Power line Bushfire Mitigation Plan
July 2020 – June 2021

Melbourne Water

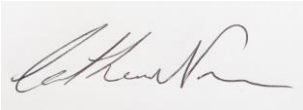
Plan Authorisation

This Bushfire Mitigation Plan outlines how Melbourne Water manages our at-risk electrical assets to mitigate bushfire risk and ensure our assets are safe and reliable.

As the owner and operator of at-risk electrical assets Melbourne Water has prepared this plan in accordance with Section 83BA of the Electrical Safety Act 1998 and the Electrical Safety (Bushfire Mitigation) Regulations 2013, for acceptance by Energy Safe Victoria.

This plan is subject to annual review and submission to Energy Safe Victoria to ensure it describes current management regimes and processes, and to allow for continuous improvement.

Approved by



Kitty Niven

Water & Sewerage Asset Management, Service Delivery

Table of Contents

1. Relevant legislation

Electrical Safety Act 1998

Electricity Safety (Bushfire Mitigation) Regulations 2013

Electricity Safety (Electric Line Clearance) Regulations 2015 (incorporating the Code of Practice for Electric Line Clearance 2015)

The Act requires the mitigation plan to include assets that are both:

i) located in a Hazardous Bushfire Risk Area; and
ii) classified as an At-Risk Electric Line

Hazardous Bushfire Risk Area is defined in the Electricity Safety Act 1998 as an area:

a) to which a fire authority has assigned a fire hazard rating of "high" under section 80, whether or not the area is an urban area; or

b) that is not an urban area (other than an area a fire control authority has assigned a fire hazard rating of "low" under section 80)

83A of the Act defines At-Risk Electric Line as an electric line (other than a private electric line) that is—

(a) above the surface of land; and

(b) in a hazardous bushfire risk area;

Part 1 of the Act section 3 defines a private electric line as any low voltage electric line used to take electricity from the point of supply, whether or not that line is vested in an electricity supplier.

Therefore this plan applies to **at risk** HV power line assets that are located in HBRA.

The plan also details assets other than at risk HV power lines that are:

a) MWC 22kV equipment connected to power lines included in Energy Safe Victoria's Rapid Earth Fault Current Limiter (REFCL) program area
b) Other overhead lines owned by MWC that are HV in a LBRA or LV (to provide MWC with an overall plan)

2. Plan Availability

This plan is available for public inspection, in accordance with section 83BA (a) and (b), following acceptance of the plan by Energy Safe Victoria. It is available on Melbourne Water's website and for viewing during normal business hours (8am to 5pm) on request at Melbourne Water's head office, 990 La Trobe St, Docklands, Victoria.

3. Introduction

Melbourne Water Corporation (MWC) is a water authority solely owned by the Victorian Government. We manage Melbourne's water supply catchments, remove and treat most of Melbourne's sewage, and manage rivers and creeks and major drainage systems throughout the Port Phillip and Westernport regions.

Melbourne Water is a significant land owner in the Port Phillip and Western Port regions managing 33,582 hectares of land and responsible for managing water supply, sewerage and drainage assets, as well as natural assets such as rivers and creeks. These assets service 4.2 million people in an area spanning 12,800 square kilometres.

Melbourne Water owns and operates electrical assets in order to ensure the continuation of our core services. These assets include low and high voltage lines and over 450 poles. Of these assets the following are located in a Hazardous Bushfire Risk Area:

- Sugarloaf Reservoir Area (including associated Winneke plant) (HV)
- Cardinia Duffy's Lookout Picnic Area (LV)
- Silvan Reservoir (LV)
- Tarago treatment plant (LV)
- Upper Yarra Reservoir
- Bells Portal (HV)

The only MWC sites that have HV assets located in HBRA and therefore meet the definition of 'at risk lines' are:

- Sugarloaf Reservoir Area.
- Bells Portal (Thompson Reservoir).

These lines are supplied by electricity distribution company AusNet Services.

This plan has been specifically designed for the 2.6 km of 11 kV lines (at-risk electric lines) in the Sugarloaf-Winneke area and 64m of 22kV line (at-risk electric lines) in the Bells Portal – Thompson dam area

In addition to the regulatory requirements, this plan also provides some mitigation details for all MWC owned overhead lines. The intent of this inclusion is to provide internal clarity on overall risk management.

This Bushfire Mitigation Plan outlines how Melbourne Water manages our at-risk electrical assets to mitigate bushfire risk and ensure our assets are safe and reliable.

The following responses address the requirements of:

- the *Electricity Safety Act 1998* – Section 83BA – Submission of bushfire mitigation plans for acceptance; and
- the *Electrical Safety (Bushfire Mitigation) Regulations 2013* – Section 6 – Prescribed particulars for bushfire mitigation plans – specified operators.

4. Prescribed Particulars

4.1. Contact details

Section 6 (a)

Name, address and telephone number of the specified operator

Melbourne Water Corporation
990 La Trobe St
Docklands Victoria 3008
Phone 131 722

Section 6 (b)

Position, address and telephone number of the person who was responsible for the preparation of the plan

Kitty Niven
Water & Sewerage Asset Management, Service Delivery, Melbourne Water
990 La Trobe St, Docklands, Victoria 3008
Email: kitty.niven@melbournewater.com.au
Phone (03) 96797357

Section 6 (c)

Position, address and telephone number of the persons who are responsible for carrying out the plan

Matthew Daley
Manager, Water Supply Wholesale Services
Melbourne Water Corporation
881 High St, Reservoir, Victoria 3073
Email: matthew.daley@melbournewater.com.au
Phone (03) 8481 4079

Robert Considine
Manager Waterways & Land Delivery Works Execution
990 La Trobe St, Docklands, Victoria 3008
Email: Robert.Considine@melbournewater.com.au
Phone (03) 96797175

Section 6 (d)

Telephone number of the specified operator's control room so that persons in the room can be contacted in an emergency that requires action by the specified operator to mitigate the danger of bushfire

Winneke Control Room (Business hours)
(03) 9719 4666
Request Winneke Duty Operator
Water Control Centre (After hours)
(03) 9325 2666
Request Winneke Duty Operator

4.2. Policy and objectives

Section 6 (e)

Bushfire mitigation policy of the specified operator to minimise the risk of fire ignition from its at-risk electric lines

Melbourne Water ensures assets are operated and maintained to:

- deliver safe, effective and reliable services
- protect and improve the environment
- meet agreed financial performance targets for the government and the wider community; and
- minimise the risk of fire ignition by Melbourne Water owned and operated high voltage power lines.

Melbourne Water's CORP GOV POL Emergency Management Policy articulates the organisation's commitment to emergency management, including fire. It outlines Melbourne Water's emergency management objectives to:

- Prevent or reduce the risks of incidents occurring
- Maintain welfare and confidence of our people, customers, stakeholders and the community
- Minimise the impacts of a disruption
- Ensure that critical stakeholders are kept informed
- Return to normal operations as quickly as possible.

In accordance with the Integrated Fire Management Planning process (IFMP), Melbourne Water has developed bushfire risk management plans identifying assets at risk from bushfire and programs to mitigate that risk. These assets at-risk, including the 2.6 km of 11kV, have been logged in the Victorian Fire Risk Register (VFRR).

Melbourne Water's Sugarloaf Bushfire Risk Management Plan identifies actions to mitigate bushfire risk within the catchment area and to our at-risk assets. In determining risk and risk management the international standard for risk management, ISO 31000:2009 is used.

Melbourne Water has developed the Electrical Line Clearance Management Plan which outline our responsibilities for clearing vegetation to manage the fire risk from power lines on our estate and ensure our compliance with relevant legislation.

Local plans and procedures:

- at the Winneke Treatment plant, including the *Winneke Team Bushfire Survival Plan (*Winneke Bushfire survival plan) and *Winneke Water Treatment Plant Emergency Response Plan (*Winneke ERP) *and Manifest* also provide governance in the management of fire risk from power lines.

At the Bells Portal site see the WLD NE Civil Emergency Response plan

Section 6 (f)

Objectives of the plan to achieve the mitigation of fire danger arising from the specified operator's at-risk electric lines

The objectives of this plan, to mitigate risks to the community, the environment and Melbourne Water assets through fire ignitions from power lines, are to:

- Ensure vegetation is managed along high voltage power lines to minimise risk of ignition and allow access for maintenance and emergency works
- Ensure electrical infrastructure is maintained to a high standard to minimise the risk of ignition or failure
- Ensure all works along power lines are completed by suitably qualified people.

4.3. Asset description

Section 6 (g)

Description, map or plan of the land to which the bushfire mitigation plan applies, identifying the location of the specified operator's at-risk electric lines

The **at-risk power lines** owned and operated by Melbourne Water are located predominantly around the Sugarloaf area in Christmas Hills, about 35 km north-east of Melbourne (see Appendix 1) and at Bells portal (Thompsons Reservoir) about 150kM east of Melbourne.

Electrical assets located within this area include:

MWC Main Substation 66kV

Substation maintained by MWC (66 kV incoming line is owned and operated by AusNet Services)

Yering Gorge (Pumping Station) Feeder No.1 and No. 2 consists of 500m of 11kV overhead aerial bundled (insulated cable) cable from the substation to the Yering Gorge Pumping Station.

WTP (Winneke Treatment Plant) Feeder No.1 and No.2 consists of 2.1 km of 11kV aerial bundled cable (insulated cable) to Winneke Treatment Plant.

The location and details of power lines and poles are shown in Appendix 3.

Locations of high voltage electrical isolation control points are shown in Appendix 4 and the results of the 2020 Assessment are shown in Appendix 4. The Vegetation Inspection Report is shown in Appendix 6.

The Sugarloaf area covers the traditional lands of the Wurundjeri and Taungurong people from the Kulin Nation. Construction of Sugarloaf Reservoir and Winneke Treatment Plant began during the late 1970s and was completed in 1981. The Sugarloaf Reservoir catchment is surrounded largely by private property. Parks Victoria also has adjoining tenure around Kinglake-Warrandyte Conservation Reserve and National Park and One Tree Hill Reserve to the north. Water from Sugarloaf Reservoir is treated at the Winneke Water Treatment Plant to World Health Organisation guidelines before entering Melbourne's water supply system. The power lines at Sugarloaf reservoir are situated within the Box Ironbark Forest EVC in the Highlands – Southern Fall Bioregion.

The Bells Portal site is located within Baw Baw national park next to Thompson reservoir.

4.4. Management strategy

Section 6 (h)

Preventative strategies and programs to be adopted by the specified operator to minimise the risk of the specified operator's at-risk electric lines starting fires

Melbourne Water applies an Asset Management approach to ensure efficient and effective management of our assets through full service lifecycle. Melbourne Water's strategies to mitigate bushfire risk are covered by two broad programs; the vegetation management program and asset condition monitoring and renewal program.

The Bush Fire Mitigation Plan (BFMP) is managed through appropriate contractor management processes as stated below.

- Vegetation Management
- Condition Monitoring and Renewal Program
- REFCL Program

Vegetation Management

Vegetation is managed as per Melbourne Water's Electrical Line Clearance Management Plan. In summary:

1. MWC engages a suitable qualified Vegetation Management Company (VMC) to complete inspections of all MWC responsible electricity lines to ensure compliance with the Code.
2. Works identified by the VMC is reported to MWC.
3. MWC's approved contractors complete the required work that has been identified in the inspection.
4. The VMC reports directly to the responsible Melbourne Water representative within the relevant delivery team within MWC's Service Delivery business group.
5. The VMC and contractors are subjected to MWC audits to ensure contractors are qualified to complete the works, are working to the required specifications and OH&S standards.

Condition monitoring and renewal program

1. MWC's Asset Management team defines the scope of condition monitoring and frequency of inspection.
2. Work orders are generated by MWC's Asset Management Information System, MAXIMO, as per the defined inspection frequency.
3. The inspections are carried out by MWC's maintenance contractor, Wood, and a condition report is attached to the work order (note the most recent inspection report is in Appendix 4 of this document).
4. Corrective work orders are raised should any urgent issues be identified in the condition report. Opportunities for improvement or issues such as deterioration in asset condition are reviewed by MWC's Asset Management team as part of a condition rating review process.

Figure 1 shows the MWC organisation chart with respect to key accountabilities and responsibilities for the BFMP.

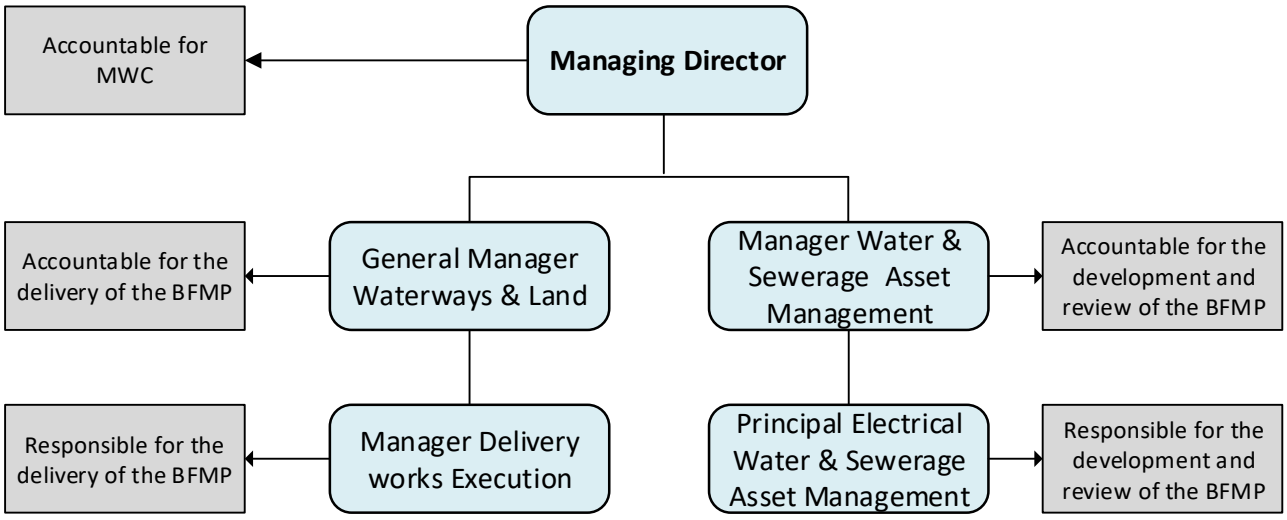


Figure 1:MWC accountabilities and responsibilities for the BFMP

Table 1 indicates the asset condition monitoring activities performed on HV power lines.

Table 1: Asset Condition monitoring activities

Asset	**Condition monitoring activity**
Concrete poles	• Leaning of poles • Bowed poles • Concrete cracks/ rust • Soil erosion at the base
Stays	• Wire condition • Anchor condition • Insulator condition • Eye bolt cracks • Soil erosion
Insulators	• Cracks and chips • Loose hardware • Bolt rust
Cross arms	• Burning marks • Bowing or bending • Loose, rust or broken hardware
Conductors (insulated)	• Incorrect sags • Cracks in outer insulation
Connections	• Loose or broken connections • Conductor damage

Annual visual inspection of poles and lines is undertaken from the ground by Melbourne Water maintenance staff as per the preventative maintenance activities in **Table 4**. These inspections

are carried out prior to summer to identify any major, visible faults or potential risks, and compliance with relevant legislation.

Professional drone inspections of high voltage lines are undertaken on a 36 month basis to ensure assets are assessed from below and above by a qualified inspector. The results of the last inspection undertaken early 2020 is summarised in Appendix 4 of this document and is carried out every 3 years. Thus, the next concrete pole assessment is scheduled for late 2022.

The vegetation clearance program is a preventative strategy which involves the proactive inspection and clearance of vegetation along our power lines to minimise the risk of fire ignitions from power line-vegetation interaction. Vegetation inspection and maintenance along the power lines identified in this plan is carried out on an annual basis by qualified individuals. Inspections and maintenance activities should be carried out prior to each bushfire season. Vegetation clearance is carried out in accordance with the Electricity Safety (Electric Line Clearance) Regulations 2015. The latest Vegetation Inspection Report was carried out in 2019 and relevant extracts are shown in Appendix 6.

Please refer to the MW ELCMP for further details including auditing processes.

Note MW ELCMP and other prevention programs are randomly audited by Energy Safe Victoria and work safe.

REFCL Program

The Essential Service Commission has amended the Electricity Distribution Code in response to changes to the Electricity Safety (Bushfire Mitigation) Regulations 2013 (Vic) under which the Victorian Government mandated the roll out of new bushfire mitigation technology across Victoria. The introduction of this technology forms part of the Victorian Government's Power Line Bushfire Safety Program.

AusNet Services will be installing Rapid Earth Fault Current Limiter (REFCL) technology at 22 of its zone substations in compliance with the Regulations.

The sites presented in **Table *2*** are within Energy Safe Victoria's Rapid Earth Fault Current Limiter (REFCL) program area. Note that only Sugarloaf Reservoir falls within the scope of this document.

Table 2: Melbourne Water facilities located in REFCL operational areas

Facility	MW Overhead HV Lines	Under Current REFCL Program	In HBRA	Comments
Sugarloaf Reservoir	Y	N	Y	
Upper Yarra mini hydro	N	Y	Y	A project is under way to harden the assets at MW owned substation.
Cardinia Silvan Pump station	N	Y	Y	A project is under way to harden the assets at MW owned substation.
Olinda mini hydro	N	Y	Y	A project is under way to harden the assets at MW owned substation.
Greenvale Reservoir	N	N	Y	
Maroondah Reservoir	N	N	Y	MW is a LV customer.
O'Shannassy Reservoir	N	Y	Y	MW is a LV customer.
Tarago Reservoir	N	N	Y	MW is a LV customer.
Yan Yean Reservoir	N	N	Y	MW is a LV customer.
Thomson Dam mini hydro	N	Y	Y	A project is under way to harden the assets at MW owned substation.
Bells Portal Pump Station	N	Y	Y	A project is under way to harden the assets at MW owned substation.
Epping Pump Station	N	N	N	HV equipment has been decommissioned. MW is a LV customer.
Preston Pump station and mini hydro	N	N	N	
Western Treatment Plant - Werribee	Y	N	N	This facility is not located in HBR area.
Eastern Treatment Plant - Bangholme	N	N	N	
Edithvale – Seaford Wetland	N	N	Y	MW is a LV customer.

The following sites that are impacted under the REFCL program are achieved with the following compliance given in **Table 3: REFCL Readiness and Compliance**.

Facility	Compliance Achieved	REFCL Readiness
Cardinia/ Silvan Pumping Station	***Protection settings reviewed and updated based on elevated voltages from the REFCL system*** - Protection settings shall be reviewed and updated in accordance with MWC standards and REF 30-10 – HV Customer Policy for REFCL Protected Networks (Load & Generator) ***Replacement of surge arresters*** with suitable ratings based on the following documents: - ESV Guidance for HV Customers – DOC/18/21295 - REF 10-04 – Equipment Building Block Functional Descriptions ***Metering Compliance*** – Voltage Transformers shall comply with the Voltage Factor for GFN: - Service & Installation Rules Document ***Testing/Replacement of Instrument Transformers*** *to be rated to withstand the 24.2kV phase-earth voltages (*with test certificates provided to prove compliance) - Instrument Transformers shall comply with the requirements of HV Customer Policy for REFCL Protected Networks (Load & Generator) – Document Number REF 30-10 ***Replacement of Insulators*** – to withstand 24.2kV phase to ground voltages.	Due for completion end July 2020
Bells Portal Pumping Station	***Lowering of the Pole Mounted Transformers to improve maintenance access with considerations for:*** - Fencing requirements, earthing, drainage, level of proposed switchyard location, cable re-routing, concrete work etc. ***Removing the need to perform manual HV switching in front of live switchboards.*** - Provide means of remote switching to de-energized switchboard - Provision of 3.3kV ***Protection settings reviewed and updated based on elevated voltages from the REFCL system*** - Protection settings shall be reviewed and updated in accordance with MWC standards and REF 30-10 – HV Customer Policy for REFCL Protected Networks (Load & Generator) ***Replacement of surge arresters*** with suitable ratings based on the following documents: - ESV Guidance for HV Customers – DOC/18/21295 - REF 10-04 – Equipment Building Block Functional Descriptions ***Metering Compliance*** – Voltage Transformers shall comply with the Voltage Factor for GFN: - Service & Installation Rules Document ***Testing/Replacement of Instrument Transformers*** *to be rated to withstand the 24.2kV phase-earth voltages (*with test certificates provided to prove compliance) - Instrument Transformers shall comply with the requirements of HV Customer Policy for REFCL Protected	Due for completion end August 20200

	Networks (Load & Generator) – Document Number REF 30-10 ***Replacement of Insulators*** – to withstand 24.2kV phase to ground voltages.	
Silvan Mini Hydro	***Protection settings reviewed and updated based on elevated voltages from the REFCL system*** - Protection settings shall be reviewed and updated in accordance with MWC standards and REF 30-10 – HV Customer Policy for REFCL Protected Networks (Load & Generator) ***Replacement of surge arresters*** with suitable ratings based on the following documents: - ESV Guidance for HV Customers – DOC/18/21295 - REF 10-04 – Equipment Building Block Functional Descriptions ***Metering Compliance*** – Voltage Transformers shall comply with the Voltage Factor for GFN: - Service & Installation Rules Document ***Testing/Replacement of Instrument Transformers*** *to be rated to withstand the 24.2kV phase-earth voltages (*with test certificates provided to prove compliance) - Instrument Transformers shall comply with the requirements of HV Customer Policy for REFCL Protected Networks (Load & Generator) – Document Number REF 30-10 ***Replacement of Insulators*** – to withstand 24.2kV phase to ground voltages.	Due for completion end August 2020
Olinda Mini Hydro	***Protection settings reviewed and updated based on elevated voltages from the REFCL system*** - Protection settings shall be reviewed and updated in accordance with MWC standards and REF 30-10 – HV Customer Policy for REFCL Protected Networks (Load & Generator) ***Replacement of surge arresters*** with suitable ratings based on the following documents: - ESV Guidance for HV Customers – DOC/18/21295 - REF 10-04 – Equipment Building Block Functional Descriptions ***Metering Compliance*** – Voltage Transformers shall comply with the Voltage Factor for GFN: - Service & Installation Rules Document ***Testing/Replacement of Instrument Transformers*** *to be rated to withstand the 24.2kV phase-earth voltages (*with test certificates provided to prove compliance) - Instrument Transformers shall comply with the requirements of HV Customer Policy for REFCL Protected Networks (Load & Generator) – Document Number REF 30-10 ***Replacement of Insulators*** – to withstand 24.2kV phase to ground voltages.	Due for completion end June 2020
Thomson Hydro	***Protection settings reviewed and updated based on elevated voltages from the REFCL system*** - Protection settings shall be reviewed and updated in accordance with MWC standards and REF 30-10 – HV Customer Policy for REFCL Protected Networks (Load & Generator)	Due for completion Sept 2020

	Replacement of surge arresters with suitable ratings based on the following documents: - ESV Guidance for HV Customers – DOC/18/21295 - REF 10-04 – Equipment Building Block Functional Descriptions ***Metering Compliance*** – Voltage Transformers shall comply with the Voltage Factor for GFN: - Service & Installation Rules Document ***Testing/Replacement of Instrument Transformers*** *to be rated to withstand the 24.2kV phase-earth voltages (*with test certificates provided to prove compliance) - Instrument Transformers shall comply with the requirements of HV Customer Policy for REFCL Protected Networks (Load & Generator) – Document Number REF 30-10 ***Replacement of Insulators*** – to withstand 24.2kV phase to ground voltages.	
Upper Yarra Hydro	***Protection settings reviewed and updated based on elevated voltages from the REFCL system*** - Protection settings shall be reviewed and updated in accordance with MWC standards and REF 30-10 – HV Customer Policy for REFCL Protected Networks (Load & Generator) ***Replacement of surge arresters*** with suitable ratings based on the following documents: - ESV Guidance for HV Customers – DOC/18/21295 - REF 10-04 – Equipment Building Block Functional Descriptions ***Metering Compliance*** – Voltage Transformers shall comply with the Voltage Factor for GFN: - Service & Installation Rules Document ***Testing/Replacement of Instrument Transformers*** *to be rated to withstand the 24.2kV phase-earth voltages (*with test certificates provided to prove compliance) - Instrument Transformers shall comply with the requirements of HV Customer Policy for REFCL Protected Networks (Load & Generator) – Document Number REF 30-10 ***Replacement of Insulators*** – to withstand 24.2kV phase to ground voltages.	Due for completion end Sept 2020

Table 3: REFCL Readiness and Compliance

In addition to these programs, Melbourne Water's *Sugarloaf Bushfire Risk Management Plan* identifies planned burning as part of the protection strategy for the assets identified in the Victorian Fire Risk Register, including the power lines in the Winneke / Sugarloaf area. Planned burning reduces fuel loads and can decrease the risk of fires starting and the speed of fire spread. Fire operation plans are three-year work programs that are reviewed annually.

4.5. Procedures

Section 6 (i)

Plan for inspection that ensures that all of the specified operator's at-risk electric lines are inspected at regular intervals of no longer than 37 months

Melbourne Water assets and activities, including inspection and maintenance works, are managed in an automated internal asset management system (MAXIMO). Preventative

maintenance activities have been scheduled for all at-risk power lines to ensure instruction to carry out these works is automatically generated and inspections are carried out at appropriate intervals (i.e. at 36 months).

Preventive maintenance programs have been scheduled for MWC managed at-risk power lines as outlined in table 4. Vegetation Line clearance maintenance programs are detailed in table 2 of Electrical Line Clearance Management Plan and are not repeated here.

Note all the critical recommendations of the previous inspection report have been implemented and no rectification work has been scheduled prior to summer 2019/20.

This plan has been specifically designed for the at-risk electric lines in the Sugarloaf-Winneke area and Thompson Dam, Bells Portal area. In addition to the plan regulatory requirements for Sugarloaf and Bells Portal mitigation, table 4 also includes all other overhead lines owned by MWC. The intent of this inclusion is to provide internal clarity on overall risk management.

Table 4: Preventative maintenance programs scheduled in MAXIMO

Preventive Maintenance Number	Description (At risk lines are greyed out)	Performer	Frequency (months)
HAN21998	Overhead Power Cable Inspection - Sugarloaf Reservoir (set at 3 year intervals in MAXIMO staggered with HAN27039 &40)	WG*	12 (effective)
HAN27039	Overhead Power Line Inspection - Sugarloaf Reservoir - External Consultant	External Specialist Contractor	36
HAN27040	Overhead Power Cable Inspection - Sugarloaf Reservoir(set at 3 year intervals in MAXIMO staggered with HAN27040 & 21998))	WG*	12 (effective)
PM21902	Overhead Power Cable Inspection – Bells Portal (may be in omitted in years coinciding with PM21903)	WG	12
PM21903	Overhead Power Line Inspection – Bells Portal - External Consultant	External Specialist Contractor	36
PM11233	Overhead Power Cable Inspection Upper Yarra	WLID**	36
PM13208	Tarago Reservoir Dam Overhead Power Line Inspection	WLID**	36
PM13232	Silvan LV Overhead Powerlines Inspection	WLID**	36

PM13284	Cardinia Res Duffy's Overhead Powerline Inspection Cardinia Overhead Powerline Inspection	WG*	36
HAN21614	Werribee Treatment Plant Overhead Power Line Inspection	WG	36

** WLID – Waterways and Land Internal Division

*Wood – The company engaged by Melbourne Water to provide Internal Services.

Section 6 (j)

Details of the processes and procedures for ensuring that each person who is assigned to carry out the inspections referred to in paragraph (i) has satisfactorily completed a training course approved by Energy Safe Victoria and is competent to carry out such inspections

Melbourne Water engages suitably qualified contractor(s) to undertake maintenance inspections of our HV overhead power lines in the Sugarloaf/Winneke and Bells Portal areas. The qualifications of internal and external contractors are reviewed and verified before engagement to ensure they meet the minimum level established by the Victorian Electricity Supply Industry (VESI) and, therefore, meet the Australian Qualification Framework (AQF) requirements or equivalent. This ensures that people undertaking the inspections have the relevant qualifications and licences.

It is a Melbourne Water contractual requirement that all employees and contractors engaged to carry out :

a) cyclic inspection of overhead power line assets including poles must have minimum Certificate II in ESI - Asset Inspection – UET20619. Where this qualification has been attained in a State of Australia other than Victoria, induction shall be conducted by a person holding a Certificate IV in Training and Assessment at a minimum, and include information on Victorians Acts, Regulations, Codes of Practice, Safety Rules, Industry Guidelines and Asset Identification. Melbourne Water and its contractors maintain the records of relevant authorisation and review to ensure re-authorisation shall occur at intervals not exceeding a three year period.

b) Vegetation Clearance inspection - Certificate II in ESI Powerline Vegetation Control - UET20319 (supersedes UET20312) including modules

- AHCPCM201A - Recognise plants
- UETTDRVC24A - Assess vegetation and recommend control measures in an ESI environment.

See the ELCMP plan for more details on vegetation clearance inspection.

Section 6 (k)

Details of the processes and procedures for ensuring that persons (other than persons referred to in paragraph (j)) who carry out or will carry out functions under the plan are competent to do so

Melbourne Water engages suitably qualified contractor(s) to undertake maintenance activities associated with our HV overhead power lines in the Sugarloaf/Winneke and Bells Portal areas. The qualifications of internal and external contractors are reviewed and verified before engagement to ensure they meet the minimum level established by the Victorian Electricity Supply Industry (VESI) and, therefore, the Australian Qualification Framework (AQF) requirements or equivalent.

Table 5 indicates the persons and their minimum qualification requirements to perform the tasks relating to the power lines specified in BFMP.

Table 5: Qualifications required to undertake BFMP tasks (other than inspections)

Task	Performed by	Minimum qualifications required
Vegetation control clearance removal works	Vegetation line clearance external contractors	Certificate II in ESI Powerline Vegetation Control – UET20319 (supersedes UET20312)
Overhead power line visual inspection from ground level	Operators	A grade electricians and authorised electrical operators
Overhead power works	Linesman, fitter or jointers employed by the external consultant	Certificate III in ESI - Power Systems - Distribution Overhead 1 – UET30619 (supersedes UET30612) or Certificate III in ESI - Power Systems - Distribution Cable Jointing 1 – UET30819 (supersedes URT 30812)
	Registered Electrical Contractor	Holder of Registered Electrical Contractors Registration

Companies undertaking vegetation management work and/or rectification work have the responsibility to ensure that their employees are suitably trained, assessed as competent, and authorised for the work that they are undertaking. Melbourne Water maintains the records of relevant authorisation and permits are only issued to work on assets where proof of up to date training can be provided. Melbourne Water's permit system automatically checks the training records prior to issuing a permit to ensure re-authorisation shall occur at intervals not exceeding a three year period.

Section 6 (l)

Operation and maintenance plans for the specified operator's at-risk electric lines—

(i) in the event of a fire; and

(ii) during a total fire ban day; and

(iii) during a fire danger period

During a fire event

In the event of a fire in the Sugarloaf catchment, Winneke Treatment plant or surrounding area, Melbourne Water staff will immediately contact emergency services. If a fire is confirmed and has the potential to impact High Voltage lines, suitably trained technicians will conduct appropriate High Voltage switching works, to safely isolate the supply, prior to combating the fire.

Bells Portal is remote from main sealed roads. Only the last 64m of the supply line is owned and operated by MWC. As such any required isolations would be undertaken by the power utility Ausnet to the main supplying line.

Melbourne Water is not a statutory firefighting authority; however, we employ more than 100 trained firefighters during the fire danger period to fight fires in conjunction with the Department of Environment, Land, Water and Planning (DELWP), Parks Victoria, and the Country Fire Authority (CFA). Rostered Melbourne Water firefighters may also attend a fire in the Sugarloaf/Winneke area if required.

Melbourne Water's response to a fire event would be carried out in accordance with our CORP GOV POL Emergency Management Policy.

Total Fire Ban days

The risk of certain work activities starting a fire or staff being caught in a dangerous environment as a result of a fire is extremely high on a Total Fire Ban (TFB) day. To help manage this risk, Melbourne Water has guidelines, procedures and instructions[1] that must be adhered to on TFB days, including declared Severe, Extreme or Code Red conditions under the National Fire Danger Rating system.

On fire danger days declared as Severe, Extreme or Code Red under the National Fire Danger Rating system Melbourne Water will defer High Voltage Switching Operations where practical, or restrict operations to essential activities to maintain critical services. In the event a plant has experienced a High Voltage feeder fault, a visual inspection of the relevant feeders is conducted to ensure the fault has not initiated a fire.

The risk of MW's HV lines starting a fire Sugarloaf and Winneke has been reduced through their design. The lines are insulated (ABC) and each of the HV lines are protected by Vacuum circuit breakers, which are set to one shot lock out. The following elements of the protection relay are enabled:

- Phase overcurrent protection
- Earth fault protection

The protection settings are outlined in Table 6.

Table 6: Protection Settings

	I	**Delay type**	**tI_e**
Phase Over Current	$>1.5I_n$	DMT	0.6sec
Earth/Ground Fault	$> 0.075I_{en}$	DMT	0.9sec

In addition, back up protection is provided by the transformer sensitive earth fault set at 1.2 sec.

Bels Portal MWC owned line section are bare conductors protected by an SF6 Circuit breaker.

Melbourne Water apply annually for Hot Work permits from the CFA under S40 CFA Act (1958) to ensure that emergency works can be undertaken on a TFB day. Emergency works are only to be carried to maintain Melbourne Water's assets critical to the health and safety of the general public. Emergency works can only be undertaken where appropriate control measures are in place.

Fire danger period

Melbourne Water's inspection and maintenance programs for asset condition and vegetation clearance are completed prior to the beginning of a fire danger period, to ensure electrical assets are clear and operating during this period. Therefore maintenance operations around

[1] These include the Winneke Team Bushfire Survival Plan 2016, Winneke Water Treatment Plant Emergency Response Plan and Manifest 2016, Sugarloaf Bushfire Risk Management Plan 2016, Guidelines for working during the fire season 2016, Planning for a severe, extreme or code red fire day 2016, Guidelines for working on fire danger days 2016, Working safely in fire prone areas (LACES) 2016, and Safe work arrangements in fire prone areas 2016.

electrical assets during the fire danger period would be restricted to fault investigation or emergency works, lowering the risk of potential fire ignitions during this high risk period.

The design features of the HV lines (discussed above) also help to mitigate bushfire risk during the fire danger period.

4.6. Performance monitoring and auditing

Section 6 (m)

Investigations, analysis and methodology to be adopted by the specified operator for the mitigation of the risk of fire ignition from its at-risk electric lines

Melbourne Water applies a condition based maintenance approach to ensure mitigation of fire ignition risk from our at-risk electric lines (see Appendix 6). Periodic inspections and works are undertaken to ensure the possibility of causing an ignition source from HV overhead lines is minimised by:

- Completing annual inspections and completing actions identified during inspections to maintain appropriate vegetation clearance.
- Completing inspections every 3 years and repairing any identified defects during inspections to ensure electrical assets are in good working order and are operating in such a way as to mitigate the risk of fire ignition.

Any safety issues or incidents relating to the electrical assets are investigated using MW's incident management system, Integrated Risk Management System (IRIS). The incidents recoded in IRIS are reviewed by a team of senior managers and assigned to the most appropriate person to action within a given time frame. The status of actions not completed within the specified time period is escalated to the next level up in the organisational hierarchy through internal reporting processes. The peak point of escalation is the Managing Director.

The assignee of the IRIS action will typically be directed to investigate and determine the root cause of the incident. Tasks undertaken to achieve this objective include:

- Site visits and information collection including photos and samples of materials.
- Conduct brain storming session with relevant people of various expertise if required
- Engage technically qualified persons (most instances a consultancy firm) to perform detailed analysis and recommend corrective actions to prevent recurrence of similar incident

The risks associated with electrical assets (including bushfire risk) are considered during condition rating reviews. This process involves determining the consequence and likelihood of potential asset failure scenarios (using the Risk Management Procedure) and evaluating the effectiveness of mitigation strategies currently in place. Risk ratings are used to determine and prioritise improved mitigation actions to reduce all risks to 'as low as practical'.

Melbourne Water annually reviews the effectiveness of the bushfire mitigation plan. Furthermore, Melbourne Water submits the Bushfire Mitigation Plan and Electric line Clearance Management Plan to ESV for acceptance annually. Recommendations and observations by ESV are actioned in accordance with the assigned priority. Progress of each action is monitored by the Melbourne Water Operations Team.

Each year Melbourne Water engages contractors specialised in inspection and vegetation management to inspect and clear vegetation in October. These inspections also identify any obvious defects in assets as well as any abnormal vegetation growth. These defects are recorded in MAXIMO and corrective work orders are generated. The inspection covers 100% of the Melbourne Water HBRA.

Section 6 (n)

Details of the processes and procedures by which the specified operator will—

(i) monitor the implementation of the bushfire mitigation plan; and

(ii) audit the implementation of the plan; and

(iii) identify any deficiencies in the plan or the plan's implementation; and

(iv) change the plan and the plan's implementation to rectify any deficiencies identified under subparagraph (iii); and

(v) monitor the effectiveness of inspections carried out under the plan; and

(vi) audit the effectiveness of inspections carried out under the plan

Monitoring and Auditing

Melbourne Water uses its asset management system, MAXIMO, to assist with the monitoring and auditing of its asset management program.

Melbourne Water uses Risk Based Maintenance (RBM) and Reliability Centred Maintenance (RCM) methodologies to determine the optimum asset maintenance policies. A range of asset parameters including asset type, criticality, failure modes, operating environment, asset age, breakdown history, inspection reports and regulatory requirements are used in this process. All inspections required under this plan have been included in this system as Programed Maintenance activities (see **Table 4**) which will automatically trigger work orders to complete inspections 3 months before the end of each inspection cycle, to ensure inspections and works are undertaken in a timely manner. The outcomes of inspection reports are utilised to assign works (see Appendix 6). The automatically generated workflow system ensures scheduled work orders are carried out on time. MAXIMO system is configured to generate reports on any work that is delayed and escalate on the management hierarchy. Power line asset information including inspection reports, testing results, fault reports and completed works are retained in electronic form within MAXIMO.

In accordance with Melbourne Water IT Security Policy, access to electronic information is strictly controlled via passwords and user names. Each user is provided with the levels of access to specified parts of the system appropriate to that user.

MW vegetation clearing and pruning program is managed by Electrical Line Clearance Management Plan (ELCMP).

Plan implementation and effectiveness

Melbourne Water's Asset Management Services team ensure optimal management and performance of our assets. The implementation of this plan by Melbourne Water's Delivery team will be audited and reviewed annually as part of the review of both the Bushfire Mitigation and Electric Line Clearance Management Plans. Any hazards, audit actions and all events such as fires are entered into Melbourne Water's incident management system, IRIS, as per CORP H&S 056 - Event Notification, Investigation and Analysis. The Asset Management Services team will audit MAXIMO and IRIS data to ensure the works are being effectivity

implemented by the Delivery team and identify any deficiencies and/or improvements as required.

Plan improvements

As part of the annual review of the Bushfire Mitigation and Electric Line Clearance plans by MW's Asset Management Services team, any deficiencies are addressed and improvements are incorporated. These documents are stored in MW's Integrated Management System (IMS) Controlled Document Library, and a system generated automatic process ensures that the document is reviewed and approved in a timely manner. This system also captures all changes and previous versions of these documents to allow an audit of changes if required.

Drafting documents used in the preparation of the next years plan are located within the below folder. These documents have DRAFT in the title and are watermarked DRAFT, link below:

Electric Line Bushfire Mitigation Plan Drafting Folder

Following internal approval of the plan, this document will be placed in MWC's Integrated Management System (IMS) Controlled Document Library, where the most current version can be made readily available to all MWC staff. The 'add version' process is used to maintain the document ID number. This also maintains the preventative maintenance links in MAXIMO.

Link below: Power Line Bushfire Mitigation Plan

Melbourne Water may also review this plan as necessary to account for changes in context or risk. This may be triggered by circumstances including but not limited to:

- Changes such as organisational responsibilities or legislation
- Directions from ESV or fire management authorities
- Improvements in risk analysis and assessment techniques
- Changes to the bushfire risk in the area
- Response to an event or incident (e.g. HV feeder fault, bushfire)
- Changes to on site HV infrastructure.

Once updated, the Bushfire Mitigation Plan is submitted to Energy Safe Victoria (ESV) for review before 1st July. Any recommendations for improvement or concerns must be addressed before ESV approves the plan.

Monitor and Audit effectiveness of inspections

Melbourne Water ensures inspections and works carried out by qualified third parties are effective through attendance at the time of works by a MW electrical technician or Project Officer or verification during subsequent inspections. For example, a Melbourne Water project officer supervises vegetation clearance works and Melbourne Water staff undertakes annual inspections along the lines to ensure clearance and operational effectiveness is maintained.

The effectiveness of annual and 3 yearly inspections and works will be monitored by a review of the inspection reports by the Asset Management Group, as part of the annual review of MW's Bushfire Mitigation Plan.

Section 6 (o)

Policy of the specified operator in relation to the assistance to be provided to fire control authorities in the investigation of fires near the specified operator's at-risk electric lines

Melbourne Water has a long history of cooperation with the Country Fire Authority (CFA), Melbourne Fire Brigade (MFB), DELWP and Parks Victoria. Bushfire planning, mitigation and fighting on our land and in the water supply catchments is undertaken in conjunction with these agencies. Melbourne Water will assist Fire Control Authorities in their investigation of fires near our at-risk electric lines by:

- Assisting with safe access to assets
- Making assets safe before commencement of investigations including, where appropriate, isolating power
- Sharing appropriate information regarding an incident and related inspection or maintenance reports
- Inviting external authorities to attend incident investigations as required.

5. Definitions

(Optional – Remove if not required)

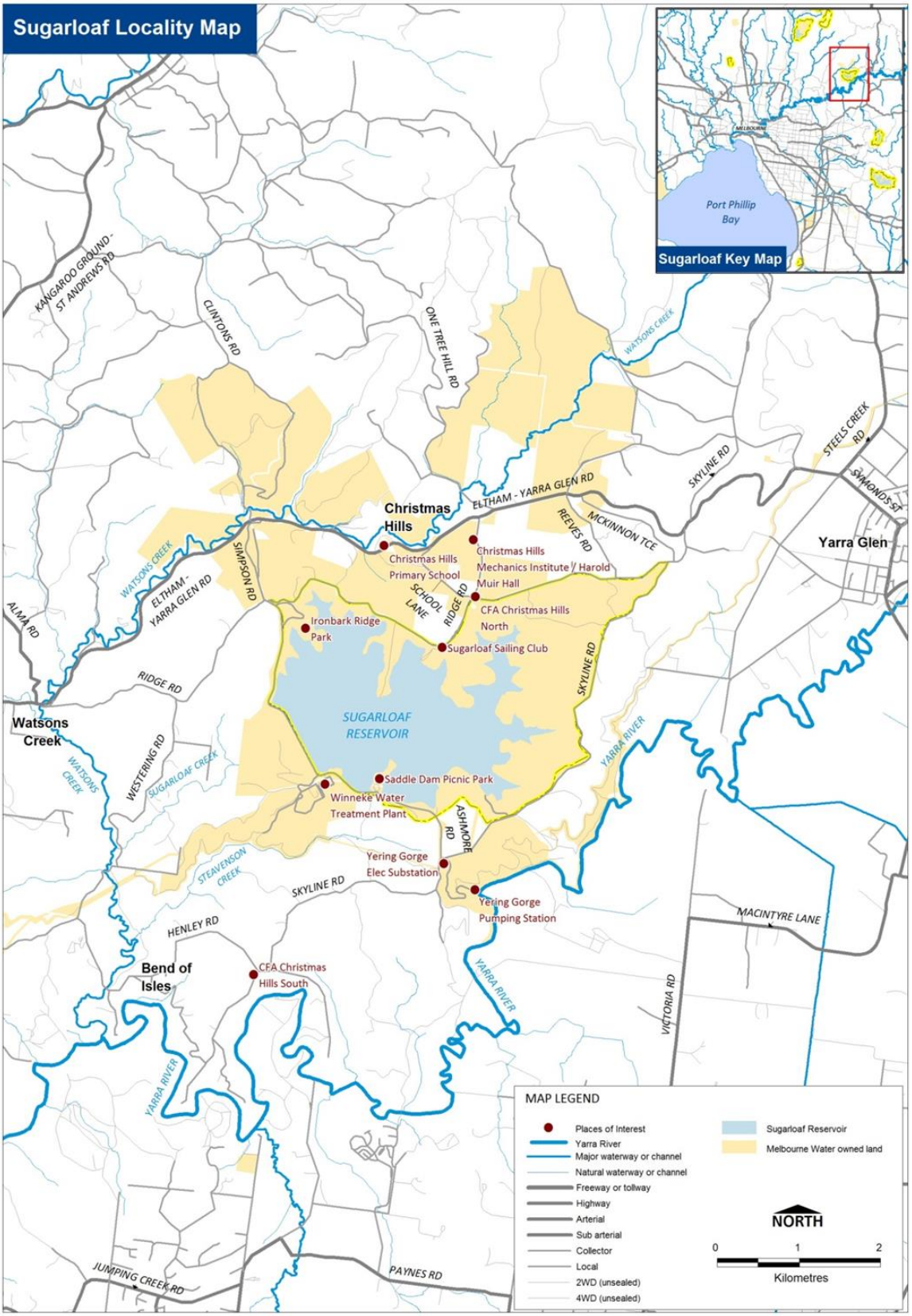
Reference	Definition
At-risk power lines	High voltage electrical lines located above the surface of land in HBRA.
Electrical asset	Any wire, fitting, cable, conduit or apparatus (including lines, poles, transformers, switching stations and other associated equipment) used in the distribution or control of electricity.
Electric line or **power line**	Whole or any part of a wire, cable or other component used for the purpose of transmitting, distributing or supplying electricity.
Energy Safe Victoria (ESV)	ESV is a technical and safety regulator responsible for the safe generation, supply and use of electricity, gas and pipelines.
Hazardous Bushfire Risk Areas (HBRA)	These areas have been assigned by the Country Fire Authority as high fire hazard rating.
High Voltage electric line (HV)	Electric line conducting at a voltage exceeding 1000 volts alternating current or 1500 volts direct current.
Low Bushfire Risk Areas (LBRA)	These are considered to be predominantly in urban areas and have been assigned by the Country Fire Authority as low fire risk.
Melbourne Water	A Victorian Government owned corporation that manages Melbourne's water supply catchments, treats and supplies drinking and recycled water, removes and treats most of Melbourne's sewage, and manages waterways and major drainage systems in the Port Phillip and Westernport regions.
Specified Operator	The operator of an at-risk electric line but does not include a major electricity company.

6. Document History

Date	Reviewed/ Actioned By	Version	Action
19/10/2016	Rene Van der Sant	1	Drafted
26/10/2016	Rene Van der Sant	8	Consultation V1
12/01/2017	Gamini Ekanayake	16	Consultation V2
25/01/2017	Alicia Pickering	24	Reviewed presentation
27/01/2017	Gamini Ekanayake	25	Added renewal work undertaken in 2016
05/07/2017	Gamini Ekanayake	37	Draft submitted for review
31/07/2017	Gamini Ekanayake	38	Addressed ESV comments on the draft
11/09/2017	Gamini Ekanayake	52	Reformatted to IMS plan template
14/09/2018	Vincent Wong	53	Draft 2018 Report Submitted for Review
28/11/2018	Gamini Ekanayake	54	Submission of authorised BFMP to ESV
4/03/2019	Vincent Wong	55	Submission of authorised BFMP to ESV
26/06/2020	Andy Fitzgerald	56	Submission of authorised BFMP to ESV

7. Appendices

Appendix 1: Locality map of the Sugarloaf/Winneke area.



Appendix 2: At Risk Power line location maps

Power line location maps are stored in Inflo at the following locations. The images have been reproduced below so can be observed directly from this plan

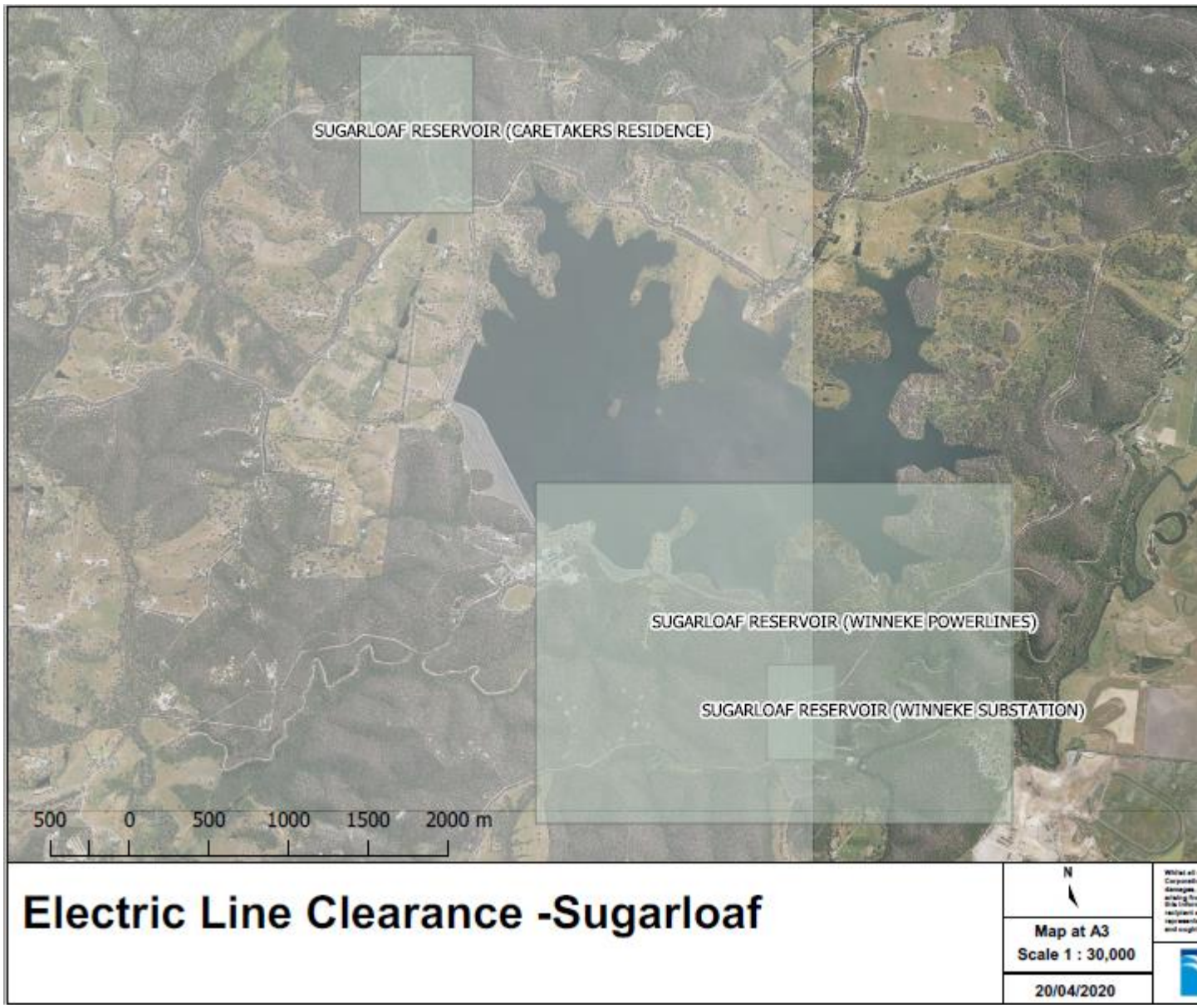
Inflo Links:

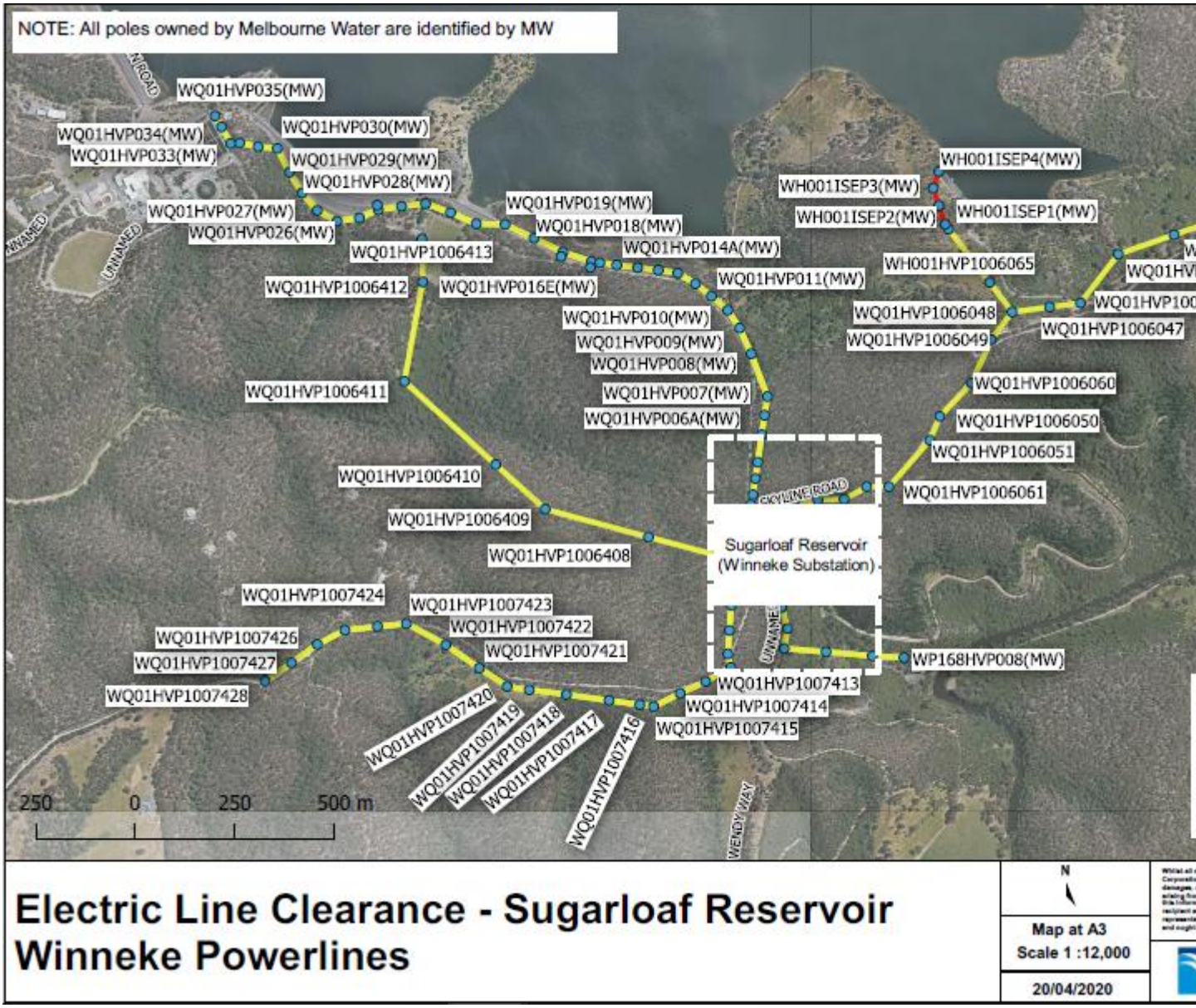
Sugarloaf Reservoir Overview OH line

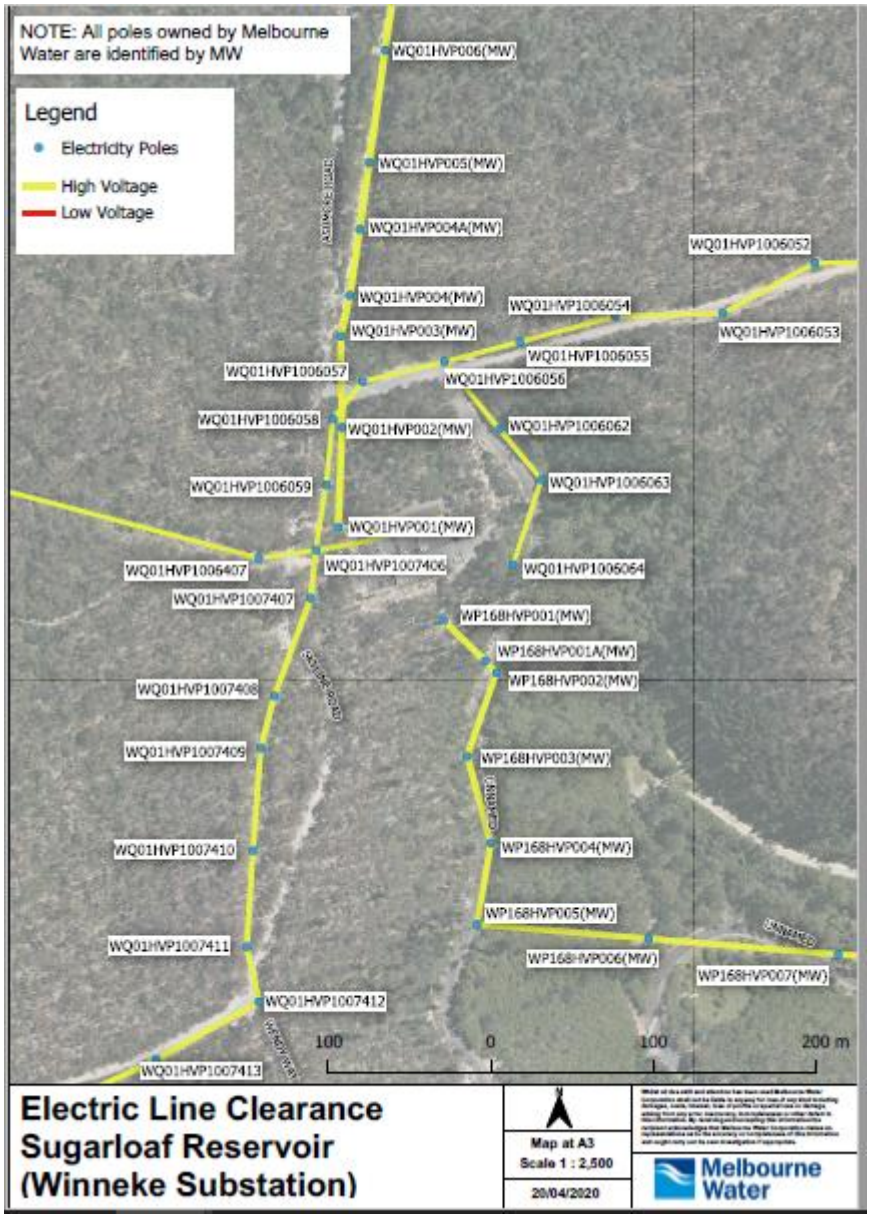
Sugarloaf Reservoir(Winneke Powerlines) OH line

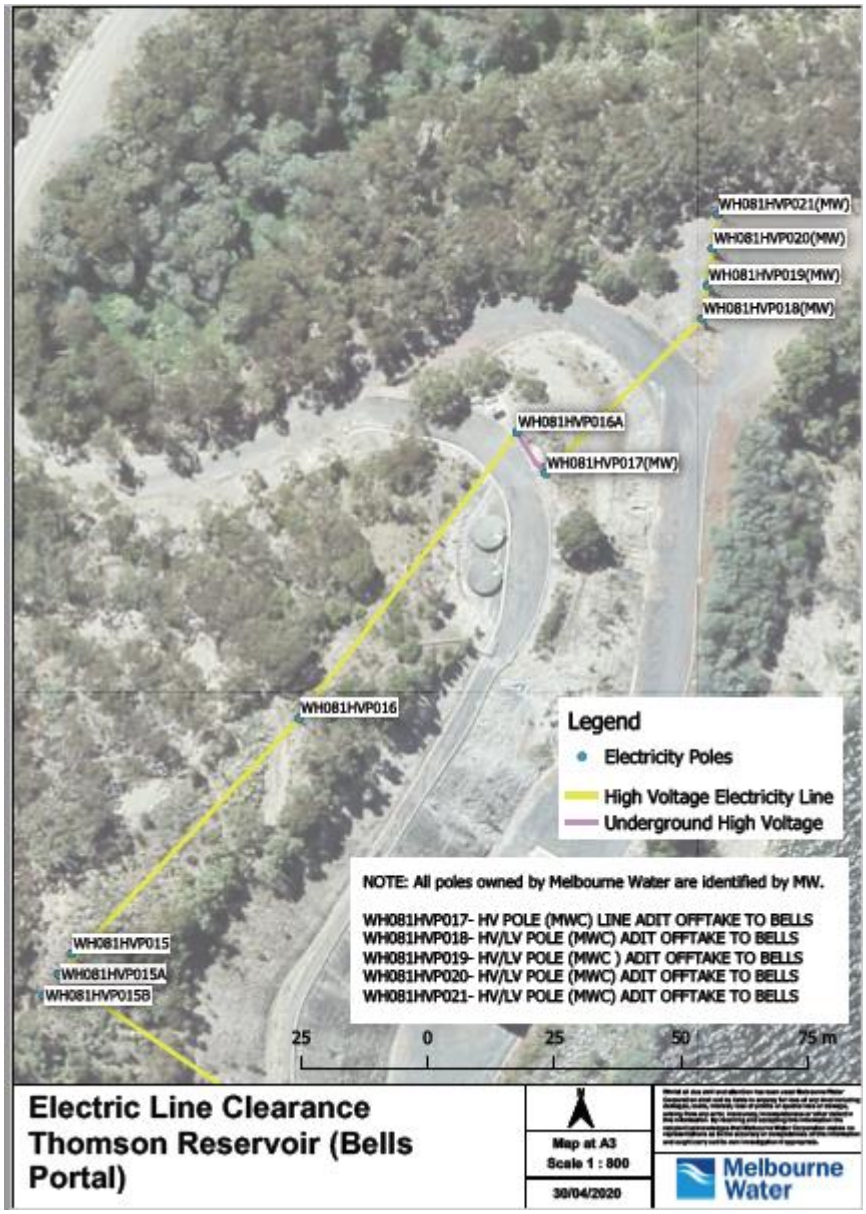
Sugarloaf Reservoir(Winneke Substation) OH line

Bells Portal overhead Lines




NOTE: All poles owned by Melbourne Water are identified by MW
WQ01HVP035(MW)
WQ01HVP034(MW)
WQ01HVP033(MW)
WQ01HVP030(MW)
WQ01HVP029(MW)
WQ01HVP028(MW)
WQ01HVP027(MW)
WQ01HVP026(MW)
WQ01HVP1006413
WQ01HVP1006412
WQ01HVP019(MW)
WQ01HVP018(MW)
WQ01HVP014A(MW)
WQ01HVP016E(MW)
WQ01HVP011(MW)
WQ01HVP010(MW)
WQ01HVP009(MW)
WQ01HVP008(MW)
WQ01HVP007(MW)
WQ01HVP006A(MW)
WQ01HVP1006411
WQ01HVP1006410
WQ01HVP1006409
WQ01HVP1006408
WH001ISEP4(MW)
WH001ISEP3(MW)
WH001ISEP2(MW)
WH001ISEP1(MW)
WH001HVP1006065
WQ01HVP1006048
WQ01HVP1006049
WQ01HVP1006047
WQ01HVP1006060
WQ01HVP1006050
WQ01HVP1006051
WQ01HVP1006061
SKYLINE ROAD
Sugarloaf Reservoir
(Winneke Substation)
WP168HVP008(MW)
WQ01HVP1007424
WQ01HVP1007423
WQ01HVP1007422
WQ01HVP1007421
WQ01HVP1007426
WQ01HVP1007427
WQ01HVP1007428
WQ01HVP1007413
WQ01HVP1007414
WQ01HVP1007415
WQ01HVP1007420
WQ01HVP1007419
WQ01HVP1007418
WQ01HVP1007417
WQ01HVP1007416
250 0 250 500 m
Electric Line Clearance - Sugarloaf Reservoir
Winneke Powerlines
N
Map at A3
Scale 1 :12,000
20/04/2020


NOTE: All poles owned by Melbourne Water are identified by MW
Legend
Electricity Poles
High Voltage
Low Voltage
WQ01HVP006(MW)
WQ01HVP005(MW)
WQ01HVP004A(MW)
WQ01HVP004(MW)
WQ01HVP003(MW)
WQ01HVP002(MW)
WQ01HVP001(MW)
WQ01HVP1006057
WQ01HVP1006054
WQ01HVP1006053
WQ01HVP1006055
WQ01HVP1006056
WQ01HVP1006058
WQ01HVP1006062
WQ01HVP1006059
WQ01HVP1006063
WQ01HVP1006407
WQ01HVP1007406
WQ01HVP1006064
WQ01HVP1007407
WQ01HVP1007408
WQ01HVP1007409
WQ01HVP1007410
WQ01HVP1007411
WQ01HVP1007412
WQ01HVP1007413
WP168HVP001(MW)
WP168HVP001A(MW)
WP168HVP002(MW)
WP168HVP003(MW)
WP168HVP004(MW)
WP168HVP005(MW)
WP168HVP006(MW)
WP168HVP007(MW)
100
0
100
200 m
Electric Line Clearance
Sugarloaf Reservoir
(Winneke Substation)
Map at A3
Scale 1 : 2,500
20/04/2020
Melbourne Water


WH081HVP021(MW)
WH081HVP020(MW)
WH081HVP019(MW)
WH081HVP018(MW)
WH081HVP016A
WH081HVP017(MW)
WH081HVP016
WH081HVP015
WH081HVP015A
WH081HVP015B
Legend
Electricity Poles
High Voltage Electricity Line
Underground High Voltage
NOTE: All poles owned by Melbourne Water are identified by MW.
WH081HVP017- HV POLE (MWC) LINE ADIT OFFTAKE TO BELLS
WH081HVP018- HV/LV POLE (MWC) ADIT OFFTAKE TO BELLS
WH081HVP019- HV/LV POLE (MWC) ADIT OFFTAKE TO BELLS
WH081HVP020- HV/LV POLE (MWC) ADIT OFFTAKE TO BELLS
WH081HVP021- HV/LV POLE (MWC) ADIT OFFTAKE TO BELLS
25 0 25 50 75 m
Electric Line Clearance
Thomson Reservoir (Bells Portal)
Map at A3
Scale 1 : 800
30/04/2020
Melbourne Water

Winneke Treatment Plant Line

Pole Number	Pole Type	
1	Concrete	
2	Concrete	
3	Concrete	
4	Concrete	
4A	Concrete	
5	Concrete	
6	Concrete	
6A	Concrete	
7	Concrete	
8	Concrete	
9	Concrete	
10	Concrete	
11	Concrete	
11A	Concrete	
12	Concrete	
13	Concrete	
14	Concrete	
14A	Concrete	
15	Concrete	
16	Concrete	
17	Concrete	
18	Concrete	
19	Concrete	
20	Concrete	
21	Concrete	
22	Concrete	
23	Concrete	
24	Concrete	
25	Concrete	
26	Concrete	
27	Concrete	
28	Concrete	
29	Concrete	
30	Concrete	
31	Concrete	
32	Concrete	
33	Concrete	
34	Concrete	
34	Concrete	

Yering Gorge (Pumping Station) Line

Pole Number	Pole Type	
YPGPSF1	Concrete	
YPGPSF2	Concrete	
2	Concrete	
3	Concrete	
4	Concrete	
5	Concrete	
6	Concrete	
7	Concrete	
8	Concrete	

Bells Portal Line

Pole Number	Pole Type	
WH081HVP017	Concrete	
WH081HVP018	Concrete	
WH081HVP019	Concrete	
WH081HVP020	Concrete	
WH081HVP021	Concrete	

Appendix 3: High Voltage Isolation Control Points

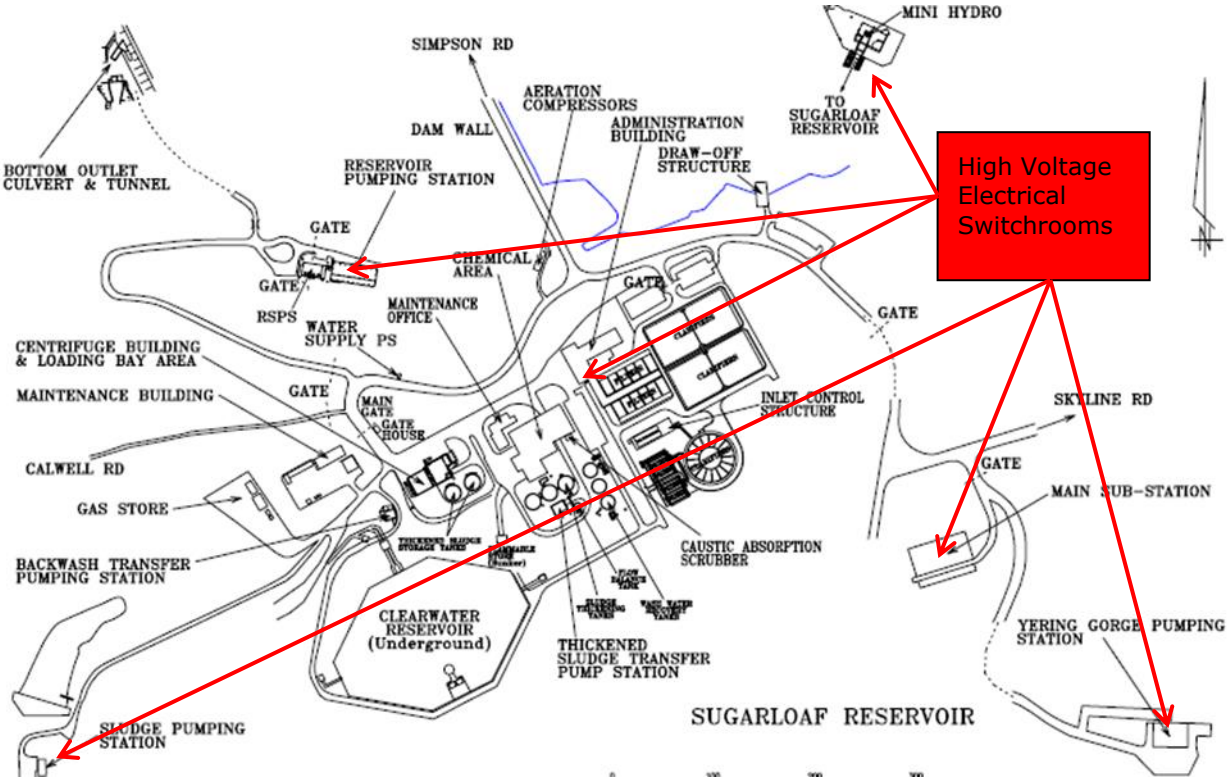


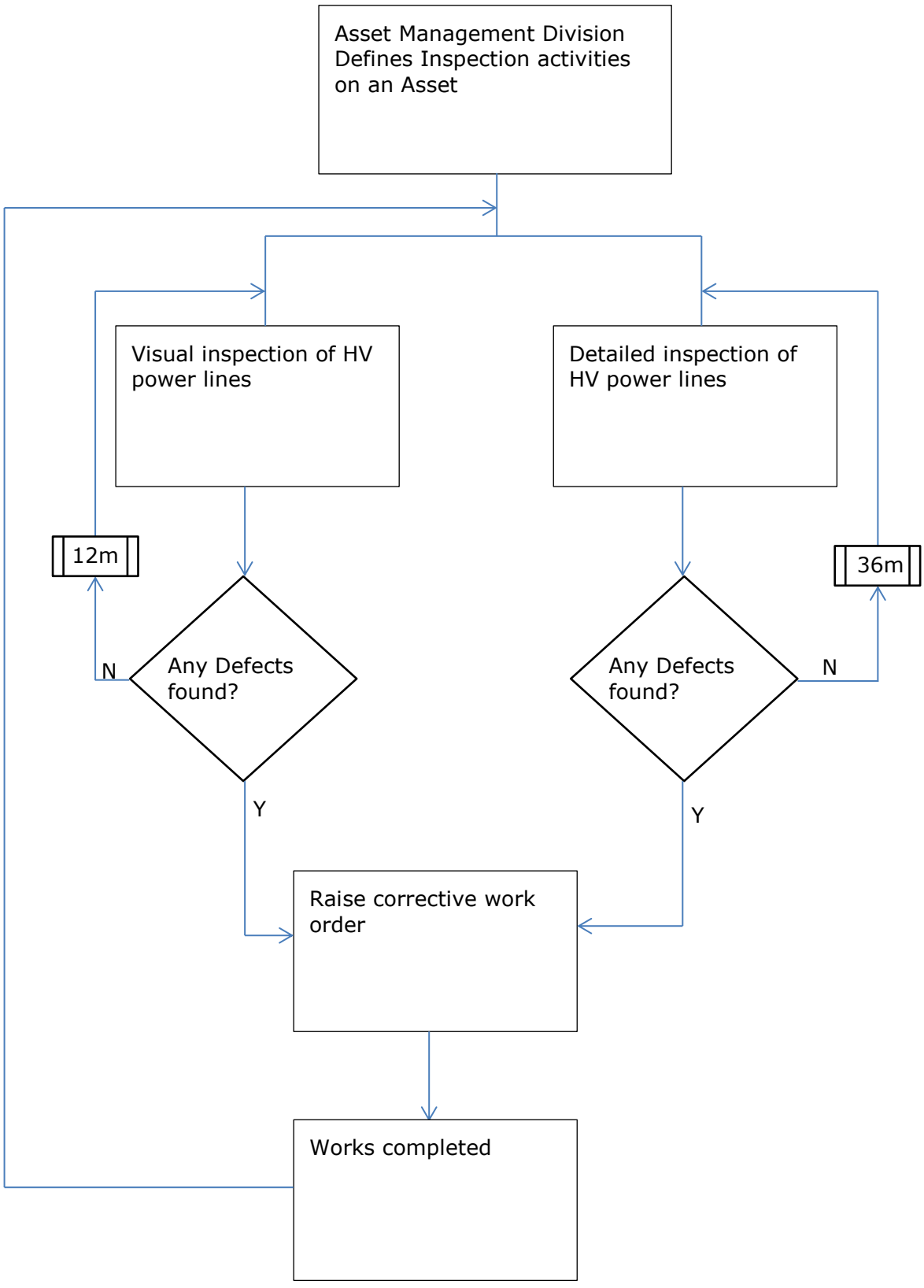
Diagram showing location of High Voltage Isolation Control Points around Winneke Treatment plant and Yering Gorge.

Appendix 4: Results of Last Inspection

For details on the 2020 external inspect report see link to report below:

Sugar Loaf Reservoir Power line Report 2020.pdf
http://inflo/inflo/cs.exe/link/54775822

Appendix 5: Condition based monitoring management approach



Appendix 6: Vegetation Inspection Report

The following is a link to the Vegetation Inspection Report October 2019:

2019 powerlines VegetationClearance Report.pdf
http://inflo/inflo/cs.exe/link/54771417