Investment Evaluation Summary (IES)

Project Details:

Project Name:	Inspection OH & Structures
Project ID:	00689
Thread:	Structures
CAPEX/OPEX:	OPEX
Service Classification:	Standard Control
Scope Type:	B
Work Category Code:	AIOHS
Work Category Description:	OH Structures inspection & monitoring
Preferred Option Description:	Inspection of OH & Structures
Preferred Option Estimate (Nominal Dollars):	$32,260,000

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Unit ($)	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54
Volume	59,000	59,000	59,000	59,000	59,000	59,000	59,000	59,000	59,000	59,000
Estimate ($)	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000
Total ($)	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000	$3,186,000

Governance:

Project Initiator:	Erin Cook	**Date:**	26/03/2015
Thread Approved:	David Ellis	**Date:**	02/11/2015
Project Approver:	David Eccles	**Date:**	30/10/2015

Document Details:

Version Number:	1

Related Documents:

Description	URL
AIOHS IES	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/Overhead%20Systems%20and%20Structures/AIOHS%20OH%20Structures%20Inspection%20and%20Monitoring/TasNetworks%20IES%20AIOHS.docx

Section 1 (Gated Investment Step 1)

1. Background

This is a continuation of the existing program to inspect TasNetworks' poles and overhead assets on an ongoing cycle. TasNetworks manages a distribution network of around 220,000 poles and 21,000km of overhead conductor. Substandard or defective installations and structures identified through this inspection are rectified in the following programs AROCO, REPOL, RESTK.

OH Structures Inspection and Monitoring (AIOHS)

Aurora's OH structures inspection and monitoring program consist of three components:

1. Inspection OH and Structures;
2. Inspection Tower Structures; and
3. Inspection of Natural Timber Poles under the Possum Guard

The business objectives driving this program are

1. Managing Business Operating Risk (through identifying defects before they impact on safety or fire risks – primary driver); and
2. Maintaining Network Performance (through identifying defects before they impact on reliability – secondary driver).

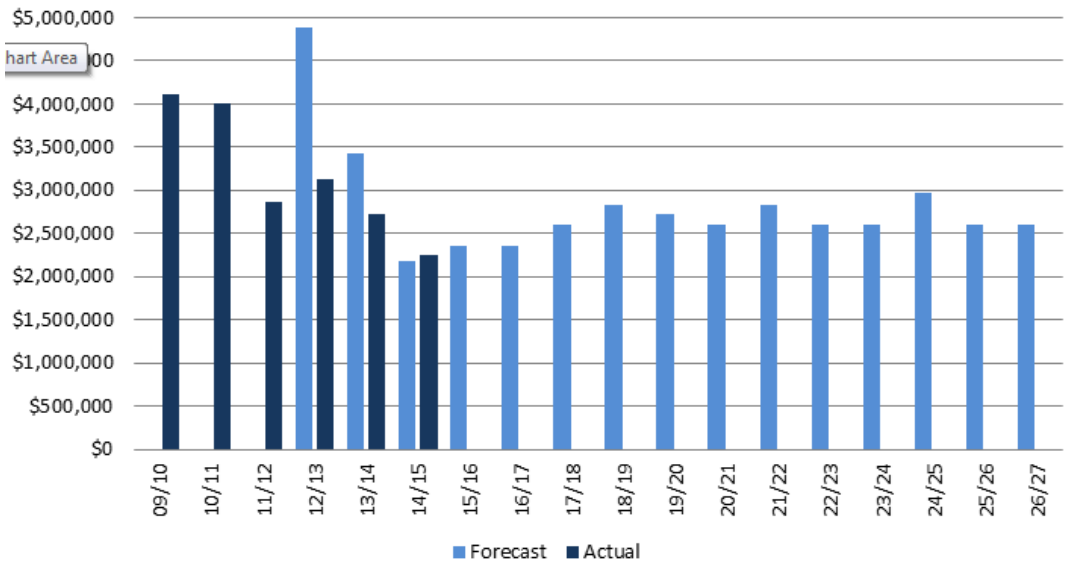

Figure 1. AIOHS Inspection OH & Structures historic and forecast expenditure

1.1 Investment Need

Inspection OH and Structures

This program mitigates the risks associated with timber poles failing in service.

The results of the tests undertaken during this inspection determine whether a pole is:

1. Serviceable – considered to be in an adequate condition to safely remain in service until the next pole inspection;
2. Impaired – not considered to be in an adequate condition to safely remain in service until the next pole inspection, but suitable to be considered for staking (it may then be condemned if it does not meet the detailed staking criteria); or
3. Condemned – not considered to be in an adequate condition to safely remain in service until the next pole inspection and not suitable for staking.

To slow the rate of deterioration of wood poles, the application of boron pole saver rods and bandages to treat wooden poles for heart and soft rot are undertaken as part of the pole inspection program.

As overhead lines and equipment are inspected as part of the pole inspection, the inspection cycle is a compromise between asset defect detection and pole condemning.

Figure 2 shows the age distribution of defective poles identified over the last decade shows a pole age of late 30s to early 40s as the average condemning/failure age for wooden poles.

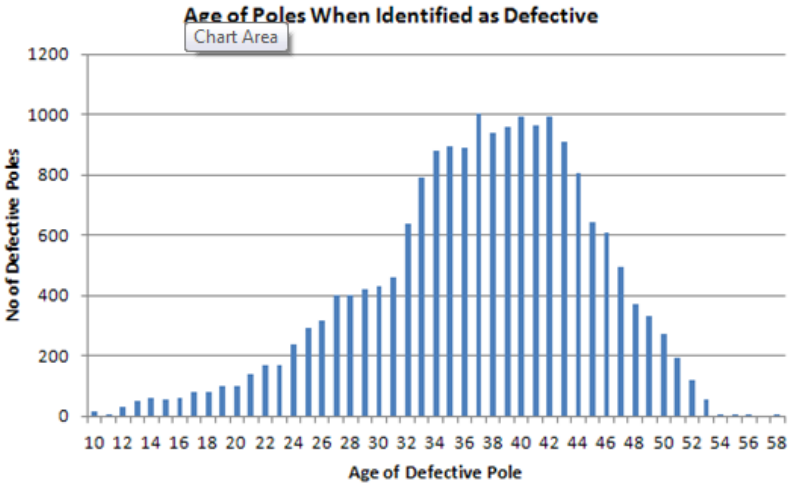

Figure 2. Age of Condemned/Staked Poles(from 2000 to 2013)

In addition there are approximately 6,000 natural wooden poles in the system, which have unpredictable characteristics and have been known to fail at early ages (under 10 years). These poles are all between 20 and 30 years old (at 2015).

Table 1 shows the defect identification and condemning rates are increasing. This trend is expected to continue due to the larger ageing pole population.

Historically, TasNetworks' timber pole failure rate, while sitting slightly above the national average, has remained reasonably consistent at around 12 poles per year. However in 2012/2013 there were no unassisted pole failures, although this was coupled with a significant increase in pole condemning/impairment rates. This has been mostly attributed to the lengthening of the pole inspection cycle from 3.5 years to 5 years having an influence on how pole inspectors interpret results (i.e borderline poles are more likely to be condemned now than previously). An increase in the spread of soft rot, even possibly via contaminated tools, could also be a factor.

Table 1 details the number of poles inspected by TasNetworks' pole inspection program over the last seven years. It also details the number of poles staked and replaced each year.

Table 1: Pole replacement and staking rates

Description	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Number of Poles Inspected	99606	119034	69686	75426	62095	54183	52699
Number of Poles Staked	1333	1660	1728	1664	1606	2272	1660
Number of Poles Replaced	773	1027	861	809	1080	1236	1171

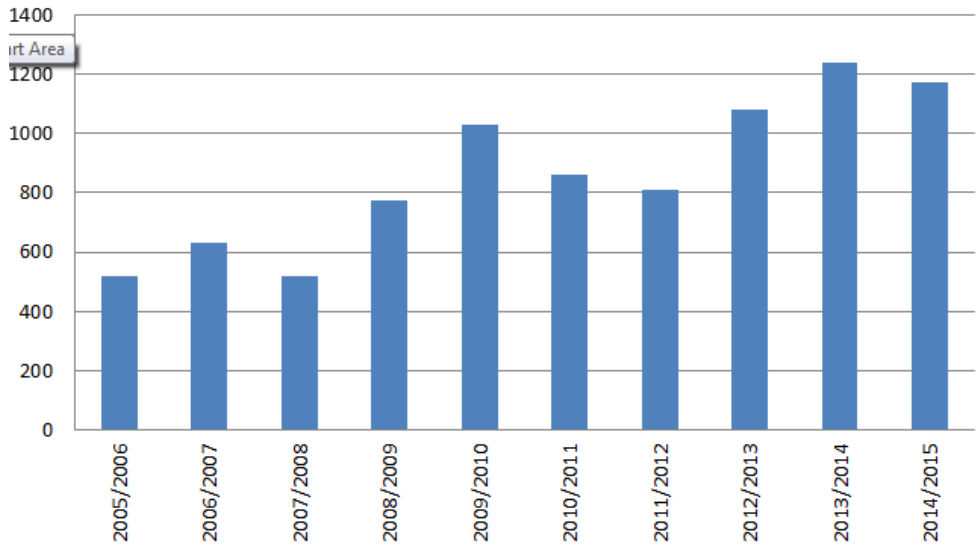

Figure 3 Pole replacement historic volumes

The future pole replacement program is based on:

1. Current trend of condemning poles;
2. Age profile of current poles with significant increases in poles greater than 40 years old during the determination period; and
3. Expected failure of natural wood poles, which are unpredictable and reaching their expected lifetime.

Introduction of Gopro inspections

Following a batch of air-break switch failures in 2014 an inspection of air-break switches was undertaken using Gopro's. Going forward pole inspectors are to be equipped and trained in using Gopro's to perform a pole top asset inspection while testing the condition of the pole. The unit rate of inspection has increased slightly to allow for this. Pole inspectors are already required to report on pole top defects, but the use of Gopro's will allow for a more detailed inspection to take place.

1.2 Customer Needs or Impact

TasNetworks continues to undertake consumer engagement as part of business as usual and through the voice of the customer program. This engagement seeks in depth feedback on specific issues relating to:

- how it prices impact on its services
- current and future consumer energy use
- outage experiences (frequency and duration) and expectations
- communication expectations
- STPIS expectations (reliability standards and incentive payments)
- Increasing understanding of the electricity industry and TasNetworks

Consumers have identified safety, restoration of faults/emergencies and supply reliability as the highest performing services offered by TasNetworks.

Consumers also identified that into the future they believe that affordability, green, communicative, innovative, efficient and reliable services must be provided by TasNetworks.

This project specifically addresses the requirements of consumers in the areas of safety and affordability.

1.3 Regulatory Considerations

This project is required to achieve the following capital and operational expenditure objectives as described by the National Electricity Rules section 6.5.7(a) and 6.5.6(a). 6.5.7 (a) Forecast capital expenditure (2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services; (4) Maintain the safety of the distribution system through the supply of standard control services.

2. Project Objectives

To inspect poles, overhead lines & equipment in the distribution system in accordance with TasNetworks' Standards & Policies to ensure that they are fit to remain in service until the next inspection cycle. This includes remedial treatment for decay in wood poles as required by the appropriate standard.

3. Strategic Alignment

3.1 Business Objectives

Strategic and operational performance objectives relevant to this project are derived from TasNetworks 2014 Corporate Plan, approved by the board in 2014. This project is relevant to the following areas of the corporate plan:

- We understand our customers by making them central to all we do.
- We enable our people to deliver value.
- We care for our assets, delivering safe and reliable networks services while transforming our business.

3.2 Business Initiatives

The business initiatives that relate to this project are as follows:

- Safety of our people and the community, while reliably providing network services, is fundamental to the TasNetworks business and remains our immediate priority
- We care for our assets to ensure they deliver safe and reliable network services

The strategic key performance indicators that will be impacted through undertaking this project are as follows:

- Price for customers – lowest sustainable prices
- Zero harm – significant and reportable incidents
- Sustainable cost reduction – efficient operating and capital expenditure

4. Current Risk Evaluation

The following section details the business risks specific to this project, as identified in TasNetworks Risk Management Framework as at March 2015.

TasNetworks business risks are analysed utilising the 5x5 corporate risk matrix, as outlined in TasNetworks Risk Management Framework.

Relevant strategic business risk factors that apply are follows:

Risk Category	Risk	Likelihood	Consequence	Risk Rating
Financial	Excessive payout of reliability incentive schemes (STPIS, GSL, NCEF) from declining network reliability	Unlikely	Moderate	Medium
	Pole or overhead asset failure results in catastrophic bushfire, insurance providers refuse to cover TasNetworks for future events	Unlikely	Severe	High
	Pole or overhead asset failure results in serious injury or fatality	Possible	Major	High
Customer	Localised interruption to supply	Almost certain	Minor	Medium

Regulatory Compliance	Increased number of unplanned outages leads to systemic NCEF breaches	Possible	Moderate	Medium
Network Performance	Localised interruption to supply	Almost certain	Minor	Medium
Reputation	Pole failure results in bushfire with significant media coverage	Possible	Moderate	Medium
	Pole failure results in catastrophic bushfire with significant media coverage	Unlikely	Major	Medium
	Pole failure results in serious injury or fatality with significant media coverage	Unlikely	Major	Medium
Environment and Community	Pole or overhead asset failure results in bushfire with some loss to property	Possible	Major	High
	Pole or overhead asset failure results in catastrophic bushfire with widespread loss of property and potential fatality	Unlikely	Severe	High
Safety and People	Pole or overhead asset failure results in injury or death to member of the public	Unlikely	Severe	High

4.1 5x5 Risk Matrix

TasNetworks business risks are analysed utilising the 5x5 corporate risk matrix, as outlined in TasNetworks Risk Management Framework.

Relevant strategic business risk factors that apply are follows:

Risk Category	Risk	Likelihood	Consequence	Risk Rating
Environment and Community	Pole or overhead asset failure results in bushfire with some loss to property	Possible	Moderate	Medium
Environment and Community	Pole or overhead asset failure results in catastrophic bushfire with widespread loss of property and potential fatality	Unlikely	Severe	High
Financial	Pole or overhead asset failure results in serious injury or fatality	Possible	Major	High
Safety and People	Pole or overhead asset failure results in injury or death to member of the public.	Unlikely	Severe	High

Section 1 Approvals (Gated Investment Step 1)

Project Initiator:	Erin Cook	**Date:**	26/03/2015
Line Manager:		**Date:**	
Manager (Network Projects) or Group/Business Manager (Non-network projects):		**Date:**	
[Send this signed and endorsed summary to the Capital Works Program Coordinator.]			

Actions			
CWP Project Manager commenced initiation:		**Assigned CW Project Manager:**	
PI notified project initiation commenced:		**Actioned by:**	

Section 2 (Gated Investment Step 2)

5. Preferred Option:

To inspect poles, overhead lines & equipment in the distribution system in accordance with TasNetworks' Standards & Policies to ensure that they are fit to remain in service until the next inspection cycle. This includes remedial treatment for decay in wood poles as required by the appropriate standard.

5.1 Scope

The work to be undertaken shall be the routine inspection of poles (supports), overhead lines & equipment. Treated poles are to be inspected once every five years +/- one month. Untreated timber poles are inspected within 3 years and six months (+/- 2 months) of their last inspection date. The inspections are to be conducted in accordance with NPRAM 27 series of procedures and NP RAM 03.

5.2 Expected outcomes and benefits

The expected outcomes of this program are continued safe and reliable running of the network. Inspecting TasNetworks poles and overhead equipment allows decisions on replacements and repairs to be made on condition. Replacing assets based on their condition presents the lowest life cycle cost while reducing environmental and safety risk as well as reducing fault response and customer outages.

5.3 Regulatory Test

6. Options Analysis

Option 0: Do Nothing

Do not inspect TasNetworks' poles and overhead assets

Advantages:

- No upfront costs

Disadvantages:

- Does not allow condition based replacements and repairs to be undertaken.
- Does not reduce the likelihood of injury or fatality due to a failing pole or overhead equipment.
- Does not reduce the likelihood of exposure of the public to energised electrical equipment or being hit by a failed pole.
- Customers will be exposed to increased unplanned outages.

Option 1: Inspection OH & Structures

Inspect TasNetworks' poles and overhead assets on an ongoing basis

Advantages:

- Allows condition based replacements and repairs to be undertaken.
- Costs in completing this work are sustainable
- Minimises likelihood of exposure to the public by failing poles or overhead equipment.

Disadvantages:

- Cannot completely eliminate the risk of poles or overhead equipment failing in service.

6.1 Option Summary

Option description	
Option 0	Do nothing
Option 1 (preferred)	Inspection of OH & Structures

6.2 Summary of Drivers

Option	
Option 0	**Minimise risks to public safety:** The risks to public safety from pole & asset failure are high. **Minimise outage frequency and duration:** There will be a higher incident of unplanned outages due to asset & pole failure **Deliver the most cost effective solution:** This option has the lowest upfront costs. Additional costs to the Business are incurred in the form of NECF and STPIS payments. As this option does not address the risk to public safety it is highly likely to involve further costs due to incidents and legal proceedings.
Option 1 (preferred)	**Minimise risks to public safety:** The risks to public safety from asset & pole failure are low, but cannot remove the risk entirely. **Minimise outage frequency and duration**: There will be a lower incident of unplanned outages due to asset & pole failure. **Deliver the most cost effective solution:** This is the lowest cost option that addresses the risk to public safety.

6.3 Summary of Costs

Option	Total Cost ($)
Option 0	$0
Option 1 (preferred)	$32,260,000

6.4 Summary of Risk

The below table shows the residual risks with the preferred option in place. The preferred option reduces the residual risk from the uncontrolled risk rating. The residual risk ratings are reduced to Medium or lower, which is within TasNetworks' risk appetite.

Risk Category	Risk	Likelihood	Consequence	Residual Risk
Financial	Excessive payout of reliability incentive schemes (STPIS, GSL, NCEF) from declining network reliability	Unlikely	Moderate	Medium
	Pole or overhead asset failure results in catastrophic bushfire, insurance providers refuse to cover TasNetworks for future events	Rare	Severe	Medium
	Pole or overhead asset failure results in serious injury or fatality	Unlikely	Major	Medium
Customer	Pole or overhead asset failure results in localised interruption to supply	Possible	Minor	Low
Regulatory Compliance	Pole or overhead asset failure results in increased number of unplanned outages leads to systemic NCEF breaches	Unlikely	Moderate	Medium
Network Performance	Pole or overhead asset failure results in localised interruption	Possible	Minor	Low

	to supply			
Reputation	Pole failure results in bushfire with significant media coverage	Unlikely	Moderate	Medium
	Pole failure results in catastrophic bushfire with significant media coverage	Rare	Major	Medium
	Pole failure results in serious injury or fatality with significant media coverage	Unlikely	Major	Medium
Environment and Community	Pole or overhead asset failure results in bushfire with some loss to property	Unlikely	Major	Medium
	Pole or overhead asset failure results in catastrophic bushfire with widespread loss of property and potential fatality	Rare	Severe	Medium
Safety and People	Pole or overhead asset failure results in injury or death to member of the public	Rare	Severe	Medium

6.5 Economic analysis

Option	Description	NPV
Option 0	Do nothing	$0
Option 1 (preferred)	Inspection of OH & Structures	$32,260,000

6.5.1 Quantitative Risk Analysis

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6.5.2 Benchmarking

TasNetworks' Inspection OH & Structures strategy is in line with standard industry practice around the country.

6.5.3 Expert findings

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6.5.4 Assumptions

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Section 2 Approvals (Gated Investment Step 2)

Project Initiator:	Erin Cook	**Date:**	26/03/2015
Project Manager:		**Date:**	

Actions			
Submitted for CIRT review:		**Actioned by:**	
CIRT outcome:			