

GENERAL INFORMATION. LONDON is the capital of Great Britain, the largest trade and financial, industrial, political, scientific and cultural centre, the main node of the country's land routes, the largest centre of the world's sea and air communications, one of the largest cities in the world in terms of population. Located on the River Thames, 90 km from its confluence with the North Sea. Having merged with its suburbs and nearby towns, Greater London forms a vast area of continuous development, stretching along the Thames for 50 km. London's population is 2.4 million inhabitants (1981), Greater London has 6.7 million inhabitants; the area of Greater London is 1,700 km².

SURROUNDINGS OF THE CITY. London is located within a gently undulating low-lying plain (the so-called "London Basin") with slopes of 3-5°. On the approaches to London from the north, west and east, the terrain is hilly-ridged. Hills and ridges (height from 20 to 180 m) have rounded tops, their slopes are gentle or of medium steepness. The soils of the watersheds are dominated by clay and loamy, in the river valleys, sandy. The largest water obstacle in and around Greater London is the River Thames, accessible up to London Bridge (-29) for ships with a draft of up to 6 m, to the railway bridge (-14) with a draft of up to 2 m, and upstream up to 1.2 m. By the system of canals the River Thames is connected with many inland waterways of the country. The width of the Thames above Kingston Bridge (-14) is 30-100 m, the depth is 1.8-2.5 m, the current speed is 0.5 m / s. The bottom is sandy, the shores are low and gentle. Below the bridge, the river bed (width 250-875 m, depth from 2 to 12 m) is canalized; the bottom of the river is muddy, the banks within the city limits are reinforced with stone. This part of the river is tidal (the average tide at London Bridge is 4.6-6.5 m). The mouth of the Thames is a wide (up to 8 km) estuary (depth up to 20 m) with low coastal banks bordered by a broad (up to 4 km) strip of sandy beach and edged by large dams for a considerable length. To protect against sea tides, a dam (length 0.5 km) with passages (width of 60 m) was built at the mouth of the Thames to allow passage of river and sea vessels. The dam consists of several 20-meter towers, in which there are drive wheels, which, if necessary, raise powerful steel barriers from the bottom of the river. The other rivers in the city and the surrounding area are not large (width up to 40 m, depth up to 1.5 m). Canals with a width of 10-20 m, depth 1.3-3 m have many locks (length 20.5-25.6 m, width 2.3-6 m). In winter, the rivers usually do not freeze, they are full of water all year round. Their highest water level occurs in January, the low water level in August and September. In the vicinity of Greater London there are small reservoirs and ponds. Deciduous forests (oak, elm, hornbeam), sometimes with a scattering of pine occur. Many roads and fields are lined with woodlands.

London is an important node of the country's highways. Several motorways leave the city, 7 of them are sections of European highways (routes E1, E2, E31, E33, E105, E107, E112). The motorways have two asphalt or cement concrete carriageways, 7-11 m wide, and a dividing strip with a width of 2.5-5 m. Dual-

carriageway highways have asphalt, asphalt concrete, less often cement-concrete surface, width of the carriageway is 6-10 m (less often 12 m), overall width 10-18 m (less often 25-27 m). Some of the highways, when approaching London, are constructed as motorways: they have two carriageways with a width of 7 m and each and a dividing strip 4-4.5 m wide. Other roads have asphalt, crushed stone or gravel surface, with width of the carriageway 5-5.5 m, overall 6-15 m. The roadbed of improved subsoil is reinforced with additives of crushed stone. Bridges on motorways are reinforced concrete and stone with the carrying capacity of 60-80 tons (some up to 180 tons).

The Greater London area is densely populated. The towns near London do not have a single planning system. Their building is predominantly dense in the centre; only on the outskirts is there more space. Brick or stone houses are 1-3 storey (in the central blocks there are modern multi-storey buildings). The main streets are straight, wide, asphalted, secondary streets are narrow, often cobbled, paved or asphalt. Rural settlements are characterised by farms and villages (up to 500 inhabitants) with sparse private or unsystematic building (in some villages the building is dense or quarterly). Houses are mostly stone 1-2 storey. The settlements are electrified and provided with all kinds of communication. Almost all cities are gasified. The townspeople and the villages have running water; Farms, as a rule, are supplied with water from wells.

100 km south-east of London (near Dungeness) is the Dungeness Nuclear Power Plant (total capacity 1.6 million kW), and 29 km northeast (near Sales Point) is Bradwell Nuclear Power Plant (capacity 0.25 million kW). In Amersham (9 km north-west of London), radioactive isotopes are produced. From the air, London is easily recognized for its large size and position on the River Thames, near its mouth.

CITY TERRITORY. London and its suburbs are located on both banks of the Thames and are connected by 36 bridges (including 10 railway lines) and 9 tunnels. The conurbation is crossed by small tributaries of the Thames and canals over which numerous bridges are built. London does not have a planning system; the layout of individual urban districts is rectangular or close to it, and some are close to radial. From the central area (the City), located on the left bank of the Thames, radial main thoroughfares are laid to the outskirts of London. The main streets are wide (up to 40 m), asphalted, as a rule, tree-lined; secondary streets are much narrower, asphalted or paved.

The development of the city is predominantly dense in the central area; in some places continuous, on the outskirts sparser. The City (the historical core of London) is the business district, the financial centre of the capitalist world. Here are the largest banks, incl. Bank of England (#16), the Royal Exchange (#17), the management of insurance, commercial and industrial companies, the offices of monopolies, the Town Hall (#259), the residence of the Lord Mayor (#264), the main post office (#253), court (#324), mint (#35), wholesale markets. The city

has preserved many ancient 3-5 storey stone houses with thick walls and basements. Prominent is the massive St. Paul's Cathedral (T-28), 110 meters high, and the Palace Tower (#34), the former residence of English kings. In recent years the city has built modern multi-storey (up to 48 floors) buildings.

South-west of the City is Westminster, a district of government agencies, the political centre of the country. Here are: the main royal residence, Buckingham Palace (#33); the residence of the Queen (#263) and the Prime Minister; the parliament (#249); the state administration (#247); the treasury (#240); the Courts of Justice (#248); the Admiralty (#1); the General Staff (#351); various ministries, including defence (#246) and foreign affairs (#245) and New Scotland Yard (#250). Houses are of stone 3-6 storey, old, with many palaces.

On the right bank of the Thames, opposite Westminster, is the Greater London Council (#283). West of the City is the most prosperous area of London, where most of the city's cultural institutions, the publishing houses of major newspapers, as well as department stores, fashionable hotels and restaurants are concentrated. From the north-west and south to this area adjoin extensive parks, near which are located 1-2 storey mansions of the bourgeoisie. To the east of the city is an unfavourable, over-populated area, almost devoid of greenery, of working quarters and docks.

Interconnected residential and industrial suburbs, which have retained their administrative and business centres, and their layout and development, form the outer belt of Greater London. Residential houses in working quarters and suburbs are dominated by the same type of two-story (sometimes 10-20 storey) brick or stone buildings. The majority of industrial enterprises are concentrated in the port area, along rivers, canals and railway lines, as well as on the south-western outskirts of the city. Around Greater London there is a new suburban zone, including new industrial centres: satellite towns (Harlow, Crawley, Bracknell, Stevenage, Hemel Hempstead, Hatfield, Basildon, etc.) are located 30-50 km from the centre of London. The streets there are wide, well-landscaped, built mainly with two-story houses with small gardens; there are also modern 10-12 storey buildings.

London is the leading scientific and cultural centre of the country. Here there are large higher educational institutions, including London University (#335) and 2 Polytechnic Institutes, numerous scientific institutions: Royal Society of London, Royal Academy of Arts, British Academy, uniting scholars in the humanities, Royal Institute of Great Britain, Greenwich Astronomical Observatory, one of the largest in the world (-35), the oil research centre (#345), the national physical laboratories (#241, 242), the Woolwich nuclear centre (#341), which carries out the development and production testing of individual components of nuclear weapons, chiefly electronic. In the city are 30 museums, including the British Museum with one of the largest libraries of the world.

In Greater London, there are numerous military institutions: the headquarters of the Allied Powers armed forces at Northwood (#352), the headquarters of the US

Navy in Europe (#350), the NATO Air Defence Operations Centre Stanmore (#346), the naval headquarters (#349), artillery topographic offices (#272,336), military research centres (#342), naval research (#343), Woolwich military academy (#2), military school (#337), naval school (#339), Greenwich naval college (#338), army training centre (#340), military camps (#30-32), barracks (#229-239), royal artillery arsenals (#3,4), various military-warehouses (#269-272), ammunition and armaments factories (#267,268), and fuel and lubricants depots (#273-277).

INDUSTRIAL AND TRANSPORT OBJECTS. Greater London is the largest industrial centre, which accounts for 1/6 of the country's manufacturing output. The development of most industries is associated with ensuring the needs of the capital's population, with the processing of imported raw materials and materials coming through the port of London. The main branches of industry are machine-building (especially electrical engineering and automobile construction), chemical and petrochemical. At 30 electrotechnical plants (including #100, 162-165, 211-226) electric generators and motors are produced, incl. cable equipment for power lines and power grids, refrigerators, air conditioners and other household electrical machines, plugs and electrical equipment for cars, vending and gaming machines, light bulbs and batteries. 43 main radio-electronic factories (including #142-155) fulfill orders for the armed forces and produce electronic computers, systems for collecting, processing and displaying information, radar and sonar stations, reconnaissance and radio countermeasures systems, electronic control and guidance equipment for guided missiles, artificial earth satellites, anti-aircraft guided missiles, anti-tank guided missiles and torpedoes, radio relay and wire communication equipment, electronic outputs numerators for industrial use, calculating devices, automatic telephone exchanges, telephones, instrumentation and testing equipment, consumer electronics and electronic components. Automobile factories (including #66-73,122) produce passenger cars and trucks, tractors, buses, car bodies, caravans, engines and cars of special models, gasoline trucks, refrigerators, car parts. Numerous machine-building plants produce ships (#175-179), locomotives and wagons (#75), metal-working machines (including #173), instruments, incl. optical (#125-128), marine drilling rigs, equipment for nuclear reactors, technological equipment for paper, chemical and food industries, boilers, military simulators, bearings, and photographic reconnaissance equipment. There are rocket-building (#166) and aviation (#62-65) factories, which produce anti-tank guided missiles, units and parts of tactical fighters and passenger aircraft, assemble military transport aircraft and fighters, and factories producing artillery (#74) and small arms (#174) weapons. At 27 chemical plants (including #129-136,180-197,200) they produce sulphuric acid, plastics, toluene, and cosmetics. Petrochemical plants (including #167-169, 171, 208,209) produce tyres, chambers, wheels, hoses, pipes and other rubber products for aircraft, ships, cars, as well as for industrial, medical and domestic purposes.

There are petroleum refineries (#123, 124). There are metalworking factories (#118,119), steelworks (#171) and steel rolling (#172), as well as 16 non-ferrous metallurgy plants (#201-205), producing refined lead, copper, aluminum and nickel, rare and precious metals, secondary copper, lead and zinc, aluminum alloys, rolled, cast and foil, copper and other non-ferrous alloy-rolling and castings. There are factories for the production of medical equipment (#117, etc.), cement (#207), as well as the enterprises of the woodworking and clothing industries. The food industry is well developed. Enterprises for canning and freezing agricultural products prevail. The largest military-industrial facilities are the following: electrotechnical (#165,213,220), radio electronic (#143,151), automobile (#68,69), car assembly (#73), chemical (#187,194), rubber products (#113,169), tyres (#210), plastics (#129), oil refining (#124), machine building (#106 106), optical instruments (#125,126,128), shipbuilding (#177,179), locomotive and car building (#75,101) machine tools (#138,139,173), non-ferrous metals (#115,206), steel casting (#171), rocket-building (#166), aviation (#65), rifle arms (#174), explosives (#76), artillery arms (#74).

There are several large industrial areas of London. The central district (north and west of the city), where the printing, clothing and furniture industries are present as well as the production of scientific equipment, control and measuring instruments, machine tools, equipment for the printing and clothing industry, and jewelry making. The riverside region, where the food and chemical industries, non-ferrous metallurgy, cable production, ship repair, automobile manufacture are developed, with oil refining and petrochemicals downstream along the Thames. The northern district (valley of the River Lee), where clothing and furniture industries are concentrated, together with chemicals, electrical engineering, and the production of radio and television equipment and electric lamps. The north-west district (along the railways linking Greater London to the Midlands (outside the plan), where new industries are developed, mainly electrical engineering and electronics, automobile, aviation, machine tool building. The south-west district (valley of the River Wandle and along the railway line to Croydon), where electrical engineering, machine tool building, and the production of scientific and control instruments are developed.

London is the UK main railway centre (from the city 16 main lines depart). This includes 16 main freight and passenger stations (including #291-294), each of which has up to 40 tracks. There are railway depots (#36-45), which provide repair and maintenance of locomotives and wagons. In the vicinity of the city there are 6 railway tunnels (including #339) with a length of 930-2250 m. The port of London is the first in terms of equipment and volume of cargo turnover (39.4 million tons, 1980) in the country; by regular lines it is connected with all large ports of the world and the main ports of the country, with automobile ferry lines to ports in Scandinavia, France and the Netherlands. The port provides world container transport of industrial goods, incl. to Japan along the Trans-Siberian Railway. Port facilities are located 50km down the Thames

from the city centre. The main facilities of the port include four complexes of closed dock-basins (water area 2.08 km), one of which is located at the Thames estuary, and the rest (#58,60,61) 48 km upstream; the complexes are connected to the Thames by entrance locks, accessible for ocean-going vessels with a cargo-carrying capacity of up to 65 thousand tons. The depth of the Thames navigable channel at London Bridge (-29) is 2.4 m; at the river mouth 10 m (at low tide). The total length of the berths of the complexes is 35.4 km, the depth at the berths within the dock basins 8.4-12.9 m, outside the dock-basins at four open berths 9.35-12.8 m. At fuels and lubricants storage depots, thermal power plants and oil refineries there are 42 tanker berths with a length of 170 to 366 m each with depths of 9.2-14.3 m, available for cargo tankers up to 280 thousand tons. At cargo warehouses and factories of various firms, there are more than 40 berths ranging in length from 50 to 245 m each with a depth of 2.4-10.7 m, available for dry cargo ships with a carrying capacity of up to 25 thousand tons. More than 180 vessels can moor at the berths at the same time, incl. up to 100 dry-cargo ships with a carrying capacity of up to 65 thousand tons in closed dock pools (available only at high tide), as well as more than 40 tankers with a carrying capacity of up to 280 thousand tons and 40 dry-cargo vessels with a carrying capacity of up to 25 thousand tons at open river berths. Loading and unloading operations in the port are mechanized: there are 278 shore cranes with a lifting capacity from 3 to 45 tons, 61 truck cranes, 389 auto-loaders and tractors, 220 electric cars, 3 floating cranes (two 120 tons each and one 60 tons). The port has covered warehouses (total area 580 thousand m), granaries with a capacity of 200 thousand tons. There are three dry docks (length 229.3, 228.6 and 175.3 m) and one floating dock for the repair of ships.

By regular direct lines of air traffic, London is connected with all the major administrative and economic centres of the country, as well as with the countries of Europe, Asia, Africa and America. In the area of London, there are two airports serving international airlines. Heathrow Airport (#11) has three concrete take-off and landing runways, the main one of which is 3850 m. The airport has radio engineering and lighting equipment that provides flights day and night in difficult meteorological conditions, two production and technical complexes for the repair and technical maintenance of aircraft and airfield equipment, five hangars; the terminal includes three buildings. Gatwick Airport (located 40 km south of central London) has a concrete runway 3300 m long. The airfields at Northolt (#8) and Biggin Hill (#14) are operated by the Royal Air Force. The possibilities of using them by combat aircraft are limited. Each airfield has two asphalt-concrete runways, the longest of which are 1690 m (Northolt) and 1850 m (Biggin Hill). There are Air Force bases (#12-14). In the London area there are two airfields (#9 and 10) with surfaced runways with a length of 1200 and 650 m.

UTILITY, COMMUNICATION AND MEDICAL INSTITUTIONS.

London receives electricity from the country's unified energy system, which includes local thermal power plants (#356-374). The Greater London area is gasified; gas is supplied through two main gas pipelines from the terminal on the coast at Bacton (located 180 km northeast of London) which receives and cleans natural gas produced in the North Sea, off the southeastern coast of the country, and from the main gas pipeline from Canvey Island (45 km east of central London), a reception and distribution point for liquefied gas delivered from Algeria. Gasworks are in operation (#77-98). The sources of water supply are reservoirs, artesian wells and wells. Water is supplied to the water supply network by pumping stations (#295-297) and water supply (#284-289) stations. The water in the rivers (especially in the Thames) is very dirty, unsuitable even for technical purposes without special purification. There is a sewerage system. Waste water is treated at treatment plants (#298-321) and discharged into the Thames estuary. There are all types of ground-level and underground transport, incl. subway with suburban electric trains. The total length of London's urban railway lines is 404 km, of which 161 km are underground metro lines. Overland and underground lines form a single unified network of about 280 stations. The densest network of underground lines is in the central and northwestern parts of the city, less dense in the eastern and southern outskirts of the city. Metro stations are located at a considerable depth (18-35 m, sometimes up to 90 m) in the centre of the city and at shallower depths or on the surface (or in cuttings) in sparsely built-up areas. London is the main hub of the country's unified telephone, telegraph and radio relay network (through it, communication with major cities of Great Britain and almost all countries of the world is carried out). Intercity telephone communication is automated. Lines of city telephone networks are cable. Communication with the cities of the country is carried out via underground telephone and telegraph cable (more than 15 main lines) and radio relay lines. Radio relay links from London to Birmingham-Manchester-Glasgow and Dover-Calais-Paris. International telephone and telegraph communication is carried out via submarine cables, radio and radio relay lines and tropospheric communication lines. 36 sea cable lines depart from London, through which communication with the USA, Europe, Africa and Asia is maintained, as well as the main tropospheric "USA-Europe" communication line. There are several radio stations (#254-256), incl. the main broadcasting station of Great Britain, owned by the BBC broadcasting corporation (#256) and four television stations (including #322). London has an extensive network of medical institutions: hospitals, hospitals, clinics. The city has a research medical centre (#344) and a national research medical institute (#228).