

SPATIAL NETWORK MANAGEMENT UPGRADE

Date Prepared: 16 December 2022

Recommendation

Essential Energy endorses this preliminary business case for investment in Spatial Network Management Upgrade.

As a preliminary business case, this paper analyses the drivers for investment and the options to address those drivers. It identifies the likely costs, benefits, risks and impacts of the proposed investment in order to inform organisational planning and forecasting.

Consistent with Essential Energy's investment governance processes, prior to proceeding with the proposed investment a detailed delivery business case will be developed and evaluated.

Executive Summary

This business case proposes investment in the upgrade or renewal of Essential Energy's Spatial Network Management capability, primarily enabled through the core Geographical Information System (GIS).

Essential Energy's current GIS platform is General Electric (GE) Smallworld. The GIS platform is a critical business application and the master of location-based data in Essential Energy. The system is instrumental in enabling the organisation to plan, operate and maintain the distribution network. To continue the reliable provision of both spatial and network model data across the organisation and to external customers, the current platform needs to be renewed for ongoing sustainability.

In the current Regulatory Control Period (RCP), it had been planned to upgrade the GE Smallworld GIS to the latest software product generation. However, geospatial management is a rapidly evolving field of technology, with lines blurring between GIS, Network Management tools and "Digital Twin" smart modelling capabilities. Therefore, during the current RCP, Essential Energy has instead extended the life of the existing Smallworld GIS solution, complemented with improvements in Digital Asset Management capability.

As a result, in the coming RCP, Essential Energy will renew the GIS for long term sustainability, with enhanced integration which will include the new Oracle Cloud Enterprise Asset Management (EAM) system and the upgraded GE PowerOn Advanced Distribution Management System (ADMS). This renewal may take the form of a product upgrade to the latest GE Smallworld version, or transition to other competing product(s).

The proposed investment is required to address the following drivers:

- **Compliance and Risk:** Risk of non-compliance with both current and future legislative requirements and market obligations due to reducing support for the current GIS solution. The reduced product support increases the organisational risk around prolonged system outages impacting customers and the safety of staff and the community. This risk will be minimised through both vendor support and the implementation of a fit for purpose Disaster Recovery framework and infrastructure supporting High Availability for the system.
- **Productivity Improvement:** Opportunity for productivity improvements with the introduction of reliable integration to Essential Energy systems including the new EAM system, upgraded GE PowerOn ADMS, and other systems such as the Customer Information System (CIS).
In addition, a renewed GIS will enable data to be shared more efficiently across the organisation. Accessible network model data will reduce and/or remove the redundant network modelling efforts performed outside the system across the organisation.
- **Business Improvement:** Business process improvements may be achieved through the streamlining of design and data capture for the distribution network. This will assist the planning, operations and maintenance for the network assets.

This business case considers two options, contrasted with the counterfactual base case:

- **Base Case: Extend the life of current GIS version**
Continue to operate the existing system, with minimal incremental investment.
- **Option 1: Lifecycle systems renewal – Upgrade the GE Smallworld GIS (Recommended)**
Undertake lifecycle renewal of the existing GE Smallworld GIS, providing a roadmap for future sustainability, compliance and an enabler of productivity improvements through robust integration with Essential Energy systems.
- **Option 2: Lifecycle systems renewal – Implementation of new "best of breed" spatial solutions**
Undertake lifecycle replacement of the GIS, with new sustainable "best of breed" solutions that provide a roadmap for future compliance and productivity improvements, and robust integration to Essential Energy systems.

Option 1 is recommended, with investment beginning in FY25. Total project expenditure is [REDACTED] (FY24 Real Terms) with an NPV of [REDACTED].

This investment will support the customer and community through:

- Continued provision of timely and accurate spatial and network model data thereby avoiding potential customer service disruption; and
- Improved enterprise performance through robust integration with Essential Energy systems, minimising the impact of system outages due to maintenance and/or incident.

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Program/Project Summary

Preliminary Business Case – Spatial Network Management Upgrade															
Investment Value	<table border="1"> <thead> <tr> <th style="background-color: #f4a460;">Expenditure (Recommended Option)</th> <th style="background-color: #f4a460;">\$M FY24 Real Terms¹</th> </tr> </thead> <tbody> <tr> <td>Seed funding (actual)</td> <td style="background-color: black;"></td> </tr> <tr> <td>This approval:</td> <td></td> </tr> <tr> <td>Project Capex - Smallworld Upgrade</td> <td style="background-color: black;"></td> </tr> <tr> <td>Project Opex - Smallworld Upgrade</td> <td style="background-color: black;"></td> </tr> <tr> <td>Total program/project expenditure</td> <td style="background-color: black;"></td> </tr> <tr> <td>Ongoing Opex p.a.</td> <td style="background-color: black;"></td> </tr> </tbody> </table>	Expenditure (Recommended Option)	\$M FY24 Real Terms ¹	Seed funding (actual)		This approval:		Project Capex - Smallworld Upgrade		Project Opex - Smallworld Upgrade		Total program/project expenditure		Ongoing Opex p.a.	
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Corporate Strategy	<ul style="list-style-type: none"> • Network of the Future • Resilience and Reliability • Other Essential Services 														
Business Drivers	<ul style="list-style-type: none"> • Compliance and Risk • Business Improvement 														
Date Needed	July 2027														

¹ All figures presented in this document are provided in middle of the year 2023/24 real dollar terms and represent whole-of-business values prior to application of the Cost Allocation Model (CAM).

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1. Business Drivers

GE Smallworld is a critical business application for Essential Energy, enabling the organisation to plan, operate and maintain the distribution network through the provision of spatial and network model data.

Essential Energy’s current GIS platform is GE Smallworld version 5.1.8, with product support now in a “best efforts” mode by the vendor. To ensure sustainable GE vendor support for the long term, Essential Energy must move to the current version of the Smallworld product.

The latest version of GE Smallworld is 5.3. When version 5.2 was released, it included a significant update to the solution architecture which impacts the technology infrastructure supporting the platform and the approach to interoperability with other ICT systems. An upgrade to version 5.2 enables the implementation of other products such as GE Electric Office (Network Management toolset) should Essential Energy identify benefits for incorporating such tools. In addition, it presents opportunities to optimise spatial and network data access from the system.

In the current RCP, Essential Energy has complemented the GIS with improvements in Digital Asset Management (DAM) capability to provide asset management insights and operational efficiencies.

DAM capability and techniques augment organisational decision making. The DAM solution relies heavily on data mastered in the GIS, providing a “Digital Twin” of the electricity distribution network, built in a product named Neara. This Digital Twin is used to inform the business on critical issues, including environmental risks such as floods and fires, vegetation management, asset maintenance, encroachments, structural analysis and line rating, third party attachments, climate and weather resistance.

A two-way relationship has been established between the Smallworld GIS and Neara, with the GIS receiving updated location and network model data from Neara. This integration enables continuous improvement in the quality of spatial and network model data for Essential Energy.

Figure 1 (below) depicts the data types aggregated to build the distribution network Digital Twin.

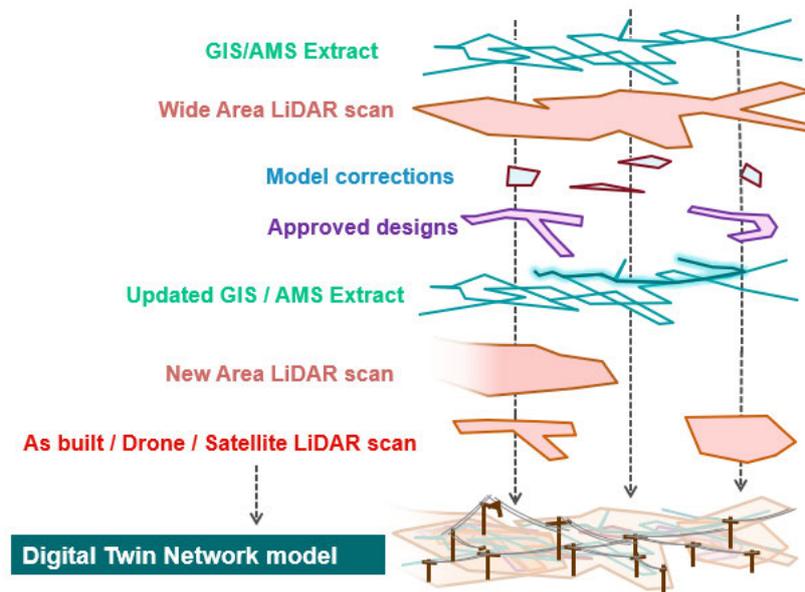


Figure 1: Digital Twin Spatial Integration

In the current RCP, it had been planned to upgrade the Smallworld GIS to the latest software product generation. However, geospatial management is a rapidly evolving field of technology, with lines blurring between GIS, Network Management tools and Digital Twin smart modelling capabilities. Therefore, during the current RCP, Essential Energy has instead extended the life of the existing Smallworld GIS solution, complemented with the improvements in DAM summarised above.

As a result, in the coming RCP, Essential Energy will renew the GIS for long term sustainability, with enhanced integration which will include the new Oracle Cloud Enterprise Asset Management (EAM) system and the

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upgraded GE PowerOn Advanced Distribution Management System (ADMS). This renewal may take the form of a product upgrade to the latest GE Smallworld version, or transition to other competing product(s).

The proposed investment is required to address the following drivers:

- **Compliance and Risk:** Risk of non-compliance with both current and future legislative requirements and market obligations due to reducing support for the current GIS solution. The reduced product support increases the organisational risk around prolonged system outages impacting customers and the safety of staff and the community. This risk will be minimised through both vendor support and the implementation of a fit for purpose Disaster Recovery framework and infrastructure supporting High Availability (HA) for the system.
- **Productivity Improvement:** Opportunity for productivity improvements with the introduction of reliable integration to Essential Energy systems including the new EAM system, upgraded GE PowerOn ADMS, and other systems such as the CIS.

In addition, a renewed GIS will enable data to be shared more efficiently across the organisation. Accessible network model data will reduce and/or remove the redundant network modelling efforts performed outside the system across the organisation.

- **Business Improvement:** Business process improvements may be achieved through the streamlining of design and data capture for the distribution network. This will assist the planning, operations and maintenance for the network assets.

1.1. Compliance Obligations

Through this investment, Essential Energy will ensure compliance with legislation, regulations, codes and standards as summarised below.

Instrument	Obligations	Investment relationship to obligation
Gas and Electricity (Consumer Safety) Act Work Health and Safety Act (section 274)	Safe operation of the distribution network as specified in the Gas and Electricity (Consumer Safety) Act and the Work Health and Safety Act.	The proposed investment will ensure Essential Energy's Spatial Network Management capability is positioned for long-term supportability, enabling compliance with all legislative and other Distribution Network Service Provider (DNSP) related obligations.
Electricity Supply Act National Electricity Rules	Obligations as specified in the Electricity Supply Act and the National Electricity Rules.	
National Environment Protection Act Environment Protection & Biodiversity Conservation Act Sustainable Planning Act	Obligations as specified in the Environment Protection Act, the Environment Protection & Biodiversity Conservation Act and the Sustainable Planning Act, requiring timely and accurate spatial and network data.	
Privacy Act	Obligations as specified in the Privacy Act, requiring security over customer data, including spatial locations of customer connections and distributed energy resources.	
Security Of Critical Infrastructure Act	Obligations as specified in the Security of Critical Infrastructure Act, with strong security and controls over data regarding the configuration and operation of the distribution network.	

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he proposed investment is aligned with the National Electricity Rules “capital expenditure objectives” (NER 6.5.7(a)) as described below.

NER Capital Expenditure Objectives	Alignment
6.5.7(a)(2) <i>the forecast capital expenditure complies with all applicable regulatory obligations or requirements associated with the provision of standard control services</i>	The proposed investment will ensure Essential Energy’s ability to maintain compliance with legislative obligations, thereby enabling stable and effective network management as a DNSP.
6.5.7(a)(3) <i>the forecast capital expenditure maintains the quality, reliability and security of supply of standard control services</i>	Through effective and efficient Spatial Network Management Essential Energy will maintain the quality, reliability and security of supply of standard control services.

The proposed investment addresses the NER “capital expenditure criteria” (NER 6.5.7(c)) as described below.

NER Capital Expenditure Criteria	Alignment
6.5.7(c)(1)(i) <i>the forecast capital expenditure reasonably reflects the efficient costs of achieving the capital expenditure objectives</i>	Investment costs have been calculated based on estimates derived from industry analysis, historical expenditure, and costed using standard labour rates. This document is a preliminary business case for investment planning purposes. Prior to investment, the costs will be further validated in preparation of the final business case.
6.5.7(c)(1)(ii) <i>the forecast capital expenditure reasonably reflects the costs that a prudent operator would require to achieve the capital expenditure objectives</i>	
6.5.7(c)(1)(iii) <i>the forecast capital expenditure reasonably reflects a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objective</i>	

1.2. Corporate Strategy Alignment

The table below describes how the proposed investment supports Essential Energy’s business strategies.

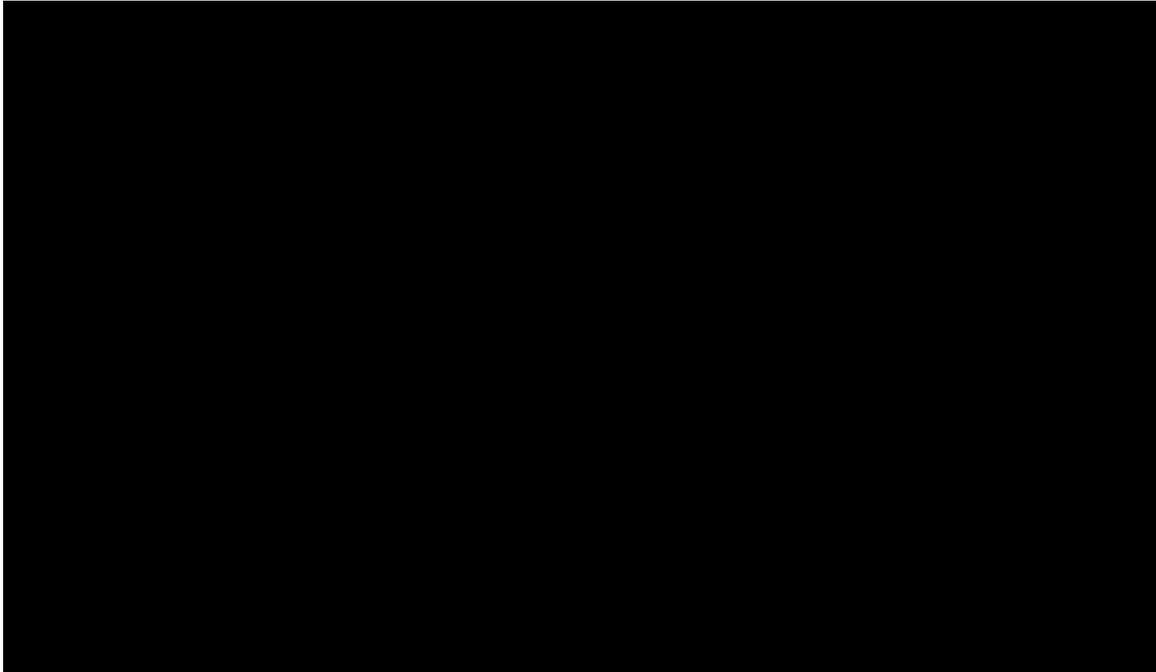
Essential Energy strategic themes	Investment relationship to strategic themes
Network of the Future delivering the services customers want today and into the future	Contemporary Spatial Network Management capabilities will enable the organisation to model the distribution network efficiently and disseminate the information to key users and stakeholders. Ultimately supporting the business to effectively plan, manage and maintain the distribution network. This will be achieved both directly within the GIS system and other systems such as Neara (Digital Twin). In addition, integration with the CIS for connection point mapping allows Essential Energy to support and manage life support processes.
Resilience and Reliability shaping our investment decisions consistent with a prudent risk appetite	Contemporary Spatial Network Management capability will ensure Essential Energy has resilient and reliable spatial and network model data to drive critical business processes and inform important investment decisions through the coming RCP and beyond.
Other Essential Services customer service and more	The proposed Spatial Network Management system will uplift organisational capabilities and support productivity improvements that contribute to the planning, operation and maintenance of the distribution network and delivery of energy solutions for our customers.

1.3. Current State

GE Smallworld integrates to various systems across Essential Energy, thereby supporting:

- Key safety processes including integration to Dial Before You Dig (DBYD) and Look up and Live (LUAL),
- Customer process with integration to the CIS and Outage Notification Online; and
- Investment processes with integration to Neara and EAM.

Figure 2 (below) depicts the interoperability between the GIS and other Essential Energy ICT systems.



1.4. Existing Issues

System supportability and sustainability

As noted previously, Essential Energy's current GIS platform is GE Smallworld version 5.1.8 with product support now in a "best efforts" mode by the vendor. To ensure sustainable GE vendor support for the long term, Essential Energy must move to the current version of the Smallworld product.

Continued use of the legacy Smallworld GIS increases the risk of Essential Energy failing to meet the compliance obligations of a DNSP.

Access to GIS data

At present, extracting and sharing GIS data is challenging due to the way data is secured and stored in the current Smallworld product. To-date, Essential Energy has implemented "workarounds" to enable operational access and use of the GIS data. This involves production of a weekly snapshot of the proprietary Smallworld data store, and replicating this data in an Oracle database for operational use. For example, GIS data is used by the Field Portal application, to enable the recording of defects and new assets by field work crews. It is also used by vegetation contractors to view the Essential Energy network.

Essential Energy is further leveraging a Geospatial Analysis (GSA) system coupled with SQL Server Database to address GIS data access challenges.

Integration reliability

The integration of systems to the GIS is mostly based on legacy file-based methods and FME extensions, which can be problematic leading to data quality issues. The GIS relies on customer data for critical attributes such as identifying customers on life support. Without up-to-date and accurate customer data, activities such as network outage management pose a significant risk to the organisation and community.

System reliability and cyber vulnerability

The current version of GE Smallworld requires a system outage when any maintenance is performed on the product. This impacts the service levels for internal business areas and customers, and adds risk to business operations. In addition, there is a risk that the service may not be restorable following a system outage, due to the ageing infrastructure and platform.

The ageing software may also experience cyber security vulnerabilities, which would be addressed through an upgrade to the current generation GE Smallworld product.

1.5. Inherent Risks

The table below summarises the inherent risks requiring mitigation through this investment, with likelihoods forecast as at the end of the coming RCP (i.e., 30 June 2029) if no remedial actions are taken.

Inherent Risk	Likelihood	Consequence	Risk Rating	Risk Impacts
<p>Risk 1</p> <p>Vendor support risk</p> <p>Vendor support for the product is “best efforts” until an upgrade to a supported version is achieved.</p>	<p>Possible</p> <p>Limited vendor support is available for the existing version of the GIS. There is a risk that further required operational changes cannot be applied to the solution.</p>	<p>Moderate</p> <p>Customer service disruption through inability to access or effectively use Essential Energy’s spatial or network data.</p> <p>Potential for non-compliance penalties.</p>	<p> Medium</p>	<p>Costs of potential non-compliance penalties and corresponding reputational impacts.</p> <p>Costs of interim manual processing and subsequent retrospective adjustments or data entry.</p> <p>System outage leads to impacts on network reliability and/or delay in network projects and maintenance.</p>
<p>Risk 2</p> <p>Cyber security risk</p> <p>Aged software platforms are vulnerable to a successful cyber security attack, resulting in a data breach or data loss.</p>	<p>Possible</p> <p>Risk may occur within the coming RCP due to the software version operating out of vendor support and lacking further software patches.</p>	<p>Major</p> <p>Exposure of network data in breach of the Security of Critical Infrastructure Act and Essential Energy’s distributor licence conditions, or customer data in breach of the Australian Privacy Act.</p> <p>Customer service disruption through inability to access spatial or network model data.</p>	<p> High</p>	<p>Societal impacts associated with exposure of sensitive customer data.</p> <p>Costs of potential non-compliance penalties and corresponding reputational impacts.</p> <p>Costs associated with urgent system remediation.</p>
<p>Risk 3</p> <p>Inability to support new electricity market obligations risk</p> <p>New market requirements may not be accommodated in the current GIS system due to lack of vendor or platform support, or due</p>	<p>Possible</p> <p>Limited vendor support is available for the existing version of the GIS. It is possible that further market requirements cannot be applied to the solution.</p>	<p>Moderate</p> <p>Customer service disruption through inability to access spatial or network Model data.</p> <p>Also potential for non-compliance penalties.</p>	<p> Medium</p>	<p>Societal impacts through failure to manage network efficiently.</p> <p>Costs of potential manual effort to compensate for lack of system functionality.</p> <p>Potential non-</p>

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<p>to inflexibility of the legacy system architecture. This includes introduction of new types of Distributed Energy Resources (DER) and related network infrastructure.</p>				<p>compliance penalties and corresponding reputational impacts.</p> <p>Costs associated with urgent system remediation.</p>
<p>Risk 4</p> <p>Operational failure risk</p> <p>Legacy GIS solution fails (or partially fails) due to the ageing technology platforms.</p>	<p>Possible</p> <p>Limited vendor support is available for the existing version of the GIS. Possibility the solution cannot be restored from back-up/known state due to ageing infrastructure.</p>	<p>Moderate</p> <p>Unavailability of the GIS and network information management capability causes delays across various asset management processes including network upgrade projects, maintenance projects and new connections.</p> <p>Financial impacts result due to productivity loss and also customer impacts in terms of delays in delivering changes to the electricity network.</p> <p>Also potential for non-compliance penalties.</p>	<p> Medium</p>	<p>Societal impacts through failure to manage network efficiently.</p> <p>Costs of potential manual effort to compensate for lack of system functionality.</p> <p>Potential non-compliance penalties and corresponding reputational impacts.</p> <p>Costs associated with urgent system remediation.</p>
<p>Risk 5</p> <p>Corrupted data leading to safety issues</p> <p>Legacy GIS solution fails (or partially fails) resulting in loss or corruption of "as constructed" network asset data.</p> <p>The recovery of "as constructed" data sets, in particular where manual intervention is required, may result in data errors.</p>	<p>Unlikely</p> <p>Limited vendor support is available for the existing version of the GIS. Possibility the solution cannot be restored from a system outage due to ageing infrastructure.</p>	<p>Major</p> <p>Data errors may cause operational safety issues where the actual network configuration is not aligned to the connectivity model within the GIS which could lead to significant operational safety incidents resulting from the integration to DBYD, LUAL and the provision of data to customers for activity such as arial crop spraying may be impacted</p> <p>Customer service disruption through inability to access spatial or network model data.</p> <p>Potential for non-compliance penalties.</p>	<p> Medium</p>	<p>Safety impacts for work crews and the community.</p> <p>Societal impacts through failure to manage network efficiently.</p> <p>Costs of potential manual effort to compensate for lack of system functionality.</p> <p>Potential non-compliance penalties and corresponding reputational impacts.</p> <p>Costs associated with urgent system remediation.</p>

Figure 3 (below) depicts the above inherent risks requiring mitigation through this investment.

		CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Severe
LIKELIHOOD	Almost Certain > 5 times within a year	Low	Medium	High	Extreme	Extreme
	Likely 1-5 times within a year	Low	Medium	High	High	Extreme
	Possible Once within 1-3 years	Low	Medium	Medium R1 R3 R4	High R2	High
	Unlikely Once within 3-10 years	Low	Low	Medium	Medium R5	High
	Rare Once within 10-100 years	Low	Low	Low	Medium	Medium
	Very Rare < Once within 100 years	Low	Low	Low	Low	Low

 Inherent Risks R1 to R5, with likelihoods forecast as at the end of the coming RCP mapped to the Essential Energy Risk Framework

Figure 3: Inherent Risks

2. Options Analysis

The following options have been considered to address the investment drivers.

Options Considered:	Assessment
Base Case: Further extend the life of the current GIS version	Continue to operate the existing system, with minimal incremental investment.
Option 1: Lifecycle systems renewal - Upgrade the Smallworld GIS (Recommended)	Undertake lifecycle renewal of the existing GE Smallworld GIS providing a roadmap for future sustainability, compliance and an enabler of productivity improvements through robust integration with Essential Energy systems.
Option 2: Lifecycle systems renewal – Implementation of new “best of breed” spatial solutions	Undertake lifecycle replacement of the GIS system with sustainable “best of breed” solution(s) that provide a roadmap for future compliance and productivity improvements, and robust integration to Essential Energy systems.

Each of these options is evaluated in the sections which follow.

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2.1. Base Case: Further extend the life of the current GIS version

The base case represents a “counterfactual” assessment of Essential Energy’s likely expenditure if none of the proposed options proceed.

2.1.1 Assumptions – Base Case Option

The following assumptions apply for this option:

- A custom, extended support arrangement is established to maintain critical support of the ageing technology platform, at an incremental cost of ██████ beginning in FY27. At the same time, Essential Energy adds a part-time FTE to enable continued Level 1 support ██████
- Interim “workarounds” or add-on solutions are implemented to enable new legislative or electricity market requirements, such as may be needed with introduction of new forms of DER etc, at a cost of ██████.
- In this Base Case option, the legacy GIS is not renewed in the coming RCP (FY25-29). However this does not allow the system to operate indefinitely into the future. Therefore the renewal investment would instead be undertaken in the following RCP, with assumed costs equivalent to those in Option 1 (in real terms).

2.1.2 Residual Risks – Base Case Option

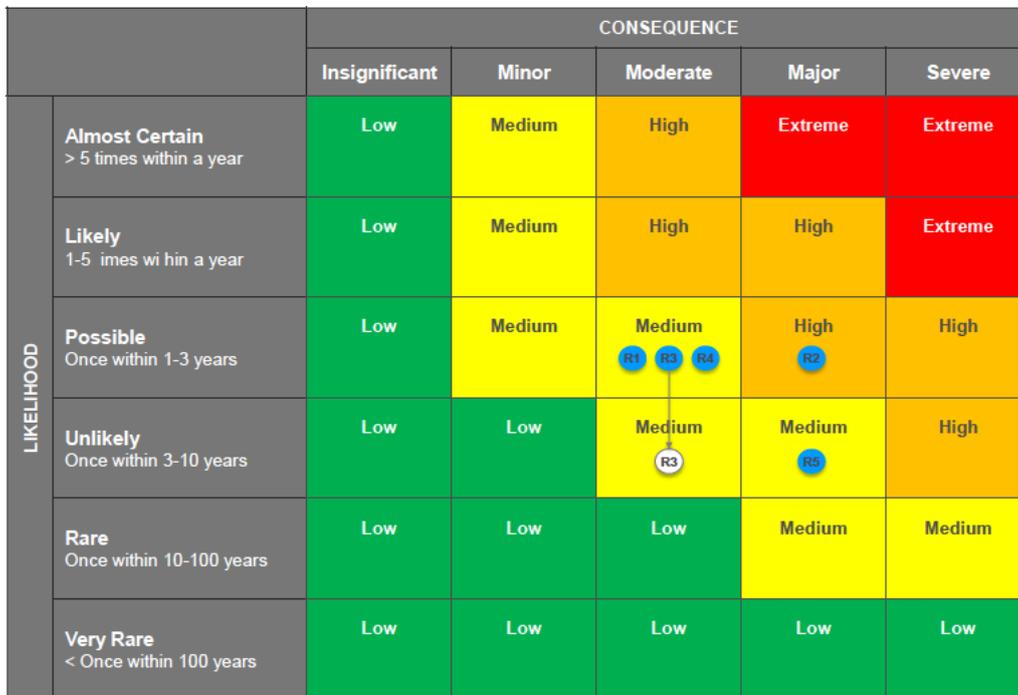
The table below summarises the risk position at the end of the coming RCP (FY29) in the event that this Base Case option is selected. Note that the risks included within this table, and the Inherent Risk ratings are as identified in section 1.5 (Page 9).

Inherent Risk at end-RCP (FY29) from business drivers - see section 1.5		Mitigated Risk for this Option I.e., residual risk			
Inherent Risk	Inherent Risk Rating	Mitigation	Likelihood	Consequence	Residual Risk Rating
Risk 1 Vendor support risk Vendor support for the product is currently “best efforts” until an upgrade to a supported version is achieved.	 Medium	Limited mitigation, other than the possibility of a further “best efforts” extended support agreement through either the vendor or third party.	Possible	Moderate	 Medium
Risk 2 Cyber security risk Aged software platforms fall subject to a successful cyber security attack, resulting in a data breach and/or data loss.	 High	Limited mitigation, due to lack of software patching of the aged software platform.	Possible	Major	 High
Risk 3 Inability to support new market obligations risk New market requirements may not be accommodated in the current GIS system due to lack of vendor or platform support, or due to inflexibility of the legacy system architecture. This includes introduction of new types of DER and related network infrastructure.	 Medium	Marginally reduced likelihood, due to introduction of “workarounds” and or add-on solutions.	Unlikely	Moderate	 Medium

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Inherent Risk at end-RCP (FY29) from business drivers - see section 1.5		Mitigated Risk for this Option i.e., residual risk			
Inherent Risk	Inherent Risk Rating	Mitigation	Likelihood	Consequence	Residual Risk Rating
Risk 4 Operational failure risk Legacy GIS solution fails (or partially fails) due to the ageing technology platforms.	Medium	Limited mitigation, other than the possibility of a further "best efforts" extended support agreement through either the vendor or third party.	Possible	Moderate	Medium
Risk 5 Corrupted data leading to safety risks. GIS fails (or partially fails) resulting in loss or corruption of "as constructed" network asset data. The recovery of "as constructed" data sets, in particular where manual intervention is required, may result in data errors. These errors may cause operational safety issues where the actual network configuration is not aligned to the connectivity model within the GIS which could lead to significant operational safety incidents.	Medium	Limited mitigation, other than the possibility of a further "best efforts" extended support agreement through either the vendor or third party.	Unlikely	Major	Medium

Table 1: Residual Risks - Base Case



- Inherent Risks R1 to R5, with likelihoods forecast as at the end of the coming RCP mapped to the Essential Energy Risk Framework
- Residual Risks R1 to R5 only shown if different to the Inherent Risk

Figure 4: Residual Risks - Base Case

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2.2. Option 1: Lifecycle systems renewal - Upgrade the Smallworld GIS (Recommended)

Through this option, Essential Energy will renew the GIS platform through migration and upgrade from the current ageing GE Smallworld version to the current product version.

The new GIS capabilities will enable improvements through:

- Improved interoperability between the GIS and Essential Energy systems supporting safety, customers and investment processes.
- Improved performance achieved through new solution architecture and the containerisation of the underpinning infrastructure allowing the solution to scale as required.
- Improved decision-making support across the organisation through the “democratisation” of GIS data.
- Improved Disaster Recovery and High Availability capability for the GIS by leveraging functionality in latest software to make use of contemporary infrastructure.
- Improved cyber security resilience through addressing known system vulnerabilities.

This option mitigates the elevated risks associated with operating on ageing software and ongoing support for product extensions (new or modified) to comply with organisational obligations.

With this transition, Essential Energy will have established an integrated commercially supported solution for long term sustainability, business process efficiency and cyber security.

2.2.1 Assumptions – Option 1

The following assumptions apply for this option:

- The existing GE Smallworld version will continue operating with current business processes, until transition to the new solution in FY26. Existing support arrangements will continue without incremental cost increases until that time.
- Transition of Spatial Network Management functions would require limited market scan and evaluation complexity, on the basis that the new GE Smallworld product version will be utilised. However, licensing and implementation negotiations must still be undertaken to ensure prudent and efficient project delivery and operations expenditure.
- The initiative will be delivered as a coordinated project, incorporating data migration trial conversions and User Acceptance Testing to ensure successful transition of critical systems capability.

Upgrade the Smallworld GIS			
Duration	Plan / Procure	4	Months
	Design	6	Months
	Construct / Test	9	Months
	Deploy / Hypercare	3	Months
	Total	22	Months
Project Expenditure	\$M FY24 Real Terms	Capex	Opex
	Labour (Direct)	█	█
	Vendor Services	█	█
	Software & Hardware	█	█
	Total	█	█
Support Costs	\$M FY24 Real Terms	Opex p.a.	
	No Change (net)	-	
	Total	-	

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2.2.2 Benefits – Option 1

The table below summarises the benefits which will be enabled through selection of this option.

Benefit	Type and Value
Improved decision-making support across the organisation through the democratisation of GIS data.	Contributor to Productivity Improvement Target
Improved interoperability between the GIS and Essential Energy systems supporting safety, customers and investment processes.	Contributor to Productivity Improvement Target and Quality of Service
Improved solution availability and faster Disaster Recovery timelines leading to increased organisational productivity.	Contributor to Productivity Improvement Target
Time saved for regulatory report generation and data requests through efficient data access.	Contributor to Productivity Improvement Target
Agility in responding to ongoing regulatory, compliance and technology changes	Compliance
Risk mitigation benefits (see section 2.2.3 below)	Risk Mitigation

2.2.3 Residual Risks – Option 1

The table below summarises the risk position at the end of the coming RCP (FY29) in the event that this option is selected. Note that the risks included within this table, and the Inherent Risk ratings are as identified in section 1.5 (Page 9).

Inherent Risk at end-RCP (FY29) from business drivers - see section 1.5		Mitigated Risk for this Option i.e., residual risk			
Inherent Risk	Inherent Risk Rating	Mitigation	Likelihood	Consequence	Residual Risk Rating
Risk 1 Vendor support risk Vendor support for the product is currently “best efforts” until an upgrade to a supported version is achieved. Vendor support for the product is withdrawn and/or a system outage is incurred.	● Medium	Moving to the latest generation of GE Smallworld reduces the likelihood of this risk. Should an outage occur, operating on current generation software would support faster recovery and reduce its potential impact.	Rare	Moderate	● Low
Risk 2 Cyber security risk Aged software platforms fall subject to a successful cyber security attack, resulting in denial of service, data breach and/or data loss.	● High	Moving to the latest generation of GE Smallworld reduces the likelihood of this risk. Contemporary ICT platforms are more resilient to cyber security threats than legacy platforms. Contemporary applications support the cycle of cyber security updates / patches of underpinning infrastructure software (operating systems, database management systems and integration technology).	Rare	Major	● Medium

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Inherent Risk at end-RCP (FY29) from business drivers - see section 1.5		Mitigated Risk for this Option i.e., residual risk			
Inherent Risk	Inherent Risk Rating	Mitigation	Likelihood	Consequence	Residual Risk Rating
Risk 3 Inability to support new market obligations risk New market requirements may not be accommodated in the current GIS system due to lack of vendor or platform support, or due to inflexibility of the legacy system architecture.	 Medium	Moving to the latest generation of GE Smallworld reduces the likelihood of this risk. Recent versions of the product have improved solution architecture enabling more flexibility in functionality.	Rare	Moderate	 Low
Risk 4 Operational failure risk GIS fails (or partially fails) due to the ageing technology platforms, resulting in the unavailability of GIS data causing delays across various asset management processes including network upgrade projects, maintenance projects and new connections. Financial impacts result due to productivity loss and also customer impacts in terms of delays in delivering changes to the electricity network.	 Medium	Moving to the latest generation of GE Smallworld reduces the likelihood of this risk. Moving to a current product version will be coupled with infrastructure which supports an effective DR approach and High Availability.	Rare	Moderate	 Low
Risk 5 Corrupted data leading to safety risks. GIS fails (or partially fails) resulting in loss or corruption of "as constructed" network asset data. The recovery of "as constructed" data sets, in particular where manual intervention is required, may result in data errors. These errors may cause operational safety issues where the actual network configuration is not aligned to the connectivity model within the GIS which could lead to significant operational safety incidents.	 Medium	Moving to the latest generation of GE Smallworld reduces the likelihood of this risk. Moving to a current platform version will be coupled with infrastructure which supports an effective Disaster Recovery approach and High Availability.	Rare	Major	 Medium

Table 2: Residual Risks - Option 1

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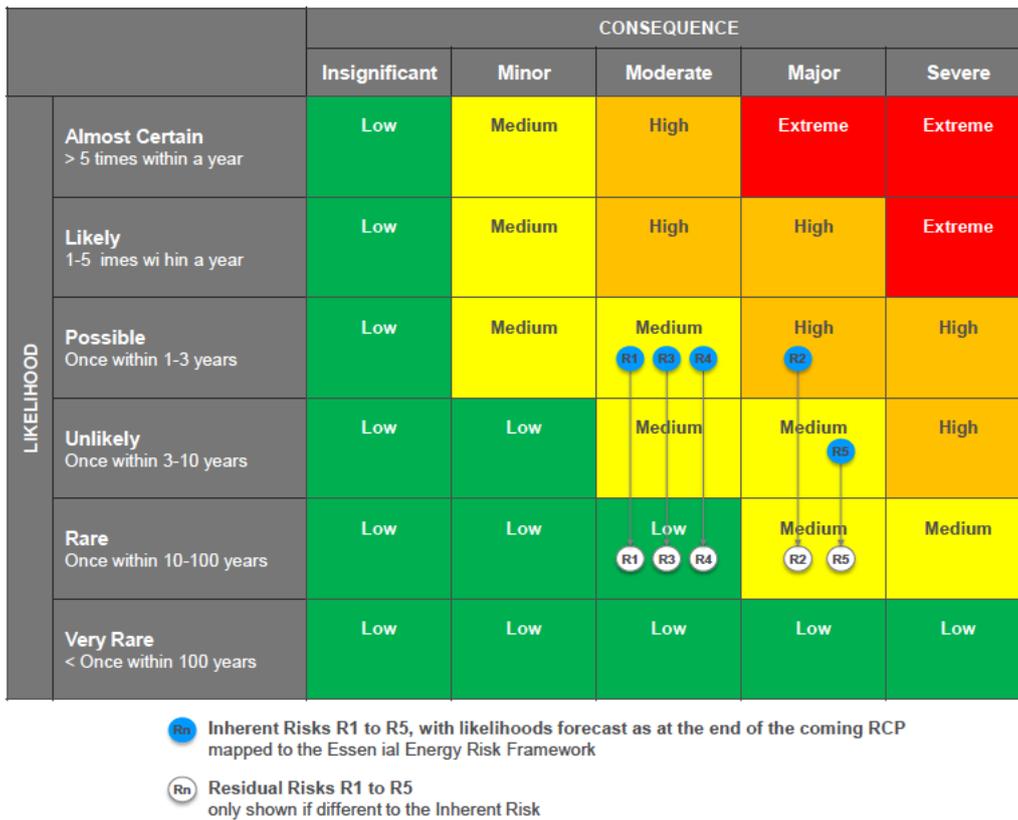


Figure 4: Residual Risks - Option 1

1.1.1 Project Delivery Risks – Option 1

The table below summarises the project delivery risks associated with implementation of this option.

Inherent Project Risk	Inherent Project Risk	Controls	Residual Project Risk
Project Risk 1 Project Delivery Complexity GIS system projects can be complex, requiring high accuracy, traceability and auditability in data related activity.	Medium	In the current RCP, Essential Energy has established strong program delivery governance and management practices which have successfully guided delivery of the Oracle ERP and EAM program. This same governance and delivery experience will be leveraged to mitigate the delivery risks associated with this initiative.	Low
Project Risk 2 Solution maturity When software solutions are relatively new in the release cycle there may be a greater number of software defects.	Medium	Choosing to upgrade to the latest version of GE Smallworld brings a quite low "maturity risk" as the product is already well established in use with other peer network businesses.	Low
Project Risk 3 Resource capacity and Skills availability The initiative requires mobilisation of a skilled delivery team comprising internal subject matter experts and external solution delivery specialists. The required internal subject matter experts may be limited in capacity due to other initiatives and organisational change. Availability of required external	High	The project will be strictly planned, scheduled and governed, consistent with the Enterprise Program Management Office (EPMO) practices which have matured through delivery of the ERP and EAM projects in the current RCP. The project plan will be scheduled to identify and minimise scarce resourcing conflicts, to ensure necessary resourcing is available for the chosen product(s), platform(s) and delivery method. Continue to perform prudent program	Low

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Inherent Project Risk	Inherent Project Risk	Controls	Residual Project Risk
solution delivery specialists is dependent on the capacity of the market.		management planning to minimise internal resourcing conflicts, ensuring adequate capacity is committed to each initiative prior to delivery. Also prior to delivery, verify the availability of external solution delivery expertise through market procurement processes.	
Project Risk 4 Data migration complexities In significant upgrades there are generally a range of data issues which need to be resolved in order to upload into the new version of the solutions. This may be particularly true in the migration from the current GE Smallworld version to a version built on new data architecture.	 Medium	Undertake data profiling early in order to identify data inconsistency issues between product versions. Undertake data cleansing early in the project to avoid data becoming the critical path. Factor adequate data conversion dress rehearsals into the project.	 Low
Project Risk 5 Business change capacity Business change capacity is insufficient, and fatigue occurs.	 Medium	Commit one or more key roles to the initiative, to ensure the best people are focussed on delivering an optimised solution. Minimise other less-critical parallel activity. Ensure an effective change and communications strategy is in place and regularly measure business readiness for change. Utilise technology for training and education and ensure achievement of minimum standards in using the new solution	 Low

Table 3: Project Delivery Risks - Option 1

2.3. Option 2: Lifecycle systems renewal - Implementation of new “best of breed” spatial solutions

Through this option, Essential Energy will replace the ageing GE Smallworld GIS with new “best of breed” commercially available spatial solution(s) for long term sustainability, business process efficiency and cyber security resilience. These solution(s) will be integrated with the broader Essential Energy systems.

While this option addresses the business drivers and mitigates the inherent risks similar to Option 1 (section 2.2), it introduces additional independent systems and integrations into the portfolio, with associated support implications.

2.3.1 Assumptions – Option 2

The following assumptions apply for this option:

- The existing GE Smallworld version will continue operating with current business processes, until transition to the new solution in FY26. Existing support arrangements will continue without incremental cost increases until that time.
- The replacement spatial solution(s) will be selected through a market evaluation and formal procurement process, to ensure prudent and efficient project delivery and operations expenditure. The scale of this procurement activity will be materially greater than for Option 1, as all alternative software and service models will be evaluated.
- The initiative will be delivered as a coordinated project, incorporating data migration, User Acceptance Testing to ensure successful transition of critical systems capability.

New “Best of breed” Spatial Network Management solutions, integrated to Essential Energy systems			
Duration	Plan / Procure	9	Months
	Design	9	Months
	Construct / Test	15	Months
	Deploy / Hypercare	3	Months
	Total	36	Months
Project Expenditure	\$M FY24 Real Terms	Capex	Opex
	Labour (Direct)	█	█
	Vendor Services	█	█
	Software & Hardware	█	█
	Total	█	█
Support Costs	\$M FY24 Real Terms	Opex p.a.	
	Ongoing SaaS service fees	█	█
	Total	█	█

1.1.2 Benefits – Option 2

The table below summarises the benefits which will be enabled through selection of this option.

Benefit	Type and Value
Improved decision-making support across the organisation through the democratisation of GIS / spatial data.	Contributor to Productivity Improvement Target
Improved interoperability between the GIS and Essential Energy systems supporting safety, customers and investment processes.	Contributor to Productivity Improvement Target and Quality of Service
Improved solution availability and faster Disaster Recovery timelines leading to increased organisational productivity.	Contributor to Productivity Improvement Target
Time saved for regulatory report generation and data requests through efficient data access.	Contributor to Productivity Improvement Target

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Ability to respond to regulatory requests and other changes impacting the organisation.	Compliance
Risk mitigation benefits (see section 2.2.3 below)	Non-Financial

1.1.3 Residual Risks – Option 2

The table below summarises the risk position at the end of the coming RCP (FY29) in the event that this option is selected. Note that the risks included within this table, and the Inherent Risk ratings are as identified in section 1.5 (Page 9).

Inherent Risk at end-RCP (FY29) from business drivers - see section 1.5		Mitigated Risk for this Option i.e., residual risk			
Inherent Risk	Inherent Risk Rating	Mitigation	Likelihood	Consequence	Residual Risk Rating
Risk 1 Vendor support risk Vendor support for the product is currently “best efforts” until an upgrade to a supported version is achieved. Vendor support for the product is withdrawn and/or a system outage is incurred.	● Medium	Moving to the latest generation of Spatial Network Management capability reduces the likelihood of this risk. Should an outage occur, operating on current generation software would support faster recovery and reduce its potential impact.	Rare	Moderate	● Low
Risk 2 Cyber security risk Aged software platforms fall subject to a successful cyber security attack, resulting in denial of service, data breach and/or data loss.	● High	Moving to the latest generation of Spatial Network Management capability reduces the likelihood of this risk. Contemporary and current version platforms are more resilient to cybersecurity threats than legacy platforms. Contemporary applications support the cycle of cyber security updates / patches of underpinning infrastructure software (operating systems, database management systems and integration technology).	Rare	Major	● Medium
Risk 3 Inability to support new market obligations risk New market requirements may not be accommodated in the current GIS system due to lack of vendor or platform support, or due to inflexibility of the legacy system architecture.	● Medium	Moving to the latest generation of Spatial Network Management capability reduces the likelihood of this risk, with modern cloud-based flexibility.	Rare	Moderate	● Low

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Inherent Risk at end-RCP (FY29) from business drivers - see section 1.5		Mitigated Risk for this Option i.e., residual risk			
Inherent Risk	Inherent Risk Rating	Mitigation	Likelihood	Consequence	Residual Risk Rating
Risk 4 Operational failure risk GIS fails (or partially fails) due to the ageing technology platforms, resulting in the unavailability of GIS data causing delays across various asset management processes including network upgrade projects, maintenance projects and new connections. Financial impacts result due to productivity loss and also customer impacts in terms of delays in delivering changes to the electricity network.	 Medium	The likelihood is materially reduced through transition to contemporary, high availability solution(s).	Rare	Moderate	 Low
Risk 5 Corrupted data leading to safety risks. GIS fails (or partially fails) resulting in loss or corruption of "as constructed" network asset data. The recovery of "as constructed" data sets, in particular where manual intervention is required, may result in data errors. These errors may cause operational safety issues where the actual network configuration is not aligned to the connectivity model within the GIS which could lead to significant operational safety incidents.	 Medium	The likelihood is materially reduced through transition to contemporary, high availability solution(s).	Rare	Major	 Medium

Table 4: Residual Risks - Option 2

PRELIMINARY BUSINESS CASE – Spatial Network Management Upgrade

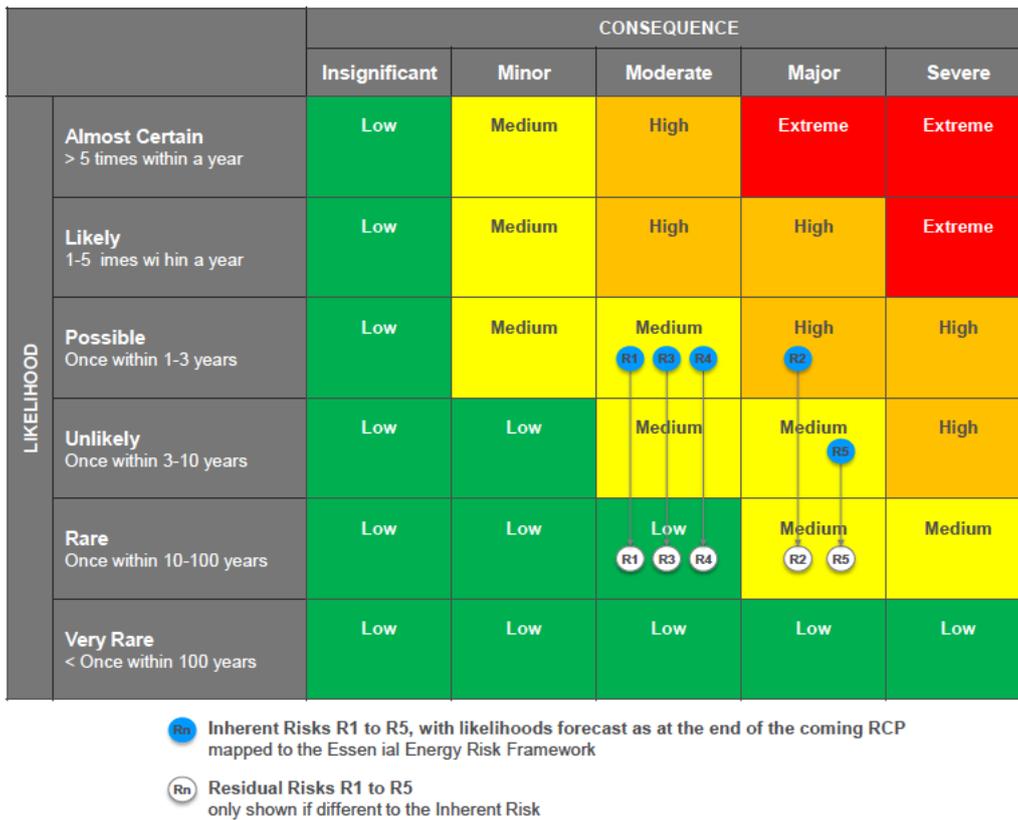


Figure 5: Residual Risks - Option 2

1.1.4 Project Delivery Risks – Option 2

The table below summarises the project delivery risks associated with implementation of this option.

Inherent Project Risk	Inherent Project Risk	Controls	Residual Project Risk
Project Risk 1 Project Delivery Complexity GIS system projects can be complex, requiring high accuracy, traceability and auditability in data related activity.	● Medium	In the current RCP, Essential Energy has established strong program delivery governance and management practices which have successfully guided delivery of the Oracle ERP and EAM program. This same governance and delivery experience will be leveraged to mitigate the delivery risks associated with this initiative.	● Low
Project Risk 2 Solution maturity When software solutions are relatively new in the release cycle there may be a greater number of software defects.	● Medium	Choosing to implement new “best of breed” solution(s) remains a risk due to potential lack of solution maturity. Some limited mitigation is possible through actions including: <ul style="list-style-type: none"> Establish connections with other organisations who have moved to the new version of the software to get insights into any product version maturity issues. Ensure test strategy and plans are robust to defect critical issues early in the testing phase. Agree defect turnaround time with vendor prior to commencement of the project. 	● Medium

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<p>Project Risk 3 Resource capacity and Skills availability</p> <p>The initiative requires mobilisation of a skilled delivery team comprising internal subject matter experts and external solution delivery specialists.</p> <p>The required internal subject matter experts may be limited in capacity due to other initiatives and organisational change.</p> <p>Availability of required external solution delivery specialists is dependent on the capacity of the market.</p>	<p> High</p>	<p>The project will be strictly planned, scheduled and governed, consistent with the Enterprise Program Management Office (EPMO) practices which have matured through delivery of the ERP and EAM projects in the current RCP.</p> <p>Program and project plans will be scheduled to identify and minimise scarce resourcing conflicts, to ensure necessary resourcing is available for the chosen product(s), platform(s) and delivery method.</p> <p>Continue to perform prudent program management planning to minimise internal resourcing conflicts, ensuring adequate capacity is committed to each initiative prior to delivery.</p> <p>Also prior to delivery, verify the availability of external solution delivery expertise through market procurement processes.</p>	<p> Low</p>
<p>Project Risk 4 Data migration complexities</p> <p>In spatial projects there are generally a range of data issues which need to be resolved in order to upload into the new version of the solutions.</p> <p>This may be particularly true in the migration from the current GE Smallworld version to a version built on new cloud based data architecture.</p>	<p> Medium</p>	<p>Undertake data profiling early in order to identify data inconsistency issues between product versions.</p> <p>Undertake data cleansing early in the project to avoid data becoming the critical path.</p> <p>Factor adequate data conversion dress rehearsals into the project.</p>	<p> Low</p>
<p>Project Risk 5 Business change capacity</p> <p>Business change capacity is insufficient, and fatigue occurs.</p>	<p> Medium</p>	<p>Commit one or more key roles to the initiative, to ensure the best people are focussed on delivering an optimised solution.</p> <p>Minimise other less-critical parallel activity.</p> <p>Ensure an effective change and communications strategy is in place and regularly measure business readiness for change.</p> <p>Utilise technology for training and education and ensure achievement of minimum standards in using the new solution.</p>	<p> Low</p>

Table 5: Project Deliver Risks - Option 2

3. Financial Comparison

The table below provide a comparison of the Net Present Value (NPV) for each option.

Option	NPV
Base Case: Further extend the life of the current GIS version	████████
Option 1: Lifecycle systems renewal - Upgrade the Smallworld GIS (Recommended)	████████
Option 2: Lifecycle systems renewal – Implementation of new “best of breed” spatial solutions	████████

The above NPV comparison has been performed using the NPV calculation workbook, with the following parameters.

- Discount Rate: 2.74% (Post-tax Real)
- Company Tax Rate: 30%
- Investment Modelling Period: 10 Years
- Asset Life: 7 years

4. Dependencies

Project Name	Nature of Dependency
EAM Project	In the remainder of the current RCP, Essential Energy is completing the Oracle EAM project delivery (building on the Oracle Cloud ERP implementation already undertaken). Therefore, this GIS project is planned to begin following implementation of the EAM system migration.
GE PowerOn Advantage	The upgrade to GE PowerOn Advantage (currently nearing finalisation) will provide opportunity for better integration with the GIS.
Digital Asset Management (Neara)	Neara is being embedded as part of the Digital Asset Management initiative. There is currently a manual data interface between Neara and the GIS, but this will be automated upon implementation of this proposed investment.
Cyber Security IPART DNSP Licence Compliance Project	In the remainder of the current RCP, Essential Energy is finalising implementation of the Cyber Security technology and practice improvements required for compliance with the company’s revised Distributor Licence Conditions. The GIS project would be delivered more efficiently post completion of the Cyber Security works.

5. Organisational Change Impacts

A stakeholder assessment and impact analysis will detail the groups/roles impacted (internal and external), the nature of the change and the level of impact. The impact assessment will articulate the change in the following dimensions for each stakeholder grouping.

- **Process:** Procedures, work practices, reference guides, work instructions, standard operating guides
- **Organisation:** Accountabilities, reporting lines, position profiles, KPI, behaviours/cultural attributes
- **Technology:** Systems, infrastructure, tools, support resourcing and contracts
- **Information:** Data and reporting.

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The impact assessment informs the interventions required, with tailoring to suit the nature of the change and the stakeholder groupings – a one size fits all approach is not appropriate.

Business Area	Nature of Impact
External Customers	Accredited Service Providers (ASP) and other consumers of data may be impacted by delays in data requests due to either resourcing or system availability.
External Agencies	External agencies such DBYD and the NSW Spatial Info Collaboration Portal may be impacted by delays in data requests due to either resourcing or system availability.
Employees	Changed work practices for accessing spatial and network model data.
GIS Support	Responding to enquiries resulting from changes across systems,
eTech ICT Support	Level 1 Help Desk support and triage training. Development of vendor management practices for Level 2 to 3 support. DevOps work practices for coordination and management of enhancement and market change releases.

6. Conclusion

The preceding sections of this preliminary business case summarise the business drivers for investment, the options to address those drivers, and the corresponding likely costs, benefits, risks and impacts.

On this basis, the recommended option (“Option 1 - Lifecycle systems renewal - Upgrade the Smallworld GIS”) is proposed for the purposes of organisational planning and forecasting.

Consistent with Essential Energy’s investment governance processes, prior to proceeding with the proposed investment a detailed delivery business case will be developed and evaluated.

ATTACHMENT 1: Terms and Abbreviations

The following terms or abbreviations are used within this document.

Term	Description
aaS	As a Service
AEMC	The Australian Energy Market Commission
AEMO	Australian Energy Market Operator
ALM	Asset Lifecycle Management
Capex	Capital Expenditure
DNSP	Distribution Network Service Provider
EAM	Enterprise Asset Management
ERP	Enterprise Resource Planning
GIS	Geographic Information System
ICT	Information & Communication Technology
IaaS	Infrastructure as a Service
NPV	Net Present Value
LNSP	Local Network Service Provider
Opex	Operating Expenditure
PaaS	Platform as a Service
RCP	Regulatory Control Period
SaaS	Software as a Service
Totex	Total Expenditure (Capital + Operating)
WACC	Weighted Average Cost of Capital