Single Approach to Isolations (SAI)

NR/L3/ELP/SAI25 Working on or near Overhead Line Equipment

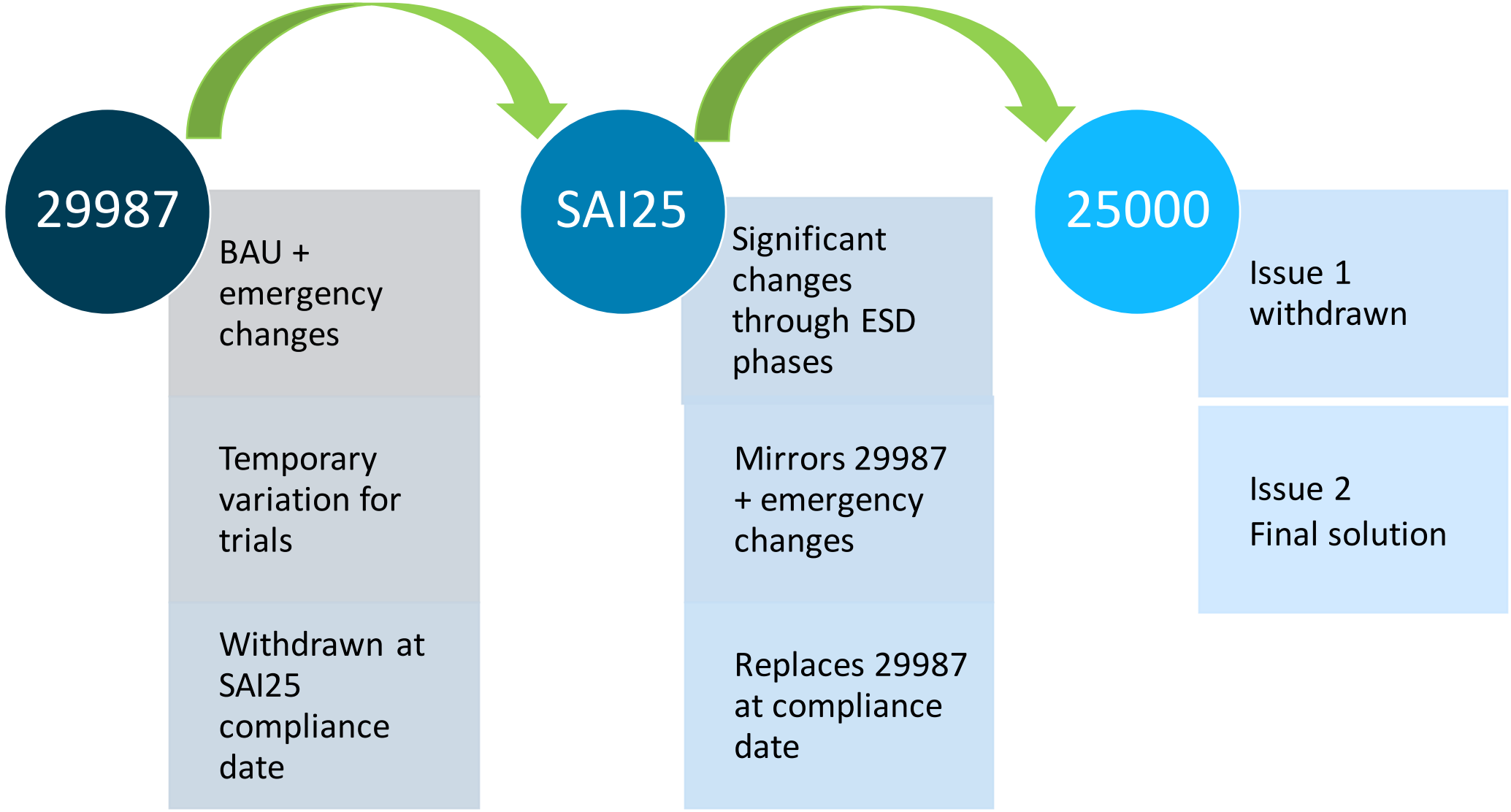
Update 14th September 2023

Agenda

- ✓ Standards 29987, SAI25 and 25000 – what does this mean?
- ✓ NR/L3/ELP/SAI25 Issue 1 and 2 in more detail*
- ✓ NR/L3/ELP/SAI25 incorporating:
  - ✓ New Electrical Safe System of Work (ESSoW) hierarchy with explanation of categories
  - ✓ Standardised Electrical Risk Assessment Form (ERAF)
- ✓ Round up and what's next…

* SAI25 is part of the phased implementation to SAI OLE. Please see appendix for details of all phases

NR/L3/ELP/SAI25 Working on or near overhead line equipment



Progression to SAI25 will be via a variation approved by Network Technical Head

NR/L3/ELP/SAI25 Issue 1 – what does it mean for the industry?

Issue 1 included the following changes;

- Expanded requirements and guidance related to electrical risk assessment
- Introduction of an electrical safe system of work hierarchy (ESSoW)
- Introduces new forms - electrical risk assessment form (ERAF), outage request form (ORF), site visit form (SVF)
- Introduces two new competencies around the risk assessment process
- Increased suite of electrical risk control measures, (additional to RoLE)
- Requirement for all COSS (OLP)s, in receipt of an OLP, to be briefed by the nominated person

- **A compliance date of September 2025 applies**

Published June 2023

The ESSoW hierarchy is covered in more detail later in this session.

For support, please contact ESDSAISupport@networkrail.co.uk

NR/L3/ELP/SAI25 Issue 2 – what does it mean for the industry?

Issue 2 includes the following changes;

- Inclusion of Module D – 'Distribution System Interfaces' requirements
- Referencing the High Voltage Isolation and Earthing Certificate (HVIEC input to NR/L3/ELP/21067 only)
- Introduction of the Live Working Form (LWF)
- Introduction of Lost Form B process/uncontactable Nominated Person process

Publication Dec 2023

This succeeds Issue 1. Issue 2 is deployed after publication date (Dec 2023)
The compliance date is unchanged – September 2025
Deployment will be co-ordinated at a local level
There are currently 2 early adopters that have received initial funding to start deployment
They are NW&C (North West Route) - DU tbc and Eastern (Anglia Route) - Ipswich Delivery Unit
Supply chain resources will be trained with local Network Rail colleagues

For support, please contact ESDSAISupport@networkrail.co.uk

New! Electrical Safe System of Work (ESSoW) hierarchy

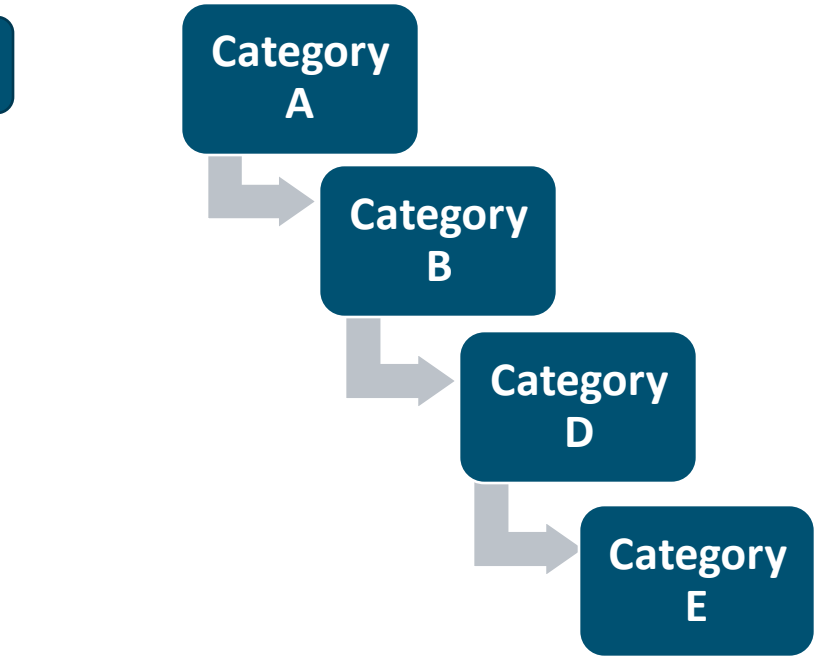
The electrical risk assessment principles are based on a structured hierarchy of Electrical Safe Systems of Work.

The defined Electrical Safe System of Work categories present **differing** levels of electrical risk.

The hierarchy is designed to prioritise implementing the electrical safe systems of work that present the least electrical risk.

Electrical Safe Systems of Work

- **Category L** - Low electrical risk
- **Category A** - Working with an earthed isolation in place on all OLE
- **Category B** – Working with an earthed isolation in place on some OLE
- **Category RC Authority** - Working on the return conductor only
- **Category D** - Working with the OLE live
- **Category E** - Live working on the OLE



ESSoW Category A – Working with an earthed isolation in place for all OLE

What is Category A?

- Category A is the gold standard and should be selected where practical when an earthed isolation is required (not category L).

- Work shall only be categorised as ESSoW Category A where;
  - All parts of the OLE between the OLP along-track limits and across all tracks are under an earthed isolation; and
  - There are no residual electrical hazards, apart from Transmission Network Operator (TNO) or Distribution Network Operator (DNO) crossings, within the OLP along-track limits when visualised across all tracks.

- If it is not possible to isolate and earth all OLE under Category A, then justification must be provided.

ESSoW Category B – Working with an earthed isolation in place on some OLE

What is Category B?

- Work shall only be categorised as ESSoW Category B where;
  - Some of the OLE between the OLP along-track limits, across all tracks are under an earthed isolation; or
  - There are residual electrical hazards, within the OLP along-track limits when visualised across all tracks.

- An example of a Category B earthed isolation is a four-track railway with only two tracks isolated and earthed – therefore, across all tracks there is live OLE.

- Category B can be selected in the electrical risk assessment where it is not practicable to select Category A. However, a justification must be provided why all OLE cannot be isolated and earthed within the along-track limits.

ESSoW Category RC Authority

What is an RC Authority?

- Work shall only be categorised as ESSOW RC Authority where:
  - The associated overhead contact system remains live; and
  - An authority has been provided by the Electrical Control to apply portable earths and electrical risk control measures to the return conductor only.

- The terminology of 'RC isolation', has changed.

- There is no way of 'isolating' the return conductor, therefore only an authority can be issued to work with it earthed
- Circuit Main Earths (CMEs) cannot be applied to the return conductor because there is no opportunity for inadvertently reenergising it
- Duplicate additional earths and a single long blue earth are placed at each end of the authority limits
- The authority is still completed via an EIDF and Form B and planned as today.

ESSoW Category D – Working with the OLE live

What is Category D?

- ESSOW Category D shall apply where:
  - Exposed live parts of the OLE are present; and
  - No earthed isolation is in place; and
  - The task is not on the list of approved Category L - Low electrical risk working tasks; and
  - The task is not on the list of approved live working tasks.
- Entry into the live zone shall be prevented.

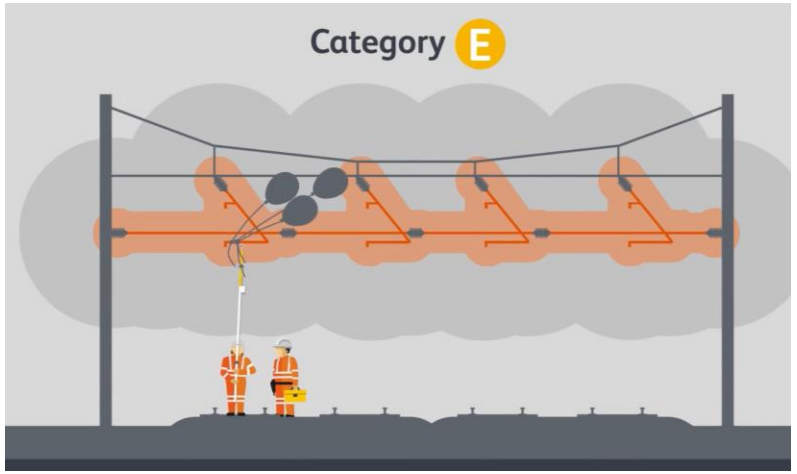
What is Category D used for?

- Examples of Category D works include but are not limited to:
  - On/off/cross tracking on-track plant (OTP) under live
  - Delivering materials near live OLE

ESSoW Category E – Working on live OLE (0.6m zone)

What is Category E?

- Category E is working with the OLE live, using approved live line tools that enter the live (0.6 m) zone.
- The tasks that can be completed without an **independent electrical risk assessment** are:
  - Live line dropper removal;
  - Inspection tools;
  - Object/vegetation removal;
  - Testing (section proving).



Note: The above tasks have been generically risk assessed and therefore can be completed without an electrical risk assessor completing an electrical risk assessment form (ERAF).

If the task is not on the approved list, then an ERAF must be completed.

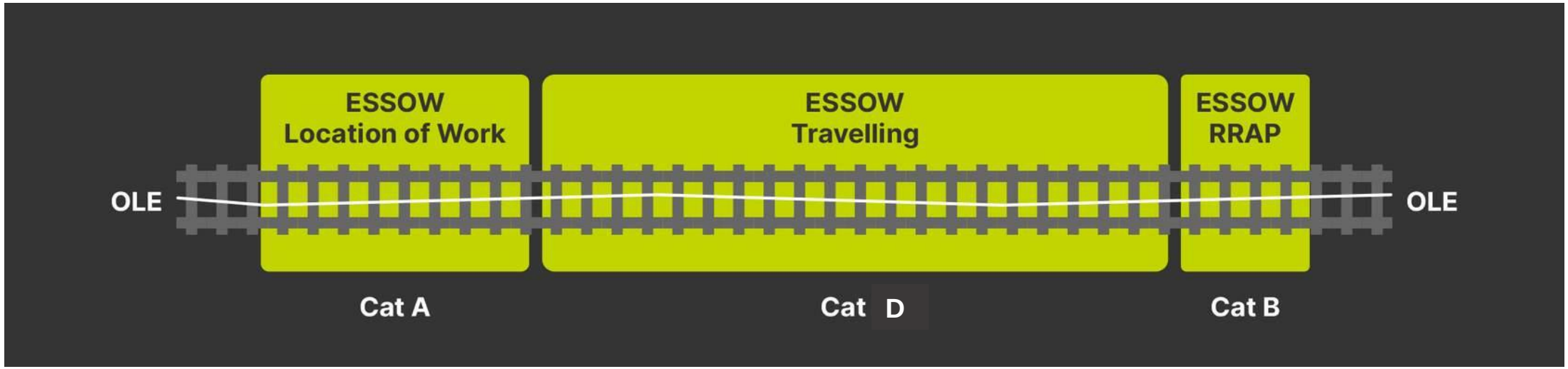
- To complete any of the live working tasks (Category E) the approved live working task list must be consulted for requirements along with any control measures in the relevant Task Risk Control Sheets (TRCSs).

Electrical risk assessment principles – Electrical Safe System of Work hierarchy and categorisation

The ESSoW categorisation for the planned work activity and associated access arrangements including the on / off, cross tracking and travelling of on-track plant (OTP) may differ.

Where OTP is used, different ESSoW categories may be used for:

- Road Rail Access Point (RRAP);
- Travelling and;
- Location of work.



Round up

- These sessions are every 6 weeks between now and the end of the control period - each session will be focused on the latest updates and/or 'hot topics'
  - 26 October – Process flow for complex jobs
  - 7 December - TBC
  - 18 January - TBC
  - 29 February - TBC
- Are there any hot topics you would like to share? Email ESDSAIsupport@networkrail.co.uk

Reminders - changes to how you access Network Rail standards and Electrical Safety Step Up… final call

- The IHS website closed on 31 August
- To register to continue to access standards, click on the following link Network Rail (ihs.com) and follow the instructions
- If you haven't attended an electrical safety step up, this is your last chance before the campaign closes on 30 September
  - Email ElectricalCulture@networkrail.co.uk
  - Materials will remain available on Safety Central

Questions?

- If you have any questions regarding SAI, email ESDSAIsupport@networkrail.co.uk

We look forward to seeing you on 26 October!

Appendix

Electrical Risk Assessment Form part 1

SAI25/ERAF Issue 01	Possession ref:	Outage Request Form ref:	Work site ref:	Electrical Risk Assessment Form ref:
	POSS/EXAMPLE/01	ORF/EXAMPLE/01	SITE/EXAMPLE/01	ERAF/EXAMPLE/01

Part 1

Part 1(a) – Work assessment and categorisation *(To be completed by the Electrical Risk Assessor)*

Work Requestor name:	Alex Rowley – Jack Partridge	Work Requestor contact number:	07986541236 – 07515210981

Details of Planned Work

Work start date and time:	06/11/2023 – 0001	Work end date and time:	06/11/2023 – 0500	Week Number:	40

Nature of planned task(s), task delivery method(s) and access requirements	*(Note: Add references of relevant SSoW and other documents detailing the work to be carried out)*

OLE Maintenance works including Neutral Section maintenance, vegetation removal and OLE general maintenance. SRS access listed below
Drainage works

Access and egress arrangements

On-tracking point(s)	Off-tracking point(s)
G145/31 Whitmore MPATS RRAP	G147/33A Whitmore P.S.P RRAP

Electrical sections, lines affected and associated limits

Electrical section(s) required to implement the isolation(s)	Line(s) affected	Electrical section limits – Limit structures: From	Electrical section limits – Limit structures: To	OLP Along-track limits required – From (Line, Structure Number)	OLP Along-track limits required – To (Line, Structure Number)
BW – 13A, 14A, 15A, 16A COMPLETE	Up Slow	G139/05	G150/11	Up+Down Fast G144/14	Up+Down Fast G147/52
BW-AF 7A, 8A COMPLETE	Down Slow	G139/05	G150/11	Up+Down Slow G144/14	Up+Down Slow G147/52
CW – 17A, 20A COMPLETE	Up Fast	G139/05	G150/11	Up+Down ATF G144/14	Up+Down Slow G145/30
CW – 18A, 19B	Down Fast	G139/05	G149/16		
	Up ATF	G139/05	G145/31		
	Down ATF	G139/05	G145/31		

Nominated Earthed Isolation provider:	Network Rail Overhead Line

Is this electrical risk assessment form part of a superseding Earthed Isolation?	(Y/N)	N	If yes, provide reference number of related Electrical Risk Assessment Form(s)	N/A

Electrical Risk Assessment Form part 1

Electrical Safe System of Work (ESSoW) Category and OTP traveling under Live				
	RRAP (Y/N or N/A)	Travelling (Y/N or N/A)	Site of Work (Y/N or N/A)	
1. Can the task be reasonably completed using Category A?	Y	Y	Y	
2. If the answer to Question 1 is 'No', can the task be reasonably completed using category B?	N/A	N/A	N/A	
3. If the answer to Question 2 is 'No', can the task be reasonably completed using category D?	N/A	N/A	N/A	
4. If the answer to Question 2 is 'No', can the task be reasonably completed using category E?			N/A	
5. Will an OLP be issued to enable work on a return conductor with the corresponding OLE remaining Live in accordance with the requirements of NR/L3/ELP/29987 Module 7?			N/A	
If the answer to Question 4 or Question 5 is 'No', the task shall be re-planned.				
If the selected ESSoW category of work is B, D or E* for the 'RRAP', 'Travelling' and/or 'Site of Work', complete Part 1(b) to provide the supporting justification (* Only complete Part 1(b) if the task is not on the approved list of ESSoW category E tasks)				
Is an Earthed Isolation required?			(Y/N)	Y
Site visit and electrical risk assessment				
Are any of the electrical sections subject to reduced wire height restrictions?			(Y/N)	N
Is a visit to site required to confirm any details of Part 1 of the Electrical Risk Assessment Form or to complete the electrical risk assessment in Appendix A?			(Y/N)	N
Will a person with a detailed understanding of the work to be carried out accompany the ERAs on the walkout?			(Y/N) or N/A	Y
*(If **No**, provide confirmation below as to how the Electrical Risk Assessor will be able to appropriately consider the work content as part of the electrical risk assessment)*				
N/A				
Complete the appended electrical risk assessment in draft in Appendix A, identifying the relevant residual electrical hazards and proposed Electrical Risk Control Measures				
With the information available at this stage, can the work be completed safely with the selected ESSoW and proposed Electrical Risk Control Measures?			(Y/N)	Y
*(If **No**, the work will need to be re-planned and a different ESSoW shall be selected)*				

Electrical Risk Assessment Form part 1

Part 1(b) – Justification (To be completed by the Electrical Risk Assessor. Where relevant, Part 1(b) shall be completed to separately record the justification for the ESSoW at the Site of Work and the ESSoW for travelling to the Site Work) - (Complete for any ESSOW other than Category A)					
Justification Elements		**RRAP (Y / N / N/A)**	**Travelling (Y / N / N/A)**	**Site of Work (Y / N / N/A)**	**Elements to consider**
Nature of the work	Does the equipment need to be Live to complete the work?			N/A	*- Testing for example: Section B74*
Economic impact	Does a lack of all line Earthed Isolation opportunities prevent the work from being carried out under category A?	N/A	N/A	N/A	*- Does the available access arrangements mean that it is not reasonable to schedule the work to allow completion under category A?* *- Is it unreasonable, or not possible, to postpone the work to allow completion when the access required to allow completion under Category A is available?* *Note 1: In many cases, the lack of available infrastructure access and the inability to postpone the work until ESSoW Category A can be implemented, will form the basis of the justification case.* *Note 2: The ERAS can consult the Route Isolation Planner to confirm the available access arrangements if clarification is required.* *Note 3: It is important to demonstrate that consideration was given to confirming if it is possible to complete the work under ESSoW Category A within the available access arrangements and to record the justification where it is not deemed to be achievable within the available access arrangements.*
Safety impact	Are the benefits of adopting ESSoW category A outweighed by the risks created through implementing an all line Earthed Isolation?	N/A	N/A	N/A	*Workforce Safety for example:* *- Does ESSoW category A lead to more driving, more 'On or Near the Line' working and/or more manual handling?* *Passenger Safety for example:* *- Overcrowding;* *- Public disorder/abusive behaviour towards workforce;* *- Public stranded on sealed trains etc.* *Safety of wider infrastructure for example:* *- The non-availability of ESSoW category A within suitable timescales may reduce access times leading to increased risk of infrastructure failures, operational incidents and close calls etc.* *- The time taken to implement ESSoW category A may reduce access times leading to increased risk of infrastructure failures, operational incidents and close calls etc.*

	Justification element	**Justification and related detail**
RRAP		
Travelling		
Site of Work		

Electrical Risk Assessment Form Part 1 – Validation							
Electrical Risk Assessor							
Prepared by:	Sarah Morgan	Signature:	Sarah Morgan	Sentinel number:	456987	Date:	13/04/2023
Electrical Risk Approver: I confirm that I have reviewed and approve the work assessments and justification recorded above.							
Endorsed by:	Matthew Brown	Signature:	Matthew Brown	Sentinel number:	654789	Date:	13/04/2023

Electrical Risk Assessment Form part 2

Part 2 - Completed as close to the Earthed Isolation as possible **Part 2(a) – Implementation details (To be completed by the Electrical Risk Assessor)**					
Complete only if different from that listed in Part 1					
Details of Planned Work					
Work Requestor name:		Work Requestor contact number:			
Details of Planned Work					
Work start date and time:		Work end date and time:		Week Number:	
Nature of planned task(s), task delivery method(s) and access requirements	*(Note: Add references of relevant SSoW and other documents detailing the work to be carried out)*				
Access and egress arrangements					
On-tracking point(s)		Off-tracking point(s)			

Electrical sections, lines affected and associated limits *(Complete only if different from that listed in Part 1)*

Electrical section(s) required to implement the Isolation(s)	Line(s) affected	Electrical section limits		OLP Along-track limits required	
		Limit structures:		From	To
		From	To	(ELR, MIL & CH)	(ELR, MIL & CH)

Nominated Earthed Isolation provider:	

Electrical Risk Assessment Form part 2

Part 2(b) – On/Off Tracking or/and Travelling under Live ((if applicable) to be completed by the Electrical Risk Assessor with support from the Work Requestor)		
Will there be any on/off tracking or travelling under Live? (*If the answer is No continue to 2(c), If the answer is Yes complete 2(b)*)	(Y/N)	N
At the location for On-Tracking stated in 1(a) or 2(a), is the approach to track level?	(Y/N)	
At the location for Off-Tracking stated in 1(a) or 2(a), is the exit from track level?	(Y/N)	

What is the minimum wire height at the access? (mm)		Location (ELD, Mileage, OLE Structure Number)	
What is the minimum wire height through the distance travelling under LIVE? (mm)		Location (ELD, Mileage, OLE Structure Number)	

Machine Type	Machine Supplier	12 Digit Number	ECC reference	MLD (Y/N)	OTP Max Height (mm)	Standing Surface Max Height (mm)	Comments

Lines Affected	ELR	Start Mileage	End Mileage	Start OLE Structure	End OLE Structure	Additional Landmark Concerns

Electrification and Plant Maintenance Engineer or Delegated Authority: I confirm that I have reviewed and approve the on/off tracking and/or travelling activies stated above.

Endorsed by:		Signature:		Sentinel number:		Date:	

Part 2(c) – Electrical Safety Document details (to be completed by the Electrical Risk Assessor)

COSS (OLP) Name	Line(s) / ATF / RC	OLP along-track limit structures: From	OLP along-track limit structures: To	Issue at Site of Work?	Work content
A Rowley	Up+Down Fast and Slow	G144/14	G147/52	N	OLE Maintenance
	Up+Down ATF	G144/14	G145/30		
J Partridge	Up+Down Fast and Slow	G146/33	G147/52	N	Drainage Works

Site of Work details (Description of the Site of Work, Site of Work boundaries including vertical boundary)

Category A, All lines isolated and earthed including ATF and RC. No Residual electrical hazards. OLP limits listed above in 2(c).

Electrical Risk Assessment Form part 2

Part 2(d) – Confirmed Electrical Risk Control Measures		
Finalise and record risks and associated Electrical Risk Control Measures in appended risk assessment, append the referenced generic risk assessment or existing risk assessment		
Are the required Electrical Risk Control Measures identified and recorded in the appended Electrical Risk Control Measures Appendix A?	(Y/N)	Y
Are drawings, diagrams or sketches included as part of this electrical risk assessment?	(Y/N)	N
Is there a requirement to inspect the Electrical Risk Control Measures? If 'Yes', provide the details in the Electrical Risk Control Measures table in Appendix A. If 'No, provide justification below:	(Y/N)	N
Devices checked prior to application and usage length is less than 12 hours.		
Will the integrity and continuity of existing electrical circuits, including bonding, be affected by the planned tasks? *If* ***Yes,*** *describe the measures to be taken to mitigate the hazards in accordance with the requirements of NR/L3/ELP/21085:*	(Y/N or N/A)	N
Has the visit to site been waived by the Electrical Risk Approver? A waiver is not required for ESSoW category A work. If Yes, provide relevant details below: (*include the name of the approver, date of the waiver and factors to justify the waiver)*	(Y/N or N/A)	Y
NOTE: *A site visit shall not be waived for On-Track Plant activites as specified in NR/L2/RMVP/0200/P501.*		
ESSoW is a Category A. NP will visit site to confirm the DEP locations and Bonding is intact.		
Can the work be completed safely with the proposed Electrical Risk Control Measures in place? (If No, detail below the action required to replan the Earthed Isolation)	(Y/N)	Y

Electrical Risk Assessment Form Part 2 – Validation						
Electrical Risk Assessor: I confirm that the Electrical Risk Control Measures and details stated above have been verified and a site visit completed where specified.						
Name:	Sarah Morgan	Signature:	Sarah Morgan	Sentinel number:	456987	Date: 01/11/2023
Electrical Risk Assessment Form Authorisation						
Electrical Risk Approver: I confirm that I have reviewed and authorise the work assessments and the justification for carrying out the work as detailed above.						
Authorised by:	Matthew Brown	Signature:	Matthew Brown	Sentinel number:	654789	Date: 01/11/2023

Short notice Earthed Isolations: Guide questions	
This section shall be completed for short notice Earthed Isolations in accordance with the requirements of NR/L3/ELP/SAI25 module 2	(Y/N)
Has the appropriate Electrical Safe System of Work been selected from the hierarchy in accordance with the requirements of NR/L3/ELP/SAI25 module 2?	
Have all electrical hazards and residual electrical hazard been identified?	
Are the Electrical Risk Control Measures identified suitable and sufficient?	
Are the necessary competences and resources available to complete the task(s) required?	

Electrical Risk Assessment Form - Appendix A

Appendix A - Electrical risk assessment (to be completed by the Electrical Risk Assessor)		
Risk assessment guidance		
1	Having selected the ESSoW category of Work that will be applied, identify all of the residual electrical hazards that remain. (Even when applying category A there could be still be the possibility that persons may accidentally stray out of the area covered by the OLP.) Please refer to NR/L3/ELP/SAI25 module 2 for more information.	
2	List the identified residual electrical hazards in the risk assessment schedule.	
3	If any risk level remains 'unacceptable', even with the proposed additional control in place, the work shall not proceed. The planning of the work shall be re-evaluated to facilitate delivery enabling a suitable level of risk mitigation.	
Scoring guidance		
How likely is it that compliance with the specified restrictions for the 2.75 m zone, Live zone will be achieved?		
Likely	There are **sufficient** controls in place to achieve this, and either all of them would need to fail, or a person would have to deliberately breach the controls	**Acceptable**
Unlikely	There are **insufficient** controls in place to achieve this, and a simple misunderstanding, or a person experiencing a momentary distraction or lapse of attention could cause them to fail	**Unacceptable**

Risk assessment

Hazard ID	Residual Electrical Hazard				Electrical Risk Control Measure(s)	Inspection required? (Yes or No)	Notes (including the frequency of inspection where required)	Is the risk from this hazard acceptable	
	Description	Line	From / At	To				Yes	No
1	OLP Along-track limit	All Lines	G144/14		Aerial RoLE x6	No		✓	
2	OLP Along-track limit	All Lines	G147/52		Aerial RoLE x6	No		✓	
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

Electrical Risk Assessment Form - Appendix B

Appendix B - Relevant information for the site walkout
Completion of Appendix B is not a requirement for the authorisation of the Electrical Risk Assessment Form

DEP Details

Structure number	Line(s)	OLE (CME/AE/CJ)	RC (AE)	ATF (CME/AE/CJ)	EAP intact	DEP bond Intact	Comments
G144/4	Up + Down Fast, Slow and ATF	CME			Y	Y	
G145/30	Up + Down Fast, Slow and ATF	AE			Y	Y	
G145/33	Up + Down Fast, Slow and ATF N/S	CJ		CME	Y	Y	
G146/01	Up + Down Fast, Slow and RC	CME	2 X AE		Y	Y	
G147/17	Up + Down Fast, Slow and RC	AE	AE		Y	Y	
G147/52	Up + Down Fast, Slow and RC	CME	2 X AE		Y	Y	

Bonding affected by the works

Structure number	Line(s)	Description

Manual lineside Disconnectors to be operated

Disconnector designation	Structure number	Line	Current position of Disconnector	Key type and location	Access / location

The phased approach for Single Approach to Isolation on Overhead Line Equipment (SAI OLE)

NR/L3/ELP/29987 Issue 6

Introduction of Reminder of Live Exposed (RoLE) on Overhead Line Equipment (OLE)

Introduced 2021-22

Electrical Safety Culture

National electrical safety step-up for frontline teams across the industry

Completing Sept 2023

Phase 0 NR/L3/ELP/27720

Introduction of a new standard to refresh the Test Before Touch process on OLE

Published September 2022

Phase 1 AP/NP Pre-Requisites

Trial of on-site assessments

Complete

Phase 2 NR/L3/ELP/29987

Issue 8 introduced new terminology with a supporting film and update

Published September 2022

Phase 3 NR/L3/ELP/SAI25

Issue 1 introduced the electrical risk assessment and supporting changes, two new competences and training and briefing for impacted

Published June 2023

Safety improves with every step towards the single approach

The phased approach for Single Approach to Isolation on Overhead Line Equipment (SAI OLE)

Phase 4
NR/L3/ELP/SAI25

Issue 2 introduces Mod D 'Distribution System Interface' Requirements

Publication Dec 2023

Phase 4.5
NR/L3/ELP/SAI25

Enables Remote Securing

CP7 2024 onwards

Phase 5
NR/L3/ELP/SAI25

introduces Optimised Earthing, Neutral Section and Return Conductor Earthing

CP7 2024 onwards

Phase 6
NR/L3/ELP/25000

Implementation of Issue 2

Replaces SAI25

CP7 2024 onwards

Phase 7

Further improvements to training

CP7 2024 onwards

Phase 8
NR/L3/ELP/25000

Post Implementation Review

CP7 2024 onwards

Safety improves with every step towards the single approach