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Further information
Skanska AB
www.skanska.com

Contact
Noel Morrin,
SVP Sustainability &
Green Construction
noel.morrin@skanska.se

North London Gas Alliance, UK

Case Study 59

Aspects of Sustainability

This project highlights the following:

Social Aspects

Human Resources

Corporate Community Involvement

Business Ethics

Health and Safety

Environmental Aspects

Energy and Climate

Materials

Ecosystems

Local Impacts

Economic Aspects

Project Selection

Supply Chain

Value Added

The North London Gas Alliance (NLGA) is a gas mains replacement project that has used several innovative techniques to minimise environmental impacts and employed comprehensive stakeholder relations measures to reduce social disturbance.

Project Introduction

The NLGA is a partnership between Skanska UK and National Grid to undertake the replacement of gas mains across the North London and East Anglia networks. The project is part of a 30-year national programme to replace with plastic piping all metal gas mains across Great Britain, which will ensure a continued safe and reliable gas supply for the future. The NLGA began in April 2005 and is scheduled to replace 3,200 km of iron gas mains with new polyethylene plastic piping as part of a US$ 840 million contract over an initial minimum 8-year period. The contract also has the possibility to be extended a further 5 years.

The NLGA manage the entire gas mains replacement process, from project planning and public relations to final safety inspections and emergency response provision. The project involves excavating sections of footpath, road and occasionally private driveways when metallic service pipes must be replaced. The new narrower polyethylene pipes are inserted through the existing metal pipes, where possible, which reduces the need for excavations and public disturbance. However, if this is not possible the existing mains may be excavated and directly replaced, or a completely new trench may be dug to house the new polyethylene pipes. The NLGA may also use directional drilling to create a new tunnel underground in which to lay the new pipe. Individual gas supplies are temporarily disconnected during the works, which NLGA engineers manage to minimise the length of disruption.

The NLGA project has received external recognition and a number of internal environmental awards from Skanska and National Grid for its environmental performance. The alliance's values are encapsulated in a motto that

all employees sign up to as part of their terms and conditions of employment. The SCORE motto includes safety, environmental considerations, exceeding stakeholder expectations, transparency and trust.

Contributing Toward Sustainable Development

Skanska works in close collaboration with National Grid as part of an efficient and productive alliance. The project has also worked very closely with local stakeholders and has employed special measures to minimise public disturbance. The NLGA maintains a highly skilled and motivated workforce through regular vocational training initiatives and the project employs local labour where possible. Occupational health and safety measures work to avoid accidents and ensure that incidents are managed efficiently and do not reoccur. The NLGA project has pioneered several 'green solutions' that are intended to minimise environmental impact whilst reducing project costs, including vacuum excavation, surface water filtration, and the recycling of excavated material. Other environmental initiatives include efforts to reduce vehicle emissions and recycle old iron mains and polyethylene pipe off-cuts.

Social Aspects

Project partner collaboration

The NLGA won the 2005 Best Partnership Award from the Chartered Institute of Purchasing and Supplies (CIPS). The award was in recognition that the alliance with Skanska had enabled National Grid to enhance productivity, improve safety, reduce costs, lessen public disruption and retain a workforce with the necessary skills. The CIPS also praised the equal partnership between National Grid and Skanska for encouraging innovation, and the exchange of ideas and good practice.

Stakeholder relations and communication

The NLGA involves and informs stakeholders in order to minimise public disruption during the work. Works are planned and agreed with the local authorities, Parish Councils, police forces and transport organisations. The NLGA also works with the Highways Authority to identify potential problems, such as traffic management issues and pedestrian access, and to work around school holidays when necessary. All local residents are informed of work that could affect them by mail, and are provided with a NLGA telephone helpline number and the contact details of their local operational supervisor. A staffed mobile information centre is used to inform local stakeholders about the project plans for their area and provides opportunities for members of the public to raise questions and concerns with NLGA staff. The NLGA also conducts door-to-door visits, and provides project updates in local newspapers and on radio stations.

Reducing public disturbance

NLGA teams work to minimise the length of time works take and prefer the insertion of new polyethylene pipes inside the old iron mains in order to reduce the amount of excavation and public disturbance. Battery powered traffic lights are also used instead of noisy petrol generators, and acoustic screening and noise-suppressed power generators are used to reduce noise disturbance when necessary. Particularly important gas mains, such as those providing schools with the means to heat and cook, are replaced at night to ensure minimal disturbance. Special considerations for affected residents include the provision of temporary heating and cooking facilities for elderly and vulnerable customers.

The NLGA won a Green Apple Award in 2007 from the Chartered Institution of Wastes Management for minimising public disruption during gas main replacement works in Waltham Cross, Hertfordshire. The town has a busy town centre market area that was particularly sensitive to noise, vibration, dust pollution and general pubic disturbance. The replacement works were carefully planned together with the police and local Council, and detailed risk assessments were conducted to ensure that the project was

undertaken without incident. Stakeholders were kept up to date with the project's progress and no formal complaints were lodged by local shopkeepers, market traders or members of the public. Work was not planned in Waltham Cross on Wednesdays and Fridays, which were scheduled market days, and noise disturbance was minimised by conducting heavy breaking work after normal shopping hours. All backfill material was reused on the site when the gas main had been installed and a minibus was used to transport the team members to the site in order to minimise the number of journeys and vehicles on site. The Waltham Cross project is used as a good practice example for the NLGA and has influenced subsequent projects.

Public safety

The NLGA project is intended to enhance public safety by replacing old gas mains to avoid gas leaks. The initial phase of the NLGA is replacing mains that National Grid has identified to be at the greatest risk of leaking. During works, all trenches or excavations are properly protected or covered to avoid accidents involving members of the public. NLGA engineers provide a free safety inspection of all private gas appliances, which is a project contract requirement.

Occupational health and safety

The Lost Time Accident Rate was 1.1 per million hours worked for the entire NLGA project, as of June 2009. The NLGA has won four consecutive Gold RoSPA (Royal Society for the Prevention of Accidents) awards for the project's excellent occupational health and safety performance since the commencement of the project.

Principal occupational safety risks include working at height, live gas operations during routine and non-routine engineering work, working on high-speed roads and the possibility of damaging power cables when replacing gas mains. Safety measures employed on high-speed roads and busy commercial areas include strict speed restrictions, safety barriers and lane closures. Five mark-out technicians equipped with specialist equipment and utility schematics were employed to identify the location of buried pipes and cables in order to avoid accidents. The technicians have enhanced project safety by reducing the incidence of power cable damage from an average of one every 3.5 km of gas main replaced to every 4.5 km. The project also has a safety incident hotline and works to ensure that incidents are managed efficiently and do not reoccur.

Charitable donations

As of summer 2009, the NLGA had donated approximately US$ 30,000 to local charities, including an organisation working with disabled children. Regular donations are made, including US$ 1.5 for every hazard and near miss report made and US$ 30 for each individual or team award nomination received. The NLGA team has also won several environmental awards from National Grid, which involve the winning project team selecting a tree to donate to a local charity, school or hospital of their choice.

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Economic Aspects

Construction employment

Approximately 340 permanent employees and 450 contractors work on the NLGA project. Around 200 of the permanent positions are on site rather than administration roles.

Vocational training

The NLGA established a training college in Romford, which provides practical and management training to employees. The college annually conducts around 700 days of training, irrespective of mandatory project inductions or gas passport training. The NLGA also participates in the National Grid Young Offenders Programme, which provides young offenders with National Vocational Qualifications (NVQs) and potential employment opportunities on the project. As of May 2009, there were around 30 NLGA employees that had been employed via the National Grid Young Offenders Programme, including a Cable Champion Supervisor.

Reduced vehicle costs

The Energy Saving Trust conducted a Green Fleet Review cost-saving analysis on the entire NLGA's vehicle fleet, which has reduced total fleet operating costs by up to 20 percent, primarily through reduced fuel consumption. Cost saving measures included the introduction of fuel cards to manage and monitor fuel usage, and a complete ban on private mileage with company vehicles. All commercial vehicles were equipped with GPS (Global Positioning System) tracking equipment, which helps to improve journey planning, increase efficiency, prevent speeding and provide a complete record to meet HM Revenue & Customs requirements. Subcontractors were also given the opportunity to fit GPS tracking systems. Training to encourage more efficient driving techniques was also identified as a priority and the Department for Transport's Safe and Fuel Efficient Driving (SaFED) programme is being rolled out following a successful pilot project that trained NLGA commercial drivers.

Environmental Aspects

Reducing environmental impacts during the project

The NLGA environmental plan seeks to minimise impacts by strictly controlling effluents and dust pollution during replacement works. Drip kits and spill trays are used to avoid potential pollutants, such as oil, causing ground contamination. The plan also strives to identify potential environmental hazards, by encouraging employees to report environmental near misses and risks.

'Dirtbag' surface water filtration

NLGA project teams use water filtration bags or 'dirtbags' to capture suspended solids in water discharge. Water is pumped from site excavations to a dirtbag, which allows clean water to filter though its permeable membrane while retaining silt particles within the bag. Once drained, sediment in the bags can be either reused on site or disposed of off-site. Dirtbags allow excavations

to be drained without polluting surrounding watercourses or damaging aquatic habitats or flood defences. The technique was particularly useful on restricted street sites with limited space, and also reduced public disturbance compared with conventional sedimentation tanks, which require relatively long sedimentation times. The dirtbag technique was awarded a Rowan Tree Award from National Grid in 2009.

Reduced vehicle emissions

The Green Fleet Review resulted in reducing vehicle fuel consumption by up to 20 percent. In addition to efforts to reduce fuel consumption, the review led to the introduction of efficient Euro 5 fuel standard vehicles where possible. Project vehicles and plant equipment are also regularly maintained to ensure they operate as efficiently as possible.

Treatment and recycling of excavated material

Excavated materials are treated and recycled on site to reduce the amount of material sent to landfill and the need for supplementary virgin aggregate. Over 200,000 tons of materials are excavated and reused to backfill the project's trenches each year and backfill material consists of less than 30 percent virgin aggregate. The reuse of excavated materials also roughly halves the number of vehicle journeys required to transport excavated materials to landfill and virgin materials to the site. Excavated materials are crushed and screened to produce a variety of aggregates and topsoils that can be reused. The processed soils are blended with lime or cement based admixtures to create hydraulically bound stabilised materials that are structurally stable. Recycling excavated materials on the project avoids various costs, including tipping charges (US$ 18 to 24 per ton), landfill tax (US$ 4 to 60 per ton), aggregate tax (US$ 3 per ton) and the cost of importing virgin aggregate (US$ 20 to 31 per ton).

Excavated materials are brought to a recycling centre, where excavated spoil is reprocessed and made suitable for reuse in reinstatement. NGLA has also been trialing the use of ARMs (Alternative Reinstatement Materials), such as SMF hydraulically stabilised materials for fill. This is added to excavated materials where possible in controlled environments (e.g. treatment plants), thereby making the material suitable for reinstatement. NGLA has established working relationships with many of the London borough councils, whose permission is required for the use of ARMs and, through such, have been progressing their use.

Vacuum excavation

The NLGA has five vacuum excavators that excavate trench material whilst eliminating the risk of damaging tree roots or existing cables. The technique also reduces the amount of material that must be excavated compared with conventional mechanical excavation. A vacuum excavator unit consists of a flexible hose on a hydraulic boom, a fan unit that creates a vacuum through the hose and a tank to store the excavated material. Vacuum excavation decreases the size of service excavations for gas connections by an average of 27 percent and connection holes by 22 percent on the NLGA project, compared with conventional excavation techniques. Vehicle journeys were reduced by around 30 percent due to the reduced amount of material excavated. A small group of pupils from a school were given a demonstration of a vacuum excavator during excavations to replace their school's gas main.

Recycling

The new polyethylene pipes are inserted inside the existing mains where possible to minimise social and environmental disturbance. However, the old iron mains are collected and recycled by a specialist company when they are excavated. The NLGA also participates in the SUPER scheme (Systems for Uponor PolyEthylene Recycling), which provides the project with a comprehensive service to collect, recycle and reuse waste polyethylene pipe off cuts. The SUPER scheme diverts waste from landfill and recycles residue material into new piping or pellets, which are sold for non-pipe applications. 54 tonnes of polyethylene was recycled between April 2008 and April 2009. The NLGA also uses an innovative technique to recycle line-marking aerosol cans and reduce the creation of hazardous waste. An aerosol piercing unit is used to extract and filter the propellant from the aerosol cans, which allows the metal cans to be recycled.

Learning From Good Practice

An external assessment of the alliance with National Grid concluded that Skanska's involvement enhanced productivity, improved safety and reduced project costs. The close partnership between Skanska and National Grid also encouraged innovation and the exchange of ideas and good practice between the two companies.