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Issue:	8
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# NR/L3/ELP/29987

## Module 6

### Planning of Isolations

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## 1 Purpose

This module provides a consistent approach to planning isolations on 25 kV a.c. electrified lines and preparing coherent technically compliant Isolation Planning Forms (IPF).

*NOTE: Further requirements for working on or about the electrified lines are contained in the Rule Book Module AC (GE/RT8000/AC) and Handbook HB16 (GE/RT8000/HB16).*

## 2 Scope

This module states the requirements for the advance planning of isolations for the purpose of carrying out work in order to produce a coherent technically compliant Isolation Planning Form (IPF) for a particular week and route on 25 kV a.c. electrified lines.

It is applicable to Network Rail personnel and to Network Rail's contractors. It is also applicable in relevant part to Train Operating Companies having locally controlled 25 kV a.c. overhead lines which abut those controlled by Network Rail.

To provide a consistent approach to working on or about 25 kV a.c. electrified lines, Train Operating Companies may, as best practice, apply this standard in full on infrastructure they control.

This Standard also includes:

- Work on or about any future sections of electrification on Network Rail controlled infrastructure and areas required to adopt a process for securing points of disconnection to form points of isolation to use the Supplementary Isolation Process (Module X).
- Planning of isolations, testing and earthing of overhead line equipment on Network Rail controlled infrastructure equipped with 750V d.c. overhead line system (Sheffield Tram Train - Module Y).
- Planning of isolations, testing and earthing of overhead line equipment on Network Rail controlled infrastructure equipped with 1500V d.c. overhead line system (Sunderland Metro Systems Operating Area – Module Z).

## 3 Assessment of Risk Before Attempting Work

Where the risk assessment required by Modules 2 and 3 determines that the work requires a planned isolation and the issue of an overhead line permit, the isolation shall be planned in accordance with this module.

## 4 Principles for the Planning of Isolations

The following shall be reviewed at the planning stage:

- a) the requirements for maintaining the integrity of the electrification system when work is to be carried out as stated in Module 4;
- b) the requirement for particular actions to be taken by the Infrastructure Maintainer when work is to be carried out as stated in Module 5;

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- c) the requirement to submit the isolation details form (IDF) to electrical control with sufficient time for the IDF to be checked by an ECO as stated in this Module;
- d) the requirements for isolating, testing and earthing of overhead line equipment as stated in Module 7;
- e) the requirement for the current isolation instructions to be used as the primary source document for isolation planning activities;
- f) the requirement for the identification of the safe working limits given in the issue of overhead line permit (Form C);
- g) the location, type and inspection frequency of Reminder of Live Exposed (RoLE) Equipment;
- h) work on or about any future sections of electrification on Network Rail controlled infrastructure and areas required to adopt a process for securing points of disconnection to form points of isolation a Supplementary Isolation Process (Module X);
- i) planning of isolations, testing and earthing of overhead line equipment on Network Rail controlled infrastructure equipped with 750V d.c. overhead line system (Sheffield Tram Train - Module Y);
- j) planning of isolations, testing and earthing of overhead line equipment on Network Rail controlled infrastructure equipped with 1500V d.c. overhead line system (Sunderland Metro Systems Operating Area – Module Z).

The planning of isolations includes the following two elements:

- 1) the Network Rail Route concerned shall decide whether or not to grant the required isolation(s) based on its acceptability (when considered in conjunction with all other isolations required) in relation to the operational and electrical requirements of the route(s) concerned; **and**
- 2) the parties and organisations actively involved in the physical implementation of the isolation and issue of overhead line permits (ECO, Authorised Persons, Nominated Persons, etc.) shall be engaged properly to undertake the activities concerned, and the necessary contractual and logistical arrangements made.

*Note: It is the responsibility of the party requiring the isolation to understand the timescales of the two activities in (1) and (2) and to make the necessary arrangements in accordance with the possession planning process.*

The planning process shall identify the requirement for manual switching and the isolation provider(s) that will carry out the manual switching to implement and restore the isolation.

Agreement of the necessary isolations, granted in accordance with (1), does not necessarily mean that the arrangements described in (2) will be automatically acted upon.

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## 5 Detailed Planning of Each Isolation

### 5.1 Request for an Overhead Line Permit

The party requiring the overhead line permit shall submit to the Route Isolation Planner a request giving the following information:

- a) nature of the work;
- b) overhead line structure numbers of the Designated Earthing Point locations between which the work is to be carried out referenced to the line(s) concerned;
- c) line of route reference (from Sectional Appendix);
- d) the access point(s) arrangements.
- e) the organisation providing the overhead line permit; and
- f) duration of the work, stating preferred date and times.

Where a party is unable to provide the requirements internally, the party shall confirm that a robust plan for the activities and arrangements described in (2) of clause 4 has been made.

*NOTE: Where external parties require an overhead line permit, the Asset Protection team will usually be the initial point of contact.*

The request for an isolation shall be reviewed by the Route Isolation Planner, it shall specify the electrical sections or subsections of OLE to be isolated and earthed and the structure numbers between which the work is to be carried out so that the effect on electric train working can be assessed.

### 5.2 Altering the Extent of an Isolation

Where it is required for the extent of an isolation to be altered whilst it remains in force (either by increasing or shortening), this shall be assessed at the planning stage and detailed in the IPF.

### 5.3 Shared Disconnectors

At the earliest opportunity in the planning process, one of the isolation providers shall be identified to operate the shared disconnector when applying the isolation AND one identified to operate the shared disconnector when restoring the isolation. This information shall be published in the weekly IPF.

The planning of abutting isolations that share an overhead line disconnector as a point of isolation should be avoided so far as is reasonably practicable.

*NOTE: Where conditions allow and there is prior agreement, it is preferable for the isolation provider that will carry out the switching to implement and/or restore the isolation.*

### 5.4 Production of an Isolation Planning Form (IPF)

The Route Isolation Planner shall enter the details of all work activities for a particular route and week on the IPF. The IPF shall state for each isolation:

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- a) a unique isolation reference number;
- b) the date and times of the isolation;
- c) the line(s) affected;
- d) the electrical section(s) or subsection(s);
- e) the total number of Forms B (for each isolation);
- f) the isolation provider for each Form B;
- g) the requirement for manual switching
- h) the isolation provider(s) carrying out the manual switching to implement and restore the isolation;
- i) for each Form B, all separate work activity(ies) that will be issued an overhead line permit(s). Each separate work activity shall be assigned a unique reference number based on or linked to the unique worksite number reference number generated by the possession planning system (PPS);
- j) the overhead line structure numbers of the Designated Earthing Point location at the limits of each work activity;
- k) the possession reference number;
- l) the Weekly Operating Notice item number;
- m) the electrical control area(s);
- n) the issue date of the IPF; and
- o) the Network Rail week number and the dates that the IPF covers.

The Route Isolation Planner shall complete all elements of the IPF.

The Route Isolation Planner, the ECO and other parties as required shall assess the IPF in relation to the operational and electrical requirements of the route or area concerned in sufficient detail to avoid any conflicting isolations.

The operational and electrical requirements to be assessed shall include, but not be specifically limited to:

- a) published engineering access statement;
- b) known power supply outage plans;
- c) electrical constraints, e.g. alternative feeding;
- d) autotransformer feeding system constraints;
- e) published alternative feeding scenarios;
- f) the availability of electric train paths required;
- g) train care depot feeding arrangements;
- h) maintenance boundaries;
- i) electrical control boundaries;
- j) possession planning process timescales;
- k) known infrastructure out of use;

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- l) known HV maintenance plan;
- m) planned infrastructure change;
- n) liaison with Network Rail (High Speed 1 Ltd) for isolations across the Network Rail–Network Rail (High Speed 1 Ltd) interfaces;
- o) liaison with Rail For London Infrastructure Limited (Elizabeth Line) interfaces;
- p) liaison with South Yorkshire Supertram Limited (Sheffield Supertram) interfaces; and
- q) liaison with Nexus (Sunderland Metro) interfaces.

*NOTE: Nexus own and manage the Sunderland Metro on behalf of the Tyne and Wear Integrated Transport Authority (ITA).*

The Route Isolation Planner shall identify and record non-compliant isolations and shall seek resolution with the relevant parties. Where this is not possible, a clear statement shall be made to all parties concerned of the reasons for rejection and recorded in accordance with the possession planning process.

The Route Isolation Planner shall then produce an IPF, in accordance with the possession planning process, of all agreed isolations.

This process might need to be repeated.

The IPF shall be circulated to all parties concerned in accordance with the possession planning process.

Each overhead line permit required, identified on the isolation plan, shall be allocated a unique reference number by the Route Isolation Planner.

## 5.5 Production of Isolation Details Forms

### 5.5.1 Production of Isolation Details Forms by Isolation Provider

Following the issue of the IPF, an isolation details form (IDF) shall be completed for each separate Form B to be issued, by a Nominated Person.

*NOTE 1: the IDF should be checked by the Nominated Person who is to be issued with the Form B.*

All details of each overhead line permit, including the unique isolation reference number, shall be entered on the isolation details form.

A summary of typical hazards to be recorded on the IDF are shown in Appendix C

*NOTE 2: It is preferable in all cases for the same competent Nominated Person to plan, implement and issue safety documentation as part of a safe system of isolation for planned work.*

The ECO may in accordance with electrical control instructions may disconnect section(s) or subsection(s) of OLE by operating circuit breakers and disconnectors. These devices can be operated by staff who have been trained for this purpose and then only on the instructions of the ECO. The ECO specifies by identifying number which disconnector are to be operated and how they are to be operated.

*NOTE 3: A Form SDF may be used for this purpose.*

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On occasions it may not be possible for the same competent Nominated Person to plan a safe isolation (including a site visit where appropriate), implement the IDF and issue the safety documentation.

In such circumstances, the implementing competent Nominated Person shall review and validate the arrangements that have previously been planned by another competent Nominated Person, prior to the work being undertaken. The Nominated Person shall confirm that the isolation arrangements are suitable for the tasks to be undertaken.

Where it is necessary to apply temporary continuity jumpers after the equipment has been isolated and earthed but before an Form C has been issued, these jumpers shall be recorded on the IDF.

Where it is required for the extent of an isolation to be altered whilst it remains in force (either by increasing or shortening), an IDF shall be completed for each alteration and shall be assigned a unique reference number.

The isolation details form for the superseding isolation shall only show details of the changes required. Reference shall be made on preceding and superseding isolation details forms to their respective unique reference numbers in the remarks column.

*NOTE 3: The procedure for altering the extent of an isolation is stated in Module 7.*

The development of a safe system of work shall be authorised based on the relevant risk assessment in accordance with Module 3.

The IDF shall contain the location and type of Reminder of Live Exposed (RoLE) Equipment required.

The Nominated Person shall confirm that all details entered on the IDF are correct and appropriate for the work being undertaken, verifying such details by carrying out an on-site walkout (see Appendix B). The walkout shall be carried out in daylight where practicable. During the walkout, all safe working limits shall be confirmed and the residual electrical hazards shall be identified (see Appendix C). In addition, the Nominated Person shall verify the isolation details using isolation diagrams, isolation instructions and other controlled information sources.

The Nominated Person shall review the specific details of the work being undertaken and the details on the IDF to determine if there is a requirement for the Form C holder, or representative, to attend the walkout or be consulted in-person.

The consultation may take the form of a virtual walkout. The Nominated Person may use visual aids to present the limits of isolation and position of residual electrical hazards.

*NOTE 4: The user to verify accuracy and the relevance of the visual aids with respect to the current state of the infrastructure.*

The consultation or on-site walkout between the Nominated Person and Form C holder, or a representative, during the production of the IDF does not negate the requirement for briefing the Form C holder on issue of the OLE permit.

The Form C holder shall be briefed as per the requirements of Module 7 clause 19.

The Form C holder may attend an on-site walkout with the Nominated Person if it is deemed that this is appropriate for the activity to be undertaken.



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The Nominated Person may waive the requirement for a walkout if the isolation is an all line isolation with no residual electrical hazards within the safe working limits stated on the Form C. It is also acceptable to waive the requirement for a walkout for isolations where there are residual electrical hazards and they are documented in controlled sources and the required control measures agreed.

For both consultation or on site walkout scenarios the following conditions shall apply:

- It shall be confirmed using isolation diagrams, isolation instructions and other controlled sources that the OLE configuration and Designated Earthing Points have not changed since the Nominated Person last carried out a planned isolation within the same limits **and**;
- The Nominated Person shall have local knowledge of the area and has previously visited the full length of the safe working limits in the course of their duties within the last 14 weeks and the locations of residual electrical hazards remain unchanged.

*NOTE 5: Examples of the details to be verified and hazards to be recorded are given in Appendices B and C.*

Where more than one Nominated Person is to be issued with an associated Form B, each shall confirm that all relevant details are correct.

### 5.5.2 Checking of Isolation Details Form by ECO and Isolation Provider undertaking the isolation

The isolation provider shall submit the IDF to the relevant electrical control. The ECO shall carry out the following checks:

- a) the unique isolation reference number is completed and matches the IPF;
- b) date and times match the IPF and engineering notices;
- c) the work activity number is completed and matches the IPF;
- d) stated electrical sections match those in the IPF and engineering notices;
- e) OLE earths are within the isolation limits of the stated electrical sections;
- f) any local instructions contained in Module 7 of the electrical control instructions are complied with.

The isolation provider shall establish the sufficient notice period with the electrical control prior to working on a particular control area.

The isolation provider shall take note of this requirement, giving sufficient notice when submitting the IDF to an electrical control area.

If the IDF is incomplete or errors are present, the ECO shall not progress the IDF but shall contact the isolation provider and state the error(s) or omission(s).

The isolation provider shall amend the IDF, raise the version number and resubmit to the ECO as soon as is practicably possible.

The IDF shall not be progressed until it is correct and signed by the ECO.

The ECO shall retain the checked and signed IDF.

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NOTE: A model isolation details form is shown in Appendix A.

## 5.6 Work Arising After the Isolation Planning Form is Issued

In exceptional circumstances, work of an urgent nature that cannot be published in the IPF or any supplementary planning publication may be carried out with the prior agreement of the Network Rail Operations Department concerned.

In such circumstances, an isolation details form shall be completed by the Nominated Person.

The Nominated Person shall contact the route's infrastructure controller requesting a daily wire to be issued to the ECO, detailing the requirements listed in Module 6, clause 5.4.

Once the Nominated Person receives confirmation that the wire has been sent to the ECO, the isolation details form shall also be submitted.

## 5.7 Work of an Urgent Nature under Rapid Response

In this case, Network Rail Route Control shall advise the ECO of the nature of the work, its location and the name of the representative of the Infrastructure Maintainer in charge on site. The Infrastructure Maintainer's staff shall communicate with the ECO, advising them of the line(s) concerned, the structure numbers between which it is required to carry out the work and the length of time required for the work or the stages of the work, to enable the isolation and earthing of the OLE to proceed in accordance with Module 7.

An isolation details form shall be completed by the Nominated Person. A daily wire shall be issued by the route's infrastructure controller to the ECO as detailed in Module 6, clause 5.6.

## 5.8 Isolations Spanning a Neutral Section Forming the Boundary Between Electrical Controls

Where a neutral section forms the boundary between electrical controls, one of the controls is designated to be responsible for isolations spanning the neutral section. At Network Rail–Network Rail (High Speed 1 Ltd) and Network Rail–Rail For London Infrastructure Limited (Elizabeth Line) electrical control boundaries, procedures exist where either electrical control can be designated to be responsible for isolations depending on who requests the isolation.

The procedure for isolations spanning a neutral section forming the boundary between electrical controls is stated in Module 7. A list of the locations of such neutral sections is given in Module 7, Appendix A.

At the planning stage it shall be agreed that complete electrical section(s) either side of the neutral section or abutting electrical subsection(s) within the adjacent complete section(s) or a combination of the above are to be isolated, this includes associated autotransformer feeders.

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In autotransformer feeding areas, the autotransformer feeders have an insulated break where they span a neutral section in the catenary system. The arrangements for an isolation spanning the insulated break shall be managed by the ECO at the designated electrical control.

### 5.9 Isolations Spanning a Section Insulator Forming the Boundary Between Electrical Controls

Where a section insulator forms the boundary between electrical controls, one of the controls is designated to be responsible for isolations spanning the section insulator. At South Yorkshire Supertram Limited (Sheffield Supertram) electrical control boundary, procedures exist where either electrical control can be designated to be responsible for isolations depending on who requests the isolation.

The procedure for isolations spanning a section insulator forming the boundary between electrical controls is stated in Module Y.

At the planning stage it shall be agreed that complete section(s) either side of the section insulator or abutting subsection(s) within the adjacent complete section(s) or a combination of the above are to be isolated.

## 6 Overlapping Safe Working Limits

The planning for the use of identical or unique safe working limits is essential for the correct deployment of the Reminder of Live Exposed (RoLE) Equipment; this is to reduce the likelihood of multiple/conflicting RoLE Equipment being deployed within the isolation limits, which might cause confusion.

Where there is more than one working party that require overlapping safe working limits the safe working limits shall be either;

- a) identical for all overhead line permits (Form C) by default; or
- b) unique to the individual work tasks which require an overhead line permit (form C), where using identical safe working limits is not appropriate.

When overlapping safe working limits are present only the outermost safe working limits shall have RoLE Equipment installed and briefed to the recipient of the overhead line permits (Form C).

## 7 Reminder of Live Exposed (RoLE) Equipment Selection

The type of Reminder of Live Exposed (RoLE) Equipment used to identify the safe working limits of the overhead line permit (Form C) shall be selected at the planning stage.

The RoLE Equipment used shall be either:

- a) Rail mounted or free standing by default; or
- b) Any other type where it is demonstrated that it is more appropriate for the work taking place and remains visible on approach to the limits regardless of plant on site and works taking place.

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The selection of the RoLE Equipment should be appropriate to the work taking place and proportionate to the associated risks.

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## Appendix A List of Forms

Reference	Title
Form IPF	Isolation Planning Form
Form IDF	Isolation Details Form

### General

When it is necessary to revise a form, the form and this index will be updated in accordance with the appropriate change process described in NR/L2/CSG/STP001/02.

Any future re-issue of forms is controlled by the Electrical Power Standards and Controls Steering Group. Any proposed revisions to forms should be forwarded to the Steering Group, who will review the form and pass it to the Standards and Controls Management team for publication at the next available opportunity.

*NOTE From time to time it may be necessary to publish a revised version of a form. As a result there may be instances when the version number on Connect is more recent than that identified in the index. The most recent version of the form should be the one used.*

For organisations that are not eligible to free of charge standards, there are a number of ways for suppliers, principal contractors and subcontractors to access Network Rail standards and controls: -

- Online: IHS Network Rail Standards Online at: <http://uk.ihs.com/products/rail/index.htm> Call IHS Customer Services on 01344 328300 for login details.
- Online: SAI Global Network Rail Standards Online [Standards Management – i2i | SAI Global Infostore](#) or call SAI Global for more details on 0203 327 3140
- Hard copy: To buy individual standards and controls, call IHS Market Customer Services on 01344 328300 or [emeastore@ihs.com](mailto:emeastore@ihs.com)

### A.1 Form IPF

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29987/IPF	1	05/09/2015	Isolation Planning Form

### A.2 Form IDF

Reference	Issue	Date	Title
NR/L3/ELP/29987/IDF	5	03/09/2022	Isolation Details Form

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## Appendix B

### Isolation Details Forms: Examples of details to be verified during a site walkout

This list is not exhaustive and is for guidance purposes.

- a) The location of each portable earth and temporary continuity jumper specified by line and structure number.
- b) Where Circuit Main Earths (CMEs) or Additional Earths are required.
- c) If, in unavoidable circumstances, a long portable earth has to be used and is justified.
- d) Whether snap-on or screw type clamps are required on the portable earths and temporary continuity jumpers.
- e) If the structure-to-rail bond or the earth wire and its connection(s) to the traction return rail to be relied upon are intact.
- f) The location of residual electrical hazards within the safe working limits.
- g) The location of all Reminder of Live Exposed (RoLE) Equipment required as part of the isolation.
- h) Confirmation that the work is compatible with the isolation.
- i) Confirmation that the access point is within the safe working limits.

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## Appendix C

### Isolation Detail Forms: Examples of hazards to be identified and recorded

This list is not exhaustive and is for guidance purposes.

- a) Live OLE including ATF.
- b) Live span wires.
- c) Live back-to-back registrations.
- d) Live overlapping registrations.
- e) Live bare feeders.
- f) Live SMOS site aerial busbars.
- g) Live cable sealing ends.
- h) Live flying tail anchors.
- i) Live cross-track connections to booster transformers.
- j) Live cross track connections to disconnectors.
- k) Live cross-track feeder connections at feeder stations.
- l) Live cross-track connections to auxiliary supply transformers.
- m) Live adjacent OLE where electrical sections or sub-sections are staggered along-track.
- n) Live side of section insulators on crossovers.
- o) Live connections to normally open disconnectors.