SQUIRE SANDERS

PLANNING ACT 2008

AND

THE INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

THE ABLE MARINE ENERGY PARK DEVELOPMENT CONSENT ORDER 2012

(PINS REFERENCE NUMBER: TR030001)

WRITTEN SUMMARY OF THE ORAL CASE PUT AT THE PROTECTIVE PROVISION HEARING ON THE DRAFT DCO AND DRAFT DEEMED MARINE LICENCE HELD ON 21 AND 22 NOVEMBER 2012

ON BEHALF OF

NATIONAL GRID PLC

(UNIQUE REFERENCE NUMBERS: ABLE-AP-042 AND ABLE-0018)

November 2012

1 INTRODUCTION

This summary of the oral representations and current position made at the Protective Provision Hearing in to the draft DCO and draft Marine Licence is submitted by National Grid Plc (**"NG"**). This includes for the avoidance of doubt National Grid Gas Plc and National Grid Electricity Plc.

NG has four items of apparatus which cross the Order Land as follows:

(a) One live 30 inch high pressure gas main;

(b) One decommissioned but maintained 6 inch hydrogen pipeline;

(c) One decommissioned but maintained 18 inch liquid products pipeline; and

(d) An overhead electricity 400kv line and lattice tower numbered 2AJ006.

All apparatus is shown on drawing 77/ED/12 produced by NG dated 2 October 2012 a copy of which is attached to this Submission.

All the assets are protected either through the existence of an easement or a wayleave.

1.1 Submissions made at Oral Hearing

It was noted that as a result of discussions between the parties NG understood that the Company had no intention of interfering with any of NG's equipment, or extinguishing any rights currently enjoyed by NG over the Order Land. This view was supported by the absence of any reference to the easements in the Book of Reference, although the Schedule contained a summary of organisations whose equipment crossed the Order Land. NG have been assured however this schedule has no legal significance regarding the authorisation for compulsory purchase contained in the Compulsory Purchase Order.

The existing easements protect NG's equipment from interference within the easement strip.

However both the high pressure gas main and the 400 kv overhead line require developers to follow NG's standards when they undertake work in the vicinity because of the risk of damage to the equipment. Such damage could of course have catastrophic consequences.

In normal circumstances, where no development consent order is involved, an applicant for development would apply to the local planning authority for planning permission. NG would be consulted and NG would advise the applicant of the requirement to comply with the standards for working close to high pressure gas mains or overhead lines.

In this case however the grant of planning permission is regulated by the Development Consent Order.

It follows that if a developer were to undertake work which caused damage to NG's equipment, this could result in damage to third parties and constitute a nuisance.

Section 158 of the Planning Act 2008 provides statutory immunity for the Company in relation to the development covered by the Development Consent Order.

NG produced copies of its guideline documents in its original representations and recently supplied the Company with copies of the Asset Protection Agreement it would expect to be signed before any work commenced in the vicinity of its equipment. The Asset Protection Agreements set out details of the limits within which an agreement is required.

However the Company have requested time to study these documents before agreeing to sign them and these formalities could not be completed before the close of the Hearing.

Accordingly, NG have been required to protect its position by producing protective provisions which have been incorporated from other Development Consent Orders. It will be noted that there are no such provisions in this Development Consent Order. These have been drafted so as to apply in the alternative if a Company is not willing to sign the Asset Protection Agreements.

It was submitted that it would be irresponsible to approve the Development Consent Order without some form of protection for working in the vicinity of the high pressure gas main and the overhead line.

1.2 **Summary of NG's requirements**

Given the position outlined above, National Grid's concerns therefore relate to ensuring the adequate protection of the equipment throughout the construction phase and any works in the vicinity or proximity of the assets.

In this regard, NG has provided to the promoter copies of its standard asset protection agreements both for gas and electricity. Should the promoter wish to enter into such an agreement on those terms or substantially the same terms, NG will be content that its assets are adequately protected.

However, in the alternative, if the agreements cannot be concluded, NG must ensure that there is an alternative mechanism to secure the protection required.

Draft protective provisions for inclusion in the Order have been provided to the promoter for consideration and a copy of those is attached.

The provisions secure protection for the retained apparatus in accordance with NG's specification for safe working in the vicinity of a high pressure gas pipelines and associated installations – requirements for third parties (T/SP/SW/22) and Development near Overhead Lines (ENA 43-8). The requirements effectively being to consult with NG, providing copies of plans and details of works enabling NG to respond to the consultation and secure any protective measures which in NG's opinion are reasonably necessary for the protection of the asset and for safe working.

NG would seek recovery of its reasonable costs associated with any protective measures deemed necessary as a consequence of the development.

This position is entirely consistent with the NG's approach to asset protection where there is construction and works in the vicinity of its apparatus.

The other draft protective provisions provide for an indemnity in the event that any damage is caused to the assets or interruption to any service provided, an alternative means of access to the assets in the event that any apparatus is materially obstructed and finally, where an agreement regulating the relations between the promoter and National Grid in respect of its apparatus is entered into on or after the date of the Order, such an agreement is not affected by the Order provisions.

NG is content to proceed in either of the two ways set out above but would respectfully submit that the granting of a development consent order without satisfactory protection could prejudice National Grid's ability to discharge its statutory obligations.

1.3 **Section 127 and Section 138 Planning Act 2008**

In response to a question from Robert Upton, NG confirmed that as the DCO did not provide any powers to acquire any interests of NG in the Order Land, Section 127 was not engaged. Similarly, as the Company had confirmed it had no intention and consequently no powers to extinguish any rights belonging to NG or power to remove its equipment, Section 138 was not engaged.

Accordingly, the Protective Provisions in Part 8 of the DCO are no longer required and should be replaced by the ones contained with this submission.

On the same basis, Article 42 (previously Article 41) would appear to be superfluous, as it simply repeats the terms of Section 138.

1.4 **Conclusion**

If NG are advised by the Company that it is willing to enter into the Asset Protection Agreements and provides an undertaking to that effect, then NG is willing to consider writing to the Secretary of State at the request of the Company to confirm that the Protective Provision supporting this representations are not required.

Squire Sanders (UK) LLP
22 November 2012

Emergency Telephone Number: **0800 111 999** - for pipeline damage or gas escapes

nationalgrid

T/SP/SSW/22

SPECIFICATION FOR

SAFE WORKING IN THE VICINITY OF NATIONAL GRID HIGH PRESSURE GAS PIPELINES AND ASSOCIATED INSTALLATIONS - REQUIREMENTS FOR THIRD PARTIES

AUGUST 2007

J537 (Rev 08/07)

CONTENTS

FOREWORD

This Specification was approved by the Policy Manager, Transmission, on 17th August 2007 for use by managers, engineers and supervisors throughout National Grid Gas.

National Grid Gas documents are revised, when necessary, by the issue of new editions. Users should ensure that they are in possession of the latest edition by referring to the Gas Documents Library available on infonetUK (company intranet.)

Compliance with this Document does not confer immunity from prosecution for breach of statutory or other legal obligations.

BRIEF HISTORY

First published as T/SP/SSW22	October 2001	EPSG/L01/283
Editorial update to reflect merger October 2002	November 2002	
Revised and reissued.	November 2003	EPSG/A03/10125
Revised and Reissued as T/SP/SSW/22	June 2004	EPSG/T04/1209
Editorial update to comply with GRM	August 2004	
Revised and re-issued as T/SP/SSW/22	December 2005	EPSG/T05/1631
Revised and re-issued	October 2006	EPSG/T06/1755
Revised and re-issued	August 2007	EPSG/T07/2006

KEY CHANGES (Identify the changes from the previous version of this document)

Section	Amendments
8.12	Included wind farm requirements
6.1 & 6.2	Confirmation of the requirement for hand dug trial holes
4. & Appendix B	Included requirements to use marker flags

DISCLAIMER

This document is provided for use by National Grid Gas and such of its contractors as are obliged by the terms and conditions of their contracts to comply with this document. Where this document is used by any other party it is the responsibility of that party to ensure that this document is correctly applied.

MANDATORY AND NON-MANDATORY REQUIREMENTS

In this document:

shall: indicates a mandatory requirement.

should: indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment shall be completed to show that the alternative method delivers the same, or better, level of protection.

National Grid plc announced on Monday 10th October 2005 that its principal businesses will now operate under one unifying name, National Grid. This completes the renaming programme initiated at the company's AGM in July 2005, when shareholders approved the group name change.

The new name and identity incorporate National Grid's UK and US regulated electricity and gas businesses, wireless infrastructure operations, metering, LNG importation and property businesses, and the Basslink electricity interconnector project in Australia.

Previous Registered Name	New Registered Name	Trading as
National Grid Transco plc	National Grid plc	National Grid
Transco plc	National Grid Gas plc	National Grid

This document supersedes the previous version and all references to Transco have been replaced by reference to National Grid.

SPECIFICATION FOR

SAFE WORKING IN THE VICINITY OF NATIONAL GRID HIGH PRESSURE GAS PIPELINES AND ASSOCIATED INSTALLATIONS - REQUIREMENTS FOR THIRD PARTIES

INTRODUCTION

This specification is for issue to third parties carrying out work in the vicinity of National Grid high pressure gas pipelines (above 7 bar gauge) and associated installations and is provided to ensure that individuals planning and undertaking work take appropriate measures to prevent damage.

Any damage to a high-pressure gas pipeline or its coating can affect its integrity and can result in failure of the pipeline with potential serious hazardous consequences for individuals located in the vicinity of the pipeline if it were to fail. It is therefore essential that the procedures outlined in this document are complied with when working near to a high pressure, above 7 bar gauge, pipeline. If any work is considered by National Grid to be in breach of the requirements stipulated in this document then the National Grid responsible person will suspend the work until the non-compliances have been rectified.

The Pipelines Safety Regulations state that “No person shall cause such damage to a pipeline as may give rise to a danger to persons” (Regulation 15). Failing to comply with these requirements could therefore also result in prosecution by the Health and Safety Executive (HSE).

The requirements in this document are in line with the requirements of the IGE (Institution of Gas Engineers) recommendations IGE/SR/18 Edition 2 - Safe Working Practices To Ensure The Integrity Of Gas Pipelines And Associated Installations and the HSE’s guidance document HS(G)47 Avoiding Danger from Underground Services.

It is the responsibility of the third party to ensure that any work carried out also conforms with the requirements of the Construction and Design Management Regulations and all other relevant health and safety legislation.

WHEN CARRYING OUT WORK IN THE VICINITY OF A HIGH PRESSURE PIPELINE FOLLOW THE FOLLOWING PROCESS

CONTACT NATIONAL GRID
Contact National Grid to obtain formal consent - Section 2 of this document.
Note: at least 7 days notice prior to commencement of the work is normally required

↓

CONSIDER SAFETY
Consider the safety requirements - Section 3 of this document.

↓

INFORM NATIONAL GRID AND REQUEST PIPELINE LOCATION
Inform National Grid prior to carrying out work and arrange for National Grid to locate the pipeline - Section 4 of this document
Note: at least 7 days notice is normally required

↓

OBSERVE RESTRICTIONS
Observe National Grid restrictions on the allowed proximity of mechanical excavators and other power tools and the measures to protect the pipeline from construction vehicles when carrying out the work – Sections 5, 6 and 7 of this document.
Note: National Grid may wish to supervise the work, consult National Grid to confirm whether or not this is the case.

↓

SPECIFIC ACTIVITIES
If work involves any of the following activities:

- No-Dig Techniques
- Change in Cover
- Piling
- Demolition
- Hot Work
- Blasting
- Surface Mineral Extraction
- Deep Mining
- Landfilling
- Pressure Testing
- Seismic Surveys
- Wind Farms

Comply with the requirements in Section 8 of this document

↓

CONSULT NATIONAL GRID
Consult National Grid prior to any backfilling over, alongside or under the pipeline and obtain National Grid's agreement to proceed. Normally National Grid require 48 hours notice prior to backfilling - Section 9 of this document.

IMPORTANT: This flowchart should be used in conjunction with the entire SSW22 document and not in isolation, AND If at any time during the works the pipeline is damaged even slightly then observe the precautions in Section 10 of this document.

IF IN DOUBT CONTACT NATIONAL GRID

1. SCOPE

This specification sets out the safety precautions and other conditions affecting the design, construction and maintenance of services, structures and other works in the vicinity of National Grid pipelines and associated installations operating at pressures greater than 7 bar gauge, located in both negotiated easements (see Section 12) and public highways.

The principles of this document should also be observed when carrying out work in the vicinity of intermediate pressure mains (pipelines operating between 2 and 7 bar gauge). In some circumstances some of the requirements of the document, when applied to intermediate pressure mains, may be relaxed but only with the prior agreement of National Grid.

2. FORMAL CONSENT

High pressure pipelines are generally laid across country within an easement agreed with the landowner or within the highway.

As the required arrangements for working within an easement and working within the highway differ, this document has been structured to highlight the specific requirements for these two types of area where work may be carried out.

In Scotland a 'Deed of Servitude', known generally as a 'wayleave' is considered equivalent to 'easement' in this document.

Generally, normal agricultural activities are not considered to affect the integrity of the pipeline, however **consult National Grid prior to undertaking deep cultivation in excess of 0.5m**.

In all other cases **no work shall be undertaken in the vicinity of the pipeline without the formal written consent of National Grid.**

Any documents handed to contractors, or other individuals undertaking work (e.g. farmer, local authority etc), on site by National Grid, shall be signed for by the site manager. National Grid will record a list of these documents using the form in Appendix A, and the contractor or other individuals undertaking work should maintain a duplicate list.

2.1 Within an Easement

The promoter of any works (see Section 12) within an easement shall provide National Grid with details of the proposed works including a method statement of how the work is intended to be carried out.

Work shall not go ahead until formal written consent has been given by National Grid. This will include details of National Grid's protection requirements, contact telephone numbers and the emergency telephone number.

On acceptance of National Grid's requirements the promoter of the works shall give National Grid 7 working days notice, or shorter only if agreed with National Grid, before commencing work on site.

2.2 Within the Highway

Work shall be notified to National Grid in accordance with the requirements of The New Roads and Street Works Act (NRSWA) and HS(G)47.

The promoter of any works within the highway should provide National Grid with details of the proposed works including a method statement of how the work is intended to be carried out. This should be submitted 7 working days before the planned work is to be carried out or shorter, only if agreed with National Grid. If similar works are being carried out at a number of locations in close proximity a single method statement should be adequate.

Work should not go ahead until formal written consent has been given by National Grid. This will include details of National Grid's protection requirements, contact telephone numbers and the emergency telephone number.

3. HS&E CONSIDERATIONS

3.1 Safe Control of Operations

All working practices shall be agreed by National Grid prior to work commencing. All personnel working on site shall be made aware of the potential hazard of the pipeline and the actions they should follow in case of an emergency. The Site Document Control Form (Appendix A) should be used to record the list of relevant documents that have been provided by National Grid to persons undertaking work at the site.

3.2 Deep Excavations

Special consideration should be given to the hazards associated with deep excavations. The HSE document CIS08 'Safety in Excavations' provides further guidance and is available on the HSE web site www.hse.gov.uk

3.3 Positioning of Plant

Mechanical excavators and any other powered mechanical plant shall not be sited or moved above the pipeline unless written authority has been given by the National Grid responsible person.

Mechanical excavators and any other powered mechanical plant shall not dig on one side of the pipeline with the cab of the excavator positioned on the other side.

Mechanical excavators, any other powered mechanical plant, and other traffic shall be positioned far enough away from the pipeline trench to prevent trench wall collapse.

3.4 General

Activities associated with working in the vicinity of pipelines operating above 7 bar gauge may have impact on the safety of the general public, site workers, National Grid staff and contractors, and may affect the local environment. Anyone (e.g. contractors, site workers, farmers, local authorities etc.) working close to the pipeline shall carry out suitable and adequate risk assessments prior to the commencement of work to ensure that all such issues are properly considered and risks mitigated.

4. PIPELINE LOCATING

Where formal consent to work has been given, the third party should give 7 working days notice or shorter, only if agreed with National Grid, to ensure that the pipeline is suitably located and marked out by National Grid prior to the work commencing.

Prior to work commencing on site the pipeline shall be located and pegged by National Grid personnel using pipeline location markers with a triangular flag (see Appendix B) to indicate the presence of the pipeline belowl. In exceptional circumstances and only with the prior agreement of National Grid the locating and marking out of the pipeline could be carried out by competent third parties on behalf of the contractor/site workers/farmers/local authorities etc. as long as National Grid is assured of their competence and the procedures to be followed.

Safe digging practices, in accordance with HSE publication HS(G)47 should be followed as both direct and consequential damage to gas plant can be dangerous both to employees and to the general public.

Previously agreed working practices should be reviewed and revised based on current site conditions. Any changes shall be agreed by the National Grid responsible person.

The requirements for trial holes to locate the pipeline or determine levels at crossing points shall be determined on site by the National Grid responsible person.

The excavation of all trial holes shall be supervised by the National Grid responsible person.

5. SLABBING AND OTHER PROTECTIVE MEASURES

No protective measures including the installation of concrete slab protection shall be installed over or near to the National Grid pipeline without the prior permission of National Grid. National Grid will need to agree the material, the dimensions and method of installation of the proposed protective measure. The method of installation shall be confirmed through the submission of a formal written method statement from the contractor to National Grid.

Where permanent slab protection is to be applied over the pipeline National Grid will normally carry out a survey (Pearson Survey) of the pipeline to check that there is no existing damage to the coating of the pipeline prior to the slab protection being put in place. National Grid shall therefore be given suitable advance notice (typically 7 working days) prior to the laying of any slab protection to arrange for them to carry out this survey.

The Safety precautions detailed in Sections 3 and 6 of this document should also be observed during the installation of the pipeline protection.

6. EXCAVATION

Remaining depth of cover. There are restrictions on excavations directly above the pipeline, even if supervised by National Grid – no mechanical excavation closer than 0.6 m to the nearest part of the pipeline.

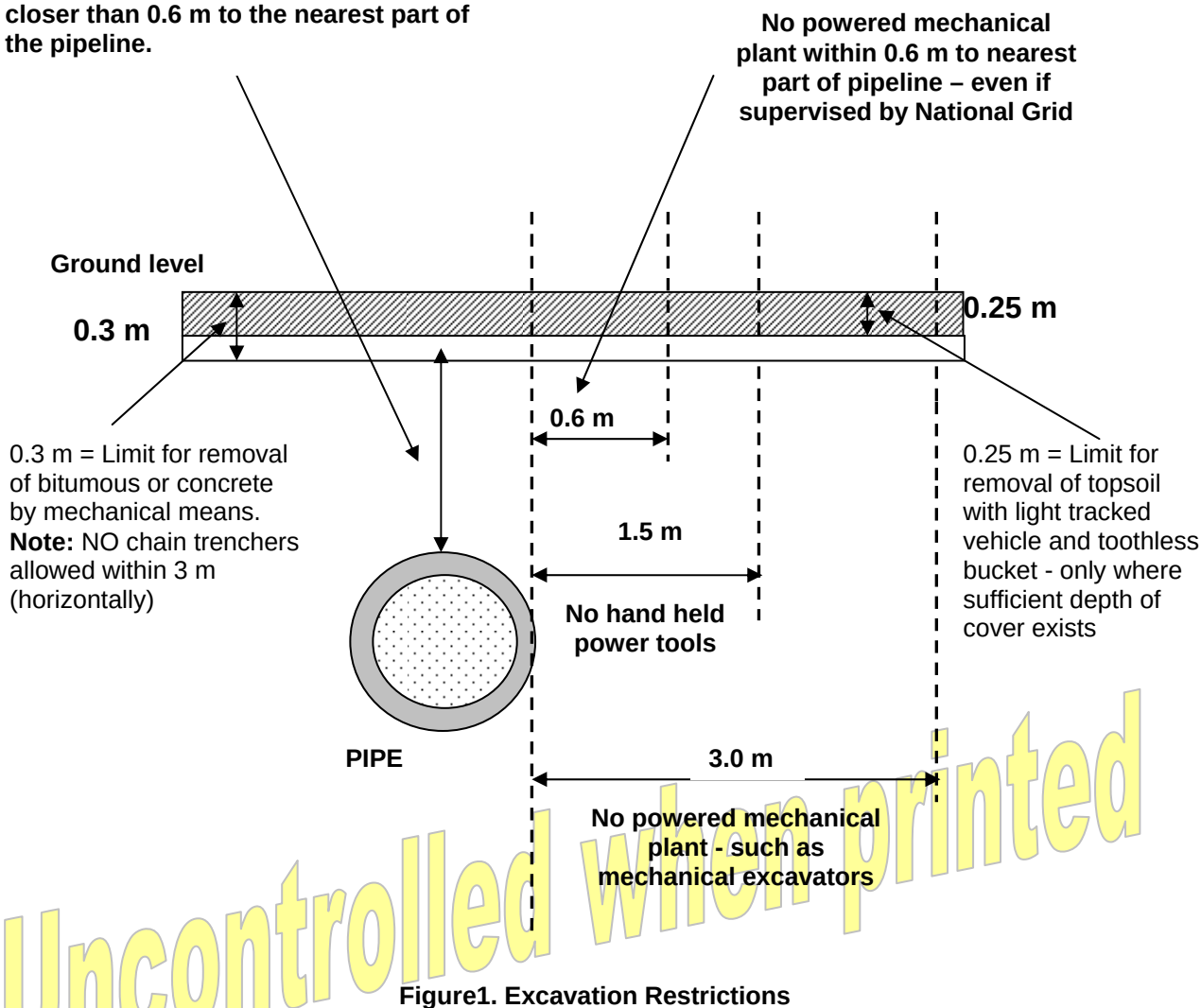


Figure1. Excavation Restrictions

6.1 In Proximity to a Pipeline in an Easement

Third parties may excavate, unsupervised, with powered mechanical plant no closer than 3 metres to the National Grid located pipeline and with hand held power tools no closer than 1.5 metres - see Figure 1. Powered mechanical plant includes mechanical excavators, whilst hand power tools includes petrol, electric and air powered tools. Due to the potential of toothed excavator buckets to damage pipelines, toothless buckets shall be used. Any fitting, attachment or connecting pipework on the pipeline shall be exposed by hand. All other excavation shall be by hand.

Consideration may be given to a relaxation of these limits by agreement with the National Grid responsible person on site and only whilst he remains on site. In this case powered mechanical plant shall not be allowed to excavate closer than 0.6 metres to the nearest part of the pipeline. Mechanically assisted excavations, between 3 and 0.6 metres of the pipeline, shall only be undertaken provided the pipeline position has been confirmed by hand dug trial holes and the work is supervised by the National Grid approved representative on site.

Where sufficient depth of cover exists, following evidence from hand dug trial holes, light tracked vehicles may be permitted to strip topsoil to a depth of 0.25 metres, using a toothless bucket.

No topsoil or other materials shall be stored within the easement without the written permission of National Grid.

No topsoil or materials shall be stored over the pipeline without the written permission of National Grid.

No fires shall be allowed in the easement strip or close to above ground gas installations.

After the completion of the work the level of cover over the pipeline should be the same as that prior to work commencing unless agreed otherwise with the National Grid responsible person.

No new service shall be laid parallel to the pipeline within the easement. In special circumstances, and only with formal written agreement from National Grid, this may be relaxed for short excursions where the service shall be laid no closer than 0.6 metres to the side of the pipeline.

Where work is being carried out parallel to the pipeline within or just alongside the easement a post and wire fence shall be erected as a protective barrier between the works and the pipeline.

National Grid may require that an easement crossing agreement (deed of indemnity) be completed by the third party prior to the commencement of work. This shall be discussed with the National Grid responsible person prior to the commencement of the works.

6.2 In Proximity to a Pipeline in the Highway

Removal of the bituminous or concrete highway surface layer by mechanical means is permitted to a depth of 0.3 metres, although the use of chain trenchers to do this should not be permitted within 3 metres of the pipeline. The National Grid responsible person may want to monitor this work.

Where the bituminous or concrete highway surface layer extends below 0.3 metres deep it should only be removed by handheld power assisted tools under the supervision of the National Grid responsible person. In exceptional circumstances, and following a risk assessment, these conditions may be relaxed by the National Grid responsible person.

Third parties may excavate, unsupervised, with powered plant mechanical plant no closer than 3 metres to the located National Grid pipeline and with hand held power tools no closer than 1.5 metres. Any fitting or attachment shall be exposed by hand.

In special circumstances consideration may be given to a relaxation of these rules by agreement with the National Grid responsible person on site and only whilst he remains on site. Mechanically assisted excavations, between 3 and 0.6 metres of the pipeline, shall only be undertaken provided the pipeline position has been confirmed by hand dug trial holes, and the work is supervised by the National Grid approved representative on site.

The use of 'No dig' techniques is covered in Section 8.1.

Any new service running parallel to the pipeline should be laid no closer than 0.6 metres to the side of the pipeline (see Section 6.4).

6.3 Crossing Over a Pipeline

Where a new service is to cross over the pipeline a clearance distance of 0.6 metres between the crown of the pipeline and underside of the service should be maintained. If this cannot be achieved the service shall cross below the pipeline with a clearance distance of 0.6 metres.

In special circumstances this distance may be reduced at the discretion of the National Grid responsible person on site.

6.4 Crossing Below a Pipeline

Where a service is to cross below the pipeline a clearance distance of 0.6 metres between the crown of the service and underside of the pipeline shall be maintained.

The exposed pipeline should be suitably supported. Where lengths of pipeline greater than 5 metres are to be exposed and unsupported the National Grid responsible person shall be consulted and a stress analysis shall be required in order to establish support requirements. The stress analysis shall be carried out by individuals with demonstrated expertise in this area, National Grid can be consulted for advice on suitable specialists. National Grid may request a copy of the stress analysis to confirm its adequacy. Such supports shall be removed prior to backfilling.

The exposed pipeline/s shall be protected by matting and suitable timber cladding.

6.5 Cathodic Protection

Cathodic Protection is applied to all of National Grid's above 7 bar gauge buried steel pipelines and is a method of protecting pipelines from corrosion by maintaining an electrical potential difference between the pipeline and anodes placed at strategic points along the pipeline.

Where a new service is to be laid and similarly protected, National Grid will undertake interference tests to determine whether the new service is interfering with the cathodic protection of the National Grid pipeline.

Should any cathodic protection posts or associated apparatus need moving to facilitate third party works, reasonable notice, typically 7 days, shall be given to National Grid. National Grid will undertake this work and any associated costs will be borne by the third party.

6.6 Installation of Electrical Equipment

Where electrical equipment is being installed close to National Grid's above 7 bar gauge buried steel pipelines, the effects of a rise of earth potential under fault conditions shall be considered by the third party and a risk assessment shall be submitted to National Grid for their approval, prior to the works.

7. CONSTRUCTION TRAFFIC

Where existing roads cannot be used construction traffic should ONLY cross the pipeline at previously agreed locations. All crossing points will be fenced on both sides with a post and wire fence and with the fence returned along the easement for a distance of 6 metres. The pipeline shall be protected, at the crossing points, by temporary rafts constructed at ground level. The third party shall review ground conditions, vehicle types and crossing frequencies to determine the type and construction of the raft required. The type of raft shall be agreed with National Grid prior to installation.

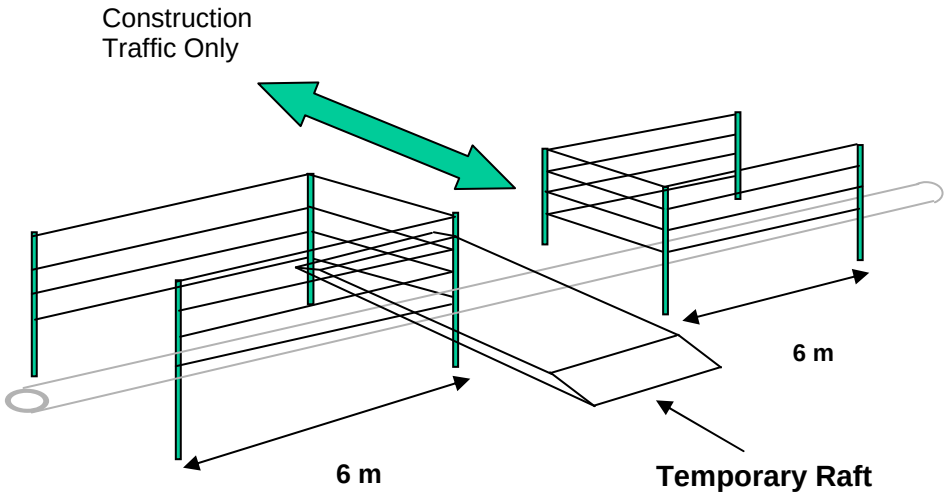


Figure 2. Construction Traffic Requirements

8. SPECIFIC ACTIVITIES

This section details the precautions that need to be taken when carrying out certain prescribed activities in the vicinity of the pipeline. Consult National Grid if you are intending to undertake one of the listed prescribed activities and/or you require further advice on whether the work that you are intending to undertake has the potential to affect the pipeline.

The table below shows, for some specific activities, the prescribed distances within which the advice of National Grid shall be sought (see Sections 8.1 to 8.11 for further details):

Activity	Distance within which National Grid advice shall be sought
Piling	**15 m**
Surface Mineral Extraction	**100 m**
Landfilling	**100 m**
Demolition	**150 m**
Blasting	**250 m**
Deep Mining	**1000 m**
Wind Farm	**1.5 times the turbine mast height from the nearest edge of a pipeline**

8.1 No-Dig Techniques

Where the third party (e.g. contractor, farmer, local authority, site worker etc.) intends using no dig techniques then a formal method statement shall be produced for all work that would encroach (either above or below ground) within the pipeline easement. This method statement shall be formally agreed with National Grid prior to the commencement of the work. National Grid may wish to be present when the work is being carried out and shall therefore be given adequate advance notice before the commencement of the work.

8.2 Changes to Depth of Cover

8.2.1 Increase in Cover

A pipeline integrity assessment shall be provided for situations involving a final cover depth exceeding 2.5 metres. This assessment should take due account of soil 'dead' loading, ground settlement due to earthworks and the impact of the increased cover on National Grid's ability to inspect and maintain the pipeline. Embankment design and construction over pipelines shall give consideration to prevention of any instability. Expert advice may need to be sought which can be arranged through National Grid.

8.2.2 Reduction in Cover

National Grid shall be consulted for any activity that will lead to a reduced depth of cover (greater than 0.1 m) over the pipeline. Expert advice may need to be sought which can be arranged through National Grid.

8.3 Piling

No piling shall be allowed within 15 metres of a pipeline without an assessment of the vibration levels at the pipeline. The peak particle velocity at the pipeline shall be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration shall be monitored by the contractor and the results available to the National Grid Responsible person at their request. A typical monitoring device would be the Vibrock V801 seismograph and tri-axial geophone sensor.

Where ground conditions are of submerged granular deposits of silt and sand, an assessment of the effect of vibration on settlement and liquefaction at the pipeline shall be made.

Expert advice may need to be sought which can be arranged through National Grid.

8.4 Demolition

No demolition should be allowed within 150 metres of a pipeline without an assessment of the vibration levels at the pipeline. The peak particle velocity at the pipeline shall be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration shall be monitored by the contractor and the results available to the National Grid Responsible person at their request.

Where ground conditions are submerged granular deposits of silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the pipeline shall be made.

Expert advice may need to be sought which can be arranged through National Grid.

8.5 Blasting

No blasting should be allowed within 250 metres of a pipeline without an assessment of the vibration levels at the pipeline. The peak particle velocity at the pipeline shall be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration shall be monitored by the individual/company undertaking the work and the results available to the National Grid Responsible person at their request.

Where ground conditions are of submerged granular deposits of silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the pipeline shall be made.

Expert advice may need to be sought which can be arranged through National Grid.

8.6 Surface Mineral Extraction

An assessment shall be carried out on the effect of surface mineral extraction activity within 100 metres of a pipeline. Consideration should also be given to extraction around groundbeds and other pipeline associated plant and equipment.

Where the mineral extraction extends up to the pipeline easement, a stable slope angle and stand-off distance between the pipeline and slope crest shall be determined by National Grid. The easement strip should be clearly marked by a suitable permanent boundary such as a post and wire fence, and where appropriate, slope indicator markers shall be erected to facilitate the verification of the recommended slope angle as the slope is formed, by the third party. The pipeline easement and slope needs to be inspected periodically to identify any signs of developing instability. This may include any change of slope profile including bulging, the development of tension cracks on the slope or easement, or any changes in drainage around the slope. The results of each inspection should be recorded.

Where surface mineral extraction activities are planned within 100 metres of the pipeline but do not extend up to the pipeline easement boundary, an assessment, by National Grid shall be made on whether the planned activity could promote instability in the vicinity of the pipeline. This may occur where the pipeline is routed across a natural slope or the excavation is deep. A significant cause of this problem is where the groundwater profile is affected by changes in drainage or the development of lagoons.

Where the extraction technique involves explosives the provisions of section 8.5 apply.

8.7 Deep Mining

Pipelines routed within 1 km of active deep mining may be affected by subsidence resulting from mineral extraction. The determination of protective or remedial measures will normally require expert assistance, which can be arranged through National Grid.

8.8 Landfilling

The creation of slopes outside of the pipeline easements may promote instability within the vicinity of the pipeline. An assessment should therefore be carried out, by National Grid, on the effect of any landfilling activity within 100 metres of a pipeline. The assessment is particularly important if landfilling operations are taking place on a slope in which the pipeline is routed.

8.9 Pressure Testing

Hydraulic testing of a third party pipeline should not be permitted within 6 metres either side of a National Grid pipeline, to provide protection against the effects of a burst.

Where this cannot be achieved, typically where the third party pipeline needs to cross a National Grid pipeline, one of the following precautions would need to be adopted:

a) limiting of the design factor of the third party pipeline to 0.3 at the pipeline's nominated maximum operating pressure (MOP), and the use of pre-tested pipe.

or

b) the use of sleeving.

In either case, the third party shall submit details of their proposed precautions and method statement for National Grid consideration.

8.10 Seismic Surveys

National Grid shall be advised of any seismic surveying work in the vicinity of pipeline that will result in National Grid's pipeline being subjected to peak particle velocities in excess of 50 mm/sec. The ground vibration near to the pipeline shall also be monitored by the contractor whilst the survey work is being carried out. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration should be monitored by the contractor and the results available to the National Grid Responsible person at their request.

8.11 Hot Work

The National Grid responsible person on site should supervise all welding, burning or other 'hot work' that takes place within the easement.

8.12 Wind Farm Development

Wind turbines should not be sited any closer than 1.5 times the proposed height of the turbine mast away from the nearest edge of a pipeline.

9. BACKFILLING

Individuals/Contractors/companies/organisations undertaking work shall provide National Grid with 48 hours notice, or shorter notice only if agreed with National Grid, of the intent to backfill over, under or alongside the pipeline. This requirement should also apply to any backfilling operations alongside the pipeline within 3 metres of the pipeline. Any damage to the pipeline or coating shall be reported to the National Grid responsible person in order that damage can be assessed and repairs can be carried out.

Minor damage to pipe coating and test leads should be repaired by National Grid free of charge.

No backfilling should be undertaken without National Grid agreement to proceed. The National Grid responsible person will stipulate the necessary consolidation requirements.

If the pipeline has been backfilled without the knowledge of the National Grid responsible person then he will require the material to be re-excavated in order to enable the condition of the pipeline coating to be confirmed.

10. ACTION IN THE CASE OF DAMAGE TO THE PIPELINE

If the National Grid pipeline is damaged, even slightly, and even if no gas leak has occurred then the following precautions shall be taken immediately:-

- Shut down all plant and machinery and extinguish any potential sources of ignition.
- Evacuate all personnel from the vicinity of the pipeline.
- Notify National Grid using the free 24 hour emergency telephone number **0800 111 999***
- Notify the National Grid responsible person or his office immediately using the contact telephone number provided.
- Ensure no one approaches the pipeline.
- Do not try to stop any leaking gas.

* All calls are recorded and may be monitored

11. REFERENCES

NRSWA	New Roads & Street Works Act
HS(G)47	HSE Guidance ‘Avoiding Danger from Underground Services’
IGE/SR/18	Safe Working Practices to Ensure the Integrity of Gas Pipelines and Associated Installations (Institution of Gas Engineers)
CIS08	Safety in Excavations (HSE document – see HSE website www.hse.gov.uk)

12. GLOSSARY OF TERMS

Deed of Servitude:	In Scotland a ‘Deed of Servitude’ is considered equivalent to ‘easement’ in this document.
Easement:	Easements are negotiated legal entitlements between National Grid and landowner and allow National Grid to lay, operate and maintain pipelines within the easement strip. Easement strips may vary in width typically between 6 and 25 metres depending on the diameter and pressure of the pipeline. Consult National Grid for details of the extent of the easement strip where work is intended.

Liquefaction:	Liquefaction is a phenomenon in which the strength and stiffness of the soil is reduced by earthquake shaking or other rapid loading. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. When liquefaction occurs, the strength of the soil decreases and the ability of the soil to support pipelines or other components is reduced.
Pearson Survey:	a survey used for locating coating defects on buried pipeline services.
Promoter of new works:	the person or persons, firm, company or authority for whom new services, structures or other works in the vicinity of existing National Grid pipelines and associated installations operating above 7 bar gauge are being undertaken.
National Grid responsible person:	the person or persons appointed by National Grid with the competencies required to act as the National Grid representative for the purpose of the managing the particular activity
Wayleave:	general term which is considered equivalent to ‘easement’ in this document.

APPENDIX A

SITE DOCUMENT CONTROL FORM - SAMPLE

EMERGENCY TELEPHONE NO.
0800 111 999*

nationalgrid

SITE DOCUMENT CONTROL FORM	
ACTIVITY REFERENCE:	
ACTIVITY LOCATION:	
SITE MANAGER:	**(***NAME & TELEPHONE NUMBER***)**
NATIONAL GRID CONTACT:	**(***NAME & TELEPHONE NUMBER***)**

THE FOLLOWING DOCUMENTS WERE ISSUED TO *(INDIVIDUAL'S NAME)* **OF** *(COMPANY NAME AND ADDRESS)*

BY *(NATIONAL GRID REPRESENTATIVE)* **ON** *(DATE)***:-**

DOCUMENTS:-
(LIST OF DOCUMENTS)

Signed : *(by the recipient)*

Date of signature :

* All calls are recorded and may be monitored

EMERGENCY TELEPHONE NO.

0800 111 999*

nationalgrid

SITE DOCUMENT CONTROL FORM	
ACTIVITY REFERENCE:	
ACTIVITY LOCATION:	
SITE MANAGER:	
NATIONAL GRID CONTACT:	

THE FOLLOWING DOCUMENTS WERE ISSUED TO
……OF

BY ……
ON *(DATE)***:-**……

DOCUMENTS:-

Signed :

Date of signature :

* All calls are recorded and may be monitored

APPENDIX B

PIPELINE LOCATION FLAGS

Note: The contact telephone number shown is for Gas Distribution but this can be amended according to the local office contact details.

ENDNOTE

Comments

Comments and queries regarding the technical content of this document should be directed to:

Safety and Engineering Registrar

SHE Directorate

National Grid

National Grid House

Warwick Technology Park

Gallows Hill

Warwick

CV34 6DA

Buying documents

Contractors and other users external to National Grid Gas should direct their requests for further copies of National Grid Gas documents to the department or group responsible for the initial issue of their contract documentation.

nationalgrid

Electricity Asset

30inch Killingholme – Scawby High Pressure Gas Pipeline

6inch ICI - Killingholme Hydrogen Pipeline

18inch Liquid Products Pipeline

PLAN OF DCO GAS ASSETS & ELECTRICITY ASSETS

	DRWN.	AT	2-Oct-12
	CHKD.		
	APPVD.		
PLAN REFERRED TO IN AGREEMENT/CONSENT No. DATE:	ORD. SUR.	SCALE	YEAR
SIGNATURE OF OWNER/ OCCUPIER/GRANTOR	Mastermap	1:5000	
WITNESS TO ABOVE SIGNATURE			
SIGNED ON BEHALF OF THE COMPANY	LINE REF.		
WITNESS TO SIGNATURE ON BEHALF OF THE COMPANY	DRAWING No	77/ED/12	
Print A1 Portrait for Scale 1:5000			

N

0 50 100 200 300 400 Meters

2AJ006

Oil Refinery

Oil Refinery

Killingholme Marshes

Killingholme Marshes

Burkinshaw's Covert

River Humber

SCHEDULES

SCHEDULE 9
PROTECTIVE PROVISIONS

PART 8
FOR THE PROTECTION OF NATIONAL GRID PLC

Application

1. For the protection of National Grid Plc the following provisions shall, unless otherwise agreed in writing between the promoter and National Grid, have effect.

Interpretation

2. In this Part of this Schedule—

"apparatus" means—

(a) in the case of an electricity undertaker, electric lines or electrical plant as defined in the Electricity Act 1989(1), belonging to or maintained by National Grid;

(b) in the case of a gas undertaker, any mains, pipes or other apparatus belonging to or maintained by a gas transporter for the purposes of gas supply;

"commence" has the same meaning as in paragraph [●] of Schedule [●] (line up with requirements);

"in" in a context referring to apparatus or alternative apparatus in land includes a reference to apparatus or alternative apparatus under, over, across, along or upon land;

"plans" include all designs, drawings, specifications, method statements, soil reports, programmes, calculations, risk assessments and other documents that are reasonably necessary properly and sufficiently to describe the works to be executed;

"promoter" means the undertaker as defined in article [●] of this Order;

Retained apparatus: protection

1.—(1) Not less than 56 days before commencing the execution of any works authorised by this Order that are near to or in the vicinity of (as defined by reference to the relevant distances contained in the policies applied by National Grid's ENA43-8 (Electric Lines) and T/SP/SSW/22 (Gas Pipelines) or such other standards as may supersede them from time to time), or will or may affect, any apparatus the removal of which has not been required by the promoter under the Order, the promoter shall submit to National Grid a plan.

(2) In relation to works which will or may be situated within the tolerances set out in ENA 43-8 (Electricity Lines) and T/SP/SSW/22 (Gas Pipelines) respectively from any apparatus measured in any direction the plan to be submitted to National Grid under sub-paragraph (1) shall be detailed describing—

(a) the exact position of the works;

(b) the level at which these works are proposed to be constructed or renewed;

(c) the manner of their construction or renewal;

(d) the position of all apparatus; and

(e) by way of detailed drawings all proposed works

(3) The promoter shall not commence the construction or renewal of any works to which sub-paragraph (2) applies until National Grid has given written approval of the plan so submitted.

(4) Any approval of National Grid required under sub-paragraph (2)—

(a) may be given subject to reasonable conditions for any purpose mentioned in sub-paragraph (5) or (7);

(b) shall not be unreasonably withheld; and

(c) shall be deemed to have been given if it is neither given nor refused within 56 days of the submission of plans for approval.

(5) In relation to a work to which sub-paragraph (2) applies, the specified undertaker may require such modifications to be made to the plans as may be reasonably necessary for the purpose of securing its system against interference or risk of damage or for the purpose of providing or securing proper and convenient means of access to any Apparatus.

(6) Works executed under this Order shall be executed only in accordance with the plan, submitted under sub-paragraph (1) and in accordance with such reasonable requirements as may be made in accordance with sub-paragraph (7) by National Grid for the alteration or otherwise for the protection of the apparatus, or for securing access to it, and National Grid shall be entitled to watch and inspect the execution of those works.

(7) Where National Grid requires any protective works to be carried out either themselves or by the promoter (whether of a temporary or permanent nature) such protective works shall be carried out to National Grid's satisfaction prior to the carrying out of works authorised by the Order and National Grid shall give 28 days notice of such works from the date of submission of a plan in line with sub paragraph (1) (except in an Emergency).

(8) Nothing in this paragraph shall preclude the promoter from submitting at any time or from time to time, but in no case less than 56 days before commencing the execution of any works, a new plan, instead of the plan previously submitted, and having done so the provisions of this paragraph shall apply to and in respect of the new plan.

(9) The promoter shall not be required to comply with sub-paragraph (1) where it needs to carry out Emergency Works as defined in the New Roads and Street Works Act 1991 but in that case it shall give to National Grid notice as soon as is reasonably practicable and a plan of those works as soon as reasonably practicable thereafter and shall: (1) comply with sub-paragraph (6) insofar as is reasonably practicable in the circumstances and (2) comply with sub paragraph 10 at all times.

(10) At all times when carrying out any works authorised under paragraph 10 to comply with National Grid's policies for safe working in proximity to electrical or gas Apparatus ENA43-8 and T/SP/SSW/22 respectively.

Expenses

3.—(1) Subject to the following provisions of this paragraph, the promoter shall repay to National Grid on demand all charges, costs and expenses reasonably incurred by National Grid in connection with, the inspection and protection of any apparatus which may be required in consequence of the execution of any such works as are required under this Schedule including—

(a) the approval of plans;

(b) the carrying out of protective works, plus a capitalised sum to cover the cost of maintaining and renewing permanent protective works if applicable;

(c) the survey of any land, apparatus or works, the inspection and monitoring of works or the installation or removal of any temporary works reasonably necessary in consequence of the execution of any such works referred to in this Schedule.

Indemnity

4.—(1) Subject to sub-paragraphs (2) and (3), if by reason or in consequence of the construction of any such works referred to in this Schedule or in consequence of the construction, maintenance or failure of any of the authorised development by or on behalf of the promoter or in consequence of any act or default of the promoter (or any person employed or authorised by him) in the course of carrying out such works, including without limitation any works carried out by the promoter to provide alternative apparatus or protective works required under paragraph 1 or any subsidence resulting from any of these works), any damage is caused to any apparatus or alternative apparatus or property of National Grid, or there is any interruption in any service provided, or in the supply of any goods, by National Grid, or National Grid becomes liable to pay any amount to any third party, the promoter shall—

(a) bear and pay on demand the cost reasonably incurred by National Grid in making good such damage or restoring the supply; and

(b) indemnify National Grid for any other expenses, loss, damages, claims, penalty or costs incurred by or recovered from National Grid, by reason or in consequence of any such damage or interruption or National Grid becoming liable to any third party as aforesaid.

(2) Nothing in sub-paragraph (1) shall impose any liability on the promoter with respect to any damage or interruption to the extent that it is attributable to the neglect or default of National Grid, its officers, servants, contractors or agents.

(3) National Grid shall give the promoter reasonable notice of any such claim or demand and no settlement or compromise shall be made without first consulting the promoter and considering his representations (such representations not to be unreasonably withheld or delayed).

Enactments and agreements

5. Nothing in this part of this Schedule shall affect the provisions of any enactment or agreement regulating the relations between the promoter and National Grid in respect of any apparatus laid or erected in land belonging to the promoter on or after the date on which this Order is made.

Access

6. If in consequence of the exercise of any powers under this Order the access to any apparatus is materially obstructed, the promoter shall provide such alternative means of access to such apparatus as will enable the undertaker to maintain or use the apparatus no less effectively than was possible before such obstruction.

Development near overhead lines

Planning and amenity aspects of high voltage electricity transmission lines and substations

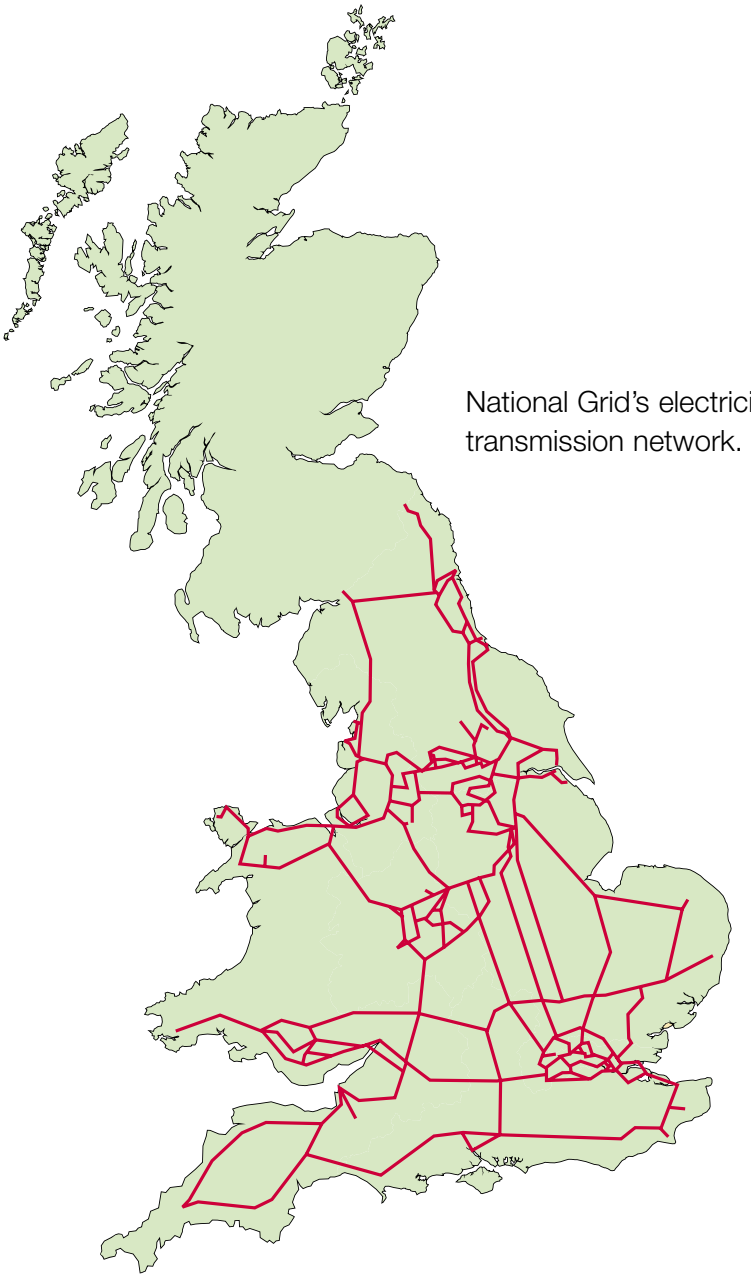
nationalgrid

Contents

This document provides information for planning authorities and developers on National Grid's electricity transmission lines and substations. It covers planning and amenity issues, both with regard to National Grid's approach to siting new equipment, and to development proposals near overhead lines and substations.

Who we are and what we do

Electricity is generated at power stations around the country. These power stations use a variety of fuels - principally coal, gas, oil, nuclear and wind - to generate electricity, and the stations are generally sited to be close to fuel and cooling water rather than to be near centres of demand.



National Grid's electricity transmission network.

Electricity is then transmitted from the power stations through a national network of electricity lines which operate at high voltage. National Grid owns the electricity transmission network in England and Wales and operates the electricity transmission system throughout Great Britain. Local distribution companies then supply electricity at progressively lower voltages to homes and businesses.

This transmission system which operates at 400,000 and 275,000 volts (400kV and 275kV) is known as the "national grid" and covers some 4,500 route miles of overhead line, 420 route miles of underground cable and more than 335 substations. The system, which connects the electricity generators' power stations with the networks of the local distribution companies, also connects with some large industrial customers who, by reason of their size and technical characteristics or location, are directly connected to the transmission system.

Under the Electricity Act 1989 National Grid is the holder of a transmission licence. It is required in this capacity to develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the supply and generation of electricity.

Unlike virtually all other commodities, electricity cannot be stored in bulk until it is needed; it has to be generated in the right quantities, at the time it is needed. The vast majority of generating capacity in England and Wales is connected by National Grid's transmission system. This enables the operation of power stations to be coordinated, offering potential benefits of reducing the amount of spare generating capacity and generating reserve needed, and the ability to select power generation to supply the needs of the moment.

The energy industry is currently going through a period of significant change resulting in a multi-billion pound investment programme. This will encompass small and large scale electricity generation and substantial investment in energy networks to replace and upgrade ageing assets, construct new infrastructure to connect and efficiently deliver new energy sources, as well as maintaining the levels of safety and reliability to which everyone has become accustomed.

This note describes National Grid's amenity responsibilities. It briefly sets out both the amenity aspects which National Grid takes into account in siting new electricity lines and substations, and the amenity aspects which are relevant to proposed development near National Grid's electricity transmission equipment. The note goes on to explain these considerations in more detail, which we believe developers and local planning authorities may wish to take into account.

Overhead lines and substations

An electricity line consists of either an overhead line or an underground cable, or both. A typical National Grid overhead line route uses three main types of lattice steel tower (or pylon). These are:

- suspension towers which support the conductors on straight stretches of line;
- deviation towers at points where the route changes direction; and
- terminal towers where lines terminate at substations or are connected to underground cables.

Appendix II illustrates these features.

National Grid's substations are necessary for the efficient operation of the transmission system, for the specific role of switching circuits or transforming voltage. They are normally sited between power stations and the transmission network, and between the transmission network and the local distribution companies' networks. They can be sizeable developments, and including connecting terminal towers, can occupy up to 20 hectares.

However, advances in technology means that the equipment located at substations is now more compact than that of the 1950s and 1960s when many of the existing substations were built. Hence new substations are considerably smaller in size, both in height and area covered, and in certain circumstances, can be sited inside a building which resembles an industrial unit. Substations are usually contained within steel palisade fencing to ensure public safety, and the structures, excluding towers, are not usually more than 15m in height. Road access is necessary for staff, and for the transport of equipment during construction, maintenance or repair. Very occasionally, transformers or other very large items of plant may need to be moved into or out of sites as abnormal indivisible loads.

Consent procedures

National Grid is a statutory undertaker under the Town and Country Planning (General Permitted Development) Order 1995. The Order grants planning permission for certain defined classes of development. National Grid therefore has certain rights to carry out development under the Order without the need for planning permission from the local planning authority. This permitted development relates primarily to development in existing substations, on operational land and to underground cables. New substations or major extensions to existing substations may require planning permission from local planning authorities.

To construct a new overhead line in either England or Wales, National Grid requires formal consent, under section 37 of the Electricity Act 1989, from the Secretary of State for Business, Enterprise and Regulatory Reform, unless the new line is across land owned and occupied by the company. The Electricity Act 1989 contains a formal procedure for consultation with local planning authorities within whose areas the new line is proposed. If they maintain an objection to an application for section 37 consent then the Secretary of State is required to convene a public inquiry. When granting section 37 consent, the Secretary of State will usually direct that planning permission for the development will be deemed to be granted under the Town and Country Planning Act 1990.

Advice on the procedure for consulting local planning authorities is given in a Circular issued jointly by the then Department of the Environment (Circular 14/90 of that office) and the then Welsh Office (Circular 20/90).

Under its duty in the Electricity Act 1989 to facilitate competition in the supply and generation of electricity, National Grid must offer connection facilities to any new or proposed power station or plant, including offering connections to a local distribution company or major industry that requires a high voltage electricity supply. Therefore proposals for a new electricity generation project may also involve transmission works away from the power station site, such as new overhead lines, modifications to existing lines or new development at substations. These transmission works may be the responsibility of National Grid, the distribution companies or the generator itself depending upon the particular circumstances of each case.

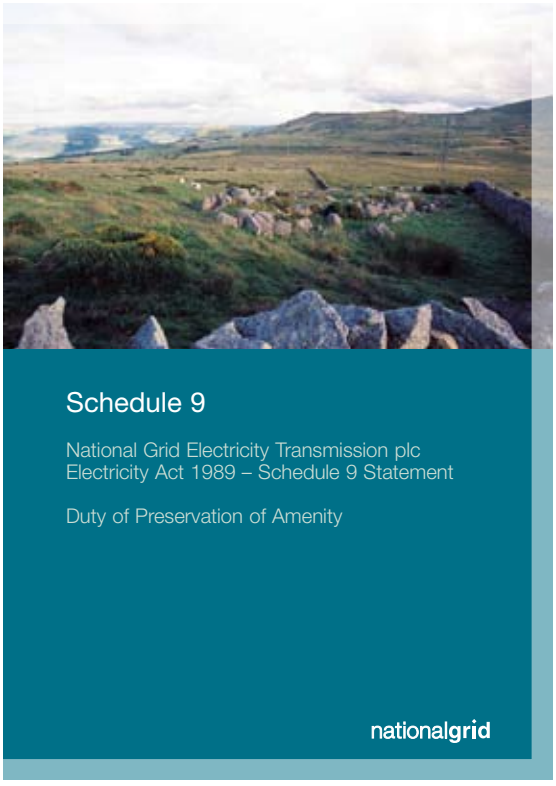
A generator promoting a new power station of over 50 megawatts generation capacity would seek consent under section 36 of the Electricity Act 1989. Although such an application would be separate from any associated transmission works, discussions between the generator and National Grid normally take place at an early stage. Indeed, National Grid would encourage prospective generators to consult it in advance of the consent process so that transmission and consent implications of the project can be fully considered.

Amenity responsibilities

Schedule 9 Statement

Under section 38 of the Electricity Act 1989, National Grid has a duty in formulating proposals for new development to "have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."

National Grid is also required under schedule 9 of the Act to produce and publish a statement setting out how it proposes to meet this obligation. The company's Schedule 9 Statement is available as a separate document. http://www.nationalgrid.com/uk/LandandDevelopment/SC/Responsibilities/



Environmental Impact Assessment

Overhead lines with a voltage of 220kV or more and a length of more than 15km which require consent under section 37 of the Electricity Act 1989 are included in schedule 1 of The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 (as amended). These regulations implement European Directive 85/337/EEC as amended by Directive 91/11/EC which set out procedures for the assessment of the effects of certain projects on the environment. For all development listed in schedule 1 of the regulations, the preparation of an environmental statement is mandatory. As such National Grid will always undertake an environmental impact assessment of all new high voltage overhead line routes of more than 15km in length and submit an environmental statement.

A separate list of developments is covered in schedule 2 of the regulations. A schedule 2 development project need only be subject to environmental assessment if it is likely to have a significant effect on the environment because of its size, nature or location. The regulations state that where proposals include a high voltage overhead line or an overhead line installed in a sensitive area, the need for an environmental impact assessment will be determined on a case-by-case basis. National Grid will therefore carry out environmental impact assessments for some overhead line developments which fall into schedule 2, dependent on consultation with the relevant local planning authorities and the outcome of the screening process.

Environmental statements are not required under the legislation for new substation proposals, however National Grid has given a commitment in its' Schedule 9 Statement to undertake relevant environmental investigations and report on these in any application for consent for new works.

Routeing of overhead lines

Guidelines for the routeing of new overhead lines were originally formulated by the Central Electricity Generating Board (CEGB), a predecessor to National Grid. These guidelines have subsequently been reviewed and supplemented by National Grid and are used as the basis of the company's approach to routeing new overhead lines.

The guidelines set out the principles to be applied in the routeing of new overhead lines. They cannot be expected to cover every possible situation and each case must be considered separately and on its own merits.

The selection of any new electricity line route will be a balance of all the various factors or constraints which have to be taken into account. Any overhead line will be a visual intrusion into the landscape through which it passes, and it is the dominant scale of towers which makes them difficult to absorb into the landscape.

In selecting a route National Grid seeks to reduce the visual effect of the line in terms of the number of people affected and the degree to which they are affected. The nature and topography of the landscape is considered and any statutory protection afforded to an area is also taken into account.

The selected route will typically seek to avoid crossing the highest contours, where towers would generally be the most prominent and will take account of the quality of the landscape and its ability to accommodate an overhead line. In other words an overhead line should 'fit' into the landscape as much as that landscape permits. The extent to which opportunities exist to screen the line will depend on existing vegetation, buildings and topographic features. When viewed from principal viewpoints, an overhead line should ideally be viewed against a background of existing landscape or other development rather than against the sky.

There may be a number of potential conflicts of interest in establishing a new overhead line route. Sometimes, for example, the best route through a landscape will be to follow a river valley rather than to cross the adjacent higher land. The valley, however, is likely to be more intensively populated and also may contain the major transport routes in the area as well as the better quality agricultural land. A new line so routed could have a greater effect on a larger number of people even though its effect outside the valley may be minimal. Conversely for example, upland areas, whilst having relatively little development, are likely to have protective designations and an overhead line across such areas may be visible over a much wider area.

These are all general routeing principles. In practice, the selection of a route will very much depend on the circumstances applicable to each case.

Siting of substations

The general location of a substation is initially determined by transmission requirements and line routeing. The substation may be required to increase the supply of electricity from a power station into the national grid system for transmission; or near an urban area, it may be required as a grid supply point to reduce the voltage to lower levels for the local distribution companies. Its general location is defined by these factors.
With regard to the precise location of a substation, National Grid has guidelines to assist in siting and designing substations to mitigate their environmental effects. The substation guidelines complement National Grid's line routeing guidelines and, where appropriate, are used in conjunction with them.

Proposals for new or significant extensions to substations, do not require environmental impact assessment under Government regulations or advice. However, National Grid normally undertakes relevant environmental investigations on such proposals, and would report on these investigations in submitting any planning application to the local planning authority.

This image shows an aerial view of St. John's Wood 400kV substation in north London. Amongst other factors, design of this GIS (gas insulated switchgear) substation had to take into account land constraints in this urban area.

Development near overhead lines and substations

National Grid owns the land occupied by its substations, but only exceptionally does it own the land which is crossed by its electricity lines. The line is retained by means of either wayleave agreements or permanent easements with the landowner. National Grid has the power to maintain and renew the electricity line and to gain access for these purposes.

National Grid seeks voluntary agreements with landowners. However, when these are not forthcoming National Grid has compulsory powers and can apply to the Secretary of State for a 'necessary wayleave' for the overhead line route, or compulsory purchase of the land occupied by the cable route. In such cases a hearing will take place which provides the opportunity for all issues to be discussed. Since it does not own the land, it cannot prevent development close to or under overhead lines (although, of course, safe electrical clearances must be maintained).

It has sometimes been suggested that minimum distances between properties and overhead lines should be prescribed. National Grid does not consider this appropriate since each instance must be dealt with on its merits. However, it has always sought to route new lines away from residential property on grounds of general amenity. Since the only limitation on new development has been the statutory safety clearances (Appendix III), a large amount of residential and other development has been carried out subsequently beneath and adjacent to overhead lines.

Where development takes place and how it is designed are principally matters for the landowner, developer and the local planning authority to determine. National Grid should be consulted at an early stage on proposals for development near lines and substations, when it is more likely that National Grid's advice and guidance on development near to electricity lines issues can be taken into account.

National Grid believes that the amenity considerations which are applied in routeing overhead lines and siting substations, should be considered in respect of development proposed in the vicinity of overhead lines and substations. Such amenity and other considerations are set out below. In addition National Grid has published comprehensive site layout, design and landscaping guidelines to provide advice and pragmatic solutions for anyone involved in the planning, design and development of sites near high voltage overhead electricity lines.
Visit the Sense of Place website at:
www.nationalgrid.com/uk/senseofplace

Safety aspects

Contact by people or objects with high voltage equipment must be avoided. At substations the high voltage compound is protected by the provision of high security fencing and all of National Grid's towers have anti-climbing guards. For overhead lines a statutory minimum safety clearance must be maintained between conductors and the ground: the higher the voltage of the line, the greater the clearance which is required. Appendix III gives information on statutory safety clearances and on where further information and advice can be obtained.

Safe clearances must be maintained from buildings constructed under or adjacent to overhead lines. Safe clearances must also be maintained for trees, structures such as street lighting, new roads, and ground levels where these will be altered by civil engineering operations.

Underground cables give rise to particular safety requirements. Requirements are dependent upon cable installation methods but generally the area above cables, and a distance on either side, must be kept clear of structures and trees. Access is required for maintenance and repair. It is essential that the cables and material surrounding them should not be disturbed. Further information on cables is available on our website.

Maintenance

From time to time access is required onto land to inspect, maintain and refurbish overhead lines and underground cables. National Grid's rights of access to undertake such works are contained within the wayleave agreement or permanent easement with the landowner.

Overhead lines are inspected on a routine basis both by foot and helicopter. Climbing inspections of towers also take place. Less frequently, overhead lines are refurbished; and conductors, insulators and associated fittings may be replaced, or towers painted. Occasionally towers and their foundations may also be refurbished.

For major refurbishment, such as replacing conductors, safety scaffolding may need to be erected over underlying properties, roads and other development. Certain maintenance techniques also involve the use of helicopters.

National Grid needs quick and easy access to carry out maintenance to its equipment, to ensure that it can be returned quickly to service and be available as part of the transmission system. Such access can be difficult to obtain without inconveniencing and disturbing occupiers and residents, particularly where development is in close proximity to overhead lines.

National Grid recognises that maintenance and refurbishment activities can cause disruption and adversely affect the general amenity of those occupying buildings beneath or adjacent to overhead lines and near to cable routes. Where possible, National Grid seeks to minimise the effects of such disruption. Developers should take into account the requirement of National Grid to maintain access to its equipment.

Visual impact

Since towers are such large and dominant structures, the opportunity to mitigate their effect on new development adjacent to an existing line is restricted. Nevertheless the layout of residential and other types of development, the orientation of main views out of a building, and the location of structural site planning by the developer can assist in reducing the visual impact on residents.

For further information please visit the Sense of Place website at: www.nationalgrid.com/uk/senseofplace

The siting, design and landscape treatment of new substations takes account of existing development. Landscaping, both through the modification of ground form and by planting, can help to mitigate the visual impact of a substation. Where new development is proposed in the vicinity of existing substations, the layout and design of the development can be planned to keep the adverse visual impact of the substation to a minimum.

Noise

High voltage overhead lines and substations can generate noise, the level of which depends mainly on the voltage of the overhead line or substation.

Noise from energised overhead lines is produced by a phenomenon known as “corona discharge” (a limited electrical breakdown of the air). While conductors are designed and constructed to minimise corona discharge, surface irregularities caused by damage, insects, raindrops or pollution may locally enhance the electric field strength sufficiently for corona discharges to occur. This can be audible in certain conditions as a “crackling” sound, occasionally accompanied by a low frequency hum. The noise level generated by a high voltage overhead line is weather-related, with highest noise levels occurring during damp conditions. Overhead lines are normally quiet during dry weather, except during long, dry spells when airborne debris adheres to the conductors. Any noise disappears when sufficient rain falls to wash the debris away.

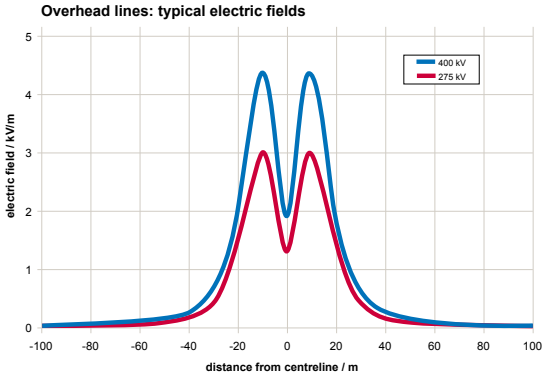
Transformers are installed at many substations, and generate low frequency hum. Whether the noise can be heard outside a substation depends on a number of factors, including transformer type and the level of noise attenuation present (either engineered intentionally or provided by other structures).

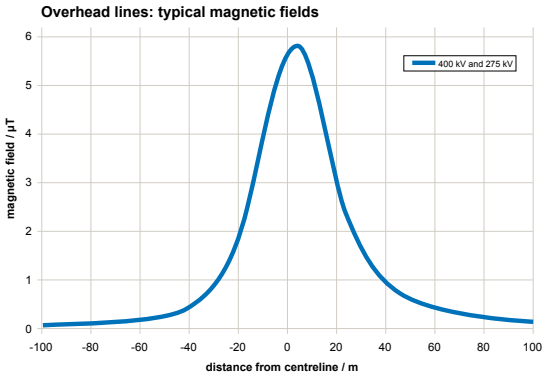
National Grid is able to provide information and advice on noise from high voltage plant to both planning authorities and developers. It is possible for the developer to mitigate significantly the effects of noise from an existing overhead line by attention to site layout and design of new developments, for example by including landscaping or by placing the noise-sensitive elements away from the high voltage plant.

The Department for Communities and Local Government Planning Policy Guidance 24 (PPG24, Planning and Noise), and Technical Advice Note (Wales) 11, guide local authorities on the use of their planning powers to minimise the adverse impact of noise. They outline the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which generate noise. They also advise on the use of conditions to minimise the impact of noise.

Electric and magnetic fields

Electric and magnetic fields (EMFs) are associated with most electrical apparatus, including power lines, underground cables and domestic appliances. They diminish rapidly with distance from the source. Electric fields are associated with voltage and can cause small micro-shocks in certain instances (see “Other Electrical Effects” below). Magnetic fields vary with the current in the line or appliance. Both can be measured with appropriate meters. A separate guide to EMFs, “EMF The Facts”, is available.





While there is ongoing debate over the possibility of a hazard to health from low-level EMFs, the balance of the scientific evidence to date is against there being health effects.

The Health Protection Agency (HPA, previously the National Radiological Protection Board) is responsible for monitoring the hazards to health from all forms of radiation, and is highly respected for its independent scientific opinions. The Government relies on the scientific advice of the HPA, and has brought EMF exposure limits into force in the UK accordingly.

All of the electricity system, including all overhead lines, complies with these limits. The limits are set to prevent all established effects of EMFs on people, and the HPA advises that there is insufficient evidence of harmful effects (for example, cancer) below these levels to reduce the limits. The Government are considering whether any precautionary measures might be justified in addition to the exposure limits, based on a report from a stakeholder group called SAGE, but have not yet introduced any. Therefore, in the UK at present, there are no restrictions on EMF grounds on building close to overhead lines.

National Grid follows the advice of the Government and the HPA. National Grid recognises that some public concern exists over this matter. National Grid, together with the Energy Networks Association, can provide information on the research carried out worldwide on this subject or, alternatively, can direct interested parties to experts, independent of the electricity industry, who can provide advice and guidance.

Other electrical effects

Induced voltages

High voltage equipment produces electric fields which can cause nearby conductive objects to acquire a charge. When discharged to earth through a person touching the object, a small microshock may be experienced. For instance, a car parked under an overhead line can pick up a voltage and when a person touches it, a small spark may occur between the car and that person. Microshocks may sometimes be annoying, but are not normally regarded as dangerous or a health risk.

Metal-clad buildings and metal fences under overhead lines can similarly pick up a voltage. These should be appropriately earthed to reduce the effect of such voltages.

Magnetic fields from power cables and overhead lines can also induce voltages on conductive services, such as pipelines or telecommunication cables, that run parallel and close by. These voltages can be significant if the length of parallelism is considerable. In such cases, an assessment of the impacts of induced voltages will be required and National Grid should be consulted for further advice.

At petrol filling stations and other sites where flammable materials are stored, where spark discharges can be a safety hazard, appropriate electrical screening and earthing of the site may be required if it is located under a high voltage overhead power line. A safety assessment should be carried out with the effects of the nearby power line taken into account, and National Grid consulted for further advice.

Computer screen interference
Some monitors or display screens used with computers suffer a distortion of the displayed image, usually a “flicker” or “wobble” in the presence of 50 Hz magnetic fields above about 0.5 microteslas. Such magnetic fields can be found around most electrical equipment, including high voltage overhead power lines. The magnitude of interference will be dependent on the proximity and orientation of the display screen to the overhead line and the magnitude of current flowing in the line. Flat Screen Displays are not affected.

Distribution wiring in buildings and adjacent equipment can also generate a magnetic field of sufficient level to interact with computer screens.

For existing equipment that is being affected, there are techniques available that can reduce the interference. National Grid can provide information and advice to minimise interference to computer screens in the design and layout of new buildings. If Flat Screen Displays are specified for new installations, the need for any such mitigation will be removed.

Electromagnetic compatibility (EMC) issues
Some electronic and radio communications equipment may be susceptible to the electromagnetic fields and low level radio noise produced by high voltage equipment. Generally, it is easier and less costly to design and plan to avoid EMC issues than it is to correct the problems after they have arisen. As such, it would be prudent for the electromagnetic environment to be taken into consideration when new electronic equipment is being specified.

The locations of television and radio aerials relative to high voltage electricity transmission lines or substations can sometimes result in poor reception. The careful siting of such aerials can usually resolve this issue.

Development plan policy

Many of the considerations which have given rise to National Grid's approach to the siting of substations and the routeing of lines are also relevant to proposals for development close to such high voltage plant.

Some local planning authorities have included policies in their development plan documents which state that, when considering new development, the effect of overhead lines on amenity should be taken into account. National Grid believes that this is an appropriate approach. While National Grid cannot control development (except for safety reasons) under and adjacent to lines, it believes that there are operational benefits to National Grid, and amenity benefits to potential occupiers and the local community, in controlling the siting of such development.

National Grid will support policies in development plan documents which seek to control, on amenity grounds, built development under and immediately adjacent to lines. National Grid is pleased to be consulted on relevant development plan policies and wishes to encourage dialogue with local planning authorities in order to achieve these objectives.

National Grid cannot support policies or proposals in development plans which rely on EMF and related health concerns as justification to control or direct development and will therefore continue to make representations against such policies.

As previously stated, it is National Grid's policy to adhere to HPA (previously NRPB) guidelines.

By appropriate site design it is often possible to incorporate amenity areas free of built development along a overhead line route and round a substation without sterilising significant areas of land. Appropriate uses for this land are public open space; nature conservation; or structural landscaping in residential areas, or for parking and storage in employment areas. For further information please visit the Sense of Place website at: www.nationalgrid.com/uk/senseofplace

National Grid wishes to encourage local planning authorities to consult it on draft development plan documents and on planning applications. It would particularly welcome discussions early in the development plan documents process.

Appendix I

Glossary

The following terms are generally used by National Grid in relation to its transmission equipment:

Cable
An insulated conductor designed for underground electricity transmission or distribution.

Central Electricity Generating Board (CEGB)
Until March 1990, the CEGB was responsible for the generation of electricity in bulk and the transportation of this power through a nation-wide transmission system called the national grid to the then Area Boards.

Circuit
Term used to describe specific electrical paths on the transmission system. i.e. Overhead Line.

Conductor
Wire strung between towers, used for transmitting electricity.

Damper
Metal devices fixed to insulators to avoid conductor damage in windy conditions which can cause vibration of the conductors.

Development Plan Documents (DPDs)
Planning documents prepared by local planning authorities to outline key development goals. DPDs cover the core strategy for the area, a proposals map and site-specific development allocations.

Earth wire
Wire strung between the tops of towers, used for lightning and system protection. This wire may also be used to carry telecommunication signals.

Electricity line
Either an overhead line or an underground cable used to transmit electricity.

Electric and magnetic fields (EMFs)
Electric and magnetic fields (EMFs) are produced by any electrical apparatus, including domestic appliances and overhead power lines.

Flashover
A disruptive electrical discharge between equipment at phase voltage and earth, or between two phases, including breakdown across the surface of an insulator as well as sparkover through air.

High voltage
275,000 volts and over. National Grid's transmission lines generally operate at 275,000 volts and 400,000 volts. Lower voltage lines, such as 132,000 volts and 33,000 volts are generally owned by local distribution companies.

Insulator
Used to attach the conductors to the towers preventing electrical discharge to the steelwork. Usually made from porcelain or glass units, joined together to form an insulator string.

kV
Kilovolt (one thousand volts).

Local distribution companies
Generally own and operate lines with a voltage of 132,000 volts and below and supply electricity to homes and businesses.

MW
Megawatt (one million watts or one thousand kilowatts).

Outage
The withdrawal from service of any part of the transmission system for a period of time in connection with repair, maintenance, or construction of the transmission system.

Permanent easement
Legal right in perpetuity granting National Grid the right to install, use and maintain its equipment. A permanent easement is granted in exchange for a one-off capital payment. Also known as a Deed of Grant of Easement.

Pylon
See tower.

Refurbishment
Repair and renewal of conductors, earthwire, fittings and insulators and where necessary remedial works to the tower and foundations.

Route mile
The length, measured in miles, of the transmission line which connects two or more points on a transmission system, irrespective of the number of circuits of which the line is comprised.

Spacer
Metal device which maintains conductor separation at intervals along the span between towers.

Substations
Transforming or switching stations to control the voltage and direction of electricity. Transforming stations are used to increase the supply of electricity (to 275kV or 400kV) into the national grid system for transmission, and to reduce the voltage to lower levels (to 132kV) for distribution by the local distribution companies. Switching controls the direction of electricity and ensures fault protection.

System security
The ability of a transmission or distribution system to withstand a disturbance and/or the loss of certain circuits.

Tower
Overhead line structure used to carry overhead electrical conductors, insulators and fittings. They are commonly known as pylons and are of a lattice steel construction. See Appendix II.

Wayleave agreement
A licence granted by the owner and occupier of land giving National Grid the right to install, use and maintain its equipment. Terms of the Wayleave Agreement provide for the annual rental and compensation payments to be made.

Appendix II

Main features of a transmission line

National Grid uses a variety of tower designs for the support of overhead line conductors which transmit high voltage electricity from generating stations to where it is needed.

The national grid until the late 1950s consisted of a series of overhead lines at a voltage of up to 132kV. As demand grew, a system of 275kV lines was developed to feed the major conurbations. This system was further developed and uprated to 400kV in the 1960s. A 400kV line carries about three times as much power as a 275kV line, and about 18 times that of a 132kV line depending on the precise line designs. Local distribution companies generally own and operate lines with a voltage of 132kV and below.

Figure 1 shows National Grid's L2 and L6 double circuit towers which are those most widely in use for high voltage transmission. The L2, a typical transmission tower from the 1950s, carried steel-reinforced aluminium conductors in pairs from each insulator. When quadruple conductors were introduced in the 1960s, larger and more substantial towers were needed. The L6 designs were then introduced. The development of lighter all aluminium alloy conductors allowed the smaller L12 design to be brought into use in the 1980s.

The size, height and spacing of towers are determined by safety, topographical, operational and environmental considerations.

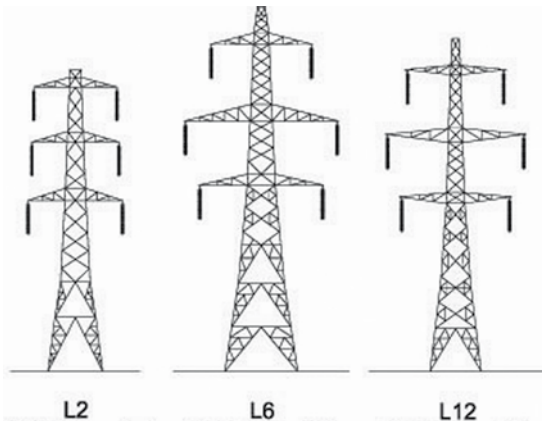


Figure 1: Typical suspension towers

A typical National Grid overhead line route will involve the use of three main types of tower. They are as follows:

- Suspension towers – these support the conductor on straight stretches of line. Conductors are suspended by a vertical insulator string
- Deviation towers – these occur at points where the route changes direction. Conductors are attached by horizontal insulator strings
- Terminal towers – these towers are of greater bulk in order to ensure stability. They occur at the end of overhead lines where they connect with substations or underground cables.

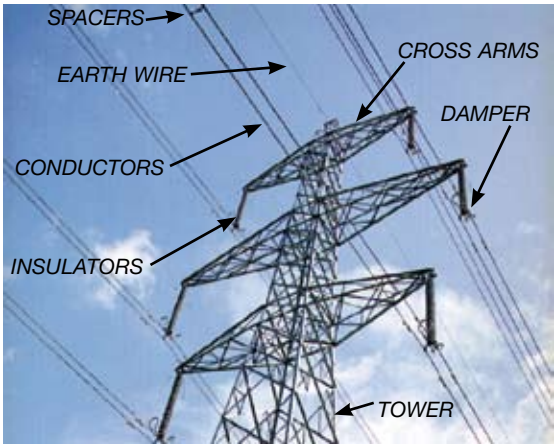


Figure 3: The main features of a transmission line

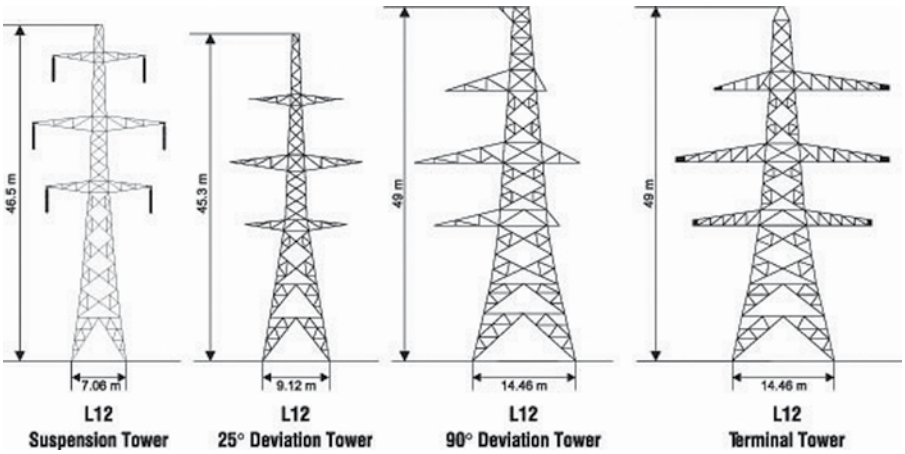


Figure 2: Typical towers in a 400kV route

Appendix III

Safety clearances

Making contact or near contact with overhead lines is dangerous. Overhead electric conductors are normally bare (uninsulated) and if an object approaches too closely it is possible that a flashover will occur and an electric current flow with the likelihood of fatal or severe shock and burns to any person nearby. In order to prevent such incidents minimum safety clearance for overhead lines are prescribed.

Overhead transmission lines must conform to the specifications contained in the Electricity Safety, Quality and Continuity Regulations 2002. The minimum heights at which the conductors are strung between towers are given for lines operating at specified voltages.

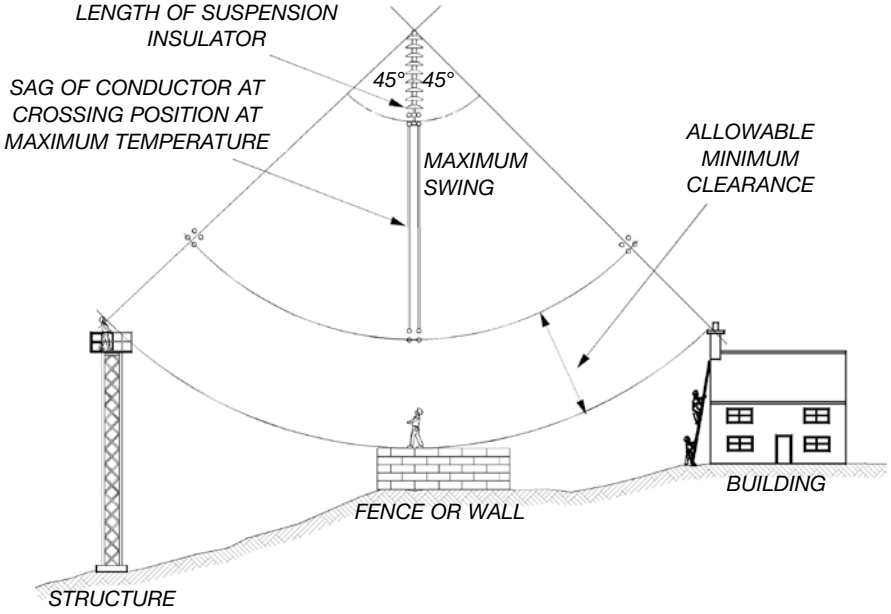


Figure 4: Clearance to objects (on which a person can stand)

Overhead lines are also constructed to conform with the Energy Networks Association's (ENA's) technical specifications which govern the minimum clearance to be maintained between the conductors, ground, roads, trees and objects on which a person may stand. A summary of ENA's Technical Specification 43-8 "Overhead Line Clearances" is given in table 1, the application of safety clearances are illustrated in figures 4, 5 and 6. The minimum clearance to ground for a 400,000 volt line is 7.6m and for a 275,000 volt line is 7.0m.

It is important to note that the information in table 1, giving the minimum safety clearances is for illustrative purposes only. The necessary clearance at a specific location will be dependent on factors including the location the line is passing over, the line's construction, design, and its operating voltage. It is therefore important to contact National Grid where it is intended to construct or alter the ground levels within the vicinity of a National Grid overhead line so that detailed advice on safety clearances and other relevant information may be given.

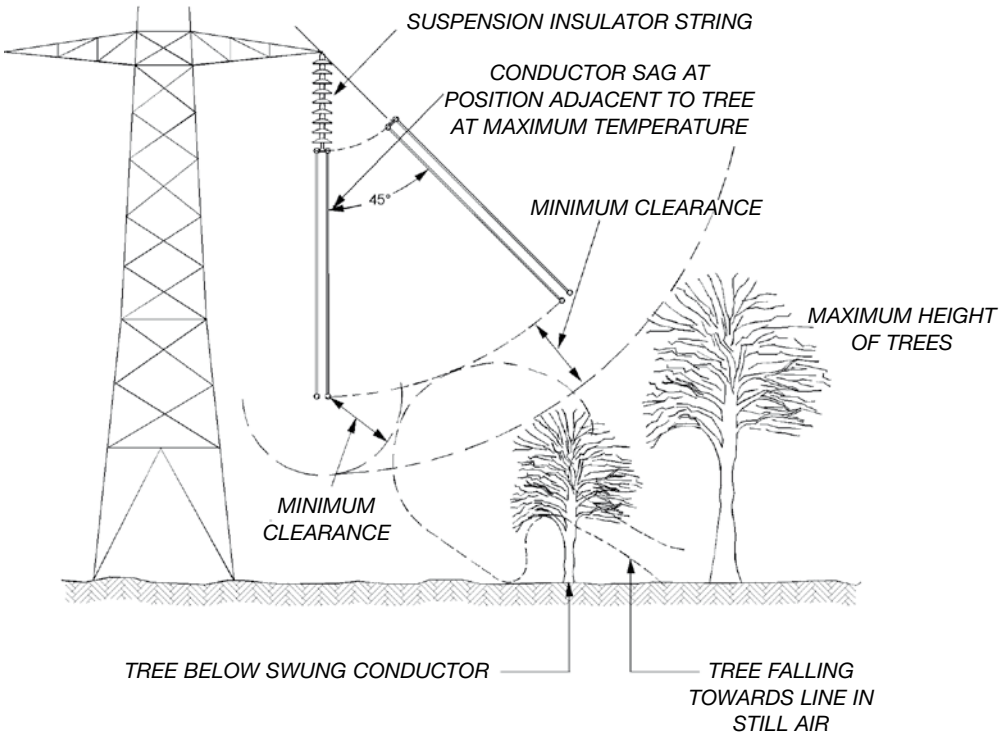


Figure 5: Clearance to trees

In order to ensure that safety clearances are not infringed where works are planned near to overhead lines, National Grid can provide profiles of the overhead line crossing specific sites which detail the height above ground of the lowest conductor. Line profiles are drawn at the time of construction to illustrate the position of the conductors at maximum sag. The position of the conductors at maximum swing should also be taken into account.

Developments adjacent to overhead lines should be designed to facilitate their construction without infringing electrical safety clearances. Care should be taken when unloading, stacking or moving material under conductors. Those involved should be acquainted with the Health and Safety Executive Guidance Notes GS6(rev) and HSG47 which advises on the avoidance of danger from overhead electrical lines and underground services respectively.

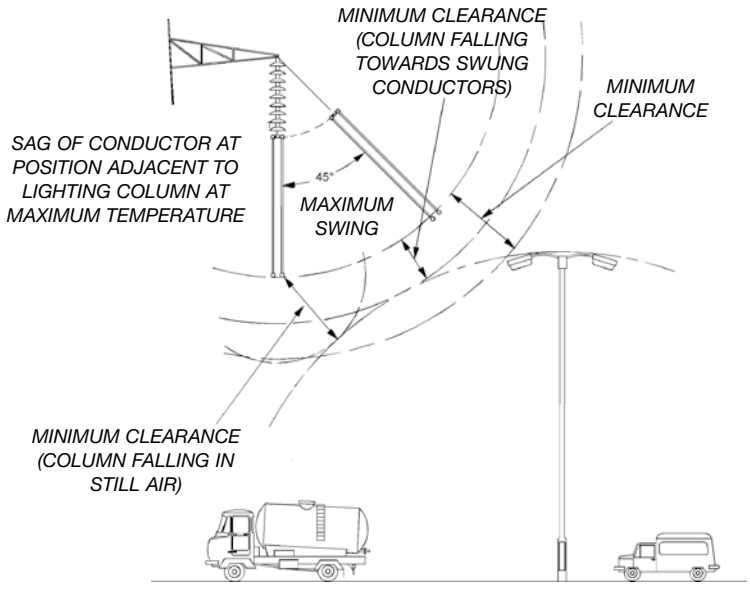


Figure 6: Clearance to lighting columns

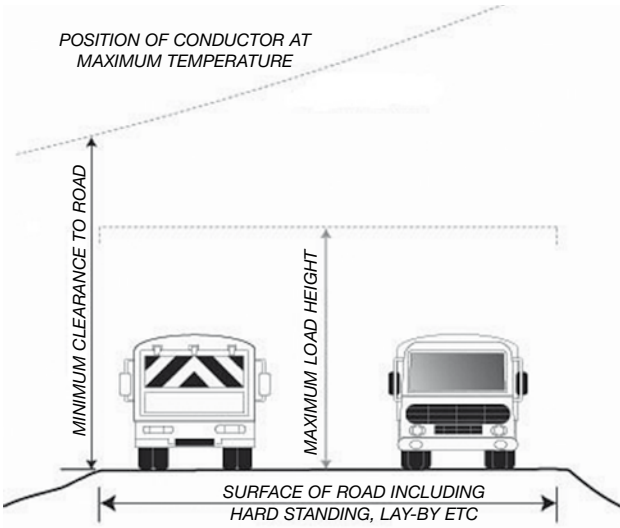


Figure 7: Clearance to roads

Table 1: Overhead line conductor clearances

Description of Clearance	Minimum clearance (metres) at 400kV	Minimum clearance (metres) at 275kV
To ground	7.6	7.0
To normal road surface	8.1	7.4
To road surface of designated '6.1 metres high load' routes	9.2	8.5
To motorway or other road surface where Skycradle can be used	10.5	9.8
To motorway road surface where scaffolding is to be used on: (i) Normal 3 lane motorways (ii) Elevated 2 lane motorways	 16.3 13.3	 15.6 12.6
To any object on which a person may stand including ladders, access platforms etc.	5.3	4.6
To any object to which access is not required AND on which a person cannot stand or lean a ladder	3.1	2.4
To trees under or adjacent to line and: (i) Unable to support ladder/climber (ii) Capable of supporting ladder/climber (iii) Trees falling towards line with line conductors hanging vertically only	 3.1 5.3 3.1	 2.4 4.6 2.4
To trees in orchards and hop gardens	5.3	4.6
To irrigators, slurry guns and high pressure hoses	30.0	30.0
To street lighting standards with: (i) Standard in normal upright position (ii) Standard falling towards line with line conductors hanging vertically only (iii) Standard falling towards line	 4.0 4.0 1.9	 3.3 3.3 1.4

References

a) The Electricity Safety, Quality and Continuity Regulations 2002 (S.I. 2002 No 2665).

b) Energy Networks Association Technical Specification 43-8 Issue 3, 2004 - Overhead Line Clearances.

c) Health & Safety Executive Guidance Note GS6(rev) - Avoidance of danger from overhead electrical lines.

d) Health & Safety Executive Guidance Note HSG47 - Avoiding danger from underground services (Second edition).

Contacts and further information

A. For planning application consultations, developer enquiries and advice on safety clearances, please contact the following:
Asset Protection Team
National Grid
Land and Development
PO Box 3484
Warwick
CV34 6TG
Switchboard: 0800 731 2961
Fax: 01926 656574

B. For development plan document consultations, general town and country planning and amenity issues, please contact the following:
Land and Development Stakeholder and Policy Manager
National Grid
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA
Tel: 01926 653000
Fax: 01926 656574

C. For questions on, or issues with, EMF please contact the following:
EMF Unit
National Grid
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA
Tel: 0845 7023270
Email: emfhelpline@uk.ngrid.com
Web: www.emfs.info

Land and Development
Stakeholder and Policy Team
National Grid
National Grid House
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