WALGA
WORKING FOR LOCAL GOVERNMENT

Local Government Guidelines
for Road Gravel Supplies in Western Australia

walga.asn.au

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Contact:

WALGA

ONE70, LV 1, 170 Railway Parade, West Leederville

Phone: (08) 9213 2000

Fax: (08) 9213 2077

Email: info@walga.asn.au

Website: www.walga.asn.au

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1.0	September 2017	Original draft from Gravel Supply Working Group.
2.0	September 2020	Finalised first draft.
3.0	March 2021	Final for publication.
4.0	July 2021	Removed references to LGMap, which has been discontinued.

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DISCLAIMER

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Purpose

The purpose of this guideline is to provide information for Local Governments in Western Australia on how to access gravel for road building.

It is intended that this information will be useful for all road managers, providing guidance on the current requirements for accessing gravel and information to plan for future resource requirements.

1 Overview

This guide describes regulatory requirements and processes to obtain access to suitable naturally occurring road pavement building materials from the closest available sources. Road pavements can consist of a wide range of materials including limestone, gravels, sand-clays and rock, which are sometimes screened, crushed or mixed. Gravel is used as the general term to describe these materials. Processes for sourcing bituminous construction materials such as asphalt and bitumen are not included in this report.

The road pavement in this report refers to the base course and sub base, or sheeting material for unsealed roads, but does not include the natural soil under the road (subgrade), or imported soil or other material to raise the road level (fill or embankment). Fill is not included in the data of this report for quantities and usage, but supply issues and processes to access or protect fill sources are usually the same as for pavement materials.

Means of addressing constraints and conditions of access are described, including those related to legislative requirements, environmental and heritage protection, logistics, and community concerns.

This document provides updated practices and data to the former State Gravel Supply Strategy 1998 (SGSS).

2 Background

2.1 Policy Context

The SGSS was issued in March 1998 by the Government of Western Australia and was widely circulated to Government agencies and industry. The foreword of the document was endorsed by the then Minister for Transport and the Minister for the Environment.

The purpose of the SGSS was to prevent shortages of gravel and other materials needed for public road network construction and maintenance programs in Western Australia.

Implementation of the strategy was coordinated by a Management Group chaired by Main Roads WA, with representatives from WA Local Government Association (WALGA), Department of Biodiversity, Conservation and Attractions (DBCA) (formerly Department of Conservation and Land Management (CALM)), Department of Mines Industry Regulation and Safety (DMIRS, formerly the Department of Mines and Petroleum), Department of Planning Lands and Heritage (DPLH) and WA Farmers Federation. An action plan was documented from issues shown in the strategy, and the Management Group developed 20 projects to address items in the action plan. From 1999 to 2012, the projects were implemented, and a status report was developed by Main Roads WA in 2013.

The Minister for Transport approved the termination of the SGSS initiative in December 2012 but endorsed ongoing meetings of the members of the SGSS Management Group to address outstanding and emerging issues related to road construction materials. In December 2015, the group was renamed the Gravel Supply Interagency Working Group (GSIWG).

The Terms of Reference for the Group are:

1. Determine projected material requirements and resources.
2. Address issues preventing access to materials including proposed changes to legislation, policies and standards.
3. Maintain or improve material extraction policies and processes including planning, environmental protection, rehabilitation and compensation for damage.
4. Maintain liaison and cooperation between agencies represented on the group including DMP, DBCA, Main Roads WA and WALGA.
5. Update documented policies, procedures and guidelines as required.

In addition to the strategic initiatives, the SGSS provided a range of useful guidance on regulations and practices for accessing gravels, current usage and future demand. The Working Group resolved to perform a review and update of this information to establish these guidelines.

2.2 Evolving Environment

Implementation of the SGSS was originally focussed on the needs of Main Roads WA and Local Governments as the principal public road construction agencies. However, in recent years, the use of contractors and private industry partners to government has complicated the responsibilities for construction and maintenance. The extensive DBCA managed public road system is now subject to increasing public traffic and requires greater recognition and funding attention.

Barriers to land entry to access materials are not new but restraints are an increasing issue because of community awareness. Objections continue to grow and the legal system is now

more often used to challenge activities of authorities. To address these issues, construction authorities need to publicise their value to the community, be more transparent, and demonstrate fairness. Ongoing liaison is required between Main Roads WA, Local Governments, DPLH, DMP, DBCA, Aboriginal related agencies and Aboriginal groups and other stakeholders.

The initial focus of the strategy was naturally occurring road building materials needing minimum processing for use as road pavement materials. However, as sources of these materials become more difficult to obtain, more processed materials such as crushed rock will need to be considered. In addition, materials for other uses in addition to roads could also be considered in the future. DMP and DPLH are currently working on a broader view of needs and sources in developing strategic basic raw materials mapping around major centres. This was beyond the scope of the original SGSS.

The achievements of the SGSS are detailed in Implementation of the State the State Gravel Supply Strategy 1999 to 2012.

3 Land Entry to Access Material

3.1 Introduction

Local Governments generally obtain access to land to extract materials by consultation and agreements with land interest holders. Interest holders can include private landowners, private land leaseholders, public land leaseholders, Aboriginal groups and other government agency managers of land. Public lands are referred to as Crown land and include lands vested for various government or public purposes as well as unallocated Crown land.

Landgate is responsible for maintaining information on the State's private and public lands.

Crown land management authority resides with various agencies, not just DPLH. In other words, Crown land is vested in an Authority which can then enter into a management order with another authority. Enquiries for all Crown land not reserved for conservation should be directed to the Department of Planning, Lands and Heritage. DBCA should be consulted directly for lands vested in the Conservation and Parks Commission. (https://www.dplh.wa.gov.au/information-and-services/crown-land/submitting-a-crown-land-enquiry).

Documentation of agreements with land interest holders or DPLH is usually important to confirm the conditions of agreement and avoid misunderstandings and disputes.

It is appropriate to obtain relevant approvals and documentation from management agencies so as to comply with formal requirements such as environmental protection, heritage protection or Crown land disturbance. Contact should be made with the relevant management agency to determine their requirements.

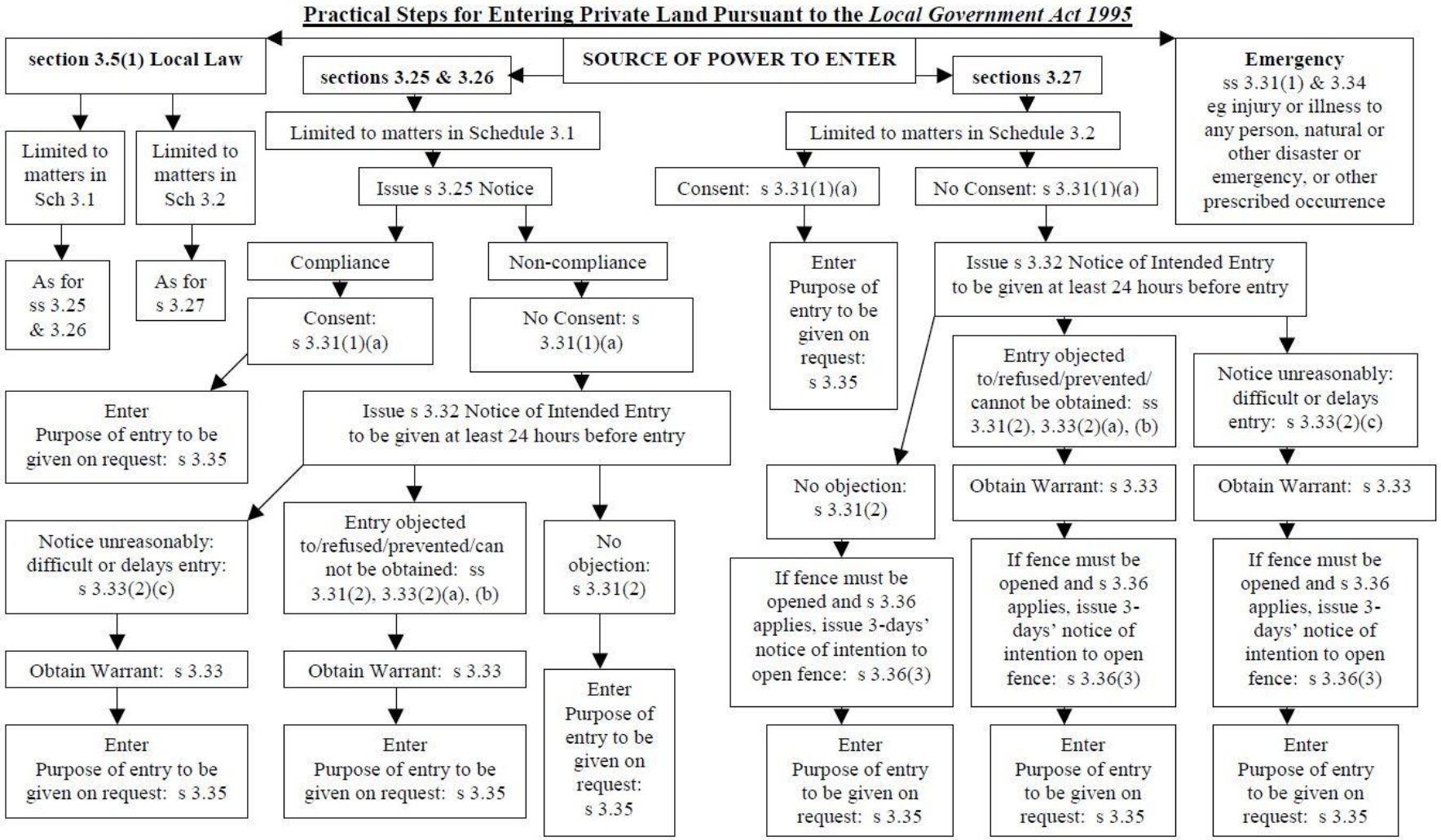
3.2 Local Government Access to Private Land

3.2.1 Powers to enter private land

Local Governments have powers to enter private land and extract materials for public works under the Local Government Act 1995. These powers are laid out in sections 3.27 to 3.32 and Schedule 3.2 – see appendix for extract. Compensation for damage is included under section 3.22. The amount of payment for materials varies considerably in different situations and locations due to many factors.

The Joint Standing Committee on Delegated Legislation of the WA Parliament released a report on the powers of entry and powers to make local laws that affect private land under the Local Government Act 1995. The Committee developed a flow chart that depicts the steps that Local Governments can take when entering private land (see Figure 1). Not all of these powers are suitable for extracting gravel from private land.

***Figure 1*:** Suggested steps for Local Government to enter private land. Source: Joint Standing Committee on Delegated Legislation (2003)



According to the Committee, there are four sources of power for Local Governments to enter private land in the Local Government Act:

1. Through a Local Law – under section 3.5 (1) of the Local Government Act 1995. This power is limited to situations detailed in Schedule 3.1 and Schedule 3.2. Schedule 3.2, Section 3 gives powers to take from private land "any native growing or dead timber, earth, stone, sand, or gravel" that is required to repair a thoroughfare, bridge, culvert, fence or gate.
2. Through a notice issued under Section 3.25 and 3.26 of the Local Government Act. These notices require the land owner or occupier to take some action in relation to their land and empower the Local Government to enter the land and address the issue itself if there is not compliance. These notices are limited to matters detailed in Schedule 3.1, and are not suitable to gain entry to land to acquire building materials.
3. Through Section 3.27 of the Act, which enables a Local Government to take any of the actions detailed in Schedule 3.2 in performing its ordinary functions, on land which is not Local Government land. Actions taken under Section 3.27 do not require the consent of the interest holder, but certain procedures must be followed when consent has not been given. This includes Crown land under pastoral lease (see next section).
4. In emergency circumstances through subsections 3.31(1) and 3.34. This power may be used when there is imminent risk of injury or illness to any person or natural disaster. This power is not suitable for obtaining building materials.

Among the four sources of power to enter private land, Section 3.27 and Schedule 3.2(3) grant Local Government the power to enter for the purposes of extracting building materials. The power to enter land under a local law (Section 3.5) may also be used, and the procedure for entering the land is the same as the procedure for entering under Section 3.27.

3.2.2 General procedure for entering private land

The procedure for entering private land is contained in Sections 3.31-3.33, 3.35 and 3.36 of the Local Government Act.

In the first instance, the Local Government should seek to reach an agreement with the interest holder to extract the gravel, so that consent is provided. If the interest holder does not consent, the Local Government may enter without consent by issuing a Section 3.31 Notice of Intended Entry.

Any Local Government officer entering private land is required to provide information on the purpose of entering that land, including the details of the powers by which the Local Government claims the right to enter.

The Local Government may open a fence around the property in question, when it is not practical to enter through the existing and usual openings in that fence. Before opening the fence, the Local Government must provide notice in writing to the owner or occupier at least three days in advance.

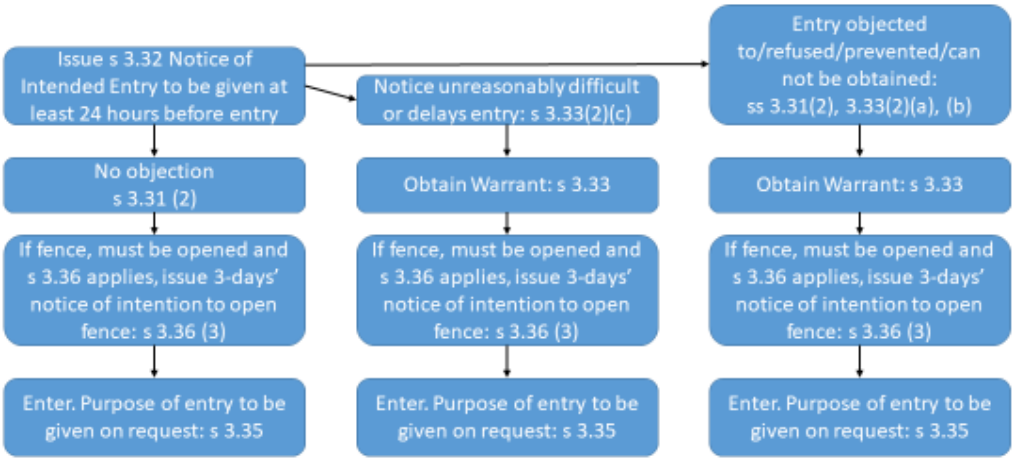
The Local Government must obtain a warrant prior to entry under the following conditions:

- if entry is refused, opposed or prevented;
- if entry cannot be obtained; or
- if the notice can be given without unreasonable difficulty or delay.

This warrant is issued by a justice and must be in a prescribed form, upon being satisfied that one of the conditions listed above has been met. The warrant should specify the purpose for which the land is to be entered, and will remain in force until that purpose has been satisfied.

This procedure is illustrated in Figure 2.

Figure 2: Procedure to enter private land when landowner does not consent



3.2.3 Entry to private land through a local law

In addition to the power to enter land deriving from Section 3.27, Local Governments may make local laws under the Local Government Act, section 3.5(1), covering all matters required for the Local Government to perform its functions.

The procedure for entering land under a local law is the same as that undertaken when using the powers derived from Section 3.27 (power of a Local Government to perform its normal functions on land that is not Local Government land), as detailed above.

3.2.4 Exclusions

Section 3.27 (3) states that the authority excludes "land being used as the site or curtilage of a building or has been developed in any other way, or is cultivated". However, as a result of the SGSS, (4A) was added that states "….planting pasture on land for grazing does not amount to cultivating the land".

3.3 Local Government Access to Crown Land

3.3.1 Local Government access to Crown Land subject to a pastoral lease

Under Section 3.27 of the Local Government Act, Local Governments can access Crown land that is subject to a pastoral lease within the meaning of the Land Administration Act 1997, Section 3. A pastoral lease is defined as pastoral lease of Crown land granted under Section 101 or continued under Section 143 of the Land Administration Act 1997.

A pastoral lessee must not use land under the pastoral lease for purposes other than pastoral purposes which includes the following:

a) the commercial grazing of authorised stock;
b) agricultural, horticultural or other supplementary uses of land inseparable from, essential to, or normally carried out in conjunction with the grazing of authorised stock, including the production of stock feed; and

c) activities ancillary to the activities mentioned in paragraphs (a) and (b);

The same procedures can be followed as per access to private land.

3.3.2 Local Government access to Unallocated Crown Land

Local Governments who wish to access Crown land that is reserved, declared or otherwise dedicated under the Land Administration Act 1997 will need to approach the Department of Planning, Lands and Heritage (DPLH) to obtain permission.

Local Governments seeking access to unallocated Crown land will also need to approach the DPLH. Under the Land Administration Act 1997, unallocated Crown land is defined as Crown land:

a) in which no interest is known to exist, but in which native title within the meaning of the Native Title Act 1993 of the Commonwealth may exist; and
b) which is not reserved, declared or otherwise dedicated under this Act or any other written law.

Access to these last two categories of Crown land is more complex, and if possible, priority should be given to extracting resources on other lands. Local Governments who do require a gravel resource from an area of unallocated Crown land should approach the DPLH through the Crown Land Enquiries page on the DPLH website (https://www.dplh.wa.gov.au/information-and-services/crown-land/crown-land-enquiries). The processing time for such applications will be uncertain, although the DPLH can prioritise requests to meet an urgent need, such as the destruction of a road by extreme weather.

The key consideration in the DPLH's determination will be the effects of native title, and in particular the conditions set out in Section 24KA of the Native Title Act (1993 (Cwth). Considerations will include the impact on native titleholders' rights, the purpose for which the material is being extracted and the quantity of material to be extracted. The purpose for which the material is being sourced (i.e. for road maintenance or re-construction) should be made clear on the application.

On-selling surplus material, or other commercial uses of the material, may result in approval not being granted, and it should be made clear in the application that this will not take place.

3.3.3 Crown land reserved under the CALM Act 1984

Crown land reserved under the CALM Act 1984 is vested with the Conservation and Parks Commission and includes national parks, conservation parks, section 5(1)(g) and 5(1)(h) reserves, nature reserves, State forest and timber reserves. What activities are permitted in these lands is dependent on the objectives for which the land is reserved.

Conservation reserves

National parks, conservation parks, section 5(1)(g) and 5(1)(h) reserves, and nature reserves, are natural areas reserved for the protection of their unique landscape, cultural and/or natural values. They are generally intended to be managed for use that is consistent with the proper maintenance and restoration of the natural environment, the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic or scientific interest for current future generations.

Although these areas may hold deposits of gravel and are viewed as a potentially economical alternative to materials acquired from commercial pits or freehold lands, these lands are

restricted by specific legislation which may or may not allow for the taking of gravel upon addressing significant restrictions, assessments and approvals. Therefore, it is not appropriate to develop gravel pits on these lands when a feasible alternative source exists. Priority should be given to extracting gravel from pits on freehold, leasehold or unallocated land, with land reserved for conservation viewed as a last resort.

State forest and timber reserves

State forest and timber reserved are managed to achieve the purpose, or combination of purposes, provided for in a management plan. A management plan contains a statement of the policies and guidelines proposed to be followed and a summary of the operations proposed to be undertaken and might include gravel extraction.

Gaining a license to extract gravel from State forest or timber reserves is not a routine approval exercise. It will generally involve prior site investigation, an application requiring detailed /comprehensive documentation for a license to extract the material, a permit to clear native vegetation as detailed in Section 4, rehabilitation requirements, and possible referral to state and federal environmental regulators with potential requirements for environmental offsets. Once all of these factors are taken into account, sourcing gravel from such lands may not be as economical as from other sources.

If gravel is proposed to be extracted from a State forest or timber reserve, the Local Government is required to first consult with DBCA to scope issues, including tenure and purpose of the land, investigation of alternative options, environmental impacts, Aboriginal heritage and native title rights and interests considerations, and dieback management. If the LGA considers it would like to further progress a proposal, it should lodge an application for a five year license with the DBCA. The application should include:

- Documentation summarising the type and quantity demands and the proximity of projects that justify sourcing basic raw materials from CALM Act lands.
- Evidence that existing pits within the locality have been exhausted, or that there is otherwise no available alternative source of gravel within economic cartage distance. This would include an independent geological report summarising potential gravel reserves across all tenure for that locality and a report summarising estimated gravel requirements over five years including dieback free gravel estimates.
- Pit management and rehabilitation plan as per *DBCA - Guidelines for the Management and Rehabilitation of Basic Raw Material Pits*.
- Evidence that other pits on DBCA lands previously used/accessed by the applicant have been successfully rehabilitated.
- Disturbance Approval System application (to be initially discussed with DBCA).
- That the proposed pit is to be sited in a location that will pose minimal risk of the spread of dieback, as detailed in Section 4.
- That the proposed site has been adequately assessed and confirmed not to support significant biodiversity conservation, Aboriginal heritage, recreation or other public values or uses, including submission of associated specialist reports including Aboriginal consultation.
- Offset proposals if native vegetation clearing is involved.
- That the proposed pit is to be sited in a landscape that is adequately represented in the conservation estate, and is of the lowest biophysical value.

- If applicable, evidence that the resource would be used to maintain a road within or adjacent to the CALM Act land, or which would otherwise serve the protection and management of the land.

The following documents are of relevance for Local Governments considering applying for a license to extract gravel from CALM Act lands:

- *DBCA – Guidelines for the Management and Rehabilitation of Basic Raw Material Pits*
- *DBCA – Phytophthora Dieback Management Manual 2020*
- *Position Statement No. 12 - Basic Raw Materials: state government and local government access to vested lands | Conservation Commission*

3.4 Access to Gravel Supplies by State Government Agencies

3.4.1 Main Roads WA

Main Roads WA has powers to enter land and extract materials in the *Main Roads WA Act 1930 and by delegations in the Land Administration Act 1997 s182-186, 195 – 197, 202-205)* (see appendix for extract). This is detailed in Main Roads WA Operational Guidelines 95 'Extracting Road Building Materials from Land in WA'.

3.4.2 Other government agencies

The Parks and Wildlife Service (Department of Biodiversity, Conservation and Attractions) has powers to extract materials from its managed lands for purposes provided for in a management plan.

Some other State Government agencies have powers to enter land under their own Acts or delegated powers under the *Land Administration Act 1997*.

4 Legislative Requirements

All extraction of materials is also subject to other relevant State and Commonwealth legislation, such as:

- Biodiversity Conservation Act 2016
- Environmental Protection Act 1986
- Environment Protection and Biodiversity Conservation Act 1999 (Cth)
- Rights in Water and Irrigation Act 1914
- Native Title Act 1993 (Cth)
- Aboriginal Heritage Act 1972
- Native Title Act 1999 (WA), or
- Specific conditions may apply when operating in proclaimed Public Drinking Water Areas.

Before exercising the rights under the *Local Government Act 1995*, provisions to access land for the purposes of gravel extraction, approvals have to be sought under relevant legislation.

4.1 Native vegetation clearing

If the site intended for gravel extraction contains native vegetation, clearing of this vegetation must be authorised. Some clearing of native vegetation will require approval under three separate pieces of legislation:

Approvals requirements summary:	Clearing Permit under *Environmental Protection Act 1986*	Application to modify or take under *Biodiversity Conservation Act 2016*	Approval under the *Environmental Protection and Biodiversity Conservation Act 1999*
Native vegetation with no threatened species, threatened ecological communities or MNES*			
Native vegetation with State listed threatened species and/or threatened ecological communities, but no MNES			
Native vegetation with MNES and State listed threatened species and/or threatened ecological communities			

*MNES – Matters of National Environmental Significance

Where native vegetation clearing requires approval under the Environmental Protection Act 1986, administered by the Department of Water and Environmental Regulation (DWER) and the Biodiversity Conservation Act 2016, administered by the Department for Biodiversity, Conservation and Attractions (DBCA), applicants are encouraged to liaise directly with both agencies to ensure the agencies are aware of the requirement for the dual process.

Environmental Protection Act 1986

In Western Australia, under the provisions of Part V Division II of the *Environmental Protection Act 1986 (EP Act)*, a clearing permit is required to remove native vegetation unless the clearing is an exempt kind prescribed in the Clearing Regulations, or set out in Schedule 6 of the EP Act. Clearing of native vegetation to access gravel is not exempt under the EP Act provisions. Extending an existing gravel pit might also require a clearing permit as clearing permits are issued for defined time frames and might define the size of the area approved to clear.

Applications to clear native vegetation must be lodged via DWER. Application forms and a clearing fee calculator are available via DWER's website.

DWER's website provide guidelines on how clearing applications are being assessed, listing the type of information required to facilitate an efficient assessment process. Other useful DWER guides that are relevant to native vegetation clearing permit for gravel extraction include:

- A guide to preparing revegetation plans for clearing permits
- Clearing of native vegetation–offset procedure.

There are two types of permit available:

- Clearing permit for a single site
- Clearing permit covering multiple gravel sites – collating the necessary information for several sites will take more time than when submitting an application for a single site, but the benefits of this approach are significant, including one permit, one process for reporting and reduced costs when compared with multiple clearing applications.

A requirement to follow best practice dieback hygiene procedures are a standard condition in native vegetation clearing permits issued by DWER. See Appendix for Guideline for Best Practice Management of Dieback in the BRM industry – see

Biodiversity Conservation Act 2016

When vegetation and fauna surveys confirm presence of threatened flora, habitat for threatened fauna or presence of threatened ecological communities, authorisations to disturb threatened species or to modify a threatened ecological community (TEC) are required.

When clearing of native vegetation for gravel extraction is approved under the provisions of the EP Act, the following authorisations are required under the provisions of the Biodiversity Conservation Act 2016:

When authorisation required	**Requirement**	**Relevant information links**
Threatened flora present at the site approved to be cleared under the EP Act	Authorisation to take threatened plants: Management Operation Licence	https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants/200-authorisation-to-take-threatened-plants
Fauna to be physically captured to be relocated prior extraction activities	A licence to take fauna	https://wildlifelicensing.dbca.wa.gov.au/
Threatened ecological community present at the site approved to be	Authorisation to modify a TEC	Application to the Minister for authorisation under section 45 of the Biodiversity Conservation Act 2016

cleared under the EP Act		

Further guidance on how the *Biodiversity Conservation Act 2016* intersect with the *Environmental Protection Act 1986* is available via DBCA website.

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

In some areas, clearing of vegetation will or is likely to require approval under the provisions of the Commonwealth legislation, the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.

If the proposed native vegetation clearing is likely to have an impact on a matter of national environmental significance, the clearing application may also need assessment and approval under the EPBC Act. Matters of national environmental significance (MNES) are listed under Part 3 Division 1 of the EPBC Act and include:

1. World Heritage Properties;
2. National heritage properties;
3. Wetlands of international importance;
4. Nationally listed threatened species and communities;
5. Listed migratory species;
6. Nuclear actions (including uranium mines)
7. Water resources, in relation to coal seam gas development and large coal mining development.

To identify whether a project requires assessment under the EPBC Act, the following tools can be used:

1. Use the Protected Matters Search Tool to find out whether there are any listed MNES on the project site or MNES that might be significantly impacted by the proposed activity;
2. Read the Significant Impact Guidelines 1.1. – Matters of National Environmental Significance to determine whether the proposed action is likely to have a significant impact.

If there is uncertainty around the significance of the proposed action, it is recommended that the proposal is referred to the Commonwealth Department for Environment. Referral information is available at https://www.environment.gov.au/epbc.

To increase the efficiency of the regulatory processes, an assessment bilateral agreement process has been set up between the Commonwealths and Western Australia in respect of clearing regulated under Part V Division II of the *Environmental Protection Act 1986*.

To identify whether a specific clearing proposal can be assessed under bilateral agreement, read A guide to native vegetation clearing processes under the assessment bilateral agreement or contact DWER to seek advice.

4.2 Gravel extraction in proclaimed water management areas

Gravel extraction is listed as a compatible land use in P1, P2 and P3 category Public Drinking Water Supply Areas (PDWSA) (DWER) subject to the following conditions:

1. A licence under the Rights in Water and Irrigation Act 1914 may be required to abstract groundwater or surface water. More information should be sought from the regional office of DWER.
2. Conditions may apply to the storage of fuels, the depth of excavation in relation to the water table and rehabilitation criteria (see guide on Rehabilitation of disturbed land in PDWSAs);
3. Unless demonstrated that the risk of water contamination is effectively controlled under all circumstances, these facilities should be located outside wellhead protection zones (WHPZs) and reservoir protection zones (RPZs).

Proclaimed Area maps and the Public Drinking Water Source Area maps can be viewed via the DWER website at https://www.water.wa.gov.au/maps-and-data/maps.

4.3 Dieback management

Dieback is a major plant disease that thrives in areas of natural vegetation such as the jarrah forest and coastal heaths in the south-west of Western Australia. Both the activity of creating gravel pits and the introduction of road building material such as gravel and sand sourced off site, are the two most common vectors of dieback introduction and spread across the south-west. Dieback, a soil borne fungus, causes permanent and irreversible changes to the vegetation structure when it infests a site, which include reduced numbers and diversity of susceptible plants. Dieback also results in knock-on effects for the remaining plants and animals due to reduced resources, protection and shade at the site.

All agencies who access or require gravel must give consideration to managing dieback hygiene for all activities associated with the requirement of road building materials. The activities of exploration, extraction, storage, transport of the basic raw materials, and rehabilitation of the pits, all pose a dieback risk. Sourcing and protecting uninfested, dieback free gravel reserves is becoming increasingly difficult. Main Roads WA is funding research projects to produce uninfested material from known dieback infested sites.

If gravel is required to be extracted from land reserved under the CALM Act, then a dieback risk assessment and risk management plan should be developed for all phases of the operation. DBCA widely recommends that all agencies adopt these best practice principles when working adjacent to the native vegetation; *DBCA - Phytophthora Dieback Management Manual* and *Guidelines for the Management and Rehabilitation of Basic Raw Material Pits* (see Section 3.3.2).

A Dieback Working Group has been formed to increase awareness of the causes of dieback spread and the impacts, which includes membership from Local Government, DBCA, Main Roads WA, Curtin University and Hanson, a major supplier of basic raw materials. The Working Group's Basic Raw Materials Subcommittee is developing guidelines for managing dieback in the basic raw materials industry, which includes gravel extraction.

The guidelines will be available on the Dieback Working Group website: https://www.dwg.org.au/, and Local Government should consult these guidelines in developing their gravel supply plans, once they are made available.

It is recommended that Local Governments plan their gravel requirements and sources well in advance of need, to ensure that sustainably sourced, dieback-free gravel is available to them when required.

4.4 Aboriginal heritage and native title considerations

Aboriginal Heritage Act 1972

The *Aboriginal Heritage Act* (AHA) protects all Aboriginal heritage sites in Western Australia, whether or not they are registered with the Department of Planning, Lands and Heritage. Consent is required from the Minister for Aboriginal Affairs for any activity which will negatively impact Aboriginal heritage sites. The AHA also provides protection for Aboriginal objects.

The Aboriginal Cultural Materials Committee (ACMC) is established under the AHA to represent Aboriginal people on heritage matters. The ACMC evaluates on behalf of the community the importance of places and objects alleged to be associated with Aboriginal persons and makes recommendations and provides advice to the Minister on places and objects which should be preserved or acquired and other matters under the AHA.

In March 2018, the Minister for Aboriginal Affairs commenced a review of the AHA, and new legislation is expected to be introduced into Parliament in 2021.

Consent to certain uses

All land users who wish to use land for a purpose which might excavate, destroy, damage, conceal or alter an Aboriginal site must exercise due diligence in trying to establish whether or not their proposed activity on a specified area may damage or destroy an Aboriginal site. The Government's Due Diligence Guidelines (linked) assist land users to understand their obligations under the AHA and inform their risk management decisions.

Where land users conclude that impact to a site is unavoidable, the Minister's consent may be sought under section 18 of the AHA to impact the Aboriginal site by giving notice to the ACMC.

For more information on the requirements of the AHA contact the Department of Planning, Lands and Heritage.

Native title

The *Native Title Act 1993* (Cth) (NTA) provides for the recognition and protection of native title rights and interests by which Aboriginal people have maintained connection to their land and waters since sovereignty. The NTA also provides that native title has been extinguished over land that has been subject to particular grants of land tenure, such as freehold and certain types of leases. By contrast, regardless of the underlying land tenure, the AHA applies to all land in Western Australia.

The South West Native Title Settlement is the most comprehensive native title agreement negotiated in Australian history. Presently the commencement of the Settlement has been delayed due to proceedings in the Federal Court. The area covered by the Settlement covers a large number of Local Governments, and is shown in Figure 3.

Figure 3: Map of the South West Native Title Settlement Area

5 Payment for Material, Damage and Rehabilitation

For government agencies, in most circumstances, payments and or rehabilitation required from material extraction operations is completed by agreement with landowners and land interest holders, and does not require formal legal arrangements using legislation. Local Governments and Main Roads WA have policies and practices for payments and negotiations. Government land managers such as the Parks and Wildlife Service have strict requirements for land entry, extraction and rehabilitation by all organisations approaching them to access materials.

For private companies extracting materials, conditions relating to extraction management, environmental care, rehabilitation and payments are set under Extractive Industry licences on private land and Mining Leases on Crown land.

It is important to consider the above requirements for all proposed land entry and land disturbance not just for material extraction but also for investigations and surveys. Even for Exploration Leases on Crown land under the *Mining Act 1978*, the leaseholder is responsible for rehabilitation of disturbed land so consultation before land entry is necessary.

Government agencies including Local Governments can also purchase materials from commercial suppliers at commercial rates. This is commonly done in areas where access to suitable naturally occurring materials is limited or the cost and effort to establish a new material source of their own is impractical or not cost effective.

5.1 Compensation to landowners by Main Roads WA

In 2001, MRWA developed a policy for entering public and private land and paying compensation for damage resulting from extracting of materials. This addressed the previous perceived anomaly between Main Roads WA, which made no payment, and Local Governments which typically paid up to about $1 per cubic metre for material extracted from private land. This is in addition to rehabilitation costs which are usually covered by the extraction agencies.

The policy is online at www.mainroads.wa.gov.au Building Roads/Standards and Technical/Materials Engineering/Publications/Operational Guideline 95.

5.2 Compensation to landowners by Local Governments

Section 3.22 of the Local Government Act also contains provisions for landowners to be compensated, if they sustain damage through the performance by a Local Government of its functions under the Act. This includes the value of any material taken from the land under the various powers listed above.

Compensation is required to be paid to owners or occupiers of land in fee simple, and for occupiers of land held under lease or conditional terms of purchase from the Crown, except for pastoral or timber purposes.

6 Abbreviations / Acronyms

DWER	Department of Water and Environmental Regulation
DMP	Department of Mines and Petroleum
DPLH	Department of Planning, Lands and Heritage
LG	Local Government
WALGA	Western Australia Local Government Association

7 References

www.mainroads.wa.gov.au/ Building Roads/Standards and Technical/Materials Engineering/Publications.

State Gravel Supply Strategy (1998) on MRWA website

Road Building Material needs (2008)

Implementation of the State Gravel Strategy (2013)

Operational Guideline 95 Extracting material from land in WA (2014)

Operational Guideline 96 Searching for Gravel (2014)

Pits and Quarries (temporarily withdrawn for review 2016) Main Roads WA

Roads 2030 Regional Road Development Strategies (2013/2015), on WALGA website:
https://walga.asn.au/Policy-Advice-and-Advocacy/Infrastructure/Roads

DER website information on clearing legislation and regulations:
https://www.der.wa.gov.au/our-work/clearing-permits/48-guidelines-clearing-permits

8 APPENDIX: State Gravel Supply Strategy Achievements

8.1 Collection of material source data

An internal database was developed by Main Roads WA with details of road building material sources for all regions in the state which is made available to other government agencies on request with conditions of confidentiality on specific location. This database is continually updated.

8.2 Estimate of material needs

The 1998 SGSS estimated annual gravel supply needs of 5.4 million cubic metres for roadworks for Main Roads WA and Local Governments.

In 2001, WALGA provided estimates of Local Government needs of about 2.2 million cubic metres per year for re-sheeting gravel roads and 0.8 million for reconstructing sealed roads.

These quantities were at the lower end of recommended practice used by the Grants Commission in its Asset Preservation Model.

In 2008, the Roads 2025 Regional Roads Development Strategy (superseded by Roads 2030) was used by Main Roads WA to calculate road building material needs of 5.5 million cubic metres per year for those road improvement projects, and a report presenting this data was included on the Main Roads WA website. Roads 2030 covers State and Local Government projects planned up to 2030 but does not include maintenance needs, or other roads such as Parks and Wildlife Service roads or private roads. Projects in Roads 2030 are dependent on funding.

In 2015, the Parks and Wildlife Service confirmed total gravel needs for roads in its estate at 350,000 cubic metres per year and proposed a strategy to re-gravel 15% of its 5,580 km of strategic gravel roads over 10 years. This would require about 100,000 cubic metres of gravel per year, but funding for this reduced level of work was not guaranteed.

8.3 Reservation of material sources

The process to reserve key material resources was followed by Main Roads WA to meet reservation requirements for three initial sites. This provided a model for future reservations but highlighted the long period of time required for completion (in the order of 3 years), and the need to also employ other mechanisms to protect sources. These other mechanisms can include measures under the *Mining Act 1978, Land Administration Act 1997* and agreements with other agencies and Aboriginal groups.

8.4 Environmental protection

Protection of the environment is now well imbedded within material extraction processes throughout government and industry. The SGSS contributed to this by assisting in the documentation of these processes.

8.5 Incomplete Actions from the State Gravel Supply Strategy

8.5.1 Protect material sources

Reserving land on which materials can be sourced remains a key action yet to be completed.

Reserving such land is a slow and expensive process, which is impractical to protect even a moderate number of sites in a reasonably short time.

Temporary protection or security of land tenure of material sources during investigation, planning, and pit preparation are not clearly covered by legislation. The *Mining Act 1978*, the *Land Administration Act 1997*, the *Local Government Act 1995* and the Planning Act have sections which address security of tenure but are inconsistent in wording or application.

On Crown land, private companies can secure land for basic raw materials for a long period by mining tenements issued by DMIRS under the *Mining Act 1978*, but such leases are not usually issued to government agencies. For areas of crown land that are public reserves, decisions on whether to provide consent for mining of basic raw materials need to be considered by the Minister for Mines and Petroleum as well as the Minister responsible for the affected reserve and in certain cases the Conservation and Parks Commission.

On private land, materials can be extracted by private companies by obtaining an Extractive Industries Licence through the Department of Planning, and Local Governments. However, Local Governments or State Government agencies are not usually issued these licences.

Local Governments and some State Government agencies can use the *Local Government Act 1995* or the *Land Administration Act 1997* to temporarily occupy land to extract materials but security of tenure during planning for extraction is not clear. In the past there have been cases where private companies have sought to access materials planned for use by government agencies and this has caused delays to extraction or legal action.

8.5.2 Payment of compensation for damage

A key inconsistency between Acts relates to payment of compensation for damage. This continues to create issues with landowners. From a private landowner viewpoint, the difference between MRWA or a Local Government taking gravel is not apparent so they do not see the logic of receiving different payments.

9 APPENDIX: Extracts from the Local Government Act 1995

3.27. Particular things local governments can do on land that is not local government property

(1) A local government may, in performing its general function, do any of the things prescribed in Schedule 3.2 even though the land on which it is done is not local government property and the local government does not have consent to do it.

(2A) In subsection (1) land includes Crown land the subject of a pastoral lease within the meaning of the Land Administration Act 1997 1997 section 3.

(2) Schedule 3.2 may be amended by regulations.

(3) If Schedule 3.2 expressly states that this subsection applies, subsection (1) does not authorise anything to be done on land that is being used as the site or curtilage of a building or has been developed in any other way, or is cultivated.

(4A) For the purposes of subsection (3), planting pasture on land for grazing does not amount to cultivating the land.

(4) Nothing in subsection (3) prevents regulations amending Schedule 3.2 from stating that subsection (3) applies, or excluding its application, in relation to a particular matter.

[Section 3.27 amended by No. 17 of 2009 s. 8]

Subdivision 3 — Powers of entry

3.28. When this Subdivision applies

The powers of entry conferred by this Subdivision may be used for performing any function that a local government has under this Act if entry is required for the performance of the function or in any other case in which entry is authorised by this Act other than by a local law.

3.29. Powers of entry are additional

The powers of entry upon land conferred by this Subdivision are in addition to and not in derogation of any power of entry conferred by any other law.

3.30. Assistants and equipment

Entry under this Subdivision may be made with such assistants and equipment as are considered necessary for the purpose for which entry is required.

3.31. General procedure for entering property

(1) Except in an emergency or if the entry is authorised by the warrant of a justice, entry by or on behalf of a local government on to any land, premises or thing is not lawful unless —

(a) the consent of the owner or occupier has been obtained; or

(b) notice has been given under section 3.32.

(2) If notice has been given under section 3.32, a person authorised by the local government to do so may lawfully enter the land, premises or thing without the consent of the owner or occupier unless the owner or occupier or a person authorised by the owner or occupier objects to the entry.

(3) The powers conferred on a local government under this section may be exercised instead of the powers conferred under the Public Works Act 1902 and are not subject to any qualification or restriction by any provision of that Act.

3.32. Notice of entry

(1) A notice of an intended entry is to be given to the owner or occupier of the land, premises or thing that is to be entered.

(2) The notice is to specify the purpose for which the entry is required and continues to have effect for so long as that requirement continues.

(3) The notice is to be given not less than 24 hours before the power of entry is exercised.

(4) Successive entries for the purpose specified in the notice are to be regarded as entries to which that notice relates.

Schedule 3.2 — Particular things local governments can do on land even though it is not local government property

[Section 3.27(1)]

1. Carry out works for the drainage of land.
2. Do earthworks or other works on land for preventing or reducing flooding.
3. Take from land any native growing or dead timber, earth, stone, sand, or gravel that, in its opinion, the local government requires for making or repairing a thoroughfare, bridge, culvert, fence, or gate.

   Section 3.36 applies.
   Section 3.27(3) applies.
4. Deposit and leave on land adjoining a thoroughfare any timber, earth, stone, sand, gravel, and other material that persons engaged in making or repairing a thoroughfare, bridge, culvert, fence, or gate do not, in the local government's opinion, require.

   Section 3.36 applies.
   Section 3.27(3) applies.
5. Make a temporary thoroughfare through land for use by the public as a detour while work is being done on a public thoroughfare.

   Section 3.36 applies.
   Section 3.27(3) applies.
6. Place on land signs to indicate the names of public thoroughfares.
7. Make safe a tree that presents serious and immediate danger, without having given the owner the notice otherwise required by regulations.
8. Obliterate graffiti that is visible from a public place and that has been applied without the consent of the owner or occupier.

[Schedule 3.2 amended by No. 17 of 2009 s. 47.]

3.22. Compensation

(1) If a person who is —

(a) the owner or occupier of land granted in fee simple; or

(b) the occupier of land held under lease or on conditional terms of purchase from the Crown, except for pastoral or timber purposes,

sustains damage through the performance by a local government of its functions under this Act, the local government is to compensate the person if the person requests compensation unless it is otherwise expressly stated in subsection (5) or in Schedule 3.1 or Schedule 3.2.

(2) Despite subsection (1), regulations amending Schedule 3.1 or Schedule 3.2 may exclude or limit the obligation of a local government to pay compensation for a particular matter.

(3) The assessment of damage for which compensation is to be paid is to include the value of any material taken under Subdivision 2.

(4) A dispute about the amount of compensation is to be determined by arbitration in accordance with section 3.23.

(5) Compensation is not payable for damage sustained through a local government —

(a) draining water onto land to the extent that the water follows a natural watercourse; or

(b) closing or restricting the use of a thoroughfare under section 3.50 or a power given by any other written law; or

(c) performing functions under section 3.51(2)(b); or

(d) performing any other prescribed function.

(6) This section does not limit section 9.57.

(7) Regulations may —

(a) prescribe the time within which compensation may be claimed and procedures for making claims;

(b) make provision as to how compensation for damage is to be assessed.

[Section 3.22 amended by No. 64 of 1998 s. 14(2).]

5. Rights to minerals, petroleum, geothermal energy etc., application of Act to

(1) This Act does not —

(a) apply to the registration of rights over Crown land in respect of minerals, petroleum, geothermal energy or geothermal energy resources; or

(b) prevent or otherwise affect the system of registration under other Acts of mining, petroleum or geothermal energy rights in respect of Crown land.

(2) In subsection (1) —

geothermal energy and ***geothermal energy resources*** have the same meanings as they have in the *Petroleum and Geothermal Energy Resources Act 1967*.

[Section 5 amended by No. 35 of 2007 s. 98(4).]

5A. Position on Earth, determining

(1) If for the purposes of this Act it is necessary to determine the position on the surface of the Earth of a point, line or area, that position is to be determined by reference to the prescribed Australian datum.

(2) Regulations that prescribe a datum for the purposes referred to in subsection (1), or amend that datum or prescribe another datum to replace that datum, may make any transitional or savings provisions that are necessary or convenient to be made.

(3) Regulations referred to in subsection (2) may modify or otherwise affect the operation of this Act.

[Section 5A inserted by No. 54 of 2000 s. 4.]

10 APPENDIX: Extracts from the Land Administration Act 1997

Part 9, Division 4 — Entry on to land

182. Entry for feasibility study

(1) If it appears to the Minister that it may be necessary to use any land for a proposed public work for which the Minister is authorised to take interests in land, the Minister may authorise a person —

(a) to enter on that land; and

(b) to do anything necessary in order to study the feasibility of the proposed public work.

(2) The Minister or person authorised must, before entering on any land under this section, give to the principal proprietor, the occupier, and to the holders of any native title rights and interests, not less than 30 days notice in writing, giving a description of the area of the land to be entered upon, a description of what is proposed to be done for the feasibility study, and the time that it is expected to take.

184. Land in notice of intention, entry of for inspection, surveys etc.

(1) At any time after the registration of a notice of intention, a person authorised in writing by the Minister may at all reasonable times enter on land included in the notice for the purpose of inspecting the land or making an assessment of compensation payable for the taking of interests in the land.

(2) At any time after the registration of a notice of intention, a person authorised in writing by the Minister may at all reasonable times enter on land included in the notice and do anything necessary or convenient for the surveying of the land for the purposes of the public work.

(3) The Minister or person authorised must, as far as is practicable, before entering on any land under this section give to the principal proprietor, the occupier, and to the holders of any native title rights and interests, not less than 48 hours notice in writing, describing the area of land to be entered on and the purpose of the entry.

185. Land may be occupied temporarily to construct etc. public work

(1) The Minister may authorise a person to occupy and use any land temporarily for the purpose of constructing or repairing any public work, and a person so authorised may —

(a) take stone, gravel, earth and other materials from the land; and

(b) deposit any such material on the land; and

(c) make and use temporary roads; and

(d) manufacture bricks or other materials; and

(e) erect temporary workshops, sheds and other buildings.

(2) Property in anything deposited, made or erected under this section remains with the Minister.

(3) Subject to subsection (4), the Minister or person authorised must, before the land is used or occupied under this section, give to the principal proprietor or occupier of the land, and to the holders of any native title rights and interests in the land, not less than 7 days notice in writing, and must state in the notice the use proposed to

be made of the land and an approximate period during which the use is expected to continue.

(4) If the Minister is satisfied that the situation is sufficiently urgent, the notice period may be shortened or the land may be occupied before notification has been given.

186. Entry etc. before land taken in certain circumstances

(1) If the Minister is satisfied that —

(a) it is necessary to use any land for a proposed public work for which the Minister is authorised to take interests in land; and

(b) because of the urgency of the work or the difficulty in tracing the proprietors of the land, it is unreasonable or impractical to delay entry onto the land until the land has been taken in accordance with this Part,

the Minister may authorise a person —

(c) to enter on the land; and

(d) to do anything necessary in order to study the feasibility of the proposed public work; and

(e) to do anything necessary as preliminary or ancillary to the undertaking, constructing, or providing of the public work; and

(f) to carry out the public work,

in all respects as if the necessary taking order had been made for the purposes of the public work.

(2) This section applies whether or not a notice of intention has been issued in relation to the land, and whether or not the land has been entered on under any other section.

(3) The Minister or person authorised must, as far as is practicable, before entering on any land under this section —

(a) give to the principal proprietor, the occupier, and to the holders of any native title rights and interests, not less than 7 days notice in writing, giving a description of the area of the land to be entered upon, a description of what is proposed to be done, and the time that it is expected to take; and

(b) advise the persons mentioned in paragraph (a) of the effect of this section and the procedures under this Part and Part 10 for the taking of land, payment of purchase money or compensation for land taken, rights of appeal or review and rights as to the future disposition of land taken by agreement or compulsorily taken, unless they have already been given that advice.

(4) As soon as practicable after any land has been entered on under this section, the Minister must determine the interests in the land which it is necessary to take.

(5) On the making of a determination under subsection (4), the Minister may make an appropriate taking order in relation to the land as if section 177 had been satisfied, and as if the determination were a notice of intention.

[Section 186 amended by No. 55 of 2004 s. 567.]

Division 6 — General provisions

195. Easement in gross in favour of State etc., creation of etc.

It is possible, and is deemed always to have been possible —

(a) to create in favour of the State of Western Australia or in favour of a State instrumentality, statutory body corporate or local government, an easement without a dominant tenement; and

(b) to annex to or make appurtenant to an easement, another easement or the benefit of a restriction as to the user of land.

196. Public access easement, creation of etc.

(1) An easement created under section 195 may be specified to be a public access easement.

(2) A public access easement is a right of way for the use and benefit of the public at large.

(3) An interest in land cannot be taken under this Part for the purpose only of creating a public access easement.

(4) Subject to subsection (3), a public access easement is a public work for the purposes of this Part and Part 10.

(5) A public access easement may be limited in any way, including, for example —

(a) limitations on use by vehicles;

(b) limitations by time, so that the right may only be exercised between particular hours, at particular times of year, or on the occurrence of particular events.

(6) A public access easement is not a public right of way for the purposes of section 68 of the *Transfer of Land Act 1893*.

(7) For the purposes of the *Occupiers' Liability Act 1985*, the Crown is not, and a local government is not, an occupier of the land over which a public access easement is granted.

(8) Any covenants in a deed creating a public access easement are binding on successors in title to the covenantor, unless the deed provides otherwise.

(9) A public access easement in favour of the State of Western Australia may be varied or surrendered on behalf of the State by a deed made by the Minister responsible for the administration of the *Planning and Development Act 2005*.

[Section 196 amended by No. 38 of 2005 s. 12.]

197. Person refusing to give up possession etc. of land, Minister's powers in case of

(1) If the Minister is authorised because of a taking order or under Division 4 to enter on, take possession of or use any land, and the proprietor or occupier of the land, or any other person, refuses to give up possession or hinders the Minister or any person appointed in writing by him or her, the Minister may issue a warrant to the sheriff to deliver possession of the land to the person appointed in the warrant to receive possession, and, on receipt of the warrant, the sheriff must deliver possession of any such land accordingly.

(2) The costs of the issue and execution of such a warrant, to be determined by the sheriff, must be paid by the person refusing to give possession, and —

(a) if any compensation is payable to the person, the amount of the costs are to be deducted from the compensation; and

(b) any excess costs remaining after the application of paragraph (a) which are not paid by the person on demand are to be levied by distress upon the goods and chattels of the person.

(3) A warrant must be issued by any Justice of the Peace for the purposes of subsection (2)(b) upon application by any person appointed for the purpose by the Minister.

198. Fences, removal of by acquiring authority restricted

Nothing in this Act permits an acquiring authority to remove any fences without making adequate provision for the security of the land fenced, except by agreement.

199. Obstructing workers, causing damage etc., offence etc.

(1) A person must not wilfully and without lawful excuse —

(a) obstruct or interfere with any engineer, architect, surveyor, overseer, workman, or other person in the performance of any duty or in doing any work which he or she has authority to do under this Part; or

(b) obstruct, interfere with, damage, destroy or remove anything constructed, provided or done, under this Part; or

(c) damage, destroy or remove any fence on land entered on or occupied under this Part.

Penalty: $1 000.

(2) The cost of any repair or reinstatement or the clearing of any obstruction necessitated by an action referred to in subsection (1) is recoverable by the Minister from the person in a court of competent jurisdiction.

Part 10 — Compensation

Division 1 — Persons entitled to compensation

202. Owners of interests in land taken, entitlement of

(1) Every person having any interest in land which is taken under Part 9 is entitled, subject to this Part, to compensation for the interest from the acquiring authority.

(2) A person whose interest in the land —

(a) is not a native title interest; and

(b) is not duly registered or notified in the Department or Registry of Deeds,

is not entitled to any compensation under this section if —

(c) another person has applied for and obtained compensation in respect of the same land; and

(d) at the time the compensation was awarded, the acquiring authority had not received written notice of the unregistered interest from the person compensated or some other person.

(3) No compensation is payable under this section for land transferred under section 75 other than in respect of —

(a) lawful improvements made to the land since the transfer; or

(b) consideration paid for the transfer of the land.

(4) In subsection (2)(b) —

Department means the department of the Public Service principally assisting in the administration of the TLA.

[Section 202 amended by No. 28 of 2006 s. 378.]

203. Person suffering damage from entry to land, entitlement of

(1) A person holding any interest in any land, or lawfully occupying the land, who suffers damage by reason of any entry on or occupation of the land, or the removal of any material, under Division 4 of Part 9, is entitled, subject to this Part, to compensation for the damage from the acquiring authority if the land is not subsequently taken.

(2) No compensation is payable under this section in respect of any entry or occupation under Division 4 of Part 9 unless some person having an interest in the land gives notice in writing to the acquiring authority during the entry or occupation concerned that the person will require compensation.

(3) Compensation paid under this section in respect of any land must not exceed the amount that would have been payable in respect of the land had the land been taken.

204. Management body, entitlement of for loss of use of structures etc.

(1) If —

(a) a taking order includes land subject to a management order and the management body is not an instrumentality of the State; and

(b) as a result of the order, the management body will lose the use of structures erected or improvements made by the management body on the land in accordance with the terms of the management order,

the management body is entitled to compensation from the acquiring authority for the depreciated value of those structures and improvements.

(2) A management body is not otherwise entitled to compensation for the revocation or variation of the management order by the taking order.

205. Mine, compensation for damage to etc.

If an interest in land taken under Part 9 is held under any Act relating to the use of land for mining purposes, the holder of the interest is only entitled to claim compensation for actual loss sustained by reason of the taking through damage to a mine on the land, or the works connected with a mine.

11 APPENDIX: Current Annual Use of Road Pavement Material

Notes:

The road pavement material is that used for pavement construction and consists of sub base, base-course and sealing aggregate. Materials not included in this report are sand fill, embankment material, rock armour protection, concrete, bitumen and asphalt.

Construction materials are sometimes measured in cubic metres or in tonnes. The following data has been shown in tonnes. Where quantities were reported in cubic metres, the data was converted to tonnes using a nominal conversion factor of 1.5 tonnes per cubic metre.

The quantities are for construction and maintenance unless otherwise stated.

The data was provided by Local Governments in response to a questionnaire in 2016, however not all agencies responded so the data is incomplete as indicated by blanks in the tables.

The lengths of roads shown are from start to finish of the road. There is no allowance for measurement of individual lanes or lanes in multi-lane roads such as highways and freeways.

11.1 Local Governments

Local Government	**Length of local roads (km)**	**Road building material usage 2014/15 (tonnes)** Where originally reported as m^3, multiplied by 1.5 to give estimated tonnes.			
		Natural gravels	Limestone	Crushed rock-base	Sealing aggregate
Albany (C)	1703	75,000	12,000		
Armadale (C)	789		4000	6000	
Ashburton	2509	429,000			375
Augusta Margaret River	1261				
Bassendean (T)	96				
Bayswater (C)	349		100		
Belmont (C)	260	2000	475		
Beverley	748				
Boddington	356	10,215			390
Boyup Brook	1034				
Bridgetown Greenbushes	824	11,200			450
Brookton	537	12,000			600
Broome	818				
Broomehill Tambellup	976	60,600			1250
Bruce Rock	1175				
Bunbury (C)	329				
Busselton (C)	1236	20,000			900
Cambridge (T)	174		1400		
Capel	517	5802	401	52	4681
Carnamah	701				
Carnarvon	1552				
Chapman Valley	885				
Chittering	439	3180			400
Claremont (T)	48				
Cockburn (C)	837		2774	1071	60
Collie	485				
Coolgardie	1276				
Coorow	858	42,504			915
Corrigin	1098				
Cottesloe (T)	49			225	
Cranbrook	1092	112,500			3000

Local Government	Length of local roads (km)	Road building material usage 2014/15 (tonnes) Where originally reported as m^3, multiplied by 1.5 to give estimated tonnes.			
		Natural gravels	Limestone	Crushed rock-base	Sealing aggregate
Cuballing	570	14,250			1437
Cue	805				
Cunderdin	806	18,900			2800
Dalwallinu	1977				
Dandaragan	1389				
Dardanup	483				
Denmark	951				
Derby West Kimberly	2009				
Donnybrook Balingup	743	29,500	500	150	1050
Dowerin	946				
Dumbleyung	1003				
Dundas	1167				
East Fremantle (T)	37				
East Pilbara	3789				
Esperance	4688				
Exmouth	298				
Fremantle (C)	195	60	100	500	
Fremantle – Rottnest	46				
Greater Geraldton (C)	2126				
Gingin	921				
Gnowangerup	1037	37,500			1706
Goomalling	593				
Gosnells (C)	787		7434	7017	245
Halls Creek	1597				
Harvey	1044				
Irwin	453				
Jerramungup	1174	135,000	1500		1800
Joondalup (C)	1046	9075			
Kalamunda	662				
Kalgoorlie Boulder (C)	1766	129,200		1690	
Karratha (C)	699	36,300			100
Katanning	712				
Kellerberrin	949				
Kent	1327	45,000			750
Kings Park	13				
Kojonup	1148	37,500			1125
Kondinin	1350	140,250		750	2175
Koorda	1110	62,940			2790
Kulin	1440				
Kwinana (C)	392	150	1760	1999	
Lake Grace	2289				
Laverton	4567				
Leonora	1435				
Mandurah (C)	705				
Manjimup	2154	3300		150	1650
Meekatharra	2614				
Melville (C)	538				
Menzies	2121				
Merredin	1307	90,000			3250
Mingenew	453	60,000			127,500
Moora	968	90,000			3200
Morawa	977				
Mosman Park (C)	52				
Mt Magnet	672				
Mt Marshall	1732				
Mukinbudin	927				

Local Government	Length of local roads (km)	Road building material usage 2014/15 (tonnes) Where originally reported as m^3, multiplied by 1.5 to give estimated tonnes.			
		Natural gravels	Limestone	Crushed rock-base	Sealing aggregate
Mundaring	755				
Murchison	1956	58,950			549
Murray	954	18,545	29,600		1917
Ngaanyatjarraku	1604				
Nannup	817	15,150		750	500
Narembeen	1413				
Narrogin (T)	806				
Nedlands (C)	159				
Northam	760				
Northampton	1151				
Nungarin	510				
Peppermint G	9				
Perenjori	1625	97,500			1040
Perth (C)	98				675
Pingelly	572	25,500		900	375
Plantagenet	1532	59,100			482
Port Hedland (T)	928				
Quairading	910				
Ravensthorpe	1343				
Rockingham (C)	1032		2700	3940	550
Rottnest (Cockburn)	46				
Sandstone	989	45,000			
Serpentine JD	774		18,000	24,000	
Shark Bay	573				
South Perth (C)	201				
Stirling (C)	1060		6800	3300	650
Subiaco (C)	119				
Swan (C)	1515				
Tammin	501				
Three Springs	696	30,600			390
Toodyay	646	10,485			1126
Trayning	763	70,150			733
Upper Gascoyne	1979				
Victoria Park (T)	173	0	0	0	Used only asphalt
Victoria Plains	825				
Vincent (C)	179		473	3000 recycled	
Wagin	788	32,850			3273
Wandering	509	30,000			742
Wanneroo (C)	1550		28,575	1305	150
Waroona	437	6204	1863		900
West Arthur	871	35,175			1975
Westonia	881	37,800			1050
Wickepin	874	30,000			1500
Williams	502				
Wiluna	2176				
Wongan Ballidu	1324	14,400			
Woodanilling	529				
Wyalkatchem	735				
Wyndham East Kimberley	1557	31,540			
Yalgoo	1216				
Yilgarn	2858	53,500			3730
York	780				
Christmas Island	136		200		100
Cocos Keeling Is	28				
Totals from 63 responses from 140 LGs		**2,425,375**	**120,655**	**56,799**	**187,006**
Extrapolated total for 140 LGs		**5,389,722**	**268,122**	**126,220**	**415,569**

11.2 Main Roads WA

Following is data from the MRWA Annual Report 2015 with regional amendments.

Regions	Length of roads (km)	Pavement material usage (tonnes)			
		Natural gravels	Limestone	Crushed rock-base	Sealing Aggregate
All	18,497 (all)	1,651,175	119,482	375,104	44,178

Region	Length of roads (km)	RBM usage (tonnes)	Maintenance total in RBM usage if known (tonnes)	Common Source issues
Kimberley	2128	335,643	90,000	Mining leases Aboriginal land
Pilbara	2975	190,109		Mining leases Aboriginal land
Midwest	3718	87,227		Aboriginal land Non-standard material (Gascoyne)
Goldfields Esperance	2486	85,487		Mining leases
Wheatbelt	3011	562,848		Developed agricultural land
Great Southern	1628	287,826	45,868	Extensive conservation land
South West*	1691	272,168	0	Extensive conservation land
Metro	860	368,631		Limited access to natural material
Total	**18,497**	**2,189,939**		

*South West data based on average needs up to 2025. Maintenance excluded.

11.3 Department of Parks and Wildlife (2015)

Region	Length of roads (km)	RBM usage per year (tonnes)	Number of reserves	Source issues	
Kimberley		45,000			
Pilbara		75,000			
Midwest		45,000			
Goldfields		1,500			
Wheat belt		3,000			
South West		30,000			
Southern Forest		60,000			
South Coast		30,000			
Swan		75,000			

11.4 DMP - Construction Materials from Mining Leases (2015)

Local Government	Aggregate (tonnes)	Gravel (tonnes)	Limestone whole state (tonnes)	Rock (tonnes)	Sand whole state (tonnes)
Roebourne	772,104	4,391			
Derby – West Kimberly	150	4,168		54	
Wyndham – East Kimberly	26,008	16,977			
Exmouth	6,213				
Ashburton	144,999	16,123			
East Pilbara	436,758				
Broome	105,810	1,614		2,796	
Port Hedland Town	156,816			671,340	
Coolgardie	39,371	32,729			
Leonora	73,968	1,952			
Kalgoorlie - Boulder		32,055		152,688	
Coorow		3,044			
Kalamunda		44,624			
Total	1,762,198	157,676	1,007,099	831,444	4,933,035

11.5 Basic Raw Materials from Extractive Industry Licences (2015)

Region	Quantity (tonnes)	Number of Licences	Source Issues	
Kimberley				
Pilbara				
Midwest				
Goldfields				
Wheat belt				
South West				
Great Southern				
Total	1,144,900			

Note: Total as reported is from 4 of 63 Local Government responses out of a total of 140 surveyed (Rottnest and Kings Park excluded from total).
Total is mostly limestone.

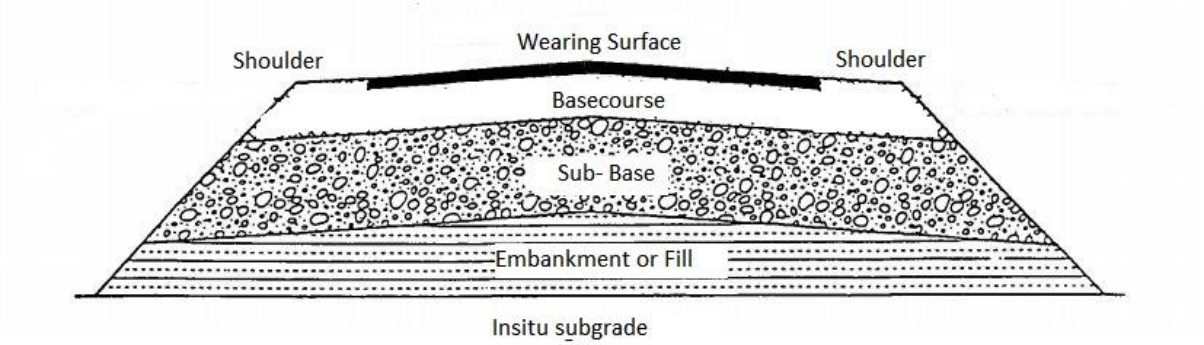
11.6 Estimate of Total Quantities Used From All Sources

Organisation	Quantity (tonnes)	Notes
Local Government	6,199,633	Extrapolated total from 63 to 140 local governments
Main Roads WA	2,189,939	Material for maintenance mostly not included
Parks and Wildlife Service	364,500	
DMP mining leases	2,926,973	Not all used on public roads
Private extractive licences	1,144,900	Reported from 63 LGs. Not extrapolated. Not all used on public roads.
Total	12,825,945	For gravels, limestone, crushed rock-base and sealing aggregate.

12 APPENDIX: Road Structure

Gravel is described as a naturally occurring material which is suitable for use as a base (including shoulders) or sub-base for construction. A typical road structure is depicted in Figure 4.

Figure 1: Typical Road Structure



12.1 In situ Subgrade

Roads are constructed on in situ material or subgrade. Usually the top level of the natural in situ material is removed because it contains structurally unsound material such as organic material, sticks, leaves and weathered soil. On low-level ground, natural soil is usually imported to raise the road to improve road drainage and prevent water entering the road structure. This imported material is sometimes still called subgrade but if the imported layer thickness is substantial (more than 300 mm) then it is often called embankment or fill.

Subgrade is usually of insufficient bearing strength to support vehicle traffic without rutting or shearing. Higher quality base and or sub base material is needed to be laid above the subgrade to provide a stable structure for traffic.

12.2 Embankment or Fill

Many lengths of road are constructed above the natural ground level by importing material which is called embankment or fill. This material can be the same material as the subgrade or can be imported from sources some distance away and be different material. Fill can be used for different purposes, commonly to keep the road close to level, or for improved drainage to prevent water ingress into the pavement. Designers usually aim to minimise importation of extra material or removal of unnecessary material. To achieve this balance, material excavated from road cuttings through hills is transported as fill to low areas of the road alignment to maintain a consistent road level with minimum steep gradients.

12.3 Sub base

Sub base material has greater bearing strength than subgrade but is unsuitable as base-course if it is of insufficient bearing strength as base-course or is too coarse or too fine or otherwise unsuitable as a running surface, or unsuitable to seal with bitumen. Sub base is typically 100-150 mm thick and is used to minimise the thickness of expensive base-course material required to meet the structural pavement design.

12.4 Base-course

Base-course material is selected with specific properties to complete a stable pavement structure to support traffic with minimum rutting or deformation, and to provide a smooth surface for a comfortable ride for vehicles. If it is to be sealed with a bituminous surfacing, which is very expensive, its quality is tightly controlled with rigid specifications. Some variations to the rigid specifications can be accepted if previous performance of the material used in the same environmental and construction conditions demonstrated its suitability.

12.5 Wearing Surface or Running Surface

The wearing surface or running surface can be composed of in situ soil, imported soil, gravel, bitumen with imbedded sand/crushed stone, or bituminous concrete (commonly called asphalt or hotmix in Australia). The type of surface is dependent on the amount and nature of traffic and the funds available to construct the road. Rural roads in WA are commonly unsealed with an imported gravel base running surface, or bitumen sealed with a single coat crushed rock layer. Town and city roads and major rural highways and freeways are often surfaced with bituminous concrete.

A description of typical naturally occurring road pavement construction materials and techniques for locating sources is documented on the MRWA website at www.mainroads.wa.gov.au/ building roads/standards and technical/materials engineering/publications/guidelines/operational guideline 96, Searching for Gravel

12.6 Quantities of Material for Road Construction

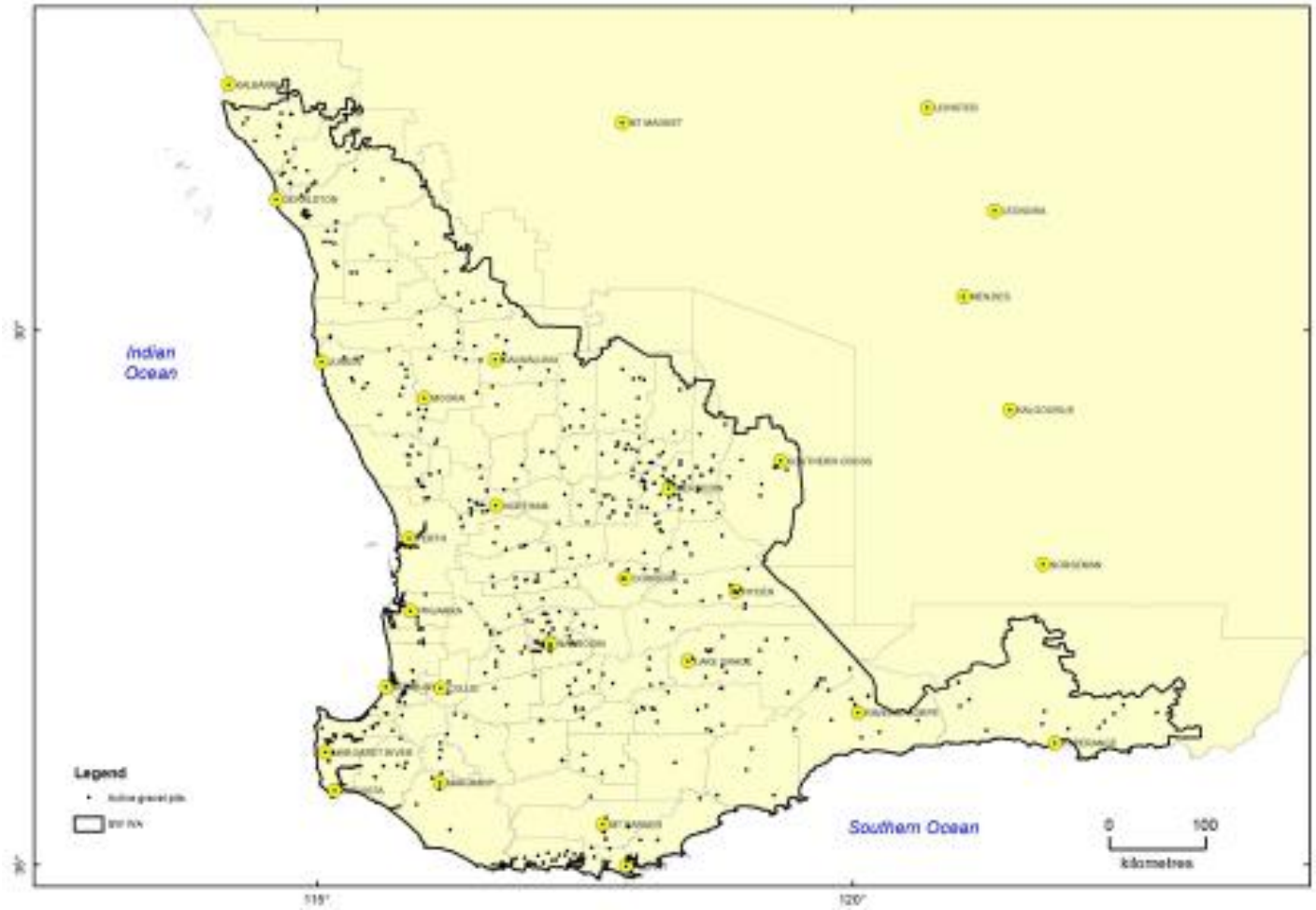
The quantity of road construction material needed per kilometre of road depends upon the design of the road type for the traffic usage. A typical 2-lane rural gravel road of nominally 7m width and 100mm thickness of pavement, requires about 700m^3 of compacted gravel per kilometre, equivalent to about 1250m^3 of loose gravel allowing for bulking and wastage.

Other classes of roads such as bitumen sealed roads, or rural highways and freeways usually require considerably more material per kilometre.

12.7 Quantities of Material for Road Maintenance

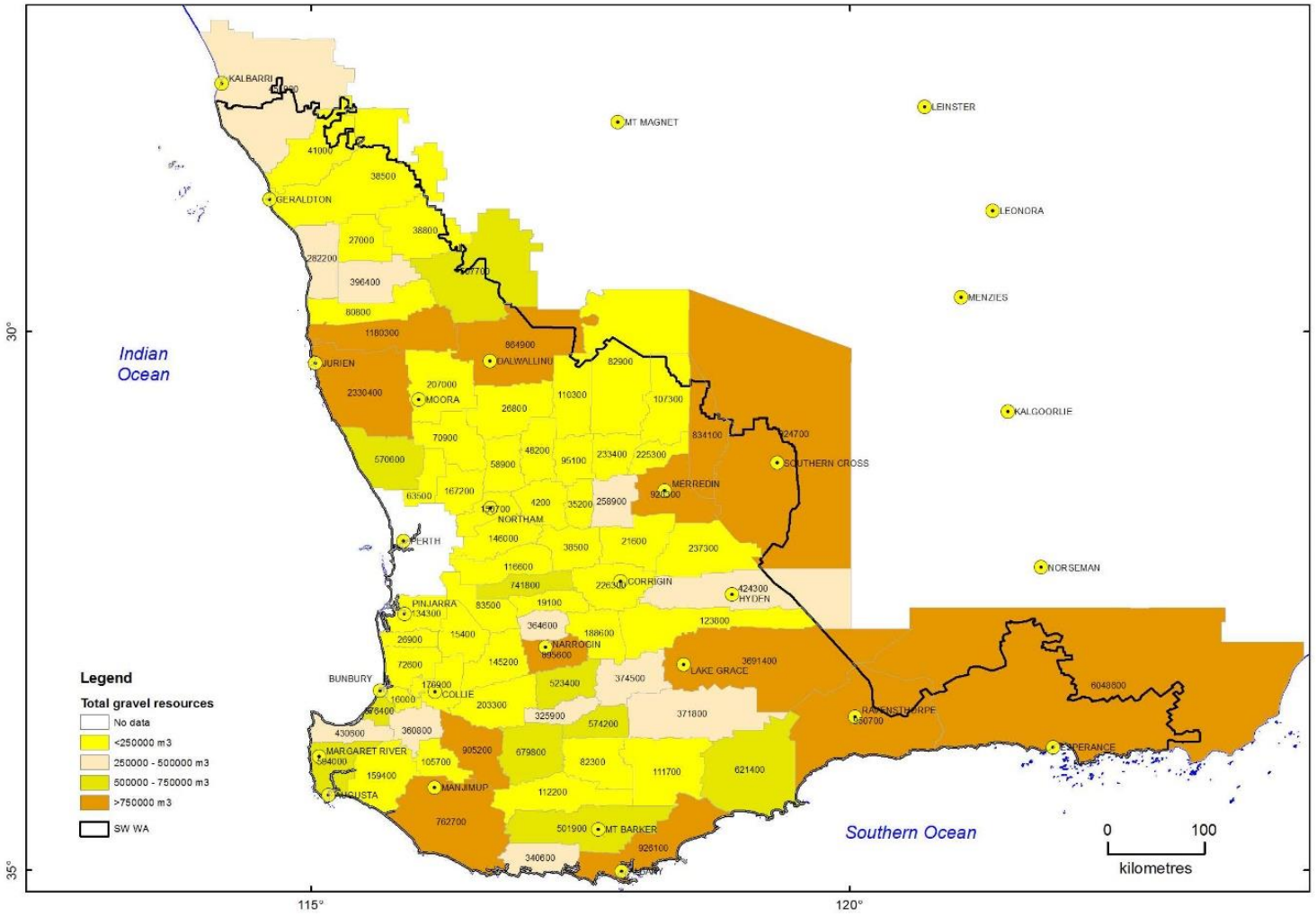
This varies greatly depending on many factors including funding, volume and composition of traffic, environmental conditions and road design. Gravel roads generally need more material than sealed roads with gravel shoulders, but sealed roads initially cost more and require expensive maintenance of the sealed surface. Provided funds are available, most road management authorities have ongoing road improvement plans including widening and upgrading to handle increased traffic. However funding is a general problem and limits the amount of maintenance and material that is actually used.

13 APPENDIX: Location of Active Gravel Pits in the South-Western Portion of Western Australia



Source: Southwest Western Australia: An atlas of gravel resources. Undertaken by Bob Gozzard of the Land Use Planning Branch of the Department of Mines, Industry Regulation and Safety, 2016-17.

14 APPENDIX: Total Gravel Resources on Crown Reserves



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