

# Environmental Report 2001



In keeping with our commitment to the environment, this report has been published principally in electronic form ([www.thetube.com](http://www.thetube.com)). A paper copy can be produced for those who prefer it, so please contact us.

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## Environmental Data

<b>London Underground Data</b>	<b>2000/2001</b>	<b>1999/2000</b>	<b>1998/1999</b>	<b>1997/1998</b>	<b>1996/1997</b>
Passenger journeys (millions)	970	927	866	832	772
Passenger kilometres (millions)	7470	7171	6716	6479	6153
Train kilometres (millions)	63.8	63.0	61.2	62.1	58.6
Total length of track (km)	408	408	392	392	392

### Resource Use

Total electricity supplied (gigawatt hours)	1006	1101(a)	1021	997(b)	977
Energy efficiency (watt hours/passenger km)	146	154	152	154	159
Water used (litres, millions)	899	661(c)	480(c)	2030	2040

### Waste generated (tonnes)

General	5592	5116	4228	3700	3500
Track	3345	5075	10804	15800	11000
Skip/compacted	2023	2261	3013	2500	3500
Special	(e)	2000(d)	2376	500	1000

- (a) Includes electricity used for testing on the extended Jubilee line prior to opening.
- (b) Correction to 1997 figures which were estimated at the time.
- (c) Not including power station water consumption.
- (d) This is an estimate – special waste was only monitored in volume rather than actual weight.
- (e) Special waste transported as part of multi-load consignments

**NB: Waste weights reduced in 1999/00 due to improvements in data recording and increased accuracy in recording track waste, using weigh-bridge tickets rather than vehicle capacity**

## Message from the Chief Executive

London Underground Limited (LUL) continues to provide a safe and efficient public transport system for London. As part of our ongoing commitment to provide the best possible service for our customers, and to play our role in protecting and improving London's environment, we seek to improve our environmental performance and minimise the negative environmental impacts of our operations.

LUL is responsible for providing safe and efficient public transport for London. In carrying out these duties, we also take our environmental responsibilities seriously. Londoners expect LUL to act in an environmentally responsible manner. They want to know that the Underground is a truly sustainable mode of transport and be confident that tube travel has social and environmental advantages over the private car.

It gives me much pleasure to continue the tradition of environmental reporting begun by London Transport and introduce LUL's latest environmental performance report. In keeping with our commitment to the environment, this report has been published principally in electronic form on our web site [www.thetube.com](http://www.thetube.com). However paper copies can be produced for those who prefer them.

The Underground is an environmental benefit for London. It carries 3 million people a day, so efficiently, that it creates less pollution per passenger kilometre than almost any other mode of transport. However our environmental impacts are still significant and we have considerable room for improvement.

LUL is embarking on a new era of investment through a Public Private Partnership (PPP). Under this arrangement, LUL remains the infrastructure controller and safety authority and continues to operate the trains, stations and signalling systems. Three Infrastructure Companies (Infracos) will be responsible for renewal and maintenance of assets.

This report highlights improvements made within LUL and the Infracos during the past year. This year we have focused on ensuring that our new structure continues to provide high levels of environmental protection and performance. In light of the new structure we have reviewed the London Underground environmental policy "Caring for the Environment" to ensure that it continues to reflect our environmental priorities. We have worked with our colleagues in Transport for London to ensure that London Underground continues to make a significant contribution to the Mayor's environmental strategies.

We have sought to minimise repetition of the material presented in last year's London Transport report, which is still available on the Transport for London web site ([www.transportforlondon.gov.uk](http://www.transportforlondon.gov.uk)).



**Derek Smith**  
**Chief Executive and Managing Director – London Underground**

# Caring for the environment

## London Underground's environmental policy

London Underground cares about good environmental performance and, as a public transport operator, we make a significant contribution to improving the quality of the urban environment. We will continually improve this contribution by promoting use of the Underground and by managing our impact on the environment, in ways that are economically and socially justified, within the resources available to us.

London Underground is committed to achieve this by:

- complying with all applicable environmental legislation
- applying industry best practice to improve environmental performance
- seeking to identify and manage our environmental impacts
- setting clear objectives and targets, and management systems, which prevent pollution and promote continuous improvement in environmental performance
- assessing environmental impacts prior to making major investment decisions
- using environmentally responsible procurement and disposal arrangements for the goods and services that we buy
- using resources, such as energy wisely
- monitoring, protecting and enhancing wildlife habitats
- ensuring that instruction, guidance, and training are in place to enable all our staff to contribute towards caring for the environment
- informing our stakeholders of our environmental performance and seeking their help in achieving our objectives where appropriate
- being sensitive to the needs and concerns of neighbouring communities
- playing a key role in the delivery of the Greater London Authority's environmental strategies
- regularly monitoring, auditing and reviewing the effectiveness of the environmental management regime and this policy, and undertaking improvement actions where necessary.

**LUL Board, July 2001**



This policy, dated July 2001, replaces Caring for the Environment dated November 1996.

## Contributing to a better environment

London Underground seeks to deliver high quality Underground services which make efficient use of all resources and deliver significant environmental, social and economic benefits. In accordance with our Caring for the Environment Policy, London Underground encourages the use of public transport rather than cars in London. During 2000/1, London Underground carried a record 970 million passengers across its network of 253 stations (see inside front cover for other key statistics).

Initiatives taken to encourage the greater use of the tube over the last year include:

- A new web site [thetube.com](http://thetube.com) – which includes a route planner and real time service information
- Improvements in ticket purchasing facilities – touch screen ticket machines, which accept credit and debit cards, and internet renewal of monthly and annual season tickets.
- Discounts on tickets for London events and exhibitions on production of a valid Travelcard.
- Simply London series of leaflets – encouraging the use of public transport to get to shops, restaurants, parks, leisure facilities and other places of interest.

However, we recognise that in providing our service, we do impact on the environment. The key environmental impacts of the Underground remain:

- energy consumption, including emissions from electricity generation;
- waste;
- noise and vibration
- the impact of engineering works on track-side habitats; and
- water consumption;

These environmental impacts are discussed on the following pages of this report. However, by providing a more environmentally efficient alternative to the private car, the overall environmental impact of the Underground remains beneficial.

## Partnerships

As well as managing and improving our own environmental performance, London Underground seeks to contribute to developing policies and technologies that will improve the performance of the rail industry in general. We remain an active partner in the Railway Forum's Environment and Noise groups.

Through the Community of Metros (CoMET) programme we seek to share best practice with world-wide metro systems and develop benchmarks to measure ourselves against.

In September 2000 we launched the Research Contacts Network. This network aims to develop new technology and knowledge to improve London Underground's service, including addressing some of the environmental impacts of our operations.

Other partnerships have been developed to seek to reduce our environmental impacts; including studies and trials related to energy consumption and vibration. (see the energy and noise sections for further details).

During 2000/1, the new Mayor of London and the Greater London Authority has drafted a number of strategies to address environmental issues within the Capital. LUL has been actively involved in these strategies.

### Target summary - what we have achieved:

- Improved travel information facilities
- Improved ticketing facilities
- Launched the Research Contacts Network
- Contributed to the GLA's London-wide environmental strategies

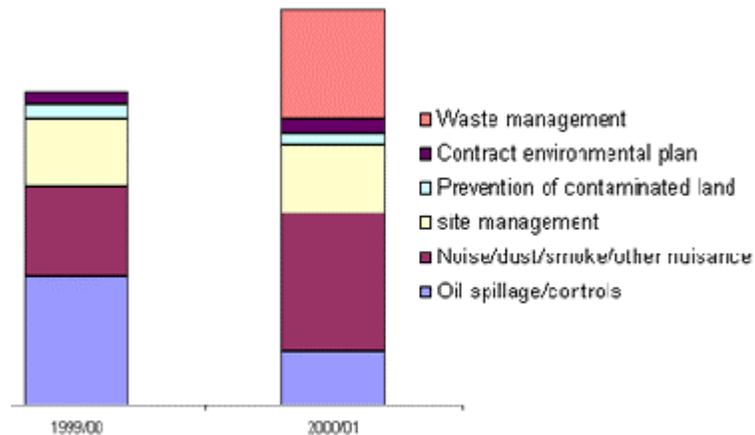
## Environmental management systems

The environmental policy “Caring for the Environment” has recently been reviewed to ensure that it continues to reflect our environmental priorities. This is the foundation of the environmental element of LUL’s Health, Safety and Environmental Management System.

The environmental management systems within LUL and the three Infracos have continued to be developed throughout 2000/1. Within LUL, revised local procedures have been issued for operational areas and, for the first time, office environments have been provided with specific local procedures, which address their safety and environmental risks. In addition to the two existing sites certificated to ISO14001, 3 further sites under the management of Infraco SSL and the first Infraco BCV operated site were recommended for certification this year.

As reported within the 2000 London Transport Environmental Performance Report, we aimed to increase the number of environmental audits during 2000. Audit procedures have been reviewed and additional environmental inspections developed. These new checks were launched at the start of 2001/2. They will help managers identify, control and reduce their environmental impacts.

As well as ensuring that our own staff protect the environment, London Underground group requires its contractors to control their environmental impacts. We check the environmental performance of contractors through site audits. The number of audits has increased to 596 during 2000/1 and gave rise to 64 non-compliances. The graph below outlines the key areas of non-compliance.



An environmental training video was developed this year to improve staff awareness of how operating the Underground impacts on the local and wider environment. The 20 minute video covers the key impacts of our operations and actions that staff should take to control them. It has been shown to all staff within the operational parts of the business and issued to the three new infrastructure companies who have incorporated it into their training for staff and contractors.

Work has continued this year, to review key processes used by London Underground to run its business. Procurement procedures now include a requirement for environmental appraisal and guidance to help staff reduce or eliminate the environmental impact of the products and services that we buy. Notable successes this year include the amendment of our plumbing standard for office facilities. HDPE replaces PVC for plumbing materials and electro-welded joints rather than solvent based methods must be used. In order to ensure that procurement staff have the appropriate skills to assess and reduce environmental impacts, environmental questions have been incorporated into the Procurement Competency Assessment Scheme.

An Environmental Forum has been established to promote partnership working to maintain and improve environmental performance across the underground network, by facilitating communication and co-operation on environmental management issues. The Environmental Forum represents the operating and new infrastructure companies and will:

- promote objectives for environmental improvement
- develop performance indicators (which will improve the quality of information contained in this report)
- review environmental performance and share matters of common interest

**Target summary - what we have achieved:**

- “Caring for the Environment” Policy revised and issued.
- Environmental management system developed for London Underground’s non-operational activities.
- 4 more sites accredited to ISO14001.
- Environmental training video produced.
- Environmental assessment and management requirements incorporated into procurement procedures.
- Environmental Forum established between LUL and the new Infrastructure companies.

## Air quality and emissions

The Underground, unlike most other motorised transport modes, does not directly contribute to air pollution. However a wide ranging fleet of vehicles, from cars to dust carts is used to support the safe and efficient operation of the service.

From January 2001, Company Cars ceased to be part of the benefits package offered to senior managers. Existing company cars are being phased out over the next three years, as their leases expire.

65% of our fleet vehicles run on diesel and all use Ultra Low Sulphur fuel. The latest 17 tonne dustcart meets the Euro III standard and all future HGV replacements will be Euro III with Continuously Recirculating Particulate Traps (CRT). Quotes are being obtained for the retrofitting of CRT to some of our existing fleet.

During the past year, to reduce emissions and improve the efficiency with which our distribution and refuse collecting vehicles can be used, more services are being transferred to night time operation and a number of routes have been amended. We continue to maintain our vehicles under a strict regime and train our staff in driving techniques to reduce the impact of our fleet operation on the environment and minimise nuisance to our neighbours.



***Inflatable tunnel plug***

The issue of dust on the Underground continues to be monitored. During dust creating operations such as rail grinding, an inflatable tunnel plug (shown left) is used to ensure that dust generated is captured and removed.

Following on from the network-wide survey of dust levels outlined in last year's report, an independent review of London Underground's dust data has been commissioned.

Although the levels of dust are well within Occupational Exposure Levels set by the Health and Safety Executive, further staff concerns have prompted a review of the quantity and quality of monitoring data and an independent view of the risk posed by the dust levels.

The study will be completed in October 2001. A study of asthmatic train drivers has been undertaken by the Occupational Health department to examine whether dust levels experienced on the Underground has any adverse effect on these individuals. The results are now being reviewed by The Brompton Hospital. Commitments to reduce Underground dust levels are made within the GLA Air Quality Strategy.

### **Target summary - what we have achieved:**

- Begun the phase-out of Company Cars
- Commissioned further studies into dust on the Underground
- Contributed to the GLA Air Quality Strategy.

## Climate change

The extreme weather conditions and flooding experienced in the UK during the past year served to highlight the potential impact of climate change in the UK. With global temperatures set to rise the UK is likely to see higher wind speeds, more winter rainfall and a higher incidence of storms. For London Underground this means more flooding, a greater risk of landslips, trees and debris on the line and power disruptions. All these effects could have a serious impact on our capability to deliver a safe, reliable service to London.

Although London Underground doesn't directly release carbon dioxide (CO<sub>2</sub>), energy used for transport is a key producer of the greenhouse gas carbon dioxide, which contributes to climate change. We are the city's largest single consumer of electricity, which in turn is produced by power stations burning fossil fuels and emitting large quantities of CO<sub>2</sub>. Although the majority of LUL's energy consumption is exempt from the Climate Change Levy, during 2000/1, London Underground continued to investigate ways in which the impact of the Company's energy consumption could be reduced.

We already buy a percentage of our electricity from renewable sources, where the electricity is generated by systems such as wind turbines or energy from waste plants, as part of the National Grid "mix". These sources produce much less CO<sub>2</sub> than the burning of fossil fuels. We are committed to increasing this percentage in the future to further reduce our environmental impact and cut our payments under the Climate Change Levy. Plans and budgets are in place to source 10% of our electricity supply from renewable energy, when the contract is retendered in 2001/2.

However the bulk of our electricity is still produced by burning fossil fuels so the most effective action we can take at present is to reduce consumption by using energy more efficiently.

Around 90% of the energy used by London Underground is for traction – moving trains. The installation of regenerative braking, has produced 20% energy recovery on the Central Line. The technology, feeds energy from braking back into the system where it can be picked up and used by other trains. However, it cannot be stored for long periods. To overcome this problem, technology which has the potential to slash energy use on the Underground was unveiled at a conference in March 2001. Developed by Cheshire-based engineering company Urenco in partnership with LU, it works by storing energy created by braking trains. A postbox-sized flywheel, located in a substation or by the side of the track is able to harness this energy and recycle it into electrical power. The energy stored at the flywheel will reduce demands on the substations, while the reduction of heat dissipated by conventional braking systems and brake resistors will help to lower the temperature within tunnels and reduce brake dust build-up, improving passenger comfort. It will also enable energy to be saved when least required and released during peak running hours - making the network more energy efficient. The technology was tested on empty three-car '96 Jubilee line stock on the test track between Northfields and Acton Town and produced a 25 per cent reduction in traction power demand.

During 2000/1 a new Stations energy saving competition was developed. The Energy Challenge aims to reduce energy consumption in stations by 15%, through simple behavioural changes, such as making sure lights are switched off when not required, and turning off some escalators outside of peak hours. The competition, which uses a Grand Prix style scoring system began in April 2001 and early indications are that the majority of stations are already making savings.

The details of the independent BREEAM (Building Research Establishments Environmental Assessment Method) assessments of LUL buildings were reported during 2000/1. We can now confirm that this environmental benchmark for a building, its management and operation, rated 20 out of 21 LUL buildings as "very good" and the remaining one as "good".

### Target summary - what we have achieved:

- 20% energy recovery from Central Line regenerative braking systems
- Partnership with Urenco to develop trackside energy storage technology
- Launch of Energy Challenge Trophy for stations
- "Very good" BREEAM rating for 20 out of 21 LUL buildings surveyed

## Heritage and Habitats

Three further London Underground stations were listed last year, East Ham, Ruislip and West Brompton, bringing the total listed as Grade II by the Department for Culture, Media and Sport as being of special architectural or historic interest to 49. In addition, several other stations are located in conservation areas, as are other LU properties such as offices.



***East Ham***



***Ruislip***



***West Brompton***

Railways are well documented as providing valuable habitats within urban areas. They are relatively undisturbed and provide a valuable link between fragmented green spaces across London. With over half the network above ground, the London Underground network provides around 220km of potential wildlife corridors, which support over 500 species. We aim to develop a Biodiversity Action Plan in line with the GLA Biodiversity Strategy to ensure that this valuable asset is preserved.



Station gardens can also provide a useful refuge in built up areas. Over the years, a number of station staff have developed and maintained gardens in their own time. Preston Road (shown left) station even includes a series of ponds.

A further helping hand was given to wildlife in Spring 2001, by one of the new infrastructure companies, Infracore BCV. As part of National Nest Box Week, on St. Valentine's Day, they launched a trackside campaign to help London's endangered wild bird and bat populations. Blue tits, coal tits, great tits, marsh tits, kestrels, robins, owls and, possibly, the rarer black redstart and nuthatch were given the chance to pair off on LUL land. Bird boxes were installed at each end of the Central Line, on trees, on poles and on buildings along open sides of the track, where the 46-mile long line reaches the countryside.

Keith Noble, from the RSPB, said 'We have high hopes of this project reversing the decline in wild birds. It gives them a home in an area rich in their natural food.'

'At the eastern end of the line, the rough grasslands of the Roding Valley will provide a supply of small mammals, such as voles, for kestrels and owls.'

'The problem for birds nesting in greater London and the south-east is city pollution killing off the insect life, which acts as the source of food for young birds.'



Much of our supply of softwood timber comes from sources certified to Forest Stewardship Council (FSC) standards, which means that the forest is managed in an environmentally and socially responsible manner. We have now begun to investigate the opportunity for using FSC certified hardwood. A number of FSC certified hardwood sleepers have been tested and have been found to meet performance requirements. However, there are two key issues, related to the under ground nature of the tube, which need to be overcome. A supply needs to be found which is light enough to be manually handled and does not give off an unpleasant odour.

### **Target summary - what we have achieved:**

- three more Grade II "listed" stations
- Central Line nesting box initiative
- trial of FSC certified hardwood sleepers.

## Noise and Vibration

Inevitably the operation of the railway and its associated maintenance activities, will give rise to noise. Over the past year we have continued our noise investigation and mitigation activities, in order to reduce the impact on our customers and neighbours. We are working to reduce track-generated noise by installing more continuously welded rail, which is quieter than the jointed type.

We have now undertaken a further trial of a new track support system, committed to in last year's London Transport Environmental Performance Report. While the system proved successful in initially reducing the transmission of vibration which gives rise to noise, some corrugation of the rail was experienced, which over time negated the benefits of the system. We are currently working to resolve this issue, ahead of any further noise reduction trials.

Trials of rail coatings to reduce the noise levels experienced at Bank station have proved less successful. The coating of one rail appeared to bring about a small decrease of approximately 2dB, but such a variation cannot clearly be attributed to the coating.



Rail grinding to restore rail profiles continues to be a successful noise reduction measure. 3 sites have been completed this year – Victoria-Brixton, Highbury-Kings Cross and Highbury-Seven Sisters. Other changes such as lubrication of curved sections, train speed restrictions in sensitive areas and better line-side vegetation management are also helping.

For a number of years within the London Transport Environmental Performance Report, our targets included a vibration reduction project. For existing metro systems such as the Underground, the locations of high disturbance are often documented but the cost effective means to eliminate these problems are limited. LUL has now joined with the Milan metro and RATP of Paris, a number of manufacturers of rail components and academic institutions to develop long term solutions to such problems. The 3 year EU funded "Control of Noise and Vibration for Underground Rail Transportation" Project (CONVURT), which began in January 2001 will address these problems through a series of innovative developments:

- A numerical prediction tool to predict ground-borne vibrations and re-radiated noise in adjacent properties for the operation of existing and new build metros.
- A computer programme which identifies potential vibration "hot spots" for new metros and models the success of different remedial measures.
- Optimised designs for slab/ballast track forms.
- Design standards for new/refurbished railways.
- Design guidelines for track and tunnel.
- Maintenance guidelines for existing operations, with an emphasis on rail and wheel roughness management.

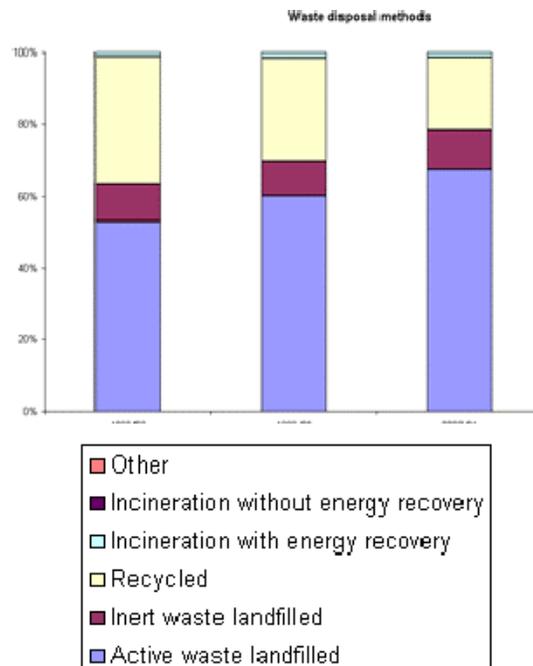
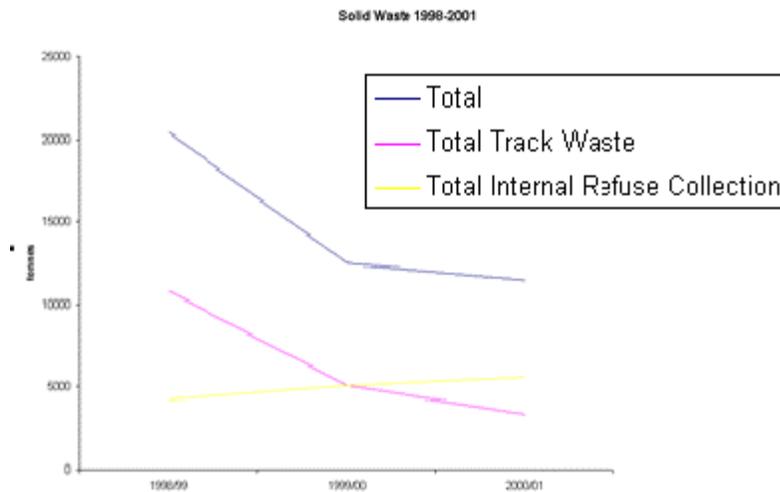
### Target summary - what we have achieved:

- Installation of more continuously welded track
- Rail grinding to reduce noise
- Commenced the CONVURT project to reduce vibration from underground metros.

# Waste

London Underground activities generate significant quantities of waste. Infraco JNP who are responsible for waste collection, handled 11,447 tonnes of waste this year for London Underground. This comprised general waste from stations, train depots, and some track maintenance activities. Current management information reporting relates to waste managed by Infraco JNP. It does not include any waste managed on major projects by outside contractors.

The graphs show how waste levels and disposal methods on the Underground have changed in recent years. The total level of waste has fallen over the period. The total waste levels will vary according to the level of maintenance and renewal works being undertaken. Track waste eg ballast and rails has decreased dramatically. However, it is expected that the level of waste will rise in future years as the PPP investment brings increased levels of works on the Underground. The decrease in track waste, which is more readily recyclable than our other wastes, has brought about a further fall in the percentage of our waste that is recycled.



A regular feature of modern urban life is the increasing amount of litter in public spaces. This applies particularly to the Underground, where litter bins were removed on security grounds some years ago. Quantities of litter collected from our network have continued to rise during 2000/01. Recognising that this is an environmental problem as well as a cosmetic one, LU has embarked on the implementation of a Cleaning Action Plan. Features include:



- More on-train and on-station litter collection. Staffed litter points have been introduced at a number of busy central London Stations, such as Oxford Circus and Westminster.
- Publicity to help customers understand why there are no litter bins and encourage them to take their litter away with them.
- Promotion of recycling points where these are adjacent to stations.
- In partnership with a number of local councils, posters promoting local recycling facilities are displayed at the stations nearest to them, to encourage Underground customers to dispose of their rubbish correctly. Westminster City Council has begun trials of split rubbish bins for the separate collection of paper near Warwick Avenue, Maida Vale and Marylebone stations.

During 2000/01, a waste audit of LUL office premises was undertaken. The results indicated that our paper use is 3 times the national average. A number of measures have been taken over the past year to try to reduce our resource use and the associated waste. For some time LUL has recycled its waste paper. At present the scheme accepts paper, but we are working to expand the scheme to other materials.

The Communications Directorate has reviewed the content of the Press Cuttings pack to focus on tube and rail transport only, resulting in a significant reduction in its size. The distribution list has also been reviewed to ensure that the document is only sent to those who use it.

The monthly LUL news pack "Team Talk" is now presented in a reusable desk presenter, saving 420 ring-binders each month.

Increased use of the Company's Intranet system and e-mail for communication by all Departments, will help us to reduce the quantity of paper used, and waste produced, within the Company.

### **Target summary - what we have achieved:**

- Implementation of the Cleaning Action Plan, including the promotion of recycling of litter.
- Reduction of resource use by the Communications Directorate.
- Increased use of Intranet and e-mail for internal communications.

## Water

London Underground has two broad areas of interest in water:

- the rising water table causes large volumes of water to seep into the London Underground tunnel system; and
- water is used at all operational and office sites.

To deal with water in tunnels, London Underground is currently pumping over 30 million litres of water from the system every 24 hours, using a network of 1,030 pumps in 630 locations. This is enough to fill a typical municipal swimming pool in less than 20 minutes. London Underground also continues to work with partners in the GARDIT consortium to implement a London-wide pumping strategy for controlling rising ground water.

London Underground is working to adopt industry Best Practice concerning the conservation of water in buildings. Our programme to install waterless urinals continues. 25% of our urinals are now of this type. Our latest washroom refurbishment also features automatic light switching and low water flushing systems.

### **Target summary - what we have achieved:**

- London Underground/Thames Water Utilities GARDIT project helping to control rising groundwater;
- Further installations of waterless urinals.

## Towards sustainability

The UK Government Sustainable Development strategy is based on the maxim of 'Quality of Life', with the following key areas of focus:

- social progress which recognises the needs of everyone;
- effective protection of the environment;
- prudent use of natural resources; and
- maintenance of high and stable levels of economic growth and employment.

This environmental performance report has naturally focused on environmental issues, but in the wider context of sustainable development, during 2000/01 London Underground has made considerable progress on a range of social issues.

LUL recognises that employees have lives outside the workplace which may give rise to a range of demands and commitments. Subject to the needs of the business, efforts are made to provide flexibility in working arrangements and/or leave to help employees meet outside responsibilities. Options available include; flexible working arrangements, family leave, special leave and career breaks.

During 2000/01, LUL retained and increased the scope of our accreditation to 'Investors In People'. We have also established a "Partnership for Equality" with the trade unions, to promote equality within the workplace. A network of Harassment Advisors are available, to help staff experiencing problems within the workplace.

### **Target summary - what we have achieved:**

- Work-life balance policy
- Increase in female train operators
- "Partnership for Equality"
- Network of Harassment Advisors.

## Progress against 2000/01 Environmental Targets

The following is a summary of last year's performance against our environmental targets.

### Develop and implement environmental management systems

Target	Progress to date	Status
London Underground group members to develop documented Environmental Management Systems to meet the requirements of ISO14001.	4 new sites have gained certification to ISO14001.	Ongoing
London Underground to develop an environmental training video and use to raise environmental awareness.	Video produced and cascaded to all London Underground staff December 2000.	Complete
Review corporate environmental policy when London Transport activities transfer to Transport for London.	London Underground "Caring for the Environment" Policy reissued.	Complete

### Reduce energy consumption and air pollution

Target	Progress to date	Status
Introduce measures at Underground stations to reduce energy consumption.	Energy Challenge competition developed and launched at the start of the 2001/2 financial year. Early results show considerable energy savings.	Complete
Reduce the environmental impact of energy consumption by incorporating renewable energy into the corporate energy basket.	Funding committed for the introduction of renewables into the Underground energy mix during 2001/2. Contract due to commence Autumn 2001.	Complete
Retro-fit catalytic converters to the 28 tonne vehicles used as part of the refuse collection service.	No longer being progressed as new vehicles are being sought.	Closed

### Reduce noise created by operations

Target	Progress to date	Status
Carry out more research into railway noise. Study how tunnel activities cause noise and vibration problems.	European funding gained for CONVURT project with RATP, and Milan Metro.	Ongoing (due for completion end 2003)
Develop effective acoustic barriers for use on above-ground track where legislation	No sites requiring barriers under current legislation.	Closed

requires.

Collate and reduce complaints about noise from Underground operations.	Noise complaints collated for all lines.	Ongoing
Carry out rail grinding to restore suitable rail profiles.	Rail grinding undertaken at 3 sites.	2000/1 programme Complete
Evaluate the effectiveness of rail coatings in reducing 'wheel squeal'.	Trial of coatings undertaken at Bank stations.	Complete

### Manage other environmental aspects

Target	Progress to date	Status
Develop a Biodiversity Action Plan in line with London BAP.	A number of initiatives and management practices help to protect and promote biodiversity, but the plan has not been developed.	To be progressed next year.
Review all LEU recommendations with a view to implementation.	Review took place in May 2000. Results will be incorporated into BAP.	To be progressed next year.
London Underground will work to promote environmental procurement of goods and services with exact measures subject to business case.	Procurement process includes environmental appraisal. Environmental features have been included in contracts for energy supply and washroom refurbishment.	Ongoing