

Network Asset Technical Document

Locating Ground Mounted Equipment



Original issue: April 2008

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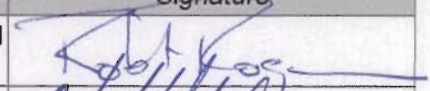
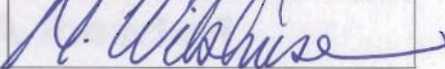
This revision: Original Issue

Date for next review: April 2013

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Document control

Endorsement / approvals

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Endorsed by	Robert Rogerson	Distribution Standards and Policy Manager	
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Record of revisions

This document contains multiple formatting sections. When it is updated please ensure all section headers and footers have also been updated with correct version numbers and dates.

Revision no.	Date	DMS version	Revised by	Description
Original Issue	April 2008	4001578v6	Lee Chan / Robert Rogerson	Original Issue

Internal documents referenced in this document

DMS#	Title of document
4012220	Summary of Road Structure, Regulations and Hazards, Western Power, 2007
2654696	Placement of Distribution Poles Along Roads With Speed Limits Not Exceeding 70 kmh, Western Power, Aug. 2006;
2654720	Placement of Rigid Distribution Poles Along Roads With Speed Limits Exceeding 70 kmh, Western Power, Aug, 2006
2697372	Calculator for placement of poles along roadside, Western Power, 2006

External documents referenced in this document

Reference	Title of document
http://www.mainroads.wa.gov.au/	Guideline to the Assessment of Roadside Hazards, Main Roads Western Australia, Oct. 2006
http://www.mainroads.wa.gov.au/	AP-R162: Relationship Between Crash Risk and Geometric Characteristics of Rural Highways, Austroads, 2001.
http://www.mainroads.wa.gov.au/	Design of Kerbing, Main Roads Western Australia, Jan. 2007

Other documents that reference this document

DMS#	Title of document
3384127	Underground Distribution Scheme Manual

Stakeholders

In the process of document update, the following positions must be consulted:

Position / title
Distribution Design Manager
IPWEA/WP committee members

Notification list

When this document is updated, the following positions must be notified of any authorised change:

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Distribution Design Manager
IPWEA/WP committee members

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1 Introduction

There have been some instances of vehicles colliding with grounded mounted distribution equipment. Serious negative outcomes can arise from these collisions, including, injury to the occupants of the impacting vehicle, danger to the public with exposed electrical apparatus, loss of power to affected customers, damage to the Ground Mounted Distribution Equipment (GME), environmental damage caused by leaking, etc. GME should be installed to minimise the likelihood of damage.

2 Scope

This policy applies to any new installation of distribution GME inside road reserves and in or near car parks.

3 Definitions

GME is defined as distribution substations, transformers, switchgear, pillars, LV switchboards and regulators. GME does not include poles.

4 Supporting documentation

- Summary of Road Structure, Regulations and Hazards, *Western Power, 2007*
- Placement of Distribution Poles Along Roads With Speed Limits Not Exceeding 70 kmh, *Western Power, Aug. 2006*
- Placement of Rigid Distribution Poles Along Roads With Speed Limits Exceeding 70 kmh, *Western Power, Aug, 2006*

5 Compliance

- (a) *Guideline to the Assessment of Roadside Hazards*, Main Roads Western Australia, Oct. 2006; <http://www.mainroads.wa.gov.au/>
- (b) AP-R162: Relationship Between Crash Risk and Geometric Characteristics of Rural Highways, Austroads, 2001.
- (c) *Design of Kerbing*, Main Roads Western Australia, Jan. 2007; <http://www.mainroads.wa.gov.au/>

6 Policy

GME shall be installed to minimize the risk of being hit by motor vehicles or being walked into by pedestrians.

6.1 GME Inside Road Reserves

When GME is installed in road reserves it shall generally be installed outside the clear zone relevant for the vehicle speed, traffic volume and road conditions.

GME can be installed in road truncations provided it is of low enough profile to not impede driver visibility at the intersection, it is not in the clear zone and the relevant council or Main Roads WA has given written approval for the equipment installation.

Where GME needs to be installed in a clear zone, high integrity crash barrier must be designed and installed to provide adequate protection.

With the exception of pillars, no GME shall be installed in the middle of roundabouts, median strips, etc. Pillars are permitted in roundabouts, or median strips when they are within 2 metres of a Western Power pole.

GME in road reserves shall not be positioned so as to interfere with normal pedestrian movement.

Where the road reserve has been extended into a lot from what would have been the normal road reserve alignment to provide land for a substation, as is required for subdivision, the GME can be considered not located in the road reserve.

6.2 GME in Vicinity of Car Parks

When GME is installed in a carpark, it shall be installed so that vehicle movement cannot impact it. The preferred protection to provide a set back from a curb which will not allow the overhang of a vehicle to impact the GME. A 3 metre overhang shall be allowed for.

Alternatively, bollards can be installed for protection.

For high voltage (HV) GME (transformers, switchgear and regulators) bollards must be 1 metres away from the HV GME. The bollards must be designed and installed to prevent vehicles from impacting the GME. The bollards must have a non-conductive exterior.

7 Policy Details

7.1 GME in Road Reserves

7.1.1 GME Clear Zone Setback

GME sites shall be located outside the clear zone (CZ) when in the road reserve. The clear zone width will vary depending on the road speed, traffic volume, and road geometry. The clear zone width for roads with speed limits not exceeding 70kmh is 3 metres. The 3 metres limit places the GME in zone 3. See Figure 1 for details of zone 3. The setbacks for GME in such roads are greater than for poles due the higher likelihood of a vehicle coming into direct contact with electricity in the event of a collision with GME.

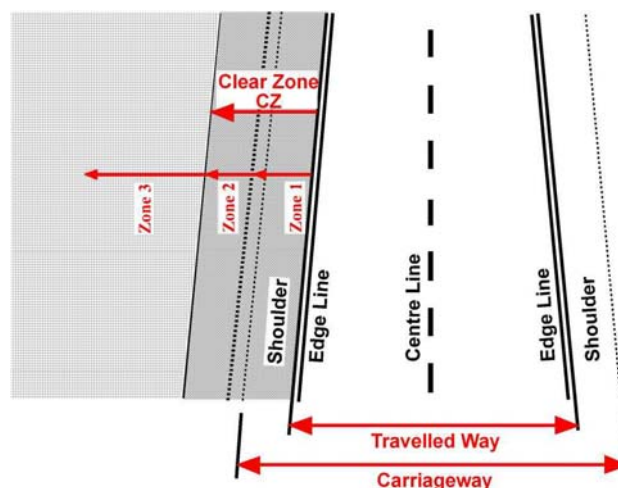


Figure 1: Clear Zone layout

For roads with speed limits above 70kmh, the setbacks are given in *Placement of Rigid Distribution Poles*. These setbacks are greater than setbacks for roads with speed limits not exceeding 70kmh.

The clear zone calculator is available in *Calculator for Replacement of Poles Along Roadside* to determine the setbacks required.

Note, clear zone setbacks do not need to be met when the GME is located within a property boundary, even if the front boundary of the property is within the clear zone.

7.1.2 GME in Road Truncation

At some intersections the road is truncated at 45 degrees as shown in Figure 2. Where there is sufficient set back from the road, as described in 7.1.1, GME may be considered for placement in this area. The truncation may be used where GME will not obstruct driver visibility and the relevant authority (council or Main Roads) gives approval. Typically the GME must not be 0.75m above the road height.

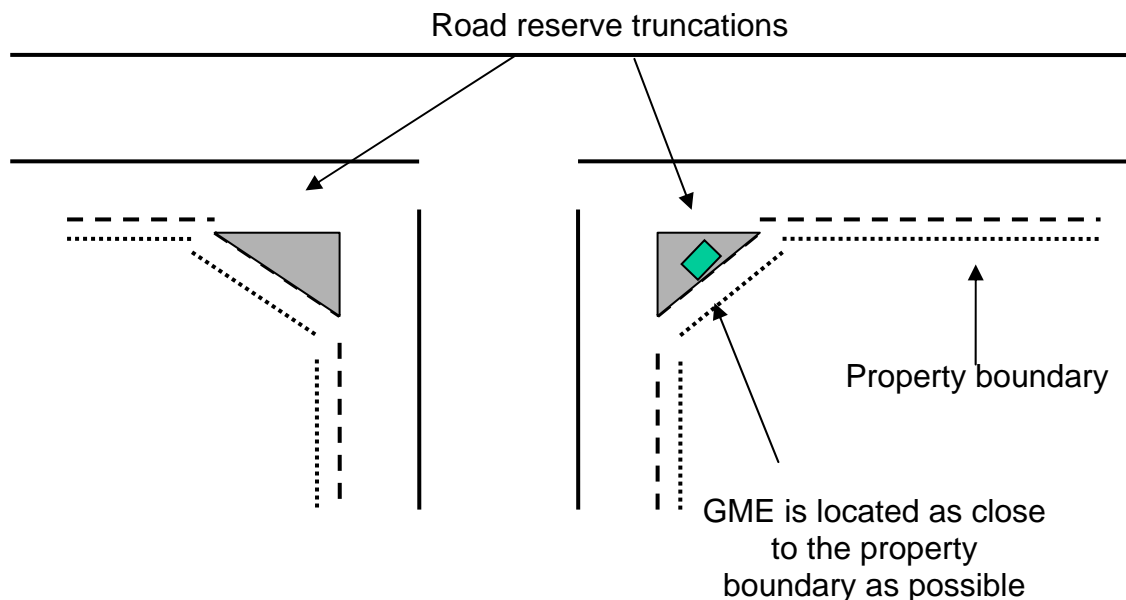


Figure 2 - Property boundary truncation and GME placement

The use of truncations for GME locations shall be limited to roads with speed limits not exceeding 70km/h.

7.1.3 Crash Barriers

Where setbacks cannot be obtained, crash barriers may be considered as a last resort. Rope barriers are not adequate protection. The barriers must be immovable concrete or W type. The barriers must be designed and installed to comply with the relevant Australian Standards.

7.1.4 GME in Middle of Road

With the exception of pillars, GME must not be installed in the middle of the road, eg in median strips, roundabouts, etc regardless of the setback achieved. Middle of the road positions are not considered appropriate due to the very strong likelihood of the road geometry being altered without WP being informed and the setback limits being encroached on.

Pillars are permitted in the middle of the road provided they are in close proximity (within 2 metres) to a pole. The proximity is required for increased visibility of the pillar.

7.1.5 Pedestrian Access

GME must not be installed where it will potentially impede pedestrian access or be a hazard to pedestrians. For example placing a pillar in the middle of a path may cause a pedestrian to trip over the pillar.

7.1.6 Substations in Road Reserve Extension

The normal practice of locating substations in subdivisions is to locate them in an extension of the road reserve, see Figure 3. For the purpose of this policy, in such situations the GME is considered outside the road reserve.

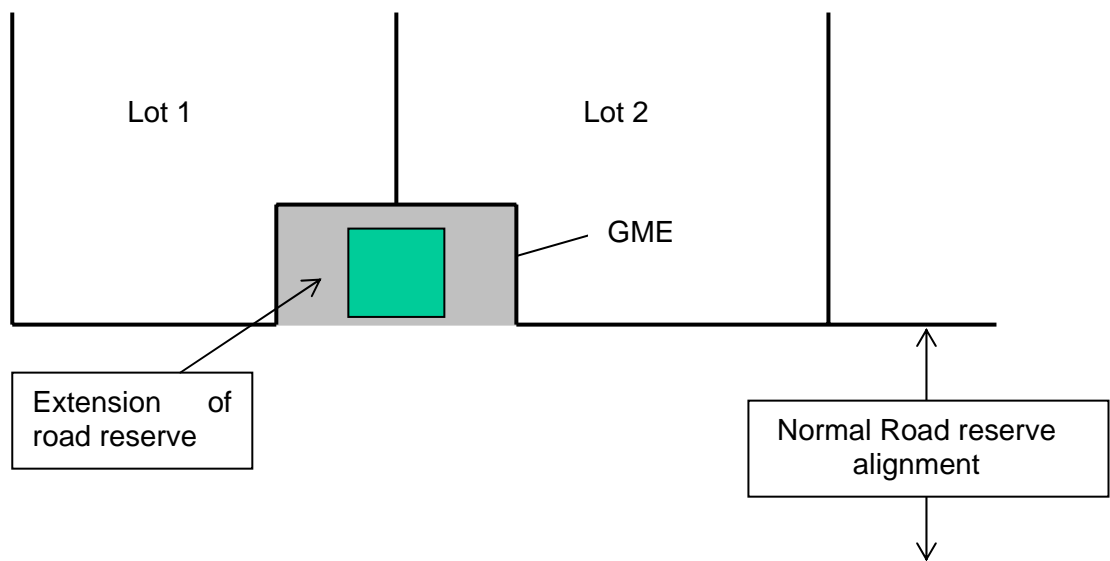


Figure 3 - Substations in road reserve extensions

7.2 GME In the Vicinity of Car Parks

A common area for vehicles damaging GME is in or near car parks. Although vehicles tend to travel at a relatively low speed in car parks, there are many driving dangers within car parks including a high traffic density, vehicle overhang and numerous blind spots.

When installing GME in the vicinity of a car park, one of the following measures shall be implemented to reduce the risk of GME damage:

- When the GME is installed in a non-trafficable area eg, a grassed or brick paved non-trafficable area, a barrier-type kerb with a minimum height of 150mm shall be installed along any trafficable surface 3m away from any side of the GME. See Figure 4 for details. Where suitable barriers are installed the GME can be located 1 metre from the barrier.

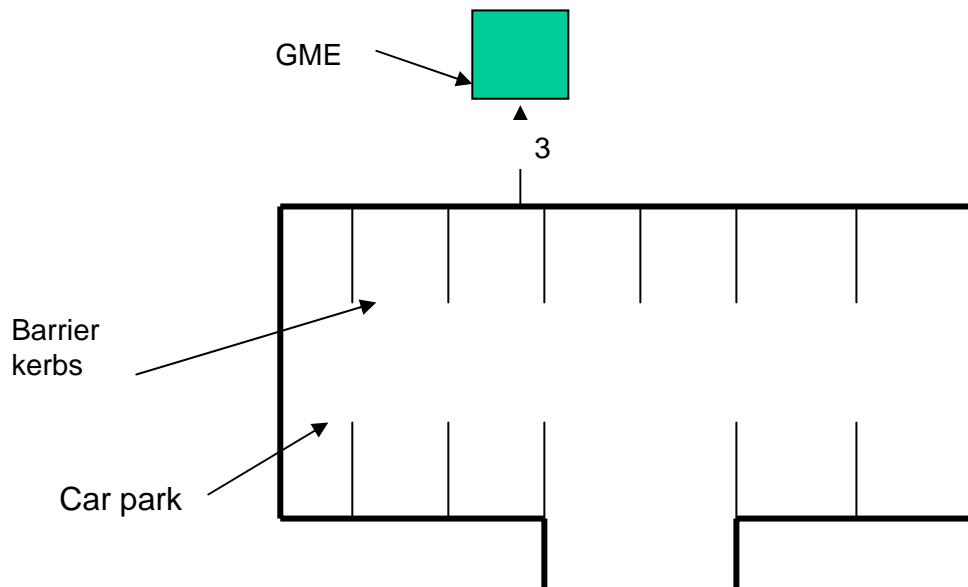


Figure 4 - GME placed outside trafficable area of car park.

- When GME is located within any trafficable area of the car park, suitably designed bollards shall be placed 1 metre from the GME to prevent vehicle impact. It preferable that the GME be placed in a corner rather than central to the carpark. The bollards shall have a non-conductive outer surface. See Figure 5 for details.

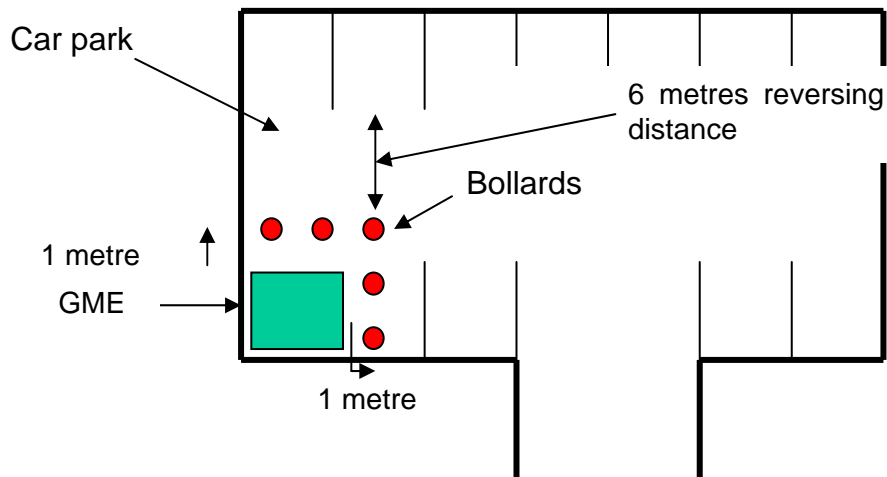


Figure 5 - GME placed in a trafficable area (preferably in a corner) of a carpark.

8 References

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