

Multinet Gas Asset Management CY2017 - CY2022



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Gas Network – Asset Management

Equipment Enclosures Strategy

CY2017 – CY2022

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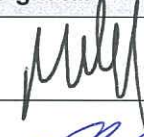




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Executive Summary

This document outlines the maintenance and replacement strategy for the Equipment Enclosures on the Multinet Gas (MG) network. This strategy aims to achieve a high level of reliability for the Equipment Enclosures installed on the Multinet Gas network through preventive & corrective maintenance coupled with planned replacement prior to asset failure.

Multinet Gas completes the following programs on installed enclosures to maintain its alignment with Network Objectives and remain compliant with its regulatory obligations contained in the Gas Safety Case, Gas Distribution System Code, AS 4645 and AS 2885.

- Structural Engineering Rectification Works Program; and
- Miscellaneous Works.

This miscellaneous works program for network enclosures contributes 60% of forecast expenditure and includes the reactive / short lead time works on a broad spectrum of enclosures including masonry buildings, concrete pits, chain wire fences, steel kiosks, gatic covers, SCADA cabinets, and weld mesh fencing.

Table 0-1 provides the financial summary of the capital expenditure which is to be incurred in the calendar year period 2017 to 2022. Table 0-1 includes a breakdown of direct, overheads and real cost escalators for the purpose of reconciliation with that of the overview documentations which support our forthcoming Access Arrangement submission (2018-22).

Table 0-1: Summary of Capital Expenditure (\$'000)

Program Name	CY2017	CY 2018	CY 2019	CY 2020	CY 2021	CY 2022
Structural Engineering Rectification Works	\$360	\$80	\$50	\$10	\$70	\$40
Miscellaneous Works Program	\$150	\$150	\$150	\$150	\$150	\$150
Total Direct Expenditure	\$510	\$230	\$200	\$160	\$220	\$190
Overhead	\$31	\$14	\$12	\$10	\$13	\$11
Subtotal	\$541	\$244	\$212	\$170	\$233	\$201
Real cost escalation	\$0	\$1	\$1	\$1	\$3	\$2
Total Expenditure	\$541	\$245	\$213	\$171	\$236	\$204

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1. Document Overview

1.1. Objectives

This document articulates Multinet Gas' approach to the management of its existing Equipment Enclosure assets and their associated components such as ladders and foot-plates.

It has the following objectives:

- The Strategy articulates the key areas of focus in relation to asset management, key risks, key CAPEX programs, costs and service standard outcomes for the asset group; and
- Show alignment of asset management practices with Gas Network Objectives;

The document is intended for use by:

- Multinet Gas staff (and it's contractors); and
- Regulators – Technical, Safety and Economic.

1.2. Scope

This strategy covers the management of Multinet Gas' existing Equipment Enclosure assets and their associated components. This strategy covers a broad spectrum of equipment enclosures which includes (but is not limited to):

- Masonry buildings;
- Concrete Pits;
- Chain Wire fences;
- Steel kiosks;
- Gatic Covers;
- SCADA cabinets; and
- Weld mesh fencing.

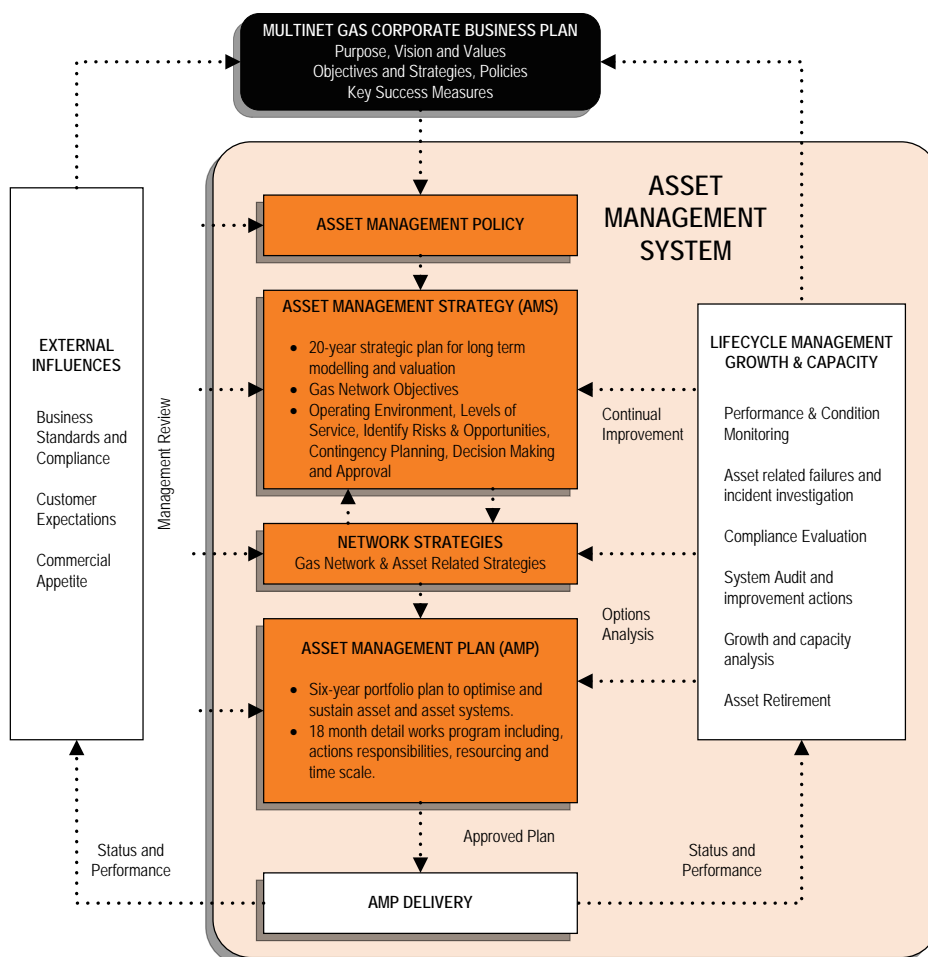
Refer Section 2.2 for a complete list of enclosure types.

This strategy excludes equipment enclosures for meter/regulator units supplying industrial and commercial consumers as they are the responsibility of the supplied customer and as such are not considered as part of the Equipment Enclosures Strategy. Refer Section 3.2.2 for inspection details regarding customer enclosures.

1.3. Relationship with other Key Asset Management Documents

The Equipment Enclosure Strategy is one of a number of key asset management related documents developed and published by Multinet Gas in relation to its gas network. As indicated in Figure 1-1 below, detailed network strategies – including the Equipment Enclosure Strategy – informs both the Asset Management Strategy (AMS) and Asset Management Plan (AMP) of the required capital programs needed to achieve the long-term objectives of the gas distribution network.

Figure 1-1: Asset Management Framework



1.4. Phasing and Financial Disclosure

All programs defined within this strategy are defined in calendar years consistent with the reporting requirements of the Australian Energy Regulator (AER) and where applicable the Gas Distribution System Code (Version 11).

Where required for conversion to financial year (July to June), dollars and volumes can be estimated using a 50:50 expenditure split.

All financial figures quoted within this document – unless otherwise specifically stated – have the following characteristics:

- Real Expenditure / Cost (reference year = 2017);
- Direct Expenditure only (i.e. excludes overheads and finance costs);
- In units of \$1,000 (i.e. '000); and
- All years are denoted in Calendar Year format.

Total values shown in tables and referred to in the text of this document may not reconcile due to rounding.

Conversion factors used in the escalation of historic expenditure to real 2017 equivalent expenditure is provided in Table 1-1. Cumulative conversion factors have been provided by Multinet Gas' Regulatory department.

Table 1-1: CPI Conversion Factors

	2012	2013	2014	2015	2016	2017
CPI Index - \$2017	1.09619	1.07465	1.05192	1.02819	1.01296	1.00000

1.5. Data Sources

The following data sources have been drawn upon in development of the Equipment Enclosure Strategy:

- SAP – ERP tool used for data collection, analysis and maintenance management of MG assets.

1.6. References

- AS 4645 series – Gas Distribution Networks;
- AS 2885 series – Gas and Liquid Petroleum;
- Multinet Gas Risk Model;
- Multinet Gas – System Operations Manual;
- U PL 0003 – Network Infrastructure Security Plan; and
- Structural Report and Site Assessment of Pressure Reduction Station Building Sites, by T.D&C Consulting Engineers and Construction Managers, August 2014.

1.7. Document Review

This document shall be reviewed every two (2) years or earlier if required. The next review is due on or before 31 December 2018.

2. Asset Overview

2.1. Introduction

There are approximately 2,500 equipment enclosures located throughout the Multinet Gas distribution system, with the majority of these subject to regular inspection activity.

Equipment enclosure performance is measured by the enclosure's ability to:

- Provide public and passer by safety;
- Provide personnel and equipment safety at site;
- Prevent casual, felonious and malicious intrusion to site; and
- Provide safe access and egress from site.

Consumer regulator enclosures are the responsibility of the customer to which gas is being supplied. Multinet Gas provides reports as to the enclosure's safety and adequacy from the above definition. Where sites are found to be deficient the enclosure's owner/representative is requested to arrange for rectification works to be completed. Multinet Gas will offer to rectify enclosure deficiencies at the owner's expense.

Major equipment enclosures have their performance measured using the same criteria (above) and most sites are performing well over many years.

A 'Network Infrastructure Security Plan U-PL-0003' provides the framework for the management of Multinet Gas assets with respect to calculated security risks.

The objectives of the Network Infrastructure Security Plan are:

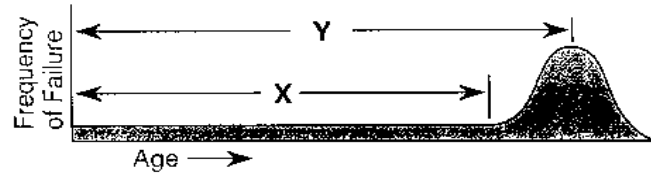
- To minimise the medium, to long term inability to operate the network assets as a result of an unauthorised access incident;
- To provide a consistent approach for identifying and prioritising the 'criticality' of infrastructure;
- To identify the 'vulnerability' of specific assets that if immobilised would result in wide-spread community impact;
- To provide a consistent assessment and treatment of security risks;
- To identify specific actions and liaison with state emergency response agencies;
- To provide an assurance to the community served by United Energy (UE) and MG's networks and the regulatory regime, that UE and MG is taking pro-active preventative measures in respect to its network infrastructure assets; and
- To ensure public safety and continuation of supply.

2.2. Asset Age Profile

The Equipment enclosure age profile encompasses a broad time-span, with some of the older regulator buildings dating back to the late 1950's. The majority of the enclosures were constructed and / or installed by the former Gas and Fuel Corporation (GFC), with enclosure types ranging from large masonry structures through to small sub-surface plastic valve pits.

Gas equipment enclosures display a wear-out characteristic, with the rapid onset of degradation at the end of the useful life that forms a normal distribution. The failures due to age must be superimposed upon the base failure. This overall failure behaviour graph is depicted Figure 2-1.

Figure 2-1: Failure Curve for Equipment Enclosures



The age profile of equipment enclosures installed within Multinet Gas are shown in Table 2-1.

Table 2-1: Multinet Gas Equipment Enclosure Age Profile

Enclosure Device	Installation Years	No. of Sites	Expected life (X)	Span (Y-X)
Buildings	1958-1981	14	80 years	30 years
Chain Wire Fences	1969-Ongoing	17	30 years	15 years
Paling & Steel Fences	1960-1972	13	25 years	10 years
Steel Kiosks Reg	1958-1986	17	30 years	10 years
Steel Kiosks CPS	1970-1996	45	20 years	10 years
SCADA Cabinets	1984-Ongoing	223	20 years	6 years
Concrete Pits	1959-1999	200	50 years	20 years
Hot Dip Galvanised Steel Covers	1976-Ongoing	180	50 years	20 years
Painted Steel Covers	1959-1976	23	30 years	10 years
Gatic Covers	1960-Ongoing	70	50 years	20 years
Weld Mesh Fencing*	2005-Ongoing	8	50 years	20 years
Fibreglass, Plastic, other Equipment Pits	1979-Ongoing	2110	20 years	10 years

[REDACTED]

The characteristics of enclosure types and their descriptions mentioned in Table 2-1 are currently under review to accurately reflect the asset count in Multinet's SAP system.

2.3. Asset Performance

The current condition of enclosures across the Multinet Gas distribution system is predominantly good. Enclosures and components recently refurbished or replaced are in excellent condition with some of the older enclosures/components in various state of repair. Enclosures/components which are deemed to be in sub-standard condition are generally due to items creating public or employee safety concerns and/or having reached or exceeded their design life.

Current known issues with equipment enclosures are:

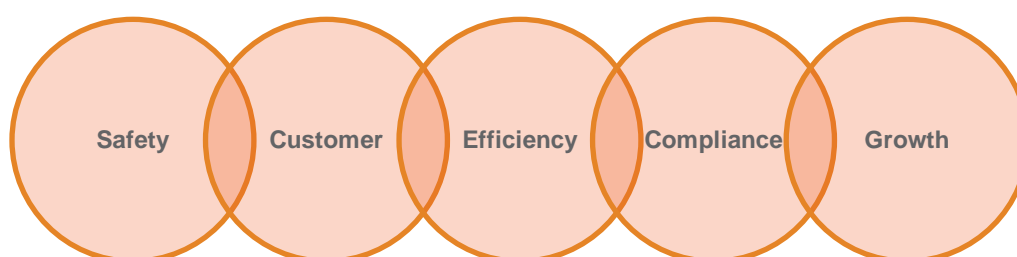
- All Multinet Gas regulator buildings have been independently audited with some found to contain asbestos, and others deemed to contain asbestos. Remedial works & monitoring for these sites is detailed in the independent audit report.
- An independent structural review was conducted in August 2014 (by T.D&C Consulting Engineers & Construction Managers) for a few of the above ground regulator sites with masonry buildings and compounds. Please refer section 0 and the Structural Report and Site Assessment of Pressure Reduction Station Building Sites, August 2014.

3. Asset Management Drivers

3.1. Network Objectives

Multinet Gas has established five (5) network objectives that govern how the network is operated and maintained. This is reflected mostly in regulatory obligations and in some cases prudent and responsible behaviour, justifiable on economic grounds. Achievement of these objectives ensures the sustainable and reliable operation of the gas distribution network.

Figure 3-1: Gas Network Objectives



The alignment between network objectives and the Equipment Enclosures strategy is described below.

3.1.1. Safety – Achieve Zero Harm, while maintaining current levels of network safety.

This strategy aims to achieve a high level of reliability and personnel / public safety through inspection, preventive and corrective maintenance and asset replacement. All planned maintenance activities for various equipment enclosures are underpinned by the need to ensure safety for the customer, general public and the field personnel who carry out any maintenance activity on the equipment.

The Structural Engineering Rectification works program aims to ensure that the building enclosures targeted for rectification are maintained in a structurally sound condition and it poses no threat to the safety of the maintenance personnel, general public and the gas equipment installed inside it.

The Miscellaneous works program takes into account replacement or refurbishment of equipment enclosures and its associated components such as pit lids, ladders and foot-plates. These components are replaced or refurbished on a “case-by-case” basis to rectify any safety related issues.

3.1.2. Customer – Effortless Customer Experience

This strategy aims to achieve a high level of customer satisfaction and experience by providing a reliable means of gas supply to the customer. The planned maintenance activities are designed to cause minimum or no interruption of supply to the customer. The objective of the Structural Engineering Rectification works program is to ensure that the equipment enclosure does not pose any threat to the safety of customers living in the vicinity of the enclosure.

3.1.3. Efficiency – Sustainable and prudent network investment

This strategy is also aimed at maintaining the equipment enclosures within the MG network in a cost efficient manner. Items requiring maintenance are prioritised based on the level of risk posed to the general public, maintenance personnel and the gas equipment installed inside the facility. Some of the items requiring maintenance are done whenever the site is due for a maintenance visit rather than organising separate visits to ensure that these repairs are conducted in an efficient manner.

3.1.4. Compliance – Maintain regulatory and technical compliance

This strategy aims to achieve a high level of regulatory and technical compliance by ensuring that all maintenance and replacement activities are carried out to meet the requirements of MG's Safety Case, AS 4645, AS 2885, the Gas Distribution System Code and the local building codes. The Gas Safety Act & Regulations dictate that ongoing maintenance of these assets is the responsibility of the asset owner, with Australian Standards AS 4645 and AS 2885 set as a minimum requirement.

The primary drivers for the Structural Engineering Rectification works program are to achieve compliance with current safety regulations and building codes. Other miscellaneous works are carried out on a case-by-case basis as required to maintain compliance with current Australian standards.

3.1.5. Growth – Seek opportunities for new growth

This strategy does not cover the installation of new equipment enclosures. Cost of new enclosures are contained in the project pertaining to the equipment being commissioned (e.g. the cost of the enclosure for a new Supply Regulator will be outlined in the scope for this project).

3.2. Lifecycle Management

3.2.1. General

The maintenance and replacement strategies as described later in this document take into consideration the broad age profile of existing equipment enclosures (some installations dating back to the late 1950's) and the varying enclosure types, sizes and construction methods employed.

3.2.2. Inspection

Inspection and reporting of equipment enclosure condition is undertaken during scheduled and breakdown maintenance visits as well as during audits and inspections. The frequency of these visits is dependent on the enclosed asset type. Multinet Gas' maintenance activities are scheduled to conform to the requirements of AS 4645 and AS 2885.

Enclosures for meter units supplying industrial/commercial premises are the responsibility of the supplied customer. However, enclosures are inspected during scheduled and breakdown maintenance of the enclosed equipment. Where enclosures are found to be sub-standard, the customer/representative is notified and requested to arrange for rectification works, at the customer's expense.

3.2.3. Preventive Maintenance

Structured preventative maintenance plans for equipment enclosures have not been created as enclosures are inspected and maintained during all asset maintenance and inspection visits. The following represents typical enclosure maintenance activities undertaken by Multinet's service providers:

- Liquids in pits are removed as priority when conducting works in confined space.
- All enclosure signage is checked and damaged or missing signage is reported / replaced.
- Chain wire and paling fence compound maintenance involves lubricating all hinges and pad locks as well as reporting any further works required. Compounds are expected to be kept clean and free of debris. Overhanging tree branches are removed.
- Regulator kiosk maintenance involves clearing the kiosk of dust, grime, insects, spiders and cobwebs. Lubricating all hinges, door and pad locks as well as reporting any further works required. Coating faults on the kiosks are also attended to during maintenance.

- Concrete pit maintenance is limited to the removal of liquids, dust, grime, grease, insects and cobwebs as well as maintaining pit wall coatings.
- Ladders and footplates are inspected with major defects reported. Minor defects are rectified on the spot.
- SCADA and CPS cabinet maintenance involves clearing the cabinet of dust, insects and cobwebs. Lubricating all hinges and door locks and replacing door seals and insect screens (as needed), as well as reporting any further works required.
- Hot dip galvanised pit lid maintenance involves lubricating hinges, pivots and locks and ensuring lid stay bars operate correctly as well as reporting any further works required. Damaged or missing components are repaired or replaced as required. The pit lid gutter and drains are cleared of any debris.
- Painted pit lids and frames maintenance involves lubricating hinges, pivots and locks and ensuring lid stay bars operate correctly as well as reporting any further works required. Damaged or missing components are repaired or replaced, as required.
- Faults requiring immediate attention are attended to during the maintenance inspections. Minor defects are also attended to during the maintenance inspections with more involved defects rectified on a special visit or during the next scheduled maintenance inspection.

3.2.4. Corrective Maintenance – Faults and Defects

Faults and Defects are reported and rectified as follows:

- By the maintenance crews who are expected to rectify any faults/defects during scheduled maintenance activities;
- By the public who phone the 1800 number (displayed on all above ground enclosures & equipment); and
- By staff/contractors during audits and inspections, with rectification occurring during the next scheduled maintenance or by a special visit (if warranted).

3.2.5. Refurbishment

The refurbishment of equipment enclosures depends on the type of enclosure and its construction.

The refurbishment of distribution asset buildings occurs every 20 to 25 years. Future refurbishment of regulator buildings will need to accommodate asbestos removal (asbestos prevalence is currently being assessed), lighting and venting requirements as well as noise regulations.

Chain-wire and paling fences are not refurbished, rather they are maintained as part of the overall site and are repaired only when damaged or replaced if considered beyond repair.

Refurbished regulator kiosks are used to replace damaged or sub-standard kiosks. Regulator kiosk refurbishment generally involves replacing corroded sections of a kiosk together with hinges and door lock mechanisms that may be seized, heavy to operate or broken. Further kiosk refurbishment may involve installing or replacing lid hinges and gas struts for easier kiosk access and safety. Refurbished regulator kiosks are also fully painted.

Concrete pit refurbishment depends on the pit construction method. Pre-cast concrete pit covers are replaced when damaged or faulty. Cast-in-situ pits are refurbished to prevent water ingress and modified if found to be sub-standard.

3.2.6. Replacement

Replacement of equipment enclosures occurs under the following criteria:

- When a chain-wire/paling fence fails to adequately prevent unlawful and malicious intrusion to site and/or is dangerous to the public, employees or contractors or is unsightly;
- SCADA cabinets are not financially viable to refurbish so are replaced on an as required basis. This is determined on a site by site a basis as local conditions contribute greatly to cabinet condition; and
- Older type cathodic protection cabinets are refurbished, whilst the newer type cabinets are replaced rather than refurbished.

3.3. Performance Measures

Equipment enclosure performance is typically measured by the enclosure's ability to:

- Provide public and passer by safety;
- Provide personnel and equipment safety at site;
- Prevent casual, felonious and malicious intrusion to site; and
- Provide safe access and egress from site.

Most of Multinet's equipment enclosure sites have performed well over many years. Enclosure failure/breakdown frequency has not been traditionally measured as the standard designs of enclosures have proven to be adequate from a performance point of view. However, over the past few years a number of enclosure components have failed and have been replaced.

4. Capital Program – 2017 to 2022

4.1. Overview

Multinet Gas completes the following annual programs to maintain its alignment with Network Objectives and remain compliant with its regulatory obligations contained in the Gas Safety Case, Gas Distribution System Code, AS 4645 and AS 2885.

- Structural Engineering Rectification Works Program; and
- Miscellaneous Works Program.

Table 4-1 and Figure 4-1 provide a breakdown of expenditure from 2017 to 2022 by program. Typical expenditure levels are low and average at \$252k per annum.

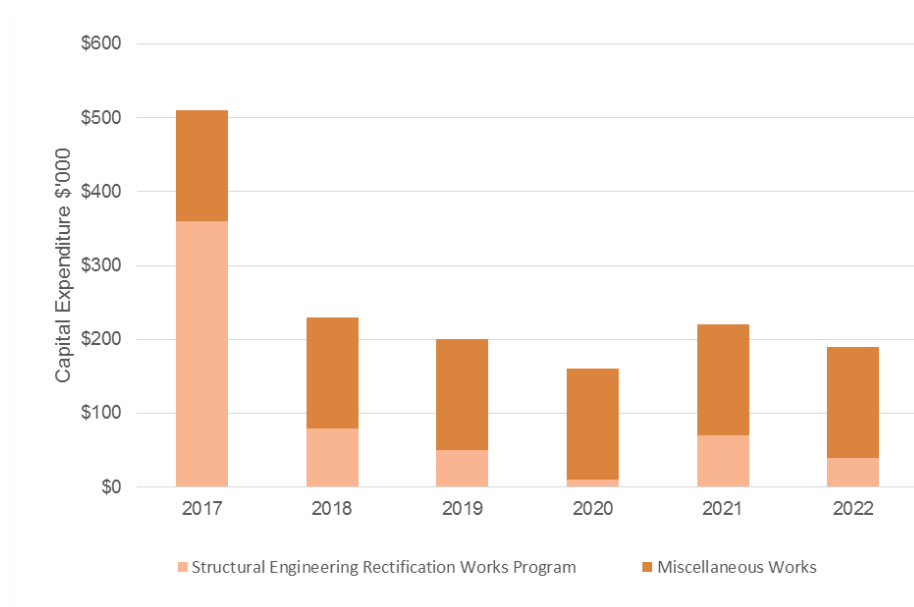
This miscellaneous works program for network enclosures contributes 60% of forecast expenditure and includes the reactive / short lead time works on a broad spectrum of enclosures including masonry buildings, concrete pits, chain wire fences, steel kiosks, gatic covers, SCADA cabinets, and weld mesh fencing.

Capex allocation is captured within the AER regulatory accounts 'Other' category (RJA sub-category).

Table 4-1: Capital Expenditure Summary

Ref	Program	2017	2018	2019	2020	2021	2022
4.2	Structural Engineering Rectification Works Program	\$360	\$80	\$50	\$10	\$70	\$40
4.3	Miscellaneous Works Program	\$150	\$150	\$150	\$150	\$150	\$150
Total Expenditure		\$510	\$230	\$200	\$160	\$220	\$190

Figure 4-1: Capital Expenditure Summary



4.2. Structural Engineering Rectification Works Program

4.2.1. Introduction

Above ground regulator sites are especially susceptible to damage due to their high exposure to the external environment. Brick walls, roof structures, door/window structures and guttering are susceptible to degradation due to corrosion, rot and water related breakdown issues.

A structural engineering review was conducted in 2014/15 (by T.D&C Consulting Engineers & Construction Managers) for the above ground supply regulator sites which are operational on the MG network. The buildings for which the structural review was conducted have an average age of 50 years and it is prudent that the structural integrity of these buildings is periodically reviewed.

The scope of the structural review included an assessment of:

- Structural integrity of the building walls;
- Structural integrity of brick masonry / fencing walls;
- Assessment of doors, windows and frame integrity;
- Assessment of roofing of building;
- Assessment of spouting and downpipes of building;
- Assessment of drainage structures within building sites; and
- General overall site condition.

The inspections undertaken were visual only and of areas which were readily accessible. No destructive or exploratory investigation was completed.

Please refer to the Structural Review Report prepared by T.D&C for further details on the current asset condition and proposed rectification works for the individual sites described below.

4.2.2. Scope

This rectification program aims to implement the recommendations put forward by the Structural Review Report prepared by T.D&C. The sites listed for rectification are as below:

Please refer Section 5.2 for further detail on the general condition of each site and the proposed rectification measures which need to be carried out as part of this capital works program.

4.2.3. Business Drivers and Strategic Alignment

The primary drivers for this program are to achieve alignment with gas network objectives of:

- Safety; and
- Regulatory compliance.

One of the key drivers for this program is to ensure that the building enclosures targeted for rectification are maintained in a structurally sound condition and pose no threat to the safety of maintenance personnel, the general public and the gas equipment installed inside it. These sites contain some high-risk assets which are essential to maintain supply to large parts of the gas network. Hence, it is critical that the upkeep of these sites is done on a regular basis and structural issues are rectified in a timely manner to prevent any safety related issues with the site.

Achieving compliance with the relevant building codes, Australian Standards and MG's Engineering Standards is also a key driver of this program. MG aims to achieve compliance with the regulatory codes by proactively engaging these independent structural engineering consultants (T.D&C) to determine the structural integrity of its existing above ground assets.

4.2.4. Works Program

The summarised works program is shown in Table 4-2, and includes the expenditure associated with the program.

Table 4-2: Structural Engineering Rectification Works Program

Program	2017	2018	2019	2020	2021	2022
[REDACTED]	-	-	■	-	-	-
[REDACTED]	■	-	-	-	-	-
[REDACTED]	-	■	-	-	-	-
[REDACTED]	-	-	■	-	-	-
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[REDACTED]	-	-	-	■	-	-
[REDACTED]	-	-	-	-	■	-
[REDACTED]	-	-	-	-	-	■
Total Expenditure	\$360	\$80	\$50	\$10	\$70	\$40

4.3. Miscellaneous Works Program

4.3.1. Introduction

The Miscellaneous Works Program covers a broad spectrum of equipment enclosures which includes masonry buildings, concrete pits, chain wire fences, steel kiosks, gatic covers, SCADA cabinets, and weld mesh fencing.

4.3.2. Scope

The Miscellaneous works program takes into account replacement or refurbishment of equipment enclosures and its associated components such as pit lids, concrete pit walls, ladders and foot-plates etc. These components are replaced or refurbished on a “case-by-case” basis to rectify any safety related issues.

4.3.3. Business Drivers and Strategic Alignment

The primary drivers for this program are to achieve alignment with gas network objectives of:

- Safety; and
- Regulatory compliance.

Some of the other issues which drive capital works and affect the integrity of equipment enclosures are outlined:

- **Damage:** Above ground sites are more susceptible to damage due to their relatively high exposure to the external environment. Vehicular impact although uncommon can have serious consequences.
- **Vandalism:** Vandalism is a problem with graffiti and malicious damage occurring frequently.
- **Theft:** Theft from the sites is rare but does occur and creates a public safety issue.
- **Noise:** Noise and smell complaints from members of the public are common at all locations. Being above ground exacerbates the effects of any noise or sound leakage more so than in pits. In addition there are frequent complaints about the aesthetics of the units from local residents and businesses. The Supply Regulators strategy (MG-SP-0003) has an Environmental Noise Improvement program which targets the high noise exceedance sites to minimise the amount of noise from these sites.
- **Contamination:** Some sites are built on former coal gas sites and which may contain some ground pollution.
- **Vegetation Management:** Overhanging trees creates constant maintenance and the risk of branches falling and damaging the facility is a security issue as they make for easy access to the site by climbing the trees.
- **Asbestos:** Many of the older style brick buildings have materials containing asbestos and some flanges still have asbestos gaskets, which present obvious OH&S risks for maintenance staff. There is potential for harm to staff, contractors and the public. Please refer to the UEMG asbestos register for more information.

4.3.4. Works Program

The summarised works program for miscellaneous work on Equipment Enclosures is shown in Table 4-3.

Table 4-3: Miscellaneous Works

Program	2017	2018	2019	2020	2021	2022
Miscellaneous Works	\$150	\$150	\$150	\$150	\$150	\$150
Total Expenditure	\$150	\$150	\$150	\$150	\$150	\$150

5. Appendix

5.1. Glossary & Definitions

Term	Meaning
AER	Australian Energy Regulator
AMP	Asset Management Plan
AMS	Asset Management Strategy
GFC	Gas and Fuel Corporation Victoria
HP	High Pressure (Pressure Range: 140 to 515 kPa)
I&C	Industrial and Commercial connections
LP	Low Pressure (Pressure Range: Up to 7 kPa)
MG	Multinet Gas
MP	Medium Pressure (Pressure Range: 35 to 210 kPa)
OH&S	Occupational Health & Safety
SAP	Systems Applications and Products is an Enterprise Resource Planning tool which is used at Multinet Gas for recording asset data and maintenance management.
SCADA	Supervisory Control And Data Acquisition
TP	Transmission Pressure (Pressure Range: Above 1050 kPa)
UE	United Energy
UEMG	United Energy & Multinet Gas

5.2. Structural Engineering Rectification works details

The below section provides details on the general condition and the rectification works to be carried out for sites outlined in Section 4.2: Structural Engineering Rectification Works Program.

These rectification works have been recommended by the structural engineering consultants T.D&C. For further details on structural integrity of building walls, roofing, site drainage and photos please refer the Structural Report and Site Assessment of Pressure Reduction Station Building Sites, August 2014.

5.2.1. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 5-1: [REDACTED]



5.2.2. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 5-2: [REDACTED]



5.2.3. [REDACTED]



Figure 5-3: [REDACTED]



5.2.4. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 5-4: [REDACTED]



5.2.5. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

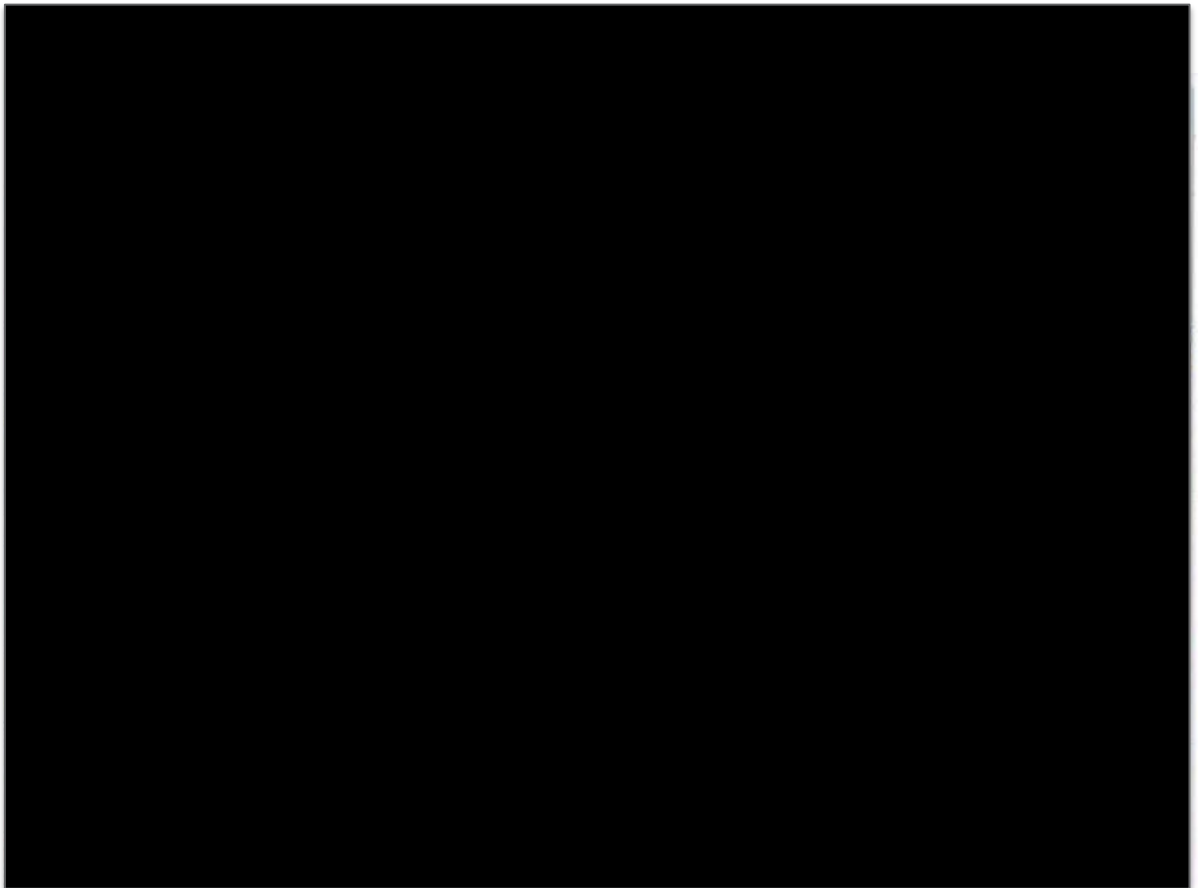
Figure 5-5: [REDACTED]



5.2.6. [REDACTED]



Figure 5-6: [REDACTED]



5.2.7. [REDACTED]



Figure 5-7: [REDACTED]



5.2.8. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

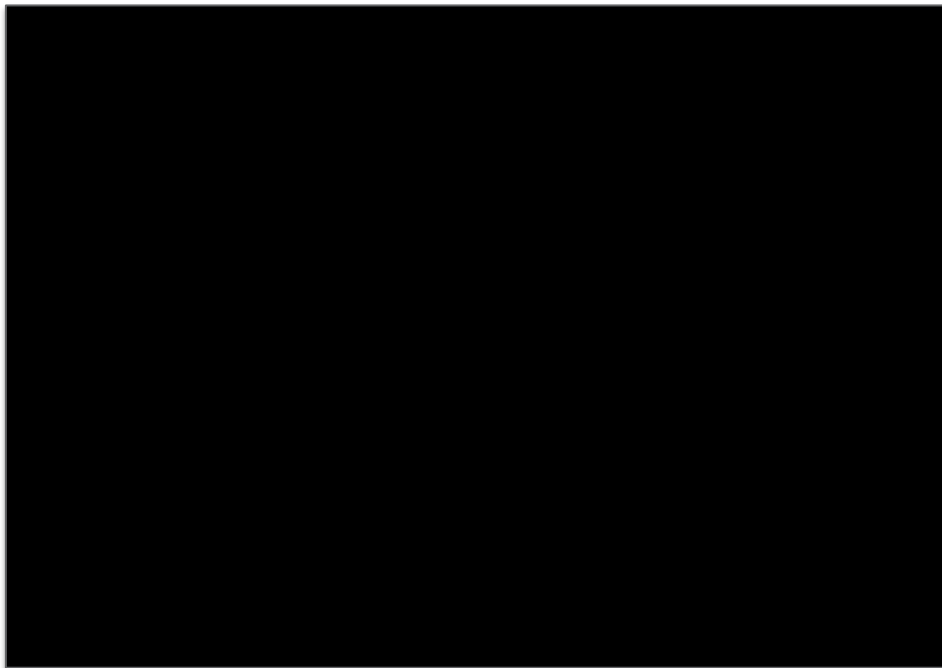
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 5-8: [REDACTED]



5.2.9. [REDACTED]



Figure 5-9: [REDACTED]



5.2.10. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 5-10: [REDACTED]



5.2.11. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

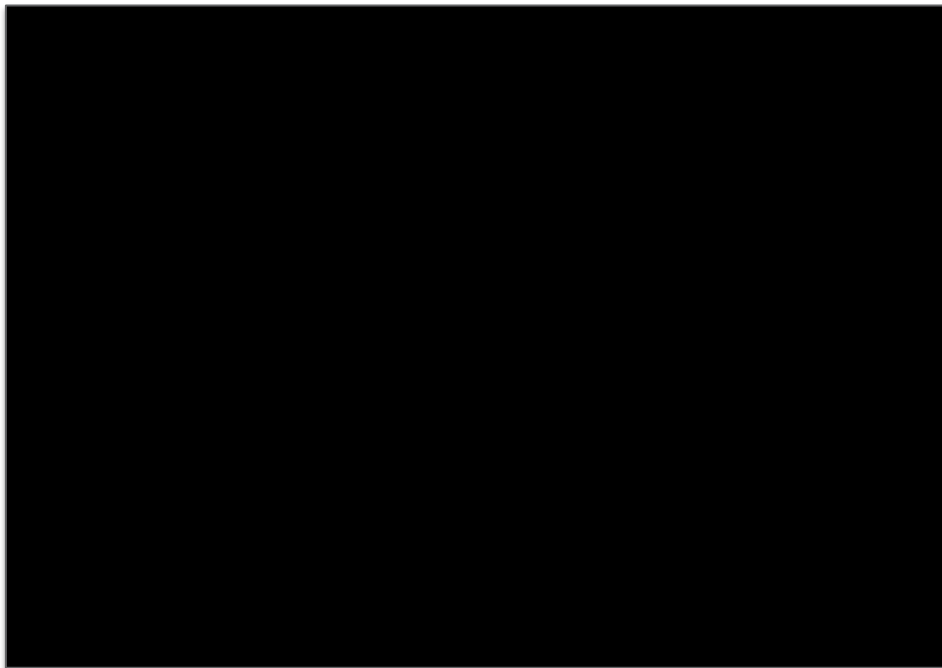
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 5-11: [REDACTED]



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