JOHN M CULLEN
Chartered Civil Engineer

YEAR OF BIRTH
1928

EDUCATION
Royal Technical College, Glasgow

PROFESSIONAL SOCIETIES
Fellow of the Institution of Civil Engineers
Fellow of the Institution of Highways and Transportation

SYNOPSIS

John Cullen served a five year apprenticeship with Babtie Shaw & Morton, Glasgow, from 1944 to 1949 and was an Assistant Engineer with them for a further six years. In the next four years he worked in Canada and USA, mainly on motorway planning and design, then returned to Scotland and worked with Cumbernauld Development Corporation. He joined Scott Wilson Kirkpatrick's newly opened Glasgow Office in 1960. He spent three years as a research Fellow at Strathclyde University and a further two years in Canada with the Department of Transport of Ontario before rejoining SWK in 1972. He took charge of the Glasgow Office in 1973 and became a partner in 1979. In the fifteen years spent in the Glasgow Office, he worked principally on all aspects of transportation planning, with special emphasis on the highway design of urban roads. In 1983, he was appointed to the Head Office as the Partner responsible for overseas roads projects and the Transportation Planning Section. He is now a Consultant to the Partnership.

PUBLICATIONS

'Recent Developments in Highway Planning in Glasgow' - Joint Author - Institution of Civil Engineers, October 1968.
'The Movement of Goods and Containerisation' - Transport Symposium at Loughborough College of Technology, 1969.

John M Cullen

'Glasgow Inner Ring Road - Geometric Design Assessed in the Light of Operating Experience' - Summer Annual Meeting of PTRC, 1973.

1] 'Environmental Aspects of Motorways in Glasgow' - XVI World Road Congress, PIARC, Mexico, 1975.

'Glasgow Motorways - Preliminary Assessment of Results' Conference at Strathclyde University, 1978.

'Glasgow Motorways - Preliminary Economic Evaluation' - International Road Federation Symposium, Lisbon, 1979.

2] Urban + Rural Motorways - Comparative Benefits P.I.A.R.C. Rio 1984

PROFESSIONAL HISTORY

1985 to ~~date~~ 1986 — Consultant, Scott Wilson Kirkpatrick & Partners.

1983 to 1984 — Partner, Scott Wilson Kirkpatrick & Partners (UK):

In charge of the Overseas Roads and Transportation Planning Sections of the Head Office, with overall responsibility for all projects carried out by these sections.
Directed the completion of the Baghdad Transportation Study and was especially concerned with the formulation of the recommended future road system including 680 km of expressways and freeways.
Responsible for the Warminster Bypass.

1979 to 1983 — Managing Partner, Scott Wilson Kirkpatrick & Partners (Scotland):

Engineer with overall responsibility for supervising the construction of the Dumbreck Road Connection - a section of urban motorway 1.3 km long.
Directed planning studies for motorways in Glasgow including traffic assignments and economic assessments.
Directed an origin-destination traffic survey which resurveyed a sector of Glasgow covering about 20% of the City and developed a refined traffic model for predicting future traffic flows separately for AM and PM peak hours, and off-peak.
Carried out a feasibility study into increasing the capacity of the Hong Kong Cross-Harbour Tunnel. This study proposed a novel solution of introducing a mid-level car only deck into one of the existing tubes.

1973 to 1979 — Managing Director, SWK Scotland

Engineer with overall responsibility for supervising the construction of a large urban motorway contract - Renfrew Motorway Stage 1, value £20 million, in 1976.
Directed computer traffic assignment to alternative future road networks covering the Greater Glasgow Area.

John M Cullen

	Management of the Springburn Public Transport Survey for the Greater Glasgow Passenger Transport Executive. This origin-destination survey correlated the bus and rail passenger movements taking place in the Springburn sector within the City of Glasgow. Feasibility study for British Rail of new rail link in Glasgow.
1972 to 1973	Senior Engineer, responsible for the preliminary design of sections of urban motorways forming part of the next five-year roads programme in Glasgow.
1970 to 1972	Project Engineer, Department of Highways, Ontario, Canada: Responsible for all aspects of highway planning in the Regional Office at London, Ontario.
1967 to 1970	Research Fellow, Strathclyde University: Engaged on a research project into the effects of containerisation on goods distribution in the Strathclyde area.
1960 to 1967	Assistant Engineer, Senior Assistant Engineer, Senior Engineer, SWK Scotland: Planned a network of motorways and expressways in Glasgow. Developed all the geometric design standards, none having been formulated in the UK at the time. Outline design for the Glasgow Inner Ring Road (Motorway Box). Responsible for highway planning studies in Motherwell and Rutherglen.
1959 to 1960	Assistant Engineer, Cumbernauld Development Corporation: Established principal geometric road standards and designed the first interchange in Cumbernauld.
1955 to 1959	Various jobs in Canada and USA: Worked on the geometric design of urban motorways and supervised the final design of an urban motorway in Las Vegas.
1949 to 1955	Assistant and Resident Engineer, Babtie Shaw & Morton, Glasgow: Responsible for planning and site supervision of various water supply projects.
1944 to 1949	Apprentice, Babtie Shaw & Morton, Glasgow.

Civil Engineering Experience.

September 1959 - August 1960.

Assistant Engineer
Cumbernauld Development Corporation
Roads Group.

When I joined the Corporation the schematic layout of the main roads had just been agreed.

I prepared the principal geometric design standards which were accepted by the Corporation.

I was entirely responsible for the geometric design of the first interchange in Cumbernauld which I took to the final calculated horizontal layout on a 1/500 scale and also the road profiles except for minor finishing points which were still required when I left. This interchange was open to traffic in November 1963 and an aerial photograph of it appears on page 11 of the recent publication "ROADS IN URBAN AREAS" published by the Ministry of Transport. I also advised on the design of the other interchanges at Cumbernauld.

September 1960 - Present time. (July 1967)

Assistant Engineer - Senior Assistant Engineer - Senior Engineer,
Scott & Wilson Kirkpatrick & Partners
Consulting Civil Engineers, at their Glasgow Office - 6, Park Circus, Glasgow.C.3.

During this period I have acted as deputy to R. Hodgen who is in charge of the Glasgow Office. Almost my entire work in this period has been concerned with urban motorway proposals for Glasgow. From the point of establishing the general network of proposed motorways in Glasgow and its immediate neighbourhood in which I had a hand, I was directly responsible for establishing design and cross-section standards for the proposed roads. I was directly responsible for the routing and preliminary design of approximately 60 miles of urban motorways and about 50 interchanges.

Of these, I was also directly responsible for the geometric design to a scale of 1/1250 of the Inner Ring Road which was carried to greater detail than is usual at the report stage to enable Glasgow Corporation to plan the eight redevelopment areas through which the Ring Road runs. I was also directly responsible for the estimate of costs of the road proposals.

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JOHN M. CULLEN

Age 40 years (1968) Married

Training: 5 years apprenticeship with Babtie, Shaw & Morton, 17 Blythswood Square, Glasgow.

Education: 5 years (1939-1944 Allan Glen's School. Senior Leaving Certificate, Higher English, Mathematics, Science (Physics and Engineering). Lower History and German. Attended 4 years evening classes at The Royal Technical College, Glasgow and passed Sec. A (Oct.46) and Sec.B (Oct.48) of the examinations of the Institution of Civil Engineers. Passed the Professional Interview October 1954.

Qualifications: M.I.C.E. (Elected Sept.1955) P.Eng. Ontario - Canada (Registered May 1956)

Brief Outline of Experience

Babtie, Shaw & Morton C.C.E. Glasgow. Apprentice - Oct. 44 to Oct. 49
Mainly water supply and drainage.

Assistant and Resident Engineer. Oct.49 to July 55
Led survey parties and designed all aspects of a series of Rural Water Supply Schemes in Sutherland. Total value of work about £200,000. Goathill housing site preparation. Value - £30,000. Chiefly responsible for all work from preparation of report to acting as R.E. during construction.
Lossiemouth Drainage Scheme. - Sewers up to 30 in. diameter. Sea outfall, pumping station. Value about £50,000. Chiefly responsible for all work from preparation of Report to acting as R.E.
R.E. on Romach Water Supply Trunk Main.
Outfall from Cambuskeith - value over £100,000. Designed 78in. storm sewer and special storm settlement tank. Supervised preparation of contract drawings and helped with contract documents.
Proctor, Redfern & Laughlin, Toronto, Ontario. Designer. Sept. to Dec.55
Housing site preparation. Designed 80 acre subdivision.

H.K.Ferguson, Hamilton Ontario. Field Engineer. Dec.55 to July 56.
Setting out for heavy machinery - heavy construction - concrete - structural.
Value of work $ 5,000,000

Patterson, Emerson & Comstock, Hamilton, Ontario. Designer. July to Dec. 56
Designed heavy concrete foundation for steel rolling mill.

Swindell, Dressler & Co., Pittsburgh, Pa. Highway Designer. Jan to Oct. 57.
Drainage design for freeways and other highways. Geometric calculations for interchanges, preliminary freeway study.

De Leuw, Cather and Co., San Francisco, California, Engineer, Nov.57 to April 59.
Freeway alignment and design. Worked mainly on all stages of highway interchange design. Did preliminary studies and final design for five interchanges on 11 miles of Federal Aid Interstate freeway through the town of Las Vegas. Value of freeway $12,000,000.

Cumbernauld Development Corporation - Assistant Engineer - Sept.1959 - Aug.1960.
Urban Motorway design - Established principal geometric design standards and largely completed the geometric design for the first interchange in Cumbernauld - Muirhead Braehead.

Scott Wilson, Kirkpatrick & Co. C.E. - Glasgow Office
Latterly Senior Engineer - Sept. 60 - Oct. 67

Acted as deputy to R. Hodgen who was in charge of the Glasgow Office. Responsible for establishing geometric design standards and for the location and preliminary design of the highways in Glasgow Highway Plan - About 60 miles of urban motorway and about 50 interchanges.

Responsible for the final geometric design of two contracts of the Glasgow Inner Ring Road as well as general direction of the work done on these contracts by the roads design group - value of both contracts about £7 million.

Prepared outline design for various other major road projects undertaken by the firm elsewhere.

Other Items

(a) In 1954 I read a paper on Rural Water Supplies to the student section of the Institution of Civil Engineers (Glasgow and West of Scotland).

(b) In 1958 I took an extension course in the Fundamentals of Traffic Engineering at the University of California in Berkeley. California.

(c) In March 1959 I took a short course on the Principles of Administration and Supervision in Highway Practice. This course was jointly conducted by the University of California and the California Department of Highways.

(d) In 1959 I attended an extra-mural class on Highway Engineering at Strathclyde University.

(e) I prepared a paper on Interchange Design in 1960 and a paper on Road Cross-section Design in 1961 for Summer Courses organised by the Institution of Municipal Engineers.

(f) In 1962 I attended an extra-mural class on Highway Construction Materials at Strathclyde University.

(g) In 1963 I took the five day course on traffic engineering run by the R.R.L.

(h) I gave a lecture course on Civil Engineering to the Urban Planning extra-mural class in Strathclyde University in two sessions and on Highway Engineering to a post graduate class in Edinburgh University.

(i) I had an article published in the February 1966 issue of Traffic Engineering and Control entitled Aspects of Urban Motorway Design.

(j) I have given talks on the Glasgow Highway Plan to numerous bodies.

(k) In 1960, I took part in a private ten day technical trip to West Germany studying roads and in 1967 I took part in a similar twelve day trip to Scandinavia.

(l) Jointly with R. Hodgen I had a paper published in the October 1968 Journal of the Institution of Civil Engineers entitled "Recent Development in Highway Planning in Glasgow".

(m) In January 1969 I read a paper to a joint meeting of the local association of the Institution of Civil and Highway Engineers entitled "The Geometric Design of the Glasgow Inner Ring Road".

(n) In March 1969 I contributed a paper entitled "The Movement of Goods and Containerisation" to a Transport Symposium organised by Loughborough College of Technology.

John M. Cullen

Civil Engineering Experience October 1944 to October 1967

Apprenticeship

Apprenticeship with Babtie, Shaw & Morton, C.C.E. 17, Blythswood Sq., Glasgow, C.2.

October 1944 to October 1949.

Oct. 44 to Oct. 46

Surveying - acting as rodman, booker and instrument man, reducing, plotting (and contouring where appropriate) the following types of surveys.

By tacheometry - strips of rough country for access roads and aqueducts for hydro-electric schemes, dam sites, housing sites, site for water purification plant and storage tank, top water contours for reservoirs, longitudinal sections for high voltage transmission lines, water pipe lines, sewers, foreshore surveys.

By chain and level - housing sites, docks, buildings cross-sections of rivers.

By hydrological survey - float tests to determine tidal currents at mouth of proposed outfall sewer. Survey of seabed in vicinity of proposed outfall.

Numerous small jobs such as colouring prints, checking schedules, taking out quantities, preparing bar lists.

Nov. 46 to Mar. 47

Preparing a drawing and bill of quantities for two hopper bottomed pre-settlement tanks and the design, drawing and billing of a 1,000 gallon concrete storage tank in connection with a complete water treatment works for the town of Stornoway (pop. 5,000).

April 47 to Nov. 47 with a 3 month gap surveying.

Under the direction of one of the partners of the firm I drew various alternative arrangements of intercepting main sewers (up to 36 in. diameter) to carry all the sewage flow of the town of Stornoway to a common point of discharge to the sea clear of the town. I designed the sewer sizes and gradients, and estimated the costs of the various alternative schemes.

General office work

Dec. 47 to Jan. 48

Feb. 48 to June 48

First stage of the Stornoway Drainage Scheme consisting principally of a 36 in. diameter sea outfall and 36 in. diameter sewer laid along a rocky foreshore. I assisted with preparation of working drawings, specifications and bill of quantities.

	July 48 to Nov. 48	Various jobs
	Dec. 48 to July 49	Rural water supply schemes Routing and surveying the pipe lines and locating the sites of storage tanks, burn intakes and chlorinator for the water supply to the town of Helmsdale and surrounding district - pop. about 1,500. I personally did the hydraulic design and was mainly responsible for the preparation of contract drawings and ordering materials. I also assisted in the preparation of the specifications and bill of quantities.
	Aug. 49 to Oct. 49	Routing pipe lines and locating storage tank sites for three more rural water supply schemes in county of Sutherland.
		Assistant Engineer
Assistant Engineer with Babtie, Shaw & Morton, C.C.E.	Oct. 49 to Nov. 49	Rural water supplies.
	Dec. 49	In charge of survey party surveying for 5th rural water supply scheme. I routed the pipe lines etc.
	Jan. 50 to Nov. 50	Mainly rural water supply work but I designed also 2 small drainage schemes for villages of 200 and 500 population.
	Dec. 50 to Jan. 51	Goathill, Stornoway. Housing site preparation for 12 acres of council housing. The water and drainage services were designed for extension at a later date to serve 24 acres. I was in charge of the survey and site investigation. I designed the sewer layout and supervised the water main design and layout of road-works. I supervised the preparation of contract drawings and had a large part in the bill of quantities and specifications preparation.
	July 51 to Dec. 52	Resident engineer on the Goathill job, travelling regularly to the site in Stornoway. During this time I supervised the preparation of the working drawings for the job.
	Jan. 53 to 10th May 53	Lossiemouth Drainage Scheme In charge of the site surveys and invesigation, design, making of drawing and estimates of cost for the above drainage improvements. I prepared a draft report for my chief. This scheme involves a sea outfall, pumping station and sewers up to 30 in. diameter.

Assistant engineer with Ross County Water Department	May 53 to Dec. 53	I was asked by my firm to work with Ross County Water Department to prepare final measurements and record drawings of a regional water supply scheme which had previously been constructed under the direction of another firm of consulting engineers. The water supply piping totalled about 75 miles.
Resumed work as assistant engineer at Babtie, Shaw & Morton.	Dec. 53 to Feb. 54	Lossiemouth Drainage Scheme. I designed the pumping station. I also designed and made the drawings for the reinforced concrete basement. I supervised the preparation of the other working drawings.
	Mar. 54 to June 55	Resident Engineer on the Lossiemouth Drainage Scheme travelling regularly to the job and supervising the making of working drawings. In addition I acted as Resident Engineer on the first part of the Romach Water Supply Scheme involving 5½ miles of trunk main, partly 10 in. and partly 9 in. in diameter.
	Sept.54 to July 55	In addition to the work previously mentioned I worked on the Outfall from Cambuskeith. This consisted essentially of a relief sewer 1100 yds. long, 78 in. dia. and a special storm settlement tank of ¾ million gal. capacity. I designed the tank and supervised the making of the contract drawings of the sewer and the tank and was mainly responsible for the bill of quantities and specifications.
		Experience in Canada and United States
Designer with Proctor, Redfern & Laughlin at branch office at Scarborough, Toronto, Ontario.	Sept.55 to Dec. 55	Subdivision work Designed an 80 acre subdivision and prepared the necessary drawings.
Field Engineer with H.K.Ferguson Company.	Dec. 55 to July 56	Field Engineer mainly setting out at Dominion Foundry, Hamilton, Ontario. This was an expansion project involving steelwork, heavy foundations and machinery installation, tower annealing line, continuous galvanising line and temper mill. Value of the job in the region of 5,000,000 dollars.
Engineer with Paterson, Emerson & Comstock, Consulting Engineers, Hamilton, Ontario.	July 56 to Dec.56	I designed a special concrete foundation on piles adjacent to an existing steel rolling mill so that a new mill could be assembled near the existing mill and slid on to the old foundation with the minimum shut-down period. The weight of the mill at the moving stage was about 500 tons. I also worked on the layout and sizes of air ducts carrying cooling air to various electric motors around the mill and on the design of flume under the rollers to carry away mill scale.

Highway designer with Swindall Dressler Corp., Aspinwall, Pittsburgh, Pa.	Jan. 57 to Oct. 57	Estimated the size of all drainage structures and culverts and storm drainage pipes on about ten miles of the Buffalo to Cleveland Thruway, including some interchanges. I did all the drainage on two or three other highway projects. I worked on a preliminary report for about 3 miles of freeway near Erie including the layout of two interchanges and estimated costs. I worked on a study to determine the best alignment and profile for a state highway to freeway standards. I did geometric calculations and highway grade sheets for interchange layouts.
Engineer with De Leuw Cather & Co., 1256 Market Street, San Francisco, California.	Nov. 57 to April 59	I worked most of this period on the Las Vegas Freeway Project - 11 miles of Federal Aid Interstate Route (designed to freeway standards) through the city of Las Vegas. This freeway varies from 8 to 4 lanes and has ten interchanges - value about $12,000,000. I did preliminary studies and preliminary design for seven of the interchanges. The final design - horizontal control and ramp profiles for five of the interchanges were done either by me or under my direction. On the last six miles of the project I was directly responsible for setting and calculating the alignment and curve data, assigning the superelevation, setting the profile and supervising the preparation of final preliminary drawings (1 in. to 50 ft.). This latter job included setting right of way lines and drainage design. On the first section of the job I supervised the preparation of cross-sections and the taking off of areas for earth work quantities, also some detailed drainage design, culverts and ditches. During this period I did preliminary studies and design for an interchange at Parleys, Canyon, Salt Lake City, as well as some alignment, profile and interchange studies for Salt Lake City. <u>Arcade Freeway Study</u> I set out and computed the final alignment of approx. 5 miles of the proposed Arcade Freeway in Sacramento, California. I drew the freeway and ramp profiles in this section. The top of cut and toe of slope lines for right of way requirements were done under my direction.

Assistant Engineer Cumbernauld Development Corporation-Roads Group.	Sept.1959 to Aug.1960	When I joined the Corporation the schematic layout of the main roads had just been agreed. I prepared the principal geometric design standards which were accepted by the Corporation. I was entirely responsible for the geometric design of the first interchange in Cumbernauld which I took to the final calculated horizontal layout on a 1/500 scale and also the road profiles except for minor finishing points which were still required when I left. This interchange was open to traffic in November 1963 and an aerial photograph of it appears on page 11 of the recent publication "ROADS IN URBAN AREAS"published by the Ministry of Transport. I also advised on the design of the other interchanges at Cumbernauld.
Assistant Engineer Senior Assistant Engineer - Senior Engineer - Scott & Wilson Kirkpatrick & Partners, Consulting Civil Engineers, at their Glasgow Office - 6 Park Circus, Glasgow.C.3	Sept.1960 to Oct.1967	During this period I have acted as deputy to R.Hodgen who is in charge of the Glasgow Office. Almost my entire work in this period has been concerned with urban motorway proposals for Glasgow. From the point of establishing the general network of proposed motorways in Glasgow and its immediate neighbourhood in which I had a hand, I was directly responsible for establishing design and cross-section standards for the proposed roads. I was directly responsible for the routing and preliminary design of approximately 60 miles of urban motorways and about 50 interchanges. Of these, I was also directly responsible for the geometric design to a scale of 1/1250 of the Inner Ring Road which was carried to greater detail than is usual at the report stage, to enable Glasgow Corporation to plan the eight redevelopment areas through which the Ring Road runs. I was also directly responsible for the estimate of costs of the road proposals. I was directly responsible for the horizontal and vertical geometric design at the contract stage of the first contract of the Ring Road (Townhead, Stage 1 - value £2.1 million). I was largely responsible for the road cross-section design. I also acted as understudy to Mr Hodgen in the overall task of bringing this project to the construction stage. Contract was opened to traffic - April 1968. I acted in a similar way in the case of Woodside, the next Ring Road contract for which we were responsible. The estimated engineering cost of this project is £4.25 million. I was in charge of a highway study for the Burgh of Rutherglen which is now completed and I was in charge of transportation studies for both Motherwell and Airdrie.

Over the past seven years I was also responsible for the preliminary geometric design of the following items:-

1. Five interchanges on the Lancaster Penrith section of the M.6

2. Interchanges on the proposed Castle-Dawson Motorway in Northern Ireland.

3. The interchanges on the approaches to the proposed cross-harbour tunnel in Hong Kong.

4. The Apapa Road - Ijora Causeway - a motorway project in Lagos, Nigeria.