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RIIO-T2

RIIO-T2 TO Submission Review Summary Report

Ofgem

18 June 2020

Summary Report – Assessment of RIIO-T2 companies EJP/IDP reports

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Executive summary

Atkins have been appointed to provide an independent technical review of the RIIO-T2 business plans of the three GB Transmission Owners (TOs). The review includes individual Investment Decision Packs (IDPs) and Engineering Justification Papers (EJPs) which aim to justify the capital expenditure on a project or asset volume basis.

We have used an evidence-based approach to carry out the review. The papers, supporting documents and information provided have been scrutinised based on the following criteria:

- Top down investment drivers and engineering needs case,
- Industry codes, standards, processes and requirements driving the needs case,
- Assessment of policies and assumptions underlying asset replacement requirements, such as;
    - Asset condition,
    - Asset criticality,
    - Principles following the Network Asset Risk Annex (NARA) / Network Output Measures (NOMs) methodology,
- The materiality of the intervention, considering the needs case, options considered, proportionality of the solution, value for money and the risk to consumer.

The prevailing output for the review was the determination of the risk to consumers i.e. the likelihood that the expenditure proposed could be either deferred beyond RIIO-T2 or not required. Based on the set criteria, responses to Supplementary Questions (SQs) and Atkins' professional engineering judgement, a Red Amber Green (RAG) scoring system has been used to inform this risk attributed to each IDP/EJP. The RAG scoring system is described in Section 3 and further details of the methodologies for assessment of each TO's IDP/EJP is provided in Appendix D.

The high-level outcomes and comments for each TO are provided below. A summary of the assessment for each TO is provided in Section 3 of this report.

Scottish Power Transmission (SPT)

SPT's EJPs were found to generally be of a good quality and with clear and consistent structure. The majority of the need cases presented were clear and supported with evidence (e.g. customer requests, Network Options Assessment (NOA) recommendations, asset condition reports etc.). The SQ responses provided were robust. This is reflected in the small percentage of evaluated EJPs which were deemed high risk (13%).

Rating	Number of Papers	Total Spend
Red (High risk to consumer)	12	£257.8m
Amber (Medium risk to consumer)	14	£290.5m
Green (Low risk to consumer)	68	£1,052.2m

Scottish Hydro Electric Transmission (SHET)

SHET's load related schemes were of a high standard with all 7 EJPs being considered low risk to consumers. The non-load EJPs based on asset condition were of a reasonable standard and were generally consistent with the supporting evidence. In the majority of cases, the supporting evidence (asset condition reports, SQ responses, etc.) was robust and presented strong arguments in support of the EJPs. Where there was insufficient evidence provided, those EJPs were categorised as medium or high risk.

Rating	Number of Papers	Total Spend
Red (High risk to consumer)	16	£360.1m
Amber (Medium risk to consumer)	13	£327.2m
Green (Low risk to consumer)	20	£1,169.3m

National Grid Electricity Transmission (NGET)

NGET submitted 31 IDPs, some covering a portfolio of assets while two papers were not associated with any investment and therefore were not assessed. Of the 29 IDPs reviewed, 9 have been categorised with a low risk to the consumer. This represents an investment of around £1.66bn, which is 34.9% of the overall requested investment. A number of concerns have been highlighted:

- **Detail** – Overall, the papers were lacking in detail requiring a significant number of SQs.
- **Evidence** – Evidence supporting the asset health condition, which aims to justify asset interventions was not provided. Atkins have carried out stratified sampling via SQs requesting evidence to verify asset health condition. The responses to SQs have not, in most cases, provided the level of evidence considered sufficient to justify the volume of assets proposed for interventions.
- **Monetised Risk** – Atkins have concerns over NGET's application of the NOMs methodology and monetised network risk. In a number of asset categories, assets have been posed for intervention with low End of Life (EoL) representing low Probability of Failure (PoF). In these cases, intervention is driven by the Consequence of Failure (CoF) which has a significant impact on the monetised risk, however the proposed interventions do not lead to significant reductions in CoF and have a marginal impact on PoF.
- **Site surveys/investigations** – In a number of IDPs NGET have put forward assets for intervention (including full replacement) based on End of Life modifier (EoL_{mod}) values which have been calculated using desktop methods only. There is little evidence provided in terms of site surveys or physical samples to justify the need for intervention. The actual condition of the equipment on site following investigation can have a significant impact on the project need, especially where full replacement is forecast.
- **NARA** – Evidence collected as part of the SQ process for 'A9.09 – OHL Conductors and Fittings' has indicated that NGET have altered their calculation of EoL for overhead line (OHL) conductor assets. Atkins feel that this action calls into question the validity and the subsequent risk to the consumers of the submission and makes it difficult to assess the needs case of the suggested volume of interventions. This could be a risk across all non-load assets, as the methodologies developed by NGET to support volume-interventions are subject to short notice change and no independent scrutiny.
- **Apportionment** – NGET have been inconsistent across IDPs in its application of apportionment of the costs of projects with RIIO-T2 outputs across RIIO-T1 and T3. Atkins have tried to interpret these figures as best as possible, but some gaps remain.

Rating	Number of Papers	Total Spend
Red (High risk to consumer)	13	£2,191.8m
Amber (Medium risk to consumer)	9	£874.8m
Green (Low risk to consumer)	9	£1,657.1m

1. Introduction

RIIO-T2 is the next regulated price control for the companies running the electricity transmission networks. The current RIIO-T1 price control will end on the 31st March 2021.

The three Transmission Owners (TOs); Scottish Power Transmission (SPT), Scottish Hydro Electric Transmission (SHET) and National Grid Electricity Transmission (NGET), have submitted their business plans intended to align with the RIIO-T2 price control.

The business plans and their intended investments provide the TO with funding to upgrade and maintain cables, substations and other equipment with the aim to keep the electricity connections reliable. Much of today's transmission network was built in the 1950s and 1960s, and investment is required on assets which require intervention to pre-empt failures or extend asset life.

As the capital investment of projects highlighted in the business plans will be recovered through GB electricity bills or network charges for developers, Ofgem are responsible for the review and agreement of the expenditure with the aim of protecting the interests of the GB consumer.

Atkins have been appointed to act as an independent party providing a review of the technical engineering portion of the business plans. This includes individual Investment Decision Packs (IDPs) and Engineering Justification Papers (EJPs) which aim to justify the capital expenditure on a per project or per asset basis.

We have used an evidence-based approach to carry out the review. For each IDP/EJP we have:

- Commented on the suitability of the needs case for the volume of interventions
- Evaluated the options proposed to tackle the need
- Considered whether the preferred solution is proportionate to the needs case
- Taking a collective view of the information into account, we have made a decision on the level of risk to the consumer

This summary report provides the scope of works undertaken by Atkins, our methodology and an overview of the findings relating to each IDP/EJP. Technical notes have also been provided in separate appendices which cover each TO's project or asset specific paper.

2. Scope of works

The main scope of works attributed to this project included the assessment of the three TOs business plans, NGET, SHET and SPT. The ultimate goal of this process was an assessment of every IDP/EJP submitted by licensees as part of their RIIO-T2 Business Plan submissions. These IDP/EJPs alongside any supplementary documentation are provided by the TOs with the aim of justifying their proposed RIIO-T2 expenditure.

For each IDP/EJP an individual technical note was required which would be split into categories. The IDP/EJP assessment had five categories, covering assessments of the following;

1. Paper complete with all references available,
2. Clear and unambiguous needs case identified,
3. Validity of the options considered,
4. Chosen solution proportionate to the identified needs case,
5. Risk to consumer – which is a comment on the risk of deferment of the posed works.

The final methodology for scoring and attributing risk varies between licensees due to the differing levels of information included in each IDP/EJP and the different approaches by the licensees in making their investment decisions. However, these 5 categories remain consistent in the individual technical notes. Further information on individual methodologies is provided in Appendix D.

The reviews of the IDP/EJPs from the companies have been scrutinised based on the following, subject to information received:

- Top down investment drivers and engineering needs case,
- Industry codes, standards, processes and requirements driving the needs case,
- Assessment of policies and assumptions underlying asset replacement requirements, such as;
    - Asset condition,
    - Asset criticality,
    - Principles following the Network Asset Risk Annex (NARA) / Network Output Measures (NOMs) methodology,
- The volume attached to the intervention, with comments made related to the needs case, options considered, proportionality of the solution, value for money and the risk to consumer
- Assessment and benchmarking of the unit cost of the interventions was not part of the scope of works. However, where a significant issue was found as part of the IDP/EJP assessment, this has been highlighted although any such issue has not impacted on the rating for the IDP/EJP.

Following initial review, Atkins raised Supplementary Questions (SQs) to receive relevant information. The formal SQ process was managed by Ofgem to seek clarification on any areas required. The SQ process was time limited and subject to resource constraints; where issues raised by SQs are outstanding these are noted in the assessment section for each of the TO's.

During the course of the project, communications with Ofgem included kick off, touch base and bi-weekly meetings. It also included 2 workshops with presentations to management.

3. Outputs

Based on the five criteria stipulated by Ofgem and following the methodology detailed in Appendix D, SQ responses and Atkins' professional judgement, a Red Amber Green (RAG) scoring system has been used to inform the risk of investment of the IDP/EJP submitted for the RIIO-T2 period:

RAG	Risk category factors
Green	• If less than 20% of the total value of the paper may not be required in RIIO-T2 period, it will still be categorised as Green • There is no / a low risk that the investment will not be required in RIIO-T2 period • Needs case is clear and unambiguous • Timing to invest is justified • Solution is proportionate to the needs case
Amber	• There is a moderate risk that part of the investment (between 20% and 50% of the total value of the paper) will not be required in RIIO-T2 period • Needs case is uncertain • Delay is likely • Solution is disproportionate to the needs case • Scope has expanded beyond the requirements • Uncertainty in the scope of work
Red	• There is a high risk that most of the investment (>50% of the total value of the paper) will not be required in RIIO-T2 period • Needs case is not clear • Significant delay is likely • Solution is significantly disproportionate to the needs case • Scope has significantly expanded beyond the requirements • Significant uncertainty in the scope of work

Table 3-1 - RAG rating and corresponding risk categorisation

3.1. SPT Outputs

This section gives an overview of the main findings of the assessment carried out by Atkins during the RIIO-T2 evaluation for SPT. A total of 110 EJPs were submitted by SPT as part of their RIIO-T2 business plan submission: 44 load-related and 66 non-load related. It is noted that some of the non-load / load schemes have secondary load / non-load drivers respectively. Where this is the case the scheme has been categorised by its primary driver. The EJPs have been grouped into High, Medium or Low risk as per the methodology outlined in Section 3, Table 3-1, based on the supporting assessment detailed below:

- An individual technical assessment report has been produced for each SPT EJP. These can be found in Appendix A.
- Summary scores for all SPT EJPs are provided in Appendix E.
- An SQ Log has been provided in Appendix G which provides a list of SQ references used to carry out the review.

The total monetarised value of all the SPT EJPs is £1,620.78m. The following figure presents a summary of the findings in terms of the EJP investment values.

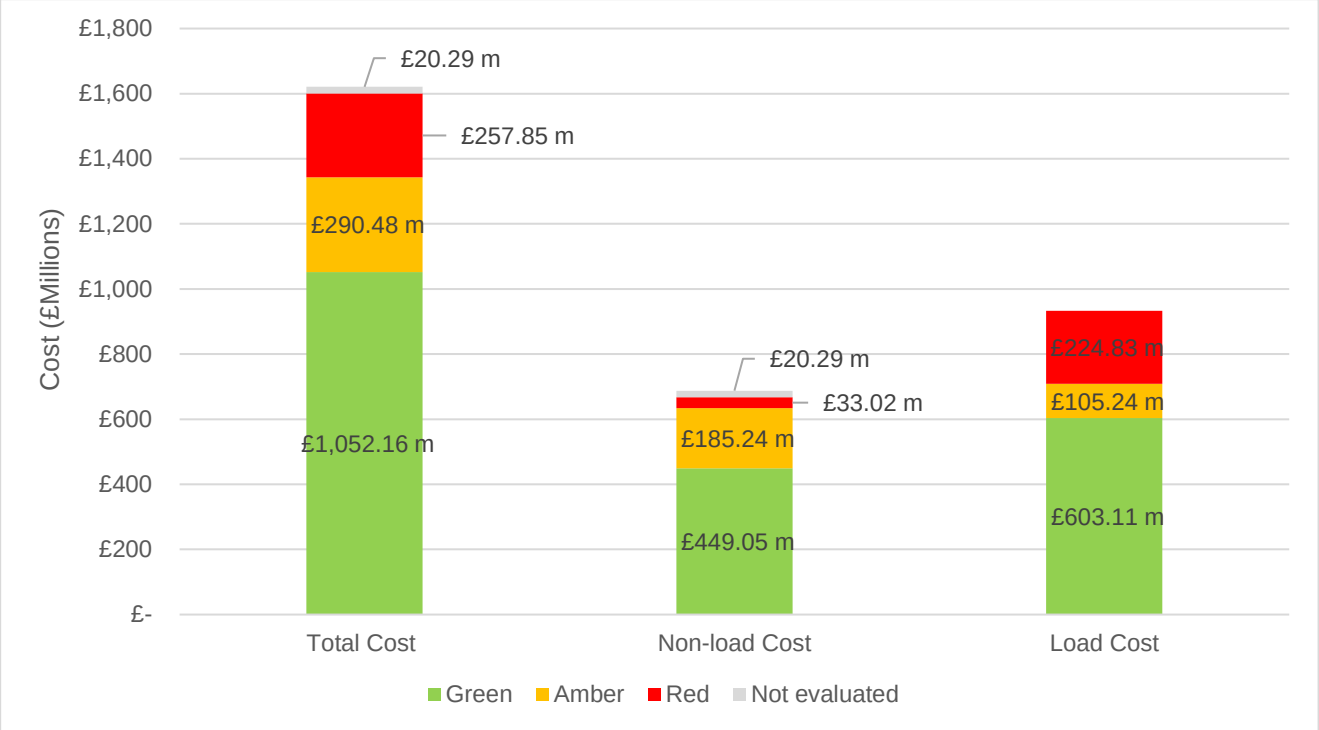

Figure 2-1 - Summary of findings by investment value

3.1.1. SPT Risk classification and issues

3.1.1.1. Risk classification

Table 3-2 - SPT RAG Summary

Scheme number & title	Risk	Spend (£m)	Load/Non-Load
SPT200137-142 Synchronous Compensators	Red	154.86	Load
SPT200106 Denny to Wishaw 400kV Reinforcement (DWNO)	Green	[redacted]	Load
SPNLT2099 Longannet 275kV switchgear replacement project	Amber	98.37	Non-Load
SPT200120 Eccles Shunt Compensation and Real-time Thermal Rating Scheme (ECVC)	Amber	[redacted]	Load
SPT200168-169 Branxton Substation	Green	93.311	Load
SPT TOCO T2 Generation Connections	Green	54.25	Load
SPNLT20109 Glenlee to Tongland Modernisation	Green	46.6	Non-Load
SPNLT205 ZA Route 400kV OHL Major Refurbishment	Green	44.6	Non-Load

SPNLT2033 Windyhill 275kV Switchgear Replacement Project	Green	43.64	Non-Load
SPT200110 East Coast 400kV Incremental Reinforcement (ECUP)	Green	[redacted]	Load
SPNLT200/201/203/2013-2017/2019/2020 OHL Minor Refurbishment Programme	Green	39.4	Non-Load
SPNLT20111 XH & XJ Route 400kV OHL Major Refurbishment	Green	39.1	Non-Load
SPT200143 Kendoon to Glenlee Reinforcement Works (TORI-221)	Green	37.316	Load
SPT20021/22 New Cumnock Fault Mitigation and Substation Extension	Green	25.067	Load
SPT200126 Harmonic Filters	Green	24.235	Load
SPT200112 Hunterston East to Neilston (HNNO)	Green	[redacted]	Load
SPNLT2034 Westfield 275kV Switchgear Replacement Project	Amber	22.93	Non-Load
SPNLT2036 Hunterston 400kV Switchgear Replacement Project	Green	21.69	Non-Load
SPNLT2055 400kV and 275kV Telecoms Resilience Project	Red	19.4	Non-Load
SPT200136 Pre-Engineering Works	Red	18.2	Load
SPNLT202 ZO, ZR and XF Routes 400kV OHL Major Refurbishment	Green	17.5	Non-Load
SPT200128/129 Black Start	Red	15.621	Load
SPNLT2037 Hunterston 132kV Switchgear Replacement Project	Green	15.33	Non-Load
SPT20085-87 GSP Lesmahagow Fault Level Mitigation	Green	15.267	Load
SPNLT2052 132kV Optical Transport Network Project	Amber	13	Non-Load
SPT200108 East Coast 275kV Upgrade (ECU2)	Green	[redacted]	Load
SPT20073/74/75/103/104/105 Central Glasgow Fault Level Management	Red	12.13	Load
SPNLT2021-2023 Cable Major Refurbishment Programme	Green	12	Non-Load
SPNLT2046/20115 SPD Driven 33kV Switchboard Change Programme	Amber	11.95	Non-Load
SPNLT2048 Protection Modernisation	Amber	11.9	Non-Load
SPT200134/135 Shunt Compensation – Mark Hill STATCOM	Green	[redacted]	Load

SPT200180/181 U and AT Route Uprating (TORI-151a)	Green	10.39	Load
SPNLT20102 Environmental – Refurbishment of Oil Bunding & Drainage Systems	Green	10.38	Non-Load
SPNLT209 BL Route 132kV OHL Major Refurbishment	Green	10.2	Non-Load
SPNLT20124 Gorgie-Telford Road 132kV Cable Replacement	Green	[redacted]	Non-Load
SPT200132/133 South West Scotland Generation Export Management System (GEMS)	Green	10.073	Load
SPT200124/125 Shunt Compensation – Operability (Reactors)	Green	9.639	Load
SPNLT20112 Currie-Gorgie 132kV Cable Replacement	Green	[redacted]	Non-Load
SPNLT Site Security	Green	9.4	Non-Load
SPT200122/123 Shunt Compensation – Operability (Hunterston)	Green	[redacted]	Load
SPT200192 Cumberhead Collector Substation (TORI-238)	Green	9.331	Load
SPNLT2012 AY Route 132kV OHL Major Refurbishment	Green	9.1	Non-Load
SPNLT207 AL Route 132kV OHL Major Refurbishment	Green	8.9	Non-Load
SPT20060-62 GSP Newarthill Fault Level Mitigation	Red	8.625	Load
SPT20043/44 New Cumnock SGT2B	Green	[redacted]	Load
SPT20025/26 Mark Hill to Chirmorie/Stranoch Wind Farms	Green	8.478	Load
SPNLT2038 Devol Moor 132kV Switchgear Replacement Project	Green	8.47	Non-Load
SPNLT20113 Cable Sealing End Proactive Programme	Green	7.9	Non-Load
SPNLT2047 Torness 400 Shunt Reactor Replacement	Red	[redacted]	Non-Load
SPT20029/30 Mark Hill SGT3	Green	[redacted]	Load
SPT20035/36 Coylton SGT1/2 Reinforcement	Green	7.579	Load
SPT20063-65 GSP Kilmarnock Town Fault Level Mitigation	Red	7.455	Load
SPNLT2067 Mosmorran 132kV Switchgear Replacement Project	Green	7.44	Non-Load
SPNLT2057 Active Equipment Refresh Programme	Green	7.3	Non-Load

SPT200119 Windyhill to Lambhill to Longannet 275kV Circuit Turn-In to Denny North 275kV Substation (WLTI)	Amber	[redacted]	Load
SPNLT204 XZ Route 275kV OHL Major Refurbishment	Green	6.5	Non-Load
SPNLT2049 EMS Replacement	Amber	6.3	Non-Load
SPNLT20103 Cockenzie Building Improvement Works	Green	6.3	Non-Load
SPNLT20100 Concrete/Steel Structures	Green	6.2	Non-Load
SPT20069/70/71/72/76/101/102 SPD GSP Proposed Reinforcement Schemes	Green	6.08	Load
SPNLT2068-2074/2094-2096 RIIO-T2 Transformer Refurbishment Programme	Green	6.03	Non-Load
SPNLT2066 Giffnock SGT1 and SGT2 Replacement	Amber	[redacted]	Non-Load
SPNLT Flood Mitigation	Green	5.5	Non-Load
SPT20077 GSP Westfield Fault Level Mitigation	Green	5.426	Load
SPT200182 Gretna - Ewe Hill 132kV Reinforcement	Green	5.313	Load
SPNLT20101 Building Refurbishment Programme	Green	5.25	Non-Load
SPNLT2018 BU Route 132kV OHL Major Refurbishment	Green	5.1	Non-Load
SPNLT Fire Protection	Green	4.89	Non-Load
SPNLT20140 SF6 Repair Works	Amber	4.77	Non-Load
SPT200130/131 Circuit Rating Management System	Green	4.651	Load
SPNLT208 BC Route 132kV OHL Major Refurbishment	Green	4.4	Non-Load
SPNLT2010 BW Route 132kV OHL Major Refurbishment	Green	4.4	Non-Load
SPT200184 Coalburn – Douglas North 132kV Cable Reinforcement	Red	4.262	Load
SPNLT2051 System Monitoring Modernisation	Green	3.8	Non-Load
SPNLT2065 Neilston SGT1 Replacement	Amber	[redacted]	Non-Load
SPT20017 132kV Ewe Hill Substation Transformer SGT2 (TORI-232)	Green	[redacted]	Load
SPT20080-82 GSP Strathaven Fault Level Mitigation	Red	3.676	Load

SPT20013/14 Newton Stewart GSP	Green	3.654	Load
SPNLT2064 Devol Moor T2A Replacement	Amber	[redacted]	Non-Load
SPNLT2091 Torness 400kV Circuit Breaker GIS Programme	Green	3.36	Non-Load
SPT20088 GSP Moffat new GSP	Amber	3.277	Load
SPNLT2063 Longannet 275kV Series Reactor Refurbishment	Red	[redacted]	Non-Load
SPNLT20104 Partick Site Rationalisation	Amber	2.96	Non-Load
SPNLT20116/20117 SPT Strategic Spares	Green	2.93	Non-Load
SPT20083/84 GSP East Kilbride Fault Level Mitigation	Green	2.893	Load
SPT20091-93 GSP Redhouse Capacity Upgrade	Green	2.861	Load
SPNLT2040 Glenniston 132kV Switchgear Replacement Project	Green	2.84	Non-Load
SPNLT2060 PD Installation for GIS and GIB Programme	Green	2.8	Non-Load
SPNLT20142 EAP - Building Energy Reduction Measures	Red	2.76	Non-Load
SPT20027/28 Newton Stewart 132kV Reinforcement Works	Green	2.289	Load
SPT200191 Coalburn to Douglas North	Green	1.605	Load
SPT20023 Glenglass Overload Protection Scheme	Green	0.685	Load
SPT20015 New Cumnock Overload Protection Scheme	Green	0.571	Load
SPT20033 Kilmarnock South Overload Protection Scheme	Green	0.361	Load

3.1.1.2. Issues

Table 3-3 - Issues for SPT

EJP	Issues & comments
SPT200137-142 Synchronous Compensators	• The needs case is clear, but it is deemed uncertain as it is subject to the outcome of the Electricity System Operator (ESO)'s stability pathfinder project tender. • SPT plan to submit the project to future pathfinder project tender phases. • The EJP seeks to allow SPT an uncertainty mechanism within the price control so that the proposal can be submitted to the ESO and

	funding can be provided should the ESO accept the solution as the most appropriate proposal. SPT's proposal is deemed sensible.
SPT200106 Denny to Wishaw 400kV Reinforcement (DWNO)	• No specific issues noted
SPNLT2099 Longannet 275kV switchgear replacement project	• The scope of work is uncertain. • The needs case is based on the conditions of the switchgear at the Longannet 275kV substation. However, Longannet substation may need to be uprated to 400kV in the future, depending on the Network Options Assessment (NOA) recommendation on the "Eastern boundary B4 400kV reinforcements". • SPT have noted the uncertainties associated with this EJP. They propose that the costs be excluded from the baseline allowances and that a trigger mechanism is implemented. • Both the 275kV and 400kV options are considered valid and appropriate.
SPT200120 Eccles Shunt Compensation and Real-time Thermal Rating Scheme (ECVC)	• The scope of the option detailed in the EJP is different to that detailed in the NOA Report – two hybrid synchronous compensators instead of two Static VAR Compensators (SVCs). SPT clarified that it was an error in the NOA Report. • SPT state that the cost difference between the hybrid synchronous compensators and the SVCs is insignificant. However, the cost of the SVCs option has not been provided for assessment. • It is reasonable to choose the hybrid synchronous compensators over the SVCs for the extra benefit of additional system strength. However, SPT should demonstrate such advantage with, for example, a Cost Benefit Analysis (CBA). • It is unclear how the extra benefit provided by SPT's chosen solution will compare or link to the ESO's ongoing Stability Pathfinder Project. • The EJP proposes a delivery date of 2025, but the latest NOA 2019/20 Report recommends a delivery date in 2026 (which is the Earliest in Service Date (EISD) for ECVC in NOA).
SPT200168-169 Branxton Substation	• The project is deemed low risk, but a small proportion of the investment may not be required based on Atkins' assessment. • The requirement for a 23-bay substation relies on future generation connection. There is not enough certainty to assume all of [redacted] 2300MW will be connected by 2033. Hence, the construction of a 14-bay substation with the option to extend to a 23-bay substation may be more appropriate. • It is noted that the costs for the 14-bay and 23-bay options differ by [redacted].
SPT TOCO T2 Generation Connections	• No specific issues noted
SPNLT20109 Glenlee to Tongland Modernisation	• No specific issues noted
SPNLT205 ZA Route 400kV OHL Major Refurbishment	• No specific issues noted
SPNLT2033 Windyhill 275kV Switchgear Replacement Project	• No specific issues noted

SPT200110 East Coast 400kV Incremental Reinforcement (ECUP)	• No specific issues noted
SPNLT200/201/203/2013-2017/2019/2020 OHL Minor Refurbishment Programme	• No specific issues noted
SPNLT20111 XH & XJ Route 400kV OHL Major Refurbishment	• The list of work on page 9 of the EJP suggests that the re-conductoring of the TORN-STHA (Torness-Strathaven) circuit of the XH route is part of the chosen solution. This is inconsistent with the rest of the EJP which suggests the re-conductoring work is on the Strathaven-Wishaw circuit of the XH route. This is likely a typographical error. The EJP states that the Torness-Strathaven circuit of the XH route was already replaced with AAAC conductor in 2014 (page 4 of the EJP). It is the Strathaven-Wishaw circuit of the XH route which still has the ACSR conductor that was installed in 1960. • The reconductoring should only proceed if it is for the Strathaven-Wishaw circuit, not the Torness-Strathaven circuit.
SPT200143 Kendoon to Glenlee Reinforcement Works (TORI-221)	• No specific issues noted
SPT20021/22 New Cumnock Fault Mitigation and Substation Extension	• No specific issues noted
SPT200126 Harmonic Filters	• No specific issues noted
SPT200112 Hunterston East to Neilston (HNNO)	• The needs case for a small proportion of the investment is unclear. No justification has been provided for the [redacted] individual protection schemes included in section 6 of the EJP. • The EJP proposes a delivery date in 2022, but the latest NOA 2019/20 Report recommends a delivery date in 2023 (which is the Earliest in Service Date (EISD) for HNNO in NOA).
SPNLT2034 Westfield 275kV Switchgear Replacement Project	• The scope of work is uncertain. • The needs case is based on the conditions of the switchgear at the Westfield 275kV substation. However, Westfield substation may need to be uprated to 400kV in the future, depending on the NOA recommendation on the “East Coast Onshore 400kV Phase 2 Reinforcement”. • SPT noted the uncertainties associated with this EJP and proposed that the costs be excluded from the baseline allowances and that a trigger mechanism be implemented. • Both the 275kV and 400kV options proposed are considered valid and appropriate.
SPNLT2036 Hunterston 400kV Switchgear Replacement Project	• No specific issues noted
SPNLT2055 400kV and 275kV Telecoms Resilience Project	• The needs case is unclear, and the justification provided is weak. • The project aims to improve the resilience of the telecoms system, but no specific examples were presented in terms of failures and consequences which could be used to justify the need for the project.

	• There is no detail on the likelihood / probability and the exact cause and effect about the situations that SPT suggest as a risk to the security of supply or to have a significant impact to the electrical network. Data such as failure rates for the existing telecoms equipment is also not available in the EJP. • It is noted (according to SPT) that the other GB TOs currently operate a duplicated comms provision at their 275kV and 400kV networks.
SPT200136 Pre-Engineering Works	• The EJP does not cover the usual format for an EJP and as such does not provide any optioneering or detailed analysis. Instead, this document simply puts forward a needs case for pre-engineering funding for several load related projects. • It is unclear what the exact scope of pre-engineering works the requested funding will cover for each of the items e.g. planning, type of surveys, consents etc. More specifically, for the funding associated with the development of new NOA projects: • It is unclear why these specific projects require separate pre-engineering funding at this early stage, which is different to the other NOA options submitted. For the funding associated with the Eastern High-Voltage Direct Current (HVDC) Link: • The needs case is deemed clear and relatively certain. However, it is expected that SPT should consider the various level of pre-engineering activities possible to continue the development of the project. For the funding associated with the synchronous compensator scheme: • The needs case of the synchronous compensators is dependent on the outcome of the ESO's Stability Pathfinder Project tender and therefore is deemed uncertain. It is also unclear what impact for allowing pre-engineering funding to this scheme will have on the other tender participants of the ESO's tender in terms of fairness and level-playing field. For the funding associated with the optioneering for the 132kV feeders at Torness: • It is unclear why this project requires separate pre-engineering funding at this early stage, which is different to the development of other projects. For the funding associated with "other projects": • It is unclear what proportion of the requested funding is to be assigned for "future NOA assessment", whether there is any overlap with those associated with the "development of new NOA projects" and why such activities are not considered Business as Usual (BaU) operational expenditure (OPEX).
SPNLT202 ZO, ZR and XF Routes 400kV OHL Major Refurbishment	• No specific issues noted

SPT200128/129 Black Start	For the works to un-bank transformers and install Point-On-Wave (POW) switching at [redacted] sites to reduce transients: • The needs cases are unclear. • The scheme is driven by the requirement to increase the black start capability of the network as set out in SPT's Strategic Investment Plan for Load. The works are proposed to reduce network switching risks during system restoration through the installation of POW switching Circuit Breakers (CBs) associated to transformers which are currently banked. The works proposed also including the un-banking of transformers. • Atkins' view is that the introduction of POW functionality onto existing switchgear is not straight forward and, in some cases, not possible. The age and type of the CBs to which SPT are proposing to add POW functionality is required to enable an assessment to be undertaken. This has not been provided. • It is unclear how SPT have selected the [redacted] transformers that need to be un-banked and the CBs on which POW is required. For the black start studies to understand and quantify the risks that could be encountered during a system restoration: • The needs case for this expenditure is ambiguous. • It is unclear why the electromagnetic transient studies are not considered BaU OPEX and whether they should be done in conjunction with the ESO. For the upgrade to the Phoenix hybrid synchronous compensator (a Network Innovation Competition (NIC) funded project) to be fully black start capable: • The needs case for this expenditure is clear and unambiguous and the solution is considered proportionate to the needs case.
SPNLT2037 Hunterston 132kV Switchgear Replacement Project	• No specific issues noted
SPT20085-87 GSP Lesmahagow Fault Level Mitigation	• The chosen solution is valid, but it should be noted that it is dependent on the completion of the reinforcement projects TORI144 Coalburn Super Grid Transformer (SGT) 3 and TORI263 Coalburn SGT4.
SPNLT2052 132kV Optical Transport Network Project	• The chosen solution is disproportionate to the needs case. • SPT have not provided sufficient evidence to support the requirement for a full optical transport network installation. The EJP lacks supporting evidence of obsolescence and bandwidth restrictions.
SPT200108 East Coast 275kV Upgrade (ECU2)	• No specific issues noted
SPT20073/74/75/103/104/105 Central Glasgow Fault Level Management	• The needs case is deemed uncertain until the Modification Application is formally issued. • The needs case presented in the EJP is that SPT need to facilitate a reduction in fault level infeed from the transmission network in response to a potential Modification Application from Scottish Power Distribution (SPD). However, SPT have yet to receive the Modification Application from SPD. • It is unclear why the project needs to be included in the baseline allowance at this early stage. It is recommended for funding to be subject to an uncertainty mechanism which will protect the consumers and allow SPT to recover their costs shall the Modification Application materialise in the future.

	• Based on the condition of the [redacted], the chosen solution could be deemed as a premature replacement.
SPNLT2021-2023 Cable Major Refurbishment Programme	• No specific issues noted
SPNLT2046/20115 SPD Driven 33kV Switchboard Change Programme	• Part of the needs case is uncertain. • This project is linked to both SPD's agreed outputs in RIIO-ED1 and proposed outputs in RIIO-ED2. While the works linked to RIIO-ED1 have a certain needs case, those linked to RIIO-ED2 do not. Therefore, the works linked to SPD's outputs in RIIO-ED2 should be subject to RIIO-ED2 approval.
SPNLT2048 Protection Modernisation	• The solution is disproportionate to the needs case. • Some focus should be undertaken to ensure that the relays are being replaced primarily due to failure, rather than just not meeting the current technical policy.
SPT200134/135 Shunt Compensation – Mark Hill STATCOM	• The proposed solution is valid, but there is a risk that the inclusion of power electronics near HVDC plant may cause sub-synchronous interference. This could result in the need for additional filtering to be installed.
SPT200180/181 U and AT Route Uprating (TORI-151a)	• No specific issues noted
SPNLT20102 Environmental – Refurbishment of Oil Bunding & Drainage Systems	• No specific issues noted
SPNLT209 BL Route 132kV OHL Major Refurbishment	• It is noted that only some sections of the overhead line (OHL) have a condition summary of "severe" and "partial", which means there is a possibility that not all the proposed works are essential within the RIIO-T2 period. • However, it is reasonable to assume that due to the costs associated with mobilisation and demobilisation that it is prudent to replace all of the conductor(s) rather than just part of them. This is because it is likely that the sections that currently do not show any deterioration, will show within the next 10 to 15 years.
SPNLT20124 Gorgie-Telford Road 132kV Cable Replacement	• No specific issues noted
SPT200132/133 South West Scotland Generation Export Management System (GEMS)	• There are some uncertainties around the scope of the solution. • The EJP states that the functional requirements for GEMS have been prepared and the next stage of the project is to engage with suppliers and prepare a specification for the system. However, without a detailed engineering assessment being provided, it is not possible to determine if the chosen solution is proportionate. • At this point in time, Atkins do not have visibility of the final products proposed by SPT. • However, the Planning Request was made by National Grid Electricity System Operator (NGESO) under the System Operator Transmission Owner Code Procedure (STCP) 16-1 and the proposed solution is an Active Network Management (ANM) scheme which will be governed by the STCP 26-1. As a result, SPT will need to submit the final design of the ANM to NGESO for approval. • It is evident that thorough process is in place to ensure the final solution will be fit-for-purpose. Hence, the chosen solution is deemed

	proportionate to the identified needs case as it stands within the EJP, on the assumption that the existing industry codes and processes will be followed.
SPT200124/125 Shunt Compensation – Operability (Reactors)	• No specific issues noted
SPNLT20112 Currie-Gorgie 132kV Cable Replacement	• No specific issues noted
SPNLT Site Security	• No specific issues noted
SPT200122/123 Shunt Compensation – Operability (Hunterston)	• There is a risk that the combined projects in the Hunterston area (to develop network resilience and stability) will provide a combined solution which exceeds the minimum requirements.
SPT200192 Cumberhead Collector Substation (TORI-238)	• There is a risk that customers will discontinue their project and funding will no longer be required. • SPT states that they will revise and amend the scope as appropriate if the developers terminate the proposed works.
SPNLT2012 AY Route 132kV OHL Major Refurbishment	• It is noted that only some sections of the OHL have a condition summary of “severe” and “partial”, which means there is a possibility that not all works are essential within the RIIO-T2 period. • However, it is reasonable to assume that due to the costs associated with mobilisation and demobilisation that it is prudent to replace all of the conductor(s) rather than just part of them. This is because it is likely that the sections that currently do not show any deterioration, will show within the next 10 to 15 years.
SPNLT207 AL Route 132kV OHL Major Refurbishment	• No specific issues noted
SPT20060-62 GSP Newarthill Fault Level Mitigation	• The needs case is deemed uncertain until the Modification Notice is formally issued. • The needs case presented in the EJP is that SPT need to facilitate a reduction in fault level infeed from the transmission network in response to a potential Modification Notice from SPD. However, SPT have yet to receive the Modification Notice from SPD. • It is unclear why the project needs to be included in the baseline allowance at this early stage. It is recommended for funding to be subject to an uncertainty mechanism which will protect the consumers and allow SPT to recover their costs shall the Modification Notice materialises in the future. • The demand and generation predications for the Grid Supply Point (GSP) contain uncertainty. Further evidence in terms of probability/confidence level of the predicted increase in demand and generation should have been provided. • There is a further risk that the new [redacted] will not be required.
SPT20043/44 New Cumnock SGT2B	• No specific issues noted
SPT20025/26 Mark Hill to Chirmorie/Stranoch Wind Farms	• There is a risk that customers will discontinue their project or new connections do not emerge. Funding will then no longer be required. • SPT states that they will revise and amend the scope as appropriate if the developers terminate the proposed works.

SPNLT2038 Devol Moor 132kV Switchgear Replacement Project	• A selected part replacement could have been undertaken on the disconnectors which show severe sign of deterioration. • However, economically, the argument made within the EJP to replace the whole disconnector based on the amount of effort to undertake a refurbishment is sound. This is in line with good engineering practice if the overall deterioration is significant. This would reduce the amount of work needed to be done on site and significantly reduce the outage requirements to undertake the works.
SPNLT20113 Cable Sealing End Proactive Programme	• The scheme costs appear to be higher than would be expected.
SPNLT2047 Torness 400 Shunt Reactor Replacement	• The needs case is unclear. • The asset condition reports show dissolved gas analysis (DGA) levels with an upwards trend (mainly carbon monoxide) but no severe DGA trend recordings. Although the degree of polymerisation (DP) levels estimated from 2FAL do show levels less than 300, this is not coupled with other significant 'End of Life' indicators which would be expected. • The in-situ refurbishment was wrongly rejected as an option based on an incorrect assumption that it would not be cost efficient or technically feasible. However, it could be managed with proper oil conditioning and regular monitoring of the paper insulation degradation. The supporting evidence of oil condition assessments suggests that the oil could be reconditioned.
SPT20029/30 Mark Hill SGT3	• There is a risk that customers will discontinue their project and funding will no longer be required. • SPT states that they will revise and amend the scope as appropriate if the developers terminate the proposed works.
SPT20035/36 Coylton SGT1/2 Reinforcement	• No specific issues noted
SPT20063-65 GSP Kilmarnock Town Fault Level Mitigation	• The needs case is deemed uncertain until the Modification Notice is formally issued. • The needs case presented in the EJP is that SPT need to facilitate a reduction in fault level infeed from the transmission network in response to a potential Modification Notice from SPD. However, SPT have yet to receive the Modification Notice from SPD. • It is unclear why the project needs to be included in the baseline allowance at this early stage. It is recommended for funding to be subject to an uncertainty mechanism which will protect the consumers and allow SPT to recover their costs shall the Modification Notice materialise in the future. • Based on the condition of the [redacted], the chosen solution could be deemed as a premature replacement. • The chosen solution does not give the highest Net Present Value (NPV) in the core CBA. It will be a policy-driven decision to invest specifically for Net Zero to choose Option 3 ([redacted]) over Option 1 ([redacted]).

SPNLT2067 Mosmorran 132kV Switchgear Replacement Project	• The proposed solution is to use SF6-free CBs. This has an added cost ([redacted] to a standard SF6 CB. SPT have justified this based on new technology being used which provides environmental benefit. The argument used is deemed to be acceptable. • It is noted that selected part replacement could be undertaken on the disconnectors which show severe sign of deterioration only. • However, economically, the argument made within the EJP to replace the whole disconnector based on the amount of effort to undertake a refurbishment is sound. This is in line with good engineering practice if the overall deterioration is significant. This would reduce the amount of work needed to be done on site and significantly reduce the outage requirements to undertake the works.
SPNLT2057 Active Equipment Refresh Programme	• No specific issues noted
SPT200119 Windyhill to Lambhill to Longannet 275kV Circuit Turn-In to Denny North 275kV Substation (WLTI)	• The needs case is uncertain. • The project and its network studies were submitted to the NOA. The latest NOA report 2019/20 gave the project a “Delay” recommendation. • According to Table 0.1 in the NOA Report, this investment is optimal for delivery between 2021-2023. SPT state in the EJP that the turn-in work is currently scheduled for completion in 2021. This is two years ahead of the NOA 2018/19 recommendation and is not consistent with the NOA 2019/20 recommendation of “Delay”. • SPT argue that the accelerated delivery can be justified as to ensure the timely delivery of the East Coast 275kV Upgrade and the Windyhill 275kV Switchgear Replacement. However, there is not enough information to assess whether the accelerated delivery is necessary from the EJP. • The CBA provided in EJP_SPT_SPNLT_2033 suggests that a delivery date of 2022 gives the least-worst regret for the chosen solution for the Windyhill 275kV Switchgear Replacement.
SPNLT204 XZ Route 275kV OHL Major Refurbishment	• No specific issues noted
SPNLT2049 EMS Replacement	• The needs case is weak. It is based on the obsolescence of the current systems, discontinued support from system providers and the limitation on transition of the system to Smart Grid operations. • The justification for a combined TO/Distribution Network Operator (DNO) system is sensible. However, it is not clear whether the system is currently used by the DNO or approved/to be proposed for RIIO-ED2.
SPNLT20103 Cockenzie Building Improvement Works	• No specific issues noted
SPNLT20100 Concrete/Steel Structures	• No specific issues noted
SPT20069/70/71/72/76/101/102 SPD GSP Proposed Reinforcement Schemes	• According to the EJP, all works listed will be funded by SPD.
SPNLT2068-2074/2094-2096 RIIO-T2 Transformer Refurbishment Programme	• No specific issues noted

SPNLT2066 Giffnock SGT1 and SGT2 Replacement	• The solution is disproportionate to the needs case. • The predicted end of life for the transformers is in 2034. Instead of replacement, it is recommended that a robust campaign refurbishment programme be carried out, along with the recondition of the transformer oil within the RIIO-T2 period. Replacement can then be considered within the RIIO-T3 period.
SPNLT Flood Mitigation	• The solution is proportionate to the needs case, however there is a risk that the provisions forecast for the flood mitigation works are either insufficient or oversized.
SPT20077 GSP Westfield Fault Level Mitigation	• Based on the condition of the [redacted], the chosen solution is deemed as a premature replacement. However, it is supported by the CBA.
SPT200182 Gretna - Ewe Hill 132kV Reinforcement	• No specific issues noted
SPNLT20101 Building Refurbishment Programme	• No specific issues noted
SPNLT2018 BU Route 132kV OHL Major Refurbishment	• No specific issues noted
SPNLT Fire Protection	• No specific issues noted
SPNLT20140 SF6 Repair Works	• The solution is disproportionate to the needs case. • SPT should first explore the possibility of fixing the leakage on the following CBs before proceeding to replace them: [redacted]. • These CBs should only be replaced if the repair is proved to be impossible or uneconomical.
SPT200130/131 Circuit Rating Management System	• This is not a 'business as usual' project. Real-Time Thermal Rating (RTTR) is not a widespread technology but the risks have been justified in the EJP. It has a range of benefits including deferring investment.
SPNLT208 BC Route 132kV OHL Major Refurbishment	• No specific issues noted
SPNLT2010 BW Route 132kV OHL Major Refurbishment	• No specific issues noted
SPT200184 Coalburn – Douglas North 132kV Cable Reinforcement	• The needs case is linked to two uncertain projects – the [redacted] and [redacted]. These two windfarms are not included in the baseline generation portfolio presented in the EJP "TOCO – Generation Connections".
SPNLT2051 System Monitoring Modernisation	• No specific issues noted

SPNLT2065 Neilston SGT1 Replacement	• The solution is noticeably disproportionate to the needs case based on the information available. • The EJP rejected the refurbishment option based on costs without providing the cost information for comparison. • SPT present their view of "There is evidence of deterioration of insulation which is likely to require extensive intervention on the active part, necessitating transportation to works, major dismantlement with no guarantee offered on works undertaken, to possibly extend the transformer's life." • However, the condition assessment report only suggested the "discharge of low energy" condition observed could be attributed to a degradation of clamping bolt insulation, and that it would "require an internal inspection to verify the condition". • The recommendations made by the asset condition report suggests refurbishment actions are available rather than replacement as the only option. • Based on the information available, Atkins cannot confirm the rejection of Option 2 (in-situ refurbishment) based on cost is justified.
SPT20017 132kV Ewe Hill Substation Transformer SGT2 (TORI-232)	• No specific issues noted
SPT20080-82 GSP Strathaven Fault Level Mitigation	• The needs case is deemed uncertain until the Modification Notice is formally issued. • The needs case presented in the EJP is that SPT need to facilitate a reduction in fault level infeed from the transmission network in response to a potential Modification Notice from SPD. However, SPT have yet to receive the Modification Notice from SPD. • It is unclear why the project needs to be included in the baseline allowance at this early stage. It is recommended for funding to be subject to an uncertainty mechanism which will protect the consumers and allow SPT to recover their costs shall the Modification Notice materialises in the future. • The [redacted] could be deemed as a premature replacement, as [redacted] is in a reasonable condition. However, it is supported by the CBA.
SPT20013/14 Newton Stewart GSP	• No specific issues noted
SPNLT2064 Devol Moor T2A Replacement	• The solution is noticeably disproportionate to the needs case based on the information available. • The EJP suggests replacement is a cheaper option than refurbishment in this case due to the extensive refurbishment that would be required and the limited extended service life such actions can achieve. However, SPT have not provided the relevant information requested (e.g. refurbishment cost estimate, constraint cost estimate and estimated end of life after refurbishment) as evidence. • SPT present their view of "There is a developing thermal fault which is likely to require extensive intervention on the active part, necessitating transportation to works, major dismantlement with no guarantee offered on works undertaken, to possibly extend the transformer's life." • However, the condition assessment report only suggested the "Possibility that a developing thermal fault may be present" and that "This would require to be investigated".

	• The recommendations made by the asset condition report suggests refurbishment actions are available rather than replacement as the only option. • Based on the information available, Atkins cannot confirm the rejection of Option 3 (in-situ refurbishment) based on cost is justified.
SPNLT2091 Torness 400kV Circuit Breaker GIS Programme	• No specific issues noted
SPT20088 GSP Moffat new GSP	• The needs case is uncertain. • The needs case presented in the EJP is that SPT need to provide a new point of connection for SPD. Based on the discussion between SPT and SPD, this will be in the form of the installation of a 132/33kV GSP substation. • However, SPT is yet to receive the Modification Application from SPD. The needs case is deemed uncertain until the Modification Application is formally issued. • It is noted that the funding for the SPD works are included in SPD's RIIO-ED1 price review. • The chosen option could be deemed disproportionate to the needs case. However, it was chosen as a result of the customer (SPD's) request.
SPNLT2063 Longannet 275kV Series Reactor Refurbishment	• The needs case is unclear. • The asset condition reports do not support the immediate needs for intervention. A valid needs case is subject to the recommendation from further assessments on the [redacted] series reactors. • It is noted that SPT want to take advantage of the coordinated outage with SPNLT2099 Longannet 275kV Switchgear Replacement works to minimise future long outage requirements. However, the benefits for such coordination against the early intervention is not clearly evidenced.
SPNLT20104 Partick Site Rationalisation	• The solution could be disproportionate to the needs case. • SPT chose Option 4 because it was the cheapest option. However, SPT assumed there was no expected maintenance cost associated with Option 4 for the next 40 years. While the maintenance associated with new buildings can be expected to be much lower than the maintenance associated with some refurbished 100-year-old buildings, SPT's assumption of no expected maintenance cost may result in over-estimated benefits from Option 4 in their analysis.
SPNLT20116/20117 SPT Strategic Spares	• The EJP has been updated as part of the SQ response SPTL_SQ_ENG_52_Final Response to clarify the outputs of the scheme.
SPT20083/84 GSP East Kilbride Fault Level Mitigation	• No specific issues noted
SPT20091-93 GSP Redhouse Capacity Upgrade	• No specific issues noted
SPNLT2040 Glenniston 132kV Switchgear Replacement Project	• No specific issues noted
SPNLT2060 PD Installation for GIS and GIB Programme	• No specific issues noted

SPNLT20142 EAP - Building Energy Reduction Measures	• The needs case is not considered valid from an engineering assessment perspective. Ofgem should consider this project at a policy level rather than an engineering assessment. • The works proposed in this EJP is to install holistic refurbishment solutions on top of the "minimum" refurbishment covered by SPT_SPNLT20101. • The EJP states that this is in line with SPT's Environmental Action Plan to decarbonise their network and reduce energy consumption across their substations. It is not clear whether this action plan is driven by SPT's corporate social responsibility (CSR) aims/policy or legislation. The proposed works do not appear to have a direct impact on the transmission license condition requirements of SPT.
SPT20027/28 Newton Stewart 132kV Reinforcement Works	• The scheme costs appear to be higher than what would be expected for the installation of [redacted] new 132kV disconnector/isolator.
SPT200191 Coalburn to Douglas North	• No specific issues noted
SPT20023 Glenglass Overload Protection Scheme	• No specific issues noted
SPT20015 New Cumnock Overload Protection Scheme	• No specific issues noted
SPT20033 Kilmarnock South Overload Protection Scheme	• No specific issues noted

3.1.2. SPT Discussion

The EJPs are generally of a good quality and with clear and consistent structure. The majority of the need cases presented are clear and supported with evidence (e.g. customer requests, NOA recommendations, asset condition reports etc.). The SQ responses provided are robust. The outcomes of the assessment are:

Rating	Number of Papers	Total Spend
Red (High risk to consumer)	12	£257.8m
Amber (Medium risk to consumer)	14	£290.5m
Green (Low risk to consumer)	68	£1,052.2m

The quality of the EJP is reflected in the small percentage of evaluated EJPs where investments are deemed as high risk (13%). The majority of EJPs are deemed low risk (75% of the load-related and 70% of the evaluated non-load related EJPs).

The limited common issues observed among the EJPs are noted below, with observations about individual EJPs documented in Appendix A.

Several EJPs were found to have presented a clear technical needs case but there are potential uncertainties around the timing or scope of works. SPT recognise the uncertainty with some of these projects and propose to have the associated allowances subject to an uncertainty mechanism with appropriate triggers. Examples are EJP's SPT200137-142 Synchronous Compensators, SPNLT2099 Longannet 275kV Switchgear Replacement Project and SPNLT2034 Westfield 275kV Switchgear Replacement Project.

Some of the projects presented are driven by SPD's requests. While the needs cases are clear as SPT are obliged to respond to such requests, some of the projects are yet to have received the relevant Modification Application or Modification Notice formally. The risk level for these projects is deemed to be high, as their needs cases remain uncertain until the relevant Modification Application/Notice is formally received. It is recommended for funding to be subject to an uncertainty mechanism which will protect the consumers and allow SPT to recover their costs should the Modification Application/Notice materialise in the future. This is an issue commonly observed among the GSP fault level mitigation schemes e.g. EJP's SPT20060-62 GSP Newarthill Fault Level Mitigation, SPT20063-65 GSP Kilmarnock Town Fault Level Mitigation.

Several load related EJPs present options which were also submitted within the NOA process. It is considered important that the EJPs are consistent with the NOA recommendations, unless a strong justification to deviate from the recommendation is presented. Since NOA is an annual process and provides single-year recommendation to projects, Atkins consider that the needs cases for most of the projects dependent on the NOA recommendations are uncertain. We have however considered the needs cases for projects with a consistent Proceed recommendation from the last three NOA to have a relatively low risk to consumers. In the case of SPT's NOA projects submitted for this review, SPT200106 DWNO, SPT200108 ECU2, SPT200110 ECUP and SPT200112 HNNO have received Proceed recommendations in the last three NOA. SPT200120 ECVC received Hold recommendation in 2018/19 NOA, and SPT200119 WLTI have received Delay recommendation in the latest NOA.

The majority of these EJPs were found consistent with the NOA recommendations. However, it was noted that EJP's SPT200112 HNNO, SPT200119 WLTI and SPT200120 ECVC were presented with an earlier delivery date than the latest NOA Report 2019/20 recommends. It is also found that the scope of ECVC presented in the EJP is different to that detailed in the NOA Report, although SPT suggested in their SQ response that it was an error in the NOA Report.

Some of the EJPs are requesting funding for pre-engineering / system analysis works which could be seen as BaU OPEX activities. Those EJPs did not provide a clear justification on why those works should be funded separately. Examples are SPT200128/129 Black Start and SPT200136 Pre-engineering Works.

The primary investment driver for several of the EJPs is resilience or the current system/equipment being obsolete. Most of these documents made a weak case for these projects to be funded as part of RIIO-T2, having presented a needs case based on improvement rather that asset condition. The majority of these schemes are information technology/operational technology projects. Examples are SPNLT2055 400kV and 275kV Telecoms Resilience Project, SPNLT2052 132kV Optical Transport Network Project and SPNLT2049 EMS Replacement.

There is a general and unavoidable risk that generation customers may discontinue projects after an initial application to connect has been submitted. SPT stated in the EJPs that they will revise and amend the scope as appropriate, if the customers terminate the proposed works. While the current level of risk for these projects is deemed to be low, a suitable mechanism which allows funding to be adjusted accordingly to any future changes in the scope of works should be considered. This applies to projects which are driven by generation customers e.g. EJP's SPT200192/193 Cumberhead Collector Substation (TORI-238), SPT20025/26 Mark Hill to Chirmorie/Stranoch Wind Farms and SPT20029/30 Mark Hill SGT3 240MVA.

It is not always possible to assess the value for money and efficiency element of the EJPs, as a noticeable number of EJPs have no cost-benefit analysis conducted/provided and/or no description of how the scheme costs were calculated.

All load related EJPs along with any associated material (CBA, SQ responses etc.) have now been evaluated.

Fifty (50) of the 66 non-load related EJPs along with any associated material (asset condition reports, SQ responses etc.) have now also been evaluated. The remaining 16 non-load related EJPs, which have not been evaluated, have a total monetarised value of £20.3m. These 16 EJPs are listed as follows:

- SPNLT2043 – Shrubhill SGT1 Replacement
- SPNLT2053 – RTU/HMI Replacement Programme

- SPNLT2085/86/90 – SPL Circuit Breaker Programme
- SPNLT2041 – Glenrothes 275kV Switchgear Replacement
- SPNLT2058 – Digital Substation Cybersecurity Project
- SPNLT20141 – RIIO-T2 PCB CVT Replacement Programme
- SPNLT2011 – AC Route 132kV OHL Major Refurbishment
- SPNLT20137 – BM Route 132kV OHL Major Refurbishment
- SPNLT2087-89 – FE2 Circuit Breaker Programme
- SPNLT2097 – Cockenzie 275kV CT Replacement
- SPNLT2056 – Active Equipment Programme
- SPNLT2061 – EMS-WAMS Integration Project
- SPNLT2054 – System Health Map Project
- SPNLT2059 – Digital Substation Offline Test Facility
- SPNLT2098 – Easterhouse 275kV Disconnector Replacement
- SPNLT2062 – Online DGA Installation Strathaven and Cockenzie

3.2. SHET Outputs

This section gives an overview of the main findings of the assessment carried out by Atkins during the RIIO-T2 evaluation for SHET. A total of 49 EJPs were submitted by SHET as part of their RIIO-T2 business plan submission: 7 load-related and 42 non-load related. It is noted that some of the non-load / load schemes have secondary load / non-load drivers respectively. Where this is the case the scheme has been categorised by its primary driver. All EJPs along with any associated material (asset condition reports, SQ responses, etc.) have now been evaluated. The EJPs have been grouped into High, Medium or Low risk as per the methodology outlined in Section 3, Table 3-1, based on the supporting assessment detailed below:

- An individual technical assessment report has been produced for each SHET EJP. These can be found in a separate document which holds the individual technical notes, details can be found in Appendix B.

- Summary scores for all SHET EJPs are provided in Appendix F.

- An SQ Log has been provided in Appendix G which provides a list of SQ references used to carry out the review.

The total monetarised value of all the SHET EJPs is £1,856.60m. The following figure presents a summary of these findings in terms of the EJPs investment value.

Figure 3-2 - Summary of findings by investment value

3.2.1. SHET Risk classification and issues

3.2.1.1. Risk classification

Table 3-4 - SHET RAG Summary

Scheme number & title	Risk	Spend (£m)	Load/Non-Load
T2BP-EJP-0017 East Coast 400kV Upgrade Justification Paper	Green	[redacted]	Load
T2BP-EJP-0016 North East 400kV Upgrade Justification Paper	Green	[redacted]	Load
T2BP-EJP-0018 East Coast 275kV Justification Paper	Green	[redacted]	Load
T2BP-EJP-0022 Port Ann - Crossaig 132kV OHL Justification Paper	Green	138.24	Non-load
T2BP-EJP-0023 Kinardochy Reactive Compensation Justification Paper	Green	106.04	Load
T2BP-EJP-0033 Beauly Substation Works Justification Paper	Green	89.8	Non-load
T2BP-EJP-0044 Kintore Substation Works Justification Paper	Amber	74.2	Non-load
T2BP-EJP-0008 Substation Resilience - Low Voltage Supplies	Amber	48.93	Non-load

T2BP-EJP-0012 Integrated Condition Performance Monitoring JP	Amber	45.5	Non-load
T2BP-EJP-0031 Willowdale Substation Justification Paper	Amber	45.43	Non-load
T2BP-EJP-0027 Sloy Substation Works Justification Paper	Red	45.3	Non-load
T2BP-EJP-0037 Foyers Substation Justification Paper	Amber	41.6	Non-load
T2BP-EJP-0028 Whistlefield - Dunoon 132kV OHL Works JP	Green	40.8	Non-load
T2BP-EJP-0013 Materials Management and Warehousing JP	Red	40.26	Non-Load
T2BP-EJP-0043 Keith Substation Works Justification Paper	Red	39.05	Non-load
T2BP-EJP-0050 Tealing 275kV Busbar Justification Paper	Green	38.93	Load
T2BP-EJP-0048 Peterhead Substation Justification Paper	Amber	36.7	Non-Load
T2BP-EJP-0045 Harris-Stornoway 132kV OHL Justification Paper	Green	35.7	Non-load
T2BP-EJP-0006 Transmission Communications Upgrade JP	Red	31.1	Non-load
T2BP-EJP-0032 Kilmorack and Aigas Substation JP	Red	27.5	Non-Load
T2BP-EJP-0005 Protection Modernisation Justification Paper	Amber	22	Non-load
T2BP-EJP-0034 Beauly - Aigas - Deanie 132kV OHL Justification Paper	Red	19	Non-Load
T2BP-EJP-0002 Climate Change and Sustainability Justification Paper	Red	18.05	Non-Load
T2BP-EJP-0026 Sloy - Windyhill West 132kV OHL Works JP	Green	16.8	Non-Load
T2BP-EJP-0025 Sloy - Windyhill East 132kV OHL Works JP	Green	16.5	Non-Load
T2BP-EJP-0003 Resilience - Operations Centre Justification Paper	Red	16.3	Non-Load
T2BP-EJP-0042 Tummel Bridge Substation Works Justification Paper	Red	14.8	Non-Load
T2BP-EJP-0036 Deanie Substation Justification Paper	Red	14.6	Non-Load
T2BP-EJP-0035 Culligran Substation Justification Paper	Red	14.3	Non-Load
T2BP-EJP-0040 Quoich Tee Substation Works Justification Paper	Red	13.6	Non-Load
T2BP-EJP-0021 Redmoss-Clayhills 132kV Justification Paper	Green	13.1	Non-Load

T2BP-EJP-0046 St Fergus Mobil Justification Paper	Red	12.7	Non-Load
T2BP-EJP-0007 Transmission Substation SCADA Replacement JP	Amber	11.93	Non-load
T2BP-EJP-0015 Operational Strategic Spares Justification Paper	Amber	11.82	Non-Load
T2BP-EJP-0020 Elmwood - Glenagnes Cable Works Justification Paper	Green	11.4	Non-Load
T2BP-EJP-0049 Peterhead - Inverugie 132kV OHL Justification Paper	Green	10.3	Non-Load
T2BP-EJP-0011 Physical Site Security Justification Paper	Green	9.59	Non-Load
T2BP-EJP-0030 Tealing Substation Works Justification Paper	Amber	9.34	Non-Load
T2BP-EJP-0047 Moray West Offshore Windfarm Justification Paper	Green	8.01	Load
T2BP-EJP-0004 Persistent Organic Pollutants Justification Paper	Amber	7.32	Non-Load
T2BP-EJP-0041 St Fillans Substation Works Justification Paper	Red	6.8	Non-Load
T2BP-EJP-0038 Glenmoriston Substation Justification Paper	Amber	5.7	Non-Load
T2BP-EJP-0024 Glenshero Connection Works Justification Paper	Green	4.4	Load
T2BP-EJP-0039 Invergarry T 132kV Justification Paper	Green	2.4	Non-Load
T2BP-EJP-0009 Resilience - Personnel Communications JP	Amber	1.93	Non-Load
T2BP-EJP-0010 Emergency Response and Contingency Planning JP	Green	1.55	Non-Load
T2BP-EJP-0019 Broadford Substation Works Justification Paper	Red	1	Non-Load
T2BP-EJP-0029 Redmoss Substation Works Justification Paper	Green	0.5	Non-Load
T2BP-EJP-0001 Black Start System Restoration Justification Paper	Red	0.21	Non-load

3.2.1.2. Issues

Table 3-5 - Issues for SHET

EJP	Issues & comments
T2BP-EJP-0017 East Coast 400kV Upgrade Justification Paper	• No specific issues noted

T2BP-EJP-0016 North East 400kV Upgrade Justification Paper	• No specific issues noted
T2BP-EJP-0018 East Coast 275kV Justification Paper	• No specific issues noted
T2BP-EJP-0022 Port Ann - Crossaig 132kV OHL Justification Paper	• A proportion of the investment may not be required as it is dependent on a number of developers proceeding with their generation schemes. A least worst regret calculation has been conducted which supports the preferred option. However, the baseline option is optimal should it be believed that the required capacity is highly likely to be less than 445MVA (with at least 84.5% probability threshold).
T2BP-EJP-0023 Kinardochy Reactive Compensation Justification Paper	• No specific issues noted
T2BP-EJP-0033 Beauly Substation Works Justification Paper	• A 132kV Air Insulated Switchgear(s) offline build should have been considered. It appears it could be possible to build an offline 132kV air-insulated switchgear (AIS) solution in the proposed area, west of the existing site. However, it is acknowledged that there is a potential space constraint which may make this difficult.
T2BP-EJP-0044 Kintore Substation Works Justification Paper	• Part of the solution is disproportionate to the needs case. There is no needs case for an offline replacement of the 132kV AIS double busbar. • The asset condition report does not support the stated condition-related issues with the 132kV switchgear as presented in the EJP. The majority of the switchgear to be replaced under this scheme is shown to be in a good condition. The CBs have recently been replaced. • The disconnectors and earth switches which are shown to be in a poor condition should be considered for an in-situ replacement in line with Option 1-1. • An in-situ replacement of the disconnectors and earth switches will be problematic and could raise safety issues during the work due to the compact nature of the site. This must not be underestimated. • The uplift of Grid Transformer (GT) 2 is not required in the short term, 90MVA would be sufficient to maintain the Security and Quality of Supply Standards (SQSS). However, the CBA shows that it is prudent to uplift the rating of GT2 should an increase in generation be expected before 2069.
T2BP-EJP-0008 Substation Resilience - Low Voltage Supplies	• Part of the solution is disproportionate to the needs case. Only works to meet legislative requirements for 72 hours of autonomy are justified. • Works proposed at ■ sites due to LV supply diversity are not warranted during the RIIO-T2 period. • Where there is a needs case to increase the autonomy, it may be prudent to increase this to 120 hours to meet the Department for Business, Energy and Industrial Strategy (BEIS) requirements • Where there is a needs case to increase the autonomy, it may be prudent to undertake the diversity of supply works. • The work across supply autonomy and diversity are not mutually exclusive and would be combined as a single work package for each site. The costs have therefore not been presented separately.

T2BP-EJP-0012 Integrated Condition Performance Monitoring JP	• The EJP has not presented a clear and unambiguous needs case. The majority of the monitoring proposed in this scheme (i.e. the transformer and switchgear monitoring) is not critical to the safe operation of the transmission network. • Although there may be benefits from an Integrated Condition & Performance Monitoring system, it is not clear what the measurable outputs of this scheme would be. • SHET should already have maintenance plans and Health, Safety, Security and Environment (HSSE) procedures in place to mitigate the risks presented in the EJP. • Only the rollout of Dynamic Line Rating sensors on the [redacted] OHL circuits prioritised for RIIO-T2 is justified and proportionate to the needs case. • Condition monitoring of higher risks assets might be useful to determine the risk associated with replacing these assets at the next business plan submission. • From our engineering experience, the costs presented in Table 4 of the EJP are higher than we would expect, we would propose this is reviewed by the financial review team. It is also unclear if engineering time has been included.
T2BP-EJP-0031 Willowdale Substation Justification Paper	• Part of the solution is disproportionate to the needs case. There is no needs case for a replacement of the existing 132kV switchgear. • [redacted] CBs are within their end of life expectations but require specific action due to issues with their seals and moisture ingress. • All earth switches and disconnectors, except [redacted], are stated to be in a good condition. • Remedial repairs on the CBs and disconnector would extend the life of the asset. • The chosen solution will improve the operational flexibility and resilience of the Willowdale substation, which is of secondary benefit.
T2BP-EJP-0027 Sloy Substation Works Justification Paper	• The chosen solution is not proportionate to the needs case. The asset condition report does not provide over-riding evidence for the need to replace GT1, GT2, GT3 and GT4. • Oil sampling and furan assessment should be carried out on a more regular basis and monitoring equipment should be installed on all the transformers. This would ensure that the transformers operate within safe parameters and will delay the need to replace them in RIIO-T2.
T2BP-EJP-0037 Foyers Substation Justification Paper	• Part of the solution is disproportionate to the needs case. There is no needs case to replace GT1. • GT1 was manufactured in 1991 and is in a reasonable condition. • The option to defer the replacement of [redacted] should have been progressed to detailed analysis and comparatively assessed against the chosen solution using cost benefit analysis. • There may be a needs case for intervention on [redacted] transformers within RIIO-T2 and RIIO-T3 period. For overall efficiency and to reduce the potential need for outages in the future, there could be an argument to replace [redacted] transformers at the same time as per the preferred solution. This would reduce the outages on a critical part of the 'black start' infrastructure on the transmission network.
T2BP-EJP-0028 Whistlefield - Dunoon 132kV OHL Works JP	• A more targeted solution could have been presented e.g. modify or change the towers which exhibit clearance issues to meet the needs case presented in the EJP. However, it is acknowledged that the preferred option to rebuild the OHL will result in less outages and temporary diversions.
T2BP-EJP-0013 Materials Management and Warehousing JP	• The chosen solution is not proportionate to the needs case. The scope of works as presented does not justify a two-warehouse solution. • SHET have not established what the spares holding area requirement is, only that they need enhanced facilities.

	• The chosen solution should have been the Minimum Requirements option. This would develop a single warehouse solution to meet the needs case for improved spares storage facilities. • The key reason for discounting the single site solution i.e. potentially, insufficient storage capacity requirements based on future network expansion scenarios, or unfeasibly large warehouse facility has not been substantiated • The existing facilities could be enhanced and used alongside the Minimum Requirements option to mitigate the business continuity risk highlighted in the EJP. • A second warehouse solution could be proposed in RIIO-T3 if the storage capacity is shown to be insufficient.
T2BP-EJP-0043 Keith Substation Works Justification Paper	• The EJP has not presented a clear and unambiguous needs case. The supporting evidence provided in the asset condition report does not wholly support the needs case and parts are contradictory to the EJP. • The proposed scope of works is an offline replacement of the [redacted] 132kV AIS busbar with a double 132kV Gas Insulated Switchgear (GIS) busbar at Keith substation. • The only requirement for the RIIO-T2 period is a like-for-like replacement of the busbars, a replacement of [redacted] of the 132kV CBs and some refurbishment of the protection and LVAC system. These works should have progressed to detailed analysis and comparatively assessed against the chosen solution using cost benefit analysis.
T2BP-EJP-0050 Tealing 275kV Busbar Justification Paper	• No specific issues noted
T2BP-EJP-0048 Peterhead Substation Justification Paper	• Part of the solution is disproportionate to the needs case. The comparatively good condition of SGT2 suggests that it could be replaced during the RIIO-T3 period. This is considered in the EJP but was not taken forward to detailed analysis. • The option to defer the replacement of SGT2 to the RIIO-T3 period should have been progressed to detailed analysis and comparatively assessed against the chosen solution using cost benefit analysis. • There is a needs case for intervention on both SGT1 and SGT2 within the RIIO-T2 and RIIO-T3 period. There are also planned HVDC works in the area. From a strategic point of view, it would be prudent to replace both SGTs at the same time.
T2BP-EJP-0045 Harris-Stornoway 132kV OHL Justification Paper	• No specific issues noted
T2BP-EJP-0006 Transmission Communications Upgrade JP	• The EJP does not present a clear and unambiguous needs case. Not enough information is given in the needs case and optioneering section of the EJP to justify the scope of works. • The justification for the needs case is based on the increasing digitisation of the SHET network. This is deemed to be an improvement project. • This project is linked to five other programmes of work which have been submitted as part of RIIO-T2. All of the interdependent projects will need to have been implemented and be operational before the full benefit of this scheme can be realised. • The only substantial needs case presented in the EJP is the requirement to meet STCP 27-01. However, this alone does not justify the chosen solution. • A more proportionate solution should be considered to help SHET meet the requirements set out in STCP 27-01.
T2BP-EJP-0032 Kilmorack and Aigas Substation JP	• The chosen solution is not proportionate to the needs case. There is no requirement to rebuild the Kilmorack and Aigas substations at a combined location in the RIIO-T2 period.

	• Oil analysis does not indicate any internal faults on the transformers at either Kilmorack or Aigas substation, and ageing performance is stated as being good. • Disconnectors and earth switches are stated as being in a good condition. • Remedial works should have been considered as the primary assets are in reasonable condition. The more appropriate solution would be to remove the wildlife waste, make the sites secure and to carry out remedial works to address the oil leakage issue. • Remedial works should be comparatively assessed against the chosen solution using cost benefit analysis. • Carrying out remedial works would be challenging and may require extended outages, which will have an impact on the availability of the local generation. This would also have a cost impact which should be considered. • It is not clear whether a suitable location for the new combined site has been found. This could pose a significant risk of deferral and escalating costs should there be any issues with the planning application for the chosen option. It is not clear whether this has been considered.
T2BP-EJP-0005 Protection Modernisation Justification Paper	• Part of the solution is disproportionate to the needs case. End of life data suggests [redacted] of what is proposed is suitable for replacement. • Replacing relays just because of age and obsolescence is not in line with good engineering practice. • The preferred option would be to replace the failing relay family types and end of life relays. • Insufficient detail has been provided for the scope of works to upgrade [redacted] sites to IEC 61850 standards.
T2BP-EJP-0034 Beauly - Aigas - Deanie 132kV OHL Justification Paper	• The EJP does not present a clear and unambiguous needs case. The project driver appears to be the age of the asset. The asset condition report does not provide over-riding evidence for the need to rebuild the BDN/BDS circuits. • It is hard to justify the replacement of the phase and earth conductor as Cormon testing (conducted in 2004) only identified limited signs of possible corrosion. • SHET have carried out testing on the Fort Augustus-Fort William (FFE/FFW) circuit. SHET state that the condition of FFE/FFW is indicative of BDN/BDS and supports the replacement of the phase conductor in RIIO-ET2. However, no evidence of this has been provided and it is not clear whether in terms of location the conditions are comparable. SHE Transmission should have conducted testing on the BDN/BDS circuit rather than rely on the 2004 results. • The condition of the fittings is unclear and the iHawk data does not support the claims that [redacted] of the earth wire fittings and [redacted] of the conductor fittings require replacement. A fitting replacement is assumed to have been carried out previously, however no information is available to support this assumption and as such it is not clear when this occurred and thus whether the fittings have reached their end of life. • This scheme was originally included in the baseline for delivery during the RIIO-T1 period.
T2BP-EJP-0002 Climate Change and Sustainability Justification Paper	• The EJP does not present a clear and unambiguous needs case. • This project is driven by SHET's commitment to support a sustainable future as outlined in their "Network for Net Zero" Business Plan. From the EJP, it is not clear whether this is driven by legal requirements or Corporate Social Responsibility (CSR). The investment on energy efficiency measures and Electric Vehicles (EV) does not seem to have a direct implication on the TO's license condition requirements and hence it is not clear whether this should be balance sheet funded or part of BaU OPEX. Ofgem should consider this at a policy level rather than an engineering assessment. • If the policy decision is that energy efficiency and carbon reduction of the company should be considered, the options considered are valid.

	• For the energy efficiency measures, the paper provides no evidence to substantiate the works and extent of changes that will be conducted at the [redacted] substations. While the paper indicates that this will be carried out on [redacted] sites, the costs include the identification and prioritisation of sites, which makes it unclear how these [redacted] sites have been selected. • For the EV related investment, SHET do not make clear why charging points should be installed at employees' homes rather than SHET premises. • For the flood mitigation expenditure, the paper includes costs for mitigation measures on [redacted] sites, but does not name the sites, does not specify why only [redacted] of the 127 sites are estimated to require mitigation measures, the type of mitigation measures included or the methodology to identify the [redacted] sites.
T2BP-EJP-0026 Sloy - Windyhill West 132kV OHL Works JP	• No supporting information is provided on the clearance issues for which there are proposed mitigation works.
T2BP-EJP-0025 Sloy - Windyhill East 132kV OHL Works JP	• No supporting information is provided on the clearance issues for which there are proposed mitigation works.
T2BP-EJP-0003 Resilience - Operations Centre Justification Paper	• The chosen solution is not proportionate to the needs case. The scope of work as presented (regarding the new building rather than the expansion of the existing facility) is not well justified. • The EJP proposes the development of an independent and new control room building to accommodate the resource requirements and improve access control. • SHET state the additional requirements, namely the need for [redacted] control desks and [redacted] support team desks by the end of RIIO-T2, compared to [redacted] control room desks and [redacted] support team desks currently. However, the majority of the paper cost is associated with establishing a new building not the control room fit out. Furthermore, in establishing the need SHET do not establish how much space the control room needs, and although SHET have considered expanding the current facility, the arguments against an expanded control room in the current facility are weak and are not sufficient for the dismissal of this option. It is also not clear how the issues surrounding tailgating could not be mitigated at the existing site.
T2BP-EJP-0042 Tummel Bridge Substation Works Justification Paper	• The chosen solution is not proportionate to the needs case. The asset condition report does not provide over-riding evidence for the need to replace GT1 and GT2. • The only needs case is to continuously monitor the transformers demand profile and to undertake a 6-monthly oil sampling regime for the transformers as stated within the asset condition report. • Intervention should also be considered on the tap-changer mechanism of GT2 and the mechanism/linkages of 132kV disconnector 113.
T2BP-EJP-0036 Deanie Substation Justification Paper	• The chosen solution is not proportionate to the needs case. The asset condition report does not provide over-riding evidence for the need to replace the transformer, disconnectors and earth switches during the RIIO-T2 period. • Based on the information within the Asset Condition Report (ACR), only remedial / refurbishment works should be undertaken to extend their predicted end of life.
T2BP-EJP-0035 Culligran Substation Justification Paper	• The chosen solution is not proportionate to the needs case. The asset condition report does not provide over-riding evidence for the need to replace the transformer, disconnectors and earth switches during the RIIO-T2 period. • Based on the information within the ACR, only remedial / refurbishment works should be undertaken to extend their predicted end of life.
T2BP-EJP-0040 Quoich Tee Substation Works Justification Paper	• The EJP does not present a clear and unambiguous needs case. • The assets identified for intervention do not have condition ratings which justify replacement or refurbishment.

	• The project has a secondary driver for improved network operability. The justification behind the secondary driver is robust and whilst it is not sufficient to justify a substation rebuild at present, it should be considered in the future when the assets have reached their end of life.
T2BP-EJP-0021 Redmoss-Clayhills 132kV Justification Paper	• No specific issues noted
T2BP-EJP-0046 St Fergus Mobil Justification Paper	• The chosen solution is disproportionate to the needs case. The option to refurbish the existing switchgear should have been taken forward to detailed analysis. • It is acknowledged the replacement of the pipework on the [redacted] CBs could pose difficulties. However, the maintenance or replacement of this asset is possible. • The chosen solution is an improvement project which seeks to replace the switchgear due to the limited operational speed and flexibility of the site. Although such improvements are beneficial, they are of secondary benefit and should be considered when the asset condition of the switchgear warrants a full refurbishment.
T2BP-EJP-0007 Transmission Substation SCADA Replacement JP	• Part of the solution is disproportionate to the needs case. End of life and fault data does not support the replacement of the [redacted] Remote terminal Units (RTUs)/Central Processing Units (CPUs). • There is no needs case for the IEC61850 network replacement and development, or the separation of shared RTUs. These are improvements which are not based on the condition of the asset.
T2BP-EJP-0015 Operational Strategic Spares Justification Paper	• Part of the solution is disproportionate to the needs case. There is no needs case to hold battery and auxiliary spares, as in most cases these assets would be off the shelf with no long lead time. • The EJP lacks detail as to how the spares costs have been calculated, however the volumes look reasonable based on what is currently in service.
T2BP-EJP-0020 Elmwood - Glenagnes Cable Works Justification Paper	• No specific issues noted
T2BP-EJP-0049 Peterhead - Inverugie 132kV OHL Justification Paper	• No specific issues noted
T2BP-EJP-0011 Physical Site Security Justification Paper	• A small part of the solution is disproportionate to the needs case. There is no needs case to replace the [redacted] obsolete CCTV systems as the majority of these assets are less than 10 years old.
T2BP-EJP-0030 Tealing Substation Works Justification Paper	• Part of the solution is disproportionate to the needs case. There is no needs case to replace Neutral Earthing Resistor (NER) 3 and upgrade the protection systems in the RIIO-T2 period. • Due to the location of the NER3 it may be reasonable to replace this asset as part of the wider works. • The functionality of both sets of protection (for the SGT and reactor) are considered adequate and not too dissimilar from modern applied standards. There is no needs case to replace these.
T2BP-EJP-0047 Moray West Offshore Windfarm Justification Paper	• No specific issues noted
T2BP-EJP-0004 Persistent Organic Pollutants Justification Paper	• Part of the solution is not proportionate to the needs case. Sample testing could be carried out on some Voltage Transformer (VT) and Current Transformer (CT) types on the network.

T2BP-EJP-0041 St Fillans Substation Works Justification Paper	• The chosen solution is disproportionate to the needs case. The asset condition report does not support the replacement of the disconnectors, the earth switches or the transformer. • The only needs case is to continuously monitor the demand profile of [redacted] and to undertake a 6-monthly oil sampling regime to see if any remedial action is required. • [redacted] should be replaced.
T2BP-EJP-0038 Glenmoriston Substation Justification Paper	• Part of the solution is disproportionate to the needs case. There is no needs case to replace and rehouse the ancillary equipment (11kV CB, batteries, protection, etc.) as part of this scheme. Although this will achieve business separation, these assets are still within their end of life expectations and are shown to be in good condition.
T2BP-EJP-0024 Glenshero Connection Works Justification Paper	• No specific issues noted
T2BP-EJP-0039 Invergarry T 132kV Justification Paper	• A small part of the solution is disproportionate to the needs case. The iHawk report does not support the replacement of the insulator sets. However, as access would be required to all [redacted] towers for the reconductor works it seems sensible that the most economic and efficient solution for the line is a full refurbishment.
T2BP-EJP-0009 Resilience - Personnel Communications JP	• Part of the solution is disproportionate to the needs case. • There is an interdependency between this scheme and the Transmission Communication Upgrade [T2BP-JPS-0006] scheme in relation to the roll out of VOIP over the Operation Technology Network (VOTN). The delivery of Operational Technology Network (OTN), a pre-requisite to the roll out of VOTN, is not accounted for in the costing for this scheme and this scheme presumes OTN availability to all sites by the end of RIIO-T2. Another option should have been considered which explored an alternative communications infrastructure across the network. This would remove dependence on the OTN. • The number of fixed and personal/portable Personal Mobile Radios (PMRs) required under this scheme has not been substantiated.
T2BP-EJP-0010 Emergency Response and Contingency Planning JP	• There is a risk that temporary masts may not be sufficient for long term planned diversions and that the utilisation of these assets for planned maintenance is not possible.
T2BP-EJP-0019 Broadford Substation Works Justification Paper	• The chosen solution is disproportionate to the needs case. There is no needs case to replace the switchgear, NER and protection systems at Broadford substation. All assets to be replaced under this scheme are shown to be healthy. • The asset condition report tries to justify the replacement of [redacted] due to its critical location and the fact that there have been significant issues with this this type of [redacted] elsewhere on the network. However only two interventions have been required on [redacted] during the RIIO-T1 period and the leakage rate of [redacted] is less than the leakage rate specified for [redacted]. • The chosen solution is an improvement project which seeks to replace the switchgear to improve network reliability and security at the site. Although such improvements are beneficial, they are of secondary benefit and should be considered when the condition of the asset warrants replacement.
T2BP-EJP-0029 Redmoss Substation Works Justification Paper	• No specific issues noted

T2BP-EJP-0001 Black Start System Restoration Justification Paper	• The EJP justifies the needs case for system studies and assessment to determine the benefits of the installation of synchronous compensators (to increase system inertia) and point-on-wave switching (to reduce transients during restoration) on the network during black start situations. • The EJP is not considered valid for a RIIO-T2 non-load project proposal as it appears to be system studies related which is more aligned to BaU OPEX or Network Innovation Allowance (NIA) / Network Innovation Competition (NIC) funding. The funding arrangement should be clarified.

3.2.2. SHET Discussion

The load related schemes were of a high standard with all 7 EJPs considered low risk to consumers. The non-load EJPs based on asset condition were of a reasonable standard and were generally consistent with the supporting evidence. In the majority of cases, the supporting evidence (asset condition reports, SQ responses, etc.) was robust and presented strong arguments in support of the EJPs. Where there was insufficient evidence provided, those EJPs were categorised as medium or high risk. The outcomes of the assessment are:

Rating	Number of Papers	Total Spend
Red (High risk to consumer)	16	£360.1m
Amber (Medium risk to consumer)	13	£327.2m
Green (Low risk to consumer)	20	£1,169.3m

The limited common issues observed among the EJPs are noted below, with observations about individual EJPs documented in Appendix A.

The primary investment driver for several of the EJPs submitted by SHET was resilience. Most of these documents made a weak case for these projects to be funded as part of RIIO-T2, having presented a needs case based on improvements rather than asset condition. Six of these schemes are part of a suite of Information Technology / Operational Technology (IT-OT) projects which aim to provide resilient communication channels between SHET's assets, operational technology and control facilities:

T2BP-EJP-0005 – Protection Modernisation Justification Paper
T2BP-EJP-0006 – Transmission Communications Upgrade Justification Paper
T2BP-EJP-0007 – Transmission Substation SCADA Replacement Justification Paper
T2BP-EJP-0012 – Integrated Condition Performance Monitoring Justification Paper
T2BP-EJP-0003 – Resilience - Operations Centre Justification Paper
T2BP-EJP-0009 – Resilience - Personnel Communications JP

There is a high risk that three of the above schemes (T2BP-EJP-0006, T2BP-EJP-0012 and T2BP-EJP-0003) will not be required in the RIIO-T2 period, as they have not presented enough information to justify the proposed scope of works.

There are significant interdependencies between these IT-OT schemes, and it is not clear how the costs and practicalities of each will be affected should not all of them progress. This should be clarified before any investment is allowed.

Generally, schemes which presented a needs case based on load or have provided evidence that the asset's health is in a poor condition have been considered as low risk to consumer. Schemes which seek to make improvements to meet legislative requirements have also been considered low risk to consumers. However,

where a project will typically result in assets being decommissioned before they reach their end of life the needs investment has been considered moderate or high risk to consumers.

The options considered in the optioneering assessment were reasonable for the needs case identified, with the majority of EJPs scoring favourably in this area. However, the chosen / preferred option was often not deemed a proportionate solution to the identified needs case, and the majority of schemes did not demonstrate value for money.

In particular, a high number of substation justification papers were found to present a disproportionate solution to the needs case. In some instances, this was because the asset condition report did not provide overriding evidence for the transformer(s) to be replaced. Where this is the case additional condition monitoring and / or remedial works have been recommended to extend the life of the asset into the RIIO-T3 period. Other substation justification papers proposed a wholesale replacement of the switchgear which seemed to be driven by network operability rather than asset condition. Although it is acknowledged that such solutions would improve the operational flexibility and resilience of the substations, this is of secondary benefit and should be considered when the asset reaches its end of life.

3.3. NGET Outputs

This section gives an overview of the main findings of the assessment carried out by Atkins during the RIIO-T2 evaluation for NGET. 31 IDPs were submitted by NGET as part of their RIIO-T2 business plan submission. It should be noted that these only include electrical asset IDPs. A number of IDPs are IT related and are being assessed by Atkins separately. All 31 electrical IDPs have been evaluated along with any associated material (CBAs, SQ responses and supporting evidence etc).

As NGET's IDPs consider multiple asset types, intervention types and projects with corresponding volumes, the methodology developed includes two discrete RAG ratings. The first is the RAG rating for volumes associated with individual asset types or individual projects where available. Secondly an overall RAG rating for each IDP is also provided as per the category descriptions shown in Section 3, Table 3-1. The overall IDP RAG rating is similar to that used for review of the Scottish TO EJPs but also considers the volume risks assigned.

An example of the RAG rating for volumes is the review of A9.09 - OHL Towers and Foundations IDP, where the tower painting and steelworks are considered as separate volumes. Atkins has highlighted volumes of assets within each IDP according to whether these represent a high, moderate or low risk of investment not being required in the RIIO-T2 period. These categories are explained in Table 3-6 below.

Table 3-6 - RAG categories for NGET volumes

RAG (volume)	Risk category factors
Green	Low Risk - Atkins consider that the proposed spend / work programme has a low risk of either deferral, or that the spend will not be required based on the needs case.
Amber	Medium Risk - Atkins consider that there is a clear needs case for a volume of work to be completed, but judge that there is some risk associated with either deferral of volumes, or that the spend will not be required. This risk cannot be disaggregated into low or high-risk components, due to lack of information (bespoke methodologies, engineering judgements etc) and further SQs are considered redundant.
Red	High Risk - Atkins consider that the proposed spend / work programme, has a high risk of either deferral, or that the spend will not be required. The needs case or the majority of the volume is not justified.

For 28 of the 31 NGET IDP submissions assessed, individual project details have not been provided (individual project details were provided for A9.08 Dinorwig-Pentir Cables, A9.12 Tyne Crossing and A9.19 London Power

Tunnels Phase 2). The majority of IDPs justify volumes of investment covering multiple assets and multiple projects. Therefore, the methodology of the assessment undertaken is different to the Scottish TOs' EJPs. For this reason, a binary scoring methodology was not considered appropriate. Where possible, Atkins has tried to maintain the 5 areas stipulated by Ofgem. Further details of the assessment methodology for NGET is provided in Appendix D. It should be noted that, given the NGET expenditure is based on unit cost benchmarking, the value for money aspect of NGET's IDPs has not been considered.

The categorisation of risk for the overall IDPs and for the volumes are presented graphically in Figure 3-3 and Figure 3-4 below respectively. The risk categorisation is also provided in terms of Load and Non-Load spend, shown in Figure 3-6. As this graph only shows Load and Non-Load projects please note that it does not include the sums attributed to the following IDPs; A10.05 - Extreme Weather, A10.07 - Black Start, A10.08 - Optel Refresh and A11.10 - EV Fleet. This categorisation is based on the supporting assessment detailed below:

- Where an IDP has an attributed spend Atkins have produced an individual technical assessment report. These can be found in a separate document which holds the individual technical notes, details can be found in Appendix C.

- An SQ Log has been provided in Appendix G which provides a list of SQ references used to carry out the review.

A small portion of expenditure have been categorised as 'Unclassified'. In most cases these values are nominal and are a delta between the total spend stipulated in the IDP and a summation of individual volume costs. However, a large portion of the spend marked as Unclassified is aligned to a value of £24m stated in the A9.16 – Transformers IDP. This sum is stated as referring to indirect costs but is not broken down per asset, it is therefore not possible to correlate a risk.

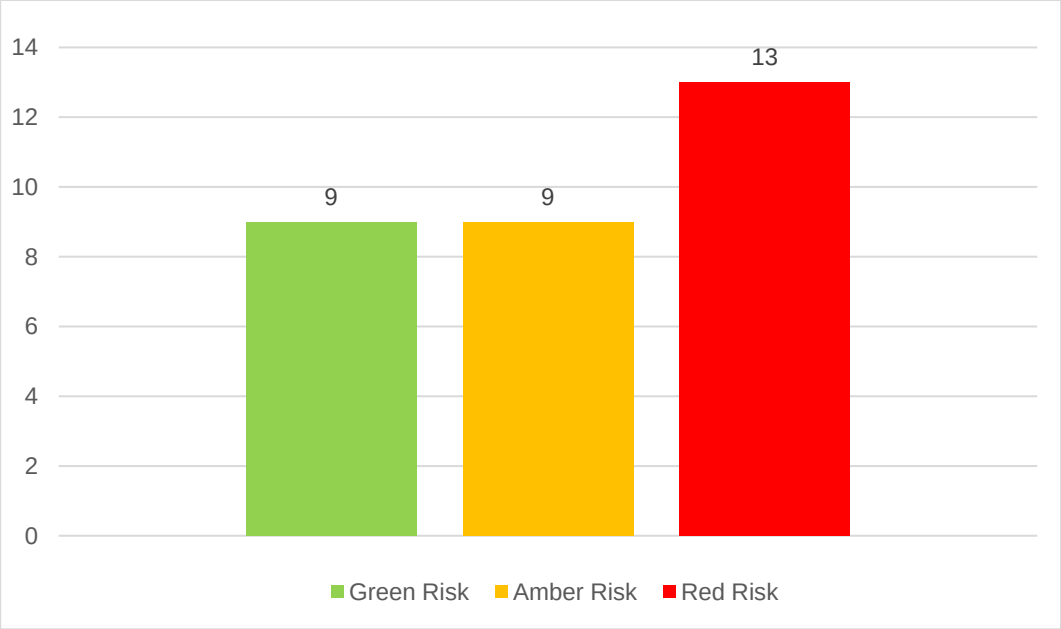

Figure 3-3 - Total risk broken down by IDP

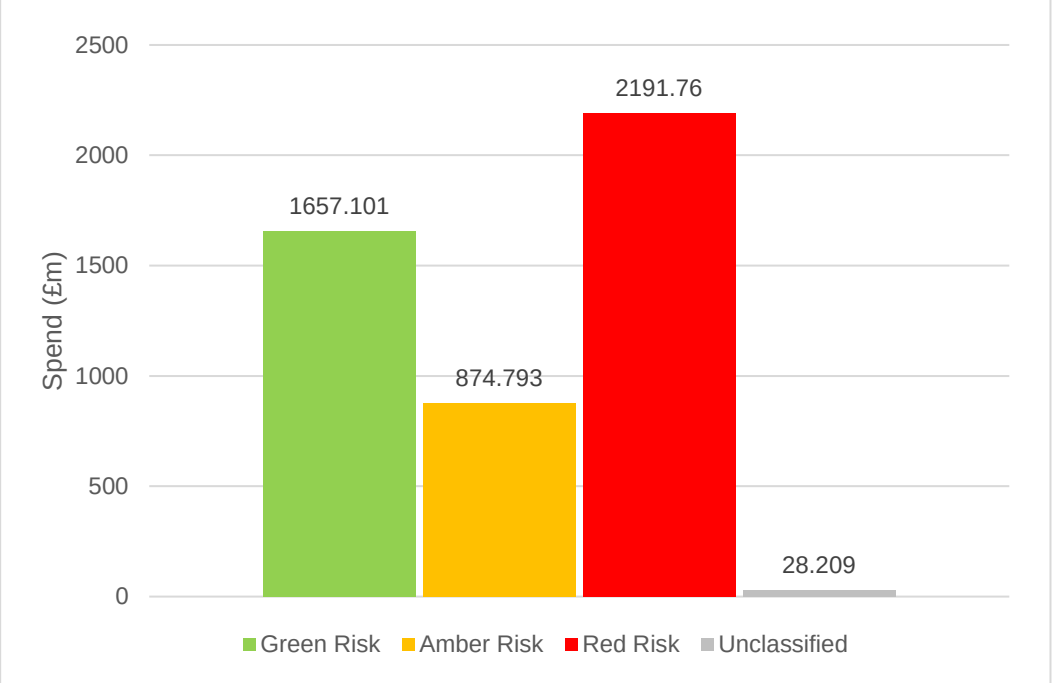

Figure 3-4 - Total spend risk broken down by volume

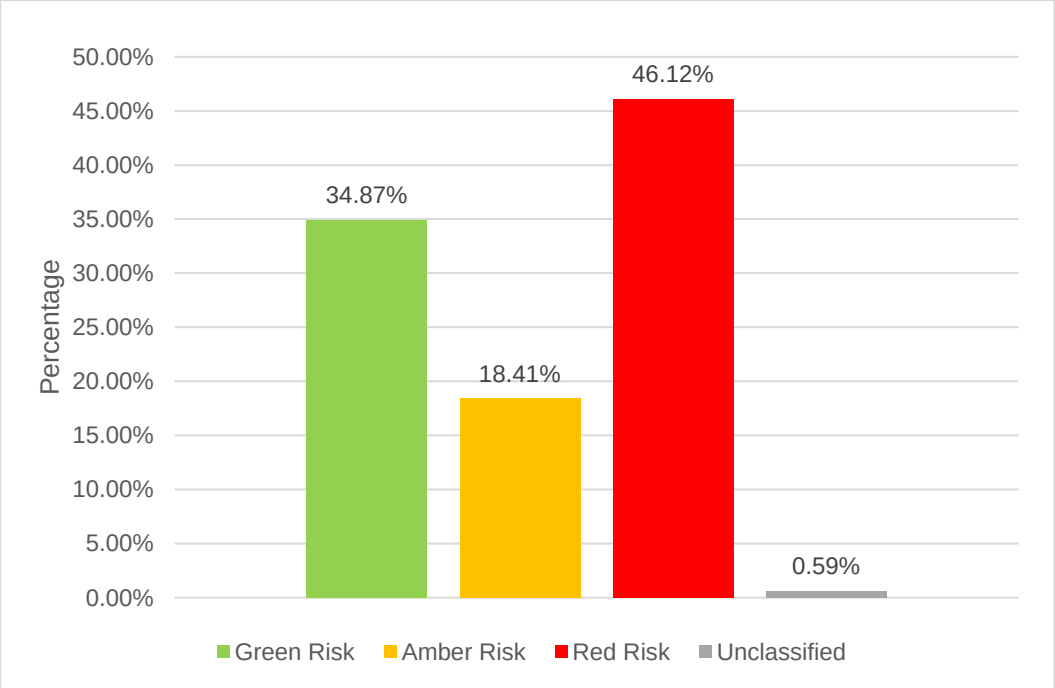

Figure 3-5 - Total percentage risk broken down by volume

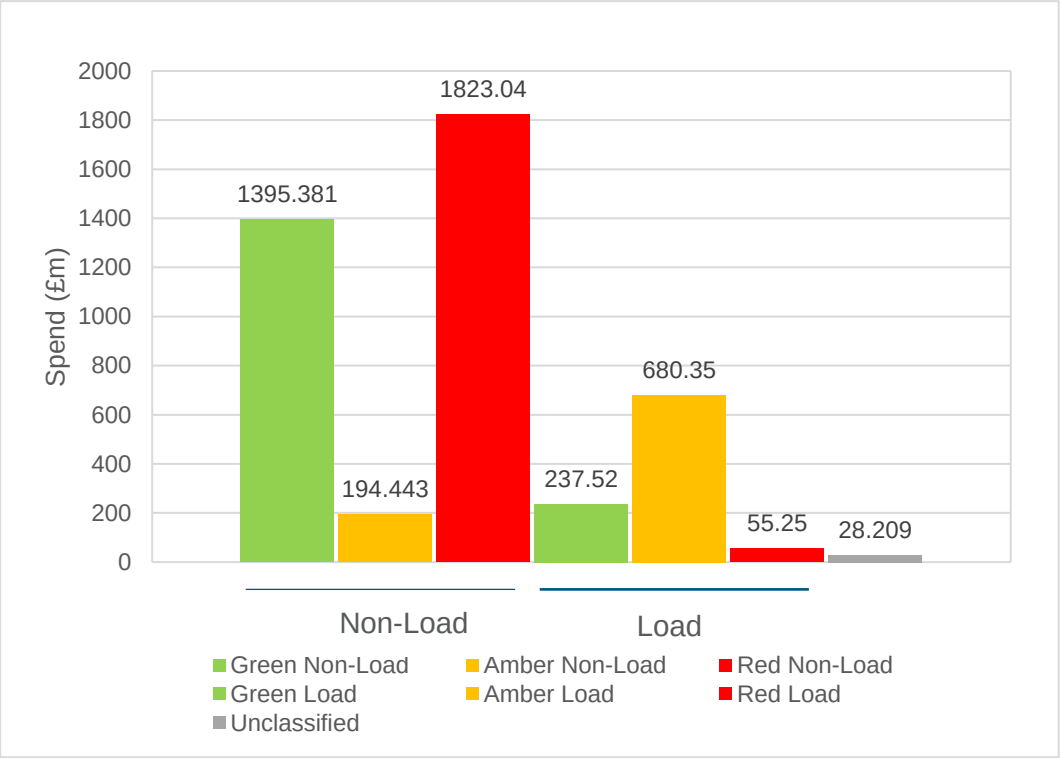

Figure 3-6 - Total spend risk broken down by volume and split into Load and Non-Load

3.3.1. NGET Risk classification and issues

Risk classifications attributed to each IDP and corresponding volume of asset categories is provided in Table 3-7 below.

A separate table has been provided in Table 3-8 below which provides a quick reference to issues relating to each IDP. Specific details for each IDP can found in the individual technical notes in Appendix C.

3.3.1.1. Risk classification

Table 3-7 - NGET IDP and volume summary

IDP	Risk (IDP)	Asset	Volume	Spend (£m)	Risk (Volume)
10.05 Extreme Weather	Red	Substations	[redacted]	49.8	Red
		Tower foundations	[redacted]	8	Red
		Amending of design standards for assets	N/A	2	Red
10.07 Black Start	Green	AC/DC Batteries – High performance technology	[redacted] units on [redacted] sites	6	Green
		LVAC power electronic (SMPS) battery chargers	[redacted] units on [redacted] sites	3.6	Green
		Standby Generator fuel polishing	[redacted] sites	0.8	Green

		Remediation of TLs - disconnectors, metering, indication and control	[redacted] items + [redacted] metering, indication and control items	9.3	Green
		Enhanced Maintenance	Across sites	0.8	Green
		Enhanced Preparedness (OPEX)	TNCC	1.38	Red
10.08 Optel Refresh	Red	Fibre Optic Wrap Replacement	[redacted]km	78	Red
		Improved Comms Link Performance	n/a	3	Green
		Improved Physical Security	n/a	0.7	Green
		Optel Network Refresh	[redacted]	77.4	Red
		High Bandwidth Overlay	n/a	19.8	Red
		Control Telephony	n/a	8	Red
		T3 OpTel Network Refresh	n/a	17.6	Red
		T3 Control Telephony	n/a	4	Red
11.10 EV fleet	Red	Electric Vehicles (EV) + Internal Combustion Engines (ICE)	[redacted]	36.05	Red
		Charging infrastructure	[redacted] standard and [redacted] DC charge-points	11.43	Red
A7.02 IWW	Amber	BMM2, BNRC, HAEU, KLRE, SEEU and WHTI	N/A	87.7[1]	Green
		BMM2, BNRC, BRRE, BTNO, CBEU, CDP1, CKPC, CTRE, ESC1, HAE2, HAEU, HSNO, HSS2, KLRE, KWHW, KWPC, MBHW, MBRE, NBRE, NEMS, NOR2, NTP1, PEM1, PEM2, RHM1, RHM2, RTRE, SEEU, SER1, SER2, SHNS, TDH1, TDH2, TDP2, TDPC, THRE, THS1, WHTI, WYTI and North Wessex VIP		323.5[1]	Amber
7.03 Protection coordination	Amber	Detailed modelling and coordination studies	N/A	1.72	Amber
		New protection solution development	N/A	3.65	Red

		Relay setting review and setting changes	[redacted]	23.07	Amber
		Replacement of relays	[redacted]	92.36	Amber
7.04 Site Separation	Amber	Site separation	[redacted]	41.43	Amber
7.05 Easements	Red	N/A	N/A	93.3	Red
A7.06 Facilitate competition (pre-consents)	Amber	E2DC, E4D3	2	75.6[1]	Green
		CGNC, E2D2, E4L5, GWNC, TKRE, TLNO, OPN2, SCD1	8	TBC[2]	Amber
7.07 System Monitoring	Red	CAPEX	N/A	48.026	Red
		OPEX	N/A	2.325	Red
7.08 System Operability	Amber	Reactors	[redacted]	30.7	Amber
8.02 Generation	Amber	Braintree, Sundon, Fleet, Norwich, Bolney, Sellindge, Bramford, Burwell Main, Coventry, Exeter, Holyhead (Orthios), Powersite@Drakelow, Progress Power, Viking, Greenlink, Neuconnect, Hinkley Point C (1st unit), Thanet 2, Dogger Bank 1A/1B, Hornsea 3A	8398MW	137.9	Green
		Keadby 2, Spalding Energy Extension, Thurrock, NSN, Triton Knoll, Hornsea 2A/2B/2C, East Anglia 3A/3B	6867MW	2.0	Amber
		Kearsley, Walpole, Damhead Creek 2, King's Lynn B, Thames Haven, Aquind/OGN, NEMO 2, Hinkley Point C (2nd unit), Hornsea 3B, Dogger Bank 4A/4B, East Anglia 2/1N, Dogger Bank 2A/2B, East Anglia 6	16086MW	105.2	Amber
8.03 Demand	Amber	Didcot, North Hyde, Bramford, Lister Drive, Taunton, West Burton	[redacted] SGTs (in T2) [redacted] SGTs (outside T2)	7.3	Green

		Quainton, Burton Green, Bridgewater, Harker, Little Horsted, Oldbury, Twinstead	[redacted] SGTs (in T2) [redacted] SGTs (outside T2)	100.5	Amber
		Bengeworth Road, Berkswell, Fawley	[redacted] SGTs (in T2) [redacted] SGTs (outside T2)	35.4	Red
9.03 Circuit breakers and Bays	Red	Circuit breakers	[redacted]	27.8	Green
			[redacted]	0.06	Amber
			[redacted]	5.17	Red
		Bays	[redacted]	194.2	Red
		Apportionment	N/A	3.15	Red
9.04 Interactions Annex	Green	N/A	N/A	0	Green
9.05 – Instrument Transformers	Red	Instrument Transformers	[redacted]	60	Red
		Emergency Replacements	[redacted]	2.6	Red
		Apportionment for T1 and T3	N/A	0.858	Red
9.06 Whole Site Replacements	Green	N/A	N/A	0	Green
9.07 Underground cables	Green	Pitsmoor-Wincobank-Templeborough	[redacted]km	37.73	Green
		Substation underground cables	[redacted]km	31.03	Green
			[redacted]km	6.1	Amber
		Sheath voltage limiters	N/A	1.477	Red
9.08 Dinorwig-Pentir	Green	Dinorwig-Pentir	[redacted]km	[redacted]	Green
9.09 - OHL Conductors and Fittings	Red	Conductors	[redacted]km	537.5	Red
		Fittings	[redacted]km	83.7	Red
9.09A - OHL Towers and Foundations	Red	Tower Painting	[redacted]m^2	92	Green
		Tower Steels	[redacted]Tonnes	53	Red
		Foundation Survey	[redacted] towers	6.41	Red

		Foundation Interventions	[redacted] towers	45.4	Red
		Unclassified spend	N/A	2.91	Unclassified
9.10 Substation Other and Other TO Equipment	Red	Unknown	Unknown	209.2	Red
9.12 Tyne Crossing	Red	OHL Conductor	[redacted]km	[redacted]	Red
9.13 Through-Wall Floor Bushings	Green	Bushing Replacements	[redacted]	12.5	Green
		Forensic Analysis	[redacted]	1.8	Amber
9.14 Condition Monitoring	Red	Partial Discharge Monitoring for GIS Substations	[redacted]	1.5	Green
		Partial Discharge Monitoring for Non-Impregnated Cables	N/A	0.4	Green
		Oil Sampling (replacement of 40 online DGA units)	[redacted]	2.7	Green
		Through Wall/Floor Bushing Condition Monitoring	N/A	1.3	Amber
		Integrated sensors	[redacted]	16.2	Red
A9.15 Protection and Control	Red	Backup Protection	[redacted]	6.68	Amber
		Double Busbar Protection	[redacted]	9.56	Amber
		Dynamic System Monitoring	[redacted]	30.33	Amber
		Feeder Protection	[redacted]	11.90	Green
		Substation Control System (SCS)	[redacted]	104.31	Green
		Auto Switching (Auto Close and Hot Standby Units)	[redacted]	0.93	Red
		Automatic Reactive Switching (ARS)	[redacted]	0.20	Red
		Automatic Voltage Control (AVC)	[redacted]	0.06	Red
		Cable SCADA System	[redacted]	20.01	Red
		Circuit Breaker Fail (CBF): MC & DBB Protection	[redacted]	7.55	Red
		Fault Recorder	[redacted]	0.94	Red
		Feeder Protection	[redacted]	35.77	Red

		Gas Density Monitoring (GDM)	[redacted]	0.45	Red
		Mesh Corner Busbar Protection	[redacted]	1.63	Green
		Mesh Corner DAR	[redacted]	10.30	Red
		Operational Tripping Scheme (OTS)	[redacted]	24.17	Red
		Quad Booster (QB) Control	[redacted]	16.48	Red
		Reactive Equipment MSC	[redacted]	39.75	Red
		Reactive Equipment SVC	[redacted]	40.41	Red
		Settlement Metering	[redacted]	12.05	Red
		SGT Protection	[redacted]	36.54	Red
		Discrepancy	N/A	86.9[3]	Red
9.16 Transformers	Amber	Super Grid Transformer (SGT)	[redacted]	101.16	Green
			[redacted]	85.88	Amber
			[redacted]	30.75	Red
		Static Compensator Transformer (SCT)	[redacted]	N/A	Green
			[redacted]	N/A	Amber
9.17 Reactors	Green	Reactors	[redacted]	49.47	Green
			[redacted]	N/A	Red
		Apportionment in RIIO-T1/T3	N/A	1.623	Red
A9.18 Strategic Spares	Green	N/A	N/A	45.86	Green
9.19 LPT2	Green	WIMB-NEWX	[redacted]km	645.8	Green
		HURS-LITT	[redacted]km		Green
9.21 Substation Auxiliary Systems	Amber	DC Battery Systems	[redacted]	23.141	Green
		LVAC supply and distribution systems	[redacted]	21.15	Red
		LVAC Minor CAPEX	[redacted]	4.25	Green
		Diesel Generator Replacement	[redacted]	12.6	Amber
		Diesel Generator minor CAPEX	[redacted]	5.0	Green

Notes:
1. Values shown in this table are based on SQ NGET_SQ_ENG_155
2. Values have not been provided
3. A discrepancy is identified between SQ NGET_SQ_ENG_180 and the submitted IDP. Values shown in this table are based on SQ NGET_SQ_ENG_180

3.3.1.2. Issues

A list of issues which have been identified during the review process has been provided in Table 3-8 below.

Table 3-8 - Issues for NGET

IDP	Issues and comments
10.05 Extreme Weather	• Specific site solutions to ensure resilience against surface level flooding on an estimated [redacted] sites. - £49.8m. It is not clear how the [redacted] sites have been selected, how much of this investment is for surveying and how much is for actual flood defence. A breakdown should be provided. • Research, pre-works assessments and scheme development for erosion and other flood related natural hazards on approximately [redacted] towers- £8m. This seems to apply to surveying only. This should be verified and any overlaps with IDP 9.09A should be highlighted. • A long-term strategy of when to review and amend design standards for assets to reflect threats posed by climate change - £2m. It is not clear why this is not considered BaU OPEX by NGET.
10.07 Black Start	• If this investment is approved, spend in IDP A9.21 should be reduced by £1.89m • The investment related to enhanced preparedness is currently not considered clear and unambiguous and represents a high risk to consumers as it is considered BaU and potentially overlaps with NGET OPEX submission. This is a total of £1.38m.
10.08 Optel Refresh	• Replacement of fibre wrap with Optical Ground Wire (OPGW): Given the extensive volume of investment, the paper doesn't provide the information on whether these replacements are feasible with respect to outages and whether these are aligned to A9.09 OHL conductor replacement. It is not clear whether OPGW outages together with outages required for A9.09 are feasible during the period given system constraints. • Given the volume of work, there is no evidence that preliminary supply chain has been carried out to inform the delivery volume, timescale or the ESO has been engaged on outage availabilities • High Bandwidth Overlay - Overlay is dependent upon the Fibre Optic Wrap Replacement and therefore is similarly at risk should the outages and delivery profile not be feasible
11.10 EV fleet	NGET have not articulated the needs case in the context of RIIO-T2 and have not provided sufficient information, namely: • There are no specific licence condition/grid code/SQSS, network operations, safety, resilience or security of supply drivers • It is not clear if the current fleet of vehicles is expected to be out of service or reaching end of life such that NGET are no longer able to meet their obligations • Justification of the volume of vehicles needs to be replaced • How the windfall from sales of current vehicle fleet will be accounted for • The CBA assumptions demonstrate that NGET believe that the cost of fuel for standard internal combustion engines (ICEs) is higher than EVs cost. but the savings have not been accounted for • Overlaps with any other areas of the RIIO-T2 business plan submissions e.g. OPEX • This investment is primarily based on a policy decision rather than an engineering requirement.
7.02 IWW	• Following the submission of the IDP further updates were carried out during the RIIO-T2 assessment process based on the NOA 19/20 recommendation which led to 8 projects being removed with a reduction of £125m and a total reduction of £279m following reprofiling of certain projects.

	• However, an additional 19 projects with 4 proceed and 1 delay, and the remaining Hold recommendations have been added to the baseline leading to an increase of £183m
	• Overall change through NOA 19/20 reassessment is £95.4m
	• Atkins has assessed the projects individually. Projects with an NOA proceed recommendation in 3 consecutive years 17/8, 18/19 and 19/20 have been rated as having a low risk to consumers
	• The assessment shows that there is a significant level of uncertainty
	• An uncertainty mechanism has been proposed within the IDP.
	• The design of the uncertainty mechanism should consider that:
	  • The NOA only gives single-year recommendations, hence some projects may see a start-stop recommendation over the course of the T2 period
	  • Pre-construction works funded under NGET A7.06_Facilitate Competition
	  • There is significant apportionment in RIIO-T2 related to projects to be delivered in RIIO-T3
	  • The volatility of the linked output i.e. boundary capabilities with respect to changes in the future energy scenarios.
	• Following NGET_SQ_ENG_155, the baseline proposal should be updated and the unit cost allowance (UCA) should be recalculated.

7.03 Protection coordination	• Detailed modelling and coordination studies (phase 1):
	  • NGET should already have existing tools and it is not clear why, localised modelling of the weaker network areas is not sufficient
	  • It is not clear how the output will be measured and why this expenditure is not classified as OPEX
	• New protection solution development (phase 1): Atkins believe that this should form part of a NIA/NIC project so that the proper industry knowledge and oversight are used and NGET is held accountable for the expenditure and share the learning
	• Relay setting review and setting changes (phase 2):
	  • Assessment of the validity of protection settings is considered to be a day to day activity as part of a responsible transmission network operator operating its network. It is not clear how the output will be measured. It is not clear whether there are any overlaps with NGET's business plan submission in terms of OPEX
	• Replacement of relays (phase 3):
	  • This is dependent on the output of phase 2 and subject to an uncertainty mechanism/re-opener
	• NGET has demonstrated within NGET_SQ_ENG_229 the extent to which phase 2 expenditure within the IDP overlaps or benefits from delivery efficiencies through alignment with IDPs A9.15 and A9.16 which has led to a revision of the expenditure forecast for phase 2 from the original IDP value by £2.71m and an increase in the expenditure forecast for phase 3 by the same amount.
	• The overall risk to consumer remains amber as it is not clear why the £25.78m (revised to £23.07m) expenditure for phase 2 is not considered to be inclusive to OPEX submissions to Ofgem and how the output will be measurable

7.04 Site Separation	• The IDP provides a list of sites with expected closure dates but there is ambiguity in the list proposed as for example [redacted] and [redacted] have been classed as "unknown closure date" • It is not clear if the closure date assumptions align with Future Energy Scenarios (FES) or the common energy scenarios used in other IDPs

	• The IDP considers mostly full separation with the exception of [redacted], it is not clear why full separation has been considered as opposed to partial separation or other alternative solutions for each site • The CBA shows a positive benefit compared to the requirement for temporary site supply provision (500kVA diesel genset with LV board etc) during a full 2-year period costing [redacted]/annum. It is explained that this is derived from experience of RIIO-T1. However, the IDP does not evidence this against the RIIO-T1 projects provided in table 2 of the IDP • It is also unclear whether other options such as alternative arrangement with the power station(s) have been considered where there are other running generators still in the power station such as [redacted] substation in the vicinity of [redacted] with respect to site security arrangement etc. • Several discrepancies have been identified with the costs presented in tables 2 and 3 of the IDP and SQ responses and in some cases the presented figures do not identify the costs • Site separation costs will be site specific. The information presented suggests that this has been considered but there is no explicit explanation of this costing within the IDP
7.05 Easements	• It is not yet possible to determine the actual level of expenditure required based on the evidence provided in the IDP. A reduction in the requested £93.3m is possible based on the averages being adjusted to accommodate accruals or property price adjustments following recent events (such as COVID-19, oil price drops, economic slowdown). A mechanism should be considered for this spend to protect the consumer. • Several inconsistencies and contradictions between the IDP and SQ responses have been identified. A full description of the inconsistencies and contradictions leading to this decision is discussed in the separate technical note for this paper (Appendix C). • In forecasting the average cost of easement claims and in justifying a year on year increase in overall yearly claims NGET have excluded the accruals of £18.1m within 2017. It is not clear what the nature of this windfall is (e.g. is this following a court proceeding, sales or cancellations of easements, readjustment of overpaid invoices etc.), the period of accrual is undefined and the reasons why the cost was accrued over the period is not presented. This has a bearing on understanding whether the cost of these additional expenditure is already factored into the averages used for forecasting expenditure
7.06 Facilitate competition (pre-consents)	• Due to the extensive changes NGET made in response to the publication of the 2019/20 NOA recommendations IDP should be updated to provide a clear baseline proposal • Following the revised NOA 2019/20 proposals the needs cases for the 8 projects and the requirement for pre-consents expenditure is considered uncertain – 5 of these projects were not featured in NOA 18/19, 2 were recommended as Do not start and 1 was recommended as Stop • At the time of carrying out this assessment, the impact on the changes in T2 expenditure has not been made available by NGET • We have considered only the needs cases for projects with a consistent Proceed recommendation for the last three NOA as low risk to consumers. These projects include E2DC and E4D3. • NGET have provided a breakdown of pre-consenting costs (averages) for activities within RIIO-T1. This has helped inform NGET in developing the cost estimates for the proposed RIIO-T2 pre-consenting projects. The activities highlighted to be required under each project is in line with expectations. • An uncertainty mechanism is proposed for any additional projects that require development in RIIO-T2, in response to an NOA proceed recommendation or a customer connection agreement, that are not in the baseline. This will also deal with efficiently incurred expenditure for projects that are terminated or paused through

	the period, either as a result of customer changes or a change in recommendation through the NOA process • NGET have provided several risks associated with the projects, which are in line with expectations.
7.07 System Monitoring	• The IDP specifies that the STCP 27-1 requires installation of system monitoring at every GSP. However, our interpretation of the STCP 27-1 is that the process requires the TOs to agree on where such monitoring devices are to be installed that provides sufficient visibility to the ESO and TOs for post event investigations and system operability purposes. • The number of units and example of the type of equipment to be installed as well as the type of data this equipment will gather (in addition to data already available) in reference to the above STCP27-1 requirement is not provided. It is not clear how the expenditure has been forecasted without a clear view of the volume of investment • Evidence of the underpinning cost information (derived from RIIO-T1 innovation projects according to the IDP) is not provided which is used to discount options • The IDP makes references to existing system monitoring capabilities and some capability provided by innovation projects such as Visualisation of Real Time System Dynamics using Enhanced Monitoring (VISOR) and Enhanced Frequency Control Capability (EFCC), and Transmission & Distribution Interface (TDI) 2.0 but does not provide explanation or justification of what system monitoring capabilities these provide, what existing capabilities are available, additional system monitoring capabilities required and the purpose of this additional system monitoring in relation to the requirements of STCP27-1. • Within the IDP, synergies, efficiency savings and overlaps with expenditure within IDPs such as NGET A9.15 and NGET A7.03 appear to have been discounted or not considered. While, the IDP mentions why extraction of data from existing systems is difficult, there is little mention of whether expenditure within these IDPs is coordinated to offer a coordinated solution • IDP does not provide explanation of the level of system monitoring required to achieve the satisfactory visibility as per STCP 27-1 and proposes potentially significantly higher volume of system monitoring installations than needed to achieve the objectives • It is not clear whether there are any overlaps with NGET's OPEX submission to Ofgem for the OPEX expenditure highlighted within this IDP. • It is not clear why the archiving and analytic tools require 2 rounds of expenditure.
7.08 System Operability	• The basis for the selection of the specific ■ sites is not clear and pending further assessment • Atkins believes that the highlighted ■ reactors should also be part of the suggested uncertainty mechanism
8.02 Generation	• The estimated volume of connection is aligned to the low-end of the Common Energy Scenario (15.3GW within the T2 period and 16.1GW beyond the T2 period) • The volume and combination of projects will likely change as the actual mix of generation is very likely to be different • Atkins consider a higher level of uncertainty for the projects selected for the 16.1GW to be connected beyond the T2 period than those for the 15.3GW to be connected within the T2 period • A customer scoring system has been used to select projects in the baseline which Atkins considers sensible • The chosen solution(s) are appropriate for the needs case, with the exception of 10 projects where there is insufficient information to assess the options • The application of uncertainty mechanism is a sensible approach to manage these potential future changes. The design ensures any baseline allowance will be adjusted accordingly. • The NDP should be an integral part of the volume driver uncertainty mechanism

	• NGET should clarify how, for the investments with an output in RIIO-T3, the UCA will work. • It is also noted that NGET has not defined clearly the outputs of the proposed baseline projects using the new proposed UCA. NGET should clarify the outputs of these projects prior to the baseline allowance and uncertainty mechanism can be agreed. • Atkins observe a significant difference (approx. 6 times) in the UCA proposed for projects of size smaller than 100MW and those larger than 100MW. There is no evidence in the IDP that justifies such a step increase in UCA at a threshold of 100MW
8.03 Demand	• Within this IDP our assessment has highlighted £7.3m of investment which is considered low risk based on the NDP project stage, the needs case and the information provided in the IDP and SQs. This is equivalent to [redacted] projects covering [redacted] SGTs ([redacted] of which to be delivered in T2) • Expenditure of £100.5m is considered investment at moderate risk, which is equivalent to 7 projects and [redacted] SGTs ([redacted] of which to be delivered in T2). • Three projects at a cost of £35.4m equivalent to a total of additional [redacted] transformers ([redacted] of which to be delivered in T2) and additional works are considered to be high-risk • NGET stated in their SQ response that DNO options were considered for the Bridgewater and Oldbury projects. However, there is no details provided on the DNO options considered • CBAs were provided for 12 projects showing a range of options has been considered by NGET. The options considered are deemed reasonable • It is not possible to do an assessment for the other 4 projects in terms of options considered, as the CBA of these projects were not included • In general, the chosen solutions for new connections and SGTs are deemed to be proportionate • All investments, including those in the baseline are to be subject to adjustment by the uncertainty mechanism. • The proposed outputs for the 16 projects included in the baseline proposal are not clear • It is also unclear how, for the investments for which the output is in RIIO-T3, the UCA will work
9.03 Circuit breakers and Bays	• [redacted] CBs have an intervention requirement driven by the age factor. For these assets, the intervention as underpinned by the NOMs methodology requirements is justified. • Specific bulk CB assets with moderate or high risk of deferral beyond RIIO-T2 have been identified through a sampling and SQ process. The total value considered high risk to consumers is £5.17m. £0.06m is considered moderate risk to consumers • Based on the information provided, it is not possible to assess the needs case justification for each individual bay asset. It is clear from NGET's responses that not every asset is evaluated in terms of its condition individually and rather a service life vs Anticipated Asset Life (AAL) approach is used. The actual condition of the asset, when it comes to replacement, may however warrant that the individual asset life is extended • During the RIIO-T1 period, NGET have delivered significantly less than the [redacted] bay interventions proposed. Our view is that there may be significant delivery risks although exact volumes at risk may not be determined within the confines of this assessment • There is therefore significant risk that a proportion of the investment is deferred beyond RIIO-T2 • All bay interventions are considered high risk to consumers. Additional protection measures should be put in place to protect consumers
9.04 Interactions Annex	• No specific issues noted

9.05 Instrument Transformers	• The IDP does not provide any evidence to back up the number of interventions with poor asset condition or known family issues. • The IDP is lacking in information surrounding the methodology to translate an assets condition into a replacement priority • The additional emergency replacement of [redacted] are considered a subset of the [redacted] assets. This is because a number of the earmarked [redacted] assets are RP 5-10 years and this allows NGET to adjust network risk appropriately such that if assets fail, NGET are able to reprioritise between assets • An explanation surrounding the apportioned spend was not received as part of the IDP
9.06 Whole Site Replacements	• No specific issues noted
9.07 Underground cables	• For 7 substation cables, of around [redacted]km cables (£6.1m), while the Asset Health Index (AHI) suggests that the asset age will be largely over the AAL, the RP is 5-10 years and the replacement is currently neither driven by alignment of outages or alignment of transformer replacement. These have been considered moderate risk to consumers • It is noted that the issue associated with Pitsmoor-Wincobank-Templeborough circuit, while a justified driver for the scheme, have been outstanding throughout RIIO-T1 representing significant risk to these cables and these were not addressed • It is noted that the design of some NOMs/NARA methodologies may need to be reconsidered to factor in civil elements of cable installations
9.08 Dinorwig-Pentir	• It is noted that the cable has suffered from significant issues over a 10-year period and it is not clear why NGET and the ESO did not resolve this issue during the RIIO-T1 period • It is noted that the design of some NOMs/NARA methodologies may need to be reconsidered to factor in and better reflect frequency of outages of such circuits
9.09 OHL Conductors and Fittings	<u>OHL:</u> • NGET have altered their methodology for the calculation of End of Life for OHL conductor assets as discussed in Section 3.1.1 of the technical note. This has taken place following their business plan submission. This action calls into question the validity and the subsequent risk to the consumers of the submission and makes is significantly difficult to assess the needs case of the suggested volumes of interventions. • Subsequent changes to the calculation methodologies within RIIO-T2 could also lead to significant changes in the volumes of interventions necessary making it difficult for Ofgem to ensure compliance with the volumes agreed within a baseline. An uncertainty mechanism or similar incentive to protect consumers from significant volume changes should be considered. • A portion of the needs case for interventions appear to have been based on the PRE value. Atkins would deem these interventions as a high risk of not being required in T2 as it would be expected that surveys would be completed prior to replacement works going ahead • For interventions which have been put forward based on SEC driven End of Life modifier (EoL_{mod}), no evidence has been provided to justify the EoL_{mod} attributed (except [redacted] which was found to not be justified). <u>Fittings:</u> • For interventions which have been put forward based on SEC driven EoL_{mod}, no evidence has been provided to justify the EoL_{mod} attributed • For the interventions proposed no evidence or background calculations have been provided to justify the Low-Medium EoL_{mods} • Further information would also be required to understand the impact on the Medium-High and High EoL_{mod} interventions. • There remains a lack of clarity over which of the interventions proposed have a needs case justified by preliminary calculations only

	• It should be noted that all fittings earmarked to be aligned to conductor replacements have been marked as high risk to coincide with the conductor risk to consumers
9.09A OHL Towers and Foundations	Painting: • No specific major issues noted Steels: • NGET have stated that a mistake has been made in the submission and have provided an alternative list of circuits highlighted for steelwork intervention. No information was provided relating to the mistake that was made undermining confidence in the volume submitted significantly. It is not clear whether the mistake could be a systematic issue and whether it can recur in RIIO-T2 period. • Concerns exist over the calculation of tonnage per side. When one of the 15 tower zones are attributed to an AHI1 grading then it appears that the method of calculation assumes that the equivalent weight of the entire zone will be replaced. However, in some cases there may only be one or two bars in the zone causing a problem. With the level of information provided so far Atkins believe that this method to attribute tonnage is misleading in providing the actual weight of required steel replacement. • Evidence for the mean tower weight was not provided. • An SQ was raised requesting a sample of [redacted] listed interventions in Appendix B of the IDP. In their response NGET provided the information and evidence for one tower. The limited amount of information received does not satisfy our sampling methodology to give the appropriate confidence level. As such, it is not possible to state whether the methodology NGET have used is consistent. • The calculation to translate total AHI1 attributed zones into a total representative tower sides which require intervention has not been provided. On inspection the total values provided appear inconsistent against expectation. As there are only 15 zones per side, we would assume that this means the intervention for steelwork side would be the total zones divided by 15. This is not apparent from the information provided. This is believed to overestimate the tower sides by 15.3%. Foundation surveys: • No evidence has been received to account for the placement specific towers in hazard risk levels. E.g. no evidence was received to justify the position of River flooding areas being categorised between 2 Fluvial (lower flood) and 1 Fluvial (higher flood). • Justification has not been received accounting for the method of scoring the Ground Water Hazard in the scoring system as there is no accounting for the differing levels of surface water or ability for drainage with the soil type present. This hazard aligns to 96.3% of the towers provided. • The [redacted] tower interventions are stated to align to conductor replacement works discussed in 9.09 OHL Conductors and Fittings IDP. The number of towers aligned to the conductor works is not clear. It is also unclear whether the remaining towers not aligned to conductor replacements would be addressed in RIIO-T2. It would be expected that any tower aligned to a high risk OHL conductor replacement would in turn be categorised as a high risk to the consumer. • Overlap with the survey works required under IDP A10.05 Extreme weather for flooding risks is not identified or justified. Foundation interventions: • The spend attributed to the intervention portion is constructed using assumptions on the number of issues expected to be discovered following survey. No background information or basis for justification of these percentages is provided within the response. • There are concerns attributed to the calculation of the high and very high-risk categories provided by NGET using a desktop study

	• There is a concern over the justification of the scoring for the calculation of overload • The [redacted] tower interventions are stated to align to conductor replacement works discussed in 9.09 OHL Conductors and Fittings IDP. It is not clear which of the towers provided align to the conductor works or whether the remaining towers would be addressed in RIIO-T2. It would be expected that any tower aligned to a high risk OHL conductor replacement would in turn be categorised as a high risk to the consumer
9.10 Substation Other and Other TO Equipment	• The IDP does not provide specific volumes requiring asset interventions in T2 • It is noted that some asset interventions may be aligned to the primary plant replacements or refurbishments specified in other IDPs. Overlaps and interactions have not been provided • Evidence of asset condition underpinning the requirement for intervention is not provided • Benchmarking data from T1 could be utilised for the design of an uncertainty mechanism. This is however not proposed under this IDP • There are inconsistencies in the posed Capital Expenditure (CAPEX) values for the Air System and Cooler Bank scenarios. It is noted that the preferred options replace the problematic equipment and then allow the supporting primary equipment to continue operation. However, the spend posed to replace the primary equipment has been included as a T2 spend in the scenarios. Atkins would suggest that the primary equipment replacement costs are considered as separate projects as their replacement could be deferred if the health of the assets are deemed sufficient. The health of the primary assets and justification for their replacement has not been considered as part of this review. As such it is expected that the primary equipment replacements will require the appropriate approvals for the T3 regulatory period.
9.12 Tyne Crossing	• The Memorandum of Understanding (MoU) is the primary driver for the needs case. Legal advice is required to confirm whether the MoU is legally binding • There are currently no confirmed contracts which have been formally won which require the OHL conductor to be removed to accommodate transportation. The Seagreen project has specified this need but NGET is awaiting formal acceptance from the Port of Tyne on the status and jacket height for this project • All calculations for the need to intervene are based on Mean Water High Spring (MWHS) whereas shipping can actually be staggered at slack tide. The difference in height constraint between these are expected to be around 3m • Options that consider potential financial renumerations to ship the jackets using alternative means or at low tide to avoid impact on the OHL have not been considered • For Option 1, where the conductor height is increased, NGET have made assumptions on increasing height of jackets and state that they expect the new conductor height to be insufficient after only 5 years. Justification for this assumption has not been received • Considering “Do Nothing” (Baseline option). NGET have assumed a 6-month outage per year for the full term of T2 and T3. Justification for this assumption has not been received • The high-level geological surveys carried out by NGET leave a large risk in relation to the timing of works and cost of ground works on the project. This could impact the cost of all options which require ground works • In relation to the options, if the needs case is justified there is a high risk that the £[redacted] may not be required in T2. This could be replaced with the £[redacted] option of increasing conductor height by completing further research and revisiting the assumptions made. It may also be feasible that another solution could be found based on discussions with upstream businesses. There are still a great deal of uncertainties and contradictions in the IDP and it may be prudent to continue the planning of this project in more detail to attain more certainty of the needs case and options

9.13 Through-Wall Floor Bushings	• A requirement for forensic analysis on decommissioned assets has been identified to allow NGET to confirm their findings of non-intrusive techniques and gives them the scope to identify further failure modes and issues. It is not clear whether the £1.8m expenditure earmarked for forensic analysis expenditure should be within the OPEX submission or NGET should confirm that such expenditure does not overlap with their OPEX submission
9.14 Condition Monitoring	Integrated sensors: • The type of sensor, information to be collected, risks that will be mitigated through the acquisition of this information, assets to which they will be fitted, and volume of sensors is not provided • The output of the project is not clear • It is not clear why such expenditure should not be funded through innovation incentives where they would benefit from industry scrutiny and the benefits would be fed to other TOs and DNOs Bushings condition monitoring: • Does not provide a view of the volume of condition monitoring, type of installation and type of monitoring • It is not clear whether the expenditure is CAPEX or as suggested by "develop condition monitoring capability" OPEX expenditure and therefore it is unclear whether this should be covered by the separate OPEX submission to Ofgem
9.15 Protection and Control	• NGET_SQ_ENG_180 provides a breakdown of the asset condition drivers behind the intervention on the [redacted] items • Evidence of obsolescence has been provided by NGET in the form of manufacturer communication • Asset interventions driven by obsolescence due to no spares being available no technical support available have been considered as high risk to consumers • Asset interventions driven by obsolescence and where performance issues have been identified on the family of assets with no evidence provided of historical performance issues have been identified as moderate risk to consumers • Asset interventions driven by obsolescence and where performance issues have been identified on the family of assets with evidence provided of historical performance issues have been identified as low risk to consumers • Mesh corner busbar protection asset interventions, although driven purely by obsolescence, have been considered low risk to consumers based on the long asset replacement lead times and the complexity • The other asset interventions are considered as having relatively shorter lead times and therefore a fix on fail approach is considered sufficient • Some categories of assets such as Automatic Reactive Switching (ARS), Automatic Voltage Control (AVC), fault recorder, dynamic system monitoring and settlement metering, although considered important assets for network operation, are not considered as requiring pre-emptive replacement where the intervention is driven by obsolescence only. This is because these systems do not have a direct impact on safety and fault clearance. In many cases the replacement lead time is short and back up information is available (in the case of settlement metering and fault recorder). The criticality of such items is a function of location, probability of a combination of network and asset failure, system condition at the time of the failures and location of relevant network fault. A fix on fail approach is therefore considered appropriate and these interventions are considered a high risk to consumers
9.16 Transformers	• [redacted] transformers represent a moderate risk that intervention will not be required in RIIO-T2 and deferred. This investment is a total of £85.88m based on EoL assessment • [redacted] transformers represent a high risk that investment is not required in RIIO-T2 at a proposed investment cost of £30.75m and further information and evidence is required to justify their inclusion based on EoL assessment

	• About £24m of indirect costs from the cost's spreadsheet provided as part of NGET_SQ_ENG_127a cannot be directly apportioned across the transformers • Lack of information surrounding Static Compensator Transformer (SCT) replacements • Where the replacement is driven by Consequence of Failure (CoF) and resulting network risk, replacement is not deemed proportionate to the needs case as the CoF will not change. Measures such as blast walls, substation reconfiguration, fire deluge systems, access limitations have not been demonstrated
9.17 Reactors	• The investment within this IDP is considered low risk to consumers as the requirement for replacement is demonstrated by the high EoL_{mod} of the proposed reactors and largely backed by the evidence of asset condition provided. • Intervention [redacted] is considered high risk based on the asset condition information provided. Note that information for the disaggregated expenditure forecast on [redacted] (high risk) has not been provided and therefore this figure should be revised accordingly • Intervention on [redacted] reactors [redacted] has been postponed from RIIO-T1 to RIIO-T2. Atkins estimate the allowance for these [redacted] reactors within RIIO-T1 to be £6.3m. Atkins is not clear whether the RIIO-T1 allowance for intervention on these [redacted] reactors has been granted to NGET as part of their maximum allowed revenue within RIIO-T1 • Understanding of the requirement for the apportioned cost in RIIO-T1 and T3 is not provided
9.18 Strategic Spares	• The expenditure is considered low risk to consumers
9.19 LPT2	• No specific issues noted
9.21 Substation Auxiliary Systems	• [redacted] LVAC Replacements and [redacted] Diesel Generator replacements have been agreed to be removed in the SQ responses. This is a 11.9% reduction based on the original IDP value of £75.05m to £66.141m • Should the expenditure in IDP A10.07 go ahead then the spend in A9.21 Battery Replacement would be further reduced by £1.89m. • The main risks that remain are around the LVAC and Diesel Generator replacement. These projects are at an early stage of development and hence there will be inherent risk which will reduce as the projects are developed and this should be managed throughout the development process. LVAC replacement in particular on some sites may require a new building which adds further cost risk

3.3.2. NGET Discussion

Of the 31 IDPs submitted for review only 9 have been categorised with a low risk to the consumer (Please note that two of these papers were not associated with any investment and therefore were not assessed). The outcomes of the assessment are:

Rating	Number of Papers	Total Spend
Red (High risk to consumer)	13	£2,191.8m
Amber (Medium risk to consumer)	9	£874.8m
Green (Low risk to consumer)	9	£1,657.1m

In terms of expenditure the low risk spend is around £1.66bn, which is 34.9% of the submission total noting that £0.77bn of this sum is attributed to the Dinorwig-Pentir and LPT2 projects). In terms of high-risk expenditure of approximately £2.19bn, which is 46.1% of the submission, £0.95bn can be attributed to two areas – OHL

Conductors and Fittings, and Protection and Control. The main causes of concern for individual papers are shown in Table 3-8 above.

The sections below give an overview of some of the overall concerns from the assessment of NGET IDPs carried out. Findings specific to papers can be found in Table 3-7, Table 3-8 and in the individual technical notes provided to Ofgem separately (Appendix C).

3.3.2.1. Load related IDPs

The Load related IDPs are generally reliant on external industry driven methods (e.g. NOA, connection applications, Connection and Infrastructure Options Note (CION) process) or connection applications. Due to these external factors, there is significant uncertainty associated with most load driven IDPs and therefore should be subject to protection measures such as uncertainty mechanisms, re-openers, caps etc.

3.3.2.2. Non-Load related IDPs

Where the information provided in the IDP and subsequent SQs allow, Atkins have commented on the risk of deferment relating to the volumes posed in NGET's non-load IDPs. Overall comments on the papers are discussed in the sections below.

3.3.2.2.1. Application of NOMs Methodology for lead assets

- **EoL_{mod} values and Monetised Risk** – A number of assets have been included in IDPs with low EoL_{mod} values and therefore low Probability of Failure (PoF) change over the RIIO-T2 period. Their inclusion in the IDP is driven by the CoF and its result on the monetised risk.

  Atkins does not feel that the way the monetised risk approach has been used is an adequate method in ascertaining the efficient volumes of interventions to provide a reliable system. NGET appears to limit risk at the end of RIIO-T2 based on current risk levels. This leads to some assets, such as CBs and Transformers, being suggested for replacement to maintain a certain risk level despite a low EoL_{mod}.

  Network risk is a product of PoF and CoF. In our interpretation, EoL_{mod} scores should be used as a way to identify the assets which require intervention. This is directly related to the probability of failure. Monetised network risk methodology should be used as a tool for prioritisation of the network assets interventions or for prioritisation between asset groups.

  It is noted that intervention on a healthy asset with low PoF makes no change to the CoF of the asset. NGET have provided no evidence of attempts to change the CoF for assets using different options as a potential strategy. One example, for transformers, may be where the consequence of catastrophic failure may lead to failure of additional transformers or site equipment, blast walls can be used, use of fire deluge systems or where the failure can lead to environmental issues, bunds can be modified. Other methods such as online condition monitoring, regular surveys or refurbishment of specific parts (e.g. tap changers) have not been explained in the IDP for those units to minimise the impact of a possible failure or manage the CoF. Where there are system consequences to failure, methods such as substation reconfiguration are not discussed.
- **Desktop calculation of EoL_{mod} values** – In a number of IDPs NGET have put forward assets for intervention (in most cases full replacement) based on EoL_{mod} values which have been calculated using desktop methods. NGET have not provided evidence, in many cases, of physical samples and site surveys or inspections to justify the need for an intervention. This is particularly relevant to those assets earmarked for full replacement. In most cases it could be expected that following investigation the asset intervention could be an elevated maintenance schedule or added monitoring rather than replacement.
- **Alteration of NARA calculations** – Evidence collected as part of SQ process for 'A9.09 – OHL Conductors and Fittings' has indicated that NGET have altered their methodology for the calculation of End of Life for OHL conductor assets. It appears that NGET have changed the premise of EoL scoring based on a Calibration, Testing and Validation (CTV) exercise carried out with the Scottish TOs. This has taken place following the business plan submission. While we have not identified this issue with other specific IDPs (given the specific calculations are not always provided), Atkins feels that this action calls into question the validity and the subsequent risk to the consumers of the submission and makes it significantly difficult to assess the needs case of the suggested volume of interventions. In the longer term, subsequent changes to the calculation methodologies within RIIO-T2 could also lead to significant changes in the volumes of interventions necessary making it difficult for Ofgem to ensure compliance with the volumes agreed within a baseline. This could impact all lead-asset volumes justified within their business plan.

- **EoL_{mod} banding -** In all Lead IDPs where NOMs and EoL_{mod} values were used, NGET has provided a banding for categorisation of the asset health condition and its corresponding replacement priority (years). There is no discussion surrounding the weighting of the bands or the durations posed in the descriptions other than for the transformers and reactors IDP where the banding is mapped to CIGRE proposal. Atkins feel that this is fundamental in judging the volumes of intervention required.

3.3.2.2.2. Application of AHI Methodology for non-lead assets

Atkins agrees with the method of using an AHI value to propose asset condition in non-lead assets in the absence of a NOMs methodology. However, a lack of detail and evidence surrounding the method used to achieve the given value has been provided. There is a lack of explanation as to how AHI scores are used to categorise the replacement years. As these are predominantly internal processes and are not subject to audit it cannot be ascertained whether the AHI methodologies are fit for purpose, continuously improved with asset health information and whether internal decision-making processes and methodology changes could lead to significant changes in AHI of assets, hence changing the targeted interventions. This makes assessing the deliverables of the agreed RIIO-T2 business plan challenging.

3.3.2.2.3. Quality of Information

- **Detail** – Overall, the papers provided limited detail around the justification for the interventions posed. For example, for non-load lead assets, which are subject to NOMs, the papers have provided the final EoL_{mod} values of the assets. A number of input factors determine the final EoL_{mod} related to the asset condition of the asset and failure modes. The underpinning input factors are often missing making it difficult to understand the asset condition limiting the EoL_{mod}.
- **Evidence** - Evidence supporting the asset health condition and inputs to the calculation of the EoL_{mod} have not been provided. These include, for example, reports on repairs, asset age information, duty information, visual inspection reports, photographs of individual assets etc. Atkins has raised SQs which have taken a sample of the interventions proposed to request all contributory information used to justify their inclusion. Our sampling methodology is discussed in Appendix D.
- **Apportionment** – NGET has been inconsistent across their IDPs in the application of apportionment of the costs of projects with RIIO-T2 outputs across RIIO-T1 and T3. We have noted in several instances; lack of information as to why these have been apportioned, inconsistencies between the apportionment figure and level of expenditure, RIIO-T1 apportionment referring to RIIO-T1 expenditure etc. Atkins has tried to interpret these figures as best as possible, but some gaps remain.

3.3.2.2.4. ESO CBA

- **Value of Lost Load (VoLL)** – For some papers, the CBA is fed by cost of constraints which have been calculated by the ESO. It should be noted that Atkins does not have access to the constraint calculation. One particular example is Tyne crossing. The stated VoLL £9,745 / MWh is used to calculate constraints and is stated to be taken from a 2013 report from London Economics. From the 2013 report this number represents a domestic consumers VoLL in a 1 in 12 outage duration (Survey providing 95% confidence, margin of error not provided). This number appears to be lifted directly from the report with no adjustment from 2013 to 2020. There is also no discussion surrounding values used for small and medium sized businesses, industrial and commercial electricity consumers or generators. A recent standard value of VoLL provided by Ofgem in the final decision for Balancing and Settlement Code (BSC)[1] is stated as £6,000 / MWh (winter 2018/2019). On page 37 of Ofgem's final decision they highlight the London Economics report and state "£6,000/MWh represents a relatively low VoLL figure compared to the range that was suggested by the VoLL study." This value is also used by Elexon[2]. An SQ was raised to the ESO. In a response from NGET (NGET_SQ_ENG_161), the VoLL value is described as valid by the ESO as it covers both Transmission and Distribution. However, we feel that there is an argument against this as the report extract from London Economics states that it only represents domestic customers in a 1 in 12 outage. Other papers such as Dinorwig-Pentir are impacted by this. It is not clear how the CBA for the projects which are impacted by cost of constraints obtained from the ESO will vary should the VoLL be changed.

[1] https://www.ofgem.gov.uk/sites/default/files/docs/2014/05/electricity_balancing_significant_code_review_-_final_policy_decision.pdf
[2] https://www.elexon.co.uk/operations-settlement/balancing-and-settlement/imbalance-pricing/

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Appendix A. SPT EJP Technical notes

'Appendix A – SPT EJP Technical notes Rev1.0.pdf' has been submitted to Ofgem as a supplementary document. This holds the individual reviews for each IDP.

Appendix B. SHET EJP Technical notes

'Appendix B – SHET EJP Technical notes Rev1.0.pdf' has been submitted to Ofgem as a supplementary document. This holds the individual reviews for each IDP.

Appendix C. NGET IDP Technical notes

'Appendix C - NGET IDP Technical notes Rev1.0.pdf' has been submitted to Ofgem as a supplementary document. This holds the individual reviews for each IDP.

Appendix D. Assessment methodology

D.1. SPT and SHET

Both Scottish TOs provided EJPs which covered individual projects. The EJPs were read in conjunction with their supporting documentation and were assessed on the following areas; as stipulated by Ofgem. Each of the five points were then assigned a binary score based on whether the criteria had been met.

1. Paper complete with all references available [3]

That the licensee has followed the suggested format and guidance of what each EJP should contain as requested by Ofgem for the specific EJP being assessed, and that all other referenced documents within the EJP are available. Please note that EJPs have only been marked down where missing documents/references are considered to materially detract from the robustness of the submission.

2. Clear and unambiguous needs case identified

That a clear and unambiguous needs case has been presented for the investment. This could be provided through evidence such as: asset condition data; boundary power flow assessment; references to the outputs of other assessment methodologies (e.g. NOA), etc.

3. Validity of the options considered

That the options being considered and taken forward in the optioneering assessment are reasonable for the needs case identified, and that the reasons given for the rejection of options are acceptable and there are no clear options omitted from the assessment.

4. Chosen solution proportionate to the needs case

That the chosen/preferred option is a proportionate solution to the identified needs case and that the scope of the solution has not expanded into something far wider with little or no justification.

5. Value for money and efficiency

That the licensee has demonstrated value for money for their chosen/preferred solution. This could be demonstrated via a CBA which should be broad enough in scale for the size of the proposal. Options which reutilise existing assets or amalgamate works where possible will be viewed favourably. Scope and cost risks are identified in these criteria but do not affect the criteria score unless considered material.

An individual assessment summary sheet was produced for each EJP to give a detailed narrative of Atkins assessment on whether that EJP was adequate with respect to the above criteria. SQs were raised to seek clarification on any areas where there was a lack of evidence or clarity in the submission to ensure that there was no ambiguity in the assessment.

D.2. NGET

For each IDP, it was necessary to consider factors which are individual to the IDP to provide an assessment in line with the 5 criteria stated above, depending on the type of asset or project. For example, for IWW projects, the individual needs case was based on the ESO's NOA assessment recommendation and constraint savings across boundaries; whereas for non-load IDPs the volume of primary assets needs case was based on End of Life modifier (EoL_{mod}, as specified in the NOMs methodology) and for non-load secondary assets on an AHI methodology. A breakdown of the decisions dependant on the related justification can be seen in Table D-1

[3] RIIO-T2 BP Guidance

below. Areas with a question mark are subject to individual case by case review as methodologies provided have an independent structure.

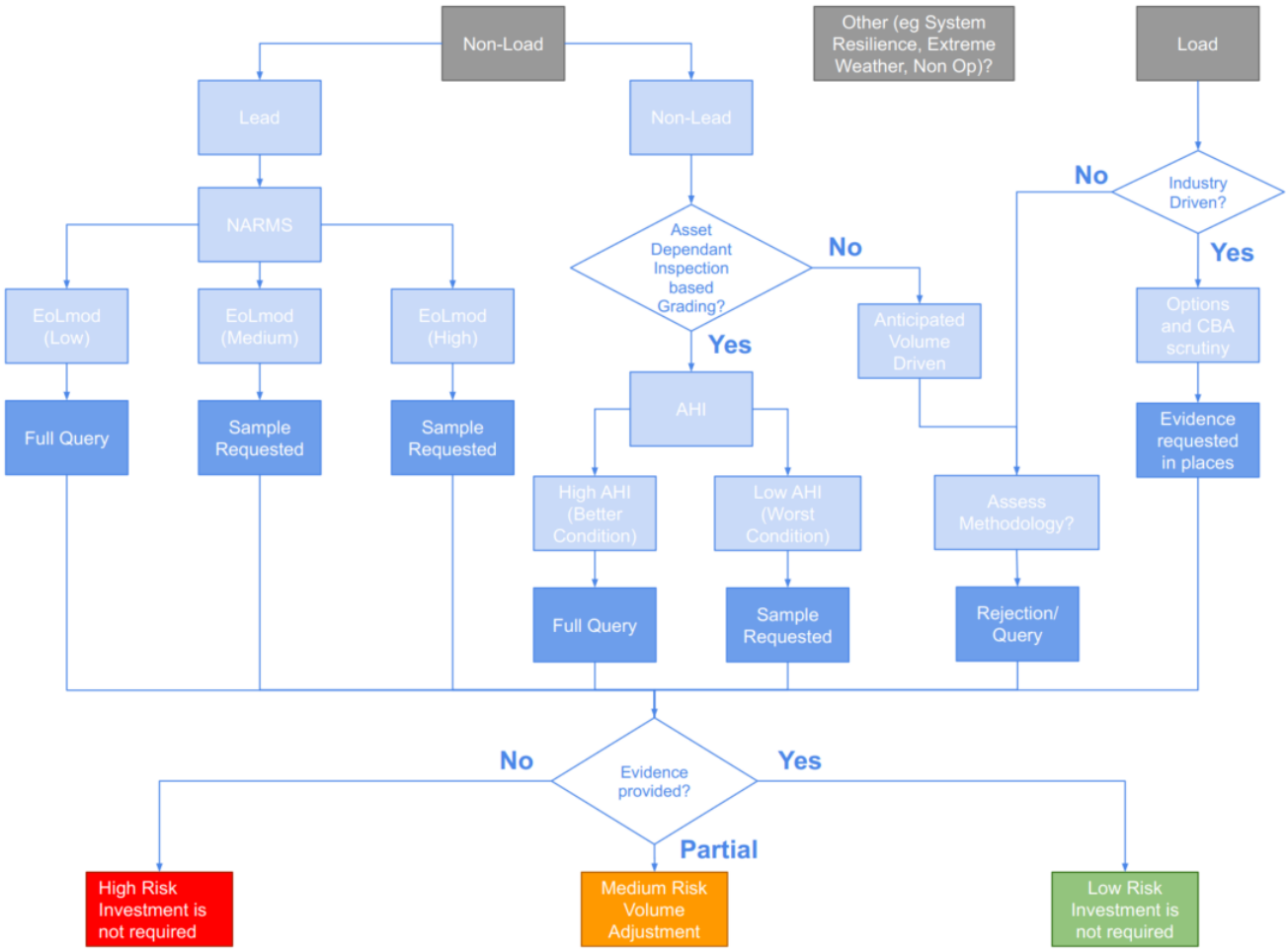

Table D-1 - Flowchart showing high-level review methodology for NGET

D.3. Sampling Methodology

NGET's IDPs, particularly concerning non-load interventions, were found to be lacking information and formal evidence relating to the condition of NGET's assets. We have utilised the SQ system with the aim to understand the processes and methodology that NGET have adopted to produce the intervention numbers. However, a significant factor for non-load intervention remains the existing asset condition. The volume of interventions is such that, Atkins cannot expect that each intervention is covered with an asset condition report or similar evidence. However, to establish the validity of the interventions proposed, some measure of the asset condition is required. In the best-case scenario, it would be possible to gain 100% confidence in the results of a review by carrying out an assessment of every piece of evidence as part of the entire population. However, the number of assets and the level of information which would need to be reviewed to carry this out is so high that it would be untenable in terms of time and resources. The best method to accommodate large populations of data is to use a representative sample size to provide oversight of results, with a target confidence level adjusted to align the available time and resource.

The smaller the sample size, the more likely outliers (unusual pieces of data) are to skew the findings. Therefore, it was important that a good balance was considered to maximise reliability while allowing enough time to consider each sample to the level of detail required. For the purposes of this methodology Atkins have used a standard bell curve with normal distribution to ascertain a realistic minimum sample size.

The relevant assumptions made to establish the criteria to calculate the minimum sample sizes for each IDP are discussed below. These parameters feed into the following formulas[4][5]:

$$n = \frac{z^2 \times (\sigma \times (1 - \sigma))}{MOE^2}$$

$$s = \frac{n}{1 + \left(\frac{z^2 \times (\sigma \times (1 - \sigma))}{MOE^2 \times n}\right)}$$

Where:

n is the non-limited population size

N is the limited population size

σ is the standard deviation

MOE is the Margin of Error

z is the z-score

s is the minimum required sample size

D.3.1. Standard deviation

The standard deviation tells you how far the variance of surveyed results is expected to spread from the mean. NGET's IDPs state that the asset conditions have been monitored and form the basis of the proposed intervention. Therefore, Atkins expect that NGET have the relevant details available to provide a positive outcome from the survey. For a survey where the answer is binary, e.g. yes/no, the standard deviation used in most statistics calculations is 0.5. This represents the value of the likely proportion of positive results i.e. 50%. However, given that NGET have expressed that the asset condition information is available, it is expected that the information received will fall under the vast majority of the normal distribution bell curve (at points extremely wide of the mean), hence a standard deviation of 0.95 has been used (unless otherwise stated). 0.95 standard deviation represents the value that we believe the likely proportion of positive results received will be.

D.3.2. Confidence level

In any survey the probability that the results conform to the entire population is an extremely important factor. This is represented by the confidence level. For the purpose of these samples Atkins would consider a high value of confidence to be important to ensure the results are indicative of the entire population.

We have used a relatively high confidence level of 95% to calculate the minimum survey numbers. When translated to cover the bell curve this gives a z value of 1.96[6].

D.3.3. Margin of error

The margin of error is selected to give a tolerance below and above the confidence level. For the purposes of the sampling performed we have considered a ±5% margin of error.

D.3.4. Population size

The population size varies dependant on the type of asset, the level of information provided and the level of information we expect NGET to hold. The population value has been scrutinised based on Atkins' understanding of the asset and each has been justified in Section 4.4 below.

[4] https://www.qualtrics.com/experience-management/research/determine-sample-size/
[5] https://www.surveymonkey.com/mp/sample-size-calculator/
[6] http://jukebox.esc13.net/untdeveloper/RM/Stats_Module_4/mobile_pages/Stats_Module_47.html

D.3.5. Asset specific sampling populations

D.3.5.1. Non-Load (lead) NOM's

For Non-Load NOM's based information, NGET have provided a breakdown of interventions with stipulated knowledge of the condition of each using an EoL_{mod}. The population has been determined using the number of assets relevant to information requested. The cumulative values are shown below.

Transformers

Comparison of transformer samples requested against minimum calculated can be seen in Table D-2 below.

Table D-2 - Transformer samples

IDP	SQ's included	Percentage of sample requested	Minimum Sample number	Actual requested	Delta
9.16 - Transformers	1,2,3,4	74%	[redacted] (Transformers)	[redacted] (Transformers)	+4

OHL Conductors and Fittings

Comparison of OHL conductors and fittings samples requested against minimum calculated can be seen in Table D-3 below.

Table D-3 - Conductors and Fittings samples

IDP	SQ's included	Percentage of sample requested	Minimum Sample number	Actual requested	Delta
9.09 – Conductors and Fittings	1,2,9,10,12	36%	[redacted] (Conductor Circuits)	[redacted] (Conductor Circuits)	+29

Circuit Breakers

Comparison of CB samples requested against minimum calculated can be seen in Table D-4 below. Note that the Bays portion of the assets has not been included in requested samples as there was no asset breakdown was provided.

Table D-4 - Circuit breaker samples

IDP	SQ's included	Percentage of sample requested	Minimum Sample number	Actual requested	Delta
9.03 – CB's	1,4,5,11	46%	[redacted] (CBs)	[redacted] (CBs)	+11

D.3.5.2. Non-Load (non-lead) AHI

OHL Towers

Comparison of tower samples requested against the minimum calculated can be seen in Table D-5 below. In this sample we have deliberately requested a much larger sample size to allow for the fact that NGET may limit the number of tower condition assessments they send. Atkins have requested a value of towers which cover [redacted] circuits (63% of circuits provided). As long as we receive a minimum of [redacted] tower side condition assessments, we will be able to deem the results from the sampling reliable.

Table D-5 - Towers samples

IDP	SQ's included	Percentage of sample requested	Minimum Sample number	Actual requested	Delta
9.09A – Towers	7	67%	[redacted] (Tower Sides)	[redacted] (Tower Sides)	+585

Note that the foundations portion of the IDP is not covered in the sampling criteria as no asset specific information is provided. Atkins do not expect NGET to hold this information at this stage

Appendix E. All SPT scores

Table E-1 - SPT EJP Score Summary

	Combined Scheme and Title	Type	Paper Value (Total)	Complete	Need Identified	Options Valid	Solution Proportionate	Demonstrated VFM	Score
	SPT200137-142 Synchronous Compensators	Load	£154.86m	1	1	1	1	1	5
	SPT200106 Denny to Wishaw 400kV Reinforcement (DWNO)	Load	[redacted]	1	1	1	1	1	5
	SPT200120 Eccles Shunt Compensation and Real-time Thermal Rating Scheme (ECVC)	Load	[redacted]	1	1	1	0	1	4
	SPT200168-169 Branxton Substation	Load	£93.311m	1	1	1	0	0	3
	SPT TOCO T2 Generation Connections	Load	£54.25m	1	1	1	1	1	5
	SPT200110 East Coast 400kV Incremental Reinforcement	Load	[redacted]	1	1	1	1	1	5
	SPT200143 Kendoon to Glenlee Reinforcement Works (TORI-221)	Load	£37.316m	1	1	1	1	1	5
	SPT20021/22 New Cumnock Fault Mitigation and Substation Extension	Load	£25.067m	1	1	1	1	1	5
	SPT200126 Harmonic Filters	Load	£24.235m	1	1	1	1	1	5
	SPT200112 Hunterston East to Neilston	Load	[redacted]	1	1	1	0	1	4
	SPT200136 Pre-Engineering Works	Load	£18.2m	1	1	0	0	0	2
	SPT200128/129 Black Start	Load	£15.621m	1	0	0	0	1	2
	SPT20085-87 GSP Lesmahagow Fault Level Mitigation	Load	£15.267m	1	1	1	1	1	5
	SPT200108 East Coast 275kV Upgrade (ECU2)	Load	[redacted]	1	1	1	1	1	5
	SPT20073/74/75/103/104/105 Central Glasgow Fault Level Management	Load	£12.13m	1	0	1	1	0	3
	SPT200134/135 Shunt Compensation – Mark Hill STATCOM	Load	[redacted]	1	1	1	1	0	4

	SPT200180/181 U and AT Route Uprating (TORI-151a)	Load	£10.39m	1	1	1	1	1	5
	SPT200132/133 South West Scotland Generation Export Management System (GEMS)	Load	£10.073m	1	1	1	1	1	5
	SPT200124/125 Shunt Compensation – Operability (Reactors)	Load	£9.639m	1	1	1	1	1	5
	SPT200122/123 Shunt Compensation – Operability (Hunterston)	Load	[redacted]	1	1	1	1	1	5
	SPNLT2099 Longannet 275kV switchgear replacement project	Non-Load	£98.37m	1	1	1	1	1	5
	SPNLT20109 Glenlee to Tongland Modernisation	Non-Load	£46.6m	1	1	1	1	1	5
	SPNLT205 ZA Route 400kV OHL Major Refurbishment	Non-Load	£44.6m	1	1	1	1	1	5
	SPNLT2033 Windyhill 275kV Switchgear Replacement Project	Non-Load	£43.64m	1	1	1	1	1	5
	SPNLT200/201/203/2013-2017/2019/2020 OHL Minor Refurbishment Programme	Non-Load	£39.4m	1	1	1	1	1	5
	SPNLT20111 XH & XJ Route 400kV OHL Major Refurbishment	Non-Load	£39.1m	1	1	1	1	1	5
	SPNLT2034 Westfield 275kV Switchgear Replacement Project	Non-Load	£22.93m	1	1	1	1	1	5
	SPNLT2036 Hunterston 400kV Switchgear Replacement Project	Non-Load	£21.69m	1	1	1	1	1	5
	SPNLT2055 400kV and 275kV Telecoms Resilience Project	Non-Load	£19.4m	0	0	1	0	0	1
	SPNLT202 ZO, ZR and XF Routes 400kV OHL Major Refurbishment	Non-Load	£17.5m	1	1	1	1	1	5
	SPNLT2037 Hunterston 132kV Switchgear Replacement Project	Non-Load	£15.33m	1	1	1	1	1	5
	SPNLT2052 132kV Optical Transport Network Project	Non-Load	£13m	1	1	1	0	1	4

	SPNLT2021-2023 Cable Major Refurbishment Programme	Non-Load	£12m	1	1	1	1	1	5
	SPNLT2046/20115 SPD Driven 33kV Switchboard Change Programme	Non-Load	£11.95m	1	1	1	1	1	5
	SPNLT2048 Protection Modernisation	Non-Load	£11.9m	1	1	1	0	0	3
	SPNLT20102 Environmental – Refurbishment of Oil Bunding & Drainage Systems	Non-Load	£10.38m	1	1	1	1	1	5
	SPNLT209 BL Route 132kV OHL Major Refurbishment	Non-Load	£10.2m	1	1	1	1	1	5
	SPNLT20124 Gorgie-Telford Road 132kV Cable Replacement	Non-Load	[redacted]	1	1	1	1	1	5
	SPNLT20112 Currie-Gorgie 132kV Cable Replacement	Non-Load	[redacted]	1	1	1	1	1	5
	SPNLT Site Security	Non-Load	£9.4m	1	1	1	1	1	5
	SPNLT2012 AY Route 132kV OHL Major Refurbishment	Non-Load	£9.1m	1	1	1	1	1	5
	SPNLT207 AL Route 132kV OHL Major Refurbishment	Non-Load	£8.9m	1	1	1	1	1	5
	SPNLT2038 Devol Moor 132kV Switchgear Replacement Project	Non-Load	£8.47m	1	1	1	1	1	5
	SPNLT20113 Cable Sealing End Proactive Programme	Non-Load	£7.9m	1	1	1	1	0	4
	SPNLT2047 Torness 400 Shunt Reactor Replacement	Non-Load	[redacted]	1	0	0	0	0	1
	SPNLT2067 Mosmorran 132kV Switchgear Replacement Project	Non-Load	£7.44m	1	1	1	1	1	5
	SPNLT2057 Active Equipment Refresh Programme	Non-Load	£7.3m	1	1	1	1	1	5
	SPNLT204 XZ Route 275kV OHL Major Refurbishment	Non-Load	£6.5m	1	1	1	1	1	5
	SPNLT2049 EMS Replacement	Non-Load	£6.3m	1	1	1	1	1	5
	SPNLT20100 Concrete/Steel Structures	Non-Load	£6.2m	1	1	1	1	1	5
	SPNLT2068-2074/2094-2096 RIIO-T2 Transformer Refurbishment Programme	Non-Load	£6.03m	1	1	1	1	1	5

	SPNLT2066 Giffnock SGT1 and SGT2 Replacement	Non-Load	[redacted]	1	1	1	0	1	4
	SPNLT Flood Mitigation	Non-Load	£5.5m	1	1	1	1	0	4
	SPNLT20101 Building Refurbishment Programme	Non-Load	£5.25m	1	1	1	1	1	5
	SPNLT2018 BU Route 132kV OHL Major Refurbishment	Non-Load	£5.1m	1	1	1	1	1	5
	SPNLT Fire Protection	Non-Load	£4.89m	1	1	1	1	1	5
	SPNLT20140 SF6 Repair Works	Non-Load	£4.77m	1	1	1	0	1	4
	SPNLT208 BC Route 132kV OHL Major Refurbishment	Non-Load	£4.4m	1	1	1	1	1	5
	SPNLT2010 BW Route 132kV OHL Major Refurbishment	Non-Load	£4.4m	1	1	1	1	1	5
	SPNLT2051 System Monitoring Modernisation	Non-Load	£3.8m	1	1	1	1	1	5
	SPNLT2065 Neilston SGT1 Replacement	Non-Load	[redacted]	1	1	0	0	1	3
	SPNLT20103 Cockenzie Building Improvement Works	Non-Load	£6.3m	1	1	1	1	1	5
	SPNLT2064 Devol Moor T2A Replacement	Non-Load	[redacted]	1	1	0	0	1	3
	SPNLT2091 Torness 400kV Circuit Breaker GIS Programme	Non-Load	£3.36m	1	1	1	1	1	5
	SPNLT2063 Longannet 275kV Series Reactor Refurbishment	Non-Load	[redacted]	1	0	1	0	1	3
	SPNLT20104 Partick Site Rationalisation	Non-Load	£2.96m	1	1	1	0	1	4
	SPNLT20116/20117 SPT Strategic Spares	Non-Load	£2.93m	0	1	1	1	1	4
	SPNLT2040 Glenniston 132kV Switchgear Replacement Project	Non-Load	£2.84m	1	1	1	1	1	5
	SPNLT2060 PD Installation for GIS and GIB Programme	Non-Load	£2.8m	1	1	1	1	1	5
	SPNLT20142 EAP - Building Energy Reduction Measures	Non-Load	£2.76m	1	0	1	1	0	3
	SPT200192 Cumberhead Collector Substation (TORI-238)	Load	£9.331m	1	1	1	1	1	5

	SPT20060-62 GSP Newarthill Fault Level Mitigation	Load	£8.625m	1	0	1	1	0	3
	SPT20043/44 New Cumnock SGT2B	Load	[redacted]	1	1	1	1	0	4
	SPT20025/26 Mark Hill to Chirmorie/Stranoch Wind Farms	Load	£8.478m	1	1	1	1	1	5
	SPT20029/30 Mark Hill SGT3	Load	[redacted]	1	1	1	1	1	5
	SPT20035/36 Coylton SGT1/2 Reinforcement	Load	£7.579m	1	1	1	1	1	5
	SPT20063-65 GSP Kilmarnock Town Fault Level Mitigation	Load	£7.455m	1	0	1	1	0	3
	SPT200119 Windyhill to Lambhill to Longannet 275kV Circuit Turn in to Denny North 275kV Substation (WLTI)	Load	[redacted]	1	0	1	1	0	3
	SPT20069/70/71/72/76/101/102 SPD GSP Proposed Reinforcement Schemes	Load	£6.08m	1	1	1	1	1	5
	SPT20077 GSP Westfield Fault Level Mitigation	Load	£5.426m	1	1	1	1	1	5
	SPT200182 Gretna - Ewe Hill 132kV Reinforcement	Load	£5.313m	1	1	1	1	1	5
	SPT200130/131 Circuit Rating Management System	Load	£4.651m	1	1	1	1	1	5
	SPT200184 Coalburn – Douglas North 132kV Cable Reinforcement	Load	£4.262m	1	0	1	1	1	4
	SPT20017 132kV Ewe Hill Substation Transformer SGT2 (TORI-232)	Load	[redacted]	1	1	1	1	1	5
	SPT20080-82 GSP Strathaven Fault Level Mitigation	Load	£3.676m	1	0	1	1	1	4
	SPT20013/14 Newton Stewart GSP	Load	£3.654m	1	1	1	1	1	5
	SPT20088 GSP Moffat new GSP	Load	£3.277m	1	1	1	0	1	4
	SPT20083/84 GSP East Kilbride Fault Level Mitigation	Load	£2.893m	1	1	1	1	1	5
	SPT20091-93 GSP Redhouse Capacity Upgrade	Load	£2.861m	1	1	1	1	1	5
	SPT20027/28 Newton Stewart 132kV Reinforcement Works	Load	£2.289m	1	1	1	1	0	4

	SPT200191 Coalburn to Douglas North	Load	£1.605m	1	1	1	1	1	5
	SPT20023 Glenglass Overload scheme	Load	£0.685m	1	1	1	1	1	5
	SPT20015 New Cumnock Overload scheme	Load	£0.571m	1	1	1	1	1	5
	SPT20033 Kilmarnock South Overload scheme	Load	£0.361m	1	1	1	1	1	5
	Total		**£1600.5m**	**92**	**83**	**89**	**78**	**79**	

Appendix F. All SHET scores

Table F-1 - SHET EJP Score Summary

Priority No.	Justification Paper Title	Type	Paper Value (Total)	Complete	Need Identified	Options Valid	Solution Proportionate	Demonstrated VFM	Score
1	T2BP-EJP-0017 East Coast 400kV Upgrade Justification Paper	Load	[redacted]	1	1	1	1	1	5
2	T2BP-EJP-0016 North East 400kV Upgrade Justification Paper	Load	[redacted]	1	1	1	1	1	5
3	T2BP-EJP-0018 East Coast 275kV Justification Paper	Load	[redacted]	1	1	1	1	1	5
4	T2BP-EJP-0022 Port Ann - Crossaig 132kV OHL Justification Paper	Non-load	£138.24m	1	1	1	1	1	5
5	T2BP-EJP-0023 Kinardochy Reactive Compensation Justification Paper	Load	£106.04m	1	1	1	1	1	5
6	T2BP-EJP-0033 Beauly Substation Works Justification Paper	Non-load	£89.80m	1	1	0	1	0	3
7	T2BP-EJP-0044 Kintore Substation Works Justification Paper	Non-load	£74.20m	1	1	1	0	0	3
8	T2BP-EJP-0008 Substation Resilience - Low Voltage Supplies	Non-load	£48.93m	1	1	1	0	0	3
9	T2BP-EJP-0012 Integrated Condition Performance Monitoring JP	Non-load	£45.50m	1	0	0	0	0	1
10	T2BP-EJP-0031 Willowdale Substation Justification Paper	Non-load	£45.43m	1	1	1	0	1	4
11	T2BP-EJP-0027 Sloy Substation Works Justification Paper	Non-load	£45.30m	1	0	1	0	0	2

12	T2BP-EJP-0037 Foyers Substation Justification Paper	Non-load	£41.60m	1	1	1	0	0	3
13	T2BP-EJP-0028 Whistlefield - Dunoon 132kV OHL Works JP	Non-load	£40.80m	1	1	1	1	0	4
14	T2BP-EJP-0013 Materials Management and Warehousing JP	Non-Load	£40.26m	1	1	0	0	0	2
15	T2BP-EJP-0043 Keith Substation Works Justification Paper	Non-load	£39.05m	1	0	1	0	0	2
16	T2BP-EJP-0050 Tealing 275kV Busbar Justification Paper	Load	£38.93m	1	1	1	1	1	5
17	T2BP-EJP-0048 Peterhead Substation Justification Paper	Non-Load	£36.70m	1	1	1	0	0	3
18	T2BP-EJP-0045 Harris-Stornoway 132kV OHL Justification Paper	Non-load	£35.70m	1	1	1	1	1	5
19	T2BP-EJP-0006 Transmission Communications Upgrade JP	Non-load	£31.10m	1	0	0	0	0	1
20	T2BP-EJP-0032 Kilmorack and Aigas Substation JP	Non-Load	£27.50m	1	1	1	0	0	3
21	T2BP-EJP-0005 Protection Modernisation Justification Paper	Non-load	£22.00m	1	1	1	0	0	3
22	T2BP-EJP-0034 Beauly - Aigas - Deanie 132kV OHL Justification Paper	Non-Load	£19.00m	1	0	1	0	0	2
23	T2BP-EJP-0002 Climate Change and Sustainability Justification Paper	Non-Load	£18.05m	1	0	1	0	0	2
24	T2BP-EJP-0026 Sloy - Windyhill West 132kV OHL Works JP	Non-Load	£16.80m	1	1	1	0	1	4
25	T2BP-EJP-0025 Sloy - Windyhill East 132kV OHL Works JP	Non-Load	£16.50m	1	1	1	0	1	4

26	T2BP-EJP-0003 Resilience - Operations Centre Justification Paper	Non-Load	£16.30m	1	0	0	0	0	1
27	T2BP-EJP-0042 Tummel Bridge Substation Works Justification Paper	Non-Load	£14.80m	1	0	0	0	0	1
28	T2BP-EJP-0036 Deanie Substation Justification Paper	Non-Load	£14.60m	1	0	0	0	0	1
29	T2BP-EJP-0035 Culligran Substation Justification Paper	Non-Load	£14.30m	1	0	0	0	0	1
30	T2BP-EJP-0040 Quoich Tee Substation Works Justification Paper	Non-Load	£13.60m	1	0	0	0	0	1
31	T2BP-EJP-0021 Redmoss-Clayhills 132kV Justification Paper	Non-Load	£13.10m	1	1	1	1	1	5
32	T2BP-EJP-0046 St Fergus Mobil Justification Paper	Non-Load	£12.70m	1	1	1	0	0	3
33	T2BP-EJP-0007 Transmission Substation SCADA Replacement JP	Non-load	£11.93m	1	0	1	0	0	2
34	T2BP-EJP-0015 Operational Strategic Spares Justification Paper	Non-Load	£11.82m	1	1	1	0	1	4
35	T2BP-EJP-0020 Elmwood Glenagnes Cable Works Justification Paper	Non-Load	£11.40m	1	1	1	1	1	5
36	T2BP-EJP-0049 Peterhead - Inverugie 132kV OHL Justification Paper	Non-Load	£10.30m	1	1	1	1	1	5
37	T2BP-EJP-0011 Physical Site Security Justification Paper	Non-Load	£9.59m	1	1	1	0	1	4
38	T2BP-EJP-0030 Tealing Substation Works Justification Paper	Non-Load	£9.34m	1	1	1	0	0	3

39	T2BP-EJP-0047 Moray West Offshore Windfarm Justification Paper	Load	£8.01m	1	1	1	1	1	5
40	T2BP-EJP-0004 Persistent Organic Pollutants Justification Paper	Non-Load	£7.32m	1	1	1	1	0	4
41	T2BP-EJP-0041 St Fillans Substation Works Justification Paper	Non-Load	£6.80m	1	0	1	0	0	2
42	T2BP-EJP-0038 Glenmoriston Substation Justification Paper	Non-Load	£5.70m	1	1	1	0	1	4
43	T2BP-EJP-0024 Glenshero Connection Works Justification Paper	Load	£4.40m	0	1	1	1	1	4
44	T2BP-EJP-0039 Invergarry T 132kV Justification Paper	Non-Load	£2.40m	1	1	1	0	0	3
45	T2BP-EJP-0009 Resilience - Personnel Communications JP	Non-Load	£1.93m	1	1	1	0	0	3
46	T2BP-EJP-0010 Emergency Response and Contingency Planning JP	Non-Load	£1.55m	1	1	1	1	0	4
47	T2BP-EJP-0019 Broadford Substation Works Justification Paper	Non-Load	£1.00m	1	0	1	0	0	2
48	T2BP-EJP-0029 Redmoss Substation Works Justification Paper	Non-Load	£0.50m	1	1	1	1	1	5
49	T2BP-EJP-0001 Black Start System Restoration Justification Paper	Non-load	£0.21m	1	1	0	0	0	2
	Total EJPs with binary score of 1	**-**		**48**	**35**	**39**	**17**	**19**	
	Portion of full marks achieved across all schemes		**-**	**97.96%**	**71.43%**	**79.59%**	**34.69%**	**38.78%**	

Appendix G.

In the course of review of the IDPs and EJPs there has been a need to clarify points and request further information from the TOs. This process was managed by Ofgem. The tables below provide a full list of the SQ references Atkins have considered during the course of this project.

G.1. SPT & SHET SQs

SPT SQs	Date Received
SPTL_SQ_ENG_17	13/02/2020
SPTL_SQ_ENG_16	13/02/2020
SPTL_SQ_ENG_15	13/02/2020
SPTL_SQ_ENG_14	13/02/2020
SPTL_SQ_ENG_13	13/02/2020
SPTL_SQ_ENG_12	13/02/2020
SPTL_SQ_ENG_11	13/02/2020
SPTL_SQ_ENG_10	13/02/2020
SPTL_SQ_ENG_9	13/02/2020
SPTL_SQ_ENG_8	13/02/2020
SPTL_SQ_ENG_7	13/02/2020
SPTL_SQ_ENG_6	13/02/2020
SPTL_SQ_ENG_5	13/02/2020
SPTL_SQ_ENG_4	13/02/2020
SPTL_SQ_ENG_3	13/02/2020
SPTL_SQ_ENG_2	13/02/2020
SPTL_SQ_ENG_1	13/02/2020
SPTL_SQ_ENG_42	05/05/2020
SPTL_SQ_ENG_43	05/05/2020
SPTL_SQ_ENG_44	05/05/2020
SPTL_SQ_ENG_45	05/05/2020
SPTL_SQ_ENG_46	05/05/2020
SPTL_SQ_ENG_47	05/05/2020
SPTL_SQ_ENG_48	05/05/2020
SPTL_SQ_ENG_27	02/04/2020
SPTL_SQ_ENG_28	02/04/2020
SPTL_SQ_ENG_36	02/04/2020
SPTL_SQ_ENG_35	02/04/2020
SPTL_SQ_ENG_34	02/04/2020
SPTL_SQ_ENG_32	02/04/2020
SPTL_SQ_ENG_31	02/04/2020
SPTL_SQ_ENG_30	02/04/2020
SPTL_SQ_ENG_29	02/04/2020
SPTL_SQ_ENG_38	02/04/2020
SPTL_SQ_ENG_49	05/05/2020

SHET SQs	Date Received
SHETL_SQ_ENG_23	27/02/2020
SHETL_SQ_ENG_23	27/02/2020
SHETL_SQ_ENG_24	27/02/2020
SHETL_SQ_ENG_25	27/02/2020
SHETL_SQ_ENG_26	27/02/2020
SHETL_SQ_ENG_26	27/02/2020
SHETL_SQ_ENG_27	27/02/2020
SHETL_SQ_ENG_28	27/02/2020
SHETL_SQ_ENG_29	27/02/2020
SHETL_SQ_ENG_30	17/02/2020
SHETL_SQ_ENG_31	17/02/2020
SHETL_SQ_ENG_32	17/02/2020
SHETL_SQ_ENG_33	17/02/2020
SHETL_SQ_ENG_34	17/02/2020
SHELT_SQ_ENG_15	09/03/2020
SHETL_SQ_ENG_35	17/02/2020
SHETL_SQ_ENG_39	02/04/2020
SHETL_SQ_ENG_40	02/04/2020
SHETL_SQ_ENG_42	02/04/2020
SHETL_SQ_ENG_44	02/04/2020
SHETL_SQ_ENG_45	02/04/2020
SHETL_SQ_ENG_47	02/04/2020
SHETL_SQ_ENG_48	02/04/2020
SHETL_SQ_ENG_49	02/04/2020
SHETL_SQ_ENG_58	05/05/2020
SHETL_SQ_ENG_53	05/05/2020
SHETL_SQ_ENG_50	05/05/2020
SHETL_SQ_ENG_51	05/05/2020
SHETL_SQ_ENG_52	05/05/2020
SHETL_ENG_SQ_54	05/05/2020
SHETL_SQ_ENG_61_Response	11/05/2020
SHETL_SQ_ENG_46	02/03/2020
SHETL_SQ_ENG_41	02/03/2020
SHETL_SQ_ENG_43	02/03/2020
SHETL_SQ_ENG_38	02/03/2020

SPTL_SQ_ENG_37	02/04/2020
SPTL_SQ_ENG_39	05/05/2020
SPTL_SQ_ENG_40	05/05/2020
SPTL_SQ_ENG_41	05/05/2020
SPTL_SQ_ENG_50	27/05/2020
SPTL_SQ_ENG_51	27/05/2020
SPTL_SQ_ENG_52	27/05/2020

SHETL_SQ_ENG_56	05/05/2020
SHETL_SQ_ENG_56	05/05/2020
SHETL_SQ_ENG_60	11/05/2020
SHETL_SQ_ENG_57	05/05/2020

G.2. NGET SQs

NGET SQs	Date Received
NGET_SQ_ENG_1	06/03/2020
NGET_SQ_ENG_2	06/03/2020
NGET_SQ_ENG_3	06/03/2020
NGET_SQ_ENG_4	06/03/2020
NGET_SQ_ENG_5	06/03/2020
NGET_SQ_ENG_6	06/03/2020
NGET_SQ_ENG_7	06/03/2020
NGET_SQ_ENG_8	06/03/2020
NGET_SQ_ENG_9	06/03/2020
NGET_SQ_ENG_10	06/03/2020
NGET_SQ_ENG_11	06/03/2020
NGET_SQ_ENG_12	06/03/2020
NGET_SQ_ENG_13	06/03/2020
NGET_SQ_ENG_14	06/03/2020
NGET_SQ_ENG_15	06/03/2020
NGET_SQ_ENG_16	06/03/2020
NGET_SQ_ENG_17	06/03/2020
NGET_SQ_ENG_18	06/03/2020
NGET_SQ_ENG_18	26/03/2020
NGET_SQ_ENG_19	06/03/2020
NGET_SQ_ENG_20	06/03/2020
NGET_SQ_ENG_21	06/03/2020
NGET_SQ_ENG_22	06/03/2020
NGET_SQ_ENG_23	06/03/2020
NGET_SQ_ENG_24	06/03/2020
NGET_SQ_ENG_25	06/03/2020
NGET_SQ_ENG_26	06/03/2020
NGET_SQ_ENG_27	06/03/2020
NGET_SQ_ENG_28	06/03/2020
NGET_SQ_ENG_29	06/03/2020
NGET_SQ_ENG_30	06/03/2020
NGET_SQ_ENG_31	06/03/2020
NGET_SQ_ENG_32	26/03/2020

NGET SQs	Date Received
NGET_SQ_ENG_119	06/03/2020
NGET_SQ_ENG_120	26/03/2020
NGET_SQ_ENG_121	06/03/2020
NGET_SQ_ENG_122	06/03/2020
NGET_SQ_ENG_123	26/03/2020
NGET_SQ_ENG_124	11/03/2020
NGET_SQ_ENG_125	26/03/2020
NGET_SQ_ENG_126	11/03/2020
NGET_SQ_ENG_127	11/03/2020
NGET_SQ_ENG_128	11/03/2020
NGET_SQ_ENG_129	06/03/2020
NGET_SQ_ENG_130	11/03/2020
NGET_SQ_ENG_131	26/03/2020
NGET_SQ_ENG_132	11/03/2020
NGET_SQ_ENG_133	26/03/2020
NGET_SQ_ENG_134	11/03/2020
NGET_SQ_ENG_135	26/03/2020
NGET_SQ_ENG_136	26/03/2020
NGET_SQ_ENG_137	11/03/2020
NGET_SQ_ENG_138	11/03/2020
NGET_SQ_ENG_139	06/03/2020
NGET_SQ_ENG_140	26/03/2020
NGET_SQ_ENG_141	11/03/2020
NGET_SQ_ENG_142	11/03/2020
NGET_SQ_ENG_143	11/03/2020
NGET_SQ_ENG_144	26/03/2020
NGET_SQ_ENG_145	06/03/2020
NGET_SQ_ENG_146	06/03/2020
NGET_SQ_ENG_147	11/03/2020
NGET_SQ_ENG_148	06/03/2020
NGET_SQ_ENG_149	26/03/2020
NGET_SQ_ENG_150	11/03/2020
NGET_SQ_ENG_151	11/03/2020

NGET_SQ_ENG_33	26/03/2020
NGET_SQ_ENG_34	26/03/2020
NGET_SQ_ENG_35	06/03/2020
NGET_SQ_ENG_36	06/03/2020
NGET_SQ_ENG_37	20/04/2020
NGET_SQ_ENG_38	26/03/2020
NGET_SQ_ENG_39	20/04/2020
NGET_SQ_ENG_40	26/03/2020
NGET_SQ_ENG_41	26/03/2020
NGET_SQ_ENG_42	26/03/2020
NGET_SQ_ENG_43	26/03/2020
NGET_SQ_ENG_44	26/03/2020
NGET_SQ_ENG_45	26/03/2020
NGET_SQ_ENG_46	26/03/2020
NGET_SQ_ENG_47	26/03/2020
NGET_SQ_ENG_48	26/03/2020
NGET_SQ_ENG_49	26/03/2020
NGET_SQ_ENG_50	26/03/2020
NGET_SQ_ENG_51	26/03/2020
NGET_SQ_ENG_52	26/03/2020
NGET_SQ_ENG_53	26/03/2020
NGET_SQ_ENG_54	20/04/2020
NGET_SQ_ENG_55	20/04/2020
NGET_SQ_ENG_56	26/03/2020
NGET_SQ_ENG_57	26/03/2020
NGET_SQ_ENG_58	20/04/2020
NGET_SQ_ENG_59	26/03/2020
NGET_SQ_ENG_60	26/03/2020
NGET_SQ_ENG_61	26/03/2020
NGET_SQ_ENG_62	26/03/2020
NGET_SQ_ENG_63	26/03/2020
NGET_SQ_ENG_64	20/04/2020
NGET_SQ_ENG_65	20/04/2020
NGET_SQ_ENG_66	26/03/2020
NGET_SQ_ENG_67	26/03/2020
NGET_SQ_ENG_68	26/03/2020
NGET_SQ_ENG_69	26/03/2020
NGET_SQ_ENG_70	26/03/2020
NGET_SQ_ENG_71	20/04/2020
NGET_SQ_ENG_72	26/03/2020
NGET_SQ_ENG_73	26/03/2020
NGET_SQ_ENG_74	26/03/2020
NGET_SQ_ENG_75	26/03/2020
NGET_SQ_ENG_76	26/03/2020

NGET_SQ_ENG_152	06/03/2020
NGET_SQ_ENG_153	11/03/2020
NGET_SQ_ENG_154	06/03/2020
NGET_SQ_ENG_155	11/03/2020
NGET_SQ_ENG_155 v2	07/04/2020
NGET_SQ_ENG_156	11/03/2020
NGET_SQ_ENG_157	11/03/2020
NGET_SQ_ENG_158	17/03/2020
NGET_SQ_ENG_159	17/03/2020
NGET_SQ_ENG_160	17/03/2020
NGET_SQ_ENG_161	26/03/2020
NGET_SQ_ENG_162	07/04/2020
NGET_SQ_ENG_163	16/04/2020
NGET_SQ_ENG_164	16/04/2020
NGET_SQ_ENG_165	16/04/2020
NGET_SQ_ENG_166	16/04/2020
NGET_SQ_ENG_167	07/04/2020
NGET_SQ_ENG_168	26/05/2020
NGET_SQ_ENG_169	20/04/2020
NGET_SQ_ENG_170	07/04/2020
NGET_SQ_ENG_171	16/04/2020
NGET_SQ_ENG_172	07/04/2020
NGET_SQ_ENG_173	07/04/2020
NGET_SQ_ENG_174	26/05/2020
NGET_SQ_ENG_175	20/04/2020
NGET_SQ_ENG_176	16/04/2020
NGET_SQ_ENG_177	07/04/2020
NGET_SQ_ENG_178	16/04/2020
NGET_SQ_ENG_179	26/05/2020
NGET_SQ_ENG_180	26/05/2020
NGET_SQ_ENG_181	20/04/2020
NGET_SQ_ENG_182	07/04/2020
NGET_SQ_ENG_183	16/04/2020
NGET_SQ_ENG_184	16/04/2020
NGET_SQ_ENG_185	16/04/2020
NGET_SQ_ENG_186	16/04/2020
NGET_SQ_ENG_187	20/04/2020
NGET_SQ_ENG_188	16/04/2020
NGET_SQ_ENG_189	20/04/2020
NGET_SQ_ENG_190	26/05/2020
NGET_SQ_ENG_191	20/04/2020
NGET_SQ_ENG_192	07/04/2020
NGET_SQ_ENG_193	20/04/2020
NGET_SQ_ENG_194	07/04/2020

NGET_SQ_ENG_77	26/03/2020
NGET_SQ_ENG_78	26/03/2020
NGET_SQ_ENG_79	20/04/2020
NGET_SQ_ENG_80	20/04/2020
NGET_SQ_ENG_81	26/03/2020
NGET_SQ_ENG_82	26/03/2020
NGET_SQ_ENG_83	20/04/2020
NGET_SQ_ENG_84	20/04/2020
NGET_SQ_ENG_85	20/04/2020
NGET_SQ_ENG_86	26/03/2020
NGET_SQ_ENG_87	26/03/2020
NGET_SQ_ENG_88	26/03/2020
NGET_SQ_ENG_89	20/04/2020
NGET_SQ_ENG_90	26/03/2020
NGET_SQ_ENG_91	20/04/2020
NGET_SQ_ENG_92	26/03/2020
NGET_SQ_ENG_93	26/03/2020
NGET_SQ_ENG_94	26/03/2020
NGET_SQ_ENG_95	26/03/2020
NGET_SQ_ENG_96	26/03/2020
NGET_SQ_ENG_97	26/03/2020
NGET_SQ_ENG_98	26/03/2020
NGET_SQ_ENG_99	26/03/2020
NGET_SQ_ENG_100	26/03/2020
NGET_SQ_ENG_101	20/04/2020
NGET_SQ_ENG_102	26/03/2020
NGET_SQ_ENG_103	26/03/2020
NGET_SQ_ENG_104	26/03/2020
NGET_SQ_ENG_105	26/03/2020
NGET_SQ_ENG_106	26/03/2020
NGET_SQ_ENG_107	06/03/2020
NGET_SQ_ENG_108	11/03/2020
NGET_SQ_ENG_109	06/03/2020
NGET_SQ_ENG_110	06/03/2020
NGET_SQ_ENG_111	06/03/2020
NGET_SQ_ENG_112	06/03/2020
NGET_SQ_ENG_113	11/03/2020
NGET_SQ_ENG_114	26/03/2020
NGET_SQ_ENG_115	06/03/2020
NGET_SQ_ENG_116	26/03/2020
NGET_SQ_ENG_117	11/03/2020
NGET_SQ_ENG_118	06/03/2020

NGET_SQ_ENG_195	07/04/2020
NGET_SQ_ENG_196	26/05/2020
NGET_SQ_ENG_197	20/04/2020
NGET_SQ_ENG_198	20/04/2020
NGET_SQ_ENG_199	20/04/2020
NGET_SQ_ENG_200	26/05/2020
NGET_SQ_ENG_201	20/04/2020
NGET_SQ_ENG_202	20/04/2020
NGET_SQ_ENG_203	20/04/2020
NGET_SQ_ENG_204	20/04/2020
NGET_SQ_ENG_205	20/04/2020
NGET_SQ_ENG_206	16/04/2020
NGET_SQ_ENG_206	26/05/2020
NGET_SQ_ENG_207	16/04/2020
NGET_SQ_ENG_207	26/05/2020
NGET_SQ_ENG_208	26/05/2020
NGET_SQ_ENG_209	20/04/2020
NGET_SQ_ENG_210	26/05/2020
NGET_SQ_ENG_211	26/05/2020
NGET_SQ_ENG_212	21/05/2020
NGET_SQ_ENG_213	21/05/2020
NGET_SQ_ENG_216	26/05/2020
NGET_SQ_ENG_217	26/05/2020
NGET_SQ_ENG_218	26/05/2020
NGET_SQ_ENG_219	21/05/2020
NGET_SQ_ENG_220	21/05/2020
NGET_SQ_ENG_221	26/05/2020
NGET_SQ_ENG_222	26/05/2020
NGET_SQ_ENG_223	26/05/2020
NGET_SQ_ENG_224	26/05/2020
NGET_SQ_ENG_225	21/05/2020
NGET_SQ_ENG_226	26/05/2020
NGET_SQ_ENG_227	26/05/2020
NGET_SQ_ENG_229	26/05/2020
NGET_SQ_ENG_230	26/05/2020
NGET_SQ_ENG_232	26/05/2020
NGET_SQ_ENG_233	21/05/2020
NGET_SQ_ENG_235	21/05/2020
NGET_SQ_ENG_237	26/05/2020
NGET_SQ_ENG_238	26/05/2020
NGET_SQ_ENG_239	26/05/2020

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