THE NATIONAL GRID COMPANY plc

NGC SUBSTATIONS AND THE ENVIRONMENT: GUIDELINES ON SITING AND DESIGN

Section 1 INTRODUCTION

1 The National Grid Company plc's (NGC's) policy statement on the environment recognises the importance of giving due regard to protecting and enhancing the environment and taking into account the environmental effects of the Company's actions. The Company has statutory duties in relation to preservation of amenity under Schedule 9 of the Electricity Act 1989, and has published a Schedule 9 Statement setting out the manner in which it proposes to meet these duties.

2 NGC has a statutory duty under the Act to develop and maintain an efficient, co-ordinated and economical transmission system of electricity for England and Wales. New transmission lines, new substations, sealing end compounds, line entries, additions and extensions to existing substations may be required to provide new connections for customers or reinforcement of the national grid system arising from changes in the demand for and generation of electricity.

3 This document explains the approach NGC takes towards such developments (Section II) and contains Guidelines (Section III) to assist those responsible for siting and designing substations to mitigate the environmental effects of such developments and so meet the Company's policy. The document complements the Company's Holford Rules guidelines on the routeing of high voltage transmission lines and when appropriate should be used in conjunction with them.

4 The guidelines are to be used by NGC staff, their consultants, and contractors in the siting and design of new substations and extensions to substations. They reflect the criteria the company requires its staff, consultants and contractors to satisfy.

5 As recognised in its Schedule 9 Statement NGC places importance on consultation with statutory planning and amenity bodies over its proposals for new developments. NGC believes that the availability of these guidelines will assist in such discussions by referring to the main considerations relevant to substation siting, and will thereby assist in achieving the most appropriate siting and design solutions.

Section II NGC'S APPROACH TO DESIGN AND SITING OF SUBSTATIONS

Approach to the Environment

6 NGC's environmental policy recognises the importance of giving due regard to protecting and enhancing the environment and taking into account the effect on the environment of all the Company's actions. Following the principle of integrating environmental considerations into all its activities, NGC seeks to keep known adverse effects on the environment to a reasonably practicable minimum and, in accordance with its duties under Schedule 9 of the Electricity Act, the Company gives due regard to the preservation of amenity and takes reasonable steps to mitigate the effects of its relevant proposals. To achieve these aims the Company therefore has to balance technical, economic and environmental considerations to reach reasonably practicable development proposals.

7 The guidelines (Section III) deal with the amenity issues associated with the siting and design of new substations and major extensions or major modifications to existing substations. They cover a range of key issues from the time options are initially considered to final design, including form, silhouette and colour of the entire development in relation to the surrounding area, and also related issues such as overhead line entries, since these are dominant features in any substation.

Environmental Report

8 In order to achieve these objectives, the environmental effects of new substations and extensions or modifications to existing substations will be assessed and where appropriate an environmental report prepared describing the effects and mitigative measures. Items to be considered are summarised in Appendix A.

Integrating Environmental Considerations into Power System Planning

9 The nature of transmission system planning is such that scheme proposals and options may go through various stages before it is finally decided to proceed with construction.

10 The purpose of each proposal for substation, sealing end compound or line entry development should be set out in a brief, and a range of system and siting options should be evaluated and documentated as part of the selection of the preferred solution. In each case the effects of the overall development on the environment should be assessed, prior to a commitment to a particular site or design.

11 When it is clear a project is likely to proceed, an assessment should be made of any additional skills required to deal effectively with the range of environmental, land use, planning and design issues. Consideration should also be given to consultation as soon as reasonably possible with appropriate statutory planning and amenity bodies.

Liaison with other Electricity Companies

12 NGC will encourage and recommend other parties such as power generators or regional electricity companies to adopt these guidelines when

working with NGC on proposals for substations, sealing end compounds or line entries.

Post Construction Review

13 Following completion of the project, a review should be undertaken to check that the necessary measures identified in the environmental report have been implemented.

Section III GUIDELINES

Overall System Options and Site Selection

1 In the development of system options including new substations, consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects in order to keep adverse effects to a reasonably practicable minimum.

Amenity, Cultural or Scientific Value of Sites

2 The siting of new NGC substations, sealing end compounds and line entries should as far as reasonably practicable seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections.

- ***Notes:***

  1 Internationally and nationally designated areas of highest amenity, cultural or scientific value are:

  National Parks;
  Areas of Outstanding Natural Beauty;
  Heritage Coasts;
  World Heritage Sites;
  Ramsar Sites;
  Sites of Special Scientific Interest;
  National Nature Reserves;
  Special Protection Areas;
  Special Areas of Conservation.

  2 Care should be taken in relation to all historic sites with statutory protection eg Ancient Monuments, Battlefields and Listed Buildings.

  3 Account should be taken of Government Planning Policy Guidance and established codes of practice.

  4 Account should be taken of any development plan policies relevant to the siting or design of substations.

3 Areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas

should be protected as far as reasonably practicable.

Local Context, Land Use and Site Planning

4 The siting of substations, extensions and associated proposals should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum.

- ***Notes:***

  1 *A preliminary study should be undertaken to identify the extent of land required to meet both operational and environmental needs.*
  2 *In some instances it may be possible to site a substation partially or fully enclosed by existing woodlands.*
  3 *Topographical information should be obtained at an early stage. In some cases a geotechnical survey may be required.*

5 The proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum.

- ***Notes:***

  1 *Allow sufficient space for screening of views by mounding or planting.*
  2 *Consider appropriate noise attenuation measures where necessary.*
  3 *Use security measures which minimise visual intrusion from lighting.*
  4 *Consider appropriate on-site water pollution prevention measures.*
  5 *Consider adjoining uses and the amenity of local inhabitants.*

6 The land use effects of the proposal should be considered when planning the siting of substations or extensions.

- ***Notes:***

  1 *Issues for consideration include potential sterilisation of nationally important land, eg Grade 1 agricultural land and sites of nationally scarce minerals.*
  2 *Effects on land drainage.*

Design

7 In the design of new substations or line entries, early consideration should be given to the options available for terminal towers, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.

- ***Notes:***

  1 *With outdoor equipment, a preference should be given normally to a low profile design with low height structures and silhouettes*

appropriate to the background.

2 *Use lightweight narrow section materials for taller structures especially for gantries over about 6 metres in height.*

3 *Commission exterior design and colours appropriate to the surroundings.*

4 *Materials and colours for buildings, equipment and fencing should be chosen to harmonise with local surroundings.*

5 *Where possible avoid the use of prominent insulators by consideration of available colours appropriate to the background.*

6 *Where possible site buildings to act as visual screens for switchgear.*

7 *Ensure that the design of high voltage and low voltage substations is co-ordinated by early consultation between NGC and its customers.*

8 *Where there are particular technical or environmental constraints, it may be appropriate to consider the use of Gas Insulated Switchgear (GIS) equipment which occupies less space and is usually enclosed within a building.*

9 *Early consideration should be given to the routeing of utility service connections.*

8 Space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation.

- ***Notes:***

1 *Assess the benefit of removing redundant substation equipment from existing sites where this would improve their appearance.*

9 The design of access roads, perimeter fencing, earthshaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings.

<u>Line Entries</u>

10 In open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance.

11 The inter-relationship between towers and substation structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal towers on prominent ridges should be minimised by siting towers against a background of trees rather than open skylines.

END

APPENDIX A

NGC SUBSTATIONS – ENVIRONMENTAL REPORT

Introduction

All proposals for significant extensions of existing substations or for new substations and associated development should be the subject of an environmental appraisal and an environmental report should be produced. The project manager will be responsible for ensuring that an appropriate appraisal is undertaken and report prepared, with due regard to expert advice available to the team.

For a major development a scoping exercise should be undertaken with the contribution of appropriate skills to establish the range and depth of the appraisal. It will generally be appropriate at this stage to consider consultation with the local planning authority.

A clear distinction should be drawn between the preparation of an environmental report which will be undertaken in most cases and a full environmental statement (ES) which may on occasion be required under UK environmental assessment legislation, for example where the substation forms part of a major new power station for which an ES may be needed.

Recommended Content of Environmental Reports for Substations

Section 1

Information describing the project during construction, when operational and on de-commissioning including:-

1.1 Purpose and physical characteristics of the project, including details of access and transport arrangements and employment.

1.2 Land use requirements and other physical features of the project.

1.3 Operational features of the project and relevant measurements of emissions such as noise, vibration, light, heat and electric and magnetic fields.

1.4 Main alternative sites considered and reasons for final choice.

Section 2

Information describing the site and its environment including:-

2.1 Physical features such as

-Flora and fauna
-Soil: agricultural quality, geology
-Water courses including land drainage generally
-Climatic factors

-Historic heritage and archaeological sites
-Landscape and topography
-Local recreational uses
-Proximity of population and any other relevant environmental features.

2.2 The policy framework

The policy framework including all relevant statutory designations such as national nature reserves, sites of special scientific interest, national parks, areas of outstanding natural beauty, heritage coasts, special protection areas, special areas of conservation, regional parks, country parks, national forest parks, local nature reserves, areas affected by tree preservation orders, water protection zones, minerals protection zones, nitrate sensitive areas, conservation areas, listed buildings, scheduled ancient monuments, and designated areas of archaeological importance. It should also include references to Structure, Unitary and Local plan policies applying to the site and the surrounding area which are relevant to the proposed development as well as to any international designations.

Section 3

Assessment of effects on the surrounding area and landscape including:-

3.1 Visual effects, emissions during normal operation, noise, light, impact on local roads and transport.

3.2 Effects of the development on buildings, the architectural and historic heritage and archaeological features.

3.3 Loss of, and damage to flora, fauna and geology.

3.4 Land use/resource effects such as
- quality and quantity of agricultural land to be taken
- sterilisation of mineral resources and alternative uses of the site.

3.5 Changes to hydrographic characteristics.

3.6 Air and Climate

3.7 Indirect matters such as
- traffic (road, rail, air, water) related to the development,
- development associated with the project, eg new roads, sewers, power lines, pipelines, telecommunications etc.

Section 4

Mitigation measures

4.1 Where significant adverse effects are identified, a description of the measures to be taken to avoid, reduce or remedy those effects, eg

a) site planning;

b) technical measures eg equipment selection, recycling of waste or redundant parts, pollution control and treatment, containment (eg shielding of transformers and bunding)

c) aesthetic and ecological measures eg
   - mounding, design, colour, landscaping, tree planting
   - measures to preserve particular habitats or create alternative habitats
   - recording of archaeological sites
   - measures to safeguard historic buildings or sites.

END