# Overview

This discussion paper has been prepared to support the foundation principle that, under BAU conditions, an asset defect should be prioritised for repair based upon the risk exposure from the defect, and the same priority of defect should generate an equal response across the three Networks NSW companies. i.e. the risks arising from a limited life pole are treated equally, the electric shock risk from mains which have an equivalent low clearance risk are treated equally, and that defect with the potential to initiate a bushfire are treated equally within their respective fire zone classifications, etc.

This principle had been reinforce recently by the Board, particularly in respect to Network Performance Report discussions and Board papers on the topics of Emergency defects, Urgent Defects and low clearance mains defects.

In recognising these emerging concerns, this paper is intended to provide and overview into;

* the different defect priority classification frameworks which currently exist in each Network,
* implications of the recent NECF on the practicality of being able to respond to non emergency defects which directly impact customers,
* what opportunities exist within the existing frameworks for establishing a common aligned defect prioritisation categorisation framework,
* definitions for proposed common defect prioritisation categories,
* proposed frameworks for application to low mains, limited life poles, vegetation encroachment and general network asset defects, and
* consideration for implementation / transition strategies for existing open defects and future reporting.

The principles which have been applied in establishing the proposed common framework are:

1. defect category response times must be practical, and representative of the level of risk,
2. the framework should be underpinned by a risk based approach, and inherent within each category is the need to prioritise work based upon risk
3. The framework should provide granularity based upon risk, and should not be excessive nor understated in the numbers of priority categories.
4. priority category names should be non-emotive, so as not to be misunderstood by parties external to the Networks looking at ‘discoverable data’

# Purpose

To provide an overview of a number of inconsistencies associated with differing defect prioritisation scales used by the three Network businesses, and to identify the opportunities for alignment into a common framework in which Network defects are prioritised. These changes will support a more consistent prioritisation of equivalent asset defect related risk across the three Networks NSW companies.

# Background

Historically the three Network businesses have each evolved over many years a defect prioritisation scale for the categorisation of the defects. These categorisation justifications vary from arbitrary, but considered limits, to justifications based upon their understanding of how quickly the defect should be addressed to manage the risk it would represent upon their Network / Network responsibilities should it progress to a failure / breakdown situation. The defect categorisation has then been used to establish a default target or due date for the defect correction within the works management modules of their respective enterprise management systems. The associated completion status of these defects can then be used to monitor the number and duration of open defects, hence providing a view of the Network’s level of risk exposure derived from interpretation of the defect categorisation, length of time open, and where relevant, extent overdue for completion.

It has become evident that these differing defect categorisation scales mean the level of Network risk from open and overdue defects cannot currently be directly compared, as the basis for the numbers of defects within a priority category with a common nomenclature is inconsistent. The extent of this inconsistency in defect prioritisation categories is evident in the defect priority categorisations for each Network shown in Figure 1.

*Figure 1 – Current defect prioritisation categories*

It would be reasonable to expect that given the commonality of equipment and operating conditions for distribution networks across NSW that the same type of defect should receive a consistent defect categorisation and priority to repair. This common categorisation should be based upon equivalent levels of risk. The differing defect prioritisation categories that have evolved mean that this common view of risk is not readily communicatable across and between the Networks, and nor does it provide a consistent base from which performance reports can be used to measure and compare performance and risk across the three Network businesses.

In order to consistently assess, report and communicate the underlying levels of network risk arising from defects on Network assets it becomes necessary to establish a common categorisation framework for the defect prioritisation. This must then be supported by a common set of criteria for defect prioritisation into the categorisation framework based upon a common set of risk measures.

# Issues impacting the determination of a common prioritisation framework

## Lead times for Planned Outages

Business as usual lead times for the submission of network outage requests vary between businesses, but are typically in the order of 10-14 days. This means that any work to correct a high risk defect which is considered urgent but not an Emergency (i.e. requires immediate emergency isolation for safe access for corrective action), will require interruption to the network’s normal control room and field resource / job allocation work processes. This type of defect corrective work needs to be separately tracked to i) ensure that these high network risks are corrected in a timely manner, and ii) provide a view of the degree to which rapid asset degradation is impacting the network.

## National Electricity Customer Framework (NECF) implications

The NECF provides very clear requirements that 4 clear working days notice are required for customer notifications for non emergency outages. In this regard urgent is not considered as emergency. This means that any urgent defect prioritisation of 1 week is virtually unachievable where the isolation to correct the defect impacts customers. This means that these defects either become escalated to an emergency job or else get pushed back beyond a week, potentially with an increased level of risk exposure to both the public and the network. If these defects are escalated to emergency defects there will be an increased number of emergency jobs, each interrupting planned works with a corresponding adverse cost impacts arising from the unplanned nature of the work, and the increasing deferral/delay of already planned work. In addition a Network may well be challenged that it is abusing the intention of the NECF by prioritising more jobs as Emergency defects. This also means that utilisation of defect categorisation with a 7 day response time becomes impractical where customers will be impacted.

If a 14 day limit is set for Urgent works then the impacts of the NECF effectively mean that this category of defects are really 1 week priority defects with a deferred start date of 1 week. Consideration should therefore be given to the urgent priority categorisation where customers are directly impacted as to whether 14 days is actually workable, or whether a period of up to 4 weeks / 1 month may now be more practical for delivery of Urgent non emergency type corrective works. The maximum 1 month limit provides some flexibility with dealing with material availability and resource scheduling issues associated with the job planning process, but provide the opportunity to accelerate the business as usual planning processes in order to address the higher risk associated with this category of defect.

## Equality of risk

The current network defect frameworks have differing definitions and consistency of application issues, meaning that events which pose an identical risk to the safety or network reliability are not categorised equally or consistently across the three Networks. There is a clear expectation from the common Board that the risk posed for an identical defect in each of the Networks should be prioritised for corrective action in the same manner in each business.

e.g. a low clearance conductor with the same clearance infringement over the same type of land usage should attract the same defect prioritisation and response regardless of the Network in which it occurs.

# Corrective Maintenance Prioritisation Categorisation – Proposed Common Definitions

The defect prioritisation framework should be aligned where appropriate with the agreed probability, consequences and associated risk levels in the Networks NSW Corporate risk matrix.

## Networks NSW Corporate Risk matrix and definitions

Figure 2 – Networks NSW Common risk Matrix


### Practicality of Application of Networks NSW Common Matrix Likelihoods to Network Defects

The Likelihood criteria above have limited applicability to Network defects due to the volume of defects detected annually. The volume of network asset failure events which occur each year number in the thousands across Networks NSW and would therefore result in a likelihood of “almost certain” for a large portion of the defects. In addition a number of the likelihood definitions are not practical for interpretation by field staff.

An alternate set of likelihood definitions is more useful within the context of network defects rather than major business risk events. The context here must relate to the likelihood that the defect will progress, if unattended, to the network failure consequence within the next asset inspection cycle and not the frequency at which the defects exist.

### Proposed Likelihood Definitions for Network Defects

The following definitions are used to rate the likelihood that the defect will progress to a full functional failure;

Almost Certain Defect progresses to failure (service interruption) several times per year in our area of responsibility.

Likely Defect progresses to failure (service interruption) in our area of responsibility.

Possible Defect generally does not progress to failure (service interruption) in our area of responsibility, but the failure is seen in other parts of the company.

Unlikely The defect progressing to failure is not seen in our company but can be seen in other networks.

Rare Not seen in our industry in more than 10 years, but foreseeable.

### Practicality of application of Networks NSW Common Matrix Consequences to Network Defects

A major defect risk assessment issue relates to the likelihood of the person raising the defect being able to apply the Networks NSW Common Risk Matrix to both the defect failure likelihood and consequence assessment issues. The Consequence definitions and categories in the Networks NSW Common Risk Matrix have a variable ability to be applied within the context of individual network asset related defects. Specifically, can the above consequence table be used effectively by field staff in assessing and recording individual defects?

Safety Yes they should be able to assess the likely safety impact.

Network No. Inspection staff may be aware of feeder reliability category in the majority of cases (but not contractors), but would not and should not be expected to be able to assess a likely SAIDI impact of the individual defect progressing to failure. Similarly they would not be able to practically and repeatably identify sensitive load customers. Alternate guidelines to the Networks NSW Common risk matrix based upon outage duration / network voltage, and perhaps potential load loss, is required.

Finance No. These dollar limits are not practical for assessing individual defects for prioritisation. Alternate guidelines to the Networks NSW Common Risk Matrix financial impact definitions will be required.

Compliance No. Inspection staff may not be aware if the individual defect would result in a compliance issue. This is more likely to arise from a combination of multiple defects and systemic issues.

Reputation No. Inspection staff would be unlikely to consistently assess the reputational impacts of the defect as currently defined. Alternate definitions to the Networks NSW Common risk matrix is required.

Environment Yes inspection staff should be able to assess the environmental consequences of the defect at the time of defect identification (i.e. on site)

### Proposed Consequence definitions for Network Defects

Safety As per Networks NSW Common Risk Matrix

Network

|  |  |
| --- | --- |
| Catastrophic | Major loss of supply categorised by a potential lengthy outage on a feeder supplied at sub-transmission level voltages (e.g. 132kV, 66kV or 33kV). This includes loss of supply for 24 hours or longer to a load sensitive customer supplied at any voltage. |
| Major | Significant loss of supply categorised by a potential lengthy outage on a feeder supplied at sub-transmission voltages or distribution high voltage (e.g. 22kV,11kV, SWER). This includes loss of supply for greater than 4 hours and less than 24 hours to a load sensitive customer. |
| Moderate | Moderate loss of supply categorised by a potential lengthy outage on a feeder supplied at low voltage. This includes loss of supply for less than 4 hours to a load sensitive customer supplied at any voltage. |
| Minor | Minor loss of supply categorised by a potential short duration (< 1 hour) outage on a feeder supplied at any voltage. |
| Insignificant | Negligible consequence (i.e. < 1min or no outage at all) to the supply at any voltage. |

Financial

|  |  |
| --- | --- |
| Catastrophic | Costs through direct / property damage and greater than $10m, |
| Major | Costs through direct / property damage and liability claims between $1m-$10m, |
| Moderate | Costs through direct / property damage and liability claims between $100k-$1m,  |
| Minor | Costs through direct / property damage and liability claims between $50k-$100k,  |
| Insignificant | Costs through direct / property and liability claims < $50k. |

Reputation

|  |  |
| --- | --- |
| Catastrophic | Loss of brand, political / regulator intervention |
| Major | Adverse national media attention, adverse, political / regulator attention |
| Moderate | Adverse regional media attention and multiple customer enquiries |
| Minor | Adverse local media attention and multiple customer enquiries. |
| Insignificant | No media attention, limited customer enquiries |

Environmental As per Networks NSW Common Risk Matrix

### Proposed Network Asset Defects Risk Matrix

Figure 3 – Networks NSW Network Defects Risk Matrix

|  |  |
| --- | --- |
|  | **Consequence** |
|  | Insignificant | Minor | Moderate | Major | Severe |
| **Likelihood** | Almost Certain | Moderate | Medium | High | Extreme | Extreme |
| Likely | Low | Moderate | Medium | High | Extreme |
| Possible | Low | Low | Moderate | Medium | High |
| Unlikely | Negligible | Negligible | Low | Moderate | Medium |
| Rare | Negligible | Negligible | Negligible | Moderate | Moderate |

## Proposed Defect Category Definitions

### CAT 1

Defects that pose a direct and immediate risk to the safety of the public/staff, and/or to the network availability, requiring diversion of resources to isolate supply if required and control/repair the defect. If an immediate safety risk then staff or contractors who identified the defect would not leave the site, but would attempt to make the area safe, where practical and safe to do so, by establishing a safe perimeter to move the public away from the hazard until such time as other resources arrive to control the situation.

### CAT 2

Defects that pose risks to safety of the public/staff and/or the network availability, where the asset condition is such that a response in a period materially less than the business as usual (BaU) processes for arrangement of isolations, materials ordering and resource allocation is required. i.e. the resolution of the defect utilises but accelerates progress through the job planning and resource scheduling processes in an accelerated manner. These risks would fall into the category that the risk be removed within one month.

### CAT 3

Defects that pose a non-immediate risk to the safe and/or reliable operation of the Network over the short term (up to 6 months) and would be prioritised for action during this period using the Network’s business as usual processes. It is logical that the defect categorisation should reflect this level of risk, but it should also allow a degree of latitude to support packaging of work into bundles for efficient delivery and to minimise customer outages. The work groups responsible for the assets would prioritise the defects for repair within this ‘risk’ window, and not necessarily default the required date due to the maximum of 6 months.

### CAT 4

These defects do not impose a level of risk to the Network that warrants an escalated priority response, but do represent a risk which needs to be managed and resolved in the medium term. These general maintenance defects would be those which are to be fixed prior to or during the next planned maintenance, but where latitude to support packaging of work into bundles for efficient delivery and to minimise customer outages is of equal or greater importance.

### Observations

Those items which are not a defect as they have been assessed as not requiring a due date for repair and are not likely to result in a failure which impacts the network availability before the next planned maintenance inspection. These types of ‘observations’ often represent concerns about an asset condition as an emerging risk, which warrants being ‘watched” or “monitored”. These condition observations should be captured to support a sound statistical understating of asset condition but not treated as defects.

# Proposed common Defect categorisation framework.

In reviewing the defect prioritisation categories currently used by the three network businesses, outside of the Emergency defect categorisation there are some opportunities evident in the prioritisation scales in use for future alignment. The alignment of the existing emergency defects into Category 1 defects at 24 hours could provide a common minimum alignment, but given the NECF implications (discussed above) on defects with a classification of urgent, and nominally due within 2 weeks, it may be prudent to define the CAT 1 classification as those defects requiring correction within 48 hours (i.e. today or by the end of the next day at the latest) (as shown in Option 2) as a common baseline across the three networks (i.e. as per current Endeavour Energy practice). .

*Figure 4 – Options 1 & 2 defect prioritisation categories*

The biggest emerging factor upon the future effective utilisation of the CAT 2 priority is the customer notification requirements of the NECF. As a result a 1 month period is the preferred defect prioritisation profile for CAT 2 defects.

The concept of a defect that is not urgent, but which still poses a risk to the safe and reliable operation of the network, and would then be prioritised for repair in the short to medium term is evident in each of the three existing prioritisation categories used by each Network business. These are currently reflected in Prioritise (Ausgrid), Risk (Essential Energy) and a range of defect correction priority categorisation windows from 1 week to 18 months for Endeavour Energy.

If there is a delineation made between defects which are genuinely a risk, and as such need to be prioritised for repair, and those defects which need to be packaged together to generate economic repair work packages, then it can be seen that these risk type defects are encompassed within the Ausgrid ‘Prioritise’ category and clearly delineated in both the Endeavour Energy at the 6 month limit, and Essential energy at the “Risk” categorisation. There are potential common alignment boundaries for risk type defects of CAT 3 defects at 6 months.

Those defects remaining which still require repair, and are not a watch/monitor defect, can logically be grouped as CAT 4 - General Maintenance defects, and with a nominal 12 months to completed over and above the “Risk” type defects. This aligns with the Endeavour Energy defect categorisation, is encompasses by the Essential Energy general maintenance classification, and overlaps the latter half of Ausgrid’s Prioritise categorisation.

# Corrective Maintenance Prioritisation Categorisation – Application

## General

The allocation of a defect categorisation in the above common priority categorisation framework to an individual defect should not necessarily result in the defect due date always defaulting to the maximum length of the categorisation period being added to the date created/found. The officer creating the defect should allocate a shorter period that the category default length if they consider the defect condition warrants a shorter response time, especially for CAT 2 and CAT 3 defects.

The following sections provide an overview of the risk based mapping of general defects, as well as providing additional guidance for the specific issues of low clearance mains, limited life poles and vegetation defects in bushfire prone and non bushfire prone areas.

### General defects (Excludes Low ground Clearance mains and Limited Life Poles)

The mapping of the defect categories for general defect prioritisation is aligned with the Figure 3 risk matrix and is shown in Figure 5 below.

Figure 5 – Networks NSW Defects Risk Matrix Category mapping

|  |  |
| --- | --- |
|  | **Consequence** |
|  | Insignificant | Minor | Moderate | Major | Severe |
| **Likelihood** | Almost Certain | CAT 4 | CAT 3 | CAT 2 | CAT 1 | CAT 1 |
| Likely | Assess Next Maintenance | CAT 4 | CAT 3 | CAT 2 | CAT 1 |
| Possible | Assess Next Maintenance | Assess Next Maintenance | CAT 4 | CAT 3 | CAT 2 |
| Unlikely | No Defect | No Defect | Assess Next Maintenance | CAT 4 | CAT 3 |
| Rare | No Defect | No Defect | No Defect | CAT 4 | CAT 4 |

## Low Ground Clearance Defects

Low clearance defects to exposed (bare) energised mains and apparatus fall directly within the scope of Network Fatal Risk 1.1 – Contact with Electricity. The likelihood of contact will be related to the actual clearance, most commonly ground clearance, and the land use at the point of the low clearance defect. Low clearances which are less than the minimum clearance for people shall be classified as CAT 1 defect due to the potentially fatal consequences of the contact in the land use scenarios[[1]](#footnote-1).

### LV Service Cables

Figure 6 – Defect Prioritisation – LV Service Cables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Conductor Clearance** | **Over the carriageway of arterial road or freeways or the centre of a public road** | **Any other part of a public carriageway / road** | **Vehicular Crossing of a road verge** **(other than an urban residential dwelling)** | **All Other Vehicular Crossing or Land likely to be used by a vehicle** | **Land not likely to be used by a vehicle** |
| **≤ 2.7 m** | CAT 1 | CAT 1 | CAT 1 | CAT 1 | CAT 1 |
| **> 2.7 m and ≤ 3.0 m** | CAT 1 | CAT 2 | CAT 2 | CAT 3 | No Defect |
| **> 3.0 m and ≤ 4.5 m** | CAT 1 | CAT 2 | CAT 3 | No Defect | No Defect |
| **> 4.5 m and ≤ 4.9 m** | CAT 2 | CAT 3 | No Defect | No Defect | No Defect |
| **> 4.9 m and ≤ 5.5 m** | CAT 3 | No Defect | No Defect | No Defect | No Defect |

### LV Bare / Insulated / Covered & HV ABC

Figure 7 – Defect Prioritisation – LV Bare / Insulated / Covered & HV ABC Conductors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Conductor Clearance** | **Over the carriageway of designated 4.6 m roads** | **Over the carriageway of all other roads** | **Over land other than the carriageway of roads** | **Over land which due to its steepness or swampiness is not traversable by vehicles** |
| **≤ 3.2 m** | CAT 1 | CAT 1 | CAT 1 | CAT 1 |
| **> 3.2 m and ≤ 4.7 m** | CAT 1 | CAT 1 | CAT 2 | CAT 4*(Min. Clearance 4.5 m)* |
| **> 4.7 m and ≤ 5.0 m** | CAT 1 | CAT 3 | CAT 3 | CAT 4*(Min. Clearance 4.5 m)* |
| **> 5.0 m and < 5.5 m** | CAT 2 | CAT 3 | CAT 3 | No Defect |

### 11, 22 or 33 kV Bare Conductor or CCT

Figure 8 – Defect Prioritisation – 11,22 or 33kV Bare Conductors or CCT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Conductor Clearance** | **Over the carriageway of designated 4.6 m roads** | **Over the carriageway of all other roads** | **Over land other than the carriageway of roads** | **Over land which due to its steepness or swampiness is not traversable by vehicles** |
| **≤ 3.3 m** | CAT 1 | CAT 1 | CAT 1 | CAT 1 |
| **> 3.3 m and ≤ 5.1 m** | CAT 1 | CAT 1 | CAT 2 | CAT 3*(Min. Clearance 4.5 m)* |
| **> 5.1 m and ≤ 5.4 m** | CAT 1 | CAT 3 | CAT 3 | CAT 4*(Min. Clearance 4.5 m)* |
| **> 5.4 m and < 6.7 m** | CAT 2 | CAT 3 | CAT 3 *(Min. Clearance 5.5 m)* | No Defect |

### 66 or 132 kV Bare Conductor

Figure 9 – Defect Prioritisation – 66 or 132 kV Bare Conductor

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Conductor Clearance** | **Over the carriageway of designated 4.6 m roads** | **Over the carriageway of all other roads** | **Over land other than the carriageway of roads** | **Over land which due to its steepness or swampiness is not traversable by vehicles** |
| **≤ 3.6 m** | CAT 1 | CAT 1 | CAT 1 | CAT 1 |
| **> 3.6 m and ≤ 5.7 m** | CAT 1 | CAT 1 | CAT 2 | CAT 3*(Min. Clearance 5.5 m)* |
| **> 5.7 m and ≤ 6.0 m** | CAT 1 | CAT 3 | CAT 3 | CAT 4*(Min. Clearance 5.5 m)* |
| **> 6.0 m and < 6.7 m** | CAT 2 | CAT 3 | CAT 3 | No Defect |

## Limited life Pole defects.

Once a pole has been assessed and determined to be a limited life pole, the likelihood of failure shall be defined as being “Almost Certain”. The priority for pole replacement will be based upon it’s condition, and allocated a priority for replacement that should ensure it is replaced before the identified degradation/damage from it’s own accord would result in pole failure. General guidelines for limited life pole prioritisation are;

|  |  |
| --- | --- |
| SF ≤ 1 or Dangerous pole | CAT 1 |
| 1.0 < SF ≤ 1.25 | CAT 1 |
| 1.25 < SF ≤ 1.5 | CAT 2 |
| 1.5 < SF ≤ 2  | CAT 3 |

## Vegetation and Bushfire Defects

General prioritisation guidelines for vegetation defects established from LiDAR / AP&A, OH line inspection processes are;

To be reviewed / finalised via risk assessment process currently underway as part of vegetation management standards review

To be reviewed / finalised via risk assessment process currently underway as part of vegetation management standards review



|  |  |  |
| --- | --- | --- |
| Legend: | **CAT 1** = Emergency job |  |
| CAT 2 Priority 1 = Emergency cut |  |
| CAT 2 Priority 2 |  |
| CAT 2 Priority 3 |  |
| CAT 3 Priority 1 |  |
| CAT 3 Priority 2 |  |
| FDP = Fire danger period |
| BFPA = Bush fire prone area. This is a measure of the potential community impact risk level from modelling where available. |
| Min = minimum or minor degree of encroachment.  |
| Notes: | max = encroachments entering an intolerable zone with higher risk of contact in more typically experienced winds.  |
| 1. Encroachment level is determined by distributor inspection methods e.g Visual AP, AP&A (Lidar), any other Audit process.
 |
| 1. Specified clearance tables will be the NNSW Common Standard clearance tables based on ISSC3.
 |

# Implementation strategy

The implementation of a common defect prioritisation framework will require the Network development of a transition path to the common framework covering updating of asset systems, asset reporting, review of current open defect data and field implementation for both mobile devices and paper based systems).

The transition planning should consider,

* Creation of new priorities in Asset System (SAP, Ellipse and WASP) to align with common framework, with consideration of legacy data compatibility.
* Brief staff and deploy new framework to mobile devices and paper based systems. Suspend old prioritisation categories for any new defect creation / reprioritisation in asset systems.
* Open defect review/transition strategy. It will not be practical to migrate all defects immediately into the new framework, and therefore the development of a staged open defect migration plan will be required, with some distinct milestones for project control purposes. This plan should consider the higher risk type defects for initial assessment, including overdue defects and then open defects by category;
	+ Review open overdue urgent / risk defects in asset system for validity (completed and not closed – if so then close defect) and re categorise valid defects to common framework.
	+ Review open urgent / risk defects in asset system for validity and re categorise to common framework
	+ Review open overdue prioritise / general maintenance defects in asset system for validity and re categorise to common framework
	+ Review open overdue prioritise / general maintenance defects in asset system for validity and re categorise to common framework
	+ Review open prioritise / general maintenance defects in asset system for validity and re categorise to common framework
	+ Review the validity of watch / next maintenance type defects in asset system and re categorise to common framework of Observation
* Generate transitional reporting for NPRs and organisational reporting for internal defect management purposes

# Further actions

It is recommended that each business;

1. Review the proposal for the common defect prioritisation framework and the impacts/benefits to their defect management and network asset condition related risk identification.
2. Assess the impacts upon their enterprise asset management systems of changes to the defect prioritisation categories of adoption of the ‘standardised’ framework proposed in sections 4.2, 5 and 6 above.
3. Develop a data transition plan for the common defect priority categorisation framework addressing issues in section 7 above.

**Prepared by:**

|  |
| --- |
| Gary Winsor |
| **Manager Network Performance** |

1. The low clearance defect priority framework is adapted from the Endeavour Energy document prepared by David Mate. [↑](#footnote-ref-1)