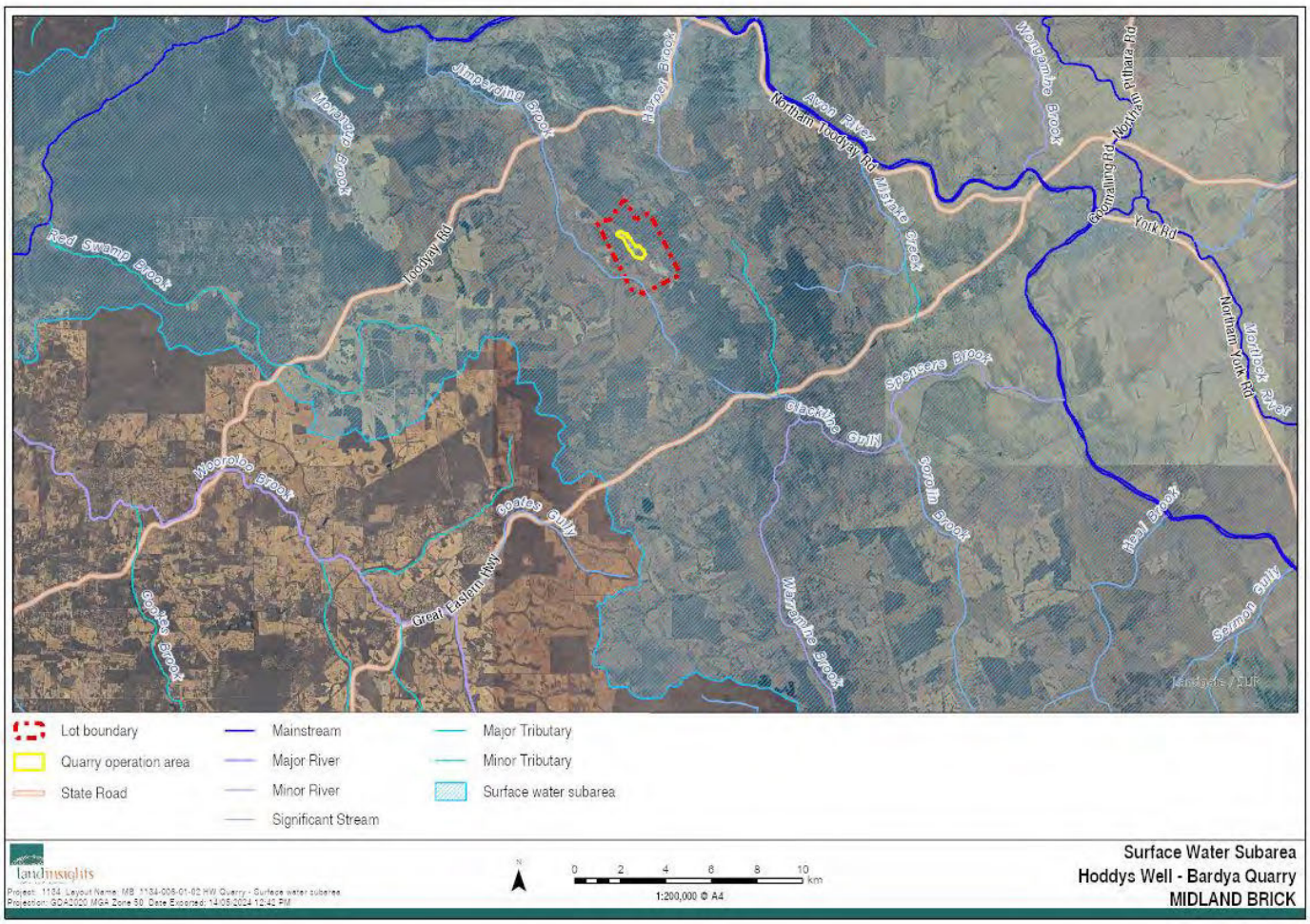
Additional hydrological mapping relating to the site (as mapped by DWER) are listed below:

- Surface Water Area – "Avon River"
- Surface Water Subarea – "Avon River"
- Hydrographic Catchment Basin – "Swan Coastal"
- Hydrographic Catchment – "Swan Avon – Main Avon"
- Hydrographic Sub catchment – "Avon River"
- Surface Water Management Area – "Avon River"
- Surface Water Management Subarea – "Ellen Brook"
- Groundwater Area – "Karri"
- Groundwater subarea – "Karri"

The site is not located within or in close proximity to a Public Drinking Water Source Areas (PDWSA's).

There are no wetlands, floodplain areas or Floodplain Development Control Areas located on or surrounding the property.

Figure 2.3 – Surface Water Subarea



Surface water features

The surface water hydrology is generally described as a deeply dissected lateritic plateau. The watercourses in the area do not contain water through all seasons and usually only flow during rainfall events and winter periods. As is mentioned above, the surface water catchment area is the Avon River which means that the surface water drainage is naturally to the north towards the River.

The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Rod and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

It should be noted that the operation is separated hydrologically from surrounding watercourses and all stormwater is retained on site within drainage basins. The quarry operations do not intercept the watercourse and does not discharge water. There are no drainage lines from the quarry towards any watercourses and there are no watercourses or drainage lines leading into the quarry.

There are no wetlands located on the site. There are no wetlands as mapped by the “Directory of Important Wetlands in Australia” or the DWER Geomorphic Wetlands database.

Figure 2.4–Watercourses

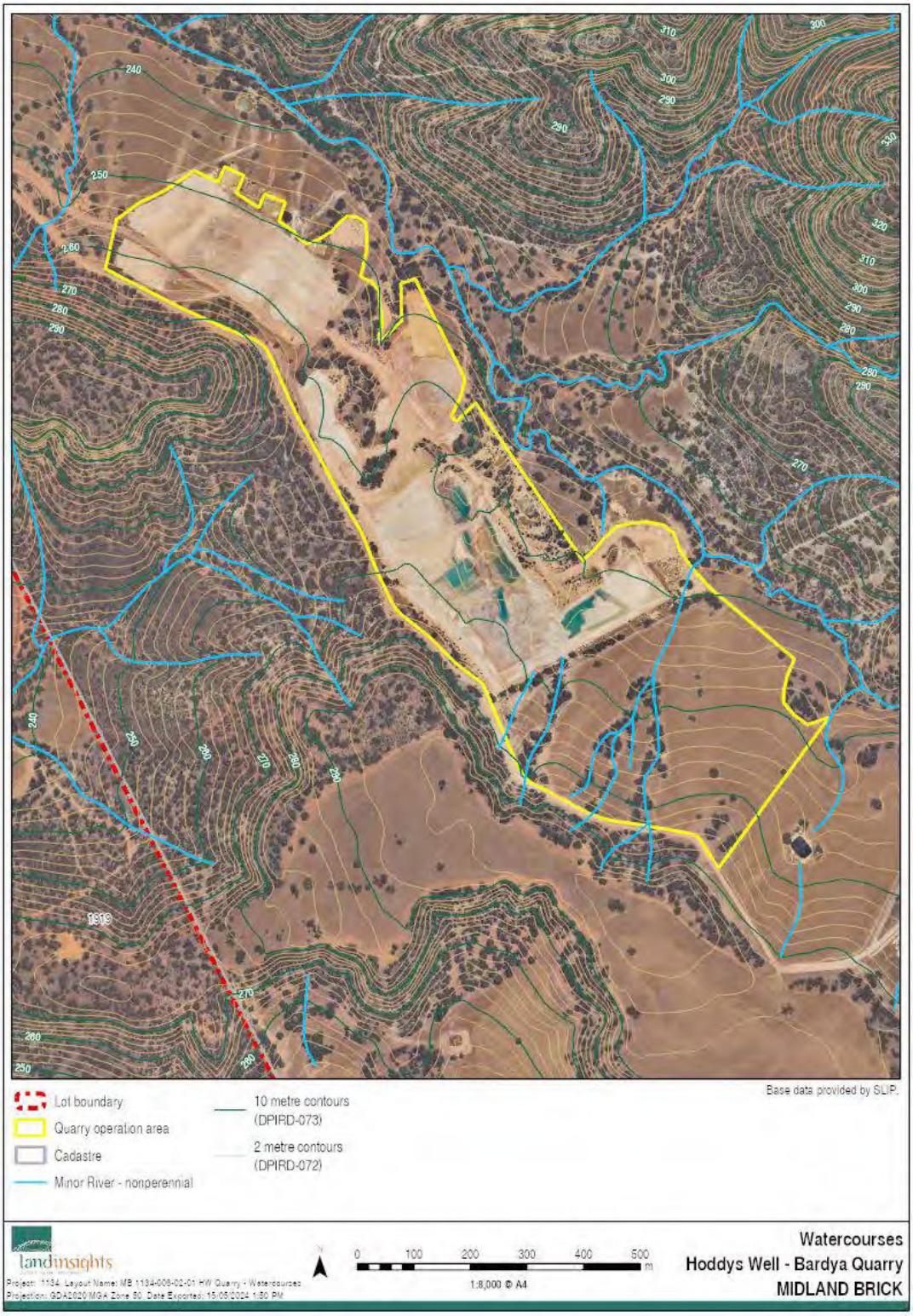
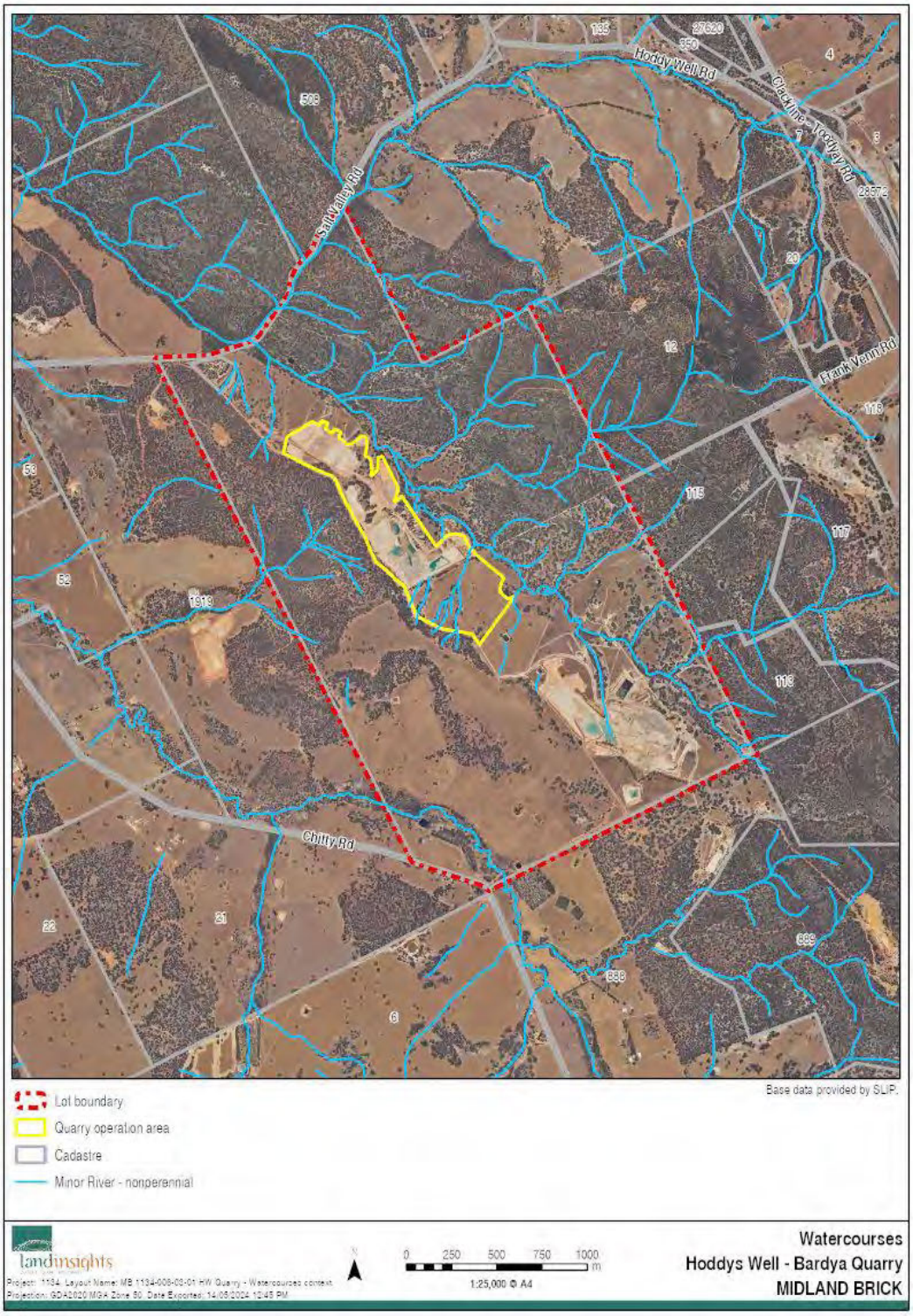


Figure 2.5 – Watercourses Context



Groundwater

The site is underlain by a confined aquifer/aquitard of limited extent which is confined by thick beds of clays and weathered schist/quartzite (Stass Environmental, 2011). Ground water flows in a south-westerly direction.

The site is not located within a Proclaimed Groundwater Area.

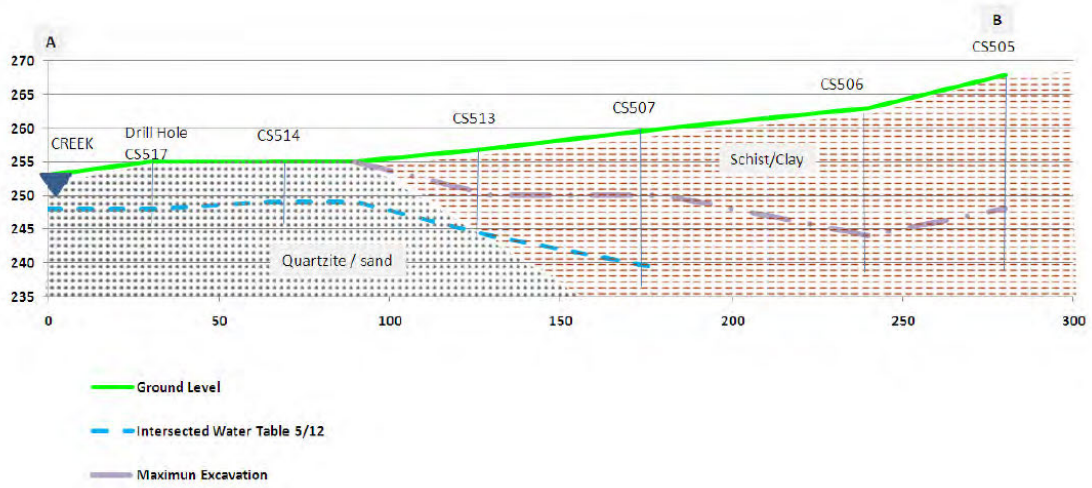
Online mapping by DPIRD identifies the site as being located in the Eastern Darling Range hydrological zone. The groundwater is described by DPIRD as “mainly low-yielding saprolite aquifers (brackish to saline).” It also states that Palaeochannels and sandy aquifers occur in some valleys which can be fresh to brackish. Groundwater discharge may occur in drainage lines and on valley floors in cleared catchments.

The general geology of the area is highly weathered rocks that have a high clay content and therefore do not allow for significant flows. There are no sedimentary sands in the area that would produce an interconnected ground water table with in the deposit. The weathered schists have a low to very low permeability. The groundwater is more accurately described as an aquiclude which indicates that groundwater is present however there is no defined/connected aquifer system within the schist (Brikmakers, 2013).

Over 100 exploration holes either within the proposed extraction area or adjacent to it have been completed by Brikmakers in the past. No significant groundwater has been located at the depths proposed to excavate to a maximum of 30m below ground level apart from groundwater previously intercepted in drilling on the eastern side of the proposed extraction (as can be seen in Figure 3.13 below). This water is contained within the fractured quartzite (Toodyay stone) that forms the eastern contact of the schist. No water table or perched water tables have been intercepted during significant drilling of the deposit and the extraction area.

Figure 2.6 below (extracted from Brikmakers, 2013) demonstrates the relationship between the water table, schist and quartzite. A minimum of 5m will exist between the water table and the finished pit floor. The cross section is an east to west section showing measured water table and proposed excavation depths.

Figure 2.6 – Generalised Geology and Hydrogeology (from Brikmakers, 2013)



3 Refuelling Procedures and Risks

3.1 Trained Operators

Midland Brick provides Standard Operating Procedure (SOP) training to any person in operating a mobile fuel truck. The training covers aspects of how to carry out the task in a safe and environmentally friendly manner but also what to do in case of an accidental spill. At the conclusion of the training each operator is to satisfactorily pass a practical and written test. In addition to the SOP, each fuel truck operator is given training in how to use a Spill Kit. Additionally, operators are trained in all aspects of this management plan as well as the other management plans applicable to this operation.

Mines and safety legislation ensures an employer provides a safe working environment in which employees are not exposed to hazards in the workplace. Environmental legislation makes it an offence to cause harm or pollution to the environment. The *Environmental Protection (Unauthorised Discharges) Regulations 2004* specifically lists “petrol, diesel or other hydrocarbon” as “materials that must not be discharged into the environment”.

3.2 Refuelling

Machinery and vehicles used for the operation will be refuelled on site from mobile fuel trucks when required. As no fuel, chemicals or lubricants are stored on site, this considerably reduces the risk of spills and leaks occurring. The use of mobile fuel trucks to refuel machinery and vehicles presents a much lower risk to the environment than storing fuel on site.

Refuelling will be undertaken in the operation area to allow for containment if a spill does occur. It will not be undertaken upstream of any surface water features and will occur in the operation area as the drainage in this area is controlled and does not flow into the surrounding area. Refuelling will also not occur within any area with dry grass.

The main risk associated with refuelling is the minor drips that occur during removal of the hoses etc. The actions required to address all spills (minor and large) is provided below.

3.3 Servicing

Servicing of machinery and vehicles is completed on site. Servicing mainly relates to oil and filter changes. A major service entails a more thorough inspection of the machinery and vehicles including diffs, gearbox/transmission, wheel hubs and engine. Some major repairs are undertaken off site.

The mobile fuel truck is well set up for evacuation of all waste fluids into containers on the truck. Any spills will be cleaned following the procedures outlined below.

Machinery is checked at the pre-start inspection each morning by the operator. Leaks in the hydrocarbon systems are part of the inspection.

3.4 Environmental risks

The refuelling risk assessment in Table 3.1 below is based on the criteria defined in "Guidance Statement: Risk Assessments" (DWER, 2017). The risk assessment below lists the activity(s) which have the potential to cause impact, the inherent risk (i.e. with no controls) and the residual risk (with controls in place).

The "risk" is determined by considering the likelihood and consequence of the environmental impact. The likelihood and consequence criteria are defined in the Guidance Statement. A copy of the criteria has been provided in the tables below. The matrix used to determine the risk rating is also based on the matrix used in the Guidance Statement and a copy of this table is provided in Table 3.4 below.

The purpose of the risk assessment is to demonstrate that risk identified as "medium", "high" or "extreme" can be effectively managed. As is stated in the "Guidance Statement: Risk Assessments" (DWER, 2017), a "low risk" is considered acceptable and generally not controlled through regulation.

The risk of environmental impact from refuelling and servicing of machinery and vehicles is considered to be low when following best practice procedures and the appropriate legislation and policies. Further information on management is provided below.

Table 3.1 – Refuelling risk assessment.

ACTIVITY AND POTENTIAL EMISSION	POTENTIAL RECEPTORS AND POTENTIAL PATHWAY	POTENTIAL ADVERSE IMPACT	INHERENT RISK			PROPOSED CONTROL	RESIDUAL RISK		
			L	C	Risk		L	C	Risk
Leaks and spills of hydrocarbons from mobile refuelling of trucks and machinery.	Soil, surface water and groundwater. Surface runoff, direct discharges to land and infiltration through soils.	Potential contamination of soil, surface water, groundwater.	Unlikely	Minor	Med	As set out in this management plan.	Rare	Minor	Low

Table 3.2 – Likelihood Criteria

Almost certain	Likely	Possible	Unlikely	Rare
The risk event is expected to occur in most circumstances.	The risk event will probably occur in most circumstances.	The risk event could occur at some time.	The risk event will probably not occur in most circumstances.	The risk event may only occur in exceptional circumstances.

Source: DWER 2017

Table 3.3 – Consequence Criteria

Slight	Minor	Moderate	Major	Severe
• On-site impact: minimal (No discernible adverse impact). • Off-site impacts local scale: minimal • Off-site impacts wider scale: not detectable	• On-site impacts: low level (discernible effect on the environment but no adverse impact) • Off-site impacts local scale: minimal • Off-site impacts wider scale: not detectable • Minor number of individuals of species may be affected locally.	• On-site impacts: mid-level (Minor adverse effect to the environment) • Off-site impacts local scale: low level • Off-site impacts wider scale: minimal • Moderate loss of individuals of species locally.	• On-site impacts: high level (moderate impact to the environment) • Off-site impacts local scale: mid-level • Off-site impacts wider scale: low level • Short term impact to an area of high conservation value or special significance^ • Moderate damage to ecosystem function and major loss of individuals of species locally.	• On-site impacts: catastrophic (significant impact to the environment) • Off-site impacts local scale: high level or above • Off-site impacts wider scale: mid-level or above • Mid to long term or permanent impact to an area of high conservation value or special significance^ • Significant long-term damage/loss of ecosystem function and loss of individuals of species locally.

Source: DWER 2017

^ Determination of areas of high conservation value or special significance should be informed by the Guidance Statement: Environmental Siting.

* 'onsite' means within the Lot boundary.

Table 3.4 – Risk Matrix Ratings

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Source: DWER 2017

4 Refuelling Management

4.1 Introduction

Table 4.1 below provides the actions to be followed in the event of a hydrocarbon spill or leak. It includes actions for the following:

- General actions to maintain machinery and vehicles
- Servicing of machinery
- Actions for when a spill is identified
- Actions to manage a minor spill or leak
- Actions to manage a large spill or leak
- Reporting requirements.

4.2 Management Plan

The Refuelling Management Plan actions, responsibilities and timing is presented in Table 4.1 below.

Table 4.1 – Refuelling Management Plan

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
General		
1. No fuels, lubricants or chemicals will be stored on site. They are brought to the site as required.	Quarry Manager	Ongoing
2. Inspect all machinery for hydrocarbon leaks at the pre-start meeting.	Quarry Manager	Ongoing (at the pre-start meeting)
3. Some major repairs of machinery are done off site.	Quarry Manager	Ongoing
4. Ensure refuelling and lubricating occurs in designated areas within the pit area and free from vegetation and dry grass.	Quarry Manager	Ongoing
5. Ensure that equipment for the containment and clean-up of spills is provided on site.	Quarry Manager	Ongoing
6. Maintain the site in a tidy manner.	Quarry Manager	Ongoing
7. Ensure that refuelling activities are not located upstream of watercourses and take place within the drainage-controlled operation area.	Quarry Manager	Ongoing
8. Ensure a spill kit is kept with the mobile fuel truck.	Quarry Manager	Ongoing
9. Train fuel truck operators and other site workers in Standard Operating Procedures, in the proper use of the spill kits and any other procedures from this Refuelling Management Plan.	Quarry Manager	Ongoing

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
Servicing and repairs		
10. Service all machinery and equipment in accordance with the maintenance schedule prescribed.	Quarry Manager	Ongoing
11. Ensure that all waste fluids are evacuated into the containers located on the mobile fuel truck.	Quarry Manager	Ongoing
12. Inspect for fuel, oil and hydraulic leaks on machinery during the start of shift pre-start inspection.	Quarry Manager	Ongoing
When a Spill is identified		
13. Isolate the spill area and identify the spilt substance.	All workers and contractors.	As soon as a spill or leak is identified.
14. Ensure the source of the spill is restricted or stopped.	All workers and contractors.	As soon as a spill or leak is identified.
15. The spill or leak should be contained by placing soil and clay resource around it.	All workers and contractors.	As soon as a spill or leak is identified.
16. Contact the Quarry Manager to advise them that a spill has occurred.	All workers and contractors.	Once the spill is contained.
Minor spills		
17. Minor spills should be scooped up with the clay resource.	Quarry Manager	In the event of a minor spill.
18. The clay resource containing the spill should be sent to the brickworks site and burnt with the clay during the firing process.	Quarry Manager	In the event of a minor spill.
Large spills		
19. Large spills can be absorbed using polypropylene pads and scooped up with the clay resource.	Quarry Manager	In the event of a large spill.
20. Depending on advice from DWER, soils containing large spills can be removed from the site and disposed of at an appropriate location/facility.	Quarry Manager	In the event of a large spill.
Reporting		
21. All spills and leaks incidents are to be reported to the Quarry Manager and followed up with an incident form.	Quarry Manager and Environmental Manager.	In the event of a spill or leak.
22. The incident form is to be followed up and investigated to determine the cause of the spill and to assist with prevention of future incidents.	Quarry Manager	In the event of a spill or leak.
23. The Quarry Manager is to report large spills to DWER and follow up any additional reporting or remediation requirements.	Quarry Manager and Environmental Manager.	In the event of a large spill or leak.

5 References

Brikmakers, (2013), *Lot 11 (DP34937) Salt Valley Rd, Hoddys Well Toodyay Shire – Extractive Industries Licence Variation Application*, Brickmakers, WA.

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Western Australian Planning Commission, (2021), *State Planning Policy 2.4 – Planning for Basic Raw Materials Guidelines*, Western Australian Planning Commission, WA.

Western Australian Planning Commission, (2021), *Draft State Planning Policy 2.9: Planning for Water Guidelines,* Western Australian Planning Commission, Perth, WA.

APPENDIX I

Weed Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

WEED MANAGEMENT PLAN

LOT 11 CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

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May-24	1134 – Hoddys Well – Bardya Quarry Weed Management Plan	SR	Initial Draft for client review	May-24
May-24	1134 – Hoddys Well – Bardya Quarry Weed Management Plan	SR	Final	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Weed Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers). The quarry is located at Lot 11 Chitty Road, Hoddys Well. The Hoddys Well quarry ("the site") is located on northern portion of Lot 11. The purpose of the Weed Management Plan is to set out the procedures in which weeds will be managed within the clay quarry operation area managed by Midland Brick. The Weed Management Plan applies to the Hoddys Well clay quarry operation area only and excludes all other areas of Lot 11.

A majority of weeds within the operation area are agricultural and common weeds. The "Detailed Flora and Vegetation Survey" (Del Botanics, 2024) did not record any Declared Plants and Weeds of National Significance (WoNS) within the survey area. This Plan has been prepared in accordance with the advice in the *Australian Weeds Strategy 2017 to 2027* (Invasive Plants and Animals Committee, 2016).

1.2 Objectives

The objectives of the Weed Management Plan are to:

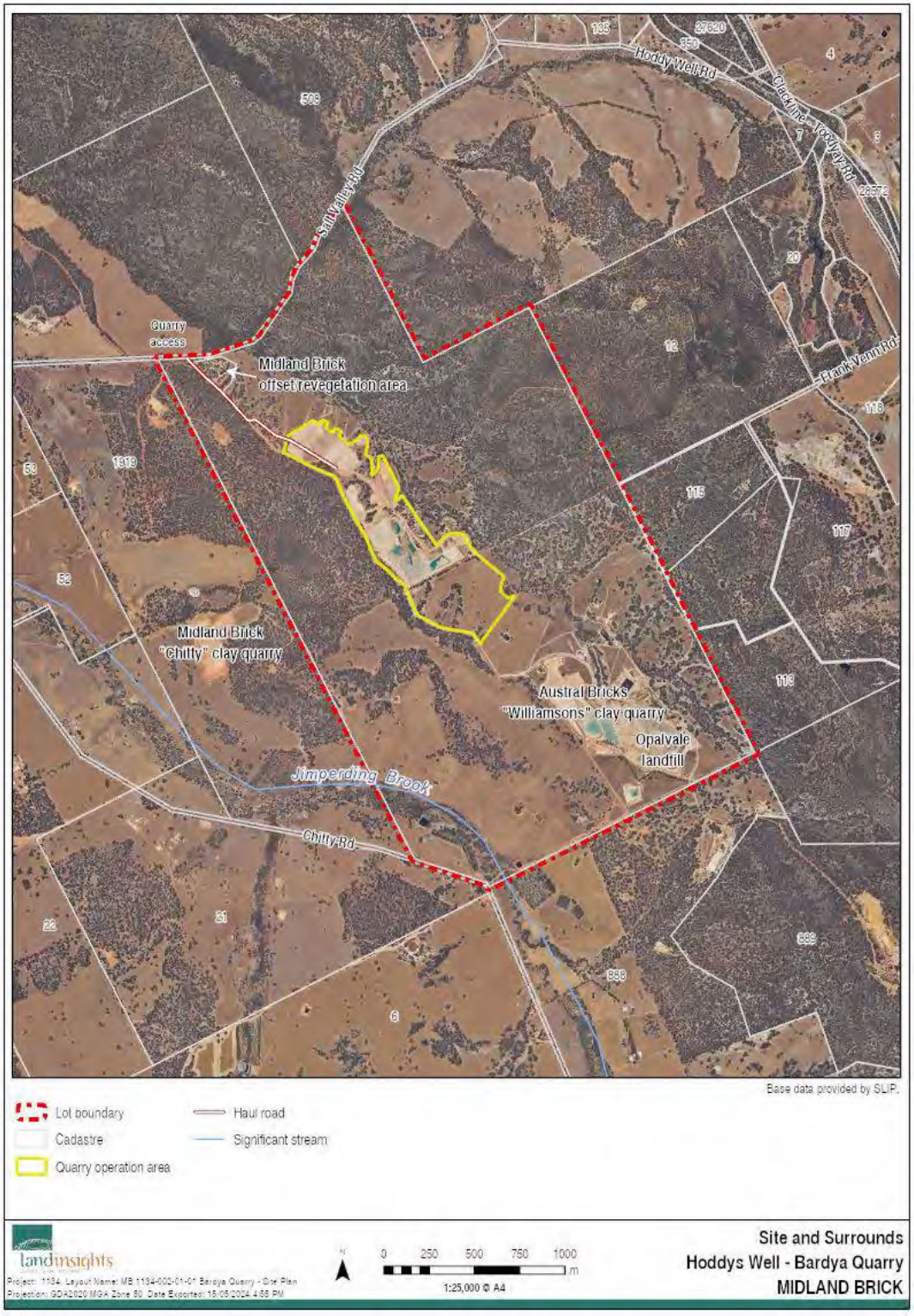
- Reduce the risk of introduction and spread of weeds within the quarry operational area.
- To reduce the occurrence and risk of "edge effects" on the vegetation surrounding the operation.
- Eliminate "Declared Plant" species as listed under the *Biosecurity and Agriculture Management Act 2007* and "Weeds of National Significance" as listed by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) located within the operation area if they occur.

1.3 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan



1.4 Context

A "weed" is defined in the *Australian Weeds Strategy 2017 to 2027* (Invasive Plants and Animals Committee, 2016) as "a plant that requires some form of action to reduce its negative effects on the economy, the environment as well as human health and amenity". They are considered as plants that are not native to an area and are not desirable.

"Environmental weeds" are plants that establish themselves in natural ecosystems and can lead to a modification of natural processes and a decline of native communities and species.

Some weed species are included on a list of "Declared Plants" or as "Weeds of National Significance". These are described further below.

- "Declared Plants" are controlled under the *Biosecurity and Agriculture Management Act 2007*. The list is regulated by the Department of Primary Industries and Regional Development (DPIRD). Weeds listed as a Declared Plant are required to be controlled as they pose a significant risk to the WA economy. It should be noted however that some weed species are not listed under this Act as they have an agricultural role. A list of Declared Plants is at the following link https://www.agric.wa.gov.au/declared-plants/declared-plant-control-table
- "Pest Plants" are identified by local government under the *Biosecurity and Agriculture Management Act 2007* in addition to weeds already listed as a Declared Plant. They will be listed under a local law prepared by the respective local government authority.
- "Weeds of National Significance" (WoNS) are listed by the DCCEEW. A list of the WoNS is available at https://weeds.org.au/weeds-profiles/ as a WoNS recognises a species as "a priority current and future weed threat to Australia, requiring coordinated and strategic management along with shared stakeholder investment to develop and implement best practice to prevent, eradicate, contain and/or minimise its impacts in different parts of the nation" (Invasive Plants and Animals Committee, 2016). All WoNS have individual national strategic management plans which can be referred to if any are identified on Midland Brick properties.

1.5 Operation

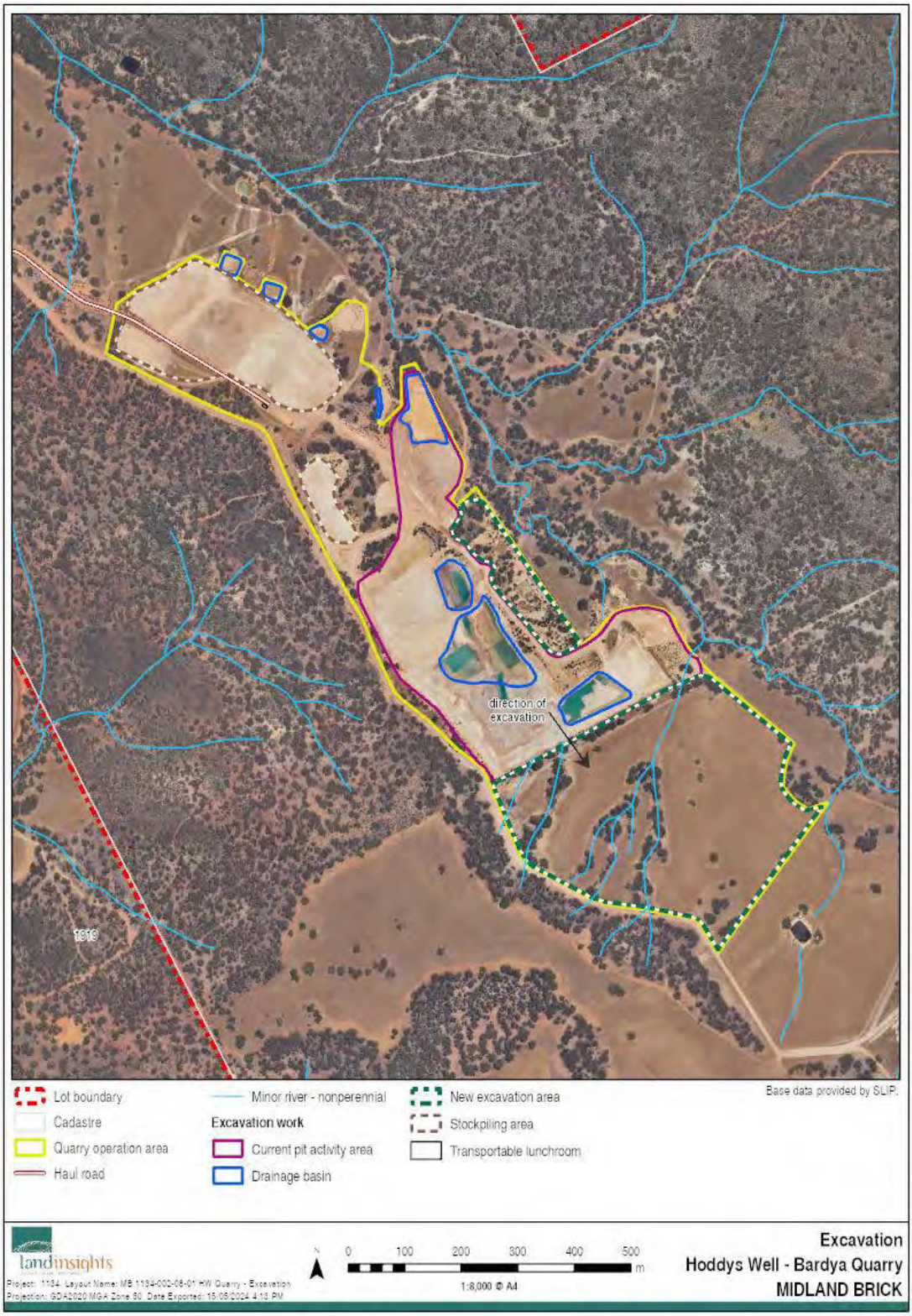
The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Figure 1.2 – Excavation Plan



2 Site description

2.1 Topography and landform

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD).

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

2.2 Geology

The site sits on the Darling Plateau which lies east of the Darling Scarp and the Swan Coastal Plain. The geology of this area can be described as “deeply weathered mantle over granitic rocks”. More specifically, the site is located within the Eastern Darling Range which is described in the DPIRD database as “moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys” with soils that are “formed in laterite colluvium or weathered in-situ granite”.

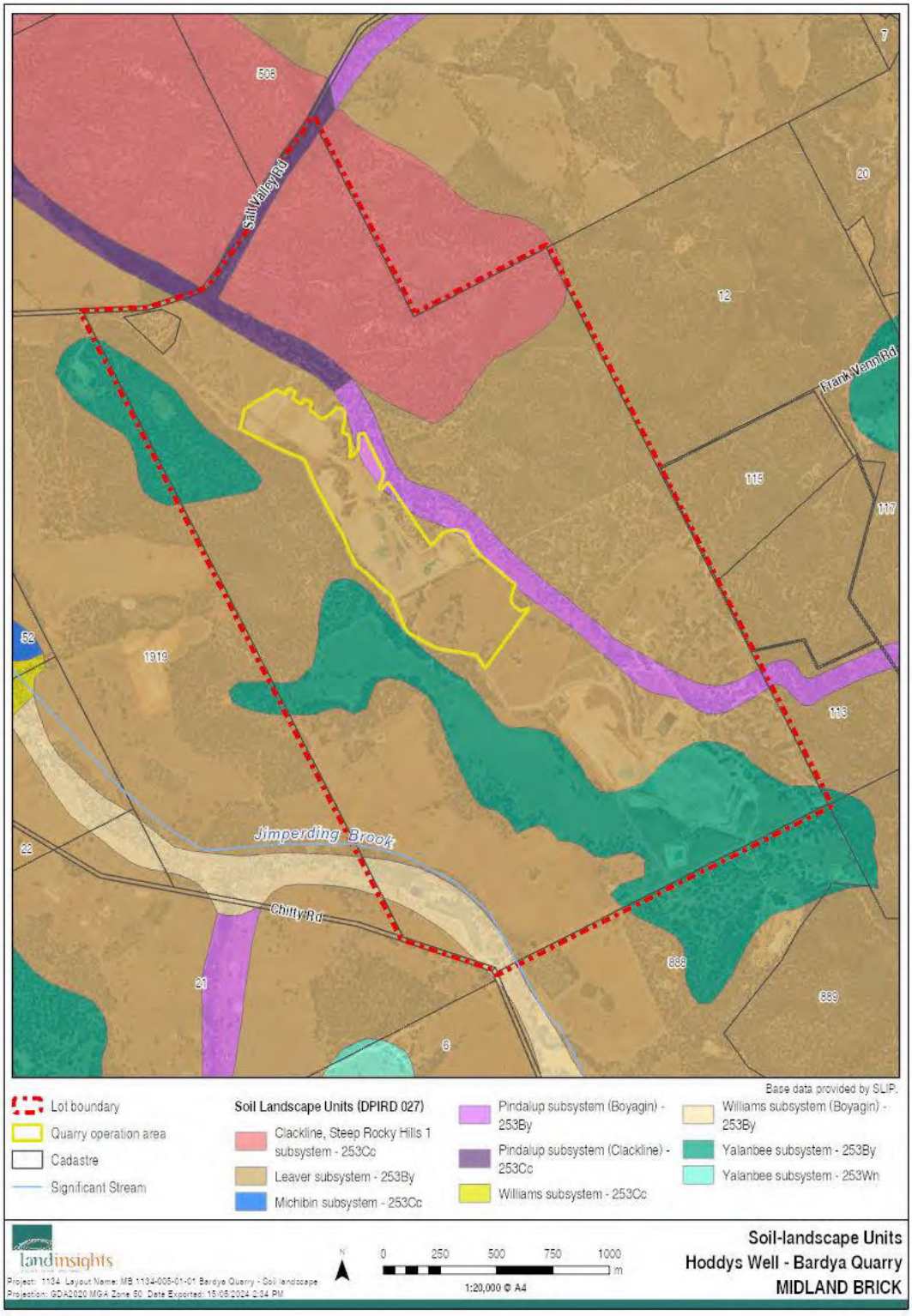
The 500 metres grid Regolith of WA as mapped by DPIRD identifies the geology “exposed rock, saprolite and saprock”. The bedrock geology is “South West Terrane greenstones” which are described as “Quartz--mica schist”.

The site is mapped by DMIRS as having “regionally significant basic raw materials” for clay. This is also reflected in SPP 2.4 which maps the site as a “Significant Geological Supply”.

2.3 Soils

The site is located within the “Leaver” soil landscape system 253ByLV. The soil-landscape units are mapped by the Department of Primary Industries and Regional Development (DPIRD). It is described as “gravelly slopes and ridges of the western Darling Plateau. Gravelly yellow and red duplexes, gravelly deep clayey sands and sandy loams over laterite and clay.”

Figure 2.1 – Soil-landscape units



Generalised soil qualities of each soil-landscape unit as mapped by DPIRD are described in the table below.

Table 2.1 – Soil Qualities

SOIL-LANDSCAPE UNIT	WATER EROSION	WIND EROSION	WATERLOGGING	FLOOD	SALINITY
Leaver subsystem	Low risk	High risk	Low risk	Low risk	Low risk

Source: DPIRD, 2024

2.4 Vegetation

Existing vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry. Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

Regional vegetation

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into "bioregions" based on major biological and geographical/geological attributes. Western Australia has 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation. The site is located within the Northern Jarrah Forest (NJF) subregion of the Jarrah Forest Bioregion.

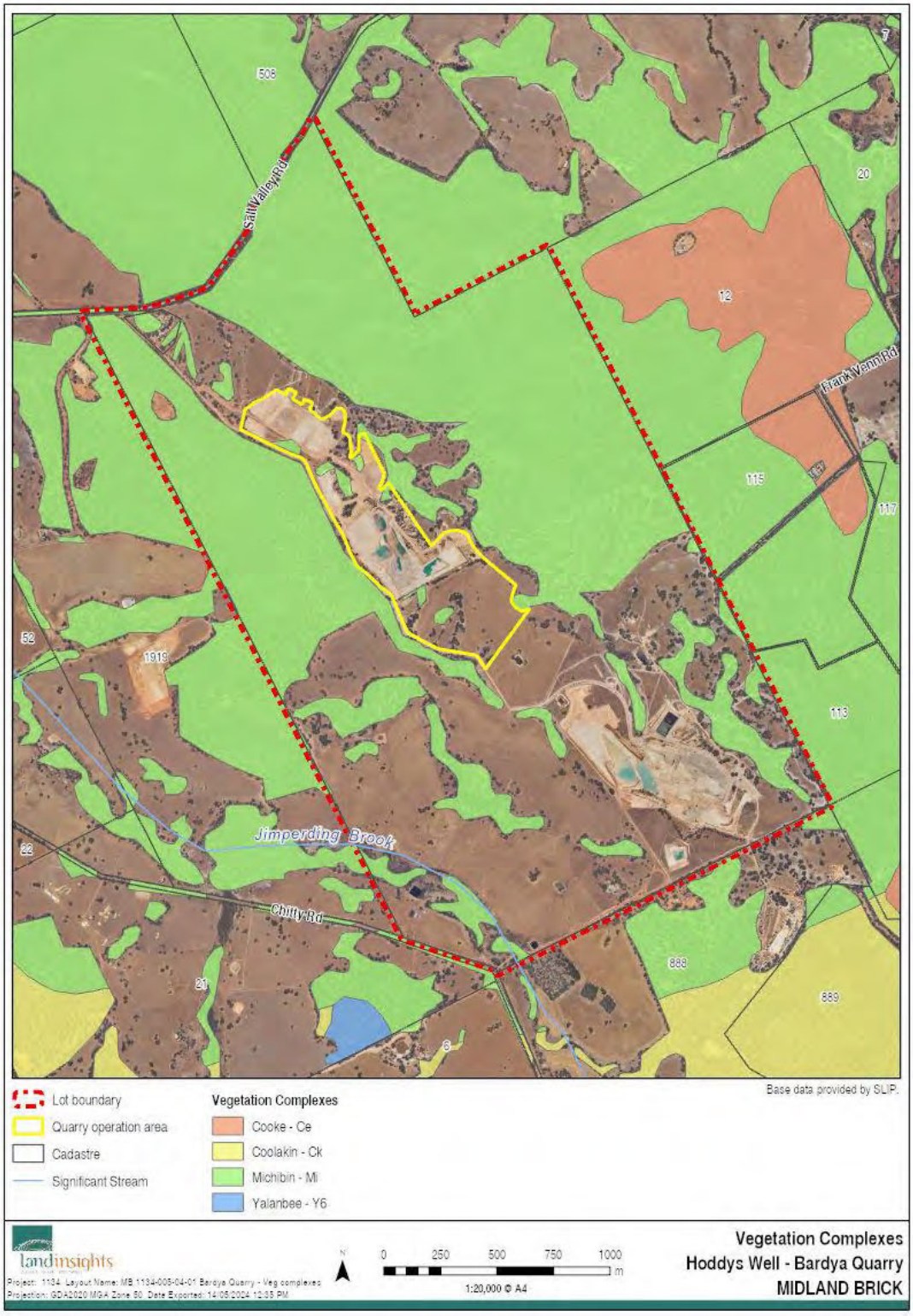
The site is located in the Drummond Botanical Subdistrict within the the Southwest Botanical Province as described by Beard (1990). Flora composition has been described by Beard (1990) as predominantly consisting of low Banksia Woodlands on leached sands with Melaleuca swamps where ill drained and Woodlands of Eucalyptus spp. on less leached soils.

Vegetation Mapping

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as "Bannister 4" which is described as "Jarrah, Marri and Wandoo." The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is "Michibin" which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones. There are no Bush Forever Areas located on the site.

Figure 2.2 – Native vegetation extent

Figure 2.3 – Vegetation complexes



A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.

The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as "Cleared Paddocks".

The Allocasuarina woodland was classified in the Survey as "Degraded" condition and the remainder of the survey area was classified as "Completely Degraded".

Threatened Species and Communities

The Flora Survey by Del Botanics stated that no species of Threatened, or Priority Flora pursuant to the *Biodiversity and Conservation Act* 2016 and the *Environment Protection and Biodiversity Conservation* Act 1999 were located during the time of the survey. No Threatened Ecological Communities (TECs) listed by Department of Climate Change, Energy, the Environment and Water (DCCEEW) or Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey.

Clearing Permits

There have been two Clearing Permits previously issued for the clearing of native vegetation for the quarry:

- CPS 5881/1 – 3.52 hectares – Issued 6th September 2014 and expires 6th September 2024
- CPS 2217/1 – 1.8 hectares – Issued 8th June 2008 and expired 8th June 2012

Both Permits were issued to BGC (Brikmakers) for clearing for the purpose of clay extraction. A majority of CPS 2217/1 was cleared and only a portion of CPS 5881/1 was cleared. Permit 5881/1 required an offset area to be placed under a Conservation Covenant. A portion at the north-western potion of Lot 11 was set aside as an offset when the permit was issued and revegetated by BGC. Clearing Permits will be applied for if further clearing of native vegetation is required.

Figure 2.4 – Vegetation Communities (based off Del Botanics, 2024)

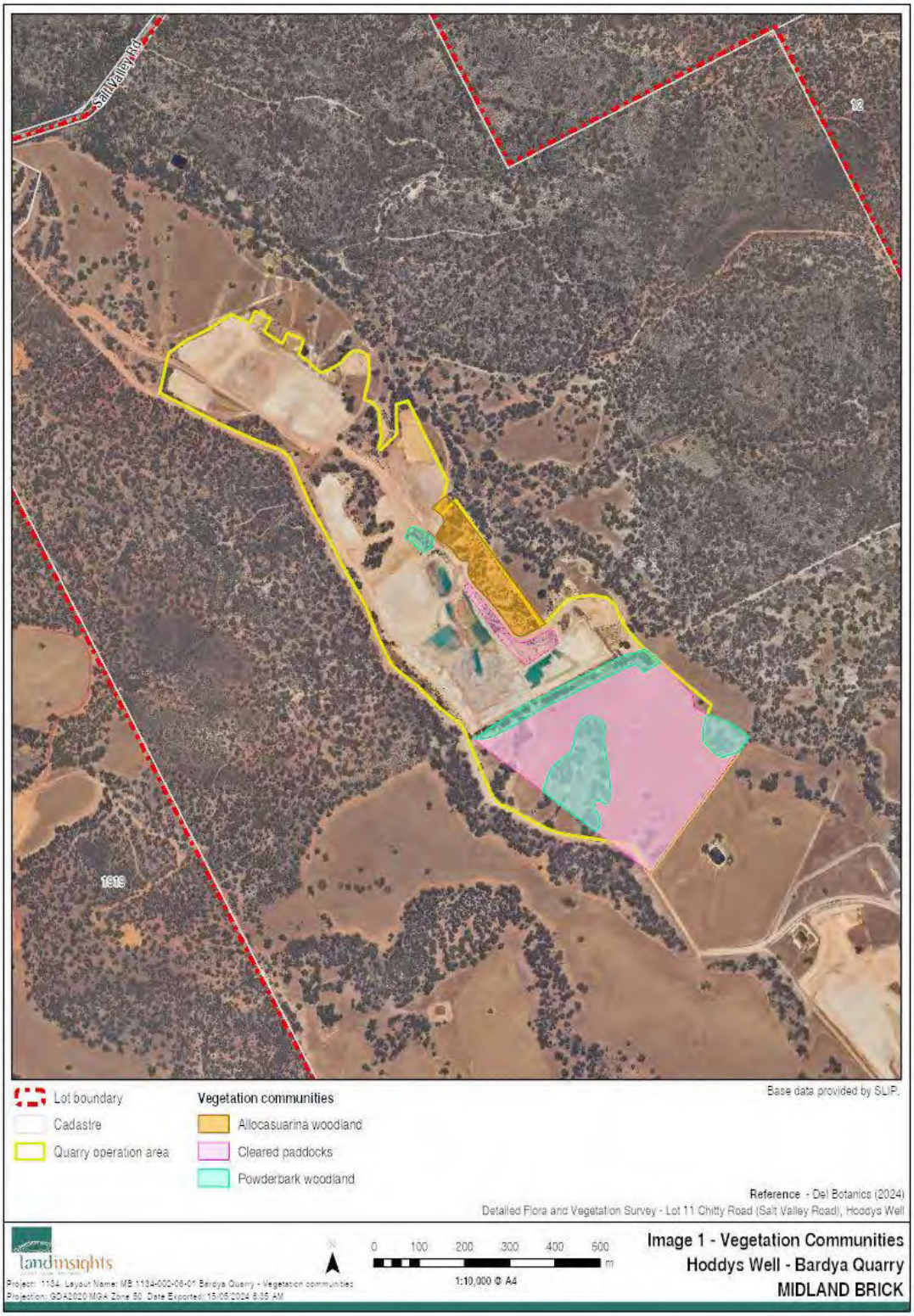
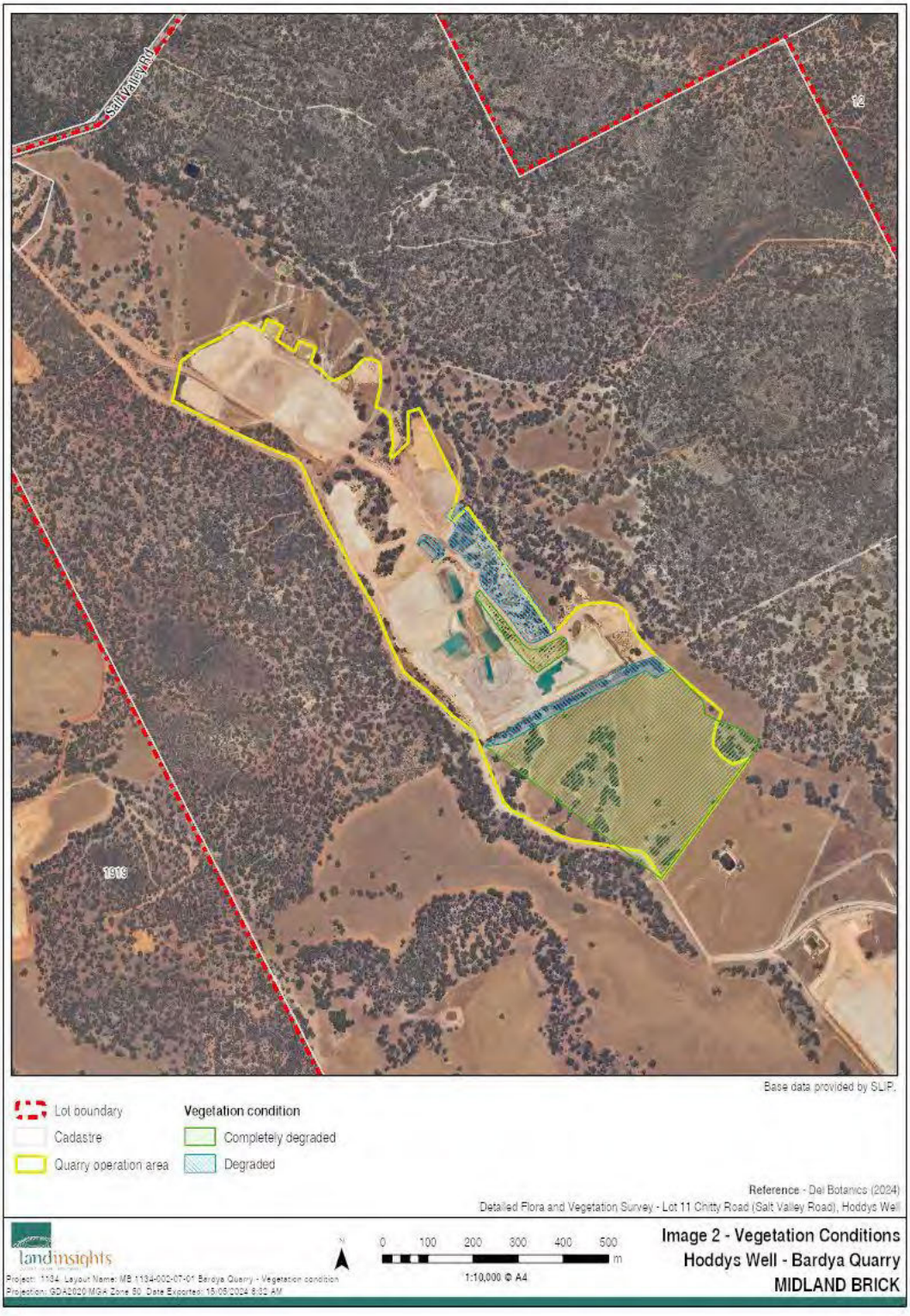


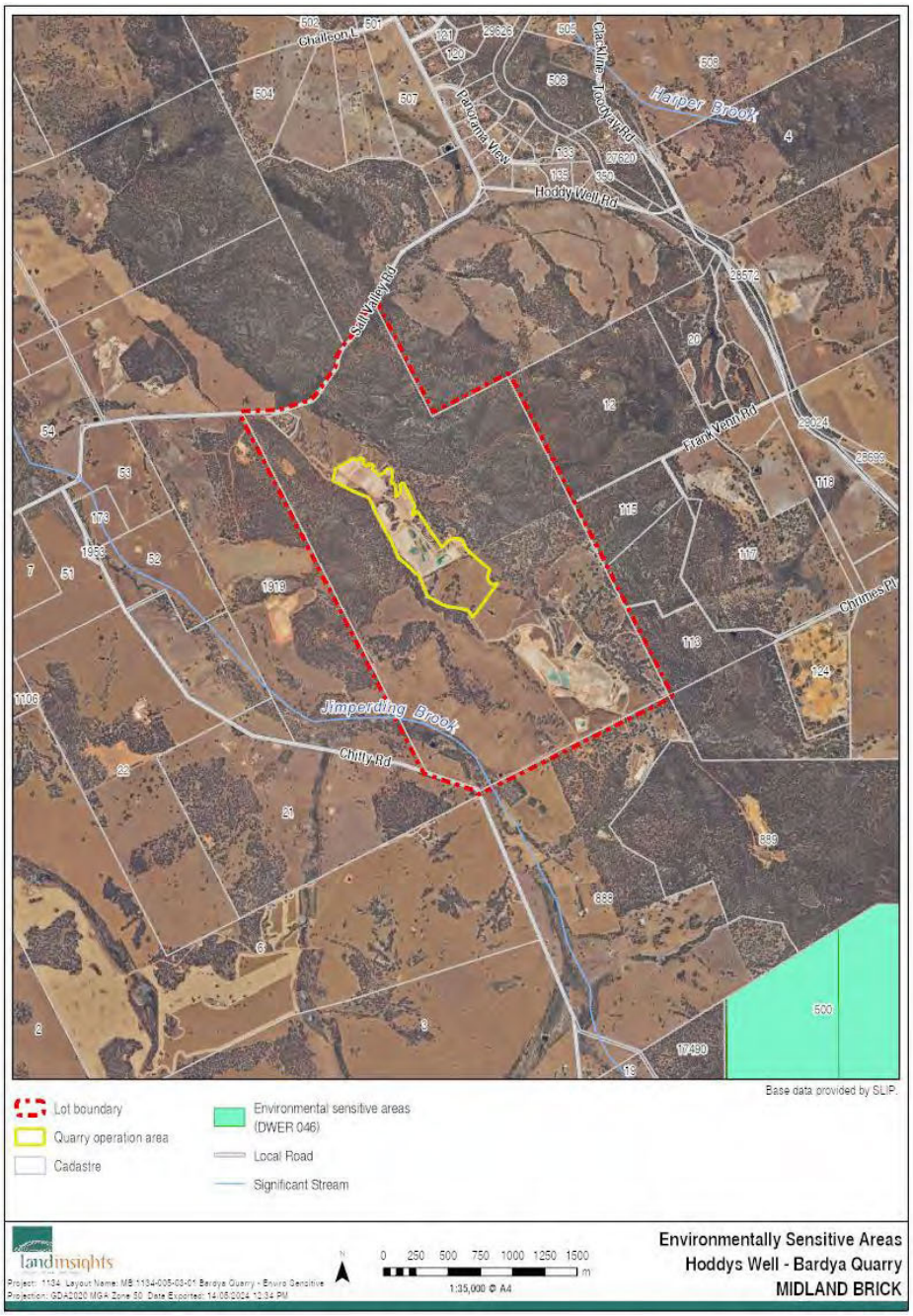
Figure 2.5 – Vegetation Condition (based off Del Botanics, 2024)



Environmentally Sensitive Areas

There are no “Environmentally Sensitive Areas” (ESA) located on or adjacent to Lot 11. The closest ESA is located approximately 3.5 kilometres to the south-east of the quarry, associated with the Clackline Nature Reserve.

Figure 2.6 – Environmentally Sensitive Areas



2.5 Native fauna

The operation area has been historically cleared of native vegetation and disturbed, even prior to clay extraction operations commencing. Some areas of remnant vegetation surrounding the quarry are likely to be used by native fauna.

A *Hoddys Well Quarry Targeted Conservation Significant Fauna Survey 2024* was undertaken by Western Wildlife in 2024. The survey area comprised the new excavation area adjacent to the south of the quarry and the vegetation at the eastern side of the quarry where some regrowth may require clearing. The study identified the following fauna habitats across the surveyed areas. The report states that "all of the habitats are disturbed, either by grazing or by past quarry activities".

- Wandoo-marri woodland
- Regrowth woodland
- Pit
- Cleared

In general, the Wandoo-Marri Woodland is located in the paddock area adjacent to the southern quarry boundary and the Regrowth Woodland describes the vegetation habitat on the eastern boundary of the quarry.

With regards to the Wandoo-Marri Woodland, Western Wildlife (2024) states that "The understory is disturbed by grazing and generally absent, but stands of shrubby *Banksia sp*. persist in patches, and there are accumulations of leaf litter and woody debris that may provide shelter for reptiles. The Marri and Jarrah trees and patches of shrubby *Banksia* sp. are important foodplants for black-cockatoos."

With regards to the Regrowth Woodland, Western Wildlife (2024) states that "this habitat consists of Wandoo, Marri, Sheoak (*Allocasuarina* sp.) and various understory shrubs on a highly modified ground surface. There are occasional remnant native trees, and areas of regrowth Wandoo with little understory. There are a few scattered shrubby *Banksia* sp. in the understory towards the northern end. Marri and shrubby *Banksia* sp. Are important food-plants for black-cockatoos, and Sheoak is a secondary food-plant for the Forest Red-tailed Black-cockatoo, however, these food-plants are sparsely distributed in this habitat."

Overall commentary of the fauna assemblage by Western Wildlife (2024) is provided below:

> *Overall, the faunal assemblage of the study area is likely to be relatively species poor as the habitats of the study area are disturbed and occur in small patches. The proximity of other native vegetation, however, means that fauna from these larger bushland areas is likely to range onto the*

study area. Even isolated paddock trees can provide habitat for birds and a small number of arboreal reptiles and bats. The cleared areas are likely to support very few species.
The birds observed on the site visit included those that forage on the nectar, seeds or invertebrates available in the eucalypt canopy, omnivorous species that forage on the ground, and mid-level foragers. Frogs may occur in the pit and burrowing frogs may forage in terrestrial habitats. Few reptiles are likely to occur as the ground surface is disturbed and understory mostly absent, but larger species may range into the study area from adjacent vegetation. Small terrestrial native mammals are likely to be rare or absent due to the lack of understory vegetation, but some may occur on occasion due to the proximity of large areas of vegetation adjacent to the study area. Native bats are likely to occur throughout the study area, roosting in tree hollows.

With regards to conservation significant fauna, the Western Wildlife report concludes that "The study area is unlikely to provide important habitat for most fauna of conservation significance known to occur in the region, although the Chuditch, Fork-tailed Swift and Peregrine Falcon potentially occur, and the Red-tailed Phascogale, Brush-tailed Phascogale, Masked Owl (southwest population), Quenda and Carpet Python possibly occur. The only conservation significant fauna for which the study area is likely to have importance are Carnaby's Cockatoo (recorded in the study area), Baudin's Cockatoo (likely to occur) and the Forest Red-tailed Black-cockatoo (likely to occur)."

A Black Cockatoo habitat assessment was undertaken as part of the survey by Western Wildlife. The survey concluded that "The study areas contain 4.6ha of high-quality cockatoo foraging habitat in Wandoo - Marri woodlands and Regrowth woodlands and 135 'potential nesting trees' were recorded. Carnaby's Cockatoo is known to breed within 12km of the study area, and although no evidence of roosting was recorded in the study area cockatoos are known to roost nearby."

The closest conservation area is the Panorama Reserve (approximately 3.0km to the north-east) and the Clackline Nature Reserve (approximately 3.5km to the south).

2.6 Water resources

The surface water hydrology is generally described as a deeply dissected lateritic plateau. The watercourses in the area do not contain water through all seasons and usually only flow during rainfall events and winter periods. As is mentioned above, the surface water catchment area is the Avon River which means that the surface water drainage is naturally to the north towards the River.

The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

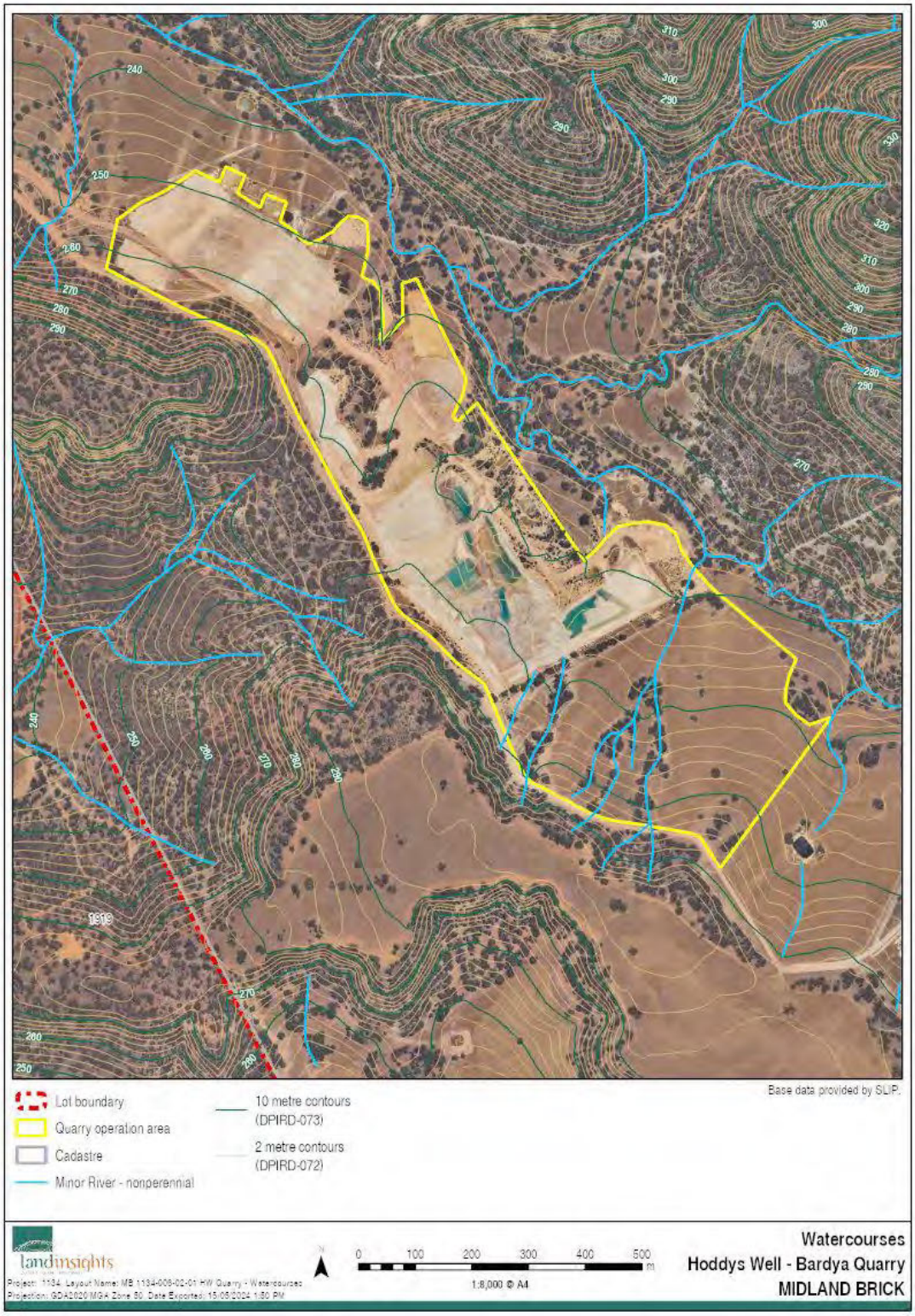
A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Rod and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

It should be noted that the operation is separated hydrologically from surrounding watercourses and all stormwater is retained on site within drainage basins. The quarry operations do not intercept the watercourse and does not discharge water. There are no drainage lines from the quarry towards any watercourses and there are no watercourses or drainage lines leading into the quarry.

There are no wetlands located on the site. There are no wetlands as mapped by the “Directory of Important Wetlands in Australia” or the DWER Geomorphic Wetlands database.

Figure 2.7 – Watercourses



2.7 Surrounding Land Uses

Land uses immediately surrounding and adjacent to the quarry include other clay extraction (operated by a separate company) and a landfill both located at the southern end of Lot 11, clay extraction (also operated by Midland Brick) to the west and rural properties.

3 Weed Control Options

3.1 Introduction

The Commonwealth Department of Climate Change, Energy, the Environment and Water recommends in the *Australian Weeds Strategy 2017 to 2027* that there are four weed management options depending on the stage of invasion, as follows:

1. Prevention
2. Eradication
3. Containment
4. Asset protection.

While the Australian Weeds Strategy is aimed at addressing weeds at a national level, the principles can also apply at a regional or local level.

Prevention of weed spread is addressed at a national and state/territory level through border controls and biosecurity. However, at a local-level, Midland Brick have this management plan to reduce the potential for disease and weeds to enter or exit their clay operations. Prevention is recommended where there is minimal weed invasion.

Eradication of weeds is possible if weed populations are small or if the weed has only recently been introduced to the country, state, or region. As is stated in the Australian Weeds Strategy (Invasive Plants and Animals Committee, 2016), "eradication at the local level tends to be less feasible, since on-going invasion tends to occur from adjacent areas, where the weed is not subject to the same high level of control". This needs to be taken into consideration as, although one aim of weed management is to eradicate certain from the property (such as Declared Plants and Weeds of National Significance), there is the risk that they will return or that they will not be entirely eradicated as invasion can occur from adjoining areas.

Containment of weeds aims to completely prevent further spread of a weed species beyond the boundary of existing infestations or to slow the spread. It may include reduction of the density or area of the infestation. Containment is recommended when there is a rapid increase in weed distribution and abundance.

Asset protection is applied to weed species that are widespread and abundant. Most likely they have existed in Australia for many decades and, over this time, have spread across large portions of their potential range. Eradication or containment of these species is considered to be impractical (Invasive Plants and Animals Committee, 2016). Instead, the goal becomes effectively managing weed threats to

protect certain high-value assets. This form of weed management is a cost/benefit approach in which the feasibility and cost-effectiveness of controlling the weed needs to be considered. This is largely the case on properties which have a high number of agricultural weeds. These weeds exist on agricultural properties which have been previously cleared and used for rural purposes. Therefore, control and elimination of these weeds is not considered practical.

Weed management at the Hoddys Well-Bardya Quarry will focus on the prevention of new weed introduction to the operation through biosecurity measures, eradication and containment of Declared Pests and Weeds of National Significance (if they occur) and asset protection where agricultural weeds are present within the operational area.

3.2 Weed prevention

As is mentioned in the chapter above, the first weed management option is to "prevent" the introduction and infestation of weeds in an area.

In the context of the Hoddys Well-Bardya Quarry, the preferred management option is to prevent, where possible, the introduction and infestation of new weeds within the operation area and the vegetation adjacent to the operation.

Actions 1 to 5 in Table 4.1 below address prevention of weed infestation and biosecurity.

3.3 Weed eradication and containment

As is mentioned in the chapter above, the management of weeds on the site will prioritise "prevention" of new weed infestation. There are no requirements to physically "eradicate" or "contain" weeds located within the operation area as they are primarily agricultural weeds.

For any Declared Plants or WoNS within the operation area, the following weed control methods can be used as recommended by the *Australian Weeds Strategy 2017 to 2027* (Invasive Plants and Animals Committee, 2016):

- Physical – the removal of the weed by physical or mechanical means, such as cutting, hand pulling, digging, mowing, tilling or burning. Hand pulling or digging can be useful for small infestations, particularly in highly sensitive areas or for herbicide-resistant weeds. Cutting and removal of woody weeds is often used in combination with chemical control (herbicide treatment of the cut stump).
- Chemical – involves the use of herbicides. Chemical weed control is generally considered to be an effective and practical form of weed control. Herbicides can be selective (targeting a particular group of plants, such as grasses or broadleaves) or nonselective, and can either destroy or reduce the growth of treated weeds.

- Biological – the introduction of a weed's natural enemies, such as insects, pests, fungi or diseases to reduce weed spread or growth. Biological control can reduce the impact and spread of a weed, but not eliminate it.

In the context of the Hoddys Well-Bardya Quarry, the most effective means of weed control will be chemical control.

3.4 Declared Plants – Weed Control

Actions for controlled Declared Plants as listed by the DPIRD are listed on their website at https://www.agric.wa.gov.au/declared-plants/declared-plant-control-table This resource provides a detailed description of the Declared Plant, the control methods and timing. There have been no Declared Plants identified within the operation or the vegetation adjoining the operation.

Detailed control actions are provided in Table 4.2 below.

3.5 Weeds of National Significance – Weed Control

There are currently 32 Weeds of National Significance (WoNS) which are listed on the Weeds Australia website at https://weeds.org.au/weeds-profiles/ This resource provides a detailed description of the weed, the control methods and timing. There have been no WoNS identified within the operation or the vegetation adjoining the operation.

Detailed control actions are provided in able 4.2 below.

4 Weed Management

4.1 Introduction

The Weed Management Plan aims to describe the measures that will be used by Midland Brick at the Hoddys Well-Bardya Quarry operations. The focus of the management is on the operational area used by Midland Brick for the clay operation. Weed management at Hoddys Well-Bardya Quarry will focus on the *prevention* of new weed introduction through biosecurity measures and *eradication* and *containment* of Declared Plants and Weeds of National Significance, if possible.

The Weed Management Plan actions, responsibilities and timing is presented in Table 4.1 below.

4.2 Weed Management Plan

Table 4.1 – Weed Management Plan for the Hoddys Well-Bardya Quarry

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
1. Ensure no weed contaminated or suspect soil or plant particles are brought to the clay quarry operation area.	Quarry Manager, Environmental Manager	Ongoing
2. Ensure the operation is kept secure with perimeter fencing, signs and locked gates to avoid rubbish dumping from trespassers.	Quarry Manager	Ongoing
3. Keep vehicles to tracks and operational areas to reduce the risk of spreading weeds around the property and vegetation adjoining the operation.	Quarry Manager, Team	Ongoing
4. Remove all rubbish promptly from the operational area.	Quarry Manager, Team	Ongoing
5. Weed affected soils are not used for rehabilitation.	Quarry Manager, Environmental Manager	Ongoing
6. The operation will be inspected annually for the presence of any Declared Plants and Weeds of National Significance. The inspection will be undertaken by the Quarry Manager or Environmental Manager.	Quarry Manager, Environmental Manager	Annually.

5 References

Bureau of Meteorology (2024), Climate Data Online, Accessed from http://www.bom.gov.au/climate/data/

Del Botanics, (2024), *Detailed Flora and Vegetation Survey, Lot 11 Chitty Road (Salt Valley Road) Hoddys Well*, Del Botanics, WA.

Department of Primary Industries and Regional Development, (2023), *Declared Plant Control Table*, Accessed from https://www.agric.wa.gov.au/declared-plants/declared-plant-control-table

Department of Water and Environmental Regulation, (2017), *Guidance Statement: Risk Assessments,* Department of Water and Environmental Regulation, Perth, WA.

Government of Western Australia, (2024), *SLIP Portal*, Accessed from https://maps.slip.wa.gov.au/landgate/locate/

Invasive Plants and Animals Committee, (2016), *Australian Weeds Strategy 2017 to 2027*, Commonwealth of Australia, Canberra.

Weeds Australia, (2024), *Weeds of National Significance (WONS),* Accessed from *https://weeds.org.au/weeds-profiles/*

Land Insights, (2024), *Clay Excavation Management Plan – Hoddys Well Bardya Quarry,* Land Insights, WA.

Western Wildlife, (2024), *Hoddys Well Quarry Targeted Conservation Significant Fauna Survey 2024*, Western Wildlife, WA.

APPENDIX J

Dieback Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

DIEBACK MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

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Document History:

Date	Document Name	Document Manager	Summary of Document Revision	Client Delivered
May-24	1133 – Hoddys Well - Bardya Quarry Dieback Management Plan	SR	Draft for client review	May-24
May-24	1133 – Hoddys Well - Bardya Quarry Dieback Management Plan	SR	Final	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Dieback Management Plan for the "Hoddys Well" ("Bardya") quarry operated by Midland Brick Pty Ltd (previously Brikmakers) located at Lot 11 Chitty Road, Hoddys Well. The Hoddys Well quarry ("the site") is located on the northern portion of Lot 11. The purpose of the Dieback Management Plan is to set out the hygiene management procedures for the site. It should be noted that the Dieback Management Plan applies to the Hoddys Well clay quarry operation only. It has been prepared to accompany the Clay Excavation Management Plan prepared by Land Insights to support an application for renewal of the Development Approval and Extractive Industry Licence.

The Plan has been prepared in accordance with the following guidelines:

- Department of Conservation and Land Management (DBCA), (2003), *Phytophthora cinnamomi and disease caused by it – Volume 1 Management Guidelines*
- Department of Conservation and Land Management (DBCA), (2004) *Draft Best Practice Guidelines for the Management of Phytophthora cinnamomi.*

1.2 Objectives

The objectives of the Dieback Management Plan are to:

- Provide hygiene practices to reduce the potential for Dieback introduction to the site
- Prevent the introduction and spread of Dieback into the site.

1.3 Context

"Dieback" is the common name for the pathogen *Phytophthora cinnamomi*, however there are also other pathogens that can cause dieback such as *Armillaria.* It is a soil-borne pathogen that kills a wide range of plant species in the south-west of Western Australia by attacking their root system. Dieback is caused when a pathogen infests a plant and causes it to lose health, eventually killing it. Areas with an average annual rainfall of more than 400 millimetres and suitable soil composition is considered vulnerable to dieback. The pathogen can be spread through the movement of soil and water from place to place (DBCA, 2003).

1.4 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot. A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan

2 Site description

2.1 Site Use

The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Information on the operation and how it relates to risk of dieback spread and management is provided below.

Excavation Campaign

Excavation takes place within the existing operation footprint. It involves digging of resource from the pit area and stockpiling. Any new excavation areas will be opened up adjoining the current pit area (i.e. a progressive movement of excavation) and will form part of the operation footprint as well. Areas of vegetation on the property located outside of the operation area will not be accessed by quarry workers or contractors. Water management will retain water within the operation area.

Carting campaign

Carting involves placing excavated material onto trucks and removing resource from the site. Trucks and machinery use the existing haulage track and operate within the development footprint (operation area). No carting vehicles will access areas of vegetation on the property.

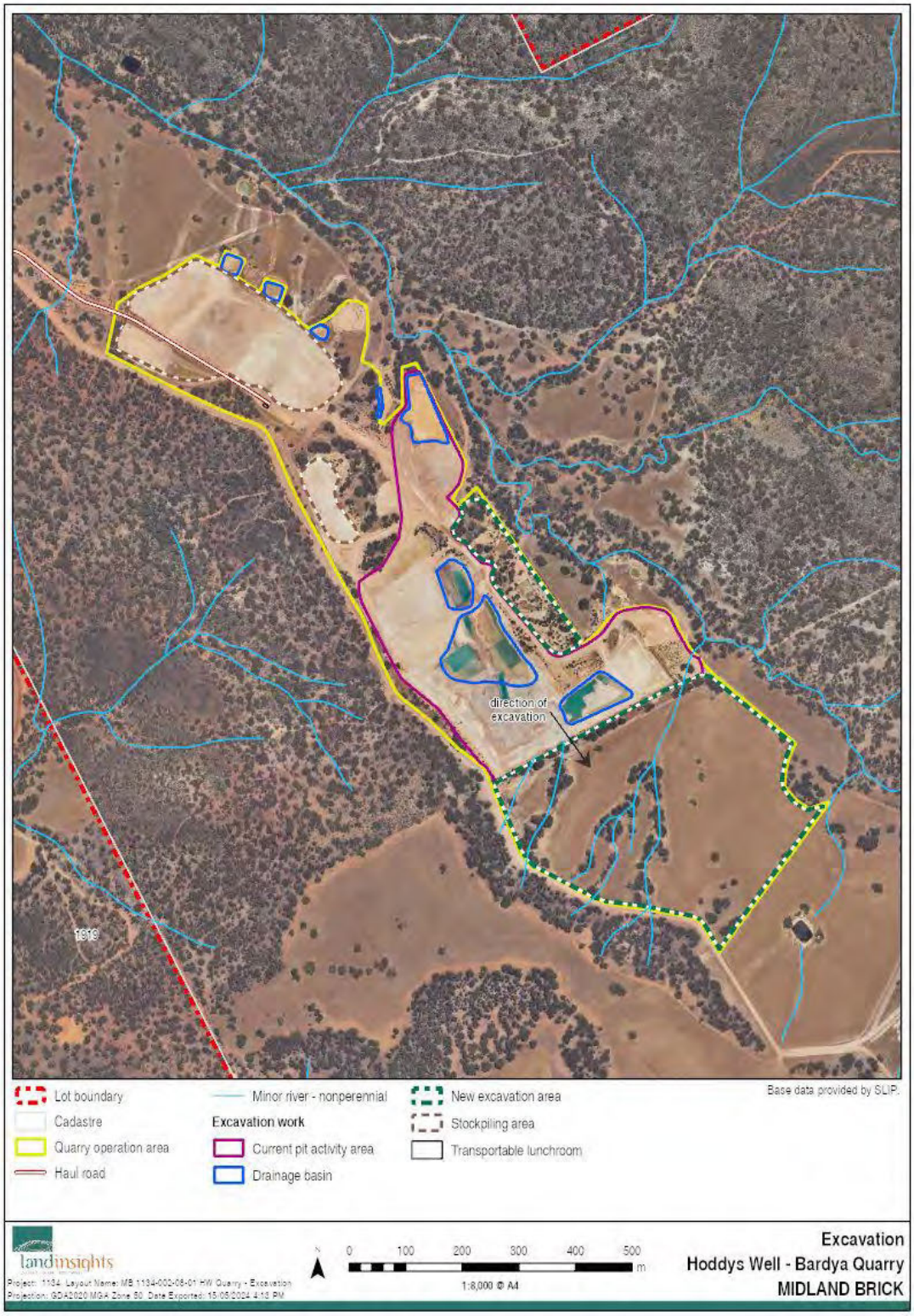
Rehabilitation

The quarry will be recontoured to a safe and stable condition with a dam or two being formed at the lowest parts of the landscape. Topsoil will be laid over recontoured areas and the land returned to farmland with

pasture and some tree belts planted with native vegetation. Similar to the excavation campaigns, all movement of soil takes place within the operational footprint. Water management remains in place during rehabilitation and workers/contractors do not enter areas of remnant vegetation surrounding the operation.

The Excavation Plan for the operation is provided in Figure 2.1 below.

Figure 2.1 – Excavation Plan



2.2 Surrounding land uses

Land uses immediately surrounding and adjacent to the quarry include other clay extraction (operated by a separate company) and a landfill both located at the southern end of Lot 11, clay extraction (also operated by Midland Brick) to the west and rural properties. A Site Context Plan is provided in Figure 1.1 above.

2.3 Topography and landscape

Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD).

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

2.4 Vegetation

Existing vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry. Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

Historic photos from 1995 onwards are provided in Figures 2.3 to 2.5 below which show the past level of disturbance prior to the quarry development.

Figure 2.2 – Native vegetation extent

Figure 2.3 – Historic aerial photo 1995

Aerial Photo – 1995 (Source: Landgate)

Figure 2.4 – Historic aerial photo 2000

Aerial photo – 2000 (Source: Landgate)

Figure 2.5 – Historic aerial photo 2010

Aerial photo – 2010 (Source: Landgate)

Regional vegetation

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into "bioregions" based on major biological and geographical/geological attributes. Western Australia has 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation. The site is located within the Northern Jarrah Forest (NJF) subregion of the Jarrah Forest Bioregion.

The site is located in the Drummond Botanical Subdistrict within the the Southwest Botanical Province as described by Beard (1990). Flora composition has been described by Beard (1990) as predominantly consisting of low Banksia Woodlands on leached sands with Melaleuca swamps where ill drained and Woodlands of Eucalyptus spp. on less leached soils.

Vegetation Mapping

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as "Bannister 4" which is described as "Jarrah, Marri and Wandoo."

The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is “Michibin” which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones.

There are no Bush Forever Areas located on the site.

A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.

The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as “Cleared Paddocks.”

The Allocasuarina woodland was classified in the Survey as “Degraded” condition and the remainder of the survey area was classified as “Completely Degraded.”

Figure 2.6 – Vegetation complexes

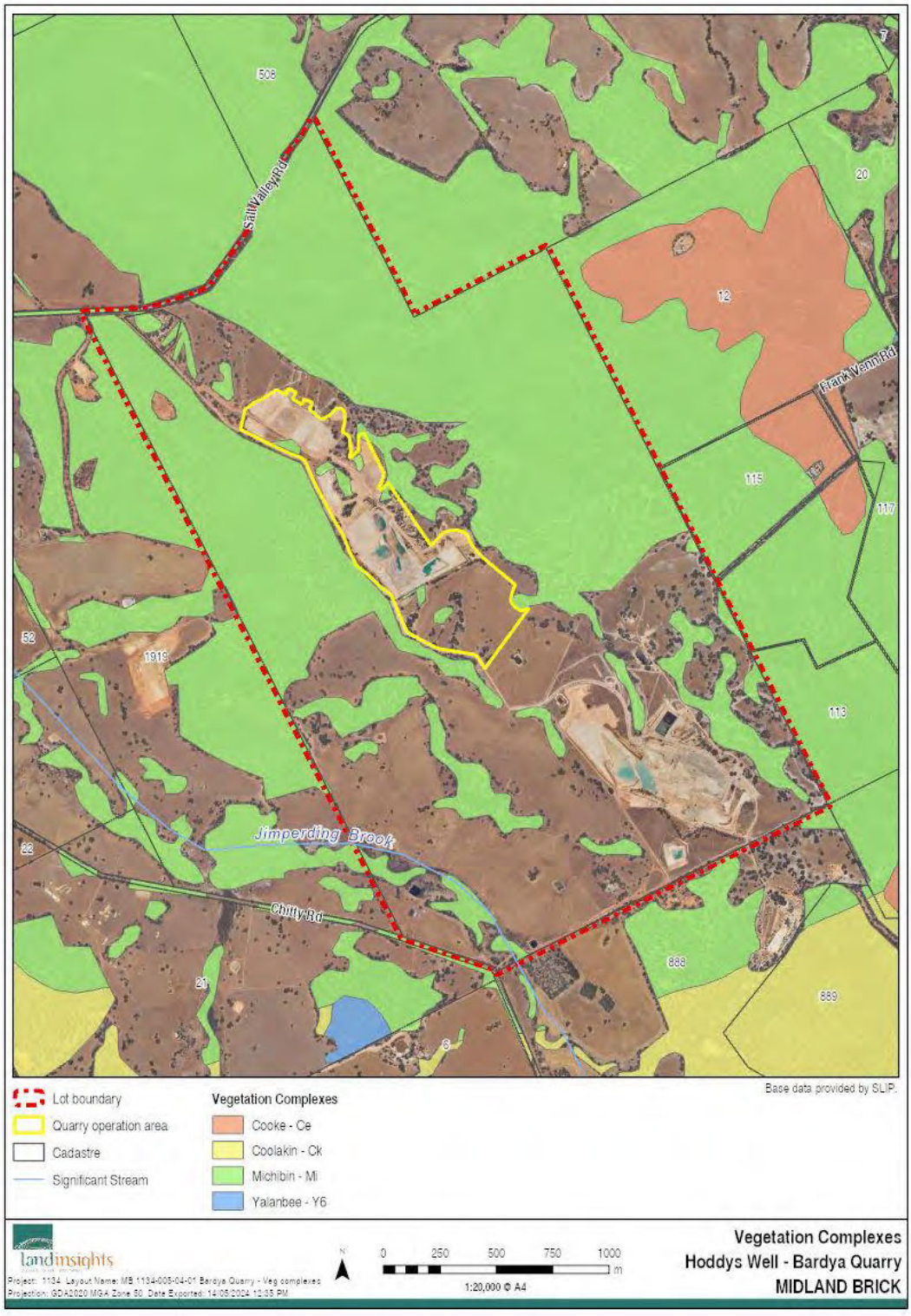


Figure 2.7 – Vegetation Communities (based off Del Botanics, 2024)

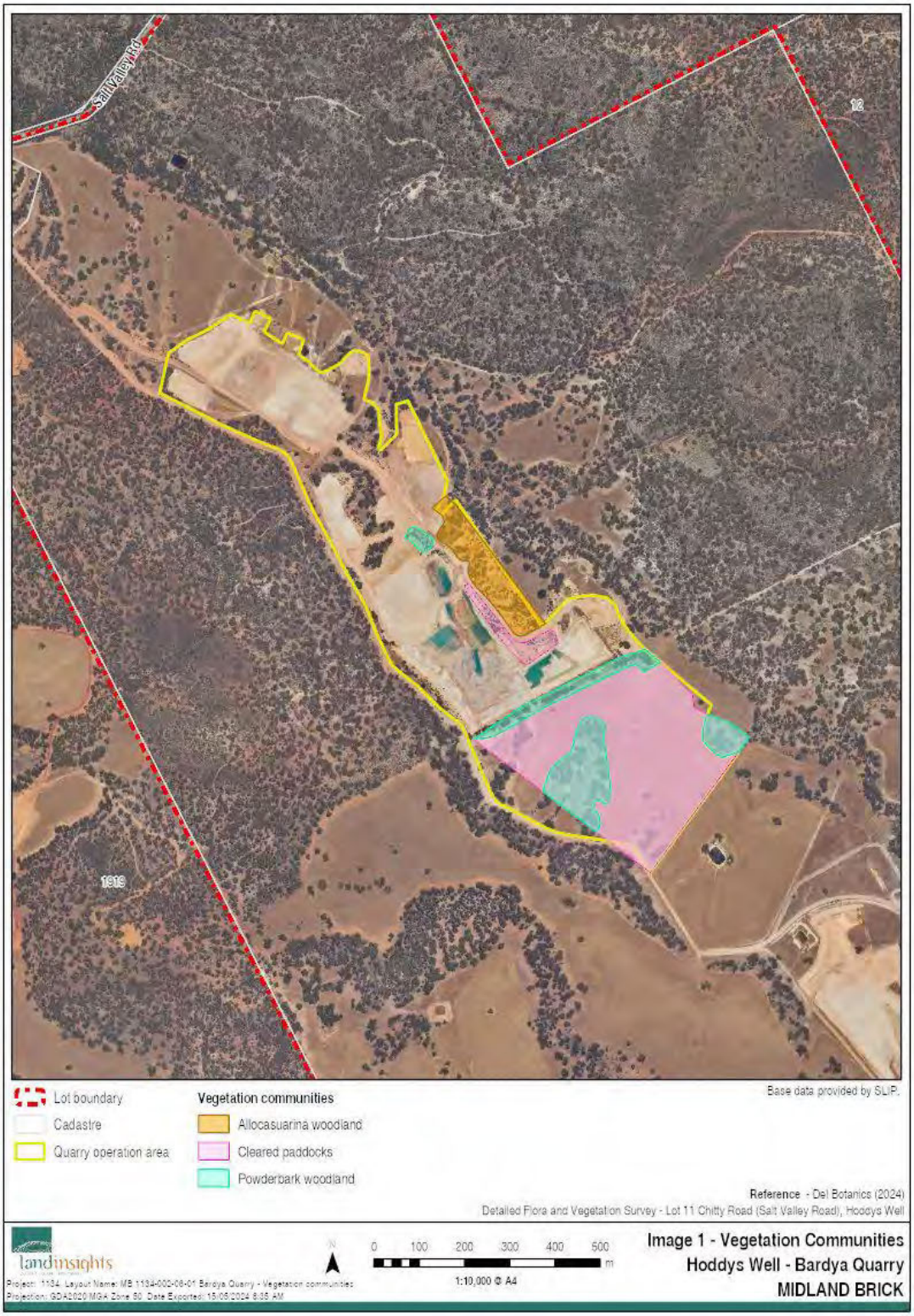
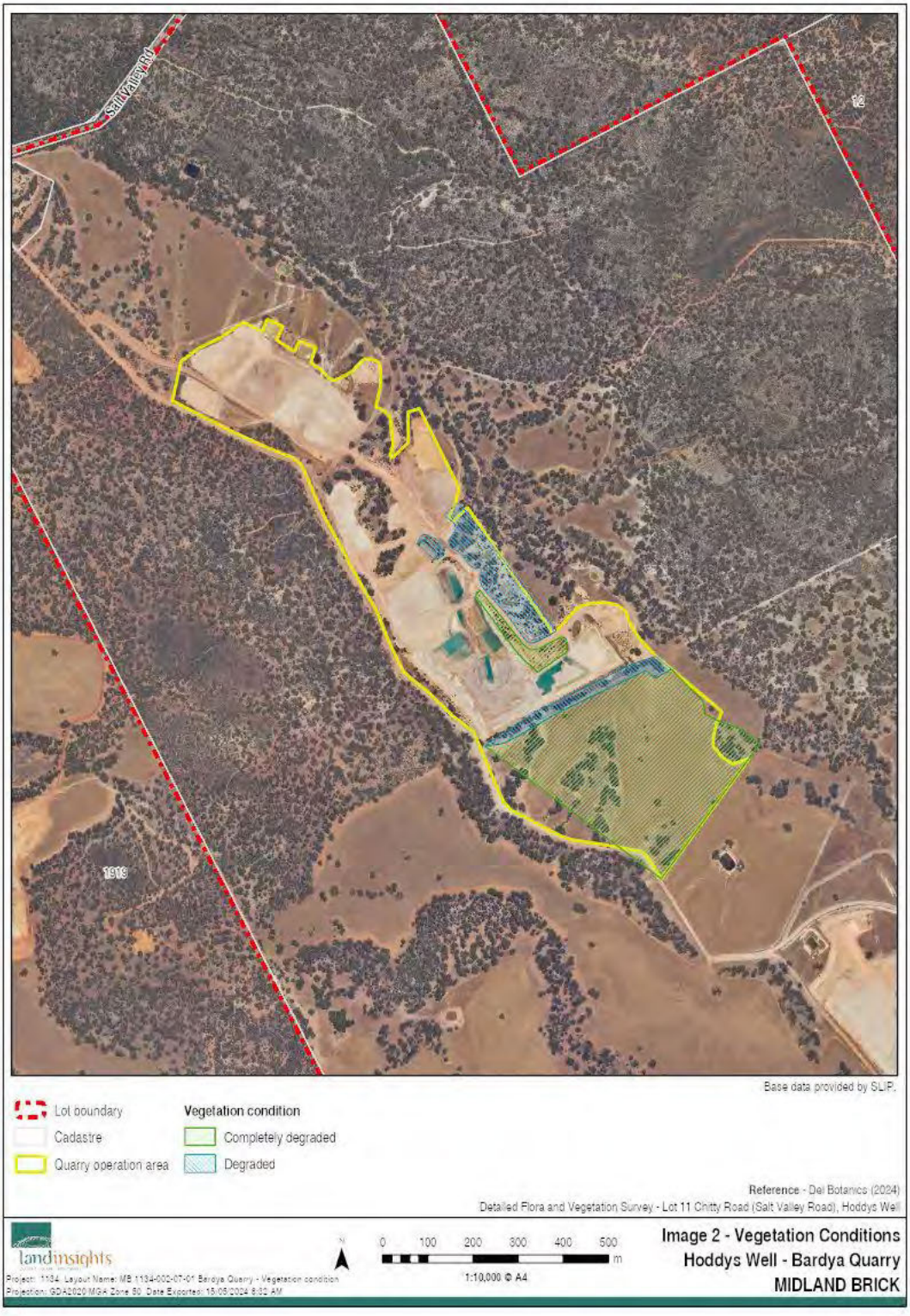


Figure 2.8 – Vegetation Condition (based off Del Botanics, 2024)



Threatened Species and Communities

The Flora Survey by Del Botanics stated that no species of Threatened, or Priority Flora pursuant to the *Biodiversity and Conservation Act* 2016 and the *Environment Protection and Biodiversity Conservation* Act 1999 were located during the time of the survey. No Threatened Ecological Communities (TECs) listed by Department of Climate Change, Energy, the Environment and Water (DCCEEW) or Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey.

Clearing Permits

There have been two Clearing Permits previously issued for the clearing of native vegetation for the quarry:

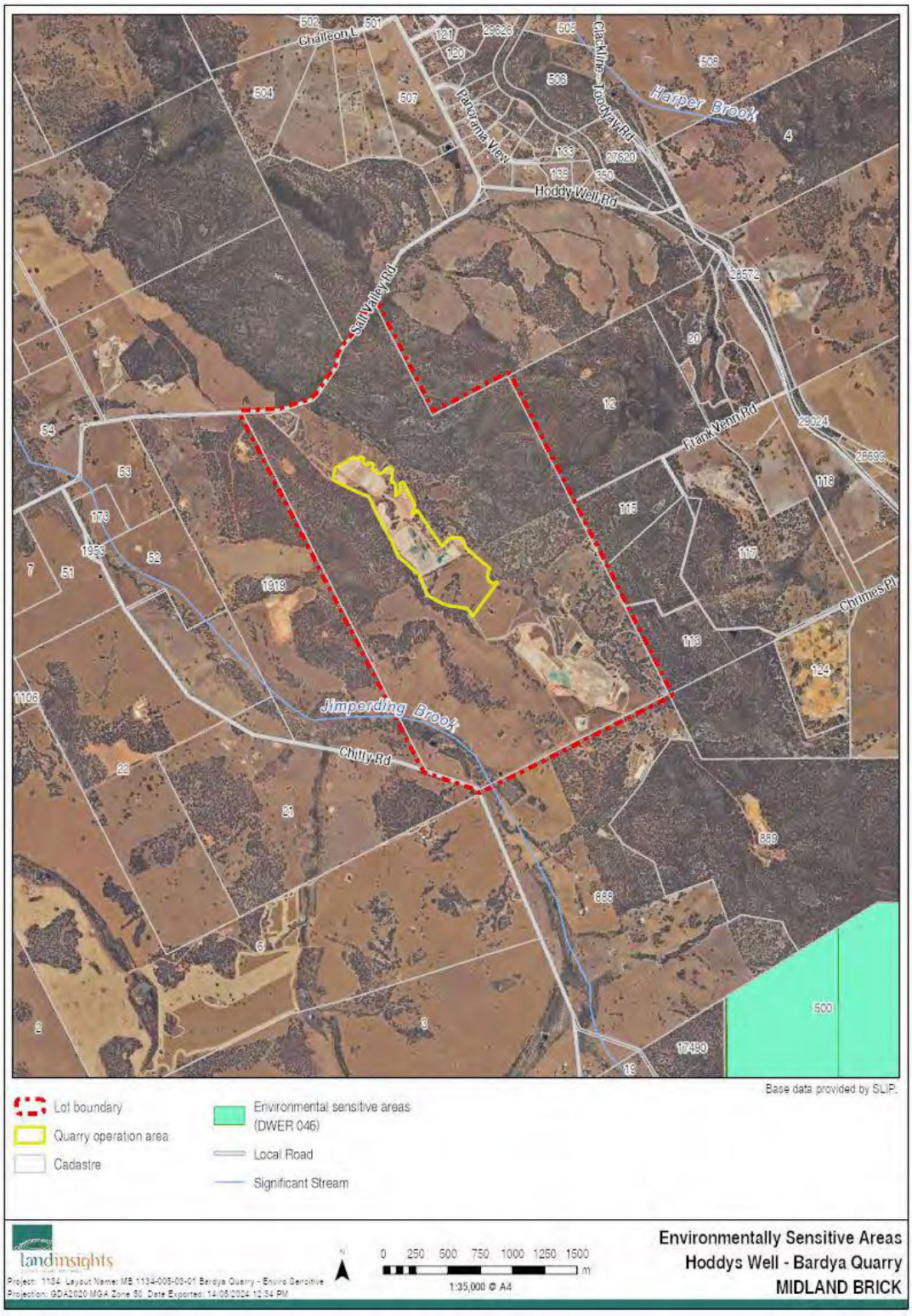
- CPS 5881/1 – 3.52 hectares – Issued 6th September 2014 and expires 6th September 2024
- CPS 2217/1 – 1.8 hectares – Issued 8th June 2008 and expired 8th June 2012

Both Permits were issued to BGC (Brikmakers) for clearing for the purpose of clay extraction. A majority of CPS 2217/1 was cleared and only a portion of CPS 5881/1 was cleared. Permit 5881/1 required an offset area to be placed under a Conservation Covenant. A portion at the north-western potion of Lot 11 was set aside as an offset when the permit was issued and revegetated by BGC. Clearing Permits will be applied for if further clearing of native vegetation is required.

Environmentally Sensitive Areas

There are no “Environmentally Sensitive Areas” (ESA) located on or adjacent to Lot 11. The closest ESA is located approximately 3.5 kilometres to the south-east of the quarry, associated with the Clackline Nature Reserve.

Figure 2.9 – Environmentally Sensitive Areas



2.5 Hydrology

Surface water features

The site sits within the Eastern Darling Range hydrogeological zone which is described as “Moderately to strongly dissected lateritic plateau on granite with eastward-flowing streams in broad shallow valleys.” The watercourses in the area do not contain water through all seasons and usually only flow during rainfall events and winter periods. As is mentioned above, the surface water catchment area is the Avon River which means that the surface water drainage is naturally to the north towards the River.

The operation is considered to be adequately separated from the nearest major watercourses. The Jimperding Brook runs across the south-western corner of Lot 11. The Brook is a tributary of the Avon River and flows north. The quarry is approximately 900 metres from the Jimperding Brook (at the shortest distance). The quarry is approximately 10.5km south of the Avon River.

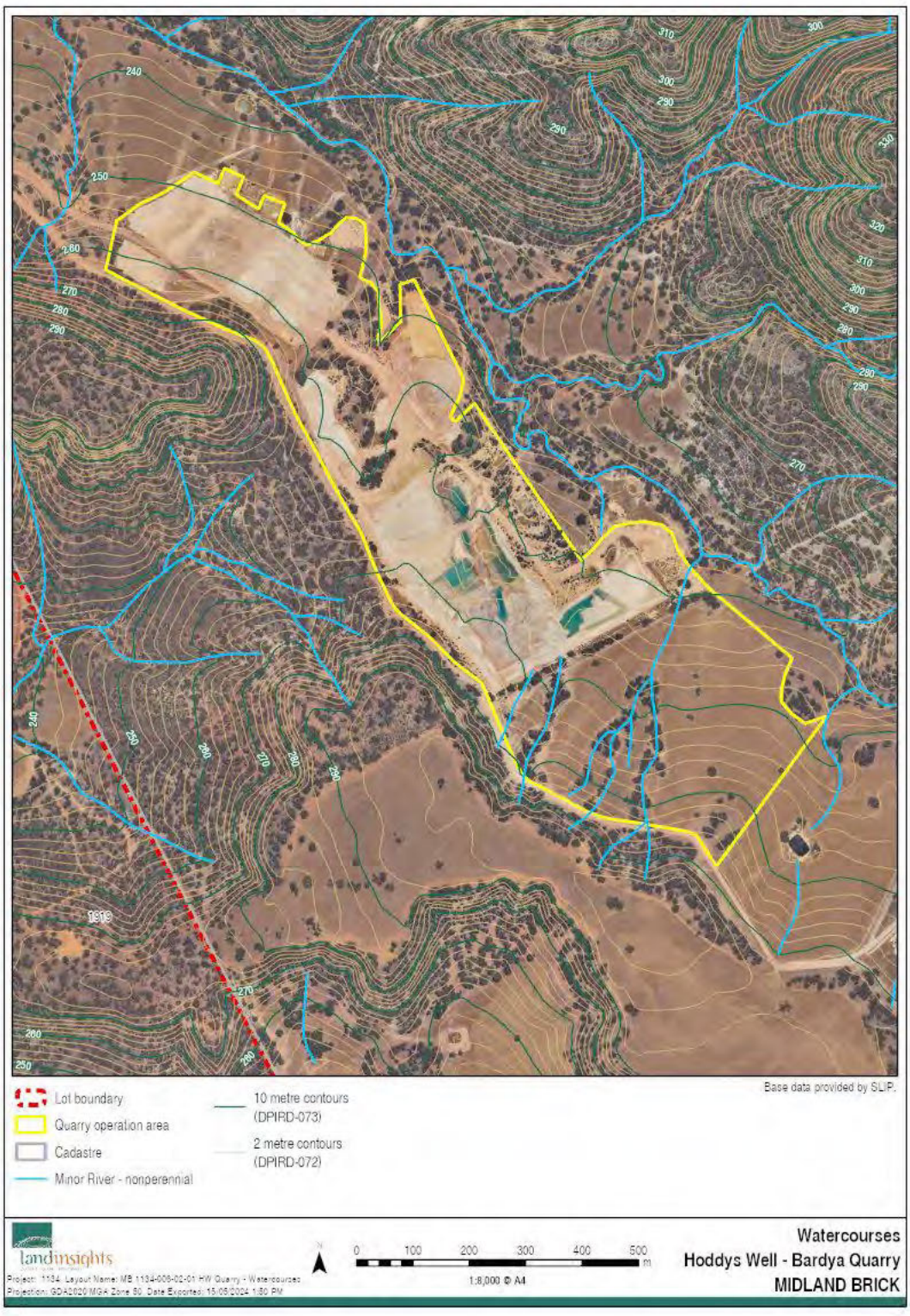
A number of minor watercourses dissect through Lot 11, following the topography of the area, which eventually flow into the Avon River. There is a minor watercourse which extends alongside the eastern side of the quarry. This watercourse flows from south-east to north-west towards Salt Valley Rod and the adjoining property to the north. A setback of at least 50 metres from the watercourse to the quarry area will continue to be maintained.

The new extraction areas located to the south of the quarry have some minor drainage lines which direct water to this watercourse. These drainage lines have been highly modified from the existing and past agricultural use of the land. These drainage lines will be removed to facilitate extraction.

It should be noted that the operation is separated hydrologically from surrounding watercourses and all stormwater is retained on site within drainage basins. The quarry operations do not intercept the watercourse and does not discharge water. There are no drainage lines from the quarry towards any watercourses and there are no watercourses or drainage lines leading into the quarry.

There are no wetlands located on the site. There are no wetlands as mapped by the “Directory of Important Wetlands in Australia” or the DWER Geomorphic Wetlands database.

Figure 2.10 –Watercourses



3 Dieback risk

3.1 Introduction

This chapter considers the risk of dieback being introduced and spread to the site and surrounding areas of vegetation. The risk assessment uses the risk criteria as set out in the Department of Water and Environmental Regulation (DWER's) "Guideline: Risk Assessments" (2017).

The risk assessment considers the activities on site, the occurrence and location of native vegetation, water and drainage management and the likelihood of dieback being brought onto the site.

3.2 Access

Lot 11 has been used as a farming property for many years. Portions of Lot 11 have been used for extractive industries for decades (prior to the 1990's). The current haul road has also been used for all of this time. No new access roads are proposed as part of this application. From the haul road, all aspects of the operation can be accessed by driving through the operational footprint. There are no access tracks leading from the quarry to surrounding areas and there is no need to access areas of vegetation surrounding the quarry.

As such, machinery and vehicles associated with the Midland Brick clay quarry only access current cleared and operational areas. Therefore, the risk of vehicles and machinery bringing dieback to the remnant vegetation on the property is low.

3.3 Clearing of native vegetation

Some limited clearing of native vegetation is required to facilitate the operation. These areas have been identified to the south of the existing pit area and some regrowth within the operational area. All vegetation has been identified by Del Botanics (2024) as "Completely Degraded" and "Degraded" and no access to areas of better quality remnant vegetation on the property will be required to facilitate proposed clearing.

Should any clearing be approved, there will be a requirement to delineate the approved areas on the site to ensure that surrounding vegetation is not accessed. Areas cleared of vegetation will form part of the operational footprint. Therefore, the risk of clearing bringing dieback to the remaining vegetation on the site is low.

3.4 Drainage

The quarry operates in accordance with the Water Management Plan (Land Insights, 2024) which ensures that water runoff is kept within the operational area/footprint. This reduces the risk of spread of dieback to the surrounding areas through the movement of water. No drainage from the operation flows into the vegetation surrounding the site, nor to any of the nearby watercourses.

Therefore, the risk of drainage and water runoff causing the spread of dieback is considered low.

3.5 Security

The site is secured to discourage public access with the use of fencing, locked gates and signage. Trespassers who enter the site are not likely to follow dieback management protocols and there is a risk that dieback is introduced to vegetation surrounding the quarry should trespassers enter these areas. Midland Brick and other site operators will keep the property locked and secured when not in operation.

3.6 Conclusion

The occurrence of dieback on the site has not been determined through soil or plant testing. However, as the risk of dieback already occurring on site and the potential for spread is low it is not considered necessary to undertake testing.

Using the criteria set out in DWER's "Guideline: Risk Assessments" (2017) and considering the above, the likelihood of dieback being introduced to the vegetation surrounding the site (the "potential receptor") is considered to be "rare" as the risk event may only occur in exceptional circumstances and the consequence is considered to be "minor" as it is considered that the potential offsite impacts are minimal and potential on site impacts are low level. Overall risk of dieback spread is considered to be low when following best practice procedures and the appropriate policies. Further information on management is provided below.

4 Management Plan

4.1 Introduction

This chapter outlines the Dieback Management Plan for the "Hoddys Well" ("Bardya") clay quarry. It provides a description of the dieback management proposed for the operation and Table 4.1 below sets out the specific actions to be followed by Midland Brick.

4.2 Dieback management

Management of dieback involves hygiene management to reduce the spread of the pathogen from infested areas to uninfested areas. If the occurrence of dieback has not been confirmed, the operation is managed to reduce the risk of introducing or removing dieback to and from the site.

Dieback can spread through the movement of infected material, including soil, plant material and water, and as such, the actions that will allow these to occur are the focus areas for management. As dieback can infect vegetation if soil or plant material is brought onto the site from vehicles and footwear. This can be managed by ensuring that vehicles and machinery arrive to the site clean and free of soil and plant material and that staff do not walk-through areas of native vegetation.

The entrance to the operation is a "clean on entry" (COE) point for machinery used to clear vegetation, strip topsoil and overburden and for maintaining firebreaks. Note that this is not recommended for other machinery and vehicles used on site as they will keep to existing cleared/operational areas (refer to the risk assessment above). This means that the vehicle should not be carrying any clods/slurry of soil or plant material. It should be noted that a thin, dry film of grime/dust is not considered to present a risk and does not need to be removed.

As good practice, trucks and vehicles should also be clean before leaving the site (i.e. the vehicle should not be carrying any clods/slurry of soil or plant material). This serves to reduce the spread of dieback to other locations and helps to reduce dust on the roads. The dry brush-down method of cleaning is the preferred method for machinery. The wash-down method increases soil moisture levels in the immediate area, creating more favourable conditions for dieback.

Firebreak maintenance should be done when the soil is dry and avoid wet weather. As is mentioned above, machinery should be clean-on-entry and cleaned of clods of soil and plant material before entering the property.

The operation is managed in accordance with the Water Management Plan (Land Insights, 2024) which ensures that water is retained within the operation area by use of bunding and is not permitting to flow into the adjoining vegetation.

4.3 Management procedures

Dieback management procedures are summarised in Table 4.1 below.

Table 4.1 – Dieback Management Plan

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
1. Inspect machinery used for clearing, stripping, and grading firebreaks when arriving at the site to ensure they are clean from clods of soil and free of plant material. The entrance to the site should be a "clean on entry" point.	Quarry Manager, Environmental Manager, Team	When maintaining firebreaks
2. Maintain firebreaks when the soil is dry and avoid wet weather.	Quarry Manager	Ongoing
3. Ensure that site workers and contractors do not walk-through areas of native vegetation located outside of the operation area.	Quarry Manager, Team	Ongoing
4. Ensure that vehicles, trucks, and machinery keep to existing access tracks and operational areas and are not permitted to enter areas of native vegetation.	Quarry Manager, Team	Ongoing
5. Inspect all vehicles, trucks, and machinery before exiting the site to ensure they are clean from clods of soil and plant material.	Quarry Manager, Team	Ongoing
6. Ensure access roads are well-maintained and that water is drained towards the basins within the operation area.	Quarry Manager	Ongoing
7. Comply with the Water Management Plan for the site to ensure that no water drainage from the operation area to the surrounding area.	Quarry Manager, Environmental Manager	Ongoing
8. Ensure that the site is secured from public access with fences, locked gates, and signage to discourage trespassers.	Quarry Manager	Ongoing
9. Ensure that any plants brought onto the site (i.e. seedlings) are obtained by nurseries free of dieback.	Quarry Manager, Environmental Manager	Ongoing
10. Keep the site tidy and remove any rubbish to an approved waste disposal facility as required.	Quarry Manager, Team	Ongoing
11. Provide training (including vehicle cleaning) during site inductions to all relevant personnel working on the site.	Quarry Manager, Environmental Manager.	Prior to working on the site and ongoing.
12. Should an area be identified as being infested with dieback (through testing etc) procedures will be followed in accordance with the DWER guidelines.	Quarry Manager, Environmental Manager.	If required

5 References

Del Botanics, (2024), *Detailed Flora and Vegetation Survey, Lot 11 Chitty Road (Salt Valley Road) Hoddys Well,* Del Botanics, WA.

Department of Conservation and Land Management (DBCA), (2003), *Phytophthora cinnamon and disease caused by it – Volume 1 Management Guidelines,* Department of Conservation and Land Management (DBCA), WA.

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Government of Western Australia, (2024), *SLIP Portal*, Accessed from https://maps.slip.wa.gov.au/landgate/locate/

Land Insights, (2024), *Clay Excavation Management Plan – Hoddys Well Bardya Quarry,* Land Insights, WA.

Western Wildlife, (2024), *Hoddys Well Quarry Targeted Conservation Significant Fauna Survey 2024*, Western Wildlife, WA.

APPENDIX K

Waste Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

WASTE MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

Prepared by:

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Document details:

Document History:

Date	Document Name	Document Manager	Summary of Document Revision	Client Delivered
May-24	1134 – Hoddys Well – Bardya Quarry Waste Management Plan	SR	Initial Draft for client review	May-24
May-24	1134 – Hoddys Well – Bardya Quarry Waste Management Plan	SR	Final	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Waste Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers) located at Lot 11 Chitty Road, Hoddys Well. The purpose of the Waste Management Plan is to set out the actions to manage waste and rubbish within the clay quarry operation.

Extraction of clay is a low waste operation. As a result, there will be minimal waste produced on site and it will largely be limited to some rubbish by site workers. Waste can also occur when trespassers access the site, and this will also be managed accordingly.

1.2 Objectives

The objectives of the Waste Management Plan are:

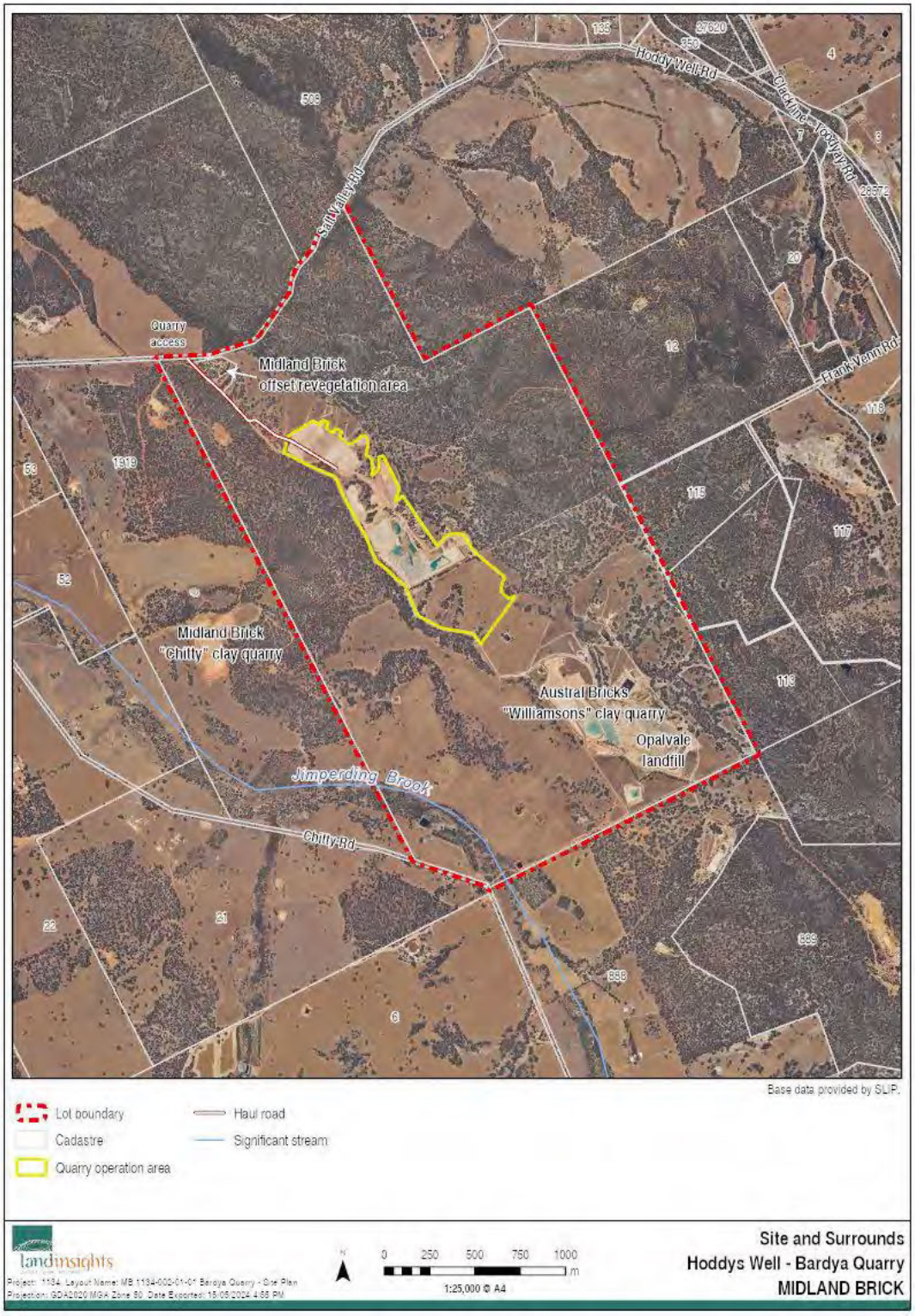
- To ensure that the clay extraction operation is kept clean and tidy
- To ensure that waste and rubbish generated by the operation and trespassers is disposed of appropriately.

1.3 Location

Lot 11 is located in the wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry ("the site") is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided below.

Figure 1.1 – Site Context Plan



2 Context

2.1 Unauthorised access dumping of rubbish

The potential for dumping of rubbish occurs from trespassers entering the site illegally. Although site security is in place, the risk of trespassers entering the site is always a possibility at extractive industry operations. The site will be fenced, and the gates locked. Signs will be located on the site perimeter to warn the public that the site is an open pit to deter trespassers from entering the site.

Any illegally dumped material will be removed promptly and removed to an approved landfill site.

2.2 Solid domestic waste and light industrial waste

The quarry will only be operational intermittingly throughout the year so the potential for creating waste is small. Solid domestic waste and light industrial waste will be stored in appropriate containers and removed from the quarry frequently to an approved landfill site.

2.3 Wastewater disposal

There are ablution or toilet facilities on the site. They are cleaned in accordance with the manufacturer's specifications.

2.4 Operation

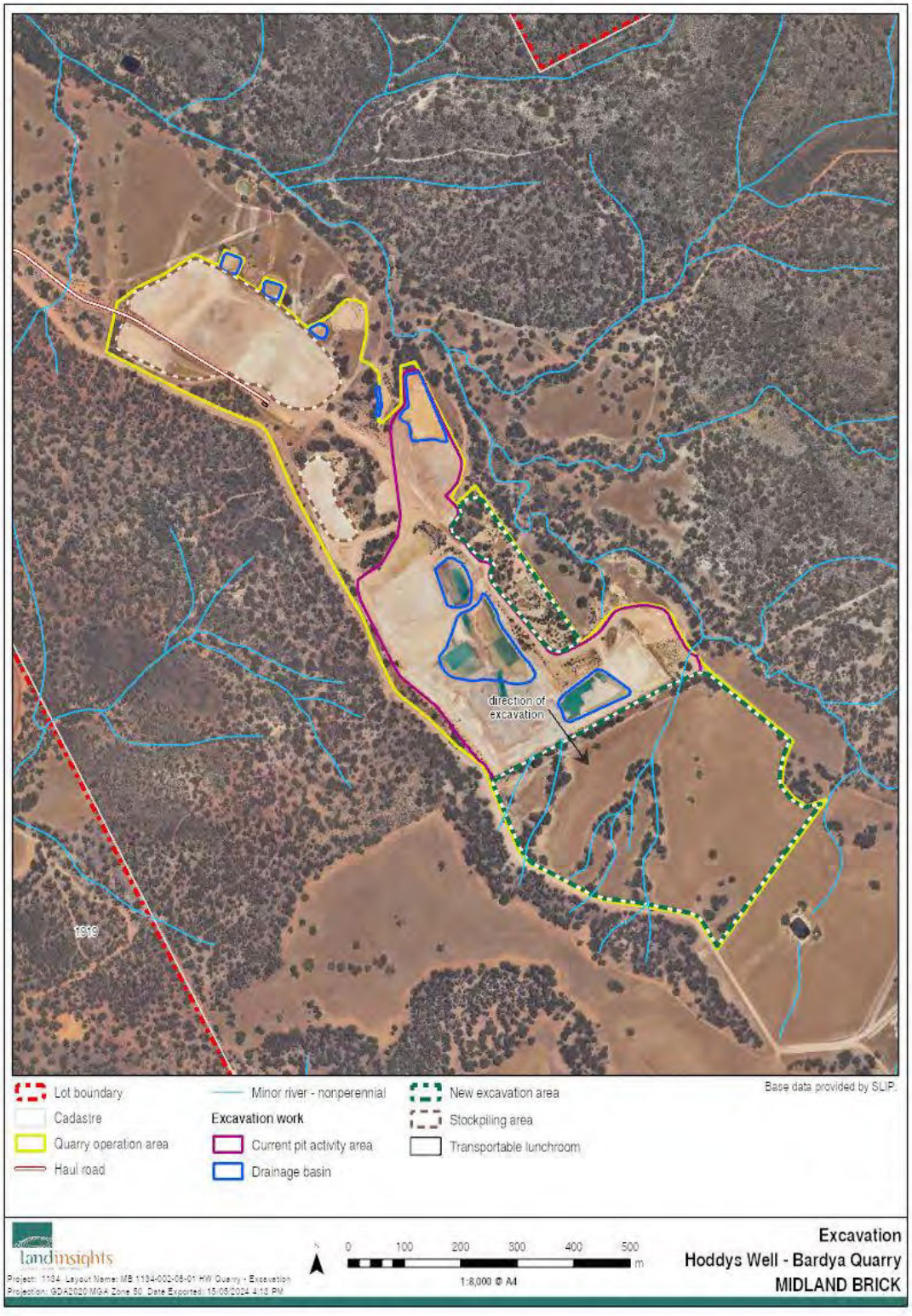
The clay quarry is located at the northern portion of Lot 11, accessible via Salt Valley Road which runs along the northern boundary. Excavation has been ongoing at the site since the 1990's. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future operation areas have been identified in this application. Clay is extracted from the pit area, stockpiled on site, placed onto trucks and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area. Access to the site is from a private road. The operation is secured with fences, locked gates and signage. There is no processing or manufacturing, and no chemicals are stored on the site.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided below.

Figure 2.1 – Excavation Plan



3 Waste Management Plan

3.1 Waste Management Actions

The Waste Management Plan actions, responsibilities and timing are presented in Table 3.1 below.

Table 3.1 – Waste Management Plan

MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
1. Keep the site tidy and remove rubbish from the quarry to an approved waste disposal facility as required.	Quarry Manager	Ongoing
2. Recycle waste where possible.	Quarry Manager	Ongoing
3. The site will be secured with fences and gates to reduce the potential for trespassers to enter the site.	Quarry Manager	Ongoing
4. Maintain signage to warn the public that there is an extractive industry operation on the site.	Quarry Manager	Ongoing
5. Maintain fences around the site perimeter.	Quarry Manager	Ongoing
6. Ensure any ablution facilities are maintained in accordance with the manufacturer's specifications.	Quarry Manager	If required.

APPENDIX L

Visual Amenity Management Plan

landinsights
PLANNING DESIGN ENVIRONMENT

"HODDYS WELL – BARDYA" CLAY QUARRY

VISUAL AMENITY MANAGEMENT PLAN

LOT 11 (768) CHITTY ROAD, HODDYS WELL

PREPARED FOR MIDLAND BRICK PTY LTD

MAY 2024

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Document details:

Document History:

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May-24	1082 – Hoddys Well - Bardya Quarry Visual Amenity Management Plan	SR	Initial Draft for client review	May-24
May-24	1082 – Hoddys Well - Bardya Quarry Visual Amenity Management Plan	SR	Final	May-24

Table of Contents

1 Introduction

1.1 Background and purpose

This report presents the Visual Amenity Management Plan for the "Hoddys Well" ("Bardya") clay quarry operated by Midland Brick Pty Ltd (previously Brikmakers). The quarry ("the site") is located on the northern portion of Lot 11 Chitty Road, Hoddys Well. The purpose of the Visual Amenity Management Plan is to accompany the Clay Excavation Management Plan prepared by Land Insights to support an application for renewal of the Development Approval and Extractive Industry Licence. The Visual Amenity Management Plan provides actions to reduce impact of the operation from the road (public realm) and from neighboring properties and surrounding residents.

Extractive industries involve bulk earthworks and the creation of pit areas of various depths below the natural ground level and stockpiling of clay, either in the pit area or on the natural ground level. It can also involve the removal and planting of vegetation which can change the views into and out of a site. In addition, the end use usually results in a change in land contours once the operation is decommissioned.

1.2 Objectives

The objective of the Visual Amenity Management Plan is:

- To reduce the impact of the operation on the visual amenity from neighbouring properties and the public realm.
- To reduce the potential for the clay extraction operation to have a visual impact.

1.3 Context

While the visual amenity of a location can be subjective, it is generally the aim for extractive industry to have minimal visual impact from the public realm (including roads and public places) and on surrounding residents and private landholdings where possible. If the operation cannot be successfully hidden using the natural topography, this is usually achieved through a "visual screen" such as bund walls and screening vegetation.

Visual amenity impact is generally guided by two key documents prepared by the State Government – "Visual Landscape Planning in Western Australia: A Manual for Evaluation, Assessment, Siting and Design" (DPLH, 2007) and "Guidance Statement No.3: Separation Distances Between Industrial and Sensitive Land Uses" (EPA, 2005). More specific guidance relating to extractive industry is provided in the "State Planning Policy 2.4 Planning for Basic Raw Materials Guidelines" (WAPC, 2021).

The Manual provides advice on techniques for incorporating visual landscape planning into the planning system. As a general rule, the Manual states that "mining and extractive uses should avoid sites that are prominent in important views, especially where they are located at the focal point of views." It also states

that the “visibility of mines, quarries and industry should be assessed from the property boundaries, from near and distant residences and from neighbourhood vantage points such as public roads”. This guidance was used during the pre-planning for the quarry operation to ensure that it was well-screened from the road and surrounding areas. The Manual will continue to be used to minimise visual amenity impact from future operations on the site.

In terms of reducing visual impact and amenity, the Manual recommends the following for quarries and mines:

- Use natural topography and existing vegetation for screening purposes
- Plant additional vegetation to enhance screening
- The working faces of mines or quarries may be oriented to minimise their public visibility.
- Access roads should be aligned to avoid providing a direct view of operations from nearby public view locations such as roads, lookouts, or recreation sites.

Guidance Statement No. 3 provides guidance on the separation distances and buffers for a range of industrial land uses to sensitive land uses. The operations on site fit into the category “Clay extraction or processing”. The separation distance is given as “500-1000 metres, depending on size and processing”, however this can be less with appropriate environmental management. The potential impacts listed in the Guidance Statement are noise and dust. These are managed through the Noise Management Plan and Dust Management Plan.

The SPP 2.4 Guidelines (WAPC, 2021) states that preserving or planting vegetation to provide a visual screen is recommended as a method to minimise visual impacts from roads, adjoining properties, and other key viewing locations. The Guidelines also refer to the “Visual Landscape Planning in Western Australia: A Manual for Evaluation, Assessment, Siting and Design” (DPLH, 2007) for further advise.

1.4 Location

Lot 11 is located in the WA wheatbelt, approximately 10km south of the Toodyay townsite and approximately 65km to the east of the Perth CBD. The lot is approximately 619 hectares in size. The clay quarry (“the site”) is located at the northern end of the lot and occupies an area of approximately 49 hectares. It should be noted that a separate clay quarry (operated by Austral Bricks (WA) Pty Ltd) and a landfill (operated by Opalvale Pty Ltd) occupy the southern portion of the lot.

A Site Context Plan is provided in the figure below.

Figure 1.1 – Site Context Plan

1.5 Operation

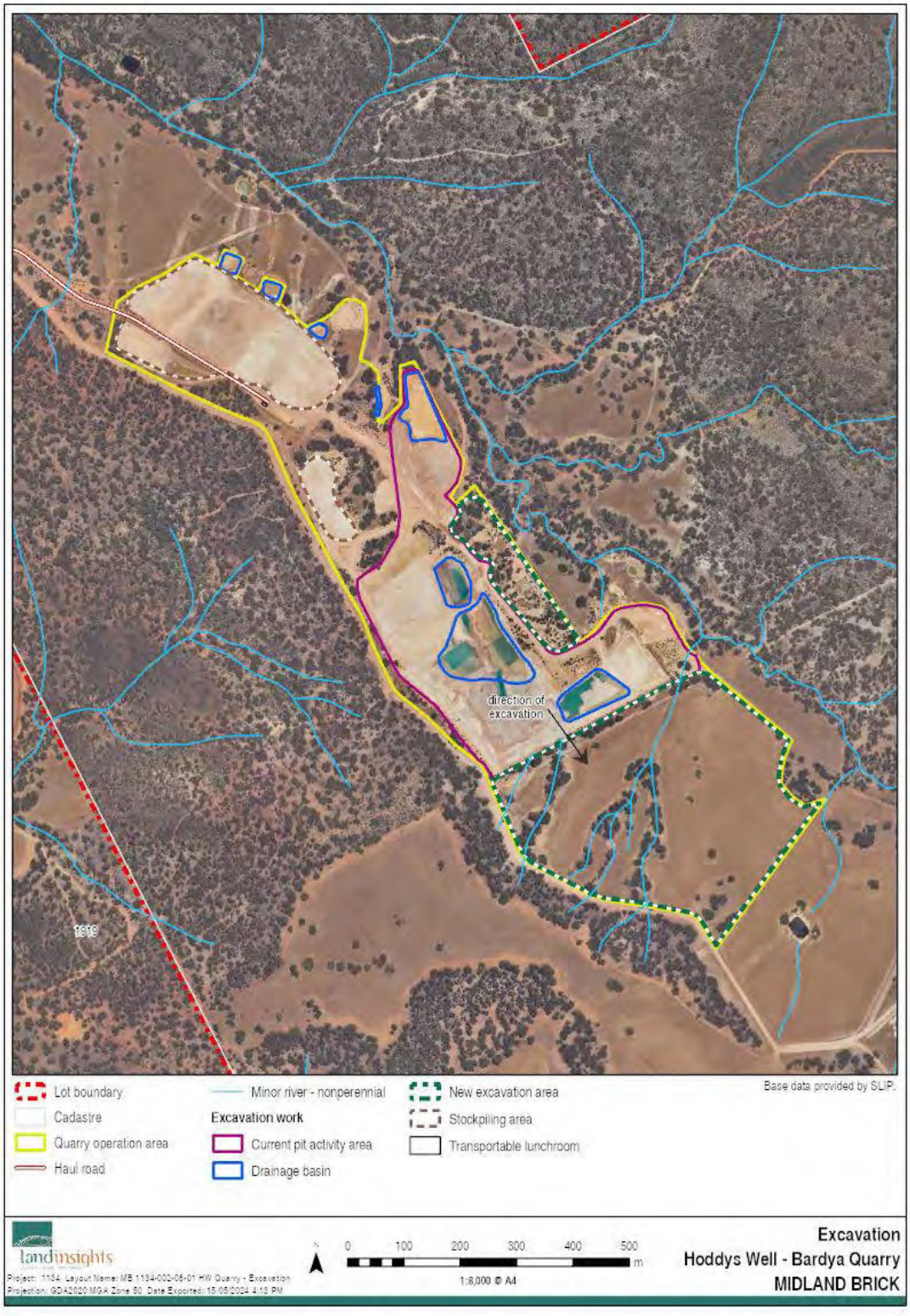
The site has been used for clay extraction since the 1990s. The current development footprint is known as the "Operation Area" and encompasses the active pit area, stockpiling areas, access tracks and drainage basins. Future excavation areas have been identified adjoining the current excavation area. Clay is extracted from the pit area, stockpiled on site, placed onto trucks, and transported from the site to the Midland Brick brickmaking factories located near the Perth metro area.

Excavation of clay takes place in a sequence of steps which can be broadly broken down into the following:

- Earthworks Campaign (i.e., removal of topsoil and overburden, excavation of clay to stockpile)
- Carting Campaign (transport of clay from the pit or stockpiles to the factories)
- Rehabilitation.

The Excavation Plan for the operation is provided in Figure 1.2 below.

Figure 1.2 – Excavation Plan



2 Visual Assessment

2.1 Introduction

As is discussed in Guidance Statement No. 3, separation distances and buffers serve the function of providing distance to sensitive land uses (such as residential dwellings). Impact on views and amenity are outlined in the Visual Landscape Planning Manual. Views into and out of the site/operation area should be considered in a visual assessment as the topography and vegetation can usually provide adequate screening.

2.2 Surrounding Land Uses

Surrounding land uses comprise largely rural enterprises (such as stud farms and other rural activities) with a mixture of some commercial and rural living.

2.3 Separation Distances

There are no sensitive receptors with 1,000 metres from the quarry (including the landowner). The following closest sensitive receptors have been identified from the quarry.

- Owner's dwelling to the south – Approximately 1,100 metres
- Nearest rural dwelling to the east – Approximately 1,400 metres
- Nearest rural dwelling to the south – Approximately 2,400 metres
- Nearest rural dwelling to the west – Approximately 1,800 metres
- Nearest rural dwelling to the north-west – Approximately 1,600 metres (note that this is to the site entrance as this is the closest point)

The location of surrounding sensitive receptors in relation to the quarry is shown in Figure 2.1 below.

The EPA's Guidance Statement No. 3 provides a guideline on the separation distances and buffers for a range of industrial land uses to sensitive land uses (such as residential dwellings). It should be noted that the distances in the policy assume the land use is not managed and, should best practice environmental management take place, these distances can be reduced.

The operations on site fit into the category "clay extraction or processing". The potential impacts are listed as "noise" and "dust". The separation distance is "500-1000 metres, depending on size and processing", however this can be less with appropriate environmental management. All surrounding sensitive receptors are over 1,000 metres from the quarry.

Although there are no sensitive receptors within 1,000 metres of the quarry, the Visual and Amenity Management Plan has been prepared to provide an outline of best practice visual management used at the site.

Figure 2.1 – Surrounding Sensitive Receptors

2.4 Site features

Topography and landform

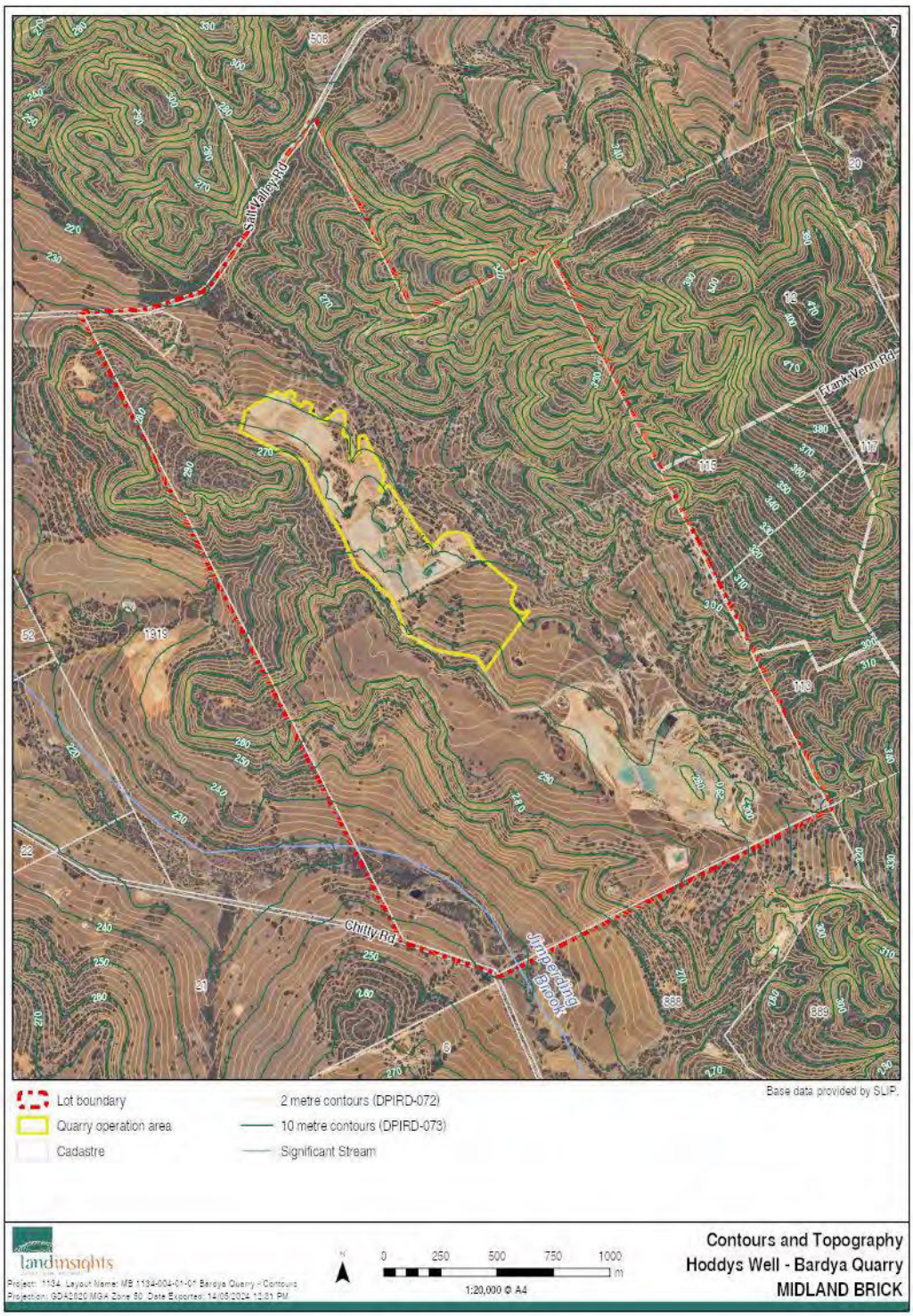
Lot 11 is located on the Darling Plateau and the natural topography is slightly undulating, dissected with drainage lines. The land in general slopes from south-west or north-east. The highest points are located to the south-west of the operation area at approximately 295 metres AHD (Australian Height Datum) and the lowest point is at the north-east of the operation area at approximately 240 metres AHD. The operation of the quarry has obviously significantly altered the natural topography of the pit area itself.

The floor of the pit area is at approximately 250m AHD and is approximately 20 metres below ground level (which is at approximately 270m AHD).

The topography of Lot 11 is undulating with high points to the north-east, south-west and south-east of the quarry. This provides significant landscape barriers between the operation and the nearest sensitive receptors. The operation is essentially located in a hole surrounded by high pit walls on all sides. Nearby sensitive resources do not have a direct view into the site and the topography provides a significant and effective barrier.

The contours (original contours) are shown on the figure below. This figure provides context for the contours surrounding the operation. It should be noted that the contours within the operation area are not current. Current contours can be seen on the latest survey plan contained in the application report (Land Insights, 2024).

Figure 2.2 –Contours



Vegetation

The property has historically been cleared of native vegetation to facilitate past land uses, particularly through the central, flatter areas of the property occupied by the quarry. Large areas of native vegetation remain on Lot 11, including significant areas to the east and west of the quarry. Vegetation located in the paddocks and within the quarry itself has been largely disturbed from past and current use.

The Beard vegetation association is mapped by the Department of Primary Industries and Regional Development (DPIRD) as "Bannister 4" which is described as "Jarrah, Marri and Wandoo." The Vegetation Complex as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) is "Michibin" which is contains open woodland of *Eucalyptus wandoo* over *Acacia acuminata* with some *Eucalyptus loxophleba* on valley slopes, with low woodland of *Allocasuarina huegeliana* on or near shallow granite outcrops in arid and perarid zones.

A *Detailed Flora and Vegetation Survey* was undertaken by Del Botanics (2024). The survey area comprised the new excavation area at the southern side of the quarry and areas of vegetation located within and directly adjacent to the quarry. The survey identified two vegetation communities across the survey area as follows:

- *Allocasuarina huegeliana* Woodland – Low Open Woodland of *Allocasuarina huegeliana* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.
- *Eucalyptus accedens* Woodland (Powderbark Woodland) – Open Forrest of *Eucalyptus accedens* over open shrubland of *Gastrolobium spp*. over very open grassland of **Avena barbata*.

The Allocasuarina woodland is located adjacent to the quarry on the south-eastern boundary and the remainder of the vegetation patches were identified in the Survey as *Eucalyptus accedens* Woodland. The remainder of the survey area were mapped as "Cleared Paddocks".

The closest sensitive receptors in all directions are separated from the clay quarry by substantial areas of established vegetation which provide an adequate visual screen (in addition to the natural topography and bund walls).

Some clearing of native vegetation will be required in the proposed excavation areas at the southern half of the site. These areas are shown on the plan at Figure 1.2. It is not expected that this will have an impact on visual amenity as there will be substantial areas of vegetation remaining.

Figure 2.3 – Current Native Vegetation Extent

2.5 Compliance history

It should be noted that no substantiated complaints have been received regarding visual amenity impacts since operations commenced in the 1990s.

2.6 Conclusion

Based off the information above, it can reasonably be concluded that the impact of the clay extraction operation on visual amenity from the public realm and adjoining land is low. A review against the recommendations in the Visual Landscape Planning Manual (DPLH, 2007) is provided in Table 2.1 below.

Table 2.1 – Visual impact assessment summary

RECOMMENDATION	COMMENT
Use natural topography and existing vegetation for screening purposes.	The natural topography provides a substantial visual screen as the land rises sharply to both the east and west of the quarry. The natural topography of the area is undulating. The excavation digs into the ground, lowering the floor level meaning that the operation is further hidden from view, particularly from the road and surrounding receptors. The pit walls are approximately 20m deep.
Plant additional vegetation to enhance screening.	The pit is already surrounded by substantial areas of remnant vegetation and the natural topography provides an effective visual barrier to the nearby houses and roads. Therefore, no additional screening vegetation is required.
The working faces of mines or quarries may be oriented to minimise their public visibility.	The working faces of the quarry are screened by the high walls of the quarry, vegetation and the naturally sloping landscape which shields it from view.
Access roads should be aligned to avoid providing a direct view of operations from nearby public view locations such as roads, lookouts, or recreation sites.	The main haul road travels from Salt Valley Road at the northern lot boundary and travels south into the property. There are no direct views from the haul road into the quarry from the road.
Separation distances to neighbouring properties are met.	All nearest sensitive receptors are adequately separated from the operation.

3 Visual Amenity Management

3.1 Introduction

The Visual Amenity Management Plan describes the measures that will be used by Midland Brick to reduce the impact of the clay quarry on visual amenity.

The plan has been prepared in accordance with "Visual Landscape Planning in Western Australia: A Manual for Evaluation, Assessment, Siting and Design" (DPLH, 2007), "Guidance Statement No.3: Separation Distances Between Industrial and Sensitive Land Uses" (EPA, 2005), "State Planning Policy 2.4 Planning for Basic Raw Materials Guidelines" (WAPC, 2021) as well as best practice in mine/quarry management and experience.

3.2 Visual Amenity Management Plan

The actions, responsibilities and timing relating to visual amenity is presented in Table 3.1 below.

Table 3.1 – Visual amenity management plan

	MANAGEMENT/ACTION	RESPONSIBILITY	TIMING
1.	Maintain earthen bunds around the excavation areas so that they provide a visual barrier to views into the quarry.	Quarry Manager	Ongoing
2.	Establish new visual screening earthen bunds using overburden when moving into a new excavation area (where required to reduce visual impact).	Quarry Manager	When moving into a new excavation area.
3.	Excavations for most of the time (except for the initial phase of excavating a new area) will be below ground level. Utilise the pit walls to screen the quarry from surrounding sensitive receptors.	Quarry Manager	Ongoing
4.	Comply with the Dust Management Plan for the operation to ensure that visible dust does not pass the property boundaries.	Quarry Manager and Environmental Manager	Ongoing
5.	Rehabilitate the site in accordance with the Rehabilitation Management Plan at the end of the operation.	Quarry Manager and Environmental Manager	Ongoing
6.	Maintain effective communication with the nearest neighbours to ensure that any visual amenity concerns are addressed as appropriate.	Quarry Manager	Ongoing

4 References

Del Botanics, (2024), *Detailed Flora and Vegetation Survey, Lot 11 Chitty Road (Salt Valley Road) Hoddys Well*, Del Botanics, WA.

Department for Planning and Infrastructure, (2007), *Visual Landscape Planning in Western Australia: A Manual for Evaluation, Assessment, Siting and Design,* Department of Planning, Lands and Heritage, WA.

Department of Water and Environmental Regulation, (2017), *Guidance Statement: Risk Assessments,* Department of Water and Environmental Regulation, Perth, WA.

Environmental Protection Authority, (2005), *Guidance Statement No.3: Separation Distances Between Industrial and Sensitive Land Uses,* Environmental Protection Authority, Perth, WA.

Government of Western Australia, (2024), *SLIP Portal*, Accessed from https://maps.slip.wa.gov.au/landgate/locate/

Land Insights, (2024), *Clay Excavation Management Plan – Hoddys Well Bardya Quarry,* Land Insights, WA.

Western Australian Planning Commission, (2021), *State Planning Policy 2.4 Planning for Basic Raw Materials Guidelines*, Western Australian Planning Commission, WA.

Western Wildlife, (2024), *Hoddys Well Quarry Targeted Conservation Significant Fauna Survey 2024*, Western Wildlife, WA.