WRITTEN SUBMISSION

Application for Planning Approval: Extractive Industry

Lot 3453 Rockwell Road, Cranbrook WA 6321 | November 2026

Field	Detail
To	Chief Executive Officer, Shire of Cranbrook, PO Box 21, Cranbrook WA 6321
Application	Planning approval for an extractive industry, under Town Planning Scheme No. 4
Land	Lot 3453 (part of Plantagenet Location 3453), Rockwell Road, Cranbrook WA 6321
Certificate of Title	Volume 1822 Folio 085 (copy attached)
Registered proprietor	Edward Robert Singleton
Lot area	352.8277 ha
Zone	Rural, Shire of Cranbrook Town Planning Scheme No. 4
Nearest intersection	Albany Highway and Rockwell Road
Proposed area	About 3.8 ha of gravel extraction in a single area, worked in cells of about 1 ha

This written submission accompanies an application for planning approval for a gravel pit on Lot 3453 Rockwell Road, Cranbrook. It addresses the matters listed in Section 4 of the Shire's Planning Application Checklist. An Environmental and Operational Management Plan (EOMP), a figure set and a geotechnical report are submitted with it.

Extractive industry is a 'D' use in the Rural zone, so the application relies on Council granting planning approval. The applicant understands the application will be referred to government agencies and advertised before Council decides it. An application for an extractive industry licence under the Shire's Extractive Industries Local Law will be lodged once planning approval is granted, as clause 3.1(1) of the Local Law requires.

1. EXISTING AND PROPOSED LAND USE

Lot 3453 is a working rural property of 353 ha used for grazing. The proposed extraction area sits on previously cleared farmland under pasture. It contains no buildings, dams, services or native vegetation. Remnant bush adjoins its eastern edge.

The proposed use is the extraction of lateritic gravel for road building. Each cell is returned to pasture once worked, so the land goes back to farming as the pit moves across the area.

2. THE PROPOSAL AND PROCESS

Gravel is won in short campaigns against orders. Three features set the proposal apart.

1. **It is shallow and small.** The extraction area is about 3.8 ha. Digging goes to about 0.9 m below the surface: 0.75 m of gravel beneath about 0.15 m of topsoil. That gives about 7,500 m³ of gravel per 1 ha cell, and about 28,500 m³ across the 3.8 ha.
2. **Only one hectare is open at a time.** The area is worked in cells of about 1 ha, one at a time. A cell is rehabilitated before the next is opened.
3. **Processing is done in place by mobile plant.** A tractor-mounted crusher works the gravel in the ground to about 400 mm per pass and lays it back down, ready to be lifted to stockpile. A mobile screen is added only when an order needs a set grading. There is no fixed plant, no washing, no imported material and no water used in processing. All plant leaves the site at the end of each campaign.

Main Roads Western Australia confirmed the resource with 196 test pits between 12 and 19 July 2021, for the Gordon River South upgrade of Albany Highway. Usable gravel was found in 192 pits, with a median thickness of 750 mm. Laboratory testing confirmed basecourse quality in the western part of the area. Water was recorded in 28 pits, between 500 mm and 1,900 mm below the surface. The pit floor is kept above any water found, and there is no dewatering.

Extraction and processing stay below the Category 12 threshold of 50,000 tonnes a year under the Environmental Protection Regulations 1987. No works approval or licence from the Department of Water and Environmental Regulation (DWER) is needed.

3. PRODUCTS,STORAGEAND SALES

Item	Detail
Products	Lateritic gravel, sold as crushed basecourse or subbase to road specification, or unprocessed for farm tracks, hardstand and general fill
Customers	Main Roads Western Australia, the Shire and other local government and private buyers
Storage	Topsoil, overburden and product gravel are stockpiled within the working cell only. Nothing is stored outside it.
Goods manufactured or assembled	None. No other goods are stored, made or sold on site.

4. HOURSOF OPERATION AND EMPLOYEES

Item	Detail
Hours	7:00 am to 6:00 pm Monday to Friday, and 7:00 am to 5:00 pm Saturday
Days not worked	Sundays and public holidays. No operation of any kind.
Working pattern	Short campaigns against orders. The site is idle and gated between campaigns.
Employees	2 to 3 people during a campaign: a plant operator, a truck driver and, where needed, a supervisor. No permanent staff on site.
Site Senior Executive	Appointed for the operation, as required by the Department of Energy, Mines, Industry Regulation and Safety

5. TRAFFIC AND TRUCKMOVEMENTS

Trucks leave Albany Highway (H1) at 311.13 SLK, travel 2.2 km along Rockwell Road, then 1.4 km along the existing private track within the lot. No new crossover or track is proposed. The route is shown on Figure 1 of the figure set.

Item	Detail
Trucks	Truck and dog or side tippers, typically 12 m³ a load. Rigid tippers may be used for smaller orders.
Truck numbers	On campaign days, up to 15 loads a day. No truck traffic between campaigns. The annual haulage amount is low.
Hours	Within the operating hours above
Signs	'Trucks entering' signs on Rockwell Road on both approaches to the entrance on campaign days, placed as agreed with the Shire
Larger campaigns	If a campaign will exceed 15 loads a day, or haulage runs at a larger scale or for longer, a Traffic Management Plan and Traffic Guidance Scheme are prepared by an accredited person and approved by the Shire before it starts. Refer EOMP Section 3.
Loads	Covered or wetted before leaving site
Road condition	Rockwell Road is kept to the Shire's standard while used for carting. Any damage caused by the operation is repaired at the operator's cost.

6. MACHINERY

Machine	Use
Tracked excavator (20 to 30 t) or wheel loader	Digging and loading
Dozer or grader	Stripping topsoil, shaping and rehabilitation, used now and then
Tractor-mounted crusher (MTH225 on a 520 hp tractor)	Crushing gravel in place to order
Mobile screen	Only for orders that need a set grading
Water cart	On site whenever the pit is worked, for dust control and fire

No plant is stored on site between campaigns and no routine servicing is done on site. Photographs of the crusher are in the EOMP, Figures 1 and 2. Photographs of the site and the Rockwell Road entrance are in the figure set, Figures 7 and 8.

7. WASTEAND DISPOSAL

The operation produces no process waste. Topsoil and overburden are kept on site and reused to rehabilitate the cell they came from. General rubbish is taken off site daily. Nothing is burned or

buried. There is no bulk fuel or chemical storage, and any spill is cleaned up and taken to a licensed facility.

8. BUSHFIRE

Yes, in part. Part of the extraction area is within Bushfire Prone Area 2 on the DFES Map of Bush Fire Prone Areas, from the mapped buffer around the remnant bush on its eastern side (figure set, Figure 9). No buildings, sensitive land uses or high-risk uses such as bulk fuel storage are proposed. Fire controls during campaigns are set out in EOMP Section 4. They include a charged water cart or firefighting unit on site whenever plant operates, extinguishers on all machines, and no work on Total Fire Ban or harvest and vehicle movement ban days.

9. SEPARATION DISTANCES AND SETBACKS

Requirement	Position at this site	Status
200 m from a sensitive land use	Nearest house is 1.3 km south east of the extraction area	Complies
40 m from a public road	750 m to Rockwell Road	Complies
20 m from the lot boundary	100 m to the nearest boundary	Complies
40 m from a watercourse	275 m to the nearest mapped watercourse	Complies
Remnant vegetation	20 m buffer from the outer drip line. No clearing proposed.	Complies
Groundwater	Pit floor kept above any water found. No dewatering.	Complies
Overhead power lines	20 m buffer each side of the transmission line, 10 m each side of the low voltage line. No poles inside the extraction area.	Applied

Distances are measured from the aerial imagery and are shown on Figures 4 to 6 of the figure set. They will be confirmed by survey.

10. DOCUMENTSLODGED

Checklist item	Lodged
A. Application form	Signed by the registered proprietor, Edward Robert Singleton
B. Application fee	$739, extractive industry
C. Site plans (3 copies)	Figure set, Figures 1 to 9
D. Floor plans	Not applicable. No buildings proposed.
Elevation plans	Not applicable. No buildings proposed.
Written submission	This document
Supporting documents	EOMP, geotechnical report, certificate of title

PROPOSED EXTRACTIVE INDUSTRY — SITE FIGURES

Sandy gravel extraction: footprint, separation distances and site condition

Lot 3453 Rockwell Road, Cranbrook WA 6321 | November 2026

1. LOCALITY AND ACCESS

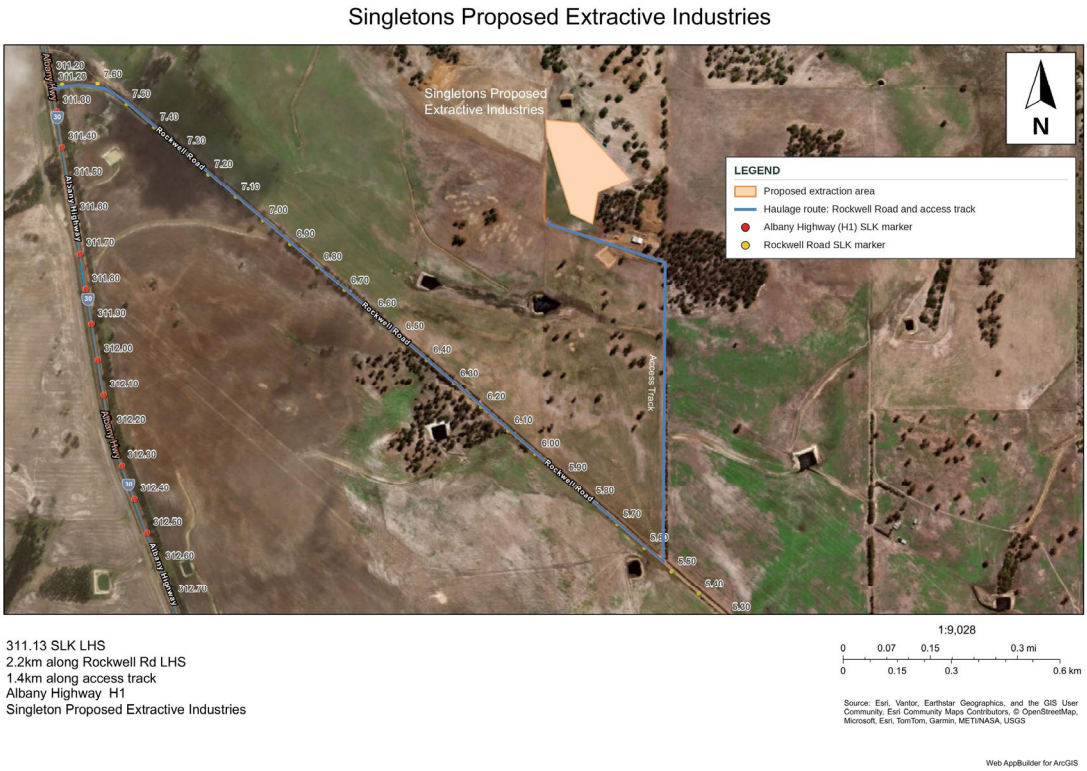


Figure 1 — Locality and haulage route from Albany Highway (H1).

Field	Detail
Locality	Cranbrook, Shire of Cranbrook
Subject land	Lot 3453 (part of Plantagenet Location 3453), CT 1822/085, 352.8277 ha. Deposited plan number to be confirmed.
Zoning	Rural, under Town Planning Scheme No. 4
Turn-off	Albany Highway (H1) at 311.13 SLK, left-hand side
Haulage route	2.2 km along Rockwell Road (left-hand side), then 1.4 km along the private access track
Total distance from H1	Approximately 3.6 km
Road frontage	Rockwell Road — formed gravel. The access track is unsealed and private.
Nominal source scale	1:9,028 at A3

Sources

- Aerial imagery: Esri community basemap. Map data © OpenStreetMap contributors, Microsoft, Facebook Inc. and its affiliates.
- Road referencing and access alignment: Main Roads Western Australia road network viewer.

EXTRACTION AREA

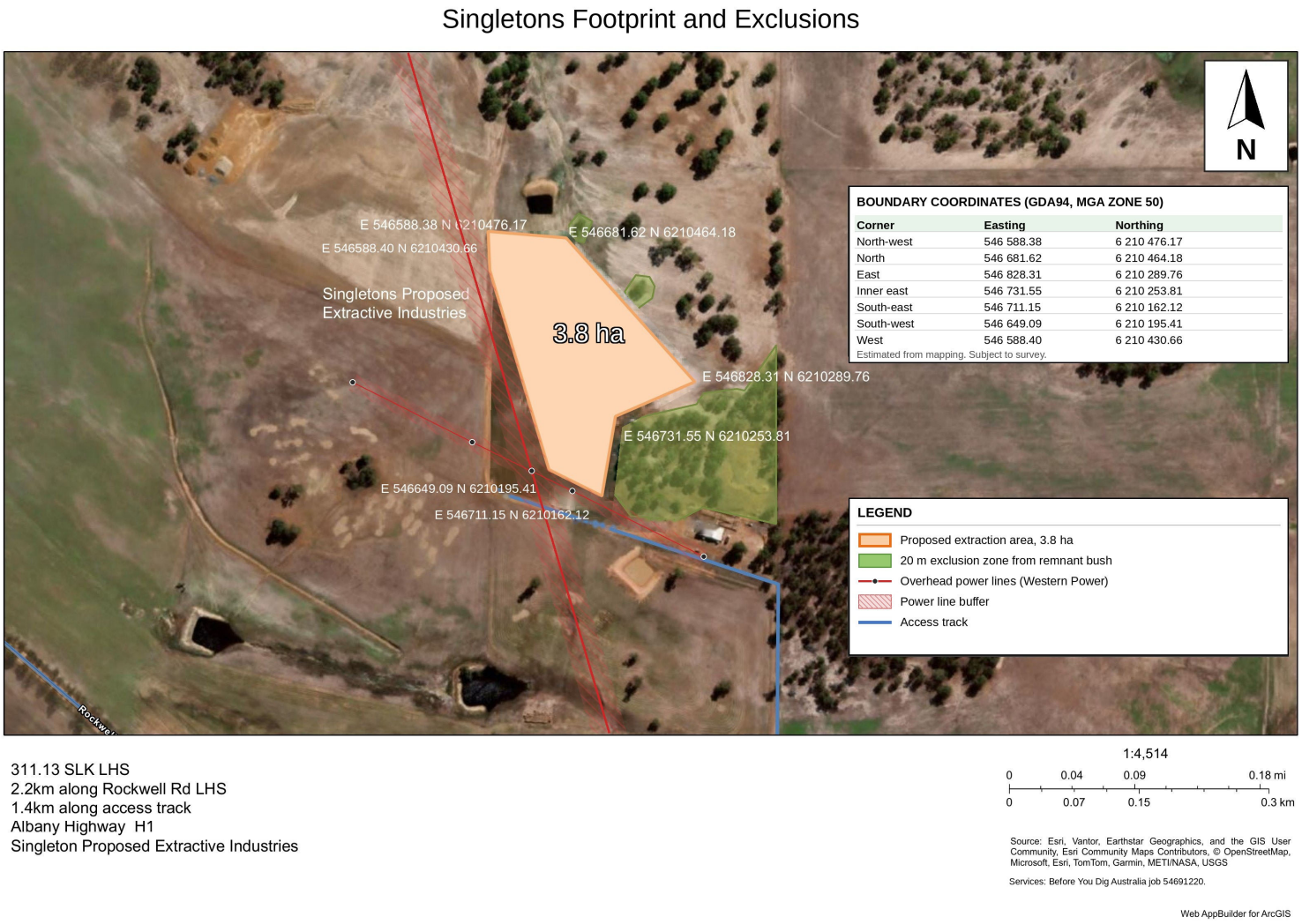


Figure 2 — Proposed extraction area, boundary coordinates and exclusion zones.

Extraction area

Field	Detail
Total application area	About 3.8 ha in a single area
Staging	Progressive, in cells of about 1 ha. One cell is open at a time, and each is rehabilitated before the next opens.
Material	Sandy gravel
Maximum excavation depth	Approximately 0.9 m below existing surface — usable gravel beneath approximately 0.15 m of topsoil and overburden
Native vegetation clearing	Nil — the area sits within previously cleared farmland
Exclusion zone	The green shading is a 20 m buffer measured from the outer drip line of remnant vegetation. No excavation, stockpiling or plant movement occurs within it.
Nominal source scale	1:4,514 at A3 — read distances from the graphic scale bar, not from the print

Boundary coordinates

Coordinates mark the corners of the area and are given in GDA94, MGA Zone 50. They are estimated from the mapping and will be replaced by the licensed surveyor's certificate under clause 2.3 of the Extractive Industries Local Law.

Point	Easting, northing (GDA94, MGA Zone 50)
North-west	E 546 588.38, N 6 210 476.17
North	E 546 681.62, N 6 210 464.18
East	E 546 828.31, N 6 210 289.76
Inner east	E 546 731.55, N 6 210 253.81
South-east	E 546 711.15, N 6 210 162.12
South-west	E 546 649.09, N 6 210 195.41
West	E 546 588.40, N 6 210 430.66

Sources

- Aerial imagery: Esri community basemap. Map data © OpenStreetMap contributors, Microsoft, Facebook Inc. and its affiliates.
- Extraction area, staging and exclusion zone boundaries: proponent-supplied, indicative only and subject to survey.
- Road referencing and access alignment: Main Roads Western Australia road network viewer.
- Services: Before You Dig Australia job 54691220, 6 November 2026.

3. EXISTING TOPOGRAPHY

Existing surface contours across the surveyed area. Contours behave erratically over tree canopy, which indicates a surface model rather than bare earth; levels beneath or adjacent to vegetation are treated as unreliable and will be confirmed on the ground.

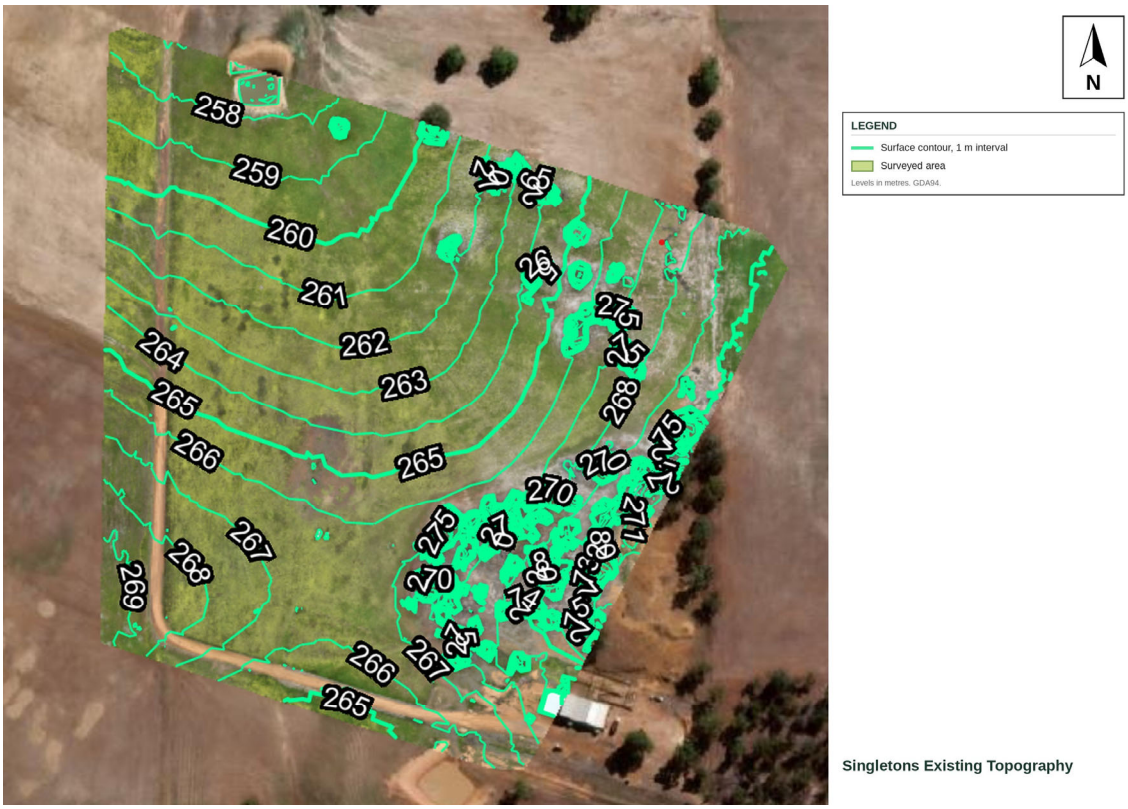


Figure 3 — Existing surface contours over the surveyed area.

Field	Detail
Contour interval	1 m
Elevation range	Approximately 258 m to 271 m across the surveyed block
Coordinate system	GDA94, north up
Datum	To be confirmed as Australian Height Datum on the surveyed plan
Still to be added	Final contour levels, contour interval statement, surveyor's certificate and datum peg, to satisfy Local Law cl. 2.3

Sources

- Contours and surface model: proponent-supplied topographic survey.
- Aerial base: as supplied with the survey.

4. SEPARATION FROM SENSITIVE LAND USES

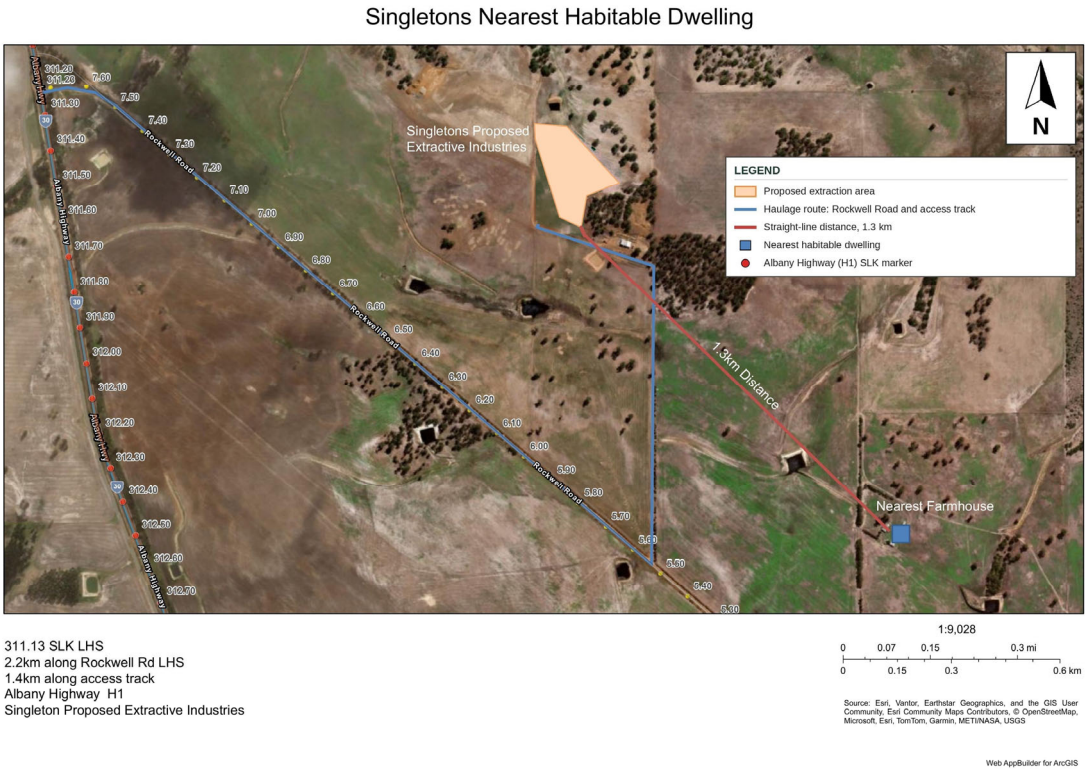


Figure 4 — Nearest habitable dwelling relative to the proposed extraction area.

Field	Detail
Nearest habitable dwelling	1.3 km south-east of the extraction area boundary
Basis of measurement	Straight-line distance from the nearest extraction area boundary
Other habitable structures	None identified within 1.3 km of the proposed extraction area
Separation required	200 m required — exceeded six times
Nominal source scale	1:9,028 at A3

Sources

- Aerial imagery: Esri community basemap. Map data © OpenStreetMap contributors, Microsoft, Facebook Inc. and its affiliates.
- Dwelling location: aerial photograph interpretation, to be confirmed on site.

O ADJOINING PROPERTY BOUNDARIES

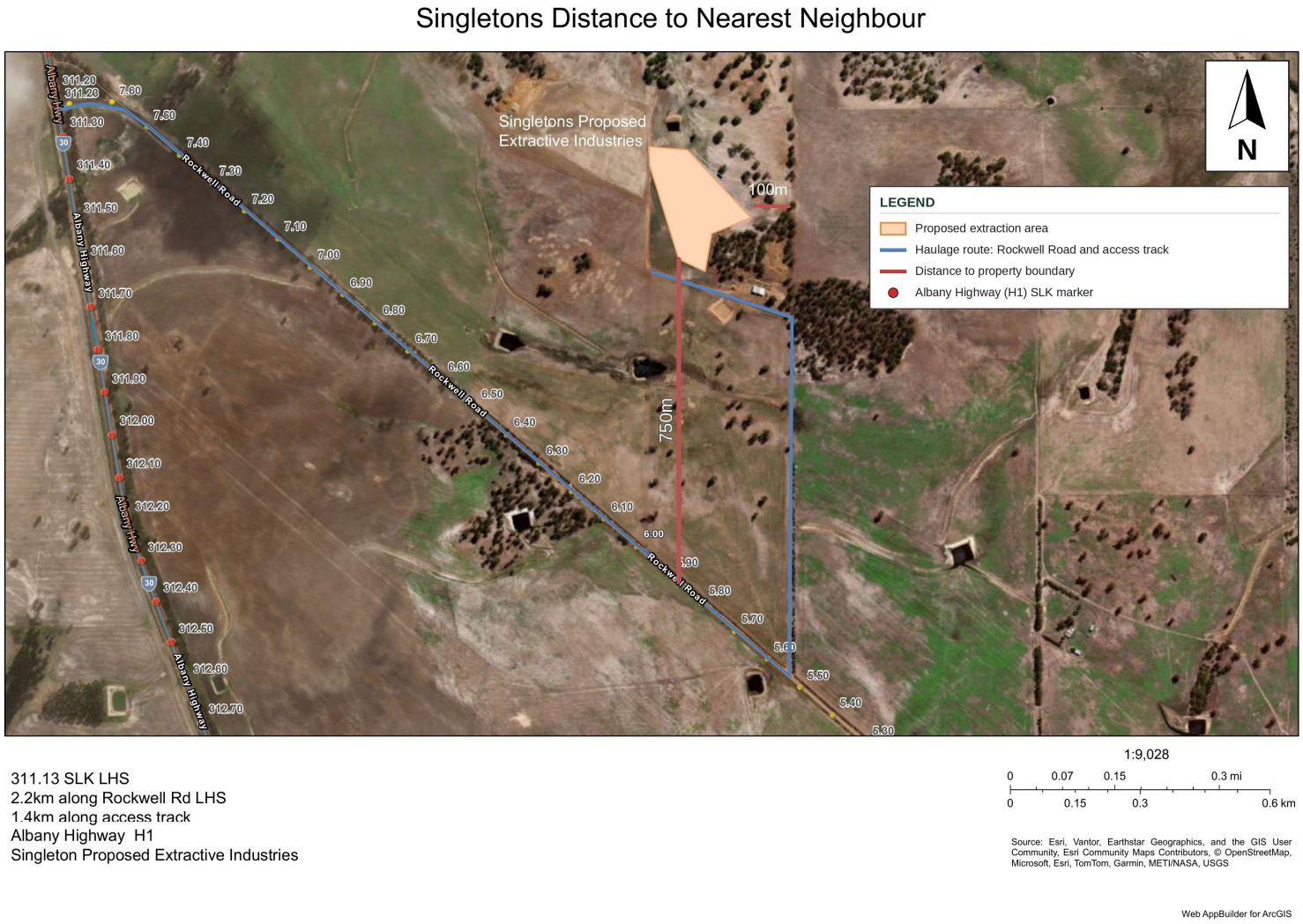


Figure 5 — Straight-line distance from the proposed extraction area to the nearest adjoining property boundaries.

Field	Detail
Nearest boundary — east	100 m
Nearest boundary — south	750 m, at Rockwell Road
Local Law, cl. 6.1(a)	20 m minimum from the boundary of the land — satisfied by five times
Basis of measurement	Straight-line distance in the map projection from the nearest extraction area boundary to the adjoining property boundary
Relationship to dwellings	These are property boundaries, not dwellings. The nearest habitable dwelling is 1.3 km — refer Figure 4.
Nominal source scale	1:9,028 at A3

Sources

- Aerial imagery: Esri community basemap. Map data © OpenStreetMap contributors, Microsoft, Facebook Inc. and its affiliates.
- Extraction area, staging and exclusion zone boundaries: proponent-supplied, indicative only and subject to survey.
- Cadastral boundaries: interpreted from aerial imagery and Landgate cadastre, to be confirmed by survey.

6. WATERCOURSE SETBACKS

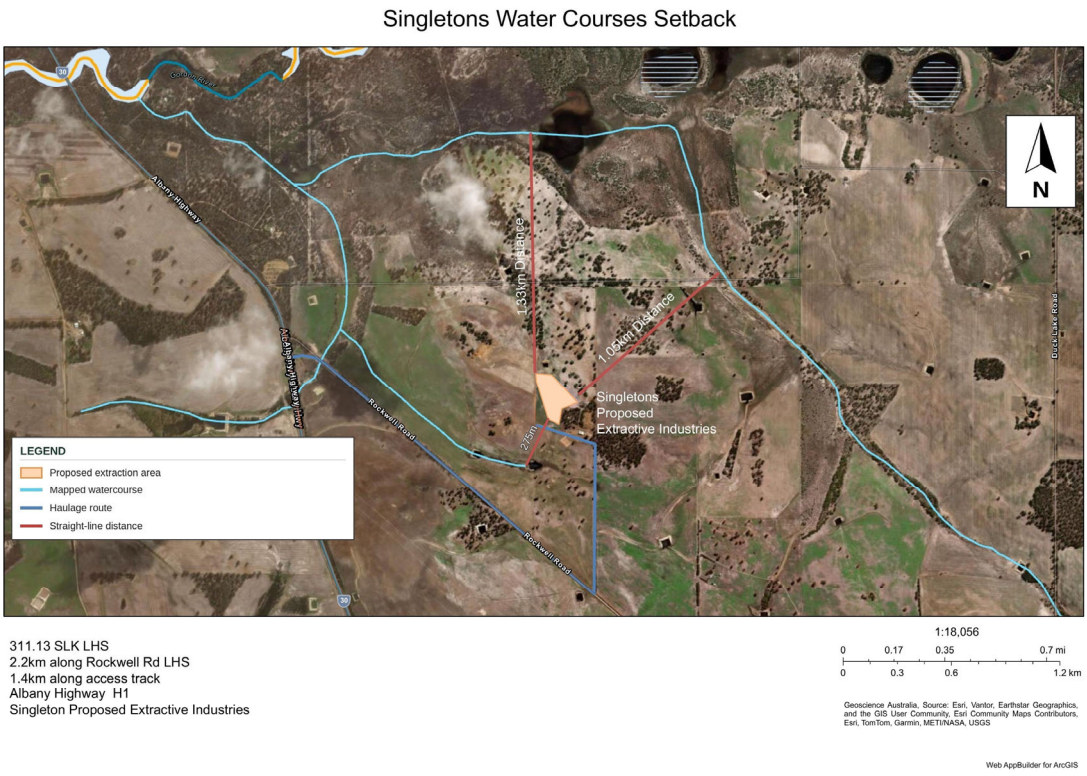


Figure 6 — Distance from the proposed extraction area to the nearest mapped watercourses.

Field	Detail
Nearest watercourse — south-west	275 m
Nearest watercourse — north-east	1.05 km
Nearest watercourse — north	1.33 km

Field	Detail
Local Law, cl. 6.1(d)	40 m minimum from any watercourse — satisfied six times
Waterway or wetland	Up to 100 m may be required — satisfied
Nominal source scale	1:18,056 at A3

Sources

- Watercourse and hydrology layers: Geoscience Australia.
- Aerial imagery: Esri community basemap. Map data © OpenStreetMap contributors, Microsoft, Facebook Inc. and its affiliates.

7. ACCESS AND ROAD CONDITION

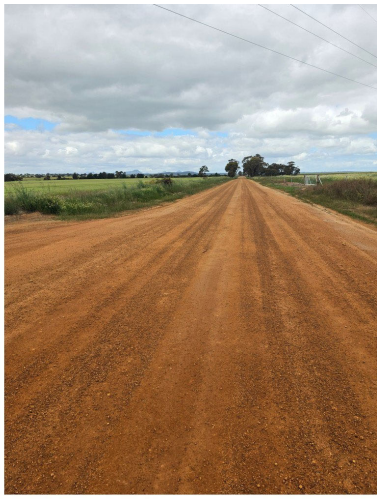
Photographs taken at the property entrance on Rockwell Road, recording the condition of the entrance and of the public road in both directions before any extraction commences. They are provided as a baseline against which road condition can be compared over the life of the operation.



(a) Entrance gate, looking in



(b) Rockwell Road, facing north-west



(c) Rockwell Road, facing south-east

Figure 7 — Property entrance and Rockwell Road, existing condition.

Field	Detail
Entrance	Rockwell Road entrance, gated, with the existing gravel access track running north into the property
Public road	Rockwell Road — formed gravel
Access track	Existing private track, unsealed, 1.4 km to the extraction area. No new access or widening is proposed.
Purpose	Baseline record. A joint photographic inspection is offered at the start and end of each campaign.

Sources

- Photographs: proponent-supplied, taken on site. Orientation as stated in each caption.

8. SITE CONDITION

Photographs of the proposed extraction area, taken from within the area. It sits on previously cleared farmland under pasture. No native vegetation occurs within the area, and none is proposed to be removed.



(a) Extraction area, facing south

(b) Extraction area, facing south

(c) Extraction area, facing north

(d) Extraction area, facing south-east

Figure 8 — Existing condition of the proposed extraction area.

Field	Detail
Extraction area	Cleared farmland under pasture, gently sloping, no native vegetation within the area
Adjoining vegetation	Remnant bush adjoins the eastern edge, to which a 20 m buffer applies
Clearing proposed	Nil
Purpose	Evidence that no clearing permit under Part V, Division 2 of the Environmental Protection Act 1986 is required

Sources

- Photographs: proponent-supplied, taken on site. Orientation as stated in each caption.

9. BUSHFIRE PRONE AREAS

The Map of Bush Fire Prone Areas shows part of the proposed extraction area within Bushfire Prone Area 2. This comes from the mapped buffer around the remnant bush on the eastern side of the area. The rest of the area is cleared farmland outside the mapped bushfire prone area.

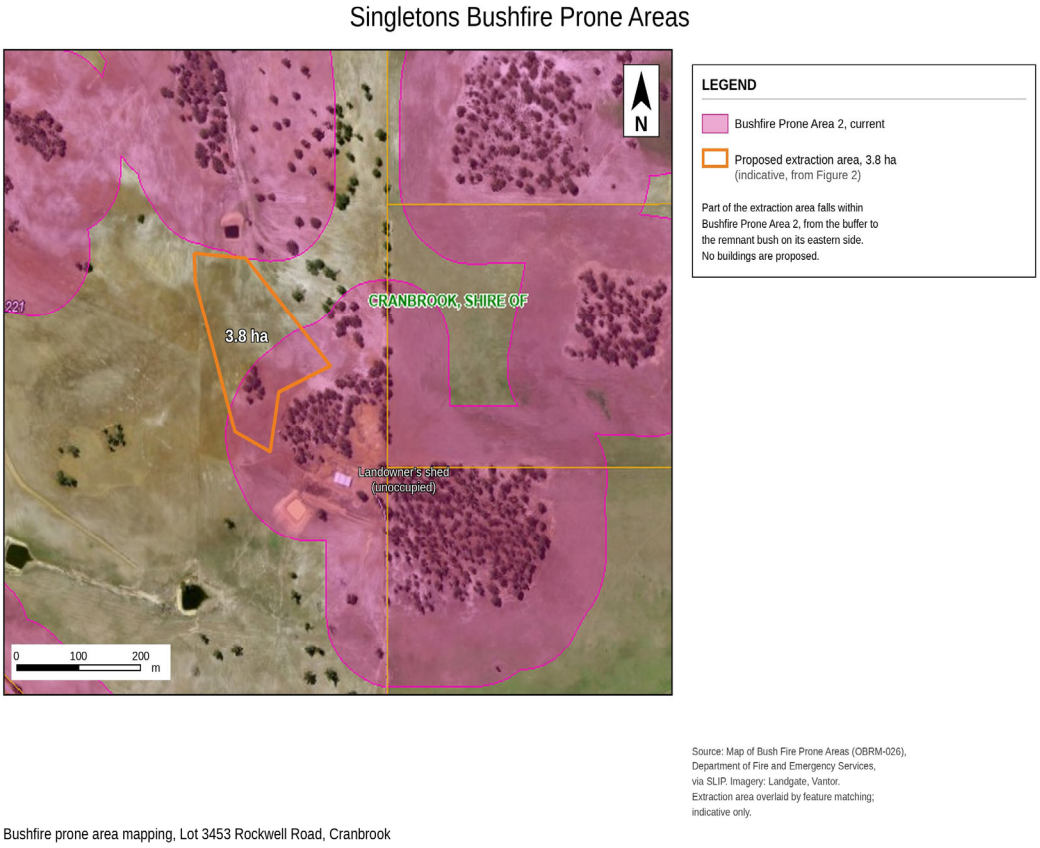


Figure 9 — Bushfire prone areas over the proposed extraction area.

Field	Detail
Mapping	Bushfire Prone Area 2, current, on the Map of Bush Fire Prone Areas (OBRM-026)
Extent	Part of the extraction area, on its eastern side next to the remnant bush. The rest is outside the mapped area.
Buildings	None proposed. The landowner's shed near the south-east corner is unoccupied.
Land use	No habitable or vulnerable land use. Short campaigns with two to three people on site.
Fire controls	No work on Total Fire Ban days, a water cart and extinguishers on site, and one 1 ha cell open at a time as bare ground. Refer EOMP.

Sources

- Bushfire prone areas: Map of Bush Fire Prone Areas (OBRM-026), Department of Fire and Emergency Services, via SLIP. Imagery: Landgate, Vantor.
- Extraction area: overlaid from Figure 2 by matching mapped features. Indicative only.

10. EXCLUSION ZONES

Every exclusion zone applying to an extractive industry in the Rural zone is listed below. The mandatory separation distances are satisfied by a wide margin; the items marked for confirmation need a measurement or a title search, not a design change.

NEAREST DWELLING	NEAREST WATERCOURSE	EXTRACTION AREA
1.3 km	**275 m**	**3.8 ha**
Against a 200 m requirement	Against a 40 m requirement	1 ha open at a time

Constraint	Requirement and position at this site
Sensitive land use	200 m required — 1.3 km at this site. Complies.
Public road	40 m required — 750 m to Rockwell Road. Complies.
Lot boundary	20 m required — 100 m to the nearest adjoining boundary. Complies.
Watercourse	40 m required — 275 m to the nearest mapped watercourse. Complies.
Waterway or wetland	Up to 100 m may be required — none within 275 m. Complies.
Trees near a thoroughfare	No removal within 40 m of a thoroughfare — no clearing proposed at all. Complies.
Remnant vegetation	20 m buffer from the outer drip line, shown green on Figure 2. Applied.
Registered easement	20 m required. No easements recorded on CT 1822/085 (1989 paper title). Confirm against a current digital title search.
Overhead power lines	20 m buffer to the transmission line and 10 m to the low voltage line, excluded from the extraction area. No poles within the area. Applied.
Groundwater	Water logged in 28 of 196 test pits in July 2021, from 500 mm to 1,900 mm below surface. In 7 pits it was at or above the 0.9 m floor. Extraction stays dry: where water is met, the floor is kept above it. Refer geotechnical attachment. Section 3.
Bushfire	Part of the area is within Bushfire Prone Area 2. No buildings proposed. Refer Figure 9.

11. NOTES AND LIMITATIONS

- Boundaries shown are indicative and derived from aerial imagery. A licensed surveyor's certificate and datum peg are required under clause 2.3 of the Extractive Industries Local Law, and will establish the final boundary coordinates and contour levels to Australian Height Datum.
- Coordinates are GDA94, MGA Zone 50, and mark the corners of the area rather than surveyed corner pegs.
- Subject land details are from certificate of title Volume 1822 Folio 085, a paper title superseded by the digital register. Items still highlighted are outstanding.
- The exclusion distances in Section 10 are horizontal straight-line measurements taken in the map projection. They are not source-reduced and should not be relied on for setting out.
- Read distances from each figure's graphic scale bar rather than by scaling off the page.
- The proposal is expected to be referred to the responsible state department for water, given the watercourses mapped on the wider property.

ENVIRONMENTAL AND OPERATIONAL MANAGEMENT PLAN

Proposed extractive industry — lateritic sandy gravel, staged extraction in cells of approximately 1 ha

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This plan is submitted with the development application under the Shire of Cranbrook Town Planning Scheme No. 4. It will also support the application for an extractive industry licence under the Shire's Extractive Industries Local Law, which is lodged once planning approval is granted, as clause 3.1(1) of the Local Law requires. It addresses the matters the Shire listed in its advice of 6 October 2026. Section 11 shows where each one is covered.

It is written to be run from the site, not from a filing cabinet. The commitments are deliberately few and checkable: one cell open, one access track, one logbook (Appendix A). Section 10 sets out the whole monitoring burden on a single page.

1. SITE DETAILS

Location, description of the site, existing land uses on subject site, existing land uses on adjoining sites

Field	Detail
Street address	221 Rockwell Road, Cranbrook WA 6321
Land description	Lot 3453 (part of Plantagenet Location 3453).
Certificate of Title	Volume 1822 Folio 085. Paper title dated 10 January 1989,
Registered proprietor	Edward Robert Singleton. (transfer J119134, registered 14 December 2004)
Lot area	352.8277 ha (part of Plantagenet Location 3453). The same title also covers Plantagenet Location 3237 (316.0595 ha), 668.8872 ha in total.
Local government	Shire of Cranbrook
Zoning	Rural, under Town Planning Scheme No. 4
Access	Albany Highway (H1) at 311.13 SLK LHS, then 2.2 km along Rockwell Road (LHS), then 1.4 km along a private access track—approximately 3.6 km in total

Existing land use — subject site

The lot is a working rural property. The proposed extraction area sits on previously cleared farmland used for grazing. Lateritic sandy gravel is present at shallow depth across the area, confirmed by a Main Roads Western Australia investigation of 196 test pits in July 2021. There are no buildings or dams within the proposed extraction area, and no native vegetation within it.

Existing land use — adjoining sites

Adjoining land is rural: broadacre farmland interspersed with remnant native vegetation, held in large landholdings. Remnant bush adjoins the eastern edge of the extraction area. The nearest habitable

dwelling is 1.3 km south-east of the extraction boundary. There are no schools, hospitals, caravan parks or other sensitive land uses in the vicinity.

Planning and statutory framework

Instrument	Position
Town Planning Scheme No. 4	Rural zone. Extractive industry is a 'D' use: not permitted unless the Shire grants planning approval.
Deemed provisions, clause 67	The Planning and Development (Local Planning Schemes) Regulations 2015 set the matters the Shire considers, including amenity, traffic and compatibility with adjoining land. Sections 3 to 6 address these.
State Planning Policy 2.4	Planning for Basic Raw Materials supports extraction close to where material is used, with separation from sensitive uses and progressive rehabilitation. The pit is 1.3 km from the nearest dwelling and is rehabilitated cell by cell.
Extractive Industries Local Law	A separate extractive industry licence is sought from the Shire once planning approval is granted (clause 3.1(1)).
Environmental Protection Act 1986	Processing stays below the Category 12 threshold, so no works approval or licence is needed (Section 2). No clearing is proposed, so no clearing permit is needed (Section 4).
Environmental Protection (Noise) Regulations 1997	Complied with. Refer Section 6.
Mine safety	A Site Senior Executive is appointed under the requirements administered by the Department of Energy, Mines, Industry Regulation and Safety. Refer Section 10.

2. PROPOSEDDEVELOPMENT

Proposed development — nature of extraction, hours and days of operation, estimated life of pit, number of employees

The proposal is the extraction and sale of lateritic sandy gravel prepared to road building specification. Topsoil is stripped, the gravel is processed in place, and the prepared material is then pushed up, stockpiled, loaded and carted off site.

Processing is carried out by mobile plant brought to the site for a campaign and removed at the end of it. Approval is sought on that basis rather than for one named machine, so that the operator can select the plant best suited to the material and the ord er without returning to the Shire each time.

The method currently used is a tractor-mounted stone crushing head, an MTH225 carried on a 520 hp tractor, which works the gravel while it is still in the ground. Other mobile units may be substituted within the envelope set out below.

How the material is processed

The gravel is processed in place by a tractor-driven stone crusher. The head is drawn along by the tractor and works the material to approximately 400 mm depth per pass, laying it back down behind the machine as an even layer which is then lifted to stockpile. A cell with 0.75 m of usable gravel is completed in two passes.

The breaking is done by an enclosed rotary drum. Because the material is worked in the ground, inside a closed housing and at its natural moisture content, the operation avoids the elevated transfer points, feed hoppers, conveyors, stacker drops and screendecks, where a conventional crushing and

screening plant generates most of its dust and noise. The plant is a tractor and a mounted implement, and the resulting dust and noise are comparable to general farming operations on the same ground. Sections 5 and 6 set out the controls that apply.



(a) Tractor and mounted stone crushing head — one machine, no fixed installation



(b) Head working below grade



(c) Enclosed drum housing and rear hood

Figure 1 — Tractor-mounted stone crushing head. The whole plant is the tractor and the implement behind it.

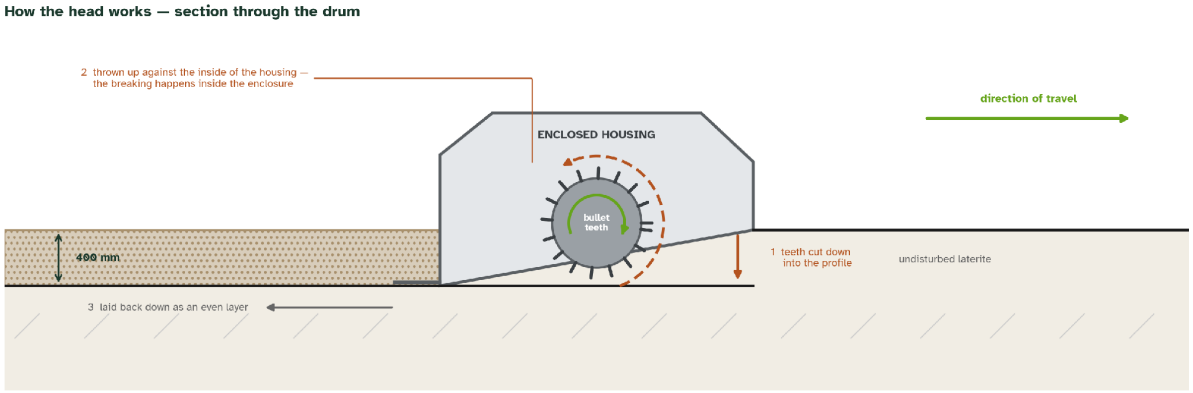

Figure 2 — Section through the crushing head. The drum cuts downward, throws the material against the inside of the housing where the breaking occurs, and lays it back down as an even layer.

The processing envelope

The following limits define what is applied for. They are offered as conditions of the licence, and anything outside them would require a fresh approval.

Limit	Commitment
Mobile plant only	All processing plant is mobile, brought to site for a campaign and removed with it. No fixed or permanent installation, no footings, no site-assembled circuit, and no plant stored on the site between campaigns.
Plant types	A tractor-mounted stone crushing head as the primary method, and where an order requires a specified grading, a mobile screen. No other processing is proposed.
No water	No washing, scrubbing or wet separation of any kind. The method requires no water at all: material is broken in place at its natural moisture content. No water is imported and no process water is generated.
No importation	No material is brought to the site for processing. Only material won from the pegged cell is processed.
Location	Within the active cell only, as shown in Figure 3. Plant does not operate outside the pegged cell boundary, and moves between cells as the operation advances.
Hours	Processing only within the operating hours at Section 2, and only during campaigns

Screening

Where an order calls for a grading the crushing head alone cannot reliably produce, a mobile screen may be brought to the cell alongside it. Screening is dry and sits within the same envelope: mobile plant only, no water, no imported material, within the active cell. Because a screen discharges from a height, on the days one operates it governs the dust and noise controls at Sections 5 and 6 rather than the crushing head.

Two things follow from the envelope and are worth stating plainly. Because no washing is undertaken and no water is imported, the operation generates no process water even where a screen is used, and the stormwater case at Section 4 is unaffected. And because all plant is mobile and has no fixed position, there is no installation on this site capable of being enclosed.

Campaign crushing — how much, and when

Processing is not continuous and does not apply to all material. It is done campaign by campaign, only where the order calls for a specified grading such as basecourse or subbase. Where the buyer wants unprocessed gravel, common for farm tracks, hardstand and general fill, the material is won and carted without processing plant entering the cell at all.

Prescribed premises position

Category 12 of Schedule 1 to the Environmental Protection Regulations 1987 covers premises on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated, at a production or design capacity of 50,000 tonnes or more per year. Extraction and processing at this site stay below that threshold, so no works approval or licence under Part V of the Environmental Protection Act 1986 is required.

The operator is aware of the threshold and commits to remaining below it for the life of the licence. Approval would be sought from the Shire and from the Department of Water and Environmental Regulation before exceeding either.

Field	Detail
Nature of extraction	Lateritic sandy gravel, worked to grading in place by a tractor-mounted stone crushing head, with a mobile screen where an order requires it, then won dry by excavator or loader. No blasting. No fixed plant, no washing, no imported material.
Annual tonnage	Varies with demand, extracted in campaigns. Extraction and processing stay below the Category 12 threshold of 50,000 tonnes a year.
Hours of operation	7:00 am to 6:00 pm Monday to Friday; 7:00 am to 5:00 pm Saturday
Days not worked	Sundays and public holidays no operation of any kind
Working pattern	Campaign-based. The pit is worked in short campaigns against orders and is idle between them, typically for the greater part of the year.
Employees	Two to three personnel on site during a campaign, an operator, a truck driver and, where required, a supervisor. No permanent staff are based on site.
Water source	Water for the water cart is drawn from source, for example a farm dam on the property. No water is used in processing.
Site office or amenities	None. No buildings, workshop, fuel store or fixed plant will be established. All processing plant is mobile and leaves the site at the end of each campaign.

Proposed size and depth — if greater than 1 ha, total extraction area, stages with staging plan, estimated timing of each stage

The application area is about 3.8 ha in a single area within the lot. Because that exceeds 1 ha, extraction is staged. Stage boundaries are not fixed in advance. The area is worked progressively in cells of approximately 1 ha, set out within the application area as demand and material require, and worked one at a time. The application area and its boundary coordinates are shown at Figure 2 of the accompanying figure set.

APPLICATION AREA	OPEN AT ANY TIME	MAXIMUM DEPTH
3.8 ha	1 ha	0.9 m
Single area	One cell only	0.75 m of gravel under topsoil

Item	Detail
Application area	About 3.8 ha in a single area, with boundary coordinates at Figure 2 of the figure set
Staging	Progressive, in cells of approximately 1 ha. Each cell is set out on the ground as it is needed. Stage areas are not pre-defined.
Excavation depth	Approximately 0.9 m below existing ground surface: 0.75 m of gravel beneath approximately 0.15 m of topsoil
Open area at any one time	One cell of approximately 1 ha. The next cell is not opened until the previous is rehabilitated, or rehabilitation is substantially advanced.

Item	Detail
Indicative timing	Driven by demand. Cells are opened one at a time and are not worked at the same time.

Cells are opened one at a time within the application area, starting nearest the access track, and are not worked concurrently. Where a cell adjoins the remnant bush on the eastern edge, work progresses away from the bush.

Estimated volume of extraction and estimated timeframe

Item	Estimate
Recoverable depth	0.75 m of usable gravel, adopted from the Main Roads Western Australia geotechnical investigation of 12 to 19 July 2021 (196 test pits). Median usable thickness was 750 mm.
Volume per cell	Approximately 7,500 m³ per 1 ha cell
Total estimated volume	Approximately 28,500 m³ across the 3.8 ha application area
Topsoil and overburden	About 0.15 m deep: about 1,500 m³ per 1 ha cell and 5,700 m³ across the 3.8 ha. Stockpiled within the cell and respread at rehabilitation.

These are planning estimates derived from the mapped extent and an assumed uniform recoverable thickness. Actual yield will vary with the depth and quality of the gravel profile encountered. The volumes are not a commitment to extract; they set the upper bound the approval is sought against.

Extraction process and staging — methods to be employed, any on-site processing works, estimated timeframe for each stage

Each cell follows the same seven-step sequence. Nothing in it varies between cells, which is what makes the operation straightforward to supervise and to audit.

1. **Set out and mark the cell.** The cell boundary is pegged within the application area before any machine enters. Pegs are maintained for the life of the cell. No plant travels outside the pegged boundary.
2. **Strip topsoil and overburden.** A minimum of 150 mm of topsoil is stripped and windrowed separately from any overburden, in the positions shown in Section 2 of this plan. Topsoil is never mixed with overburden or with gravel.
3. **Process the material.** Where the order calls for a specified grading, the crushing head is drawn across the cell, working approximately 400 mm deep and laying the processed material back down as an even layer. A loader or dozer lifts that layer to stockpile, leaving a clean floor, and the next layer is worked the same way. Material is processed at its natural moisture content; nothing is washed and no water is used.
4. **Win the gravel.** The prepared material is pushed up and excavated dry to a maximum of approximately 0.9 m below the original surface using an excavator or loader. Hard ironstone may be ripped with a tine ahead of the excavator. No blasting or dewatering is undertaken.
5. **Load and cart.** Material is loaded directly to trucks and carted off site. Where a short-term product stockpile is needed it is held within the working cell, clear of the topsoil and overburden windrows, in the position shown in Figure 3.

6. **Shape the floor and batters.** On completion of extraction in the cell, the floor is graded to an even surface draining to the natural fall and the faces are battered to a minimum of 5 horizontal to 1 vertical, with all loose material removed.
7. **Respread topsoil and revegetate.** The windrowed topsoil is respread across the cell, the surface is ripped on the contour and the cell is seeded to pasture. Only then is the next cell opened.

Stage timing follows demand rather than a calendar. A cell may sit part-worked between campaigns. The binding limit is the one-hectare cap on open area, not the rate of progress.

Location of topsoil and storage areas

Every stockpile on this site sits within the working cell topsoil, overburden and any short-term stockpile of product gravel. Nothing is placed on undisturbed ground outside the pegged cell, which keeps the disturbed footprint to the one hectare approved and means rehabilitation of the cell closes out the stockpile areas at the same time.

The three materials are kept apart from one another within the cell. Topsoil is windrowed parallel to the cell boundary so that it is respread over the shortest possible haul at rehabilitation, and so that it is never double-handled between cells.

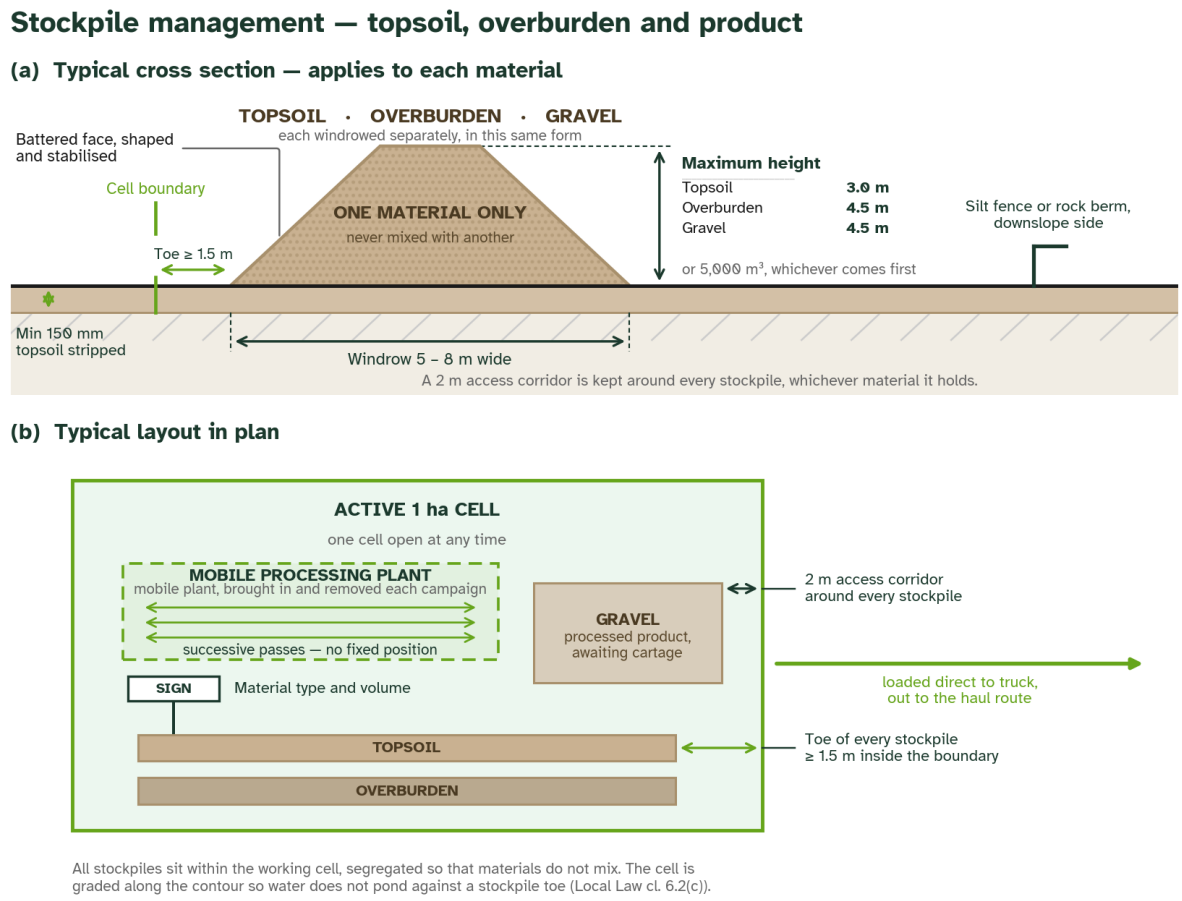

Figure 3 — Typical stockpile cross section, which applies equally to topsoil, overburden and gravel, and the stockpile and mobile processing layout within a working cell.

Sources

- Drainage, dust and reinstatement requirements: Extractive Industries Local Law, clauses 6.2 and 7.4.
- Stockpile positions within each cell: proponent-supplied, indicative and subject to final set-out on site.

Matter	Control measure	When
Topsoil	Stripped to a minimum of 150 mm and windrowed parallel to the cell boundary. Windrows 5 to 8 m wide and no more than 3.0 m high a lower limit than the other materials, so the seed bank and soil biology survive storage.	At cell opening
Overburden	Windrowed separately from topsoil, alongside it, with a clear gap between the two toes. No mixing at any point. Height limited to 4.5 m or 5,000 m³, whichever is reached first.	At cell opening
Processed gravel	Prepared material is pushed up and held within the working cell in the position shown in Figure 3, clear of the topsoil and overburden windrows, or loaded direct to truck. Height limited to 4.5 m or 5,000 m³, whichever is reached first. No product is stockpiled on topsoil.	During campaigns
Toe clearance	The toe of every stockpile sits at least 1.5 m inside the cell boundary so that no material can move beyond it.	Ongoing
Fire and plant access	A 2 m corridor is maintained around all sides of every stockpile.	Ongoing
Drainage	The cell is graded so that water does not pond against a stockpile toe. A silt fence or rock berm is installed on the downslope side where any fall exists.	At cell opening
Stabilisation	Faces are shaped and battered. Windrows left standing over summer are seeded or left to grass over to hold the surface.	Ongoing
Identification	Each stockpile is signed with the material type and approximate volume so that nothing is loaded or spread in error.	Ongoing
Retention on site	All topsoil and overburden stays on the lot. None is sold, removed or used off site.	Life of the pit

3. TRANSPORT

Vehicles and machinery — proposed number, size or classification of trucks; covered or uncovered for dust management during transport

Item	Detail
Processing plant	Mobile plant only. An MTH225 stone crushing head on a 520 hp tractor, working to approximately 400 mm depth per pass, and where an order requires it a mobile screen. Brought to site for the campaign and removed with it.
Extraction plant	One tracked excavator (20 to 30 t) or one wheel loader, working the face
Support plant	One dozer or grader for stripping, shaping and rehabilitation, on site intermittently
Water cart	One water cart or tanker, on site whenever the pit is being worked, for dust suppression and fire response

Item	Detail
Haulage	Truck and dog or side-tipper combinations, typically 12 m³ capacity. Rigid tippers may be used for smaller orders.
Load covering	All laden trucks leaving the site are covered or the load is dampened before departure. Loads are not carried above the sideboard line.
Plant storage	No plant is stored on site outside campaigns. Trucks do not remain on site overnight.
Servicing	No routine servicing on site. Breakdown repairs only, with drip trays and a spill kit in place.

Number of vehicle movements per day

Haulage runs in campaigns. Trucks move only on campaign days and only within the operating hours. Between campaigns there is no truck traffic, and the annual haulage amount is low.

Scenario	Vehicle movements
Typical campaign day	8 to 12 laden loads, which is 16 to 24 truck movements counting both directions
Maximum campaign day	15 laden loads, which is 30 truck movements
Light vehicles	2 to 3 movements a day during a campaign, for personnel
Between campaigns	Nil
Movement hours	Within the operating hours at Section 2. No carting outside those hours.

Traffic management

The traffic controls are set to match the movements above: up to 30 truck movements a day, on campaign days only, entering and leaving a low-volume rural road at a single existing crossover. At that scale, warning signs on the approaches to the entrance are fit for purpose. No traffic control, lane closure or work on the road is needed.

Matter	Control measure	When
Warning signs	‘Trucks entering’ signs are placed on Rockwell Road on both approaches to the entrance, in positions agreed with the Shire	Before the first load of each campaign
Sign removal	Signs are taken down or covered at the end of each campaign, so they are only shown when trucks are using the entrance	End of each campaign
Entrance	Trucks give way to traffic on Rockwell Road when leaving the property	Every load
Driver briefing	Drivers are briefed on the route, the entrance, the speed limit on the private track and the operating hours	Start of each campaign
Sign check	Signs are checked at the start of each working day and repaired or replaced if damaged	Every campaign day

If a campaign is expected to exceed 15 laden loads a day, or haulage is to run at a larger scale or for a longer period than described here, a Traffic Management Plan (TMP) and Traffic Guidance Scheme (TGS) can be prepared if needed by a suitably accredited person and approved by the Shire before

that campaign starts. Haulage above the levels in this plan does not proceed until that approval is in place.

Access and haulage routes — also indicated on the site plan

There is one route in and one route out, and it is the route already used by the property. No new access is proposed and no new track is to be constructed.

Leg	Detail
Turn-off	Albany Highway (H1) at 311.13 SLK, left-hand side
Public road leg	2.2 km along Rockwell Road, left-hand side
Private leg	1.4 km along the existing private access track within the lot — unsealed
Total from H1	Approximately 3.6 km
Internal haul	Direct from the working cell to the private access track. No haul across undisturbed ground outside the pegged route.
Route figure	Refer Figure 1 of the accompanying figure set

Matter	Control measure	When
Track condition	The private access track is graded and maintained for the life of the operation and left in a condition no worse than at commencement.	Ongoing
Road condition	Rockwell Road is maintained to the Shire's satisfaction while it is used for haulage. Any damage attributable to the operation is made good at the operator's cost.	As required
Track-out	The last 30 m of the access track before Rockwell Road is kept free of loose gravel so that material is not dragged onto the public road.	Each campaign
Signage	'Trucks entering' signs on both approaches to the entrance on campaign days, as set out under Traffic management above	Campaign days
Power lines	Tipper trays down when passing under the power lines on the access track.	Every load
Operator sign	A sign at the property entrance names the operator and gives a contact name and phone number for enquiries.	Life of the pit
Speed	Trucks travel to conditions on the unsealed track, and no faster than 40 km/h within the property.	Ongoing

4. ENVIRONMENT AND BUFFERS

Distance to all habitable structures or sensitive land uses within 1 km of the proposed extraction area

There are none. The nearest habitable dwelling is 1.3 km south-east of the extraction boundary, measured as a straight line. The 200 m separation required is exceeded more than six times. EPA guidance on separation distances recommends 1,000 m for hard-rock extraction involving blasting, crushing and screening. That is also exceeded, although no blasting is proposed here.

Because there is no sensitive receptor within 1 km, no acoustic assessment or air-quality modelling is proposed. Refer Figure 4 of the accompanying figure set, which shows the surrounding land use and the nearest sensitive receptor. The dwelling location is derived from aerial photograph interpretation and will be confirmed on site.

Details of on -site vegetation and waterways, and distances from these

Feature	Position
Vegetation in extraction area	Nil. The area sits on previously cleared farmland.
Adjacent vegetation	Remnant bush adjoins the eastern edge of the application area. A 20 m buffer is applied to any remnant vegetation, measured from the outer drip line of the canopy and pegged before the adjoining cell is opened, to protect root systems and to keep the excavation clear of the ground that drains to the bush. No clearing of native vegetation is proposed anywhere on the site.
Nearest watercourse (SW)	275 m
Nearest watercourse (NE)	1.05 km
Nearest watercourse (N)	1.33 km
Local Law cl. 6.1(d)	40 m minimum from any watercourse - satisfied six times
Waterway or wetland	Up to 100 m may be required from a waterway or wetland- satisfied
Wetlands	No mapped wetland within or adjoining the application area
Nearest adjoining property boundary	100 m east and 750 m south at Rockwell Road, refer Figure 5 of the accompanying figure set. Local Law cl. 6.1(a) requires 20 m.
Visual impact	The area is 750 m from Rockwell Road on cleared farmland, with remnant bush to the east. Only 1 ha is open at a time and each cell is returned to pasture, so no screening works are proposed.
Overhead power lines	20 m buffer to the transmission line and 10 m to the low voltage line, excluded from the extraction area. No poles within the area. Applied.

Watercourses are mapped elsewhere on the wider property, the nearest 275 m south-west of the extraction area, and the application is expected to be referred to the Department of Water and Environmental Regulation on that basis. Refer Figure 6 of the accompanying figure set.

Details and description of any proposed vegetation removal, on site or within the road reserve

None. No native vegetation will be removed from the extraction area, from the access track or from the Rockwell Road reserve. A 20 m buffer is maintained to any remnant vegetation, measured from the outer drip line and pegged on the ground before the adjoining cell is opened, so that no excavation, stockpiling or plant movement occurs within it. No clearing permit under Part V, Division 2 of the Environmental Protection Act 1986 is required, and none is sought.

The access track is existing and requires no widening. Clause 6.3(a) of the Local Law, which prohibits removing trees or shrubs within 40 m of a thoroughfare boundary, is satisfied because no removal of any kind is proposed. If an unforeseen circumstance ever made clearing necessary, work would stop and the Shire would be approached before anything was cut.

Control of environmental incidents, corrective and preventive actions, spill management procedures; list of poisonous, flammable or harmful chemicals or hazardous materials stored on site and measures to prevent escape

No hazardous materials are stored on the site. There is no fuel tank, no chemical store, no workshop and no bulk container of any kind. Diesel arrives with the service vehicle, goes into the machine and leaves with the vehicle at the end of the day.

Item	Position on site
Bulk fuel storage	None
Chemical storage	None
Materials present during a campaign	Diesel in machine tanks and in the service vehicle's mobile tank; small quantities of engine oil, grease and hydraulic oil carried on the service vehicle
Refuelling	Direct transfer from the service vehicle, over a spill tray sized to contain the largest single transfer, at a single nominated point on the flattest available ground within the cell, never within 100 m of a stockpile toe or the drainage line south-west of the area. No fixed fuel tank is proposed.
Spill equipment	A spill kit sized for the largest single container on site travels with the service vehicle and is checked at the start of each campaign

If something is spilled

1. **Stop the source.** Shut down the machine or transfer and stop the flow, if it is safe to do so.
2. **Contain it.** Bund the spill with soil or absorbent from the spill kit before it can reach a drainage line.
3. **Recover it.** Lift contaminated soil and absorbent into a sealed container. Take it off site to a licensed facility. Nothing contaminated is buried on the lot.
4. **Report it.** Notify the Shire within 48 hours for any spill beyond a trivial drip, and the DWER Pollution Watch Hotline on 1300 784 782 for anything that reaches or threatens a watercourse.
5. **Record and fix the cause.** Record the event in the complaints and incidents register in the site logbook (Appendix A), with the date, volume, cause and action taken, and change the practice that allowed it.

Is there bulk storage of flammable materials on site? Details of bushfire management

No. There is no bulk storage of flammable material on the site, so no bushfire management plan is triggered on that basis. The site is nonetheless in a rural bushfire landscape and is worked over summer, so the following applies.

Part of the extraction area is within Bushfire Prone Area 2 on the Map of Bush Fire Prone Areas, from the mapped buffer around the remnant bush on its eastern side (figure set, Figure 9). The rest of the area is outside it. No buildings and no habitable or vulnerable land use are proposed, and the landowner's shed near the south-east corner is unoccupied. The open cell is bare ground with little to burn.

Matter	Control measure	When
Bans	No work on a day of Total Fire Ban or during a declared vehicle movement or harvest ban, unless a written exemption is held.	Checked daily
Water on site	A charged water cart or firefighting unit is on site at all times while plant is operating.	Every working day
Extinguishers	Every machine and vehicle carries a serviceable extinguisher.	Ongoing
Spark arrestors	Approved spark arrestors are fitted to all plant working on site.	Ongoing
Hot work	No welding, grinding or cutting on site during the restricted period. If unavoidable, a fire watch is kept for three hours after work stops.	As required
Cleared surrounds	The working cell is bare ground, which gives a substantial fuel-free buffer in every direction.	Inherent
Egress	The access track is maintained trafficable in both directions at all times so that plant and personnel can leave.	Ongoing
Firebreaks	Maintained in line with the Shire's annual Firebreak Notice.	Ongoing

Details of drainage conditions and methods by which the excavation site is to be kept drained

Clause 6.2(c) of the Local Law requires the excavation to be drained and kept drained so that water does not accumulate. At approximately 0.9 m depth on cleared farmland this is a matter of shaping rather than engineering, and only one hectare is open at any time.

The controls below follow WQPN 15. Clean water from upslope is turned around the cell rather than through it; a sediment trap at the cell's low point catches fines before they can leave; and the trap is sized for the two-hour, 1 in 10 AEP event using DWER's published runoff coefficient of 0.8 for gravel pit floors, which at one hectare is 80 m³ for every 10 mm of design rainfall. The rainfall depth will be taken from Bureau of Meteorology IFD data for the site and the resulting volume reported to the Shire before the first cell is opened. Sediment is a scheduled item under the Environmental Protection (Unauthorised Discharges) Regulations 2004, so this is treated as a compliance control rather than a courtesy.

Matter	Control measure	When
Floor grade	Each cell floor is graded to an even surface following the natural fall, so that water sheds rather than ponds.	At cell opening and on completion
Run-on diversion	A diversion bank is formed on the upslope side of every cell so that clean water from above is turned around the cell rather than run through it.	At cell opening
Sediment trap	Formed at the low point of each cell with the excavator during set-up, and backfilled at rehabilitation. Sized as above.	Every cell
Overflow	The trap overflows to a stable spillway following the natural fall, able to pass events up to the 1 in 100 (1%) AEP without eroding.	At cell opening

Matter	Control measure	When
Discharge	Water released from the trap leaves as sheet flow across vegetated paddock. There is no piped or point discharge, and no discharge to any watercourse or drainage line.	Ongoing
Stormwater contained	All stormwater runoff from the working cell is contained within the lot. Nothing is discharged beyond the lot boundary.	Ongoing
Stockpiles	A silt fence or rock berm is installed on the downslope side of every stockpile, as shown in Figure 3.	At cell opening
After rain	The cell is inspected after any rainfall event above 20 mm in 24 hours. Any rill is repaired and the sediment trap desilted before work resumes.	After heavy rain
Desilting	Material recovered from the sediment trap is returned to the cell and incorporated in the respread topsoil. It is not spread on undisturbed ground.	As required
Standing water	No cell is left with standing water. If water accumulates, the floor is regraded to drain it - it is not pumped to a watercourse.	Ongoing
Dry excavation	Extraction is dry only. No dewatering or pumping. If water is encountered in a cell, extraction there stops and the floor is kept above it.	Ongoing

Dieback and general hygiene management

The extraction area is cleared farmland, which places it at the low end of the dieback risk spectrum. The material handled is subsoil gravel rather than organic topsoil from bushland, and no native vegetation is entered. The controls below are proportionate to that, and are the same controls that manage weed spread: one cleandown regime covers both.

Matter	Control measure	When
Clean on entry	Every machine and truck arrives free of soil and plant material. Anything arriving dirty is cleaned down at the property entrance before it proceeds.	Every arrival
Clean on exit	Plant moving off the property to another site is cleaned down before it leaves.	Every departure
Record	The ‘Machines’ check on the daily checklist in the site logbook (Appendix A). Any plant turned away is noted. That is the whole record-keeping requirement.	Every arrival
Single track	All movement is on the existing access track and within pegged cells. No plant travels through remnant vegetation or across undisturbed ground.	Ongoing
Wet soil	No plant movement through or adjacent to remnant vegetation when soils are wet and soil is being carried on tyres or tracks.	Wet season
Imported material	No soil, mulch, fill or seed is imported to the site. If material is ever needed for rehabilitation, it will be sourced from a dieback-free area and certified before it arrives.	If required

Matter	Control measure	When
Direction of work	Where a cell adjoins vegetation, work progresses away from the vegetation rather than towards it.	Eastern edge

5. DUST MANAGEMENT PLAN

The nearest habitable dwelling is 1.3 km south-east, so dust is unlikely to be an amenity problem for a neighbour. It matters most for the people working in the cell, for the remnant bush on the eastern edge, and for anyone sharing the road. The controls are set accordingly.

Processing is the main new dust consideration and is addressed directly rather than assumed away. The method described at Section 2 is inherently low-dust, for reasons of physics rather than good intentions. The breaking occurs by impact inside a closed housing at ground level; the material is worked at its natural moisture content, is never lifted clear of the ground, and is laid straight back down behind the machine. There is no feed hopper, no conveyor, no transfer point and no stacker drop. In a conventional crushing and screening circuit those elevated transfer points are where most of the dust is generated, and this method has none of them.

This is a genuine difference in kind, not a difference in degree, and it is the reason the operator considers dust from the crushing head to be comparable to that from a tractor-drawn implement working the same ground which is what the plant is. It is not, however, a claim that has been measured at this site, and no assertion of a specific emission level is made. The visible-dust standard below applies to the head exactly as it applies to the working face, and the water cart is on site and available if conditions require it, even though the process itself needs no water.

The mobile screen, where one is used, is a different matter and the plan does not pretend otherwise. A screen feeds, elevates and discharges material, so it has the transfer points the crushing head lacks, and it is the larger dust source of the two. On the days a screen is operating it governs the dust controls: it is positioned within the cell on the downwind side, discharge heights are kept as low as the machine allows, and watering is applied at the feed and discharge points. If dust cannot be held within the cell, the screen stops before other activities do.

Matter	Control measure	When
Trigger	The standard is visible dust leaving the working cell. If dust is visibly drifting beyond the cell, suppression is increased or work stops. This applies to the processing unit as it does to every other activity.	Continuous, by observation
Weather check	Before work starts each day the forecast wind speed and direction are checked, and work is planned so dust drifts away from the remnant bush and the nearest dwelling.	Every working day
Access track	The internal access track is watered during dry and windy conditions to keep the haul surface damp.	Dry or windy weather
Wind stand-down	Work stops when wind conditions are such that watering can no longer hold the dust within the cell. Where a screen is operating it stops first, as the activity with the highest discharge points.	As required
Loads	Every laden truck leaves with either a suitable in-situ moisture content or the load is dampened before it leaves the site. Loads are not heaped above the sideboards.	Every load

Matter	Control measure	When
Stockpiles	Stockpiles are shaped and battered rather than left loose, and are watered or allowed to grass over if they are to stand through summer.	Ongoing
Open area	Only one cell is open at a time, which is itself the single largest dust control on the site exposed area is capped at 1 ha.	Inherent
Vegetation edge	Where a cell adjoins the remnant bush on the eastern edge, watering is increased when working within 50 m of it, so dust does not blanket the foliage.	Eastern edge
Speed	Vehicle speed within the property is limited to 40 km/h, and lower on the haul when dry.	Ongoing
Screen operation	A mobile screen, where used, is set within the cell on the downwind side, with discharge heights kept as low as the machine allows and watering at the feed and discharge points.	Screening days
Monitoring and reporting	Dust is monitored by observation through the working day. Any exceedance of the trigger and the action taken are recorded on the daily checklist in the site logbook (Appendix A), which is available to the Shire on request.	Ongoing
Complaints	Any dust complaint is handled under the complaints procedure at Section 10.	On receipt

6. NOISE MANAGEMENTPLAN

Operations will comply with the Environmental Protection (Noise) Regulations 1997. With the nearest noise-sensitive premises 1.3 km away and no fixed plant, the assigned levels are not at risk of being exceeded and no acoustic assessment is proposed.

Processing plant is the loudest activity on the site and is identified as such rather than left out of the account. The primary unit is a 520 hp tractor drawing an enclosed drum head. Two things about it matter for noise. The drum runs inside a housing rather than in open air, and there is no crusher jaw, no conveyor and no separate power unit sources that make a conventional crushing and screening plant loud and that run continuously. What remains is a large agricultural tractor under load, of the same class already used for cropping on this property and on those around it.

A mobile screen, on the days one is used, is louder than the head. It has a deck, a discharge conveyor and its own power unit. It is used only for the orders that require it, only within the operating hours at Section 2, and it does not change the separation distance that governs compliance.

The operator’s position is that the resulting noise is comparable in kind and in level to agricultural plant working the same paddock. That comparison has not been measured, and no specific level is asserted. At 1.3 km from the nearest noisesensitive premises the assigned levels under the Regulations are not at risk, the unit is used only within the operating hours at Section 2, and only during campaigns.

Matter	Control measure	When
Hours	7:00 am to 6:00 pm Monday to Friday; 7:00 am to 5:00 pm Saturday. No operation on Sundays or public holidays.	Strictly observed
Separation	Nearest noise-sensitive premises 1.3 km south-east. No premises within 1 km.	Inherent
Fixed plant	None. No fixed screen, generator, compressor or crushing plant is established on the site. All processing plant is mobile and leaves at the end of each campaign.	Life of the pit
Blasting	None. No blasting is proposed and no explosives will be brought to or stored on the site.	Life of the pit
Vibration	No blasting and no fixed plant. The only vibration sources are mobile plant and trucks, comparable to farm machinery. No vibration monitoring is proposed.	Life of the pit
Plant condition	All plant is maintained with effective exhaust silencing. Any machine with a defective muffler is stood down until repaired.	Ongoing
Idling	Plant is shut down rather than left idling when not in use.	Ongoing
Reversing alarms	Broadband or self-adjusting reversing alarms are fitted where practicable.	Ongoing
Complaints	Any noise complaint is handled under the complaints procedure at Section 10, with the date, time and weather recorded in the complaints and incidents register (Appendix A).	On receipt
Change of scope	If fixed plant, screening, washing or extended hours are ever contemplated, or if annual production would approach the Category 12 threshold, an acoustic assessment will be prepared and Shire and DWER approval obtained first.	Before any change

7. WEEDMANAGEMENTPLAN

The realistic weed pathway on this site is machinery arriving with seed and soil on it, and disturbed ground being colonised before pasture establishes. Both are addressed by controls already committed to elsewhere in this plan, which is deliberate the clean-down regime at Section 4 and the prompt revegetation at Section 8 do most of the work.

Matter	Control measure	When
Clean-down	Every machine and truck arrives clean, as required at Section 4. This is the primary weed control on the site.	Every arrival
Baseline check	The cell is walked before it is opened and any declared pest under the Biosecurity and Agriculture Management Act 2007 present is recorded and treated before the ground is disturbed.	Before each cell opens

Matter	Control measure	When
Topsoil handling	Topsoil from a weed-affected area is kept separate and is not spread over clean ground. In practice this is avoided by treating before stripping.	As required
No import	No soil, gravel, mulch or seed is imported to the site. Any future import is certified weed-free before delivery.	Ongoing
Monitoring	Open cells, stockpiles, the access track and the entrance are inspected for new weed growth at the start and end of each campaign, and at least twice a year.	Twice yearly minimum
Treatment	New infestations are spot-sprayed or grubbed before seed set. Treatment is repeated until the infestation is gone rather than merely knocked back.	Before seed set
Rehabilitation	Prompt respreading of topsoil and seeding to pasture closes the window in which weeds establish on bare ground.	At cell closure
Record	New weeds are ticked on the daily checklist with their location, and any treatment is noted in the notes box (Appendix A).	Each treatment
Integration	Weed control on the extraction area is carried out as part of the property's existing farm weed programme rather than as a separate exercise.	Ongoing

8. REHABILITATION MANAGEMENTPLAN

The end land use is agricultural. Each cell is returned to pasture at the original grade, capable of being cropped or grazed with the paddock around it. Because extraction is only about 0.9 m deep and topsoil is retained on site, this is achievable cell by cell rather than as a single exercise at the end of the licence.

This section satisfies clause 6.2(d) and clause 7.4 of the Local Law. Rehabilitation is progressive: a cell is closed out before the next opens, so at no point is there more than one hectare of unrehabilitated disturbance on the property.

Rehabilitation sequence for each cell

1. **Cease extraction and remove plant.** All plant, equipment and any temporary stockpile of product is removed from the cell.
2. **Batter the faces.** All faces are battered to a minimum of 5 horizontal to 1 vertical, with all loose material removed, as required by clause 7.4(b)(ii). At 0.9 m depth that produces a face 4.5 m wide at its base trafficable by farm machinery and requiring no exclusion fencing. No unsupported or overhanging face is left standing.
3. **Grade the floor.** The floor is graded to an even surface following the natural fall, so that water sheds rather than ponds, as required by clause 7.4(c).
4. **Rip on the contour.** The floor is ripped along the contour to relieve compaction from plant traffic and to give the respread topsoil a surface to key into.
5. **Respread topsoil.** The windrowed topsoil is respread evenly across the cell, followed by any overburden where it is needed to make up level. Depth of cover is even rather than concentrated.

6. **Seed to pasture.** The cell is seeded to a pasture mix consistent with the surrounding paddock, at the break of season, and fertilised in line with normal farm practice.
7. **Exclude stock.** Stock are excluded from the cell until ground cover is established, using temporary electric fencing where the paddock is being grazed.
8. **Sign off.** Photographs are taken from fixed points and the cell is recorded as closed on the cell record (Appendix A). The next cell is not opened until this step is complete.

Completion standard

Measure	Standard
Ground cover	At least 70% perennial or annual pasture cover across the cell by the end of the second growing season after seeding
Surface	Even grade, free-draining, no rills, no ponding, no loose material
Batters	Battered to 5:1 (horizontal to vertical), stable and trafficable by farm machinery
Trees and shrubs	None planted. The end use is pasture, matching the surrounding paddock.
Weeds	No declared pest species present at a density above that of the surrounding paddock
Depth of cover	Topsoil respread across the full cell area
End use	Grazing or cropping, integrated with the surrounding paddock
Site left clear	No plant, equipment, waste or imported material remaining —clause 7.4(f)

Monitoring after closure

Matter	Control measure	When
First growing season	Inspect the cell after the break and again at the end of the season. Record cover, erosion and weeds on the cell record (Appendix A), with photographs from the fixed points.	Twice in year 1
Year 2	Annual inspection. Reseed any bare patch. Repair any rill before it develops.	Annually
Year 3	Final inspection against the completion standard above. A short written record with photographs is provided to the Shire on request.	Year 3
If the standard is not met	Remedial works, reseeding, additional topsoil, regrading are undertaken in the following season and the monitoring period extends until the standard is met.	As required

On permanent cessation

If the operation ceases permanently or the licence expires, the Shire is notified in writing within one week as required by clause 7.3. All open cells are then closed out to the sequence and standard above,

all plant and equipment is removed, any holes left by their removal are filled and compacted, and every area used for stockpiling is broken up, covered with topsoil and seeded as required by clauses 7.4(f) and 7.4(g).

9. ON-SITE WASTE MANAGEMENT PLAN

The simplest waste plan is the one where nothing is left on site. There is no bin, no skip and no burn pit at this operation. What comes in with the crew goes out with the crew at the end of the day.

Matter	Control measure	When
General rubbish	Food scraps, wrappers, containers and packaging are carried out daily in the service vehicle and disposed of off site.	Daily
Burning	No burning of any waste on site, at any time.	Absolute
Burial	No burial of any waste on site. No cell is used as a disposal point.	Absolute
Used oil and filters	No routine servicing on site. Any oil, filter or rag generated in a breakdown repair is contained and removed with the service vehicle to a licensed facility.	Each occurrence
Contaminated soil	Soil contaminated by a spill is lifted, contained and taken to a licensed facility. It is never spread or buried on the lot.	Each occurrence
Scrap metal and tyres	Removed from site. Nothing is left in a cell or windrow.	Each occurrence
Sanitary facilities	A serviced portable toilet is provided where a campaign runs more than five consecutive days. It is removed and pumped out by a licensed contractor.	Longer campaigns
Overburden and topsoil	Not waste. Retained on site and reused in rehabilitation of the cell they came from.	Life of the pit
Illegal dumping	The entrance is kept gated and the site is inspected at the start of each campaign for material dumped by others. Anything found is removed and reported.	Each campaign

10. MONITORING, RECORDS AND REVIEW

This is the whole administrative burden of the plan. It is deliberately short, because a plan that demands weekly paperwork from a two-person crew will not be followed and the Shire will end up auditing a fiction.

The site logbook

The site logbook is the two-page proforma at Appendix A. It has a daily checklist for each working day, a cell record for each cell from opening to sign-off, and a complaints and incidents register. Each check is a Yes or No tick, with a note only when something needs action. The supervisor keeps it, and it is produced to the Shire on request. Nothing else is required day to day.

Matter	Control measure	When
Cell opening	Boundary pegged within the application area shown at Figure 2 of the figure set, datum peg checked,	Each cell

Matter	Control measure	When
	run-on diversion and sediment trap formed, baseline weed walk done, photographs taken from fixed points. Recorded on the cell record (Appendix A). Underground services located before work near the eastern edge.	
Warning signs	Warning signs are put up and maintained at the open cell, as required by clause 6.2(b) of the Local Law.	Each cell
Daily, when working	Fire ban check, water cart charged, extinguishers in place, dust observed. No paperwork unless something is out of order.	Working days
Each arrival	Plant clean-down: the 'Machines' tick on the daily checklist (Appendix A).	Every machine
Each campaign	Site walked for dumped waste and new weeds at the start and end. Access track condition noted.	Per campaign
After heavy rain	Inspection for rills, ponding and sediment movement following any event above 20 mm in 24 hours.	As triggered
Cell closing	Rehabilitation sequence completed and signed off, photographs taken, closure recorded on the cell record (Appendix A) before the next cell opens.	Each cell
On request	A report is provided to the Shire at its request, with photographs and access for on-site inspection. It covers cells opened and closed, volume extracted, rehabilitation status, incidents and complaints.	At the Shire's request
Plan review	This plan is reviewed at the end of each licence year, and immediately after any incident or any change to the method of working. Amendments are submitted to the Shire for endorsement.	Annually or on change

Complaints procedure

Every complaint, whether it comes to the site, the operator or the Shire, is handled the same way.

1. **Receive.** Complaints can be made by phone to the contact on the entrance sign or through the Shire. Each one is entered in the complaints and incidents register (Appendix A) on the day, with the complainant's name and contact details, the date, time, weather and the nature of the complaint.
2. **Acknowledge.** The complainant is contacted within one working day to confirm the complaint has been received.
3. **Investigate.** The site supervisor investigates the same week, checking the activity, the weather and the controls in place at the time.
4. **Act.** If the complaint is substantiated, the cause is corrected. Where dust or noise cannot be controlled, the activity stops until it can be.
5. **Report back.** The complainant and the Shire are told the outcome and any action taken within seven days. Complaint records are kept for the life of the licence and made available to the Shire, other authorities and the complainant on request.

Responsibility

Role	Responsibility
Licensee	Holds the licence, holds the secured sum, and is accountable to the Shire for everything in this plan
Site Senior Executive	A Site Senior Executive is appointed for the operation, consistent with the requirements administered by the Department of Energy, Mines, Industry Regulation and Safety, with accountability for safety and health on site.
Site supervisor	Named for each campaign. Keeps the site logbook (Appendix A), runs the pre-start briefing, has authority to stop work on dust, noise, fire or wet conditions.
Dust, noise and complaints contact	Bill Gibbs, Managing Director, 0428 412 279. Responsible for dust and noise management, monitoring and the complaints procedure.
All personnel	Briefed on this plan before first working on the site, and on the specific controls for the cell being worked
Landowner	Notified before each campaign commences and consulted on access track condition and stock movements
Shire of Cranbrook	19 Gathorne Street, Cranbrook WA 6321 (PO Box 21) (08) 9826 1008 — admin@cranbrook.wa.gov.au
Reporting	A report is provided to the Shire at its request, and the site is made available for inspection. Particulars of any inspection or report under the Mines Safety and Inspection Act 1994 or the Environmental Protection Act 1986 are given to the Shire within 14 days, as clause 7.2 requires.
Public liability	A current public liability policy of at least $10,000,000 for any one claim, in the joint names of the licensee and the Shire. A copy is given to the Shire within 14 days of issue and evidence of renewal within 14 days of each renewal, as clause 7.1 requires.
Reportable incidents	Shire of Cranbrook within 48 hours. DWER Pollution Watch Hotline 1300 784 782 for pollution incidents.

11.SHIRE CHECKLIST

The Shire's advice of 6 October 2026 lists what a planning application should include. Each item is cross-referenced below.

Shire item	Where addressed
Application form	Signed by the applicant and owner of the land. Lodged separately.
Site plan	Accompanying figure set, Figures 1, 2 and 5.
(a) Site description, excavation areas and annual tonnage	Sections 1 and 2
(b) Strategic and statutory planning requirements	Section 1, Planning and statutory framework
(c) Environmental values requiring protection	Section 4
(d) Separation distances and map of sensitive premises	Section 4; figure set Figure 4
(e) Transport routes and site access	Section 3; figure set Figure 1
(f) Sequential land use and staging plan for rehabilitation	Sections 2 and 8
(g) State Planning Policy 2.4 guidelines	Section 1, Planning and statutory framework
(h) Complaints procedure	Section 10, Complaints procedure
(i) Machinery and water sources	Sections 2 and 3
(j) Noise, dust and vibration management	Sections 5 and 6
(k) Rehabilitation plan	Section 8
(l) Explosives or blasting management	Not applicable. No blasting is proposed and no explosives are brought to or stored on the site (Section 6).
(m) Traffic management: truck movements and routes	Section 3

APPENDIX A: SITE LOGBOOK

One daily checklist for each working day, one cell record for each cell, one line in the register for each complaint or incident. Tick Yes or No, and add a note only when something needs action. Kept by the site supervisor and shown to the Shire on request

Part 1: Daily checklist

Date and cell number	Start and finish time	Wind at start, e.g. light from the SW

Item	Check	Yes / No
Fire	No fire ban, extinguisher on every machine?	☐ Yes ☐ No
Machines	Machines arrived clean of soil and plants?	☐ Yes ☐ No
Signs	Truck signs and cell warning signs up?	☐ Yes ☐ No
Water cart	Water cart on site and charged?	☐ Yes ☐ No
Dust	Dust left the cell? Note the action.	☐ Yes ☐ No
Stop work	Work stopped for dust, noise or wind? Note time.	☐ Yes ☐ No
Water	Water met? Keep the floor above it.	☐ Yes ☐ No
Depth	Floor no deeper than 0.9 m?	☐ Yes ☐ No
Rain	Heavy rain? Check the bank and trap.	☐ Yes ☐ No
Spill	Spill? Record it in Part 3.	☐ Yes ☐ No
Complaint	Complaint? Record it in Part 3.	☐ Yes ☐ No
Weeds	New weeds seen? Note where.	☐ Yes ☐ No
Rubbish	All rubbish taken off site?	☐ Yes ☐ No
Truck loads	15 loads or fewer today? Number: ___	☐ Yes ☐ No
Last day	Last day? Signs down, plant removed.	☐ Yes ☐ No

Notes and actions	Supervisor signature and name	Date

Part 2: Cell record

Cell number	Dates opened and closed	Supervisor signature and name

Stage and item	Check	Yes / No
Open: pegging	Cell boundary pegged inside the approved area?	☐ Yes ☐ No
Open: buffer	20 m bush buffer pegged, if near the bush?	☐ Yes ☐ No
Open: water	Check pit dug, floor above any water?	☐ Yes ☐ No
Open: topsoil	Topsoil stockpiled separately from overburden?	☐ Yes ☐ No
Open: drainage	Diversion bank and sediment trap built?	☐ Yes ☐ No
Open: photos	Opening photos taken from the fixed points?	☐ Yes ☐ No
Close: clean up	Plant, gravel stockpiles and rubbish removed?	☐ Yes ☐ No
Close: edges	Edges sloped to 5 across for every 1 down?	☐ Yes ☐ No
Close: floor	Floor graded to drain and ripped?	☐ Yes ☐ No
Close: topsoil	Topsoil spread back evenly?	☐ Yes ☐ No
Close: seeding	Pasture sown? Note the date.	☐ Yes ☐ No
Close: stock	Stock kept out until pasture is established?	☐ Yes ☐ No
Close: photos	Closing photos taken from the fixed points?	☐ Yes ☐ No
Season 1	Pasture establishing, no erosion or ponding?	☐ Yes ☐ No
Season 2	Pasture cover at least 70%?	☐ Yes ☐ No
Sign-off	Cell signed off as rehabilitated? Note the date.	☐ Yes ☐ No

Part 3: Complaints and incidents register

One line per complaint, spill or incident. Contact a complainant within one working day. Tell the Shire about a spill within 48 hours.

Date, name and contact	What happened	Action taken and date reported back

GEOTECHNICAL INVESTIGATION

Singleton's Proposed Gravel Pit

Gravel resource assessment

311.13 SLK LHS Albany Highway (H1), via Rockwell Road, Shire of Cranbrook, Western Australia

Lot 3453 (part of Plantagenet Location 3453), Certificate of Title Volume 1822 Folio 085

Prepared from the Main Roads Western Australia field investigation and laboratory testing of July 2021

Field	Detail
Road	Albany Highway (H1)
Project	Gordon River South Widening and Reconstruction, 307.95 - 316.23 SLK
Location	311.13 SLK LHS, 2.2 km along Rockwell Road LHS, then 1.4 km along the access track
Dates	12 - 19 July 2021
Test pits	TP1822 - TP2020 (196 pits)
Excavation	CAT 330D tracked excavator, 1,500 mm bucket
Logged by	L. Grieve / M. Mulligan
Field report	21 A 333 /1
Laboratory report	21 A 334 - 342 /1 (Field No. A 4487), 26 July 2021

The Main Roads Great Southern Region Geotechnical Investigation Explanatory Notes, Version 4, 5 June 2021 (D19#508261), apply to the field logs. They are reproduced in the field report at Appendix D.

At a glance

TEST PITS	USABLE GRAVEL FOUND	MEDIAN USABLE GRAVEL
196	**98%**	**750 mm**
TP1822 - TP2020	192 of 196 pits	Below 150 mm of topsoil
TOPSOIL	**LAB: BASECOURSE QUALITY**	**SUGGESTED WORKING DEPTH**
150 mm	**5 of 9**	**0.9 m**
Consistent across the site	Soaked CBR 100 - 140	0.75 m of gravel under 0.15 m of topsoil

Key findings

- Gravel is present across nearly the whole site, typically 500 to 1,100 mm thick under 150 mm of topsoil.
- Area A (west and centre) is the better resource, with a median of 875 mm. Area B (south and east) has a median of 750 mm and is more variable.
- Lab testing confirms basecourse at TP1840 - TP1888. Four later samples (TP1897, TP1906, TP1943, TP1988) tested as subbase or select fill, although they were logged as basecourse.

- The material is coarse, low in fines and cobbly. Expect crushing, screening or blending to make basecourse.
- The south end of Area B (TP2012 - TP2020) is sand, with little or no usable gravel.
- No acid sulphate soils were identified. Risk is low for the gravel areas.

1. Site and investigation

1.1 Location

The site is reached from Albany Highway (H1) at 311.13 SLK, left-hand side. Travel 2.2 km along Rockwell Road (left-hand side), then 1.4 km along a private access track. The property is in the Shire of Cranbrook.

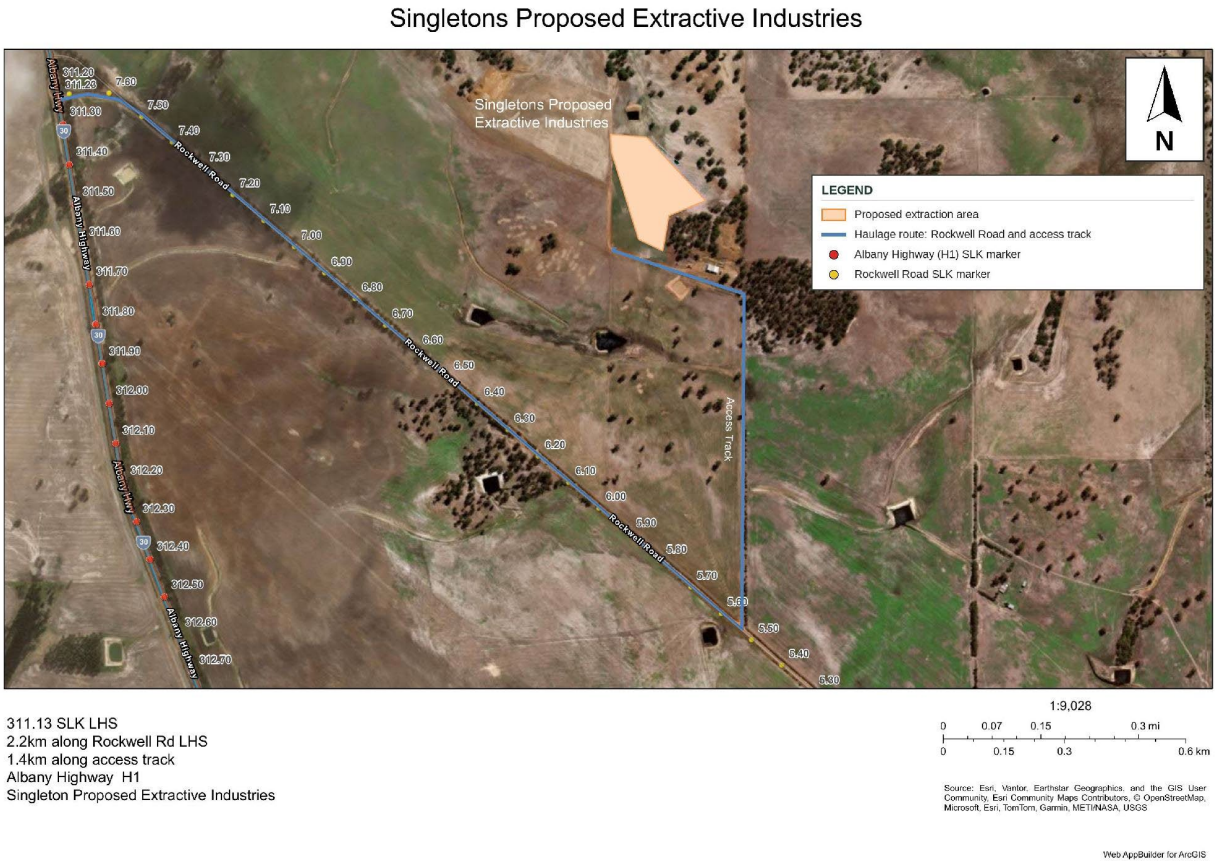

Figure 1 - Locality and access route (1:9,028 at A3).

1.2 What was done

Main Roads Western Australia dug and logged 196 test pits between 12 and 19 July 2021, for the Gordon River South Widening and Reconstruction project. Pits were dug with a CAT 330D excavator until clay, refusal or unusable material was reached.

Each pit was logged on the Main Roads Gravel Investigation Log Worksheet: topsoil depth, each layer's material and depth, quality code, cobble content, usable gravel depth, plasticity and refusal. Ten bulk samples were taken. Nine were tested.

Pit numbers TP1970, TP1993 and TP1994 do not appear on the worksheets. Some Area B pits were renumbered during logging; the corrected numbers are used here. The loggers used RPC (rock produces clay) where cobbles broke down to clay under the bucket.

1.3 Quality codes

Code	Classification	CBR estimate	Linear shrinkage
VG	High CBR basecourse	Over 100	Under 2
G	Basecourse	80 to 100	Under 2

Code	Classification	CBR estimate	Linear shrinkage
M	Subbase	60 to 80	Under 4
P	Select fill	Under 60	Under 6

Combined codes, for example G-VG or P-M, span two classes. G? is material the logger queried as basecourse.

1.4 How usable gravel is measured

Usable thickness is the combined thickness of all layers logged G, G?, G-VG or VG. It leaves out subbase (M, M-G), select fill (P) and sand overburden. This is applied the same way to every pit. It runs about 180 mm below the logger's own field figure on average, so it is the more conservative of the two. Where a pit stopped on refusal, the figure is a minimum.

2. Usable gravel

Measure	Area A	Area B	All pits
Test pits	106 (TP1822 - TP1927)	90 (TP1928 - TP2020)	196
Pits with usable gravel	106 (100%)	86 (96%)	192 (98%)
Mean usable thickness	934 mm	786 mm	866 mm
Median usable thickness	875 mm	750 mm	750 mm
Range	300 - 2,150 mm	200 - 1,750 mm	200 - 2,150 mm
Topsoil	150 mm	150 mm; sand to 1,250 mm at TP2012 - TP2020	150 mm typical
Deepest pit	2,300 mm	2,200 mm	2,300 mm
Pits stopped on refusal	7	2	9

Spread of thickness

Usable thickness	Area A	Area B	All pits	Share
1,100 mm and above	35	20	55	28%
800 - 1,099 mm	23	19	42	21%
500 - 799 mm	34	30	64	33%
Below 500 mm	14	17	31	16%
No usable gravel	0	4	4	2%

Usable gravel is spread across the investigated area with no large barren patches. The thickest gravel (dark green on Figure 2) is in the centre and west of Area A. Thinner results cluster along the north-east edge of Area A and in the south-west corner (TP1928 - TP1937).

Usable gravel thickness

Singleton's Proposed Gravel Pit | Derived usable thickness below topsoil, MRWA investigation July 2021

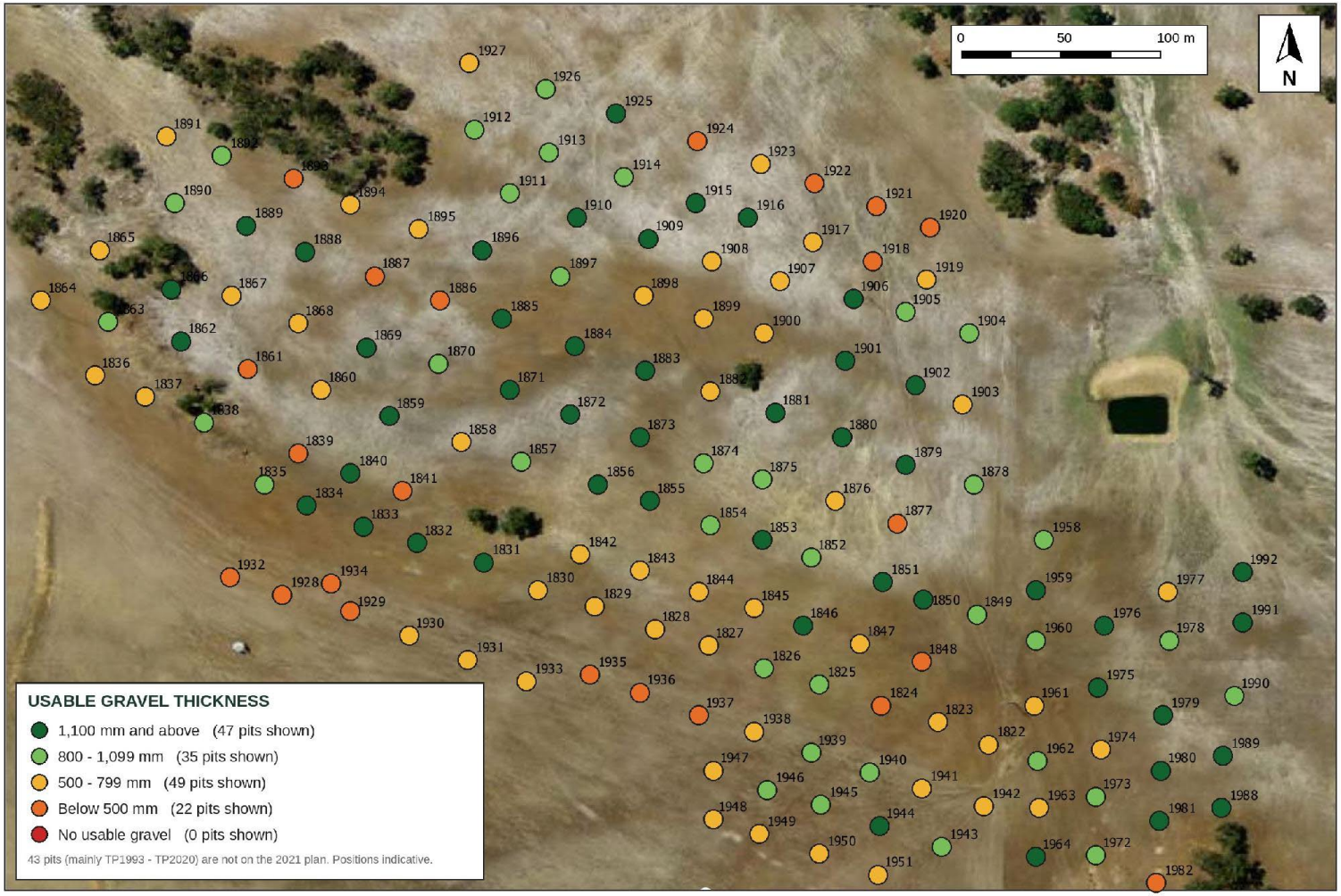

Figure 2 - Usable gravel thickness at each test pit.

3. Ground profile

Topsoil is 150 mm across the site. Below it, the profile is lateritic: sandy gravel over sandy or ironstone conglomerate, grading into clayey conglomerate and clay. The change to clayey material marks the practical floor of extraction.

Part of site	What was found
Area A, TP1822 - TP1927	Deepest and hardest gravel. Usable gravel in every pit, median 875 mm. Hard ironstone often needed a ripper tine (37 pits). Refusal at 1,100 - 2,100 mm in 7 pits. Shale noted around TP1886 - TP1916.
Area B north, TP1928 - TP1957 and TP1965 - TP1969	Finer gravel with few cobbles, sitting directly on clay. Clay logged as medium to high plasticity in 34 pits.
Area B south, TP1974 - TP2011	Harder ironstone conglomerate, similar to Area A. Refusal at 1,300 mm in TP1979 and TP1980.
Area B sand, TP2012 - TP2020	500 - 1,100 mm of yellow or mottled sand over a thin gravel band on clay. Four pits with no usable gravel: TP2013, TP2016, TP2019, TP2020.

Cobbles and boulders are common. 74 pits (38%) logged 60% or more in at least one layer, with single cobbles to 600 - 1,000 mm. The loggers noted that the ironstone cobbles produce clay when worked, and that the upper gravel lacks fines in places.

4. Laboratory results

Nine samples were tested by the Main Roads Great Southern laboratory, Albany (NATA accreditation 1989, site 2034), between 15 and 24 July 2021. Full results, including the laboratory test reports, are in Appendix C.

Sample	Test pit	Area	Logged as	Soaked CBR	Lab result
21 A 334	TP1856	A	G	110	Basecourse
21 A 335	TP1840	A	M-G / G	140	Basecourse
21 A 336	TP1845	A	G / M-G	100	Basecourse
21 A 337	TP1879	A	G	100	Basecourse
21 A 338	TP1888	A	VG	110	Basecourse
21 A 339	TP1897	A	G / M-G	60	Subbase
21 A 340	TP1906	A	G	40	Select fill
21 A 341	TP1943	B	G	60	Subbase
21 A 342	TP1988	B	G-VG / G	70	Subbase

- Five samples from TP1840 - TP1888 (Area A) are basecourse: soaked CBR 100 - 140 and dry compressive strength 3,420 - 3,910 kPa.
- Four samples are subbase or select fill: TP1897, TP1906, TP1943 and TP1988 (soaked CBR 40 - 70). All four were logged as basecourse in the field.
- All samples are non-plastic, with linear shrinkage of 0 - 0.5%. They are coarse and low in fines: 2 - 4% passing 0.075 mm, and up to 27% retained on 37.5 mm.

Soaked CBR at 96% modified maximum dry density, 4-day soak, 4.5 kg surcharge. Swell was 0.0% for every sample. Lab result applies the CBR ranges in Section 1.3. Sample 21 A 343 (TP2013, sand) was not tested.

Laboratory samples

Singleton's Proposed Gravel Pit | Soaked CBR, laboratory report 21 A 334 - 342 /1

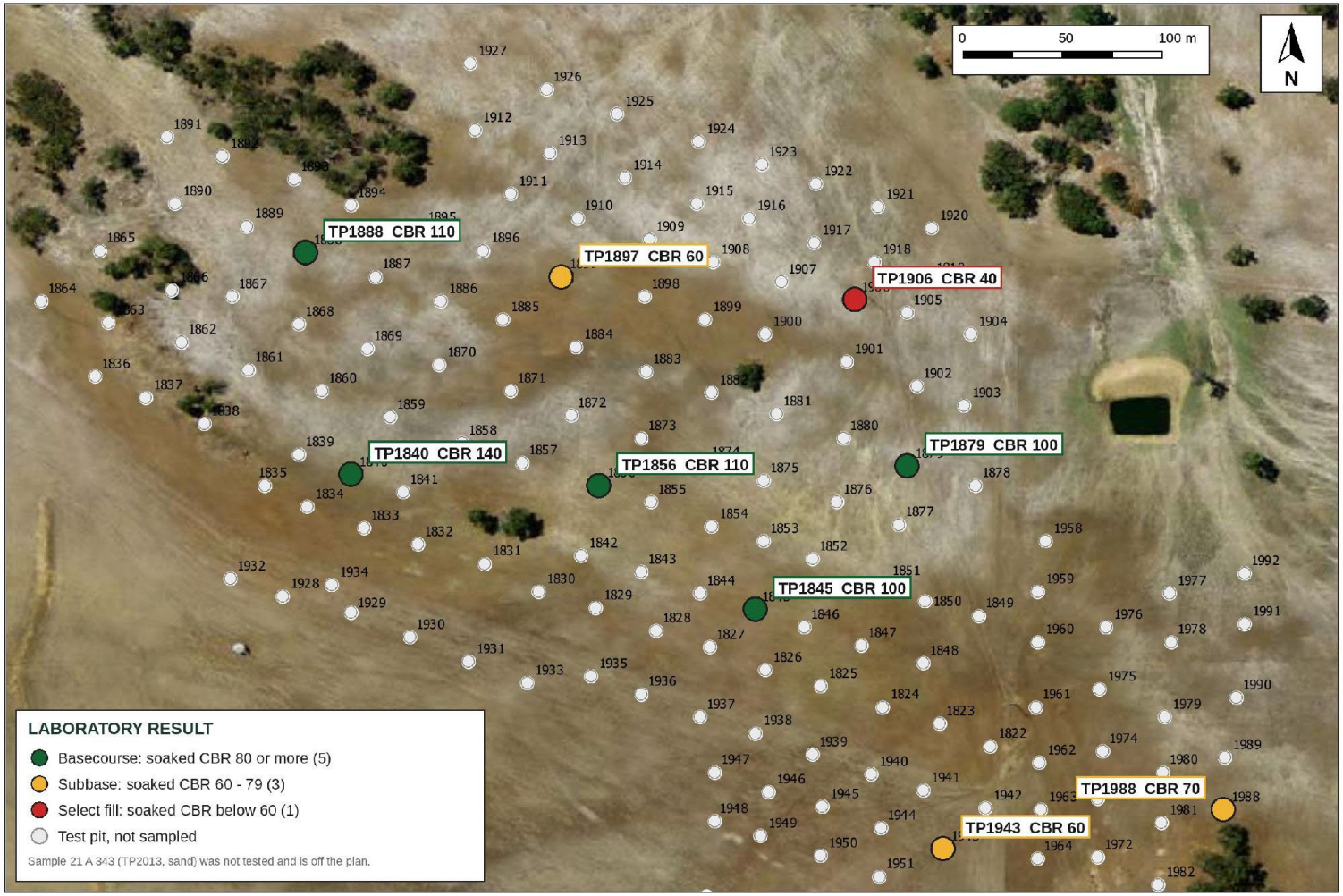

Figure 3 - Sampled test pits and soaked CBR result.

5. Acid sulphate soils

No acid sulphate soils were identified. Risk is assessed as low for the gravel areas because:

- the profile is lateritic (sandy gravel, ironstone conglomerate and clay), which is oxidised and not a typical acid sulphate soil setting
- no organic, peaty, sulfidic, dark grey or black saturated material was logged in any pit.

Based on field observation. No laboratory acid sulphate soil testing was done. Sample 21 A 343 (TP2013, sand) was taken but not tested.

6. Working depth and volumes

The proposed working depth is 0.9 m below the surface: 0.15 m of topsoil over 0.75 m of gravel. That matches the median usable thickness of 750 mm. Across much of Area A the gravel runs thicker than 0.75 m, so the extraction volume sits within the resource rather than at its limit.

Hard ironstone needing a ripper, with refusal in nine pits, will slow production in the harder parts of both areas.

Extraction volumes at 0.9 m

Area worked	Gravel won (0.75 m)	Topsoil stripped (0.15 m)	Total excavated (0.9 m)
1 ha cell	7,500 m³	1,500 m³	9,000 m³
3.8 ha (proposed extraction area)	28,500 m³	5,700 m³	34,200 m³

Volumes assume a uniform 0.75 m of gravel under 0.15 m of topsoil, with no allowance for setbacks, batters, access or stockpiles. Recoverable volume may be lower. No tonnage is given: the lab maximum dry densities (2.02 - 2.53 t/m³) are compacted values, not in-situ bulk density.

7. Conclusions

- A lateritic gravel resource is present across both areas, confirmed by 196 test pits. Usable gravel was found in 192, at a median of 750 mm below 150 mm of topsoil.
- Area A is the stronger resource: thicker (mean 934 mm) and, at TP1840 - TP1888, lab-confirmed basecourse.
- Treat Area B and the north-east of Area A as subbase until more testing shows otherwise.
- A working depth of 0.9 m, winning 0.75 m of gravel under 0.15 m of topsoil, suits most of the site.
- Expect to crush, screen or blend for basecourse, given the coarse, low-fines, cobbly material.
- Acid sulphate soil risk is low for the gravel areas, subject to the DWER map check.

Appendix A - Test pit summary

Usable thickness is derived as in Section 1.4. A dash means none recorded.

Test pit	Area	Topsoil (mm)	Usable, derived (mm)	Usable, field (mm)	Top layer quality	Sample
1822	A	150	650	900	G?	
1823	A	150	750	1100	G?	
1824	A	150	350	1200	G	
1825	A	150	850	1000	G	
1826	A	150	950	850	G?	
1827	A	150	650	900	G	
1828	A	150	550	850	G?	
1829	A	150	650	900	G?	
1830	A	150	750	1000	G?	
1831	A	150	1850	1500	G	
1832	A	150	1650	1500	G	
1833	A	150	1550	1300	G	
1834	A	150	1650	1300	G	
1835	A	150	1050	1150	G	
1836	A	150	750	750	G	
1837	A	150	700	900	G	
1838	A	150	950	1200	G	
1839	A	150	450	1500	G	
1840	A	150	1200	1650	M-G	21 A 335
1841	A	150	450	1000	G	
1842	A	150	650	850	G?	
1843	A	150	650	800	G	
1844	A	150	750	900	G?	
1845	A	150	750	1050	G	21 A 336
1846	A	150	1250	1450	G	
1847	A	150	650	900	G	
1848	A	150	350	1150	G	
1849	A	150	850	1500	G	
1850	A	150	1450	1500	G	
1851	A	150	2150	2150	G	
1852	A	150	800	1500+	M	
1853	A	150	1250	1200+	G?	
1854	A	150	900	1250	G	
1855	A	150	1850	1850	G?	
1856	A	150	1950	1950+	G	21 A 334
1857	A	150	1050	1050+	G	

Test pit	Area	Topsoil (mm)	Usable, derived (mm)	Usable, field (mm)	Top layer quality	Sample
1858	A	150	750	1150+	P	
1859	A	150	1700	1200	G	
1860	A	150	600	1250	G?	
1861	A	150	300	1250	G	
1862	A	150	1550	1500	G	
1863	A	150	950	950	G?	
1864	A	150	550	550	G	
1865	A	150	500	500	G	
1866	A	150	1350	1350	G	
1867	A	150	700	700	G	
1868	A	150	750	1000	G	
1869	A	150	1350	1150	G	
1870	A	150	900	1100	VG	
1871	A	150	1650	1650	G	
1872	A	150	1650	1450	G	
1873	A	150	1100	1100	G	
1874	A	150	1000	1000	G	
1875	A	150	900	1550	M-G	
1876	A	150	650	1000+	M-G	
1877	A	150	450	1000+	M-G	
1878	A	150	950	950+	G	
1879	A	150	1350	1350	G	21 A 337
1880	A	150	1450	1450	G	
1881	A	150	1250	1250	G	
1882	A	150	500	950	G	
1883	A	150	1650	1630	VG	
1884	A	150	1450	1450	G	
1885	A	150	1100	1300	G	
1886	A	150	350	1150	G	
1887	A	150	450	950	G	
1888	A	150	1300	1300	VG	21 A 338
1889	A	150	1150	1150	G	
1890	A	150	1050	1050	G	
1891	A	250	600	1250	P-M	
1892	A	150	800	1650	M-G	
1893	A	150	400	1100	G	
1894	A	150	650	1250	G?	
1895	A	150	550	1050	G	
1896	A	150	1200	1200	G	

Test pit	Area	Topsoil (mm)	Usable, derived (mm)	Usable, field (mm)	Top layer quality	Sample
1897	A	150	900	1150	G	21 A 339
1898	A	150	550	1250	G	
1899	A	150	650	1250	G	
1900	A	150	750	1250	G	
1901	A	150	1150	1200	G	
1902	A	150	1150	1150	G	
1903	A	150	700	1000	G?	
1904	A	150	950	1100+	G	
1905	A	150	1050	1200+	G	
1906	A	150	1250	1250+	G	21 A 340
1907	A	150	700	1000	G	
1908	A	150	550	1000	G	
1909	A	150	1150	1150	G	
1910	A	150	1250	1250	G	
1911	A	150	800	800	G	
1912	A	150	900	1100	G	
1913	A	150	900	1100	G	
1914	A	150	950	1200	G	
1915	A	150	1350	1350+	G	
1916	A	150	1300	1300+	G	
1917	A	150	550	800+	G	
1918	A	150	350	1000 (est)	G	
1919	A	150	750	750	G	
1920	A	150	350	700	G	
1921	A	150	350	500	G	
1922	A	150	350	500	G	
1923	A	150	600	600	G	
1924	A	150	450	1050	G	
1925	A	150	1250	1250	G	
1926	A	150	1050	1400	G	
1927	A	150	750	950	G	
1928	B	150	300	-	G	
1929	B	150	350	-	G	
1930	B	150	500	-	G	
1931	B	150	750	700	VG	
1932	B	150	400	-	G	
1933	B	150	750	700	VG	
1934	B	150	400	-	G	
1935	B	150	450	450	G	

Test pit	Area	Topsoil (mm)	Usable, derived (mm)	Usable, field (mm)	Top layer quality	Sample
1936	B	150	450	500	G	
1937	B	150	450	500	G	
1938	B	150	700	750	G	
1939	B	150	800	800	G	
1940	B	150	800	800	G	
1941	B	150	600	750	G	
1942	B	150	750	750	G	
1943	B	150	1050	1050	G	21 A 341
1944	B	150	1150	1150	G	
1945	B	150	850	900	G	
1946	B	150	850	850	G	
1947	B	150	550	550	G	
1948	B	150	550	550	G	
1949	B	150	750	800	G	
1950	B	150	650	700	G	
1951	B	150	650	650	G	
1952	B	150	1050	1000	G	
1953	B	150	850	850	G	
1954	B	150	500	500	G	
1955	B	150	450	450	G	
1956	B	150	400	400	G	
1957	B	150	200	200	G	
1958	B	150	950	950	G	
1959	B	150	1500	1500	G	
1960	B	150	1050	1400	G	
1961	B	150	700	900	G	
1962	B	150	950	950	G	
1963	B	150	750	1000	G	
1964	B	150	1200	1200	G	
1965	B	150	800	800	G	
1966	B	150	600	600	G	
1967	B	150	600	600	G	
1968	B	150	750	750	G	
1969	B	150	600	700	G	
1971	B	150	750	800	G	
1972	B	150	1000	1000	G	
1973	B	150	1000	1000	G	
1974	B	150	550	1250	G	
1975	B	150	1550	1550	G	

Test pit	Area	Topsoil (mm)	Usable, derived (mm)	Usable, field (mm)	Top layer quality	Sample
1976	B	150	1450	1450	G	
1977	B	150	500	500+?	G	
1978	B	150	900	900+?	G-VG	
1979	B	150	1150	1150+	G-VG	
1980	B	150	1150	1150+	G-VG	
1981	B	150	1200	1200	G	
1982	B	150	350	950	G	
1983	B	150	650	1150	G	
1984	B	150	650	1000	G	
1985	B	150	750	750	G	
1986	B	150	1400	1400	G	
1987	B	150	700	1050	G	
1988	B	150	1500	1500	G-VG	21 A 342
1989	B	150	1600	1500	G	
1990	B	150	1000	1000+	G	
1991	B	150	1450	1450	G-VG	
1992	B	150	1350	1350	G	
1995	B	150	1050	1050	G	
1996	B	150	1100	1100	G-VG	
1997	B	150	550	1500	G-VG	
1998	B	150	1400	1650	M	
1999	B	150	1600	1500	G-VG	
2000	B	150	1750	1750	G-VG	
2001	B	150	650	850	G	
2002	B	150	700	1000	G	
2003	B	150	700	800	G	
2004	B	150	250	450	G	
2005	B	150	450	700	G	
2006	B	150	1250	1300	G	
2007	B	150	1000	1400	P	
2008	B	150	1600	1350	G	
2009	B	150	1100	1600	P-M	
2010	B	150	950	950+	G	
2011	B	150	1050	1050	G	
2012	B	150	550	1100	Sand	
2013	B	150	Nil	1050	Sand	21 A 343
2014	B	150	300	1050	Sand	
2015	B	150	200	550	Sand	
2016	B	150	Nil	500	Sand	

Test pit	Area	Topsoil (mm)	Usable, derived (mm)	Usable, field (mm)	Top layer quality	Sample
2017	B	150	200	600	Sand	
2018	B	150	300	800	Sand	
2019	B	150	Nil	750	Sand	
2020	B	150	Nil	1000	Sand	

Appendix B - Test pit location plan



Figure B1 - Test pit locations, from the MRWA plan Singleton Gravel Pit Combined, 16 July 2021. 43 pits, mainly TP1993 - TP2020, are not on the plan.

Appendix C - Laboratory test results

Nine samples were tested under laboratory report 21 A 334 - 342 /1 (Field No. A 4487, TRIM 21/228), approved by J.M. Hewitt, Technical Officer Materials, on 26 July 2021. The full 26-sheet report is reproduced at C4.

C1 Samples

Test pit	Sample	Ref. no.	Depth (mm)	Tests	Status
TP1856	21 A 334	21 A (INT) 430	150 - 2,100	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1840	21 A 335	21 A (INT) 431	150 - 1,800	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1845	21 A 336	21 A (INT) 432	150 - 1,500	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1879	21 A 337	21 A (INT) 433	150 - 1,500	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1888	21 A 338	21 A (INT) 434	150 - 1,450	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1897	21 A 339	21 A (INT) 435	150 - 1,700	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1906	21 A 340	21 A (INT) 436	150 - 1,400	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1943	21 A 341	21 A (INT) 437	150 - 1,200	PSD, PI, LS, MDD, CBR, MDCS	Tested
TP1988	21 A 342	21 A (INT) 438	150 - 1,650	PSD, PI, LS, MDD, CBR	Tested
TP2013	21 A 343	21 A (INT) 439	150 - 1,200	Requested	Not tested

Where a lab result differs from the field classification for the same pit, the lab result prevails.

C2 Particle size distribution (WA 115.1), % passing

Sieve (mm)	334	335	336	337	338	339	340	341	342
75.0	100	100	100	100	100	-	100	-	100
53.0	78	92	98	98	89	100	98	-	88
37.5	73	88	93	93	77	98	97	100	79
19.0	65	75	79	75	66	80	80	99	60
9.50	46	53	55	51	49	53	49	73	38
4.75	27	27	38	33	30	36	30	42	21
2.36	19	18	29	23	20	27	23	25	14
1.18	15	15	25	19	17	23	20	18	12
0.600	12	13	20	15	14	19	16	15	10
0.425	11	11	17	12	12	16	13	13	9
0.300	9	9	13	8	9	12	9	10	7
0.150	5	6	7	5	5	6	4	5	4
0.075	3	4	3	3	2	3	2	2	2
0.0135	1	1	1	1	1	1	1	1	1

Column headings are sample numbers 21 A 334 to 21 A 342.

C3 Plasticity, compaction, strength and bearing ratio

Sample	Test pit	LL (%)	PI	LS (%)	Group	MDD (t/m³)	OMC (%)	CBR unsoaked	CBR soaked	MDCS (kPa)
21 A 334	TP1856	27	NP	0.5	GP	2.308	9.0	120	110	3,820
21 A 335	TP1840	26	NP	0.5	GP	2.527	7.7	160	140	3,750
21 A 336	TP1845	23	NP	0.0	GW	2.054	10.4	100	100	3,910
21 A 337	TP1879	25	NP	0.5	GP	2.213	9.9	120	100	3,420
21 A 338	TP1888	25	NP	0.5	GP	2.338	9.5	110	110	3,440
21 A 339	TP1897	21	NP	0.5	GP	2.026	10.8	70	60	4,310
21 A 340	TP1906	N/O	NP	0.0	GP	2.023	9.8	60	40	1,930
21 A 341	TP1943	N/O	NP	0.0	GP	2.231	6.9	70	60	2,600
21 A 342	TP1988	25	NP	0.0	GP	2.152	8.2	80	70	-

LL N/O = not obtainable. Linear shrinkage for 21 A 340 and 341 was 0% at 24.0% and 20.5% moisture. MDD and OMC by WA 133.1 (modified), with material retained on 19.0 mm excluded (4 - 8%).

C4 Laboratory test reports, 21 A 334 - 342 /1

The full laboratory report follows: soil classification, particle size distribution, dry density / moisture content, California Bearing Ratio and maximum dry compressive strength sheets (26 sheets).

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SOIL CLASSIFICATION TEST REPORT Sheet 1 of 26

Report No.	21 A 334 - 342 /1	Field No.	A 4487	Project No.
Date Sampled	12/07/2021 - 15/07/2021	Date/s Tested	20/07/2021 - 22/07/2021	
Local Govt Authority	Cranbrook			
Road	Albany Highway H1			
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK			
	311.13 SLK LHS 2.2km along Rockwell Road LHS 1.4km along access track Singleton's Proposed Gravel Pit			

Sample No.	21 A 334	21 A 335	21 A 336	21 A 337
Reference No.	21 A (INT) 430	21 A (INT) 431	21 A (INT) 432	21 A (INT) 433
Depth, (mm)	150 - 2100	150 - 1800	150 - 1500	150 - 1500
Sample Location	Test Pit 1856	Test Pit 1840	Test Pit 1845	Test Pit 1879
Field Description	Sandy GRAVEL	Sandy GRAVEL	Sandy GRAVEL	Sandy GRAVEL
Proposed Use	Basecourse/ Subbase	Basecourse/ Subbase	Basecourse/ Subbase	Basecourse/ Subbase
PSD WA 115.1	**Sampling Method:**	WA 100.1	**Preparation Method:**	WA 105.1
Percent Retained on Sieve Size 37.50 mm	27	12	7	7
Sieve Size (mm)	**% Passing**	**% Passing**	**% Passing**	**% Passing**
125.00	-	-	-	-
106.00	-	-	-	-
75.00	100	100	100	100
53.00	78	92	98	98
37.50	73	88	93	93
26.50	-	-	-	-
19.00	65	75	79	75
13.20	-	-	-	-
9.50	46	53	55	51
6.70	-	-	-	-
4.75	27	27	38	33
2.36	19	18	29	23
1.18	15	15	25	19
0.600	12	13	20	15
0.425	11	11	17	12
0.300	9	9	13	8
0.150	5	6	7	5
0.075	3	4	3	3
0.0135	1	1	1	1
LL WA 120.2 (%)	27	26	23	25
PL WA 121.1 (%)	Non Plastic	Non Plastic	Non Plastic	Non Plastic
PI WA 122.1 (%)	Non Plastic	Non Plastic	Non Plastic	Non Plastic
LS WA 123.1 (%)	0.5	0.5	0.0	0.5
GROUP SYMBOL AS 1726 - Tables 9 & 10 (Laboratory classification elements only)	GP	GP	GW	GP

Comments / Distribution
TRIM File No. 21/228
Laboratory File
MDD/CBR pre-treated utilising a hand held rammer to approximately 5 - 10% retained on the 19.0mm sieve.

Approved Signatory
Name J.M. HEWITT
Function Technical Officer Materials
Date 26/07/2021

Document:71/05/115.1_15 Issue:05/11//2020 D14#628373

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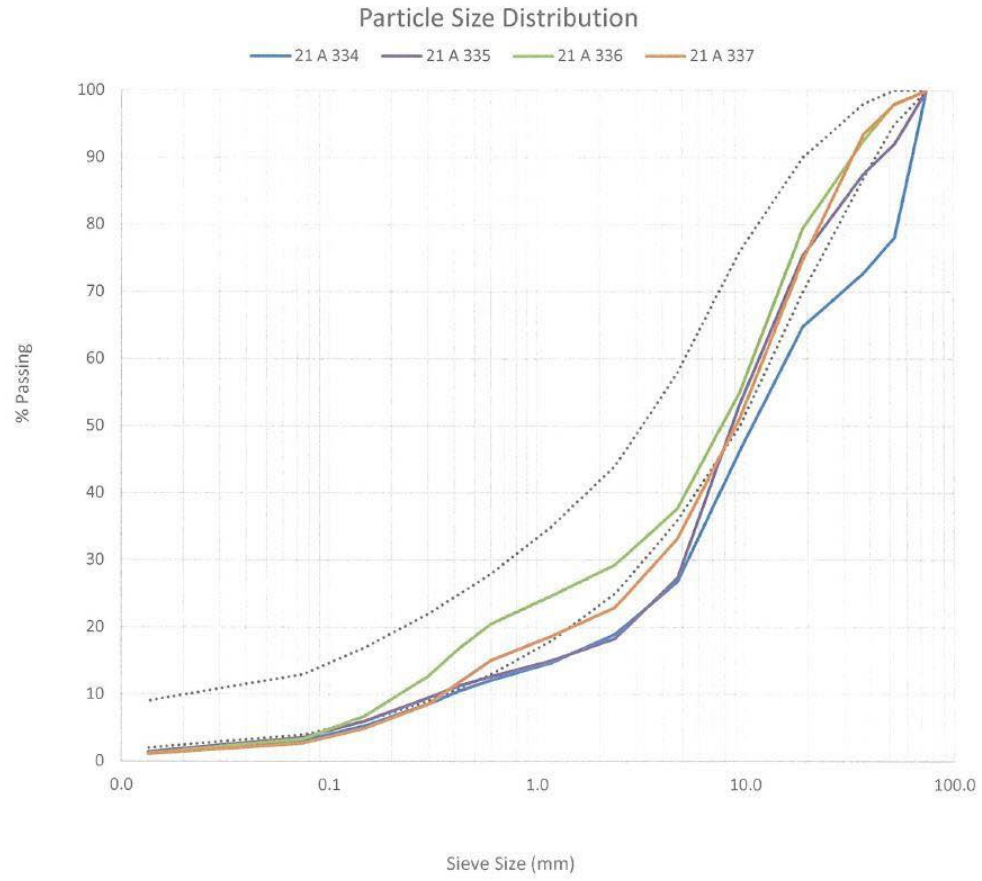
SOIL CLASSIFICATION TEST REPORT Sheet 2 of 26

Report No. 21 A 334 - 342 /1



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SOIL CLASSIFICATION TEST REPORT

Sheet 3 of 26

Report No.	21 A 334 - 342 /1	Field No.	A 4487	Project No.
Date Sampled	12/07/2021 - 15/07/2021	Date/s Tested	20/07/2021 - 22/07/2021	
Local Govt Authority	Cranbrook			
Road	Albany Highway H1			
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK			
	311.13 SLK LHS 2.2km along Rockwell Road LHS 1.4km along access track Singleton's Proposed Gravel Pit			

Sample No.	21 A 338	21 A 339	21 A 340	21 A 341
Reference No.	21 A (INT) 434	21 A (INT) 435	21 A (INT) 436	21 A (INT) 437
Depth, (mm)	150 - 1450	150 - 1700	150 - 1400	150 - 1200
Sample Location	Test Pit 1888	Test Pit 1897	Test Pit 1906	Test Pit 1943
Field Description	Sandy GRAVEL	Sandy GRAVEL	Sandy GRAVEL	Sandy GRAVEL
Proposed Use	Basecourse/ Subbase	Basecourse/ Subbase	Basecourse/ Subbase	Basecourse/ Subbase
PSD WA 115.1	**Sampling Method:**	WA 100.1	**Preparation Method:**	WA 105.1
Percent Retained on Sieve Size 37.50 mm	23	2	3	0
Sieve Size (mm)	**% Passing**	**% Passing**	**% Passing**	**% Passing**
125.00	-	-	-	-
106.00	-	-	-	-
75.00	100	-	100	-
53.00	89	100	98	-
37.50	77	98	97	100
26.50	-	-	-	-
19.00	66	80	80	99
13.20	-	-	-	-
9.50	49	53	49	73
6.70	-	-	-	-
4.75	30	36	30	42
2.36	20	27	23	25
1.18	17	23	20	18
0.600	14	19	16	15
0.425	12	16	13	13
0.300	9	12	9	10
0.150	5	6	4	5
0.075	2	3	2	2
0.0135	1	1	1	1
LL WA 120.2 (%)	25	21	Not Obtainable	Not Obtainable
PL WA 121.1 (%)	Non Plastic	Non Plastic	Non Plastic	Non Plastic
PI WA 122.1 (%)	Non Plastic	Non Plastic	Non Plastic	Non Plastic
LS WA 123.1 (%)	0.5	0.5	0 at MC 24.0%	0 at MC 20.5%
GROUP SYMBOL AS 1726 - Tables 9 & 10 (Laboratory classification elements only)	GP	GP	GP	GP

Comments / Distribution *MC - moisture content

TRIM File No. 21/228

Laboratory File

MDD/CBR pre-treated utilising a hand held rammer to approximately 5 - 10% retained on the 19.0mm sieve.

Approved Signatory

Name J.M. HEWITT

Function Technical Officer Materials

Date 26/07/2021

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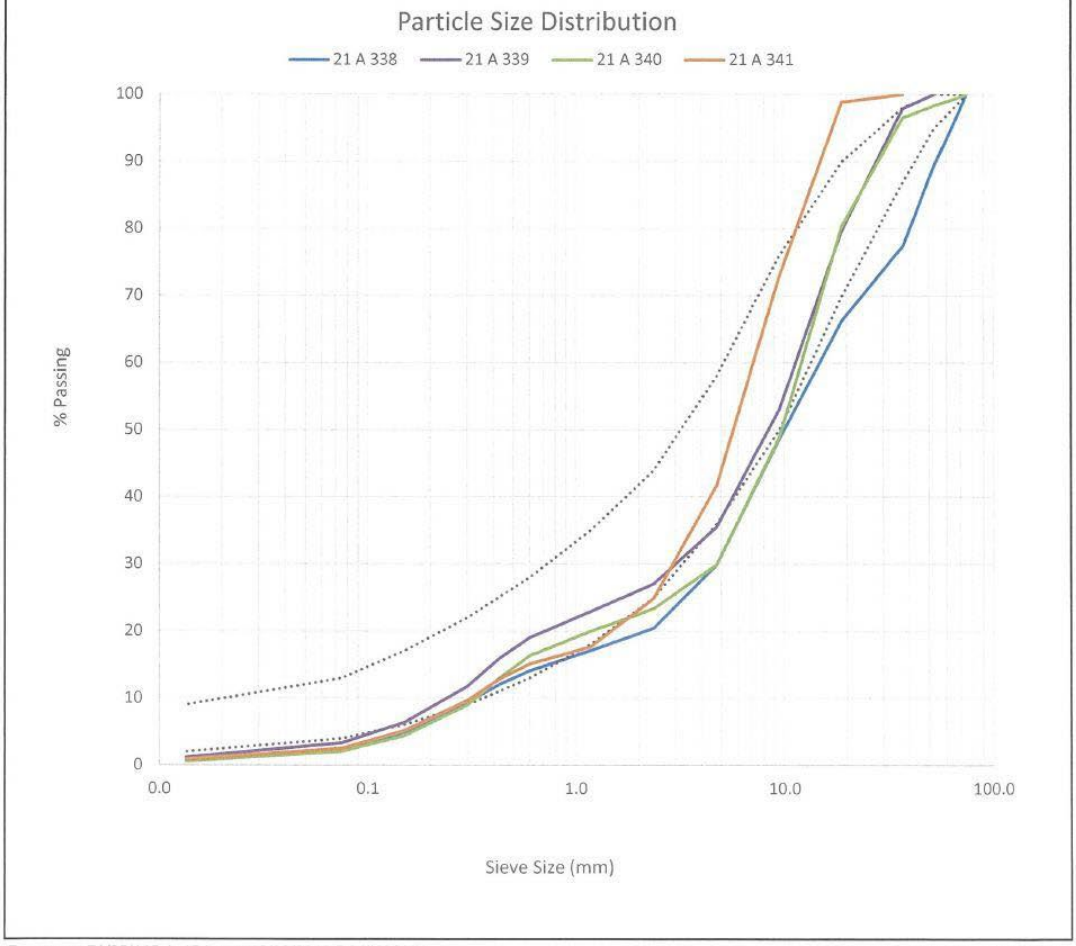
Report No. 21 A 334 - 342 /1



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SOIL CLASSIFICATION TEST REPORT

Sheet 5 of 26

Report No.	21 A 334 - 342 /1	Field No.	A 4487	Project No.
Date Sampled	12/07/2021 - 15/07/2021	Date/s Tested	20/07/2021 - 22/07/2021	
Local Govt Authority	Cranbrook			
Road	Albany Highway H1			
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK			
	311.13 SLK LHS 2.2km along Rockwell Road LHS 1.4km along access track Singleton's Proposed Gravel Pit			

Sample No.	21 A 342			
Reference No.	21 A (INT) 438			
Depth, (mm)	150 - 1650			
Sample Location	Test Pit 1988			
Field Description	Sandy GRAVEL			
Proposed Use	Basecourse/ Subbase			
PSD WA 115.1	**Sampling Method:**	WA 100.1	**Preparation Method:**	WA 105.1
Percent Retained on Sieve Size 37.50 mm	21			
Sieve Size (mm)	**% Passing**			
125.00	-	-	-	-
106.00	-	-	-	-
75.00	100	-	-	-
53.00	88	-	-	-
37.50	79	-	-	-
26.50	-	-	-	-
19.00	60	-	-	-
13.20	-	-	-	-
9.50	38	-	-	-
6.70	-	-	-	-
4.75	21	-	-	-
2.36	14	-	-	-
1.18	12	-	-	-
0.600	10	-	-	-
0.425	9	-	-	-
0.300	7	-	-	-
0.150	4	-	-	-
0.075	2	-	-	-
0.0135	1	-	-	-
LL WA 120.2 (%)	25	-	-	-
PL WA 121.1 (%)	Non Plastic	-	-	-
PI WA 122.1 (%)	Non Plastic	-	-	-
LS WA 123.1 (%)	0.0	-	-	-
GROUP SYMBOL AS 1726 - Tables 9 & 10 (Laboratory classification elements only)	GP			

Comments / Distribution
TRIM File No. 21/228
Laboratory File
MDD/CBR pre-treated utilising a hand held rammer to approximately 5 - 10% retained on the 19.0mm sieve.

Approved Signatory

Name J.M. HEWITT
Function Technical Officer Materials
Date 26/07/2021

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SOIL CLASSIFICATION TEST REPORT Sheet 6 of 26

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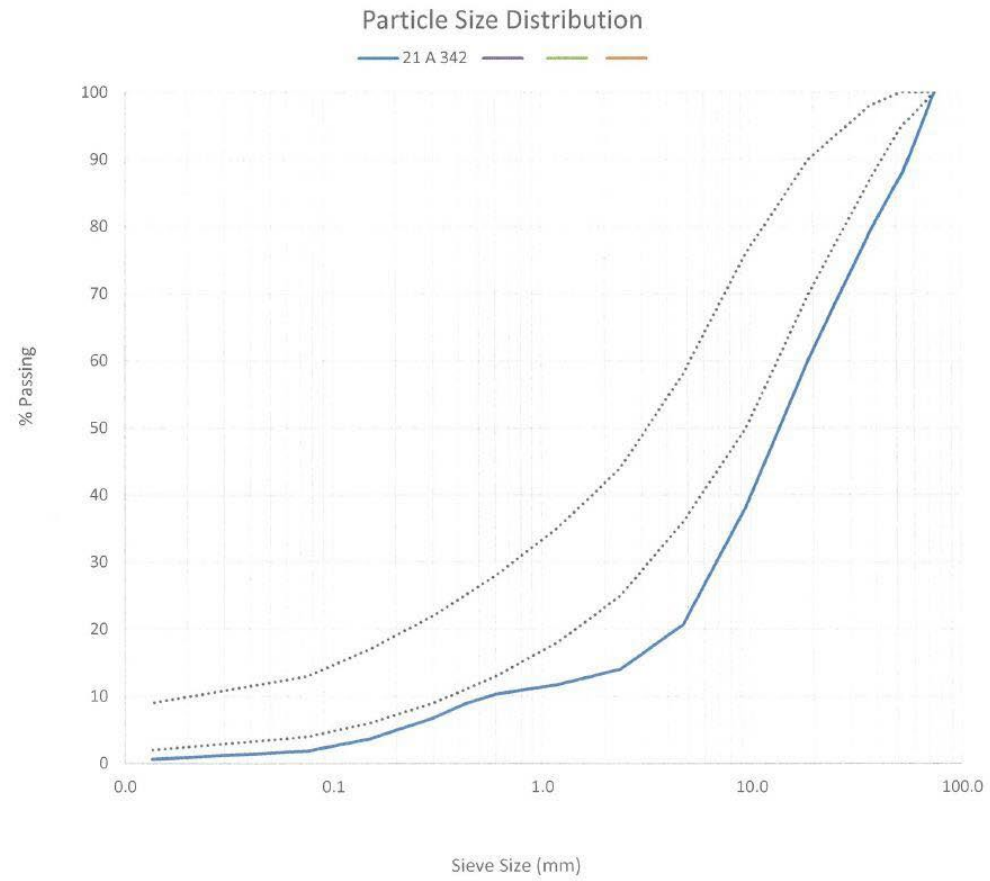

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Dry Density/Moisture Content Relationship Test Report

Sampling Method: WA 100.1 Preparation Method: WA 105.1 Sheet 7 of 26

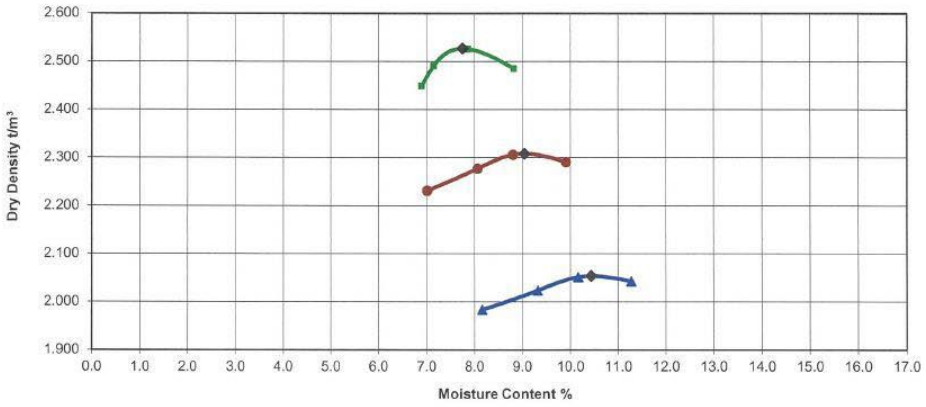
Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	15/07/2021 - 17/07/2021
Proposed Use	Basecourse/ Subbase			Project No.	
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Section	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK Singleton's Proposed Gravel Pit				

Sample No.	Location	Depth (mm)	Curing Period (Days) Water	Curing Period (Hrs) Stabiliser	Stabiliser Added %
21 A 334	Test Pit 1856	150 - 2100	0.96	-	-
21 A 335	Test Pit 1840	150 - 1800	0.96	-	-
21 A 336	Test Pit 1845	150 - 1500	0.97	-	-

Moisture Content ☑ WA 110.1 ☐ WA 110.2 Stabiliser Used Not Applicable

Field Description Sandy GRAVEL

DD / MC Relationship



Sample Number		21 A 334	21 A 335	21 A 336
Test Method		WA 115.2, WA 133.1	WA 115.2, WA 133.1	WA 115.2, WA 133.1
Maximum Dry Density t/m³		**2.308**	**2.527**	**2.054**
Optimum Moisture Content %		**9.0**	**7.7**	**10.4**
Percentage Retained %	37.5 mm	**0**	**0**	**0**
Percentage Retained %	19.0 mm	**8**	**6**	**8**

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Dry Density/Moisture Content Relationship Test Report

Sampling Method: WA 100.1 Preparation Method: WA 105.1 Sheet 8 of 26

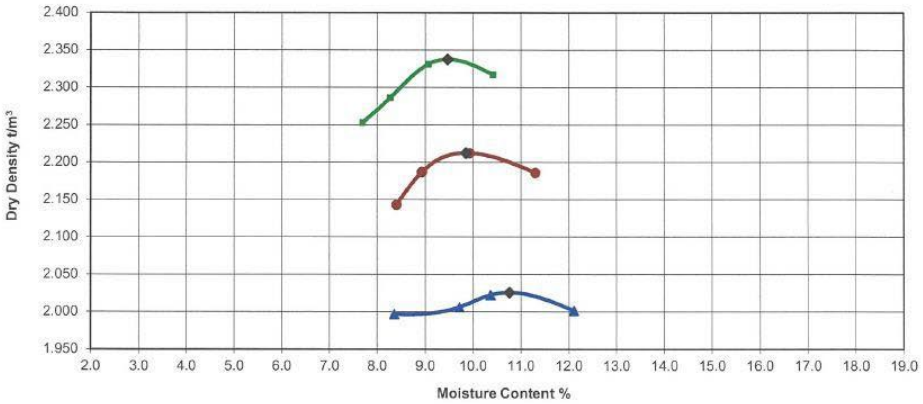
Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	15/07/2021 - 20/07/2021
Proposed Use	Basecourse/ Subbase			Project No.	
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Section	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK Singleton's Proposed Gravel Pit				

Sample No.	Location	Depth (mm)	Curing Period (Days)	Curing Period (Hrs)	Stabiliser Added %
21 A 337	Test Pit 1879	150 - 1500	0.90	-	-
21 A 338	Test Pit 1888	150 - 1450	0.92	-	-
21 A 339	Test Pit 1897	150 - 1700	2.28	-	-

Moisture Content ☑ WA 110.1 ☐ WA 110.2 Stabiliser Used Not Applicable

Field Description Sandy GRAVEL

DD / MC Relationship



Sample Number		21 A 337	21 A 338	21 A 339
Test Method		WA 115.2, WA 133.1	WA 115.2, WA 133.1	WA 115.2, WA 133.1
Maximum Dry Density t/m³		**2.213**	**2.338**	**2.026**
Optimum Moisture Content %		**9.9**	**9.5**	**10.8**
Percentage Retained %	37.5 mm	**0**	**0**	**0**
Percentage Retained %	19.0 mm	**8**	**7**	**8**

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Dry Density/Moisture Content Relationship Test Report

Sampling Method: WA 100.1 Preparation Method: WA 105.1 Sheet 9 of 26

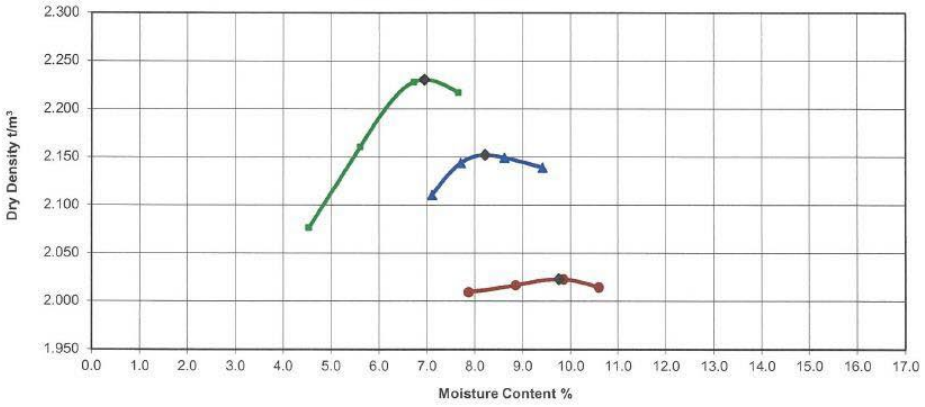
Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	19/07/21 - 20/07/21
Proposed Use	Basecourse/ Subbase			Project No.	
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Section	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK				
	Singleton's Proposed Gravel Pit				

Sample No.	Location	Depth (mm)	Curing Period (Days) Water	Curing Period (Hrs) Stabiliser	Stabiliser Added %
21 A 340	Test Pit 1906	150 - 1400	4.26	-	-
21 A 341	Test Pit 1943	150 - 1200	0.08	-	-
21 A 342	Test Pit 1988	150 - 1650	2.31	-	-

Moisture Content ☑ WA 110.1 ☐ WA 110.2 Stabiliser Used Not Applicable

Field Description Sandy GRAVEL

DD / MC Relationship



Sample Number		21 A 340	21 A 341	21 A 342
Test Method		WA 115.2, WA 133.1	WA 115.2, WA 133.1	WA 115.2, WA 133.1
Maximum Dry Density t/m³		**2.023**	**2.231**	**2.152**
Optimum Moisture Content %		**9.8**	**6.9**	**8.2**
Percentage Retained %	37.5 mm	**0**	**0**	**0**
Percentage Retained %	19.0 mm	**8**	**4**	**8**

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 10 of 26

Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	15/07/21 - 23/07/21
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK				
	Singleton's Proposed Gravel Pit Test Pit 1856				
Proposed Use	Basecourse/ Subbase				
Project No.				Depth	150 - 2100 mm
Field Description	Sandy GRAVEL				

Sample No.			21 A 334	21 A 334
Condition			Unsoaked	Soaked
Period of Curing		days	3.92	3.94
% Retained 19 mm Sieve	WA 115.2	%	8	8
Material Retained 19 mm Sieve (Excluded/Replaced)			Excluded	Excluded
Maximum Dry Density		t/m³	2.308	2.308
Optimum Moisture Content		%	9.0	9.0
Test Conditions of Specimen				
Surcharging of Specimen		kg	4.50	4.50
Period of Soaking		days		4.00
Compactive Effort Used in Moulding Specimen				
Blows, layers, kg hammer			23 5 4.9	23 5 4.9
Test Results				
Dry Density				
Specimen at Compaction		t/m³	2.217	2.209
Specimen after Soaking		t/m³		2.211
Dry Density Ratio				
Desired Dry Density Ratio		%	96.0	96.0
Specimen at Compaction		%	96.0	95.7
Specimen after Soaking		%		95.8
Moisture Content				
Specimen at Compaction		%	8.9	9.2
Specimen after Soaking		%		11.2
Top 30 mm Layer of Specimen After Penetration		%	9.0	10.0
Remainder of Specimen After Penetration		%	8.7	10.7
Moisture Ratio				
Desired Moisture Content Ratio		%	100.0	100.0
Specimen at Compaction		%	98.5	102.5
Specimen after Soaking		%		124.1
Top 30 mm Layer of Specimen After Penetration		%	99.6	110.8
Remainder of Specimen After Penetration		%	96.7	118.7
Specimen Swell		%		0.0
California Bearing Ratio		%	**120**	**110**
Penetration		mm	**5.0**	**5.0**

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 11 of 26

Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21-15/07/21	Date Received	12/07/21-15/07/21	Date/s of Test	15/07/21 - 23/07/21
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK				
	Singleton's Proposed Gravel Pit Test Pit 1840				
Proposed Use	Basecourse/ Subbase				
Project No.				Depth	150 - 1800 mm
Field Description	Sandy GRAVEL				

Sample No.			21 A 335	21 A 335
Condition			Unsoaked	Soaked
Period of Curing		days	3.91	3.93
% Retained 19 mm Sieve	WA 115.2	%	6	6
Material Retained 19 mm Sieve (Excluded/Replaced)			Excluded	Excluded
Maximum Dry Density		t/m³	2.527	2.527
Optimum Moisture Content		%	7.7	7.7
Test Conditions of Specimen				
Surcharging of Specimen		kg	4.50	4.50
Period of Soaking		days		4.00
Compactive Effort Used in Moulding Specimen				
Blows, layers, kg hammer			24 5 4.9	24 5 4.9
Test Results				
Dry Density				
Specimen at Compaction		t/m³	2.430	2.428
Specimen after Soaking		t/m³		2.431
Dry Density Ratio				
Desired Dry Density Ratio		%	96.0	96.0
Specimen at Compaction		%	96.1	96.1
Specimen after Soaking		%		96.2
Moisture Content				
Specimen at Compaction		%	7.5	7.6
Specimen after Soaking		%		8.9
Top 30 mm Layer of Specimen After Penetration		%	7.8	8.0
Remainder of Specimen After Penetration		%	7.7	8.5
Moisture Ratio				
Desired Moisture Content Ratio		%	100.0	100.0
Specimen at Compaction		%	97.2	98.4
Specimen after Soaking		%		116.0
Top 30 mm Layer of Specimen After Penetration		%	101.5	103.5
Remainder of Specimen After Penetration		%	100.0	109.9
Specimen Swell		%		0.0
California Bearing Ratio		%	**160**	**140**
Penetration		mm	**5.0**	**5.0**

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 12 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test 15/07/21 - 23/07/21
Local Govt Authority	Cranbrook			
Road	Albany Highway H1			
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK			
	Singleton's Proposed Gravel Pit Test Pit 1845			
Proposed Use	Basecourse/ Subbase			
Project No.			Depth	150 - 1500 mm
Field Description	Sandy GRAVEL			

Sample No.		21 A 336	21 A 336
Condition		Unsoaked	Soaked
Period of Curing	days	3.79	3.82
% Retained 19 mm Sieve WA 115.2	%	8	8
Material Retained 19 mm Sieve (Excluded/Replaced)		Excluded	Excluded
Maximum Dry Density	t/m³	2.054	2.054
Optimum Moisture Content	%	10.4	10.4
Test Conditions of Specimen			
Surcharging of Specimen	kg	4.50	4.50
Period of Soaking	days		4.00
Compactive Effort Used in Moulding Specimen			
Blows, layers, kg hammer		21 5 4.9	21 5 4.9
Test Results			
Dry Density			
Specimen at Compaction	t/m³	1.975	1.976
Specimen after Soaking	t/m³		1.976
Dry Density Ratio			
Desired Dry Density Ratio	%	96.0	96.0
Specimen at Compaction	%	96.2	96.2
Specimen after Soaking	%		96.2
Moisture Content			
Specimen at Compaction	%	10.2	10.2
Specimen after Soaking	%		12.2
Top 30 mm Layer of Specimen After Penetration	%	10.0	11.6
Remainder of Specimen After Penetration	%	9.9	11.1
Moisture Ratio			
Desired Moisture Content Ratio	%	100.0	100.0
Specimen at Compaction	%	98.2	97.9
Specimen after Soaking	%		117.7
Top 30 mm Layer of Specimen After Penetration	%	95.9	111.5
Remainder of Specimen After Penetration	%	94.9	106.6
Specimen Swell	%		0.0
California Bearing Ratio	%	**100**	**100**
Penetration	mm	**5.0**	**5.0**

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 13 of 26

Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	15/07/21 - 23/07/21
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK				
	Singleton's Proposed Gravel Pit Test Pit 1879				
Proposed Use	Basecourse/ Subbase				
Project No.				Depth	150 - 1500 mm
Field Description	Sandy GRAVEL				

Sample No.			21 A 337	21 A 337
Condition			Unsoaked	Soaked
Period of Curing		days	3.86	3.94
% Retained 19 mm Sieve	WA 115.2	%	8	8
Material Retained 19 mm Sieve (Excluded/Replaced)			Excluded	Excluded
Maximum Dry Density		t/m³	2.213	2.213
Optimum Moisture Content		%	9.9	9.9
Test Conditions of Specimen				
Surcharging of Specimen		kg	4.50	4.50
Period of Soaking		days		4.00
Compactive Effort Used in Moulding Specimen				
Blows, layers, kg hammer			23 5 4.9	23 5 4.9
Test Results				
Dry Density				
Specimen at Compaction		t/m³	2.128	2.129
Specimen after Soaking		t/m³		2.131
Dry Density Ratio				
Desired Dry Density Ratio		%	96.0	96.0
Specimen at Compaction		%	96.1	96.2
Specimen after Soaking		%		96.3
Moisture Content				
Specimen at Compaction		%	9.7	9.6
Specimen after Soaking		%		10.8
Top 30 mm Layer of Specimen After Penetration		%	9.7	10.2
Remainder of Specimen After Penetration		%	9.4	10.2
Moisture Ratio				
Desired Moisture Content Ratio		%	100.0	100.0
Specimen at Compaction		%	98.4	97.2
Specimen after Soaking		%		109.3
Top 30 mm Layer of Specimen After Penetration		%	97.6	102.7
Remainder of Specimen After Penetration		%	94.6	103.0
Specimen Swell		%		0.0
California Bearing Ratio		%	**120**	**100**
Penetration		mm	**5.0**	**5.0**

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 14 of 26

Report No.	21 A 334 - 342 /1	Reference No.			Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21		Date/s of Test	15/07/21 - 23/07/21
Local Govt Authority	Cranbrook					
Road	Albany Highway H1					
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK					
	Singleton's Proposed Gravel Pit Test Pit 1888					
Proposed Use	Basecourse/ Subbase					
Project No.					Depth	150 - 1450 mm
Field Description	Sandy GRAVEL					

Sample No.			21 A 338			21 A 338		
Condition			Unsoaked			Soaked		
Period of Curing		days	4.02			4.04		
% Retained 19 mm Sieve	WA 115.2	%	7			7		
Material Retained 19 mm Sieve (Excluded/Replaced)			Excluded			Excluded		
Maximum Dry Density		t/m³	2.338			2.338		
Optimum Moisture Content		%	9.5			9.5		
Test Conditions of Specimen								
Surcharging of Specimen		kg	4.50			4.50		
Period of Soaking		days				4.00		
Compactive Effort Used in Moulding Specimen								
Blows, layers, kg hammer			24	5	4.9	24	5	4.9
Test Results								
Dry Density								
Specimen at Compaction		t/m³	2.237			2.240		
Specimen after Soaking		t/m³				2.242		
Dry Density Ratio								
Desired Dry Density Ratio		%	96.0			96.0		
Specimen at Compaction		%	95.7			95.8		
Specimen after Soaking		%				95.9		
Moisture Content								
Specimen at Compaction		%	9.5			9.6		
Specimen after Soaking		%				10.3		
Top 30 mm Layer of Specimen After Penetration		%	9.5			9.8		
Remainder of Specimen After Penetration		%	9.1			10.0		
Moisture Ratio								
Desired Moisture Content Ratio		%	100.0			100.0		
Specimen at Compaction		%	100.3			101.1		
Specimen after Soaking		%				108.5		
Top 30 mm Layer of Specimen After Penetration		%	99.6			103.0		
Remainder of Specimen After Penetration		%	96.1			105.5		
Specimen Swell		%				0.0		
California Bearing Ratio		%	**110**			**110**		
Penetration		mm	**5.0**			**5.0**		

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 15 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received 12/07/21 - 15/07/21	Date/s of Test 17/07/21 - 24/07/21
Local Govt Authority	Cranbrook		
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK Singleton's Proposed Gravel Pit Test Pit 1897		
Proposed Use	Basecourse/ Subbase		
Project No.		Depth	150 - 1700 mm
Field Description	Sandy GRAVEL		

Sample No.		21 A 339	21 A 339
Condition		Unsoaked	Soaked
Period of Curing	days	3.05	3.06
% Retained 19 mm Sieve WA 115.2	%	8	8
Material Retained 19 mm Sieve (Excluded/Replaced)		Excluded	Excluded
Maximum Dry Density	t/m³	2.026	2.026
Optimum Moisture Content	%	10.8	10.8
Test Conditions of Specimen			
Surcharging of Specimen	kg	4.50	4.50
Period of Soaking	days		4.00
Compactive Effort Used in Moulding Specimen			
Blows, layers, kg hammer		22 5 4.9	22 5 4.9
Test Results			
Dry Density			
Specimen at Compaction	t/m³	1.946	1.947
Specimen after Soaking	t/m³		1.947
Dry Density Ratio			
Desired Dry Density Ratio	%	96.0	96.0
Specimen at Compaction	%	96.1	96.1
Specimen after Soaking	%		96.1
Moisture Content			
Specimen at Compaction	%	10.6	10.6
Specimen after Soaking	%		12.4
Top 30 mm Layer of Specimen After Penetration	%	10.9	11.1
Remainder of Specimen After Penetration	%	10.4	11.9
Moisture Ratio			
Desired Moisture Content Ratio	%	100.0	100.0
Specimen at Compaction	%	98.5	98.5
Specimen after Soaking	%		114.7
Top 30 mm Layer of Specimen After Penetration	%	100.6	103.0
Remainder of Specimen After Penetration	%	96.0	110.6
Specimen Swell	%		0.0
California Bearing Ratio	%	**70**	**60**
Penetration	mm	**5.0**	**5.0**

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 16 of 26

Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	17/07/21 - 24/07/21
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK				
	Singleton's Proposed Gravel Pit Test Pit 1906				
Proposed Use	Basecourse/ Subbase				
Project No.				Depth	150 - 1400 mm
Field Description	Sandy GRAVEL				

Sample No.			21 A 340	21 A 340
Condition			Unsoaked	Soaked
Period of Curing		days	3.05	3.11
% Retained 19 mm Sieve	WA 115.2	%	8	8
Material Retained 19 mm Sieve (Excluded/Replaced)			Excluded	Excluded
Maximum Dry Density		t/m³	2.023	2.023
Optimum Moisture Content		%	9.8	9.8
Test Conditions of Specimen				
Surcharging of Specimen		kg	4.50	4.50
Period of Soaking		days		4.00
Compactive Effort Used in Moulding Specimen				
Blows, layers, kg hammer			20 5 4.9	20 5 4.9
Test Results				
Dry Density				
Specimen at Compaction		t/m³	1.936	1.944
Specimen after Soaking		t/m³		1.945
Dry Density Ratio				
Desired Dry Density Ratio		%	96.0	96.0
Specimen at Compaction		%	95.7	96.1
Specimen after Soaking		%		96.1
Moisture Content				
Specimen at Compaction		%	10.1	9.8
Specimen after Soaking		%		13.1
Top 30 mm Layer of Specimen After Penetration		%	9.9	11.8
Remainder of Specimen After Penetration		%	9.7	12.5
Moisture Ratio				
Desired Moisture Content Ratio		%	100.0	100.0
Specimen at Compaction		%	103.2	100.1
Specimen after Soaking		%		134.0
Top 30 mm Layer of Specimen After Penetration		%	100.6	120.9
Remainder of Specimen After Penetration		%	98.7	127.1
Specimen Swell		%		0.0
California Bearing Ratio		%	**60**	**40**
Penetration		mm	**5.0**	**5.0**

Comments / Distribution
TRIM File No. 21/228
Laboratory File

Approved Signatory

Name J.M. HEWITT
Function Technical Officer Materials
Date 26/07/2021

Document:71/05/141.1V2_5 Issue:24/08/2020 TRIM:D18#627560

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 17 of 26

Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	19/07/21 - 24/07/2021
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK				
	Singleton's Proposed Gravel Pit Test Pit 1943				
Proposed Use	Basecourse/ Subbase				
Project No.				Depth	150 - 1200 mm
Field Description	Sandy GRAVEL				

Sample No.			21 A 341	21 A 341
Condition			Unsoaked	Soaked
Period of Curing		days	1.02	1.04
% Retained 19 mm Sieve	WA 115.2	%	4	4
Material Retained 19 mm Sieve (Excluded/Replaced)			Excluded	Excluded
Maximum Dry Density		t/m³	2.231	2.231
Optimum Moisture Content		%	6.9	6.9
Test Conditions of Specimen				
Surcharging of Specimen		kg	4.50	4.50
Period of Soaking		days		3.92
Compactive Effort Used in Moulding Specimen				
Blows, layers, kg hammer			22 5 4.9	22 5 4.9
Test Results				
Dry Density				
Specimen at Compaction		t/m³	2.139	2.141
Specimen after Soaking		t/m³		2.140
Dry Density Ratio				
Desired Dry Density Ratio		%	96.0	96.0
Specimen at Compaction		%	95.9	96.0
Specimen after Soaking		%		95.9
Moisture Content				
Specimen at Compaction		%	6.9	7.0
Specimen after Soaking		%		10.2
Top 30 mm Layer of Specimen After Penetration		%	6.7	9.0
Remainder of Specimen After Penetration		%	6.8	9.8
Moisture Ratio				
Desired Moisture Content Ratio		%	100.0	100.0
Specimen at Compaction		%	100.3	100.9
Specimen after Soaking		%		148.1
Top 30 mm Layer of Specimen After Penetration		%	96.6	130.1
Remainder of Specimen After Penetration		%	98.6	142.5
Specimen Swell		%		0.0
California Bearing Ratio		%	**70**	**60**
Penetration		mm	**5.0**	**5.0**

Comments / Distribution
TRIM File No. 21/228
Laboratory File

Approved Signatory

Name J.M. HEWITT
Function Technical Officer Materials
Date 26/07/2021

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CALIFORNIA BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

WA 141.1 Sampling Method: WA 100.1 Sheet 18 of 26

Report No.	21 A 334 - 342 /1	Reference No.		Field No.	A 4487
Date Sampled	12/07/21 - 15/07/21	Date Received	12/07/21 - 15/07/21	Date/s of Test	17/07/21 - 24/07/21
Local Govt Authority	Cranbrook				
Road	Albany Highway H1				
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK				
	Singleton's Proposed Gravel Pit Test Pit 1988				
Proposed Use	Basecourse/ Subbase				
Project No.				Depth	150 - 1650 mm
Field Description	Sandy GRAVEL				

Sample No.			21 A 342			21 A 342		
Condition			Unsoaked			Soaked		
Period of Curing		days	3.35			3.36		
% Retained 19 mm Sieve	WA 115.2	%	8			8		
Material Retained 19 mm Sieve (Excluded/Replaced)			Excluded			Excluded		
Maximum Dry Density		t/m³	2.152			2.152		
Optimum Moisture Content		%	8.2			8.2		
Test Conditions of Specimen								
Surcharging of Specimen		kg	4.50			4.50		
Period of Soaking		days				3.93		
Compactive Effort Used in Moulding Specimen								
Blows, layers, kg hammer			23	5	4.9	23	5	4.9
Test Results								
Dry Density								
Specimen at Compaction		t/m³	2.075			2.072		
Specimen after Soaking		t/m³				2.074		
Dry Density Ratio								
Desired Dry Density Ratio		%	96.0			96.0		
Specimen at Compaction		%	96.4			96.3		
Specimen after Soaking		%				96.4		
Moisture Content								
Specimen at Compaction		%	7.8			7.8		
Specimen after Soaking		%				12.5		
Top 30 mm Layer of Specimen After Penetration		%	7.7			10.6		
Remainder of Specimen After Penetration		%	7.9			11.6		
Moisture Ratio								
Desired Moisture Content Ratio		%	100.0			100.0		
Specimen at Compaction		%	95.4			95.6		
Specimen after Soaking		%				152.3		
Top 30 mm Layer of Specimen After Penetration		%	94.2			129.4		
Remainder of Specimen After Penetration		%	96.0			141.7		
Specimen Swell		%				0.0		
California Bearing Ratio		%	**80**			**70**		
Penetration		mm	**5.0**			**5.0**		

Comments / Distribution
TRIM File No. 21/228
Laboratory File

Approved Signatory

Name J.M. HEWITT
Function Technical Officer Materials
Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 19 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	12/07/2021	Date Received 12/07/2021	Date/s of Test 21/07/21 - 22/07/21
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**3820**
Moisture Content at Maximum Dry Compressive Strength	%	**10.0**
Sample No.		**21 A 334**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File Sample No. 21 A 334 TP 1856	 Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 20 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	13/07/2021	Date Received 13/07/2021	Date/s of Test 21/07/21 - 22/07/21
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**3750**
Moisture Content at Maximum Dry Compressive Strength	%	**8.0**
Sample No.		**21 A 335**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File 21 A 335 TP 1840	Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 21 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	13/07/2021	Date Received 13/07/2021	Date/s of Test 21/07/21 - 22/07/21
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**3910**
Moisture Content at Maximum Dry Compressive Strength	%	**10.0**
Sample No.		**21 A 336**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File 21 A 336 TP 1845	Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 22 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	13/07/2021	Date Received 13/07/2021	Date/s of Test 21/07/21 - 22/07/21
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**3420**
Moisture Content at Maximum Dry Compressive Strength	%	**9.0**
Sample No.		**21 A 337**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File 21 A 337 TP 1879	 Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 23 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	13/07/2021	Date Received 13/07/2021	Date/s of Test 21/07/21 - 22/07/21
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**3440**
Moisture Content at Maximum Dry Compressive Strength	%	**8.5**
Sample No.		**21 A 338**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File 21 A 338 TP 1888	 Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 24 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	15/07/2021	Date Received 15/07/2021	Date/s of Test 21/07/21 - 22/07/22
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**4310**
Moisture Content at Maximum Dry Compressive Strength	%	**10.0**
Sample No.		**21 A 339**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File 21 A 339 TP 1897	 Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 25 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	15/07/2021	Date Received 15/07/2021	Date/s of Test 21/07/21 - 22/07/21
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**1930**
Moisture Content at Maximum Dry Compressive Strength	%	**10.0**
Sample No.		**21 A 340**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File 21 A 340 TP 1906	Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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MAXIMUM DRY COMPRESSIVE STRENGTH TEST REPORT

Sheet 26 of 26

Report No.	21 A 334 - 342 /1	Reference No.	Field No. A 4487
Date Sampled	15/07/2021	Date Received 15/07/2021	Date/s of Test 21/07/21 - 22/07/21
Local Govt Authority	Cranbrook		Project No.
Road	Albany Highway H1		
Location	For/ Gordon River South Widening & Reconstruction 307.95 - 316.23 SLK		
Proposed Use	Basecourse/ Subbase		
Field Description	Sandy GRAVEL		

Sampling Method: WA 100.1

Moisture Content Method: WA 110.1 Convection

Test Method		WA 140.1
Maximum Dry Compressive Strength	kPa	**2600**
Moisture Content at Maximum Dry Compressive Strength	%	**7.5**
Sample No.		**21 A 341**

Comments / Distribution	Approved Signatory
TRIM File No. 21/228 Laboratory File 21 A 341 TP 1943	Name J.M. HEWITT Function Technical Officer Materials Date 26/07/2021

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