Investment Evaluation Summary (IES)

Project Details:

Project Name:	Reinforce steel tower legs
Project ID:	00672
Thread:	Structures
CAPEX/OPEX:	CAPEX
Service Classification:	Standard Control
Scope Type:	D
Work Category Code:	RESTK
Work Category Description:	Pole Staking
Preferred Option Description:	Reinforce tower legs.
Preferred Option Estimate (Nominal Dollars):	$16,600,000

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Unit ($)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Volume	0	0	0	1	0	0	0	0	1	0
Estimate ($)										
Total ($)	$0	$0	$0	$160,000	$0	$0	$0	$0	$160,000	$0

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
RESTK IES	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/Overhead%20Systems%20and%20Structures/RESTK%20Pole%20Staking/RESTK%20Investment%20Evaluation%20Summary%20(IES).docx
RESTK NPV	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/Overhead%20Systems%20and%20Structures/RESTK%20Pole%20Staking/RESTK%20NPV.xlsm

Section 1 (Gated Investment Step 1)

1. Background

Steel towers also deteriorate below ground at a faster rate than above ground. Thus major remedial works are undertaken on the below ground portion of TasNetworks' distribution steel towers to extend their life and defer the cost of replacement. Steel tower legs requiring reinforcing are identified from the AIOHS inspection of steel towers with remedial action program.

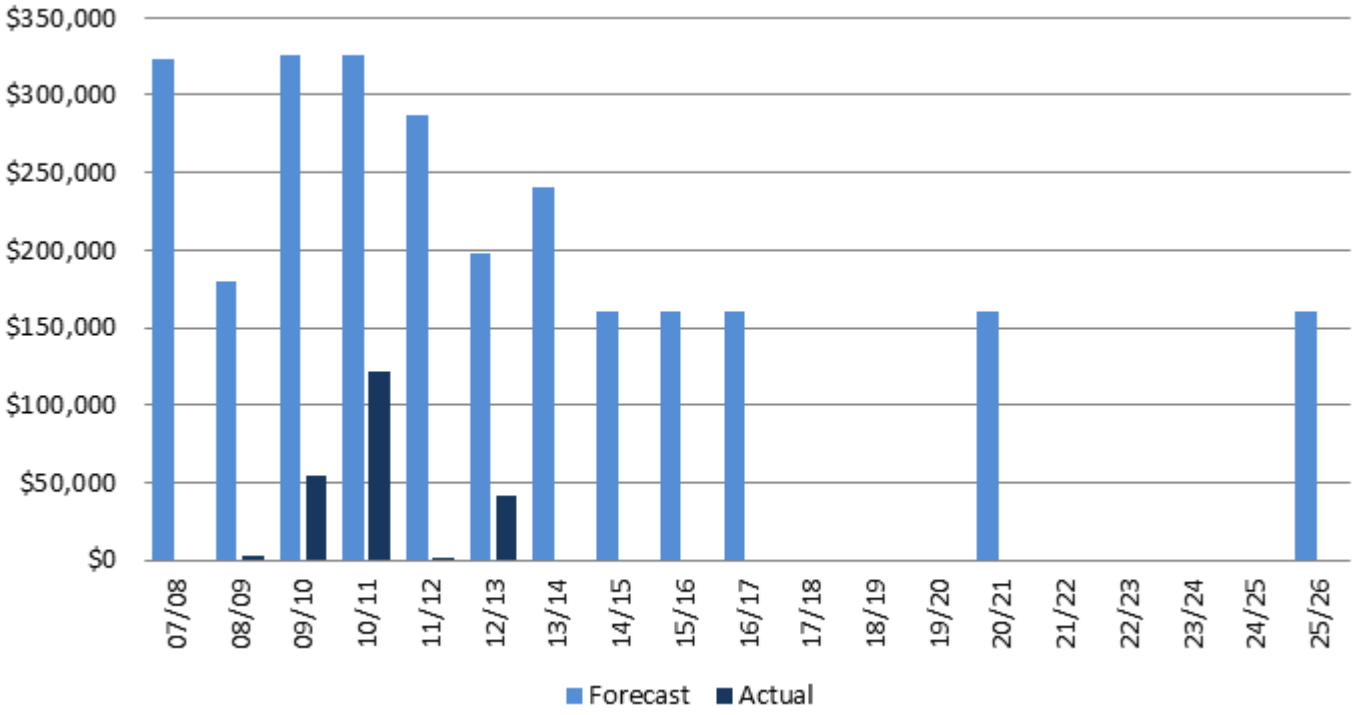

Figure 1: Reinforce Tower Leg Expenditure

Figure 2: Corrosion on surfaces of underground portion of Steel Tower Leg

1.1 Investment Need

Reinforce Below Ground Portion Tower leg

The aim of this program is to undertake major remedial works on the below ground portion of TasNetworks' distribution steel towers. As with wood poles, steel towers deteriorate below ground at a faster rate than above ground. The remedial action proposed is the replacement of the below ground section of the legs. The alternative is to replace the entire steel tower structure, which is very costly. The remedial action costs only a fraction of the amount to replace the entire tower and extends the life of the tower in the order of twenty to thirty years.

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). (4) maintain the safety of the distribution system through the supply of standard control services.

2. Project Objectives

The aim of this program is to rebuild the ground-line strength of steel towers by replacing tower legs below the ground line.

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 failure results in catastrophic bushfire, insurance providers refuse to cover TasNetworks for future events	Unlikely	Severe	High
	Pole failure results in			

	serious injury or fatality	Possible	Major	High
Customer	Pole failure results in localised interruption to supply	Almost certain	Minor	Medium
Regulatory Compliance	Pole failure results in increased number of unplanned outages leads to systemic NCEF breaches	Possible	Moderate	Medium
Network Performance	Pole failure results in 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 failure results in bushfire with some loss to property	Possible	Major	High
	Pole failure results in catastrophic bushfire with widespread loss of property and potential fatality	Unlikely	Severe	High
Safety and People	Pole 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	Steel tower failure results in catastrophic bushfire with widespread loss of property and potential fatality	Rare	Severe	Medium
Financial	Steel tower failure results in serious injury or fatality	Possible	Major	High
Network Performance	Steel tower failure results in localised interruption to supply.	Likely	Moderate	High
Safety and People	Steel Tower failure results in injury or death to member of the public	Rare	Severe	Medium

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 rebuild the ground-line strength of steel towers by replacing tower legs below the ground line that are identified from the dedicated steel tower inspection program that have been classified as impaired.

5.1 Scope

To rebuild the ground-line strength of poles by staking those that are identified from the pole inspection program that have been classified as impaired. The work to be undertaken shall be the staking of impaired poles is generally be sourced from the pole inspection program (AIOHS), managed by the Works Delivery. The pole inspection program will identify poles that are classified as impaired and suitable for staking. Selection of staking system shall be as guided in the Distribution Overhead Line Design & Construction Standard drawing numbers D-OH1-3.2/12 & 13.

5.2 Expected outcomes and benefits

The expected outcomes of this program are continued safe and reliable running of the network. Staking impaired poles prolong the service life of a pole by at least 15 years and performing remedial works on steel towers extends the life of the tower in the order of twenty to thirty years, in both cases deferring the significant cost of replacement.

PROGRAM BENEFITS

- Reduced environmental and safety risk
- Reduced fault response
- Reduced customer outages
- Deferred replacement cost

5.3 Regulatory Test

6. Options Analysis

Option 0 - Do Nothing:

Do nothing. All poles and steel towers run to failure.

Advantages:

- No upfront costs

Disadvantages:

- Does not reduce the likelihood of injury or fatality due to a failing pole/tower.
- Does not reduce the likelihood of exposure of the public to energised electrical equipment or being hit by a failed pole/tower.
- Customers will be exposed to increased unplanned outages.

Option 1:

Stake Poles & Reinforce tower legs.

Advantages:

- Costs in completing this work are sustainable
- Minimises likelihood of exposure to the public
- Defers costs of asset replacement

Disadvantages:

- Poles will still need to be replaced at some time in the future
- Cannot completely eliminate the risk of poles/towers failing in service

Option 2:

Replace impaired poles & towers

Advantages:

- Minimises likelihood of exposure to the public

Disadvantages:

- High cost unsustainable
- Possibly replacing entire structures for small defects
- Cannot completely eliminate the risk of poles/towers failing in service

6.1 Option Summary

Option description	
Option 0	Do nothing. All steel towers run to failure.
Option 1 (preferred)	Reinforce tower legs.
Option 2	Replace steel towers.

6.2 Summary of Drivers

<table>
<tr><th>Option</th><th colspan="3"></th></tr>
<tr><td>Option 0</td><td>
<table>
<tr><th>Minimise risks to public safety</th><th>Minimise outage frequency and duration</th><th>Deliver the most cost effective solution</th></tr>
<tr><td>The risks to public safety from pole failure are high.</td><td>There will be a higher incident of unplanned outages due to pole failure</td><td>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</td></tr>
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</td></tr>
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			and legal proceedings.
Option 1 (preferred)	**Minimise risks to public safety**	**Minimise outage frequency and duration**	**Deliver the most cost effective solution**
	The risks to public safety from pole failure are low, but cannot remove the risk entirely.	There will be a lower incident of unplanned outages due to pole failure.	This is the lowest cost option that addresses the risk to public safety. Costs of asset replacement are deferred.
Option 2	**Minimise risks to public safety**	**Minimise outage frequency and duration**	**Deliver the most cost effective solution**
	The risks to public safety from pole failure are low, but cannot remove the risk entirely.	There will be a lower incident of unplanned outages due to pole failure.	This is the highest cost option.

6.3 Summary of Costs

Option	Total Cost ($)
Option 0	$0
Option 1 (preferred)	$16,600,000
Option 2	$164,500,000

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 failure results in catastrophic bushfire, insurance providers refuse to cover TasNetworks for future events	Rare	Severe	Medium

	Pole failure results in serious injury or fatality	Rare	Major	Medium
Customer	Pole failure results in localised interruption to supply	Possible	Minor	Low
Regulatory Compliance	Pole failure results in increased number of unplanned outages leads to systemic NCEF breaches	Unlikely	Moderate	Medium
Network Performance	Pole failure results in localised interruption to supply	Possible	Minor	Low
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 failure results in bushfire with some loss to property	Unlikely	Major	Medium
	Pole failure results in catastrophic bushfire with widespread loss of property and potential fatality	Rare	Severe	Medium
Safety and People	Pole 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. All steel towers run to failure.	$0
Option 1 (preferred)	Reinforce tower legs.	-$9,953,178
Option 2	Replace steel towers.	-$66,844,474

6.5.1 Quantitative Risk Analysis

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6.5.2 Benchmarking

TasNetworks Pole Staking and Steel Tower Reinforcement strategies are 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:			