SHARING WITH PRIDE

The Story of Municipal Engineers in Ontario

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Orland French and Gary May

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MEA Mission Statement and Objectives

Mission Statement: To provide unity and focus for licensed engineers employed by Ontario's municipalities by addressing issues of common concern and by facilitating the sharing of knowledge and information.

Objectives: To be a resource in matters relating to municipal engineering.

The Municipal Engineers Association will:

- develop and champion positions on municipal engineering issues;
- be an advocate for sound municipal engineering;
- disseminate information and provide training;
- recognize outstanding achievements of municipal engineers.

Dedication

This book is dedicated to all the municipal engineers, both past and present, who have contributed to the betterment of the Province of Ontario.

Sharing With Pride was published on the occasion of the 50th Workshop, an annual program begun by the City Engineers Association and continued by the Municipal Engineers Association. The book was also printed in a CD format and is available on-line at www.municipalengineers.on.ca.

Message from the President

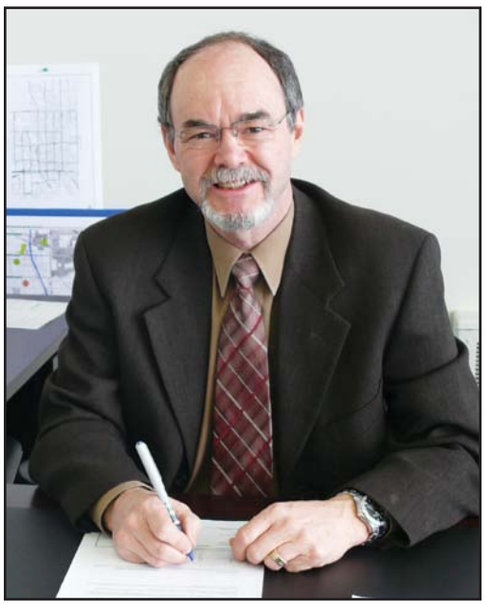


PHOTO COURTESY CITY OF OSHAWA

▲ **Gary Carroll, MEA President, 2009.**

The story of the Municipal Engineers Association is a tale of the dedicated engineering professionals who plan, design, construct, operate and maintain Ontario's civil municipal infrastructure. Most citizens have little concept of the complex systems that provide the transportation networks, manage waste and maintain drinking water quality and waste-water treatment facilities that support commerce and industry and ensure the qualify of life that we so cherish. However, it was by no whim of fate that we arrived where we are today.

From its rudimentary beginnings in 1946 as the upstart City Engineers Association, followed by the County Engineers Association formally constituted in 1951, the deal was finally done and the new organization was formed. Some 27 years later, in 1973, out of the CEA was born the Municipal Engineers Association, today representing over 600 professionals serving 440 communities province-wide.

On the occasion of the 50th anniversary Workshop, the City of Kingston welcomes us for the launch of a history book that has been a lifetime in the making! However, unlike other such publications, our story goes beyond a chronological summary of events and is one of growing and "sharing with pride" the learned experience amongst our peers. The story of the municipal engineer relates to the individual identity and desire of you, the members, contributing as public servants and valuable members of society.

I share with you the pride and satisfaction we all feel as practitioners in the field of municipal engineering, of bringing better recognition to the importance of good engineering practices. This book speaks to our need to grow the profession and to give relevance to a renaissance of sorts that we are experiencing in a changing relationship between the province and its constituent municipalities. It frames our challenges and opportunities in a unique way as we seek greater influence on federal and provincial legislation and programs. From within, by attracting a variety of vocations and embracing other non-professional colleagues, and externally, by establishing formal mechanisms to effect change in public policy development, we will continue to meet our mission in thte 21st century.

We will need to further our initiatives such as the Municipal Class EA, the Ontario Provincial Standards and our bursary program. We must tackle the challenges of climate change, technological advances and long-term sustainability and go beyond the "voice of reason" to live The Obligation of the Calling of the Engineer so gracefully bestowed upon the fraternity by the great poet Rudyard Kipling.

And so, congratulations to you all for choosing this career path. Celebrate your past but revel in the future, for it still belongs to municipal engineers!

On behalf of the board, I would like to thank the History Book Committee and the authors for bringing our story to life.

Gary Carroll, P. Eng.
MEA President
November 2009

About the Authors

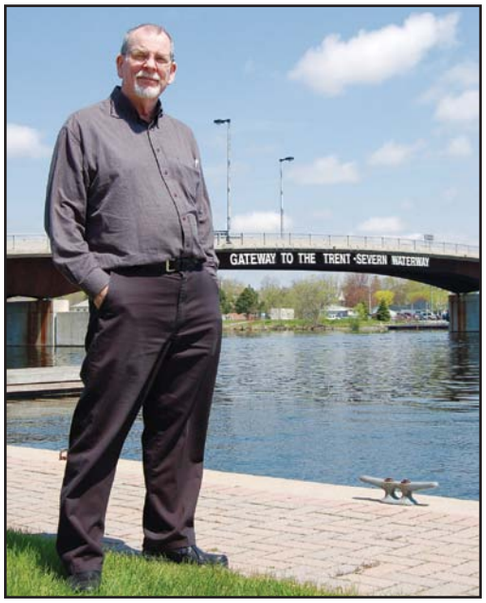
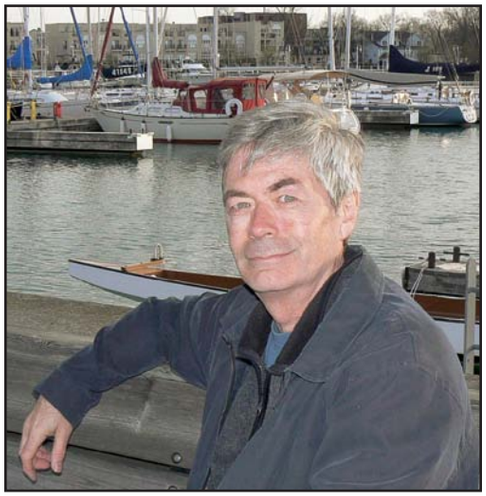


PHOTO BY JOE VANVEENEN

ORLAND FRENCH

Life in journalism for Orland French began at Ryerson's J-school and led to newsrooms in Kingston, Ottawa and Toronto. He was a political reporter and columnist for the *Ottawa Citizen* and the *Globe and Mail*, writing stories, editorials and columns from the political hotspots of Parliament Hill and Queen's Park. After a few years of teaching journalism, he began writing and publishing Canadian history books on community history and selected historical topics. From his home in Belleville, Ontario, he also provides advice as a consultant on history publications. He was fascinated by the engineering of a new bridge in Trenton (background) which was built beside the old span, put into service in a temporary location while the former bridge was removed, then pushed hydraulically sideways into its permanent position.

Website: www.littlebrickbookhouse.com



GARY MAY

After more than 30 years in daily newspaper journalism, Gary May is now a freelance writer, editor and photographer. He has reported from Parliament Hill and Queen's Park and wrote the 1998 book, *Hard Oiler! The Story of Early Canadians' Quest for Oil at Home and Abroad*. His work has appeared in newspapers and magazines across Canada and the United States. He also specializes in writing personal history books for individuals and families, corporations, clubs and societies. He lives in Leamington, Ontario. Until recently he lived in Cobourg, where the town sparked the rejuvenation of a derelict waterfront with the design and construction of a marina.

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THANKS TO PREVIOUS HISTORY WRITERS

Over the years a number of histories have been written about Ontario's municipal engineers by members of the engineering associations. Thanks must be extended to Robert G. Moore and F.B.D. (Boyd) Arnold, who wrote histories of the County Engineers Association. More gratitude is owed to Frank J. Horgan for his history of the City Engineers Association and to W.J. (Bill) Warwick for his account of the early years of the Municipal Engineers Association. The results of their research and writings have been incorporated into this book. Jeff Seaton, former executive director of the MEA, provided cartons of documents and minute books. Members of the MEA patiently provided many answers and explanations for the authors, who are not engineers.

PHOTO BY ORLAND FRENCH

THE EDITORIAL COMMITTEE

The MEA history book committee held its editorial sessions over lunch at the Kingston Brewpub. The project was directed and supervised by Mark Segsworth, public works manager, Township of South Frontenac, third from left. Members from left were Donald (D.J.) McDonald, road superintendent and engineer (ret'd), Stormont, Dundas and Glengarry County, Dave Shantz, MEA executive director, Segsworth, Steve Carroll, commissioner of public works, Prince Edward County (ret'd), Ken Becking, (standing) director of public works, City of Kawartha Lakes, and Jeff Seaton, retired MEA executive director.

The Iron Ring

▲ **Constant Reminder**
The iron ring is worn on the little finger to brush against the engineer's work. This ring spent its professional career on the finger of Joe Angelo scraping against blueprints in the City of Belleville.

PHOTO BY ORLAND FRENCH, FINGER COURTESY OF JOE ANGELO, RETIRED DIRECTOR OF PUBLIC WORKS, CITY OF BELLEVILLE

The iron ring is worn on the little finger of the working hand by Canadian engineers. The ring is a symbol of both pride and humility, signifying the wearer's intent to honour and care for humanity through careful engineering. The ring is intended to rub against documents and drawings on which the engineer is writing. Originally the ring was hammered manually with a rough outer surface to indicate that it was not a trinket or decoration. Modern machine-produced rings are manufactured to look handmade. Today the ring is often made of stainless steel rather than iron, which rusts.

The ring is placed on the graduating engineer's hand after the Ritual of the Calling of an Engineer (also known as the Kipling Ritual, or the Iron Ring Ceremony). The ritual includes a reading of The Obligation which was written by Rudyard Kipling in 1923 in response to a request from a group of Canadian engineers. The Obligation is not an oath but a solemn expression of intention to adhere to the highest ideals of the engineering profession.

The Obligation

I, (name), in the presence of these my betters and my equals in my Calling, bind myself upon my Honour and Cold Iron, that to the best of my knowledge and power, I will not henceforward suffer or pass, or be privy to the passing of, Bad Workmanship or Faulty Material in aught that concerns my works before men as an Engineer, or in my dealings with my own Soul before my Maker.

My Time I will not refuse; my Thought I will not grudge; my Care I will not deny towards the honour, use, stability and perfection of any works to which I may be called to set my hand.

My fair wages for that work I will openly take. My Reputation in my Calling I will honourably guard; but I will in no way go about to compass or wrest judgment or gratification from anyone with whom I may deal. And further, I will early and warily strive my uttermost against professional jealousy or the belittling of my working-brothers, in any field of their labour.

For my assured failures and derelictions, I ask pardon beforehand of my betters and my equals in my Calling here assembled; praying that in the hour of my temptations, weakness and weariness, the memory of this my Obligation of the company before whom it was entered into, may return to me to aid, comfort and restrain.

CONTENTS

Scattered throughout this book are two little icons to mark significant short stories.

Road Sweepings identifies individual items culled from MEA minutes over the years.

Tales from the Field are some interesting adventures experienced by municipal engineers on the job.

The Role of the Municipal Engineer

What is this thing called Municipal Engineering? It's more than snowplows and sewers. It's a very blurred world, where engineers go into many diverse businesses. Yes, they plow roads and build sewers, but they are also expected to run landfill sites, construct roads, provide clean drinking water and clean it up after everybody's done with it. Their work has as much to do with installing pipes as laying asphalt. Since they do it all on the public dollar, they are subjected to taxpayers' heat and hostility when things don't go right.

Very few people will phone up to compliment an engineer when the sewage system is working. When people flush their toilets, they don't care where the waste water goes as long as it goes somewhere else. If it ends up in their basement, then suddenly they get an education in their municipal systems and how they operate.

Much of the municipal engineer's work is taken for granted, until the roads develop potholes or a bridge collapses. Much of their realm of responsibility is underground, which for the public means out of sight, out of mind. Until it breaks down.

But for all that, most municipal engineers enjoy the sense of community service that comes with the job. They like to look at what they have accomplished in terms of building something. They have an intense desire to satisfy the public, to create something with their hands and their technology and to leave a bit of a legacy. It could be a structure, an edifice, or it could be a procedure or protocol. Whatever it is, it leaves a satisfaction with the engineer of having contributed to the public good.

Municipal engineers are the embodiment of the pioneer Canadian: think of them as "hewers of wood and drawers of water", the wood being the bridges and even some of our old corduroy roads, the water being everything from drainage and potable water to sanitary treatment systems.

Engineers have played a huge role in the development of Canada. Roads, canals, railways and airports were surveyed and built by engineers. As towns and cities grew, they hired engineers to take care of their public works and help plan for expansion and new developments. These employees became known as "city engineers" and "county engineers" who eventually formed their own associations to promote their work and share their ideas.

Eventually they merged their organizations into one and called themselves municipal engineers, the term reflecting employment by various forms of municipalities.

This book has been published by the Municipal Engineers Association to coincide with the 50th workshop organized by municipal engineers in Ontario.

Orland French,
EDITOR

Changing the Community, Changing the World

Ask most engineers why they're doing what they do and you'll likely be told: "I was good in maths and sciences." Arup Mukherjee replies unabashedly: "I want to change the world."

Mukherjee's family came to Canada from India when he was 13. Sometime during his high school years he learned the important part engineers played in making the world a better place, how roads, bridges and water treatment facilities could improve the quality of life for so many people. It was either become a doctor or an engineer, says Mukherjee, "and I couldn't stand the thought of cutting up frogs in biology class, so I chose engineering."

After graduating from the University of Waterloo in 1982, he went to work for a private consultant but remembered his co-op job placements as a surveyor in Markham and in transportation/traffic for the former Metro Toronto. When an opportunity in the public sector presented itself, he jumped at it.

"It's what public service is all about. You can change the way government does business. You help to set policy and make decisions that affect how we live. It's that element of serving the public and the gratification that comes from that, that attracted me to municipal work," says Mukherjee.

It was that element of public service that led him to volunteer 10 days of his vacation, and travel at his own expense in November 2007 to Guatemala with As Green As It Gets, an organization that describes itself as "an incubator for small Guatemalan businesses". Mukherjee joined several other engineers, city planners and human resources officials who used their bare hands and simple tools to construct a concrete pad that serves double duty as a coffee bean drying platform and a community activity area.

Will Mukherjee volunteer his time again? You bet, he says. He's already worked locally for Habitat for Humanity and plans some day to return for a visit to his native India to take on a project there. Engineering gave him the tools to help make the world a better place, says Mukherjee, and he doesn't plan to waste them.

For some engineers, the path to the public sector rather than private consulting is one of opportunity and happenstance. For others it's a conscious decision.

Once having chosen public service, an engineer will decide whether to work with the federal or provincial governments, or head to a municipality — a county, a city or town. Many who have taken the municipal route say they enjoy being "closer to the people", serving their community rather than the more anonymous role of a provincial or federal engineer.

"The public sector is a lot of things the private sector is not," says Ken Becking, Kawartha Lakes director of engineering and public works. "You're much more connected to the community. You're doing things for people. It's a place to utilize your skills other than the purely technical. You're self-reliant, practical, pragmatic and you learn to do the most with the money you've got. I've learned to be more creative."

Becking worked for an Ottawa-area consulting firm after graduating from McMaster in 1984 but left for the public sector nine years later. "I don't regret starting with the private sector. It allowed me to hone my technical skills. I wouldn't have been able to do it in the public service. But at the same time people have had successful careers going directly to public service."

One who went directly to the public sector was Donald McDonald. After graduating from Queen's in 1968, he worked for Scarborough, then Northumberland-Durham and finally the United Counties of Stormont, Dundas and Glengarry. There he became county engineer in 1972 and there he remained until retiring in 2009.

"I've heard it said that in the municipal field the hours are shorter and the stress is higher," McDonald says. "I don't think working in the private sector would have changed me or made me a different engineer."

As a municipal official McDonald has worked with many private consultants and believes there's a lot of personal salesmanship in that field. In contrast, municipal work is more a partnership or team approach, he believes.

Becking and McDonald had another choice to make once they took up employment with a municipality. Both chose to become managers, a move that further distanced them from hands-on technical engineering. Neither regrets his choice.

Becking points with pride to the variety of topics he might have to deal with on any given day: Roads; a boil-water advisory and the biology of water testing; electrical engineering because a power supply failure led to the water quality problem; waste-water treatment; landfill expansion; capturing methane and turning it into power; mechanical and thermo-dynamics; and the politics of dealing with elected officials and members of the public.

Conal Cosgrove left private consulting to go to work for the City of Brockville as a junior engineer, then moved up to director of operations. Once there he had to learn that instead of working for a single client he now had 22,000 clients. The measure of success for a private company is clear-cut, he says: satisfying that single client. The measure of success as a municipal engineering manager is more difficult to determine. "I feel a sense of accomplishment by serving the community and the things I'm working on are making people's lives a little bit better."

Private consulting wouldn't offer him the same sense of ownership, says Joe Pitushka, Mississauga's director of engineering and works. Since graduating from the University of Toronto in 1975 Pitushka has spent most of his work life in the public sector and believes municipal service provides the engineer with the best possible job satisfaction.

One big difference between public and private practice, says Waterloo Region director of transportation John Hammer, is that in the private sector someone comes up with an idea and they keep it to themselves; in public-sector engineering, "we have all sorts of groups and committees and if we come up with something, we share it with everybody else."

Sandra Lawson has worked in private enterprise and at the provincial level and is now manager of engineering operational services for Brantford. It's faster to get things done in private consulting, she admits, but municipalities are far quicker than provincial government. While municipal work might sometimes be frustratingly slow, she says she's comforted by the fact it's the level of government that's closest to the people.

It's where everyday services are delivered, everything from snow removal and garbage collection to ensuring safe drinking water.

Lawson believes university co-op job placements are a good spot for engineering students to begin and says her own path to municipal management is worth young engineers' consideration. As a student, she spent summers working in a municipal government office and on a survey crew. Graduating from civil engineering, she went into consultancy, then served as assistant to the county engineer in Huron County. It gave her a chance to observe and experience what it's like to take over a municipal engineering department, how to prepare reports and deal with politicians and the public.

John Simmonds is retired now. He graduated from Nottingham University in England in 1972, came to Canada and worked for the cities of Ottawa, North Bay and Oshawa. Finally he returned to North Bay where he served as city engineer for a decade before taking early retirement in 2007.

"I never thought of the public sector when I was (an engineering student)," he says. But once he began working for the city, he realized he was part of making things better for people. "You see the results of your work every day." But, he warns, "If you don't like dealing with people, don't get into municipal engineering."

Municipal work has its pluses and its minuses, Simmonds admits. It offers job security and good, portable pensions. On the other side of the ledger, there is the stress of long hours and aiming to constantly please your political masters.

Municipalities are good places to work, says Paul Knowles, chief administrative officer for the Town of Carleton Place in charge of engineering. But you need to be cognizant of the public scrutiny under which you will work. Not only will the news media be watching, so will every taxpayer, and practices that might seem to make sense just might not be acceptable in the public sector. Knowles uses as an example an engineer taking home a municipally owned truck he plans to use in the morning. Leave it in the driveway and chances are good you'll end up in the local newspaper, he says.

The Road Back to Private Practice

Sometimes engineers take their leave from municipal work and head back into private enterprise. Sometimes it's for better money. Sometimes for more stable hours and less stress. And sometimes it's just because they've become too divorced from the work that attracted them to their profession.

After graduating from the University of Waterloo in 1992, David Bonsall spent eight years in private consulting and the next eight with municipal government, in Waterloo Region and Peterborough, ending his career there as manager of engineering and construction. During that time he served on the MEA executive. In September 2008, he went back to private practice.

"In municipal, the job became increasingly administrative and less technical. The move to consulting was to get back into the technical aspects of engineering. As your municipal career develops, you need to be able to go into the administrative side. I was getting away from what I got into the business for," explains Bonsall.

He doesn't believe any degree of university training can prepare a young engineer for the administrative side of municipal work. "To be prepared for the administrative side it's more a personality trait than a learned skill. You need social behavioural skills.

"I don't think people understand the broad nature of the projects municipal engineers become involved with. It's everything physical in a city, the buildings, the roads."

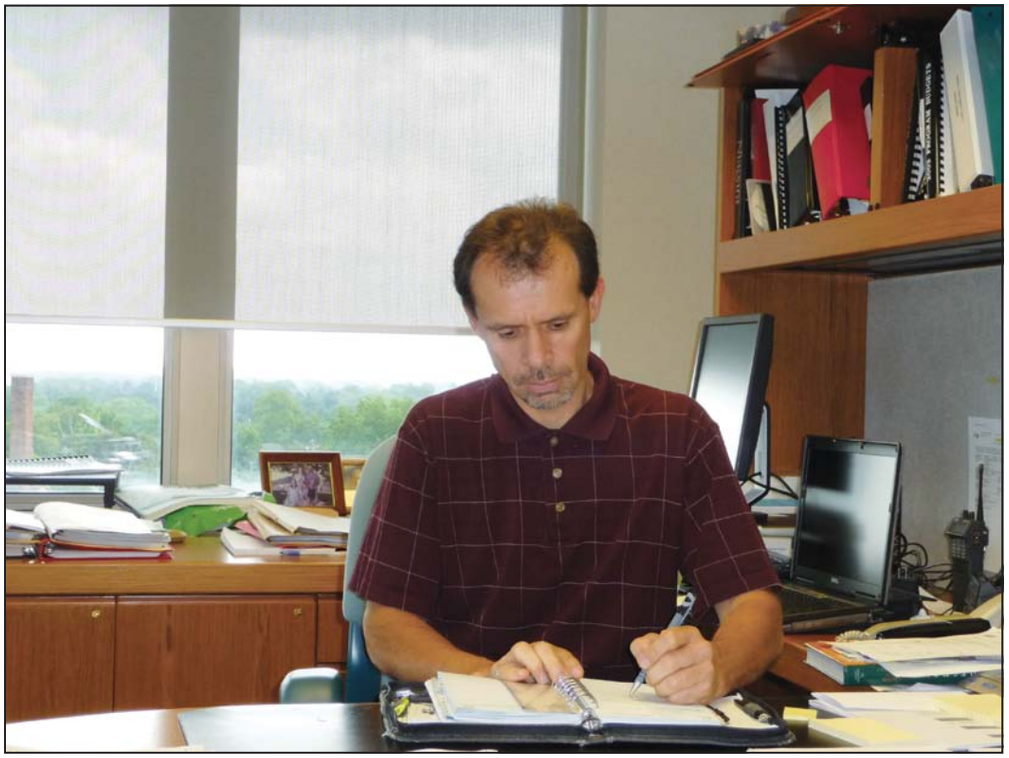


PHOTO COURTESY REGION OF WATERLOO

Planning Ahead
Region of Waterloo's Director of Transportation John Hammer books yet another appointment in his office.

The Looming Demand for Engineers

The fact is that engineering departments have been shrinking in most municipalities as politicians seek ways to cut budgets. Fewer engineering jobs are being done in-house and more are being contracted out to private consultants. The result is that just as the baby-boomer generation begins to retire and senior positions are opening up, municipalities are finding it more difficult to locate qualified replacements to move up through the ranks.

Roger Tudhope casts his mind back to the 1990s and says that's where the problem began. In those days, says the manager of Trow Associates Inc.'s Barrie office, civil engineering students found jobs increasingly difficult to find because municipalities stopped hiring and started contracting out their engineering work. Consequently, good young engineers drifted away from the municipal field.

At the same time, says Tudhope, engineering school curricula began to change. Students began demanding computer and environmental classes and a smaller percentage chose civil engineering.

Dave Shantz, the MEA's executive director, believes that the trend to use private consultants may have gone too far. "It makes perfect sense to use consultants with expertise which is not available or required frequently on staff. Furthermore, it has been cost-effective to outsource to consultants the extra or 'peak' work of large capital projects which is beyond the normal work capacity of the current engineering staff.

"However, when you get to the point where you are continuously outsourcing engineering work just because you do not have enough in-house staff, you are spending twice as much as it would cost to hire staff and do the work in-house. In addition, you are losing the opportunity to bring on junior staff that could be trained, and who could also be available to move up to more senior positions when vacancies occur. "Unfortunately, most councils will not permit you to hire that additional staff that would save them money due to generally inflexible attitudes and controls guarding against any increase in the numbers of municipal employees."

What this means for young engineers just entering the field is that few municipalities are hiring new engineering graduates. When a new position does open up in a municipality, employers have to attract someone from another municipality or turn to engineers employed by private consultants to fill it. "We're not training our own," says Shantz, "and when we lose someone, we are then fighting with everyone else to steal an experienced replacement."

Certainly the larger municipalities still hire engineering grads and provide the four years' work experience they require to write their exams and become P. Eng.s. But many smaller communities end up raiding one another, and private consultants, to fill positions.

The shortage of municipal engineers has meant that people are constantly on the move, says John Hammer, director of transportation for the Region of Waterloo. Now, he says, employers, both private and public, are tossing out incentives and salaries to lure good engineers away from other employers.

"There aren't enough technical people to go around," adds Frank Hull, manager of technical services for the Ontario Good Roads Association. "In transportation they're raiding one another. Some people are working 90 hours a week. We're all scratching our heads, trying to figure out how to hire the people we need.

"The result is that old guys like me are still working, retirees are coming back as consultants, municipalities are hiring back retirees — maybe not full-time, but under an arrangement that suits both parties. A lot more boomers are going to retire in the next few years."

Tom Copeland, manager of waste water and drainage engineering for the City of London, says his city has responded to this looming shortage by partnering with the University of Western Ontario to establish an Engineers in Training program. Students receive job placements and mentoring. Upon graduation they stand a better chance of moving into a position with the city.

"This is a very dynamic profession," says Copeland. "People are moving around, taking new postings for better benefits and job security. This way it places us in a better position to weather the challenges of the future."

It's not exactly like the co-operative programs employed by the University of Waterloo and many community colleges, but it does give students a chance to try municipal work while they're still in school.

London human resources official Lou Anne Oldenhof says the city estimated in 2005 that one-quarter of its environmental and engineering services workforce was eligible to retire by 2010. They also estimated as many as 15 per cent might actually do so.

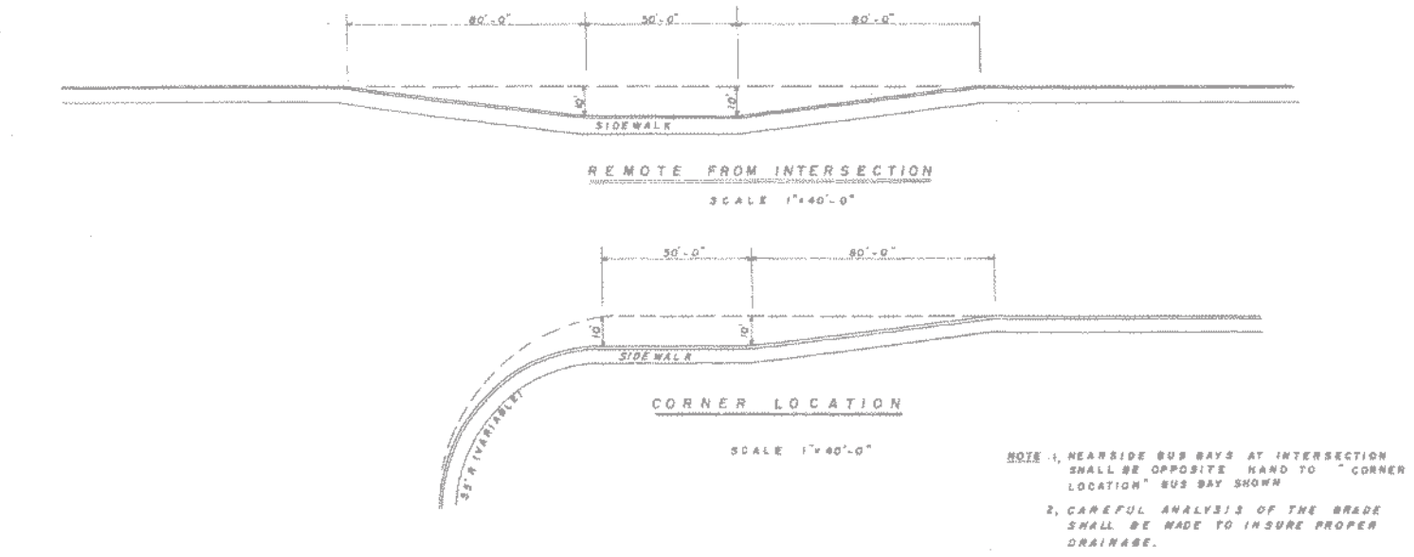
"We decided we were having difficulty finding engineers with civil experience," says Oldenhof, "and it would be a good idea to grow our own." The resulting Engineers in Training program has been a success, she says, and they've actually hired eight engineers through the program.

One of the results of this growing shortage is that smaller, out-of-the-mainstream municipalities are particularly hard hit. One of them is Chatham-Kent. Gary Northcott, director of engineering and transportation, says he's even having trouble finding qualified engineers for summer jobs. "Consultants in this area can't find enough qualified staff either," he says.

"We have to train staff, we have to retrain staff, and try to attract people to our industry," says Rick Kester, Belleville's director of engineering and public works. The MEA introduced a bursary program to help attract high school students. "There aren't a lot of people who want to get down into those holes and put the pipe in the ground. We're all chasing the same person. The contractors are chasing them, the consulting engineering firms are chasing them and we're chasing them. And then of course all of our competing industries are chasing them."

Graduating students are "opting for jobs that pay well and where they don't have to work Mondays or Fridays," Kester says.

There are two routes to employment as a municipal engineer, says Shantz: take a junior engineering position with one of those few larger municipalities that hire grads, or else go to work for a private consultancy, get experience contracting for municipal work and then network — keep your eye out for an opening. The MEA provides a job board on its website, www.municipalengineers.on.ca



A Young Engineer's Story

Benjamin de Haan is one of those young engineers who was able to find municipal employment early in his career. He graduated from McGill University in 2003 and went to work for a private consulting firm in Cornwall. In 2008 at the age of 28, he was hired by the United Counties of Stormont, Dundas and Glengarry as assistant county engineer.

Engineers stay a long time in SDG. Since the county roads system was established in 1917 there had been just three until Donald McDonald retired in the summer of 2009. Succession planning is taken very seriously in SDG and de Haan found himself learning the ropes from McDonald, helping with the administration of the department, planning, design, and developing policy, procedures and programs.

"I had some experience with municipal work while I was at McGill, says de Haan. "I liked the heavy equipment, the construction. It's very interesting to see something go from plan to completed project, to see an empty field turn into a subdivision with services. It's very rewarding."

While he watched his classmates go into other types of engineering, de Haan stuck with drainage and land development and looked forward to the day he might be able to take on an administrative role, too. Now that he has entered that field, "I like the challenge of it, the budgeting and being part of the decision-making process. It's a lot of responsibility."

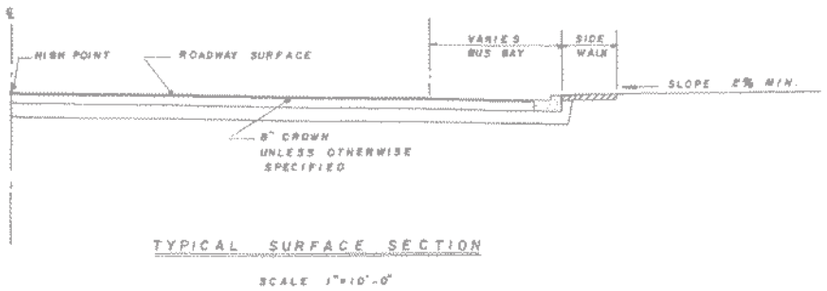
Did McGill prepare de Haan for municipal work? "I believe university prepares you by teaching you how to learn. I went to a consulting firm and began to apply my learning to real-life situations. That's what I'm planning to do here, too."

De Haan believes the danger of ending up in a large consulting firm is that an engineer could be stuck in one type of work. "I was able to get a variety of work because I was at a small firm. Here, I'm in a job that's financially attractive, has good benefits and I'll get a chance not just in design but in budgeting and administration."

Ken's Three Simple Rules

Ken Becking, director of engineering and public works for the City of Kawartha Lakes, says municipal engineering is all about public service. He lives by three simple rules, which have stood him in good stead over the years:

1. Look after the people.
2. Look after the property.
3. Go back to Rule Number 1!



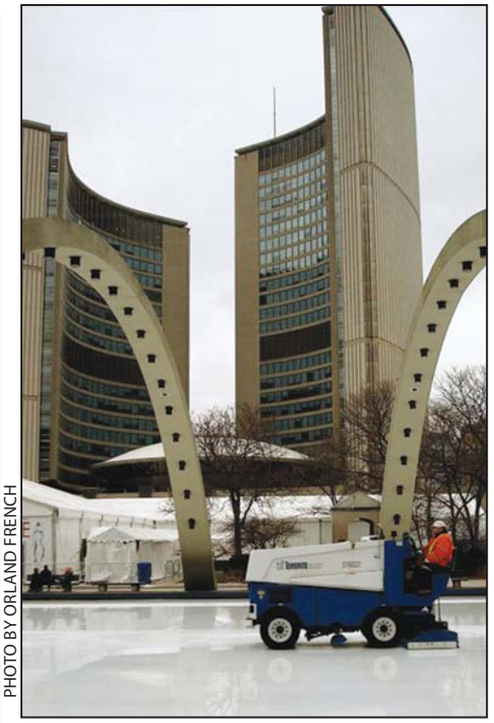
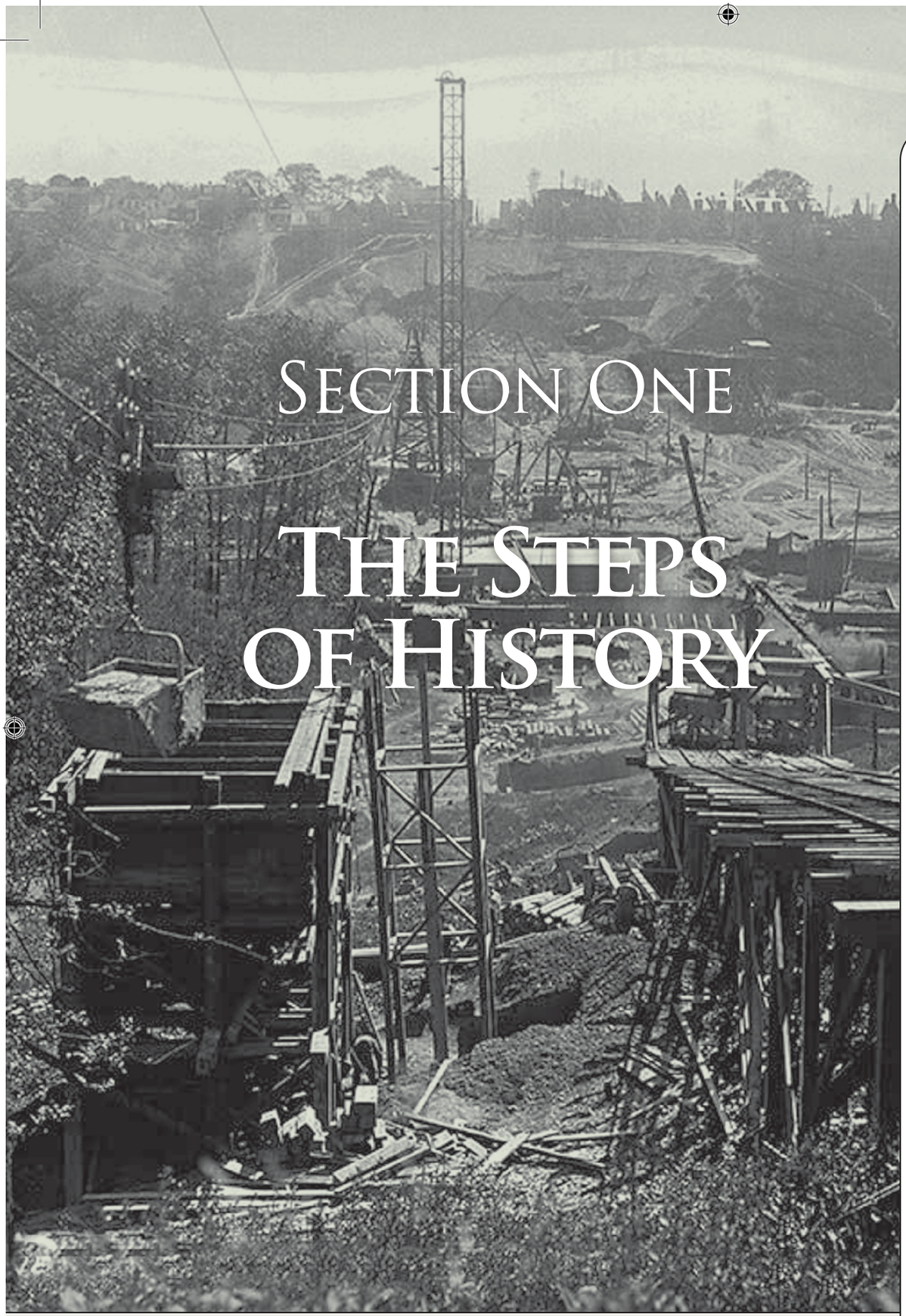


PHOTO BY ORLAND FRENCH

▲ **Engineering on Ice**
Public demand for outdoor recreational facilities year round has added new challenges to a municipal engineer's job. Here a Zamboni cleans the ice on the skating rink in front of Toronto's city hall.



TORONTO ARCHIVES

Section One

The Steps of History

Crossing the Don
At the turn of the 20th century, growth in the east end of Toronto promoted the need for a major high-level crossing of the Don Valley. Construction of the Bloor Street Viaduct began in the 1910s.

From the Nile to Niagara: The Story of Civil Engineering

A visitor to the Great Pyramid of Giza might not realize it, but they are standing in the place that represents the birth of modern engineering. Those early people who conceived and built the magnificent structure could not have known just what they had set in motion. Evolving 4,500 years ago as Middle Eastern people had begun to abandon a nomadic lifestyle, the pyramid was the first example of a large structure, the world's premier feat of engineering greatness.

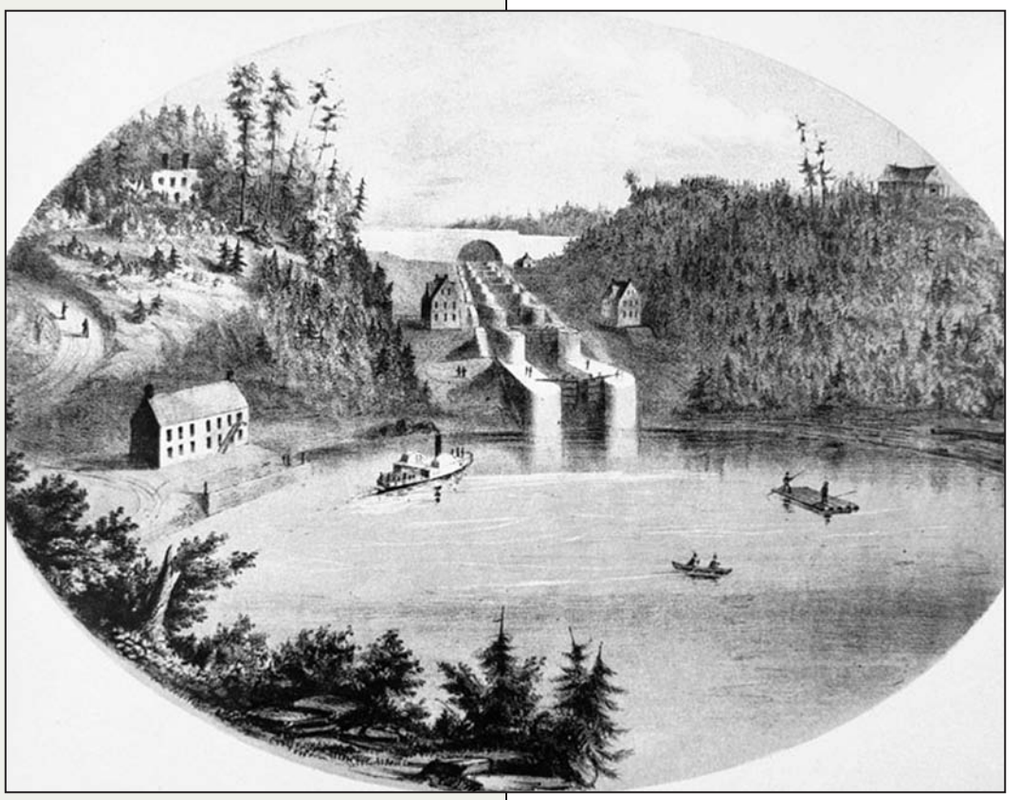
EGYPTIAN TOURISM AUTHORITY

The intricacies of ancient Egypt's engineering achievements are still being revealed to our modern society. In the fall of 2008 archaeologists unearthed the oldest known step-pyramid at Saqqara, the burial site of long-ago royal Egyptians. In recent years archaeologists have learned some astonishing facts about these engineering marvels. For instance, the pyramids were built using an early form of concrete. That discovery holds untold benefits for the developing world even today: replicating those early construction methods would not only prove economical, it would also, obviously, result in long-lasting structures. And it would produce less carbon dioxide than mixing Portland cement.

The Seven Wonders of the Ancient World are all evidence of man's early engineering prowess. From the Great Pyramid, to the Colossus of Rhodes, the Hanging Gardens of Babylon, the Statue of Zeus at Olympia, the Temple of Artemis at Ephesus, the Mausoleum of Maussollos at Halicarnassus and the Lighthouse of Alexandria, each marks a significant step in the evolution of engineering, of man's fight to tame his environment, all achieved before the birth of Christ.

Among those, only the Great Pyramid remains standing, yet they all proved highly durable. It took catastrophic fire or earthquake to destroy five of them and plundering robbers to dispatch the last.

◀ **Where It All Began**
The true beginnings of modern engineering can be traced back to the time when man gave up his nomadic lifestyle and began to settle into communities. Egypt's pyramids and sphinx are examples of early engineering genius.



NATIONAL CAPITAL COMMISSION

▲ **Early Days on the Rideau**
An artist's sketch of the No. 1 lock on the Rideau Canal as it enters the Ottawa River. Today, Parliament Hill stands on the right of the canal and the Chateau Laurier Hotel is to the left.

The list of early engineering masterpieces goes on, from the Parthenon (447-438 BC) to the Great Wall of China (ca. 220 BC). Then came those true master engineers, the Romans. They built the Appian Way about 312 BC as well as a host of aqueducts and dams, harbours, bridges and insulae — early apartments that featured shops on the ground floor and living quarters above. With the Romans bringing a sophistication and discipline to the art of planning their cities, the municipal engineer had truly evolved.

It was only with the rise of a strong middle class in the 18th century, however, that the term "civil engineering" began to be used to distinguish some projects from those constructed for the military. Ports, harbours, breakwaters and lighthouses were conceived of, plans were drawn up and projects constructed.

In Britain, John Smeaton was the first self-proclaimed civil engineer. He built the Eddystone Lighthouse and in 1771 formed the Smeaton Society of Civil Engineers. It was in Britain, too, in 1818 that the Institution of Civil Engineers was formed in London. Two years later Thomas Telford became its first president and in 1828 it received its royal charter, a milestone for the recognition of engineering as a profession.

Canada's first great engineering achieve–ments date to about that same time: the first Welland Canal was finished in 1829 and the Rideau Canal three years later. The last spike was driven to complete the nation's transcontinental railway, the Canadian Pacific, in 1885. And in 1887 the Canadian Society for Civil Engineering was founded, later renamed the Canadian Society of Civil Engineers.

More great Canadian civil projects were completed in the 20th century, projects requiring the commitment of tremendous resources, plus the foresight and the power of immense political will to get them done: Toronto's Bloor Street Viaduct, the R.C. Harris Water Treatment Plant and the subway system, the infrastructure required to make Montreal's Expo 67 a success, Highway 401 and perhaps the most ambitious project of the 1900s, the St. Lawrence Seaway.

Many will argue, however, that the engineering profession's greatest achievement of all time also came in the 20th century, one that does not share the grand dimensions of a railway or a pyramid or a waterway to the heart of a continent. It is, rather, a more subtle but crucial breakthrough: the provision of safe drinking water.

"That single act had a greater effect on public health than all of curative health," says Barry J. Adams, professor of civil engineering at the University of Toronto.

Ken Becking, the director of engineering and public works for the City of Kawartha Lakes, says a survey for the British medical journal *Lancet* concluded the provision of potable water is the most important development in the battle to guarantee good health. "As engineers, we are the first line of defence, making sure the public has the necessities of life," says Becking.

The fight for clean water in Ontario has its roots back in the 19th century. It was a time when the province was rife with typhoid and other lethal water-borne diseases. Out of that climate sprang the careers of half-brothers Thomas Coltrin and Samuel Keefer, who designed urban water systems to protect the public from these diseases. Later Willis Chipman, sometimes called Canada's first consulting engineer, graduated from McGill University in civil and mechanical engineering and gained a reputation for the treatment of drinking water and waste water.

Perhaps the greatest hero of Ontario's fight for clean drinking water was Dr. Albert E. Berry, who served as first director of the Ontario Water Resources Commission and put this province in the forefront of the potable water campaign.

Born in 1894, in the last years of the Victorian era, Berry graduated from the University of Toronto, worked briefly for the Ontario Board of Health and enlisted with the Royal Engineers in the First World War. After the war he joined what would become the Department of Public Health, took his master's degree and wrote his thesis on garbage collection and disposal.

Berry raised eyebrows when he studied for his Ph.D. at the University of Toronto's School of Hygiene, at a time when engineers were discouraged from crossing disciplinary lines. He produced his thesis on pathogenic organisms in milk, a work that became instrumental in Ontario making compulsory the pasteurization of milk.

In 1926 Berry was appointed director of sanitary engineering for the Department of Health and investigated several epidemics involving milk and water-borne diseases. In 1956 he was appointed general manager and chief engineer for the Ontario Water Resources Commission and oversaw that agency's aggressive campaign of environmental public works.

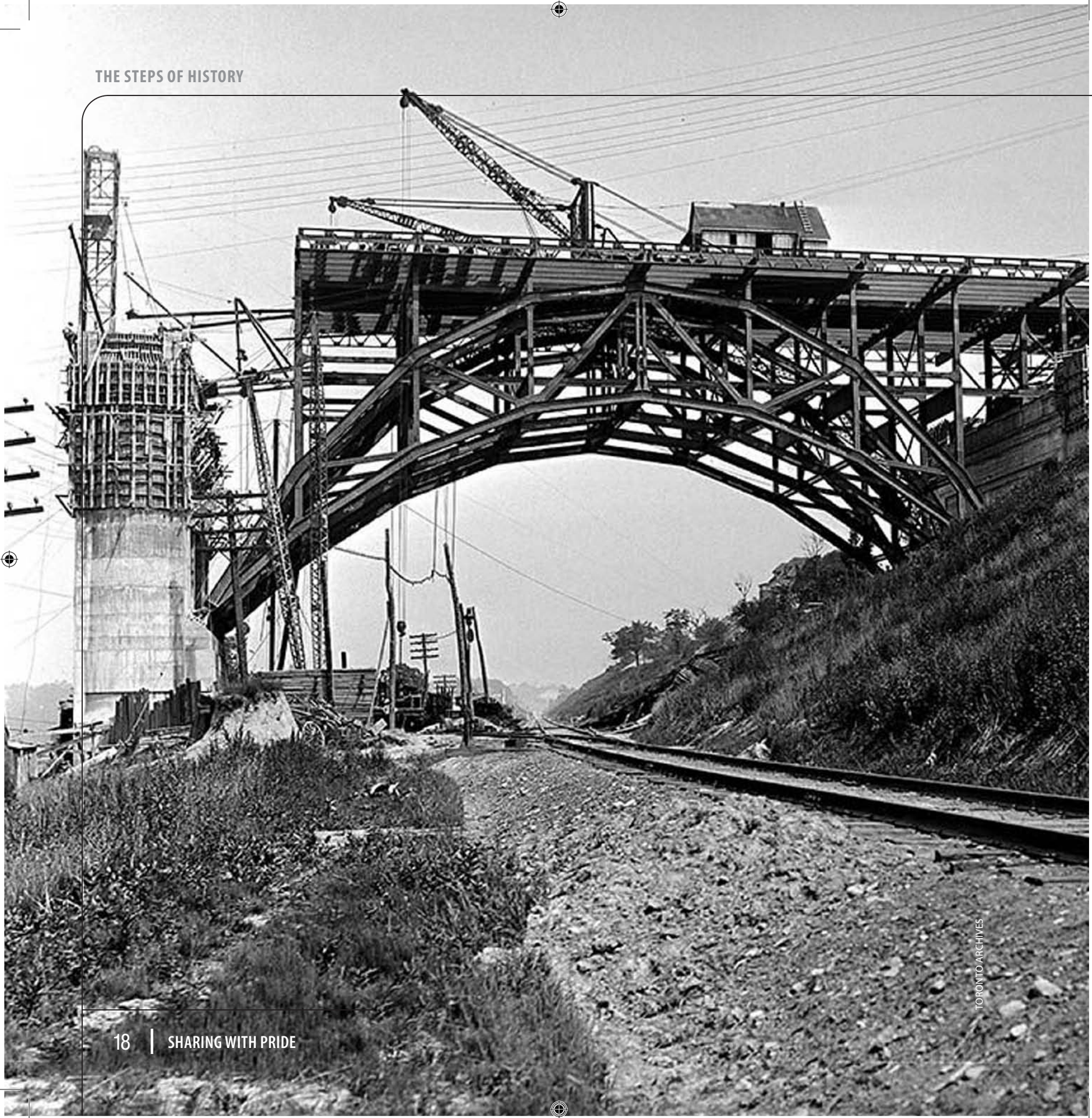
TORONTO ARCHIVES

◀ R.C. Harris

Rowland Caldwell Harris was never trained as a professional engineer but today is acknowledged to have been one of the most important public works managers in Toronto's history. Harris oversaw construction of the Prince Edward Viaduct and the R.C. Harris Water Treatment Plant.

He was elected president of both the American Water Works Association and the organization that later would become the Water Environment Federation, the only person in North America to achieve both honours. Upon his retirement in 1963 he became a consultant to the World Health Organization.

By the time of Berry's retirement, Ontario was world renowned for its waste-water and drinking-water treatment and had earned a reputation for leadership in pollution control. At a time when many of the world's great cities were still dumping sewage into waterways, 98 per cent of the province's urban communities were served by modern drinking-water systems and 95 per cent by treatment plants.



TORONTO ARCHIVES

Berry is remembered today through the Albert E. Berry Award of the Canadian Society for Civil Engineering, recognizing significant contributions by a civil engineer to the field of environmental engineering in Canada. As well, a refurbished water treatment facility in his home town of St. Marys was named after him.

While he had no formal education in the field, Rowland Caldwell Harris was the consummate municipal engineer, a man of grand vision. Engineering was his passion and he served from 1912 to his death in 1945 as Toronto's commissioner of public works. He conceived of, and guided construction of the R.C. Harris Water Treatment Plant, built between 1932 and 1941 and considered one of the province's greatest engineering achievements, a leading symbol of the importance placed on a clean and plentiful water supply.

The project entailed excavating tunnels beneath Lake Ontario and embedding pipes sufficient for future enlargement, as well as space for future equipment in pumping, screening, electrical and chemical rooms. The intakes are located more than 2.6 kilometres from the lake's shoreline in 15 metres of water.

Not only a marvel of engineering fore–thought, the treatment building's art deco style, with marble and brass ornamentation, has been widely recognized and applauded. The building, which rises, cathedral-like at Queen Street East and Victoria Park Avenue, was determined to be of historical and architectural value under Ontario's Heritage Act and has been declared a national historic civil engineering site by the Canadian Society for Civil Engineering.

The building has been used in TV and film shoots and featured prominently in Michael Ondaatje's 1987 novel, *In the Skin of A Lion*.

Ondaatje's book also brought attention to another significant engineering accomplishment, the Bloor Street viaduct, officially dubbed the Prince Edward Viaduct and opened in 1918. The bridge linked Toronto's east end with the centre of the city. As Ondaatje wrote: "It will carry traffic, water and electricity across the Don Valley. It will carry trains that have not even been invented yet."

The viaduct, also overseen by Harris, consisted of five huge arches that spanned the valley. Piers were sunk 15 metres, through clay, shale and quicksand, into the bedrock. A total of 45,000 cubic yards of earth was excavated.

As evidence of his engineer's instinct for long-term planning, Harris designed the lower trestle to some day carry subway trains across the valley and insisted on the inclusion of giant water mains. His vision seemed hopelessly grand for the day, but is typical of the planning for the future that is instilled in engineers.

When the first Europeans came to what would become Ontario, they encountered a densely forested region marked by a civilization of First Nations people whose society, while highly developed and reliant on sophisticated trade systems, had not discovered the wheel. Rather than roads, the native peoples of Ontario relied instead on transportation by water — across thousands of lakes and along a multitude of rivers and streams.

The Europeans adopted this system of water transportation and until well into the 1800s, Ontario's road system was limited and primitive. The first significant route across the province's southern region was what would become Highway 2, running from the Ontario/Quebec border to Windsor. Based on footpaths and trails, it became the primary route for stagecoaches and wagons and connected many of the most significant settlements.

Known for years as The Provincial Road, the highway formed the main thoroughfare of many of the settlements through which it passed, and took on names such as Kingston Road, Dundas Street and King Street. In 1925 Ontario introduced a numbering system for its highways and The Provincial Road became Highway 2. With downloading of responsibility to municipalities in recent years, only a small portion of old Highway 2 remains under Ontario's jurisdiction, near Gananoque.

In the 19th century, farmers had been required by law to maintain roads past their properties. Only in the early 20th century did the province embark on a significant road building and maintenance program and Ontario's first inter-city highway to be paved was the Toronto-Hamilton Highway, also known as Lakeshore Road, in 1917.

About that time, the county road system was established and counties hired engineers as roads superintendents to ensure they were maintained. As the automobile increased in numbers and importance, demand increased for government to keep roads cleared of snow and the county engineer's job became increasingly important.

With more emphasis on professional standards of engineering, a rapidly expanding road system, increasing demands on municipalities and a growing emphasis on sanitation and clean water, the City Engineers Association was formed in 1946 and the County Engineers Association followed soon after.

◀ **Over the Don**

The Prince Edward Viaduct (Bloor Street) was constructed as a mass transit roadway across the Don Valley in Toronto. The 494-metre-long bridge, 40 metres above the Don Valley, is an excellent example of advance planning. Built 1914-1919 – while Canada was fighting a war in Europe – the concrete and steel arched bridge contained a lower deck to accommodate rapid transit someday. That someday happened in 1966, half a century later, when the Toronto Transit Commission ran its first trains on the Bloor Street subway across that deck. The bridge cost $2.5 million, about $40 million in 2009 dollars. The Viaduct was designed by Edmund W. Burke and named after the Prince of Wales, later King Edward VIII. The visual elegance of the bridge has been affected by the addition of anti-suicide mesh barriers along the railings.

Prosperity After the War

When soldiers returned from Europe at the end of the Second World War, many of them looked for a career in engineering. Fortunately, the explosive post-war growth of Ontario offered them plenty of opportunities.

At the end of the Second World War, Ontario was poised to enter a period of prosperity and population growth. The agrarian economy of rural Ontario was about to become dominated by the industrial economy of urban Ontario. The province would unharness the plow horses and hitch its fortune to the automobile and the branch plant.

▲ **Urban Sprawl**
Post-war prosperity in Ontario led to sprawling shopping centres, suburbs and expressways, paving over fertile farm lands.

The men and women were coming home from the war. There would be marriages and lots of kids, and thousands of immigrants, all of them needing bigger new houses and sprawling subdivisions and bustling shopping centres and sparkling schools and multi-lane highways to get to all these wonderful things. The expansion of sewer and water and electrical supply systems would be unprecedented.

The opportunities for municipal engineers were immense.

The war had put a lot of projects on hold, but now they could be unleashed to transform the provincial economy and personal careers. Among the returning war vets were thousands of men who had had a taste of engineering on the battlefield, and they liked it. They were not prepared to return to the farm to milk Bossy. They wanted to be engineers.

Some of them were surprised to find one of the biggest engineering schools was in Ajax, a town that hadn't even existed when they went overseas to fight Hitler. Ajax, now one of those towns that has disappeared into the maw of the Greater Toronto Area, was born in 1941 when a Defence Industries Limited shell plant was located in rural Pickering Township. A townsite grew up around the plant and was named after *HMS Ajax*, one of three British warships which had destroyed the German pocket battleship *Admiral Graf Spee* in 1939.

Forty million shells later, the DIL plant was closed at the end of the war. Anticipating a huge influx of engineering students as soldiers returned, the University of Toronto leased part of the factory and converted it into an engineering school. At peak enrolment, the Ajax Division of the Faculty of Applied Science and Engineering was teaching 3,300 students. When the Ajax Division was closed in 1949, more than 7,000 students had received their basics in engineering in a converted wartime production plant.

For municipal engineers, there was lots of work to do. It was time to get organized.

The first to organize were the city engineers. The county engineers followed a couple of years later. Dates are a bit hazy since some of the preliminary meetings consisted of guys getting together for a beer and a conflab about the value of creating an organization to share information and experiences, and to act as a single voice for a group of like-minded professionals.

The origin of the City Engineers Association can be traced to an informal meeting of engineers who were attending a convention of the Federation of Sewerage Works Associations in Toronto in 1946. D.H. Jack, city engineer for Kingston, hosted the gathering in his hotel room. Also participating were H.S. Nicklin, city engineer, Guelph; W.C. Miller, city engineer, St. Thomas; A.R.H. Thomas, manager, public utilities, New Toronto; N. MacNicol, commissioner of works, Forest Hill; W.G. Ure, city engineer, Woodstock; W.S. Orr, city manager and engineer, Niagara Falls; C.A. Mott, city engineer, Belleville; B.F. Lamson, city engineer, St. Catharines and R.J. Desmaurais, city engineer, Windsor.

The consensus of the group was that an association could be of great value to municipal engineers, both by acting as a body on their behalf in legislative and other matters and by collecting and distributing work-related information to the membership. It was the beginning of "sharing with pride" on an organized basis.

A second meeting with 18 engineers attending was held over lunch at the Royal York Hotel in Toronto on October 9, 1946. At this critical meeting, membership guidelines were established. Only professional engineers would be admitted, and only those engineers employed by large and small cities and urbanized townships. Rural municipal engineers could not be members. Immediately, the seeds for a similar association of county engineers were planted!

They, too, began to organize.

Led by D.J. (Bill) Emrey, engineer, Waterloo County, they started to talk of forming a county organization. Emrey kept the group loosely on track until they finally organized in 1951. Others agitating for an organization were Guy Marston, Roy Smith, Lawry Langlois, Bill Colby, Frank Weir, "Nic" Meathrell, Newton "Newt" Powell, Joe Cameron, Harold Wilford, William H. Keith and Roy Patterson.

They took their first steps at a meeting on February 25, 1948 (possibly while attending a convention of the Ontario Good Roads Association, OGRA), where they struck a committee to draw up a constitution and bylaws for the County Engineers Association. (Using an acronym is confusing because CEA can mean either City or County Engineers Association.) This committee consisted of W. Ken Clawson, Middlesex County engineer; E.W. (Ted) Jones, Simcoe County engineer; William H. Keith, Wellington County engineer; Guy Marston, Norfolk County engineer and Newton L. Powell, Peel County engineer.

One of the distinctions between the county and city engineers was that the county engineers were not always "professional engineers", with a P. Eng. after their names. Although the Highway Improvement Act was amended to require that any newly appointed county engineer must be a member of the Association of Professional Engineers of Ontario (APEO), those without a P. Eng. were allowed to hold their jobs, at the discretion of county council, until they retired. The last of these was William H. Knister, Essex County engineer.

TORONTO ARCHIVES

▲ **Scenic Splendour**
Tourists in the 1920s pass by a scenic lake in Northern Ontario on an early unpaved stretch of Highway 11.

Normally the official title was "County Engineer and Road Superintendent". Sometimes there were other variations. Prior to Bob Moore's appointment in Elgin County, the county had a road superintendent as well, and the county engineer was a part-time employee who conducted a private practice on the side.

For the first few years, neither the city nor county associations were significantly active forces. Between 1948 and 1951, the only formal meeting on the county engineers' agenda was a Monday morning session with officials of the Municipal Roads Branch of the Department of Highways, during the OGRA convention. This was an event greeted with much pleasure, for it allowed county engineers and provincial officials to discuss matters frankly without the interfering presence of elected politicians.

On one occasion Ted Marshall, who was the department's chief municipal engineer, served advance notice that he wanted to discuss "signs" at the Monday conference. When the doors were closed, he said he really wanted to find out how engineers were getting along with their county councils. But Marshall was not a strong supporter of the association. He felt that it was being formed for the sole benefit of personal gain for the county engineers.

At the conferences, county engineers were treated to lunch by the Department of Highways. They were made to feel on the inside because the minister of highways would give them the scoop on whatever he was going to announce later in the day to the convention.

The City Engineers Association got off to a wobbly start as well and nearly folded early in its life. It held its first meeting on January 18, 1947, at the Royal York Hotel. Twenty-eight engineers attended and elected an executive consisting of Warren Miller, chair, David Jack, secretary-treasurer, and Orville Falls, Ernest Oke and William Riehl. These men guided the association through its early years, but the organization suffered a setback when Jack retired and took the minutes with him. Oke was very active, but he recalled in a letter in 1972 that the fledgling organization almost died. "In the short span 1946 to 1949 the initial enthusiasm shown for the association nearly petered out to almost zero. The period 1946-1949 records were lost when the Secretary-Treasurer (Jack) lost interest in the Association."

The moment of truth arrived at a strange meeting in Timmins in 1949, when engineers were attending the Canadian Institute on Sewage and Sanitation (CISS) conference. President W.C. Miller could not attend, as he was busy at a Public Works Association meeting in Kansas City. Ernest Oke took over, and called a meeting without notice on the Tuesday evening during the conference.

According to one account, it was explained that the reason why the meeting was called without notice was that there was some doubt in members' minds that the association was needed. Those who turned up for the meeting declared unanimously that there was a value to municipal engineers in having an association. At that moment, the City Engineers Association picked itself up off the floor and started life anew.

On January 28, 1950, the city engineers were back at the Royal York, this time 15 strong under the presidency of W.C. Miller. They reorganized, and decided to hold their annual meeting prior to the APEO meeting, and a general meeting during the CISS convention.

A general meeting was held at the Bigwin Inn on September 13, 1950, attended by 17 members. The secretary-treasurer reported there were 28 paid-up members, 37 more potential members, and a bank balance of $27.18. Of that, the members decided to spend $10 for typing the corrected constitution.

The revival continued at the association's next meeting on January 26, 1951. President Miller and the others present were delighted to note that the association had already exerted some influence on Queen's Park. At its previous meeting, in January 1950, the engineers had submitted a resolution to the minister of agriculture regarding application of the Weed Control Act to urban areas. During the 1950 session of the provincial legislature, the government had adopted the proposal. Score one for the CEA.

Taking the Fun out of Work

"It was pointed out that the Ministry of Transportation has recently circulated a notice to its management and employees that the practice of riding in the back of pick-up trucks is in contravention of the law that requires everyone to 'sit on a seat designed to be sat upon.'"
– MEA minutes October 14, 1987, from an advisory from the Health and Safety Office

PHOTO COURTESY COUNTY OF DUFFERIN

▲ **Round and Round and Round**
The many wheels of this flatbed truck are articulated to assist in turning corners.

Perhaps the government, then under Leslie Frost, was beginning to take the new associations more seriously. The county engineers found that Jack M. MacInnis, who had replaced Ted Marshall as chief municipal engineer for the Department of Highways of Ontario (DHO), stood firmly behind their organization and would give any assistance he could to assist the creation of the County Engineers Association. They were also encouraged by the positive attitude of Minister of Highways George Doucett.

An organizing committee was established during a meeting of the County and Suburban Engineers in the library of the Royal York on February 19, 1951. Four objectives were established to: create broader public relations, provide opportunity for exchanging information, make recommendations for changes in legislation and lend assistance in formulating OGRA convention programs. The very next day a general meeting was held in the library of the Royal York and the first County Engineers Association executive was elected:

President: Newton L. Powell, Peel County engineer
Vice-president: Roy F. Smith, Halton County engineer
Secretary-Treasurer: Jack D. Kean, Peterborough County engineer
Councillors: E.W. (Ted) Jones, Simcoe County engineer; T. Roy Patterson, Huron County engineer; F. Boyd D. Arnold, Prince Edward County engineer.

The first meeting of the new organization was held in Toronto in November 1951, with the first annual meeting following on February 12, 1952. The membership adopted the association's constitution and they were in business.

F.B.D. Arnold, who wrote a history of the association in 1985, was proud of the organization's record. "This association, as newly constituted, prevailed from 1951 to 1973 and in my opinion there was no single organization or group that enhanced the cause of improving the County Road Systems in Ontario more than the County Engineers Association of that period."

PHOTO COURTESY R.G. MOORE

▲ **One Span at a Time**
Modern steel truss bridges are prefabricated and lifted into place, with the road surface applied manually later.

Home from the War

When Bill Warwick came home from the Second World War, he wanted to be a civil engineer. He attended the University of Toronto and got his engineering degree, then went looking for a clean, secure job with a municipality. He saw an ad for "chief sewer engineer" in Scarborough and took it. During his 31-year career with Scarborough, the community blossomed from a township to a borough to a city. Farmland became shopping centres, country roads became multi-lane thoroughfares and bush lands became housing developments. When Warwick retired in 1985, he was executive director of engineering and deputy commissioner of public works, overseeing a staff of nearly 100. And he had been president of MEA in 1983.

Getting Established, the County Way

Forming an alliance with the Department of Highways and links to the minister's office established the legitimacy of the new County Engineers Association.

If the new engineers associations were to have any legitimacy as lobbying agencies, they would have to prove themselves valuable to the ruling powers in the provincial government. Almost immediately, the provincial minister of highways could see much merit in having an organized group of volunteer experts to advise him.

The county engineers were asked to form an advisory committee to assist the Department of Highways on matters pertaining to county roads and bridges. A five-man committee was established (no women yet) on a rotating basis, with one person appointed for one year, the second for two years, and so on, to provide continuity.

This committee met at the DHO Downsview office about once a month. Jim Howard or Charles Wilmot would represent the ministry and the CEA president of the day would be the chair. The sessions were described as "no holds barred" and at the end of the day the engineers felt they had settled many important and controversial matters.

Topics brought before the advisory committee included evaluation of traffic accidents on county roads, measuring and reporting traffic density, standardizing the county road-marking system, determining formulas for county road subsidies, and standardizing bylaws that applied to county roads.

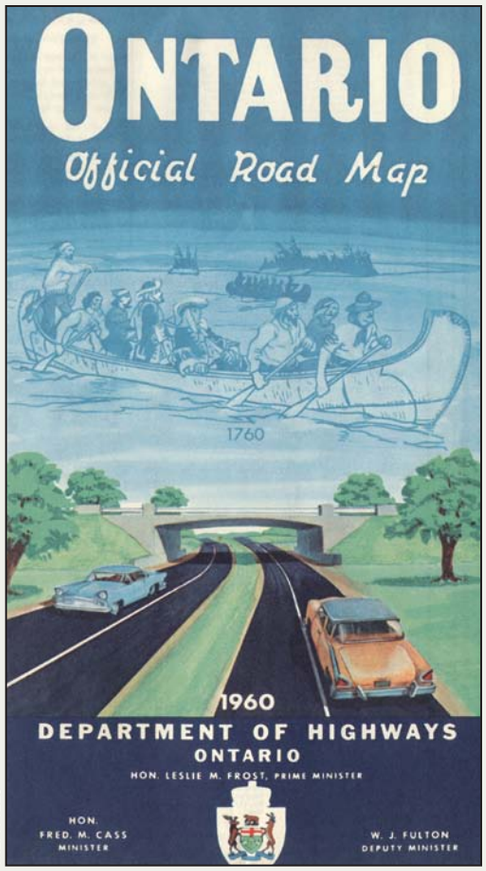
One of the more important subjects was the introduction of geometric standards for county roads. These standards determined such essentials in road design as the appropriate base, alignment and width of the highway. Without such standards, the county system of roads was subject to the whims and pressures of local politics. Poorly built roads and narrow winding trails could be, and were, added to a county road system through the sheer political power of the local council.

Yet some ministry officials, perhaps looking at the cost of subsidies, felt the standards were too high for county roads. Some engineers agreed. While the benefits of high standards were not always immediately apparent, several decades later the well-built county road would more than pay for its excellence in construction through lower maintenance costs.

After a while, the advisory committee began to tour the province. On these annual three-day tours the committee would inspect county road systems, particularly new construction, and discuss their findings at the next meeting in Downsview. One year they would check an area of eastern Ontario, the next they would tour the west. The tours consisted of long days on the road, culminating in a hearty evening meal.

The advisory committee also stepped into the development roads issue up to its boot-tops. The designation of a development road had become a highly political item. A "development road" was a county-level road which was deemed to serve as a connector between a region and a trunk highway, such as Highway 401. An example would be Airport Road south of Mono Mills to the 401, and Road 45 through Norfolk and Elgin counties which connected an entire region with the 401.

A development road designation was highly prized because the province would pay 100 per cent of the construction cost, but not the cost of any land assembly. This was a good idea but the practice, too often, was that councils would pick the worst road in their area and request its designation as a development road.



MEA FILES

▲ **From Canoes to Cars**
A 1960 road map of Ontario celebrates 200 years of travel in the province.

PHOTO COURTESY LOYALIST TOWNSHIP

▲ **Keeping a Low Profile**
The Fairfield Water Treatment plant in Loyalist Township was built one-storey high on the shore of the Bay of Quinte to avoid interfering with the view from adjacent residences. The roof of the building, on the same level as lawns across the street, forms an attractive waterside parkette.

Since the poor minister of highways personally approved all such designations, he was besieged with wheedlings from members of the legislative assembly in favour of their local council's pet project. The advisory committee suggested that a road should serve more than one municipality or county before it was worthy of designation.

Depending on how it was administered, the development road program could be a boon or a boondoggle. Bob Moore, a retired county engineer from Elgin County, saw it in a positive light. "All in all, the development road program was the biggest boon to the county road systems in Ontario. Without the program, poorer areas of the province would never have progressed to a point where they could attract industry and tourism and thus raise the local assessment to the level that they could afford to do road work on their own."

However, the amounts of provincial cash required to develop these roads led to a proposition which might have undermined the entire county system across Ontario.

In an era when many of Ontario's highways have been downloaded to the municipal level, it is hard to comprehend a desire by the province to take over all the county road systems. But according to Bob Moore, this happened in 1965. The minister of highways in John Robarts' Conservative government at the time was Charles MacNaughton, a powerhouse from western Ontario who believed in the integral relationship between a good highway system and the provincial economy. He was a political animal who liked control. It was said that he was the only Conservative candidate who did not allow any election signs promoting his party leader, John Robarts and later William Davis, in his riding. It was all Charlie, all the time.

MacNaughton's politics were simple. His motto was, "If it moves, give it a grant. If it doesn't move, pave it."

As the province poured more and more money into the creation and maintenance of development and county roads, some bright lights in the DHO got the idea that the county road system was being developed in a hodge podge way. They felt the problem needed to be approached in an organized fashion. The solution, as they saw it, was that the province should assume ownership of all county roads.

A delegation of the highest power short of the premier himself, Minister MacNaughton and his deputy, A.T.C. "Cam" McNab, met with Bob Moore, Jim Britnell and Jack Rettie, representing the executive of the County Engineers Association, in the summer of 1965.

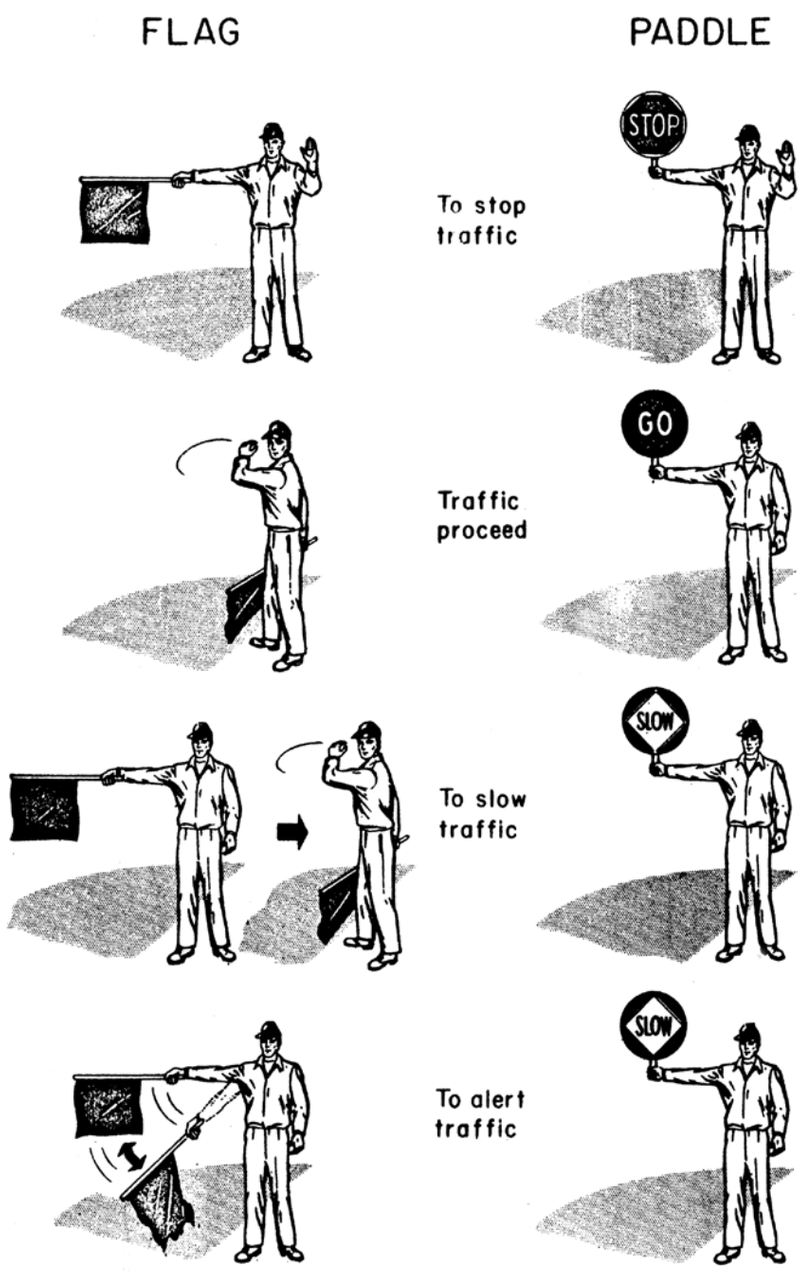
Needless to say, the county engineers were surprised and shocked by the proposal. From Moore's perspective, the concept would eviscerate the county system. The county road system was the backbone of many counties. Without it, counties would have little to operate other than old folks' homes. The County Engineers Association would disappear, and likely so would the OGRA which was mainly county- and rural-oriented.

Furthermore, local townships would be stripped of technical assistance supplied by the county, and would not have the ability to borrow county road graders and other equipment when necessary. County engineers who resisted employment by the province would be replaced by DHO personnel who could not possibly know the area as well, nor would they be welcomed by local residents and the county work force.

The CEA threesome defended their position valiantly. Their point was, essentially, that local people know more about local conditions than someone in the DHO head office in Toronto.

The takeover never happened. While the proposal may have made sense in strictly economic terms, it held enormous political implications. Profound undercutting of the county system would, in all likelihood, have fractured the Conservative party's bedrock support in the rural reaches of Ontario. At the end of the day, MacNaughton and McNab returned to their offices at Queen's Park and continued to write cheques to the counties. Politically speaking, they may have received the answer they wanted. The wheel continued to turn, and thirty years later, the province was giving away its highways to the counties.

What might be inferred from this incident is that the County Engineers Association had firmly established itself as a knowledgeable advisory body to the provincial government. But there was another force at work undermining their collective power: regional government.



MEA FILES

▲ **Watch My Hands**
Flagman instructions from "Traffic Control Manual for Work on Public Roads", as recommended by the executive of the City Engineers Association, 1964.

One-Day Wonder

Maurice Rollins had one of the shortest terms of office by a municipal engineer in Ontario. He lasted one day.

In 1951 he was working for Harvey McFarland, a construction magnate in eastern Ontario. Rollins was well-known in the area and he was offered the job of town engineer in Trenton, even though he was not an engineer. The appointment of the new town engineer was announced with some fanfare in the local newspaper.

"Harvey heard about this and next day he looked me up in the yard," says Rollins. "He said, 'You're not going to like that job.' I asked him why not. He said, 'They'll call you in the middle of the night because some sewer is clogged, and you won't like it.' So I said, 'Well, it's a better job than I have here." McFarland immediately offered him a better job and Rollins turned down the position in Trenton.

The change of mind didn't hurt his fortunes. Rollins became a multi-millionaire by building thousands of housing units and establishing the Journey's End hotel chain.

PHOTO COURTESY TOWN OF AJAX

▼ **All in a Row**

The population explosion after the Second World War led to neat and tidy suburbs and new engineering challenges for municipalities.

▲ **Fire Trucks are Red, Fire Stations are Green**

The Town of Ajax Fire Station Headquarters opened in June 2008, as the first municipal LEED certified building in Durham Region. The 28,000-square-foot building includes initiatives such as a "green roof", underfloor ventilation, cisterns to collect and reuse storm water and a ground source heat pump. The Leadership in Energy and Environmental Design (LEED) system encourages sustainable green building and development practices to promote efficiencies in energy and water usage.

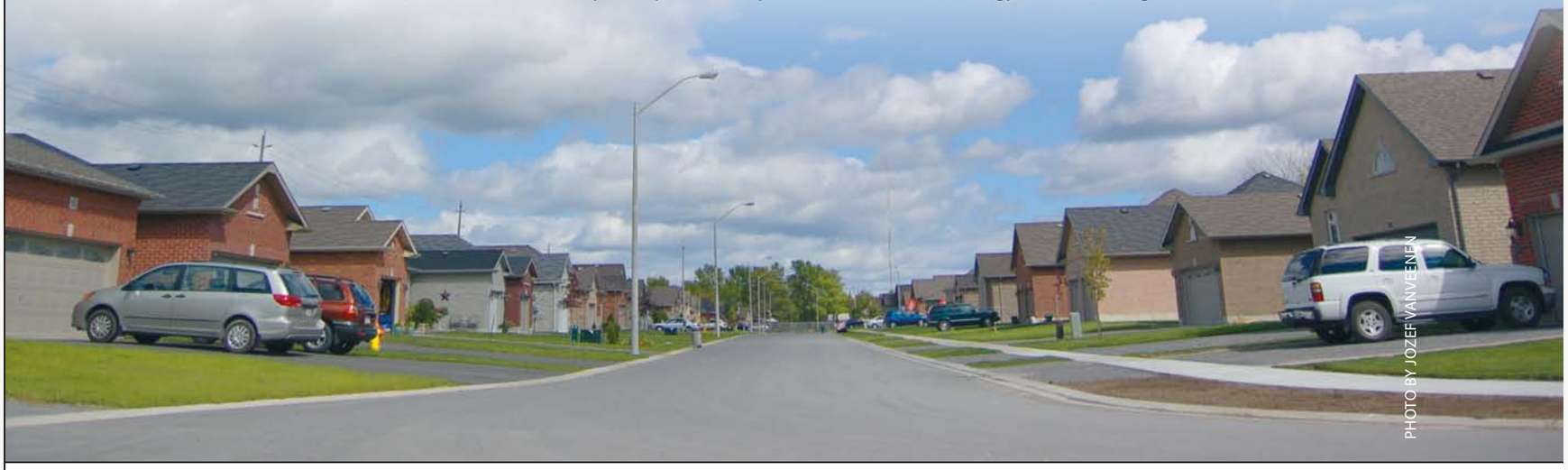


PHOTO BY JOZEF VANVEENEN

▲ Ken Becking making notes on site.

All Those Washed-out Bridges

Ken Becking specialized in structural engineering after graduating from McMaster University in 1984 and went to work for an Ottawa-area consulting firm. In 1993 he headed west from the capital, up the valley, leaving the big city for the quieter life of rural Renfrew County. There he became county engineer before moving on to the City of Kawartha Lakes in 2005 as director of engineering and public works.

The big ice storm of 1998 struck eastern Ontario and the Ottawa Valley particularly hard. But for Becking it was the aftermath — the big thaw — that lingers most vividly in his mind. Ten of Renfrew's bridges disappeared, each torn from its moorings by raging torrents that gushed down the county's rivers and creeks. "I didn't get much sleep for about 10 days," Becking says.

As the county's emergency measures officer, Becking was able to patch up nine of the bridges, leaving just one — the lifeline to the outside world for one small community — to be replaced. He had to think fast.

Becking picked up the phone and called nearby CFB Petawawa. He had to persuade the base commander to send help. Convinced by Becking of the community's plight, the commander agreed to send in members of the 2nd Combat Engineers Regiment.

But Becking wasn't done yet. He hit the phones again, this time calling officials at the provincial transportation ministry. "I need a Bailey bridge," he told them. "Fast." The ministry, too, sprang into action.

"The design was literally drawn on the back of a pack of cigarettes," recalls Becking. "We built the bridge in 56 hours and lifted it into place. I became an expert in Bailey bridges that year."

PHOTOS COURTESY OF KEN BECKING

▲ **Bailey Bridge**
A winter bridge washout had Renfrew County Engineer Ken Becking scrambling in 1998. He persuaded the base commander at CFB Petawawa he needed military help to bridge the washout temporarily on a local road. Provincial Ministry of Transportation officials approved a Bailey bridge and the team put it together.

▲ Members of 1st Troop, 2nd Combat Engineers Regiment pose on the Bailey bridge they constructed for Renfrew County. They erected the bridge under the command of Capt. Chad Rizado and Company Sgt. Maj. Gary Crosby.

Collapse of Elgin County's Culverts

When three massive steel culverts were installed south of St. Thomas on Elgin County's Road 45 at Kettle Creek in 1970, they were the largest pipes of their type in the world, says Bob Moore, the county's engineer at the time. Elliptical in shape, they were 37 feet (11 metres) in diameter and stood 26 feet (eight metres) high. The culverts were constructed in place by bolting panels together (1), and then covered with three feet (one metre) of granular spread (2) and more than 20 feet (seven metres) of clay (3).

Unfortunately, the culverts did not stand up to the pressure of the overburden. They were restored through a major remedial program which involved stripping off all the backfill, rebuilding the culverts and encasing them in concrete to prevent a repetition of the problem (4). The cost of restoration was $750,000. The culverts were "squeezed like a pop can", in the words of Moore (5).

PHOTOS COURTESY R.G. MOORE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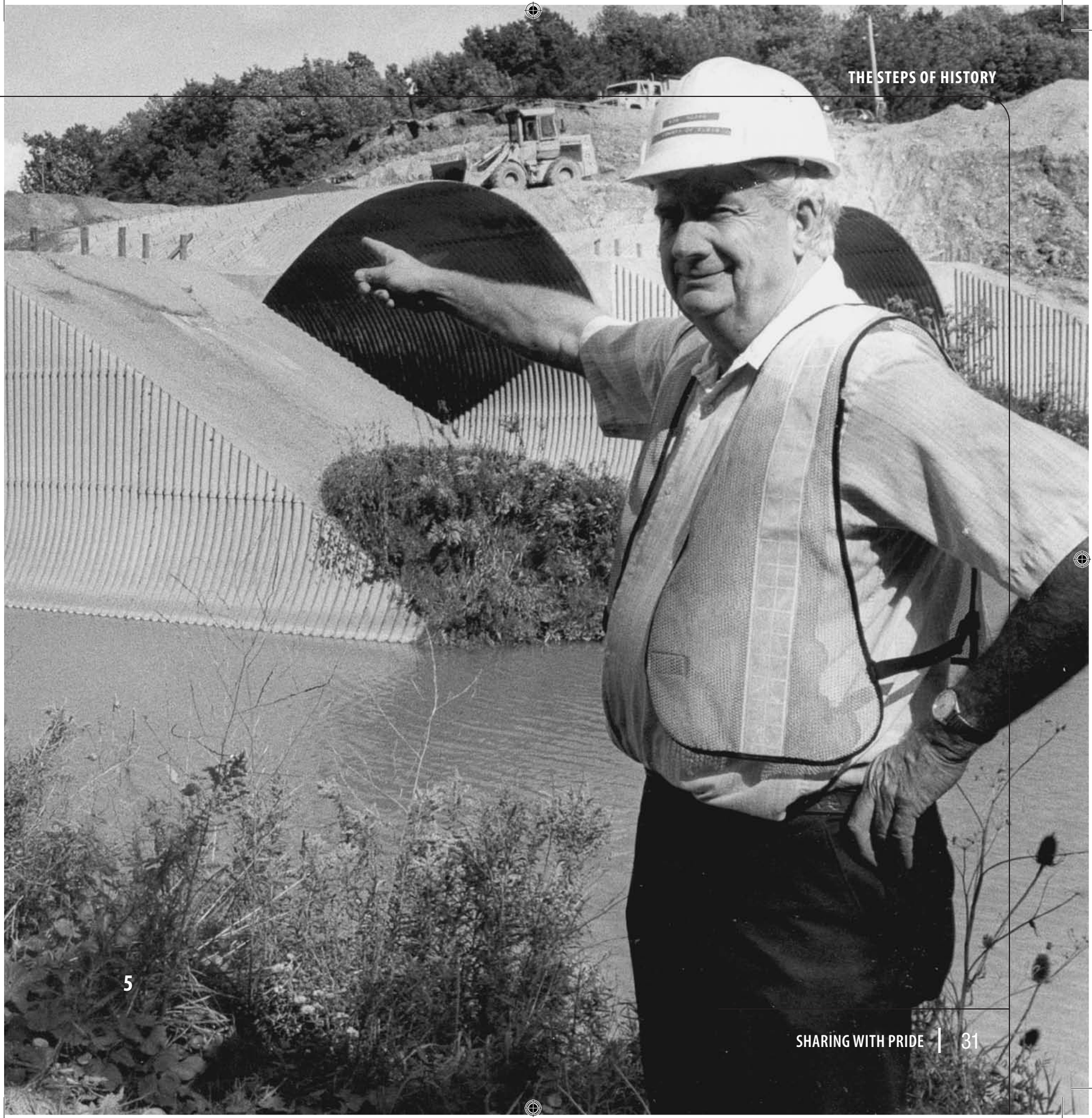

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From Bridge Designs to Street Signs: Keeping the Members Busy

One of the ways a good leader keeps his association active is to give his members something to do. When President W.C. Miller met with his colleagues in the new City Engineers Association in January 1951, he presented a list of two dozen subjects which he felt were worthy of the engineers' attention. They ranged from bridge design to markets to street signs to service station entrances to civil defence to catch basins. At the same meeting, the 17 members of the association were assigned to one or more committees: municipal streets, cost accounting, Local Improvement Act, control surveys, membership and the long-winded Municipal Drainage Act as Applied to Urban Municipalities Committee.

Now they all had something to do and they went at it.

One of the first subjects they tackled was highway subsidies for urban roads, always a popular topic for politicians and engineers. The solutions had a common theme: get more money from the province, an approach that has been consistent to this day.

One of the constant bugaboos (still felt today) was the appropriate distribution, or lack of it, of the revenue from motor fuel taxes and vehicle licences. Ostensibly, these revenues were to be used for construction and maintenance of roads and streets. The association felt the funds should be distributed in a more equitable manner, taking into account such matters as the

PHOTO COURTESY R.G. MOORE

volume of traffic in urban areas, the revenue returned relevant to the revenues raised in a given area, and the subsidy of road costs assessed against abutting properties. And, it went without saying but they put it in anyway, that the Department of Highways should bear the total cost of highways traversing municipalities.

A year later, the department announced that it was raising the subsidy to 50 per cent for all roads in the Metropolitan Toronto region. In 1956 the association suggested that a seven per cent subsidy allowance be made to cover such items as engineering and overhead costs. Minister James N. Allan, always a friend to highways, thought it might be possible in 1958. The promise came through that year.

In 1959, the engineering association produced a comprehensive study of the estimated expenditures needed for municipal roads in the next 20 years. They were regarded as immense at the time: county roads $731,760,000; township roads $1,154,340,000; urban streets, $2,828,040,000 for a total of $4.7 billion. The engineers association was becoming a big-ticket item.

During the '50s, the engineers concerned themselves with such diverse municipal issues as cost accounting, trench excavating, gas explosions and sanitary landfill. But they were also looking after their own welfare, since this was part of the reason for having an association. Early in its life, the City EA did a survey of salaries and asked the Association of Professional Engineers of Ontario (APEO) to send a copy of its minimum salary schedule to municipal clerks and councils. This may have rubbed some of the clerks the wrong way, for it seemed to them that the engineers were trying to force their salaries above the clerks' levels. Feeling hard done by, the engineers discussed protection against unjust dismissal, suspension or demotion with Col. T.M. Medland of the APEO.

The colonel came back with a brusque report which suggested strongly that if the engineers wanted better treatment, they had to become more professional.

In his view, the lack of respect accorded to engineers stemmed from:

- insufficient or inadequate records and poor organization;
- lack of full knowledge by the engineer of his work in progress and organization under his responsibility;
- laxity in insuring that all work was properly authorized by appropriate authorities and written record of all changes made from the literal wording of original authority;
- insufficient attention paid by the municipal engineer to his personal dress and appearance.

In other words, he was saying shape up!

◀ **Rubbing Elbows**

Major construction projects merit a formal opening ceremony. Local politicians, municipal engineers and other dignitaries celebrate their achievements with provincial heavyweights. Ontario's Minister of Highways James Allan (wearing hat) attended the opening of the Wardsville Bridge in Elgin County in 1961 to see how the province's money had been spent.

Subsidies Good in Any Language

Walk/Don't Walk program: "It was noted that while installations of symbols are subsidizable, the use of words is not subsidizable." (Report from Ministry of Transport advisory committee)
– MEA minutes January 13, 1988

PHOTO COURTESY R.G. MOORE

▲ **Spanning the Thames**
The steel through-truss Wardsville Bridge was built over the Thames River in 1891.

The question of where and when to hold the association's meetings was a perennial issue. Like their county relatives, the city engineers tended to hold their meetings in conjunction with other professional conventions. Not only did this mean that their municipalities would pick up most of the cost of attending the meetings, but they would have to schedule fewer days away from the office.

At first, the city engineers scheduled their meetings to coincide with the APEO annual meeting in January. Later they switched their annual meeting to coincide with the annual conference of the OGRA. By 1960, membership had grown to 92 from 37 in 1950. And the price of membership had jumped five-fold from $2 to $10.

Growing Up in the City

After a decade of development as a serious organization, the City Engineers Association was invited to form an advisory committee to provide wisdom and guidance to the minister of highways.

It was a milestone, like getting your driver's licence or being allowed to sit at the adult table at Thanksgiving. Or maybe being asked for a date by the most desirable guy in the school.

In 1960, under the dynamic leadership of President T.L. "Spike" Hennessy, the City Engineers Association was giddy with success. After 10 years of establishing itself as a serious organization, it had been invited by the provincial government to form an advisory committee to the minister of highways. The door was open – they had an in!

The purpose of the committee was to investigate matters of common concern to city engineers and the Department of Highways and to make recommendations to the minister. A similar relationship already existed with a committee of county engineers, and the cities were being given equal opportunity. There were to be up to seven reps from the city organization, spread geographically equally across the province, from small towns, large cities and urban townships. Joining them on the committee would be two representatives from the DHO.

There was a sense of permanence about it. Members were to be appointed for long terms, and the planning studies were to be projected over at least five years. They would meet frequently, at least once a month, at the department's headquarters in Downsview. All expenses would be covered by the department.

As a committee independent of the DHO, the advisory group would report directly to the minister and the CEA.

This was heady stuff indeed, but another advantage soon emerged. In practice, the seven CEA members chosen for the advisory committee were also the executive members. They took advantage of the Downsview sessions to hold their own executive meetings consecutively, thereby gaining more time together to thrash out the association's business. Naturally, the CEA agenda tended to be heavily influenced by whatever had been discussed at the advisory committee.

In the first year, the advisory committee dug into a wide variety of topics:

- efforts to encourage attendance by elected municipal officials at the urban session of the OGRA conference;
- improvement in the dissemination of the DHO research documents to CEA members;
- establishment of a system to review DHO manuals on municipal roads and determine their usefulness to municipal engineers;
- subsidies for storm sewers on municipal streets;
- geometric design standards for urban streets;
- discussion of the requirement of licensing snow removal vehicles;
- polling member municipalities to evaluate the benefit of courses on asphalt, concrete and soils offered to municipal employees by the DHO.

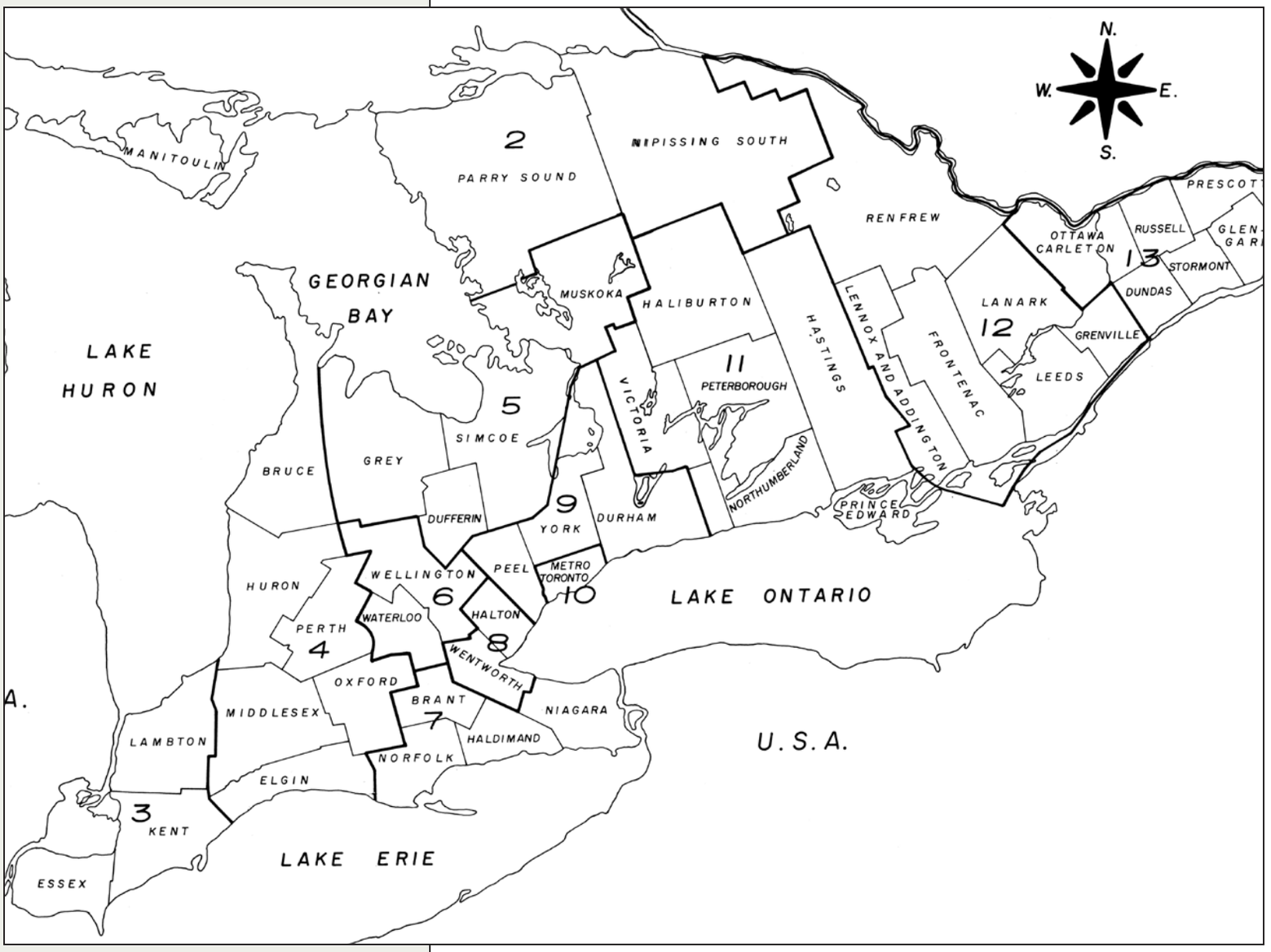
Their work did not go unnoticed and unrewarded. At the 1961 annual meeting – the year after the advisory committee was formed – Highways Minister Fred Cass complimented the work of the advisory committee, indicating that it had played a large role in obtaining the pre-construction engineering allowance.

The following year Cass opened the provincial purse and invited the city and county engineers to join him for lunch at the OGRA convention. This was the first of a long string of lunches at the expense of the provincial government.

A good rapport developed between the ministry and the CEA and it was a two-way street. The CEA distributed material for the DHO, and could bring its members' concerns directly to the ministry. However, sometimes the answers weren't always swiftly forthcoming. For example, in 1967 the CEA asked whether street cleaning could be subsidized by the DHO. Two years later the DHO replied, yes, but only during three months of the year.

During the '60s, the committee tackled a large range of topics, with subsidies on roads, sewers and streetlights seeming to top the list. Every municipality was looking for more money from the provincial treasury. But they also got into training programs, regulations of pits and quarries, legal load limits for trucks and subsidies for snow removal.

The success of the DHO advisory committee soon had the executive considering other similar links with the government. In 1962 an advisory body was established to work with the Ontario Water Resources Commission. The committee started splendidly, meeting on a monthly basis, but attendance began to slide and there were gaps in meeting dates. But when the OWRC picked up expenses of CEA members attending meetings, interest was revived. The committee met at the OWRC laboratories in Toronto next to Highway 401.



ZONE MAP, MEA, 1974

▲ **Engineering in the Zone**

In slower-paced days before the internet, the MEA created a zone system for its members. A co-ordinator in each zone was to report to the executive on zone activities and exchange problem-solving ideas and information with other zones. Members of each zone were expected to meet quarterly to hold round-table discussions on local and provincial issues. The zones were largely abandoned when rapid communications systems, including the internet, enabled engineers to communicate with each other at any moment. The zone system lasted only four or five years.

Some of the topics which have become vital issues in the intervening years began to show up on the agenda: how to dispose of sewage sludge, developing regulations on sanitary landfills, dumping of snow into sewers, jurisdictions competing over the disposal of wastes.

This was an era of rapid suburban expansion, and issues relating to servicing developments were constantly on the agenda. Growth was running ahead of the ability of government to regulate. Such things as the use of water softeners by homeowners were discussed. And then there was the matter of the engineers' credibility. In 1968 the CEA expressed concern that municipal engineers were required by the Ontario Municipal Board to certify development decisions of council, even when the engineers had recommended against them on the basis of inadequate servicing. The OWRC said this was a matter of OMB policy; the engineers saw it as an example of too many chefs stirring the pot. That is, jurisdiction was spread throughout too many provincial bodies.

Periodically, the CEA would review its own sense of purpose to determine whether it was fulfilling the needs of its members. In the early '60s it had re-examined its committee system and disbanded some that seemed no longer needed. A committee of objectives was struck in 1963, led by President S.R. Price. Its goal was to answer the question, "Why are we here?"

Salaries and working conditions may have improved for the engineers, for the committee opted to give improved public works top priority. It said the primary goal of the association should be better public works engineering for the municipalities and the public; to this end, improved techniques and procedures should be paramount over issues pertaining to the welfare of the membership. Disseminating information to members would be a main objective, as would research and lobbying to influence legislation.

During their formative years both the county and city associations had struggled with their membership criteria. Basically, you had to be an engineer and you had to work for a municipality. And until the 1960s, the chief municipal engineer was indeed an engineer. But a new phenomenon was emerging: the role of a non-engineer professional administrator in charge of public works. The committee recommended a new class of membership to accommodate them. It advanced a number of arguments to support this proposal, one of them being a need to forestall the formation of parallel non-engineering organizations.

The executive opted not to change the membership criteria.

The committee was disbanded but reconstituted in 1969 to take another look at the association's objectives. At that time, one of the primary concerns was the proliferation of regional governments. Engineers in these new sprawling municipalities were neither city nor county, but hybrids who had pasture mud on their city shoes.

CITY OF HAMILTON

▲ **Turning 360s in Turner**
Public skateboard parks have become popular in Ontario communities. Turner Skatepark in Hamilton has approximately 2,500 square metres (26,909 square feet) of skateable surface.

A Marriage of Mutual Interests

The advent of regional governments began to blur the line between the duties and responsibilities of city and county engineers. Rural and urban municipal engineers decided it was time to amalgamate the City and County Engineers Associations.

By 1970, it had become clear to both county and city engineers that a merger of their respective organizations would be beneficial to all. While their associations might lose some of their individual identities, the benefits to be gained from a stronger organization were becoming obvious.

CITY OF HAMILTON

▲ **Tripping Through the Trilliums**
Boardwalks through forest areas, like the Joe Sams Trail in Hamilton, create opportunities for leisurely excursions.

As the advent of regional government changed the face of municipal Ontario, the duties and responsibilities of both urban and rural officials had to change as well. The county engineer could no longer devote his time primarily to roads and culverts.

In the summer of 1970, amalgamation talks began. The first meeting was on July 29, when high-level representatives of both organizations got together. Representing the City Engineers Association were President R.R. Bailie, director of public works, Town of Burlington, Immediate Past President Eric Aldersley, deputy city engineer, City of Brantford, and W.P. Taylor, city engineer, City of Guelph. Appearing for the County Engineers Association were C.G. Spencer, county engineer, Brant County, (chairman), W.C. McDowall, county engineer, Norfolk County, D. Husson, deputy county engineer, Middlesex County, and J.M. Jordan, engineer for Waterloo County.

They recommended that a formal committee be formed of three engineers from each organization, plus a secretary, with at least one member from a regional municipality, and that two members of each organization be on the executive.

That committee was established under Chairman E.G. Yundt, Bruce County engineer, with Vice-Chair C.H. Eidt, director of engineering, Regional Municipality of Niagara; Secretary William C. Holman, roadways division engineer, Regional Municipality of Niagara; C.G. Spencer, Brant County engineer; Jim Cruickshank, operations engineer, City of St. Catharines; R.R. Bailie, commissioner of works, Town of Burlington; R.W. Knight, Peel County engineer.

With the blessings and the assistance of the two engineering associations, the County Engineers/City Engineers Amalgamation Committee sought valiantly through 1971 to find common ground on which to establish a firm foundation for a new organization. In doing so, it had to overcome some built-in prejudices between the two organizations,

mostly rooted in the different objectives of city and county engineers.

When it reported on October 27, 1971, the amalgamation committee highly recommended the merger of the two organizations. However, it did note that there would be some disadvantages. One was a possible loss of identity through assimilation. "This loss of identity may be of a personal nature or may be experienced by a large group of engineers," the report said. Another was the dilution of services then being provided by the individual organizations to their members. "For example, the County Engineers at present are concerned mainly with road administration matters. This programme would, of necessity, be diluted by amalgamation when other subjects of interest to the City Engineers would be considered."

The city boys weren't about to spend all their time grading gravel and unclogging culverts.

This wasn't a superficial judgment. The amalgamation committee had reviewed the objectives of both potential partners, based on their constitutions, and discovered that the county engineers were more preoccupied with road building.

As stated in its constitution, the objectives of the County Engineers Association were:

- to maintain good relations with the Ministry of Transportation and Communications (formerly the Department of Highways of Ontario);
- to acquire and exchange information;
- to continue studies of standards and specifications for county roads;
- to study and review all legislation affecting roads;
- to promote a knowledge of highway economics;
- to promote better public relations;
- to advance the status and well-being of Association members.

Meanwhile, the objectives of the city engineers appeared to cover a broader range:

- to study the technical and legal problems met within the practice of Municipal Engineering;
- to interchange information to co-operate with other associations whose objectives or work is wholly or in part related to the work usually performed by a City Engineer;
- to disseminate the results of these studies to the membership in such a manner as to advance the practice of design, construction, and maintenance of municipal services and their administration;
- to make the recommendations to the appropriate authorities for improvement in legislation concerned with municipal problems;
- to promote the common interests of the members of the associations.

The committee thought the differences could be worked out, given that some compromise would be necessary by both partners.

Counterbalancing this was the advantage of increased power and size, producing strength in numbers.

"A larger stronger organization would be more stable, would be less liable to undue pressure from other organizations and would reduce fragmentation. This larger organization would speak with one voice to Provincial Government Departments and to other associations," the report said.

Members would also benefit from increased services. "One organization would result in a larger body, able to provide a broad spectrum of experience to all members. It is anticipated that existing services could be provided to the membership on a more economical basis than is presently experienced. In all probability, the variety of services would increase."

The amalgamation noted there were minor differences in membership qualifications, that the annual meetings were held at different times, and the approach to workshops was significantly different. The city engineers also appeared to have a much better communications system to reach its members through newsletters (the county engineers had none) and through circulating employment notices of positions available in municipalities. The county engineers relied on less formal lines of communication.

Given the differences, the amalgamation recommended that the executive committees of the two associations concentrate on resolving their differences on membership, representation on the executive of the new association, formats of workshops and annual meetings, and the development of a new constitution.

Fine by us, said the city engineers, who appeared to be moving more swiftly toward amalgamation than their county cousins. At an executive meeting in December 1971, directors of the city association indicated that they wanted to amalgamate the two organizations in the immediate future. They were aiming for amalgamation by January 1973.

This was optimistic. On February 20, 1972, a motion was passed at a joint meeting to call the new organization the Municipal Engineers Association of Ontario. The last two words were later deleted. The county engineers then wanted time to review the city association's constitution and propose amendments to suit them. The county engineers were slow to respond, and when the CEA executives had not heard of any decision by November 1972 they decided that amalgamation would have to be deferred until 1974.

Ours Are Longer

A bill to allow longer trucks received first reading. MTO would allow longer trucks on Ontario highways providing the trailer was built in Ontario. This was intended to alleviate concern in the truck trailer industry that it could not very well build a longer trailer until the revised law had been adopted. MEA opposed this change in legislation, pointing out that the law was being revised despite a lengthy consultative process which indicated opinions to the contrary.
– MEA minutes January 10, 1990

Some persuasion was needed. City engineers outnumbered county engineers by almost three to one, with 148 members in the city organization and 50 in the county. Many of the rural county engineers were worried that they would lose their voice in an organization dominated by urban engineers. They also noted that the impetus for the amalgamation seemed to originate from engineers in regional municipalities who were no longer sure where they fit in.

County engineers also wondered how the workshops could be amended to suit their interests, since the city engineers seemed to have workshops on topics which were of little interest to rural engineers, such as waste collection and disposal. On the other hand, city engineers were concerned about the county association's emphasis on the development and maintenance of rural roads. F.B.D. Arnold, in his history of the County Engineers Association, observed that the interest of county engineers in the workshops appeared to subside considerably after amalgamation.

The proposed amalgamation caught the eye of the press. The Toronto-based *Daily Commercial News* carried two stories, both citing the advantages of merging the organizations. Still, time dragged on and the next joint meeting did not take place until October 18, 1973, when both parties reviewed a draft constitution and agreed on a final version.

Immediately, both organizations decided to put amalgamation to a vote of their members in November, the very next month. The outcome was clearly pro-merger. City engineers voted 129 for, two against, with four spoiled ballots. The vote of the county engineers was also overwhelmingly in favour, but not unanimous. Don Pratt, engineer of Oxford County, cast the single vote against amalgamation and he asked that the vote be recorded. By doing so, he won his place in history.

The new and unified Municipal Engineers Association became effective at its annual meeting on February 25, 1974. A.A. Jackson, the president of the former city organization said, with some understatement, that the most significant thing that had happened during his presidency was the agreement to amalgamate.

PHOTO BY ORLAND FRENCH

◀ **Green Power**
Water pours over a dam at a mini-generating station on the Moira River at Belleville.

The Birth of Regional Governments

The creation of regional governments absorbed and dissolved a number of familiar old Ontario counties. Since the new municipalities were usually an amalgamation of both rural and urban populaces, the engineer working for one of them was no longer only a city or a county engineer. A subset of regional municipal engineers was born.

The burgeoning population growth of southern Ontario after the Second World War placed an enormous burden on municipal administrations. Villages became towns and towns became cities. Suburbs merged with suburbs. Cities spilled over their borders into neighbouring townships which were not equipped to deal with huge increases in population. Many rural municipalities, eagerly eyeing the tax revenues offered by sudden growth, approved developments they were not prepared to handle.

It seemed everybody in Ontario, and people from all over the world, wanted to live in the larger towns and cities of old Upper Canada. Families blossomed, as all those men home from the war did their duty on the home front.

Concentrations of populations meant concentrations of housing and commercial activities. Farmland was turned into subdivisions, shopping malls and industrial parks, often in townships which had no experience in dealing with anything larger than Joe's Gas Station.

In 1947 Canadian entrepreneur E.P. Taylor began buying up working farms in the Don Mills Road and Lawrence Avenue area of Toronto. He intended to build a brewery but changed his mind and created the first major post-war planned subdivision in Canada. It was a sparkling jewel of subdivision development and Queen Elizabeth opened the Don Mills Centre in 1958. The Golden Mile in Scarborough, one of Canada's first model industrial parks, occupied land that had been farmed just before the Second World War. It became a site of intensive industrial and commercial development.

The phrase to describe it all was "chaotic sprawl". In the planner's mind, the way to control it was to create more powerful municipal governments to deliver urban services over a much larger area. They would be called regional governments.

The first regional government in Ontario was created in 1953, when the Municipality of Metropolitan Toronto (Frederick G. "Big Daddy" Gardiner in charge) consumed the City of Toronto and a number of surrounding townships and boroughs.

The 1960s and 1970s were the heyday of the regional government, at the cost of a number of counties. Carleton County disappeared in 1968, to be replaced with the Regional Municipality of Ottawa-Carleton. Lincoln and Welland counties were replaced with the Regional Municipality of Niagara. Durham, Northumberland, Ontario, Haldimand, Halton, Norfolk, Peel, Waterloo and Wentworth counties all underwent transformations into regional forms of government.

Most of the regional governments followed the old boundaries of the counties. Some of the old counties were split up into different regions. Administratively, municipalities within the regions retained their own councils, to form a two-tier government structure. This was not dissimilar to the old county structure but the new governments were handed more powers than counties to deal with issues such as land-use planning, social services and major roads.

The process continued to evolve. With further restructuring in the 1990s, some regions ceased to exist and some were subsumed by the municipalities within them. The Regional Municipality of Ottawa-Carleton, for example, has become the City of Ottawa.

What this meant to the engineering associations was the creation of a new breed of municipal engineer, one who on any given day could be dealing with a broken watermain in downtown Towerville or a clogged drainage ditch in rural Toonerville. He or she was neither "city" nor "county".

The emergence of regional governments forced the realization that the issues confronting engineers of both cities and counties were no longer distinct and different. The duties and responsibilities of the municipal engineer were changing and they might be better served through one single amalgamated organization. It was a decision not to be taken lightly.

Ultimately, the regional engineers were encouraged to continue as members of the MEA but they also took part in their own organization, called the Regional Public Works Commissioners of Ontario (RPWCO). Originally including only the commissioners of the regional governments and some of their staff, it was later expanded to include similar levels of public works decision-makers from the larger single-tiered municipalities with more than 100,000 population. The RPWCO began as an opportunity for informal networking on the common problems of these large municipalities but later got into specific agendas for issues management.

Because of the numbers of voters represented by their municipalities, the RPWCO has often been able to more easily gain the attention of MPPs, a minister involved or even the premier, to raise matters of concern. In addition, the larger municipalities and regions tend to have more staffing and budget available to do special studies and develop new best practices. Through greater interaction between the MEA and the RPWCO, more issues are beginning to be included and addressed that are to the benefit of all sizes of municipalities.

Railway Bridge is Falling Down

Because the Federal Government is not contributing money to grade separation projects, the railway companies are not paying their share for maintenance of these structures. The Municipal Engineers Association has real concern for the rehabilitation of structures to bring them back to their original design loading.
– MEA minutes December 9, 1987

Tight Rules on Membership

Today, an engineer is an engineer is an engineer, but that's not good enough to get into the Municipal Engineers Association. You have to have your paycheque signed by a municipality as well.

Those are the two basic requirements for membership in MEA, but life is never quite as simple as it seems. Occasionally the MEA membership is surveyed to determine if there is interest in expanding membership eligibility. This happened again in 2009 when MEA members were polled to see how they felt about admitting Certified Engineering Technologists (CETs) as full or associate members.

For some, this would be accepting the new realities of modern engineering practices. For others, the change represents dilution of the purity of the realm. Those in favour of allowing CETs to join argue that the expertise of these people would be invaluable for inclusion as MEA reps on many technical committees, and would also build on the relevance of the MEA to represent municipal engineering and public works operational concerns.

Active membership has traditionally been open only to those engineers who are registered as a professional engineer with the Professional Engineers of Ontario, the provincial licensing body, and are a full-time employee of a municipal government. This can be a township, county, city or town.

Associate member status is open to registered engineers who are employed in a provincial or federal civil service capacity, or with a related agency such as the Ontario Good Roads Association or the Association of Municipalities of Ontario.

Associate membership is also available for EITs, or engineers in training. This is the designation given to a newly graduated engineer without four years of recognized employment in engineering practice and who has yet to write an ethics exam required to become a P. Eng. Until acquiring their P. Eng., or professional engineer designation, an EIT is permitted to be only an associate member.

At one time, when the city and county engineers had their own organizations, usually only the chief engineer would represent the municipality in the association. With the emergence of MEA, membership was broadened to include all engineers employed by a municipality.

There are three additional categories of membership, all of which include the basic provisions for joining in the first place. One is life member, open to former active members who have retired from a municipality. Life members have provided extensive service to the association through its board or committees of the association and extensive service to the individual's municipality. Another is "retired member", a former active member who has been retired from municipal service. The third category is that of an honourary member who is voted in by the board to recognize an outstanding contribution to the practice of engineering. Life members continue to have full voting privileges while retired and honourary members do not.

▼ **Summer Works**
Road construction is a familiar traffic-stopper during Ontario's building season.

PHOTO BY ORLAND FRENCH

Down with a Mighty Splash

COUNTY OF DUFFERIN

▲ **With a Grand Explosion**

As in cooking breakfast, you can't make an omelet without breaking a few eggs. The old bow-string arch Black Bridge on County Road 25 in Dufferin County was brought down in a few moments to make way for a new crossing. This series of photos shows the destruction and collapse of the old bridge into the Grand River.

Great expectations

Taxpayers just don't understand an engineer cannot build for every eventuality, says David Bonsall. It's too expensive. They'd never stand for it.

A member of the University of Waterloo's Class of '92, Bonsall began his career in private consulting, left for the public sector and in 2008 returned to private practice in Peterborough. He was still manager of engineering and construction for the City of Peterborough in 2004 when a major downpour taxed the municipality's sewers beyond their limit.

Roads were washed out. Retaining walls failed. Private and public property was severely damaged. "You can't design for that," says Bonsall. "Well, you could, but as a taxpayer you would never choose that level of service. It would be too expensive."

As the city was left to clean up and repair the damage, ratepayers' anger mounted. They held neighbourhood meetings and descended on City Hall where they demanded to know what had gone wrong. "Nothing went wrong," says Bonsall. "It was a simple matter of a rainfall so excessive none of the systems could handle it. We design systems to handle a maximum wet weather flow and this exceeded the storm parameters."

Bonsall honed his diplomatic skills that year. He learned that a crucial part of any city engineer's job is to remain calm in the face of a public outcry.

"University can't prepare you for that side of municipal engineering. I guess to be prepared for the administrative side, it's more a personality trait than a learned skill. You need social behavioural skills."

It was a stressful experience, one he says he never wants to repeat.

From Metrication to Ministration

As the Municipal Engineers Association developed its profile, it gradually broadened its interests and influence. In addition to interpreting the impact of new government rules and regulations on its members, the MEA became an integral part of the advisory process available to a modern democratic government.

In 1974 the new Municipal Engineers Association opened its first year with 276 active members, 26 associate members, 15 life members and three honourary members.

This was the first year the engineers studied the implications of Canada's new metric system in some detail. They had had notice of it since 1970, when Pierre Trudeau's Liberal government decided to catch up to the rest of the world – with the notable exception of the United States – and go metric. A White Paper on Metric Conversion was introduced in January 1970 to advise Canadians they would soon be measuring their height in centimetres and their weight in kilos.

For municipal engineers, metrication brought many changes, not the least being the challenge to order road salt in metric tonnes and adjusting the road signs from miles to kilometres. Cities appeared to move farther apart; for instance, North Bay had been only 210 miles from Toronto, now it was 338 kilometres. By the end of 1977 all road signs were metric and all new cars had metric odometers and speedometers. As far as is known, there were no conversion disasters in Ontario as spectacular as the circumstances that led to the Gimli Glider, the brand-new Air Canada aircraft that ran out of fuel over Manitoba because of a metric conversion error.

The activity rate of the new organization appeared to increase disproportionately to the simple act of merging two associations. During the 1970s the MEA executive met with many technical and professional groups to exchange information and concerns. W.J. Warwick of Scarborough, who wrote a history on this era, commented, "It seems as the new association acquired experience it was meeting more and more with other technical and professional groups in order to enhance the awareness of these groups with MEA."

In MEA's fledgling years, the executive worked hard to establish the organization's professional presence and credibility. By 1979, the association had gained sufficient profile that it was able to attract the premier of the province, William G. Davis, to speak at its annual workshop. The workshop was held in Peel. As this was Davis's riding, it was all part of a day's work for him. It also permitted him another opportunity to speak lovingly about his hometown Brampton. That year's MEA president, William J. Anderson, was from Peel Region.

The beleaguered secretary-treasurer also felt the onerous demand of a higher workload, so the position was split into two executive positions. During this decade, the treasurer had the pleasure of dealing with a growing pot of money: members' equity at the end of 1974 was $8,280.47, in bank deposits and Canada Savings Bonds, growing steadily to $42,788.20 at the end of 1980 and $78,875.98 at the end of 1987.

The new MEA also established a system of 12 zones across Ontario to encourage local participation of its members. Members of each zone were expected to meet three or four times a year. The meetings appear to have been breezy affairs: they were to be kept as informal as possible to allow free and open discussion of association business and promote good fellowship among the members.

This was in the era of pre-internet and, in some counties, pre-fax machine. But as the pace of work speeded up, office staffs became larger and communications improved, the meeting process seemed outmoded and slow. For the most part the concept of regions was abandoned except in the London area.

The new executive was also concerned about the legal responsibilities of a municipal engineer. Some members were worried that the current legislation in Ontario did not effectively protect municipal engineers from liability on the job. After some consultation and discussion, the MEA executive asked for changes in legislation to extend liability coverage for municipal engineers. This paid off with an amendment to Bill 80 in 1978 to permit municipalities to obtain liability insurance for their employees.

A few years later, in 1984, the MEA purchased its own comprehensive liability insurance, including an errors and omissions policy, to cover its members who were working on MEA business.

The growing frequency of litigation had caused the MEA to keep a wary eye on members' liability. There was, for instance, a proposal to extend the time period for commencing an action against a municipality for non-repair of highways from three months to two years after the date of an accident. This meant, at the least, more scrupulous recordkeeping by municipalities.

In another case, a British Columbia court had held a municipality responsible for the overflow of raw sewage from a pumping station into a creek. While the design of the station itself complied with all federal and provincial regulations and guarded against sewer back-ups into basements, the court held that the release of sewage action contravened the Canada Fisheries Act.

In 1981 the association scrambled to align itself with a new municipal force in Ontario. The various organizations representing towns, cities, regions and counties had voted to amalgamate into the Association of Municipalities of Ontario (AMO). This would unite all municipalities into one large lobbying organization.

TOWN OF RICHMOND HILL, QUOTE COURTESY WILLIAM SHAKESPEARE'S JULIUS CAESAR

At its founding convention in August 1981 the new AMO proposed affiliations with professional associations such as MEA. The executive listened to the presentation and agreed to support PAMO, the Professional Association of Municipalities of Ontario. The executive felt that if the new AMO was to be the voice of municipalities when speaking to other levels of government, it was essential for the health of MEA to be part of that voice. As well, being part of the group meant that MEA reps would have a first-hand look at items of concern and resolutions on the AMO agenda. These resolutions would shape the policy of AMO and were the basis of briefs and submissions to other levels of government. It would be extremely beneficial to MEA to get in on the ground floor.

▲ **"Caesar's spirit … come hot from hell."** Audiences in the Richmond Hill Centre for the Performing Arts are warmed and cooled from sources deep in the earth. Twenty-one bore holes of a geothermal installation pick up ground source heating and cooling. PVC piping connects the bore holes to equipment inside the theatre.

The Mayor, In The Council Chamber, with a Letter Opener

Everything well in hand except experiencing problems with small number of people going to Murder Mystery dinner. President (Jeff Seaton) to look into the situation.

– MEA minutes November 13, 1991, re annual workshop update

Representatives of the new AMO staff met with the MEA executive in January 1982 and subsequently the executive reconfirmed its intention to apply for affiliated association status. The president and vice-president were appointed to the board of AMO.

A couple of years later (1984), the MEA proved its worth to AMO by preparing an extensive report on the cost impact on municipalities of the new Environmental Assessment Act. Under the chairmanship of Jeff Seaton of Victoria County, this was the first major project undertaken by MEA for its new affiliate.

As it grew in stature and strength, MEA received numerous requests for similar affiliations. Each of these, if granted, would require representation from MEA and divert attention from the primary goals of the organization. As the result of affiliating with AMO, MEA had representatives sitting on eight AMO committees as well as on the board itself.

As flattering as this might be to MEA, there was a downside to ever-growing involvements, as President Gordon G. Dougall of Leeds-Grenville noted at the end of his term (1981-1982): "During my term as president, MEA was bombarded by demands from a wide variety of other municipal and government associations for participation or liaison in their activities. I found myself trying to steer the association away from many of these activities. I felt that the association should concentrate its efforts on those matters which were of importance to our own membership. I understand that this type of consideration is still valid."

Dougall's warning may have been difficult to heed. Two years later, at the beginning of 1984, the MEA was involved in 47 active committees. In 1985 it joined another one – NACE, the National Association of County Engineers. Maintaining an active role in all those committees kept the membership hopping. At a think tank session that year, some brain power was exerted on ways to involve past-presidents in MEA activities.

By the mid-'80s the MEA had developed its own identity and was becoming quite possessive of it. Needless to say it was somewhat dismayed when the Municipal Electrical Utilities Association and the Ontario Municipal Electrical Association amalgamated to form the Municipal Electrical Association, initials MEA. After some consultation with a lawyer, the original MEA determined it had no legal method of preventing another organization from using the same initials and similar logo. (A web search by Google in early 2009 found other organizations using MEA initials, including Middle East Airlines, Metro East Anglers and the Ministry of External Affairs, India. The engineers' MEA ranked near the top.)

MEA grew sharply in 1986. The newsletter reported 96 new members, of which two notes should be made. Fifty came from Metro Toronto, and one from the City of St. John's, Newfoundland (James J. Finn, director of engineering and works).

The executive workload continued to be exhausting. Outgoing president D.C. Redmond of Sault Ste. Marie said at the end of his term, "I am sure every president of MEA both past and future was and will be slightly taken aback at the volume of work and the dedication required of him and perhaps someday her. On the other hand I do not believe any person elected to this office will ever question their desire to seek this office or the satisfaction derived therefrom."

During the '80s, the MEA had been doggedly working on documents to implement the provisions of the Environmental Assessment Act. At the end of 1987, President R.B. Strachan (Lanark County) summed up the amount of sweat that had gone into producing workable documents to implement Municipal Class EA.

"At long last the Class Environmental Assessment documents for municipal roads as well as the document for water and sewer projects were finally approved by the minister. This approval finally concluded a long and arduous process for MEA representatives on the committees responsible for these documents and after approximately eight years we feel we have produced documents that are practical for municipal engineers in Ontario to use. A

CITY OF HAMILTON

monitoring process will continue in the next few years to ensure the documents are workable and that municipal projects will consider the wellbeing of the environment of Ontario."

In the same year, the MEA had established a liaison committee with the Ministry of Labour. This was only one of several, and the number of formal links indicated how far the association had moved in becoming an integral part of the advisory process available to the modern democratic government. Where once the former city and county engineers associations had been delighted to be receiving crumbs from the luncheon table of the minister of highways, now as MEA they were regularly and routinely passing on information and concerns through liaison committees to various ministries: transportation and communications, environment, housing, natural resources and now labour.

Municipal engineering no longer was only about sewers, roads and bridges.

The High and The Mighty

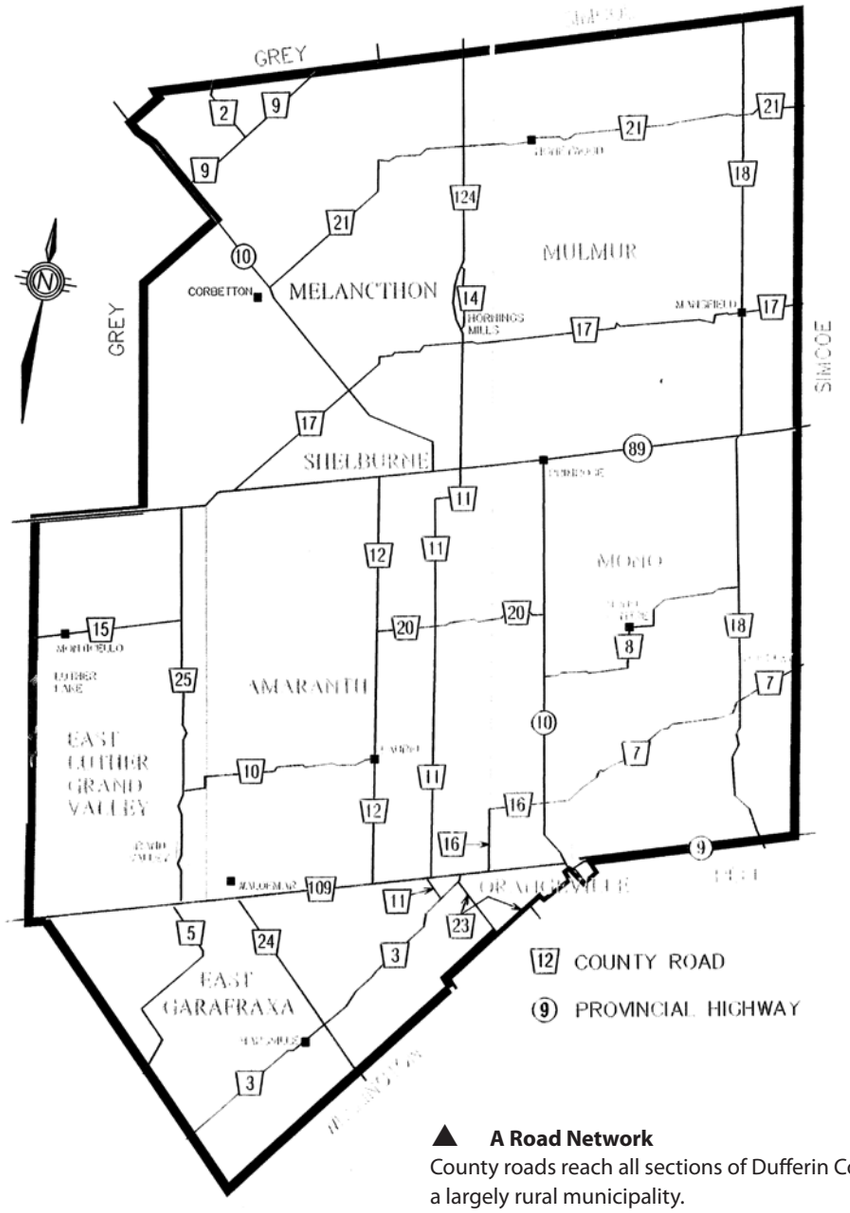
The influence of municipal engineers can be found anywhere. One day in the mid-'60s, William Davis, then the minister of education for Ontario, was flying Air Canada from New York to Toronto with his executive assistant, Clare Westcott. Also known as "Brampton Billy", Davis represented the City of Brampton and would fondly mention his hometown several times in any speech he gave. A flight attendant came along and told Davis that the captain had invited him to visit the cockpit.

Davis was pleased at being recognized and went up front. When he returned some time later, he wasn't smiling. Westcott asked him, "Was that interesting?" Davis replied, "As a matter of fact, no." He explained, "The captain is a member of Brampton City Council and the engineers wanted to know when they would be getting a government grant for a new watermain."

▲ **Overlooking the Falls**
Platforms such as this one overlooking Albion Falls in Hamilton improve the local quality of life and encourage tourists to visit the area.

A Relationship Grown Distant

At one time the MEA worked hand-in-hand with the provincial government. With the downloading of costs and responsibilities, municipal engineers find that they are more reliant on each other than on the government for guidance and technical advice.



DUFFERIN COUNTY PUBLIC WORKS DEPARTMENT

▲ **A Road Network**
County roads reach all sections of Dufferin County, a largely rural municipality.

It was built right into the constitution: the engineers wanted to be close to their provincial roads department. The first objective of the former County Engineers Association was "to maintain good relations with the Department of Highways." To help cement that relationship, Article 5 of the constitution named the minister of highways as the honourary president of the CEA.

The engineers were soon asked to form an advisory committee to counsel the ministry on the needs of county roads. After a while they were invited annually to join the minister at lunch.

With the formation of the Municipal Engineers Association, municipal engineers became more proactive in their assistance to the provincial government. They developed the system of Ontario Provincial Standards, which made everyone's job immensely easier. Whether engineers were installing watermains or lampposts, there was a standard way of doing it and all they had to do was consult the manual.

The greening of Ontario led to the Environmental Assessment Act and the Municipal Class Environment Assessment rules (Class EA), which were somewhat like provincial standards in that they set down approved approaches to assessing the environmental impact of engineering projects. The engineers justifiably take great pride in the role they played in developing those standards.

But the provincial government got bigger, municipal organizations proliferated, and over time the MEA felt a distance developing between itself and the government with which it had once been so cozy. The relationship didn't go sour, it just cooled.

The "minister of highways", known now as the minister of transportation, is still welcome among municipal engineers. As guest speaker at the Niagara Falls workshop in the fall of 2008, James Bradley brought the welcome news that many of the public dollars used in the war on the economic recession would be spent on infrastructure.

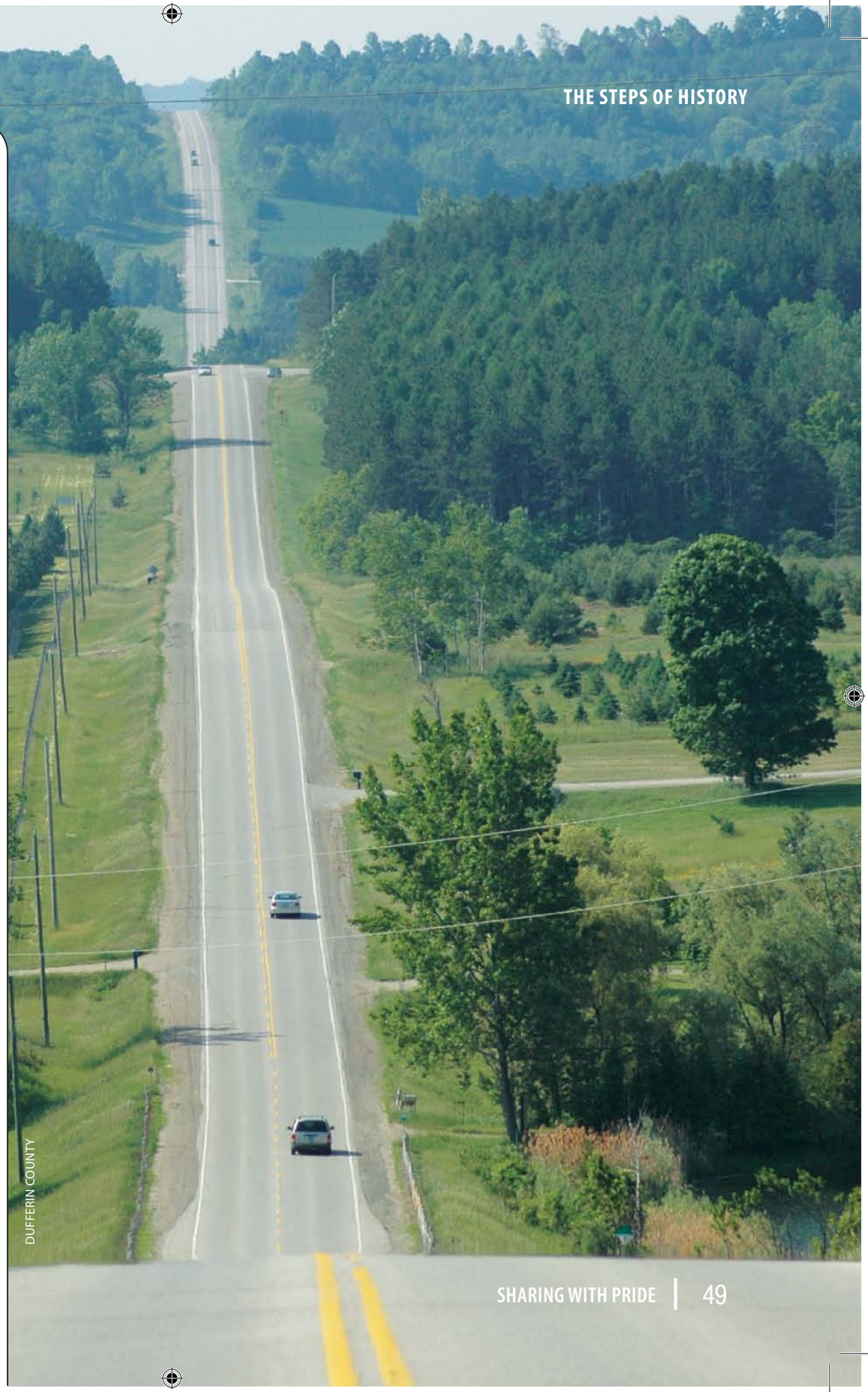
Bradley knows a lot about repairing infrastructure. The Queen Elizabeth Way runs through his riding of St. Catharines, and it seems to be perpetually under construction to keep up with traffic demands. And Bradley has been in and around government a long time: elected first in 1977 and returned to Queen's Park in every election since, he has seen government from the Opposition benches and from inside the cabinet room.

He expresses much respect for the Municipal Engineers Association for its ability to help implement ideas proposed by planners and politicians. "It has always brought to great concepts the practical applications. It has helped turn great dreams into realities."

He listed some examples. "If we hadn't had the buy-in from municipal engineers, it would have taken a longer time for municipal recycling to come into being. If we had left Environmental Assessment to the planners and the lawyers, it would be a much less practical process. Many of the greening ideas came from municipal engineers."

Still, for all of that, he concedes that the once powerful voice of the municipal engineer is being drowned out by the cacophony of clamour from other municipal organizations. All of them want the attention of the minister, all of them have worthy proposals which may be at odds with the goals of equally well-intentioned organizations. The minister has only 24 hours in the day, like everyone else, and he hasn't time to meet with everyone. "A united voice would be helpful," says Bradley.

What may have diminished MEA's influence was a shift in power politics over the years. Other organizations have become politically involved and they may do a "better" job of influencing government, says Gary Carroll, MEA president in 2009. Of MEA, he says, "Politically, it's not as effective as it might be. It's not in the limelight. We are usually regarded as SMEs (subject matter experts). That is, we're the doers, not the thinkers. We're looked to and relied upon as providing



▶ **Over the Hills**
Airport Road in Dufferin County is a dead-straight line over rolling terrain.

CITY OF HAMILTON

▲ **Round the Roundabout Issue**
Hamilton claims the first modern roundabout constructed in Ontario. It now has four roundabouts and proposes sites for as many as nine more. The city's website gives detailed instructions on how to use a roundabout, both for motorists and pedestrians. It points out that thousands of roundabouts are successfully used around the world. The concept has been resisted in North America, in part because of previous negative experiences with traffic circles. Safety and operational problems caused these traffic circles to fall out of favour by the 1950s.

'the answers' as opposed to determining the outcome."

Of course, the question is, which is the "better" approach? A reading of the MEA minutes over the years reveals an ongoing debate between engineers who are quite content to be the "doers" of the world and those who want to become more politically active and become the "thinkers".

"Do we want to become more politically involved?" asks Carroll. "Do we want to become a political creature or do we stay with what we do best and as we're seen by the public – delivering water, building safe roads, keeping homes from flooding? A difference of opinion exists within the executive. Is the municipal engineer a technocrat, a facilitator or a politician?"

If MEA is seen as "doers", then perhaps it has lost its bond with the provincial government because the government itself is doing less. That's the way Rick Kester of Belleville sees it.

"The provincial government is becoming much more a governor and a regulator than they are service providers," he says. "They are getting out of many direct businesses they were traditionally in, such as material testing, highway maintenance and research."

He gives some examples. "At one time, if we had an unusual road situation, we could phone MTO and ask for guidance on how to fix a particular problem. Now, there is no guidance. There have been so many changes in the ministry that now we don't know who to call. MTO was a world leader in asphalt research. Now they do very little basic research. They used to issue research paper after research paper, now municipalities have to rely on other sources of information.

"It's not just roads and the MTO, but also with sewage treatment plants and the MOE. Now they say, 'Your effluent didn't meet the standards. How are you going to fix it?'"

Kester finds that municipal engineers have to rely on their own research and on the work done by others in the MEA network, and on research done by private industry, suppliers and contractors. "We rely on ourselves more than anyone. We are really masters of our own destiny now. The province has shifted from being a technical service provider to much more of a regulator role."

Consequently, the hand-in-hand link with government enjoyed by MEA in the past has been broken. A distance has developed.

Conditional Grants and the Common Sense Revolution

The Common Sense Revolution of Premier Mike Harris eliminated the policy of conditional grants for road development, over the objection of the MEA.

Into every relationship a little strain must fall. And so it was with the Municipal Engineers Association and the Association of Municipalities of Ontario on the issue of conditional grants. The issue may be so much water under the bridge now, but there were times when the water on the roadway could have been tears of frustration.

The strain was inevitable because on this issue the members of AMO – politicians – and their municipal engineers were on a collision course. The nature of conditional grants was that the province would give money to municipalities to build infrastructure items such as bridges and roads, on condition that these items were built to ministry standards.

The concept of provincial grants for county roads extended back to the early part of the 20th century. In 1901 the provincial legislature established an Act to Improve Public Highways, in which counties could designate highways to be improved with provincial assistance. Grants to cover one-third of the cost of road construction or repair were available, conditional upon the highways being constructed to the standards of the Department of Public Works.

Counties gained jurisdiction over certain boundary roads and key roads between counties and separated cities and towns in 1917 under the provisions of the Highway Improvement Act. At the same time legislation enabled counties to acquire privately owned toll roads. Construction costs on county roads were eligible for a 60 per cent subsidy from the province. The legislation also covered township and other municipal roads. Suburban roads were eligible for a 40 per cent subsidy, with 30 per cent paid by the township or city involved, and 30 per cent by the county.

The principle was established that roads had to be built to provincial standards to be eligible for funding. Sometimes politicians found these standards difficult to accept, arguing that perfectly adequate roads could be built to less exacting, and less expensive, standards in some circumstances. But their municipal engineers, who had often been involved in developing these standards, stood by the requirements. Whenever politicians wanted to shave costs by adopting a slightly narrower road surface, slightly slimmer shoulders or a thinner granular base, the municipal engineer could argue that the project might not be eligible for a government grant. And that often sealed the deal, for politicians disliked spending their own tax dollars if they could get them free from Queen's Park.

Over the years, a very complicated funding formula developed (how else to explain a funding rate of 90.909 per cent?)

The definition of what constituted a county road became problematic. A county road had to meet one of the following requirements:

- connect with urban centres;
- service special industries;
- parallel or cross topographical barriers;
- service seasonal and resort areas;
- serve as an extension of an urban arterial road;
- provide general area service, determined by a formula based on population.

By the time the conditional subsidy program came to an end in 1997, the government was using a formula based on frequency of road repair and upgrading to determine the "lifecycle" cost of a road, and the municipalities were demonstrating that the grants were no longer adequate.

But this was all in the future when friction began to develop between AMO and MEA over conditional grants in the early 1990s. The AMO proposed deconditionalizing grants but MEA, its loyal affiliate, did not agree. It went on record as saying that MEA opposed "the general thrust" of the AMO proposal, and said that it supported the principle that "conditional grants toward environmental and transportation (roads, transit and airport) services should be based on needs documentation that encourages 'best management practices'." In a separate motion, it was resolved that "the Municipal Engineers Association support the principle of conditional grants from the province to initiate, subject to a commitment to sustain, enhanced programs on matters that are considered to be provincial priorities."

MEA fired off these resolutions to the OGRA, the provincial treasurer and the premier. However, in 1996 the province agreed with the AMO and created annual block funding grants without conditions on usage. Municipalities could now choose to spend this funding as they chose.

Protecting the Taxpayer

The issue of road standards and conditional grants fell into that philosophical realm which perennially puzzled MEA: how far should the organization go to protect the local taxpayer?

This question was tackled at an executive "think tank" held in Mississauga in June 1989. That MEA had been protecting the taxpayers was not in doubt, for the question before them was worded:

"Should municipal engineers continue to defend the municipal taxpayer in the face of provincial initiatives to transfer burden from the provincial purse to local taxpayers or should engineers simply get on the with the job of providing the best possible delivery of service and allow elected municipal politicians to defend local taxpayers?" The operative words were "continue to defend", strongly suggesting that that is what MEA had been doing all along. Had they been able to appreciate the full force of downloading which was to come during the Mike Harris government years, they might have debated the issue with more vigour.

As it was, the engineers generally agreed that MEA should remain proactive in defending the local taxpayer. Past-president Hugh Thomas (Chatham) argued that MEA was allowing the province to "create the agenda" while MEA "should create the agenda in our areas of expertise." The minutes of the meeting noted that MEA "had been effective in inputting technical as well as funding information through its liaison committees with the province. It must continue to look at best solutions as well as the ability to pay and continue to impress on the ministries the significance of transferred funds."

Ice follies

Every spring, ice breaks up on the Sydenham River and begins its sluggish flow down toward Lake St. Clair, a shallow body of water that can easily flood the flatlands that surround it. At the same time, huge quantities of ice begin to shift down through the upper Great Lakes, funnel into the St. Clair River and empty into Lake St. Clair.

In order to limit ice damage, ice-breaking tugs ply the Sydenham to help keep the floes moving, rather than forming dams that would only add to the region's flooding troubles. It's an annual headache for the Chatham-Kent Public Works Department and Gary Northcott, director of engineering and transportation for the municipality. And sometimes things go wrong.

Northcott recalls the year a rudder broke on a tug that was breaking up ice in the Sydenham, sending the boat hurtling out of control and careening into a bridge. Another time a small tug was unable to maintain its course against the Sydenham's rushing current. The only way the captain was able to keep it under any sense of control was to give it full throttle, maintaining the tug on a straight course rather than being driven helplessly downstream. Eventually the captain was able to beach the craft.

Past-president Viktor Silgailis (Durham Region) said that in the early '60s, municipal engineers were able to stick to technical matters, but no longer. "Now it is difficult to separate technical and financial matters." Others argued that one of the strengths of MEA had been an ability to get the ear of senior administrators in the provincial government. They felt that MEA should maintain that contact and work with local councils to impress on Queen's Park the true costs of transfers of responsibilities to local levels.

In September, the executive pursued the proactive approach by polling its members for examples of concern regarding funding for roads, pollution abatement, waste management and occupational health and safety.

By 1996, the full effects of Mike Harris's "Common Sense Revolution" were becoming evident in Ontario. Harris and his Conservatives had come to power in 1995 promising to slash government spending. Part of his solution was to download responsibilities, and their consequent costs, to municipal governments. Senior staffers in municipal governments were scrambling to handle the impact of downloading and engineers had little time to come up with new initiatives in MEA. The organization was feeling somewhat marginalized, which became the topic of a think tank in April 1996.

The question before the group was "whether MEA should continue as a resource association or become more of an advocacy body." While this was similar to the topic posed in 1989, the proposals voiced by members carried a sense of urgency that MEA was losing its influence. One member suggested that the province did not recognize MEA because the association didn't have full-time staff and a political presence on its board, as did OGRA and AMO. There were proposals to meet directly with assistant deputy ministers, and even ministers themselves, to volunteer MEA's resources for dealing with provincial issues.

At another think tank in the fall, further evidence of MEA's weakening position was noted: the restructuring of local governments had wiped out a number of county engineers, and some municipalities were appointing works commissioners who were not engineers.

There was concern that the government was being driven by a strictly political agenda, one that probably could not be sustained for any length of time. As it turned out, Harris was premier until 2002, to be succeeded by Ernie Eves who continued the same philosophical approach until Dalton McGuinty's Liberals defeated the Conservatives in October 2003.

Despite meanderings of government policy, MEA members were determined to keep their eye on the ball and pursue their organization's objectives. Periodically, they had to stop and refocus their eyes to avoid losing sight of the objectives.

In 1993, for example, the association held a strategic planning session to discuss MEA's objectives. They were listed as:

- to study the technical, administrative and legal problems encountered in the practice of municipal engineering;
- to exchange information and to co-operate with other associations whose objectives or work are related to matters of concern to municipal engineers;
- to disseminate information to the membership with respect to the design, construction, maintenance and administration of municipal services;
- to make recommendations to the appropriate authorities on any matter of concern to municipal engineers;
- to promote the status and areas of interest of all members of the association.

As a result of the discussion, a mission statement was added to the constitution and some of the objectives revised.

PHOTO BY ORLAND FRENCH

▲ **Jeff Seaton**
First executive director, retired 2008

MEA FILES

▲ **David Shantz**
Current MEA executive director

Executive Director: The MEA Goes Pro

The "Whither MEA?" debate continued throughout the 1990s, as the organization struggled to confront the downsizing of its potential membership through the amalgamation of municipalities, and the appointment of non-engineers to key works administrative positions. This latter point would emerge in discussions of changing qualifications for MEA memberships. One of the themes running through these discussions was a perceived need to hire an executive director to give the organization more profile.

But this would not happen until 2003, for the issue of the executive director was a contentious one. There was a group that objected to the concept. The creation of the position required some finesse and significant changes in how MEA did business, for the group until then had been a strictly voluntary organization. The creation of an executive director's position also required a change to the constitution of the organization.

Finally the way was clear and Jeff Seaton was hired as executive director. Seaton had been county engineer for Victoria County and a very active member (president in 1991). He held the position of executive director until the summer of 2008 when he retired to pursue his interests in globe-trotting. He was succeeded by David Shantz, who had retired from the City of Welland where he had performed multiple roles as its general manager of engineering, public works, transportation services/city engineer.

The executive director is responsible for the day-to-day administrative operations of MEA including formulating policy, member services and products, and long-range strategic planning recommendations. He acts as advisor and recording secretary to the executive committee. He also oversees publication of association periodicals, supervises the hosting and organization of association events and represents the association with external agencies and on behalf of the board as required. In addition, part of the job is a constant liaising with member municipalities and agencies, other levels of government and industry groups.

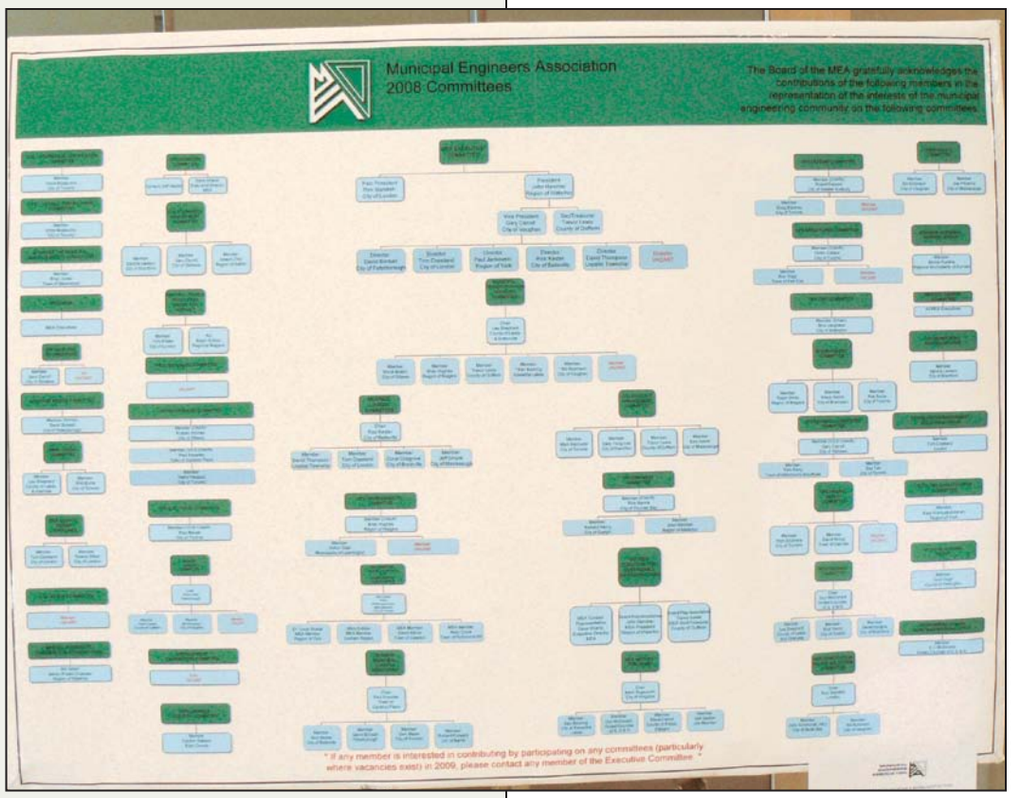


PHOTO BY GARY MAY

▲ **The MEA Organization**
Volunteer work within MEA requires a high degree of organization. This committee organizational chart was displayed outside conference rooms at the MEA workshop in Niagara Falls in 2008.

Engineers Only?

Over the years MEA has jealously guarded two basic conditions of membership: you had to be an engineer and you had to be employed by a municipality. This principle became more difficult to defend as new categories of engineers and pseudo-engineers emerged. For instance, what was MEA to do with the non-engineer who was appointed to be in charge of public works, traditionally an engineer's position? Would it adopt the stance of a union, and keep him or her out, or would it recognize the value of granting some form of access so that the non-engineer could be apprised of information from MEA?

A further question arose in 2005 when the Professional Engineers of Ontario allowed qualified engineering technicians a licence to practise engineering outside the supervision of a professional engineer. Should engineering technicians now be allowed membership as full engineers?

The current constitution (2007) lists five categories of membership: active, associate, life, honourary and retired.

MEA Inc.

As the organization grew in numbers and influence, and as the social propensity for litigation increased, MEA was under pressure to incorporate. In July 1988, the executive considered incorporation but could not find any substantial advantage unless an individual executive member were to be found liable for more than $5 million in damages. The executive decided that was unlikely, and so it abandoned a plan to incorporate for the moment.

Nevertheless, some members of the legal profession urged MEA to incorporate. One of them was Douglas Cameron, solicitor for the Regional Municipality of Ottawa-Carleton.

After several years of discussion, MEA made the jump to incorporation. At a meeting at the Royal Brock Hotel in Brockville, during the annual workshop, the board made the decision to present incorporation, and a new constitution, to the membership at the annual meeting at the Royal York Hotel in the following February.

This was done on February 26, 2007, with 24 members present and a further 23 present by proxy. Ron Standish of the City of London was in the chair and Gary Carroll acted as secretary. The motion to adopt was carried unanimously. Elected as directors under the newly incorporated organization were Ron Standish, John Hammer (Waterloo Region), Gary Carroll (Vaughan), Raffi Bedrosyan (Toronto), David Bonsall (Peterborough), Rick Kester (Belleville), Trevor Lewis (Dufferin County), Ezio Savini (Mississauga) and David Thompson (Loyalist Township). John Simmonds (North Bay) was appointed ex officio as past-president.

REGION OF WATERLOO

▲ **Planes, Trains and Automobiles… and Pedestrians, Bicycles and Buggies**

Proving that municipal engineering is about more than pipes and pavement, the Regional Municipality of Waterloo also deals with a range of other transportation challenges. One of them was to get pedestrians safely across the Macdonald-Cartier Freeway, so it built the first pedestrian bridge across Highway 401 despite resistance from the provincial government. It is part of the Trans-Canada Trail. When the region began designing roundabouts, it incorporated special gravel paths to allow Mennonites in their horse-drawn vehicles to bypass roundabouts. The Mennonites prefer to stick to the pavement. The region also builds shoulders extra-wide to accommodate horses and buggies and has attracted attention from Pennsylvania. It also operates Region of Waterloo International Airport, with direct flights to the United States, and a local tourist train.

Political Potholes Buckle Pavement of the Road Ahead

The cost of repairing or replacing old pipes and bridges is going to be one of the big challenges to municipal governments in the years ahead. Some engineers refer to old city installations as "heritage infrastructure".

Aging infrastructure, tightening budgets, growing demands from the politicians and the public. The road ahead for municipal engineers is not without its potholes.

Roads are continually damaged by frost and bridges are plagued by salt. Sewer lines built in the 19th century won't last forever. Sewage and water treatment plants can't live up to modern expectations. Every community in Ontario is having to deal with infrastructure that needs a great deal of attention and money.

"People like to talk about our heritage architecture," says Brockville operations director Conal Cosgrove. "I like to talk about our heritage infrastructure."

North Bay's Alan Korell estimates his city needs to spend double the current annual level on roads and 50 per cent more on sewers just to avoid falling farther behind in the "infrastructure deficit". "It's a hard sell to the politicians and the taxpayers," he says.

Meanwhile, "continuing to rely on property taxes as the only source (of revenue) has severe limitations," says Arup Mukherjee, senior project manager for transportation services in York Region. As the need for public transit grows, "the property tax system simply cannot fund the capital and operating expenses."

The public and the politicians don't always understand just how extensive such work is going to have to be. Chatham's Gary Northcott says councils want to build more "people services" such as exercise and bicycle paths, services that, while laudable, are now competing with hard services for the taxpayer dollar.

Put simply, adds Brantford's Sandra Lawson, "we'll have to be more innovative in stretching our tax dollars." Although, she says, technological advances often make things a bit easier. She points, for instance, to new ways to preserve pavements, new methods for ensuring that hard service systems don't decay as quickly.

One result of the infrastructure deficit is that municipalities will have to become a lot more demanding of private developers. When a builder comes to council with a new housing project, for instance, council will have to insist the developer share more

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◀▼ **Rebuilding Our Cities**
Municipal engineers can play a major role in the reconstruction of the urban landscape. The removal of the railway yards in downtown Ottawa and the renovation of the station into a national conference centre provided the focus for a major redevelopment in the heart of the city.

PHOTO BY ORLAND FRENCH

▲ **Loyalist's Navy**
The Frontenac II ferry crosses the Bay of Quinte to connect Amherst Island with the mainland. Although owned by the Province of Ontario, the ferry is operated by Loyalist Township. A full-time staff of 21 is required to operate the ferry year-round and represents a third of Township Engineer David Thompson's full-time department of 60. Since the province pays 85 per cent of the $2 million budget, the other 15 per cent is covered with a fare which, in 2009, was $8 per car, return trip. A similar provincially operated ferry serving Wolfe Island off nearby Kingston is free.

of the burden of upgrading the existing infrastructure, says Cosgrove.

But handling the escalating costs related to infrastructure is only one of the many issues municipal engineers will be grappling with in the coming years. Others include:

Public-private partnerships: As costs go up, there will be increasing demands for consideration of public-private partnerships, or design/build/operate arrangements. But while the concept has become a popular one in Alberta and parts of the United States, experience with these arrangements in Ontario has not been without its problems. The bottom line, say some engineering managers, is that taxpayers must be protected. If service can be delivered for a better price than if the project were built and operated by a municipality, and taxpayer interests can be equally well served, then that's all that matters.

Waste management: Rapidly filling landfill sites and tougher environmental demands will put the squeeze on municipal engineers to find safe and clean ways to dispose of garbage. A booming technology business has evolved around waste-to-energy and the debate over incineration and laser technology continues at a furious pace.

▶ **Sharp Blades**
The City of Kingston turned Market Square behind city hall into a skating rink.

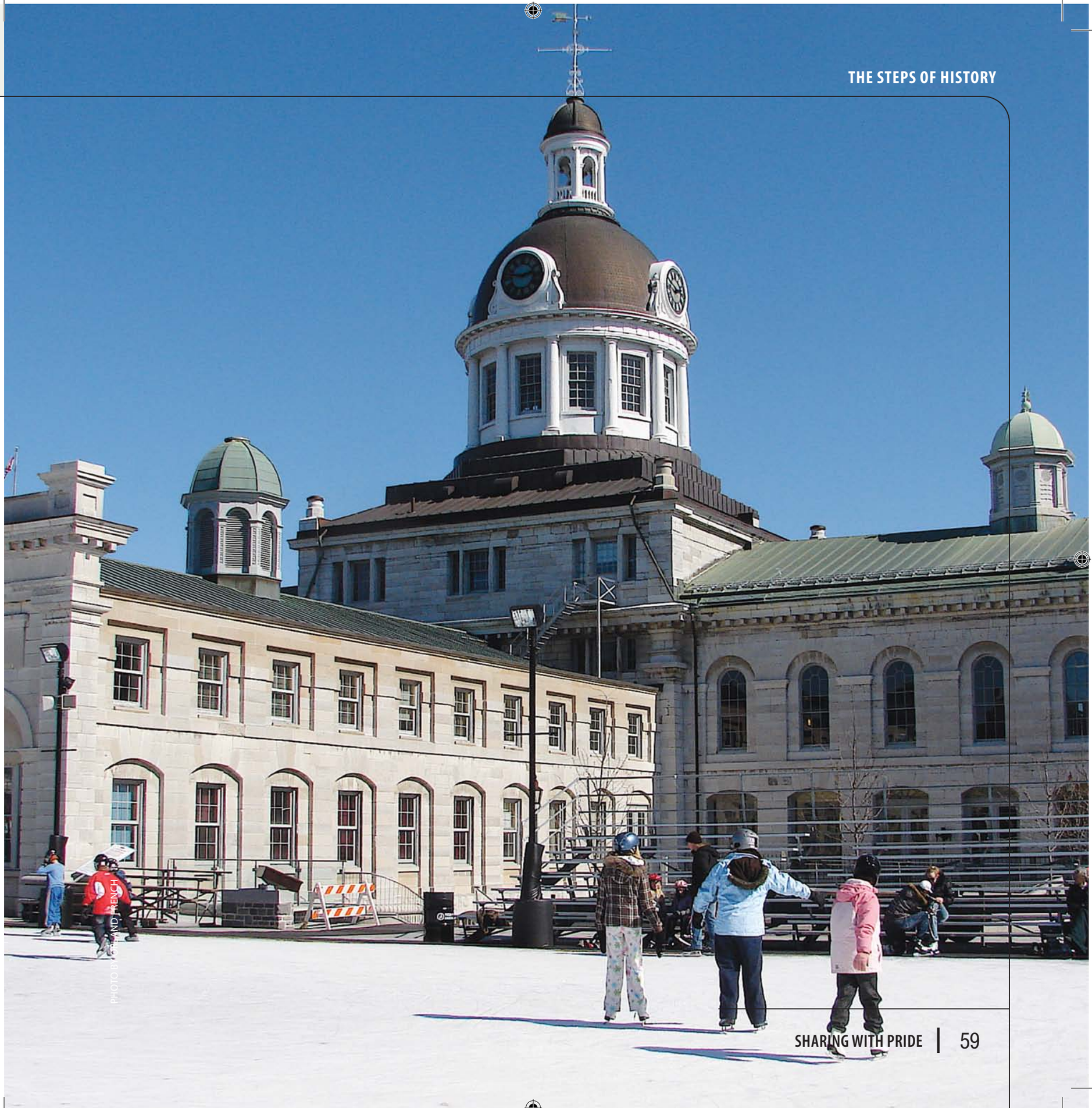


PHOTO BY BRAND FRENCH

REGION OF WATERLOO

▲ **All Aboard**
A tourist train is one of several modes of transportation under the direction of the Region of Waterloo's municipal engineers.

Environmental assessments: The MEA was a key player in the development of the Class EA system that has helped to keep the assessment process moving efficiently. Most of the giant public works projects pre-date environmental assessment. What does the future hold? Could another project the size of Highway 401 or the Seaway be taken on in this era? Recent experience is bound to raise doubts: The Toronto subway extension and the eastern expansion of Highway 407 are both hung up in regulation. A better approach needs to be found to satisfy environmental demands while moving ahead with necessary public projects in a timely manner.

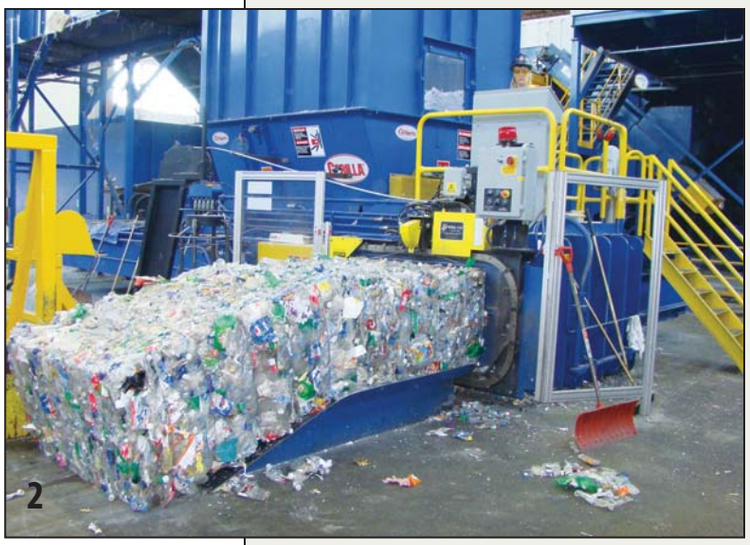
Climate change: Whether you believe human activity is heating up the globe, any municipal engineer will tell you that climate change is here. Rapid freeze-thaw cycles cost millions for road repairs. More rain and freezing rainfalls mean that icy roads need to be addressed, even as the pressure grows to find environmentally safe alternatives to road salt. Municipalities and the Ontario Ministry of the Environment are already exploring the impact climate change is having on the work they do. Climate change is bound to become another factor pushing maintenance costs higher.

Catastrophic failures: A bridge collapse in Montreal and tainted water in Walkerton. Those two events have helped to sound alarm bells and focus public attention in recent years. While most believe Ontario's bridges are in better shape than those in Quebec, closer attention is being paid to their condition. And the tainted water case has caused many to stop to consider the impact that the downloading and privatizing of responsibility for quality testing has had. Ontario was once considered second to none in its adherence to strict water quality controls. The Walkerton experience has resulted in tougher water regulations that force even the most conscientious municipal officials to step up their testing and procedures, even when they consider it excessive.

Public transit: Just how large does a city need to be before public transit ceases to be strictly for senior citizens and students and turns into a necessity for everyday life? Toronto's subway, streetcar and bus system is now taken for granted and the 2009 bus strike in Ottawa made officials there recognize their city cannot be adequately served by the private automobile. Ottawa plans a light rail system to complement its buses. Will Hamilton be next? And what of Toronto's growing tentacles — is the GO Transit system sufficiently well developed to serve the city? Will costly new routes be required to push farther into the suburbs? Public transit's development and operation is bound to be a significant issue for the 21st-century municipal engineer.

Native issues: Land claims used to be seen as a federal issue. Then along came Caledonia and the Ontario government was pulled in. Now, says Brantford's manager of engineering operational services, the Six Nations of the Grand River Territory is claiming land rights

DURHAM REGION



▲ **Sorting and Recycling Cast-off Treasures** The 68,600-square-foot Material Recovery Facility (MRF), which officially opened in December 2007, is owned by Durham Region and privately operated. Located in the Town of Whitby, the MRF can process up to 115,000 tonnes of recyclables each year. As part of a two-stream process to keep fibres and containers separate, the MRF uses dual-functioning optical sorters – the first of their kind in Canada – to further separate plastic bottles and containers from the stream (1). Recyclables are baled for shipment (2). Financed in large part by the federal Gas Tax Fund, this $16.6 million state-of-the-art facility received several awards in 2008, including an Association of Municipalities of Ontario federal Gas Tax Project Award, a Gold Recycling Systems Excellence Award from the Solid Waste Association of North America, and a Silver Waste Diversion Program Operator award from the Recycling Council of Ontario.

six miles (9.6 kilometres) on each side of the Grand River, which includes most of that city. Sandra Lawson says this fact has brought several developments to a standstill and Brantford became the first city in Canada to seek an injunction on property the city doesn't even own. What will the future hold for other municipalities within which First Nations communities exist?

Staff attrition: As senior staff retires, all municipalities compete for the remaining qualified candidates. For example, the City of London estimated in 2005 that 25 per cent of its environmental and engineering services staff was eligible to retire by 2010. Further investigation led to the conclusion that 15 per cent might actually do so. While the current recession may have slowed the pace of retirements, there are likely to be plenty of openings for qualified managers and supervisors in London and across the province in the next few years.

Municipal-provincial relations: It used to be what long-time engineering managers call a partnership, a team approach, but Ontario's relationship with municipalities has changed, they say. And while some may wish that it return to that day, most don't believe it will. "We rely on ourselves," says Belleville engineering and public works director Rick Kester. Ontario is the governor and the regulator, requiring municipalities to figure out how to meet its standards. That is where the MEA can play a valuable role, Kester says, as a system of sharing research and learning among its members.

Future of the MEA: In December 2008, incoming MEA president Gary Carroll identified three areas of focus for the organization itself: build relationships and promote the association's views on matters of public policy; consider opening membership, perhaps as associates, to non-professional technicians and technologists; and review the future direction — and priorities — for the organization's membership. With municipalities cutting staff and relying more on outside consultants, membership in the MEA is no longer growing, says Carroll. That opens up the question of what resources will be available to it, whether the organization wants to continue to seek out new members and how it can best go about doing that. Carroll believes the very future and nature of the organization are at stake.

How Co-Operation Quickly Repaired a Huge Hole in the Ground

In the fall of 2007, the City of London learned the hard way that the failure of infrastructure carries a heavy price tag. A large water main at a major downtown intersection burst and created a major sinkhole. The incident drew Canada-wide attention to the hazards of aging and failing infrastructure. The national infrastructure deficit has been estimated at $123 billion; individual municipalities are facing repair and replacement bills in the tens of millions of dollars.

On October 31, 2007 at 3:04 a.m., a 300-millimetre cast iron water main broke in the northeast corner of Dundas and Wellington streets. Cast iron is susceptible to temperature fluctuations in the water and in the ground, as well as vibration and settlement, but no exact cause of this break was determined. The large volume of water released under pressure caused quick and devastating erosive effects on the sandy soils within 10 metres of the failure location. The adjacent brick London Hydro vault was significantly damaged on two sides allowing water and silt to penetrate exposed ducts in all directions. Water and silt migrated through hydro ducts into manholes and into adjacent buildings.

Power in the immediate area was lost right away, and London Hydro shut down electricity to the core of the city at 8:40 a.m. because of concern about ground instability in the break location. After damaged cables were isolated, removed or protected, power was restored to the core area later in the day.

The task group charged with restoring the intersection faced a Herculean job. Had the project been conducted under normal circumstances, the engineering, approvals and tendering process would have taken eight months, with a further six to seven months for construction. Yet within 31 days, all the utilities through the intersection were repaired, the surface was restored and traffic was rolling again. The job entailed 39 separate tasks.

The mammoth effort required a highly co-ordinated approach by many of London's public service agencies. The London Emergency Response Plan was utilized to coordinate this effort. Agencies involved included the mayor's office, CAO's department, environmental and engineering services department, London Hydro, London Police Service, London Fire Department, Community Services, London Transit, Corporate Communications, Middlesex London Health Unit, Middlesex London EMS, Technical Services Division and Corporate Security and Emergency Management Division.

The direct costs to the city were about $400,000 but each utility also picked up its own expenses. Overall, the break and repair cost in the range of $2 million.

Some of these photos were taken from the office of Justin Lawrence, division manager, construction administration for the City of London. He was literally overseeing the job. In his view, there were valuable lessons learned. "Generally the break and subsequent reconstruction led to increased awareness (nationally and locally) of the need to close the infrastructure funding gap. Specifically it reminded the city and utilities of the need for redundancy in systems. It also illustrated the interconnections between all the parties technically and from a relationship perspective."

LONDON DISTRICT ENERGY

A Broken Mess
In a little more than a month, this massive sinkhole at a downtown intersection in London, Ontario, was totally repaired, thanks to the united effort of a multitude of municipal departments and agencies.

CITY OF LONDON

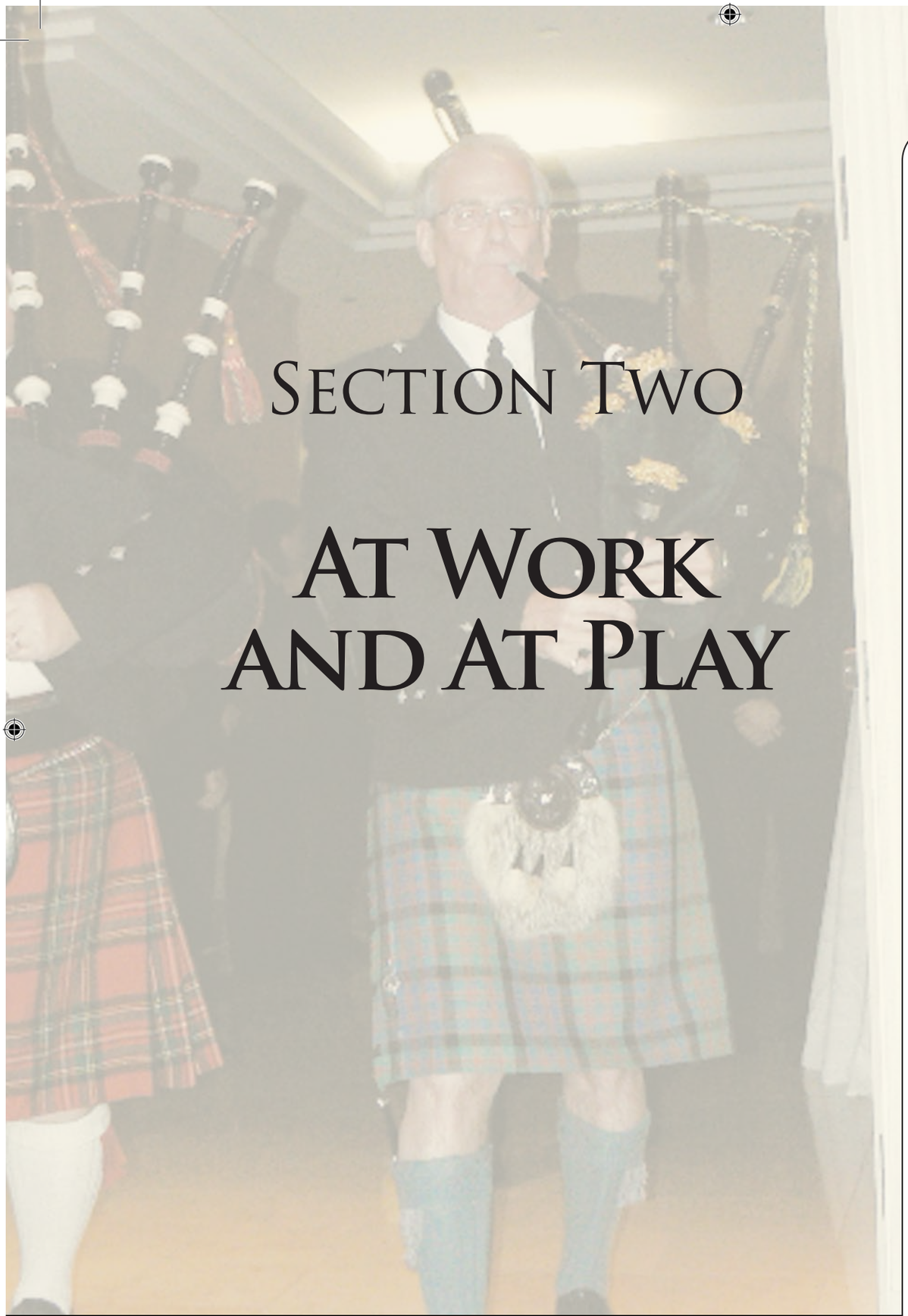
LONDON DISTRICT ENERGY

CITY OF LONDON

CITY OF LONDON

A Month in the Life of a City

1. October 31, 2007. Pipes, conduits and cables lie in a jumble immediately after this sinkhole developed in downtown London, Ontario. London Hydro crews are assessing the damage and protecting live cables.
2. November 20. Multiple crews worked on-site together installing and repairing water lines, hydro and other utility conduits.
3. November 22. November can be a rough month for construction because of the uncertainty of the weather.
4. December 2. Trying to beat the weather, workers laid the final layer of pavement.
5. December 3. Traffic resumed its normal pattern in a snowstorm.



Section Two

At Work and At Play

Piping the Tune
Donald McDonald of Stormont, Dundas and Glengarry, home of the highlanders, pipes in the head table at the Niagara Falls workshop in 2008.

PHOTO BY GARY MAY

Blueprint for a Workshop

Every year a group of engineers in an Ontario community is challenged with building something they have little or no experience in: a workshop.

MEA FILES

▲ **Before the Days of PowerPoint**
A speaker using an overhead projector addresses the 14th annual workshop at a MEA conference in North Bay at the Pinewood Park Motor Inn, 1974.

"Hey, I've been to a lot of these," said Paul Mustard, who chaired the Niagara Falls workshop committee for the MEA in 2008. "I thought, how difficult can it be?"

After all, they are engineers. They design and build things. And, Paul was assured, they would have the assistance of the official MEA blueprint on how to construct a workshop. It's got to be around here somewhere but … rats, it was misfiled. Oh, well, they would just wing it.

The last thing they did was find a theme for the workshop. Sure, it was called "Keeping Up With New Technology" but the generic title came after the assembly. "Sometimes the name of the theme is designed to cover up the fact that the workshop is a dog's breakfast of presentations," said Paul. This might explain such all-encompassing titles as "A Spectrum of Challenges" (Ottawa, 1976) and "A Potpourri" (Belleville, 1994).

Based on the premise that municipal engineers have to keep up to speed on technology and new engineering solutions, the workshop has given members of the MEA annual opportunities to get together to share ideas and steal some, with pride, from other engineers.

The first workshop was held at Prudhommes, near St. Catharines, in late November 1960. Workshops are still scheduled in late November, although they have grown from a Thursday-evening-to-Friday event to a Tuesday-evening-to-Friday conference. Today they cover a range of topics, whereas the first workshops were specific to a single issue.

The first was titled "Spalling and Deterioration of Concrete Curbs, Walks and Roadways," a heart-throbbing topic only to a municipal engineer. The success of that first event, thanks to the organizational skills of W.A. Wheten of Hamilton, was reflected in immediate requests by other cities to host workshops.


C
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CITY ENGINEERS' ASSOCIATION

Eighth Annual Fall Workshop

THE ENGINEERS ROLL IN MUNICIPAL PLANNING

NOVEMBER 29 and 30, DECEMBER 1, 1967

HOLIDAY INN

OTTAWA - ONTARIO

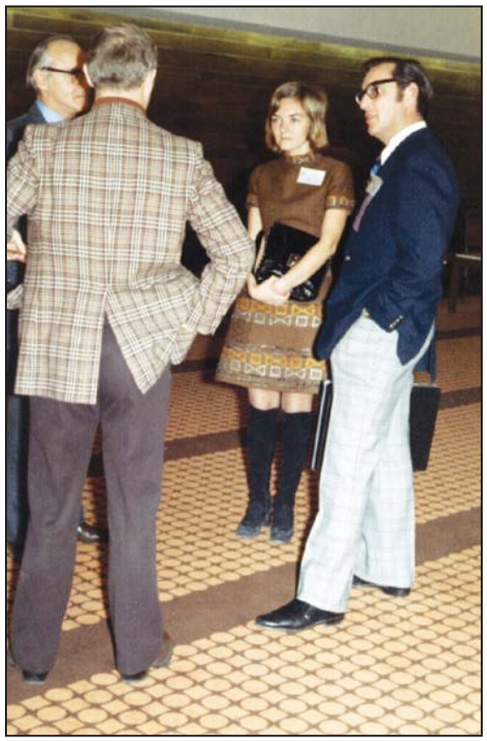
MEA FILES

▲ **Roll Model**
Cover of the Centennial Year workshop in Ottawa. Some would say engineers revel in municipal planning, if not roll in it.

Peterborough hosted the second one at the Empress Hotel over November 30 and December 1, 1961. Moving on from the prosaic topic of spalling concrete, the engineers discussed "Asphalt". At the same time the Canadian Asphalt Technical Institute was holding a conference in Vancouver, but this was not deemed to be a serious conflict.

For the next 10 years or so the workshops tended to be limited to specific topics. These were workshops produced by city engineers. After the birth of the Municipal Engineers Association, when county engineers were included, topic titles became broader and more inclusive.

The workshops were not expensive. Registration for delegates to the first workshops cost $5, plus $2 for a reception. For their five bucks, delegates got a lunch and coffee breaks both morning and afternoon. This was enough to turn a profit of $47.14. Most years the workshops made money but an early one held in Kitchener ("Administration of Public Works Departments") was a financial disaster. It lost $484.90, in part because of a poorly attended "ladies program" which was subsequently dropped. Next year, in Windsor, the workshop realized a profit of $112.95.



MEA FILES

▲ **Checks and Plaids**
Fashions of the 1970s were displayed at the 1973 MEA workshop in North Bay.

Unfortunately, records of the first four workshops are as skimpy as sand on a highway spread by a short-fingered contractor. As of 1964, the proceeds were recorded and printed in booklets for distribution to CEA members. Delegates were pleased at the high calibre of legal participation. Technical representatives of companies were invited to make presentations but the workshops had a virtual "no advertising" rule. You could talk about new technologies your company was using but you couldn't promote the firm.

This rule did not discourage participation. A number of lawyers regarded as extremely proficient in municipal law took part in a workshop on "Legal Aspects of Engineering in Municipal Law" in Brockville in 1965, in return for only token recognition. The excellence of content made the workshops a great learning experience and gained them a "must attend" rating.

Topics for workshop presentations have usually been determined by the local workshop organizing committee. They have tended to reflect issues of interest at the time. The organizing committee uses local resources and contacts for arranging a suitable speaker. Themes for workshops are an attempt to collect the general content of the presentations under a common statement. However, recently the MEA executive has been discussing ways to better align the annual workshop with the organization's strategic goals and to ensure adequate levels of content for member relevance and participation.

For a history of topic titles, see the appendix at the back of the book.

Inspecting the Elephant Hunters

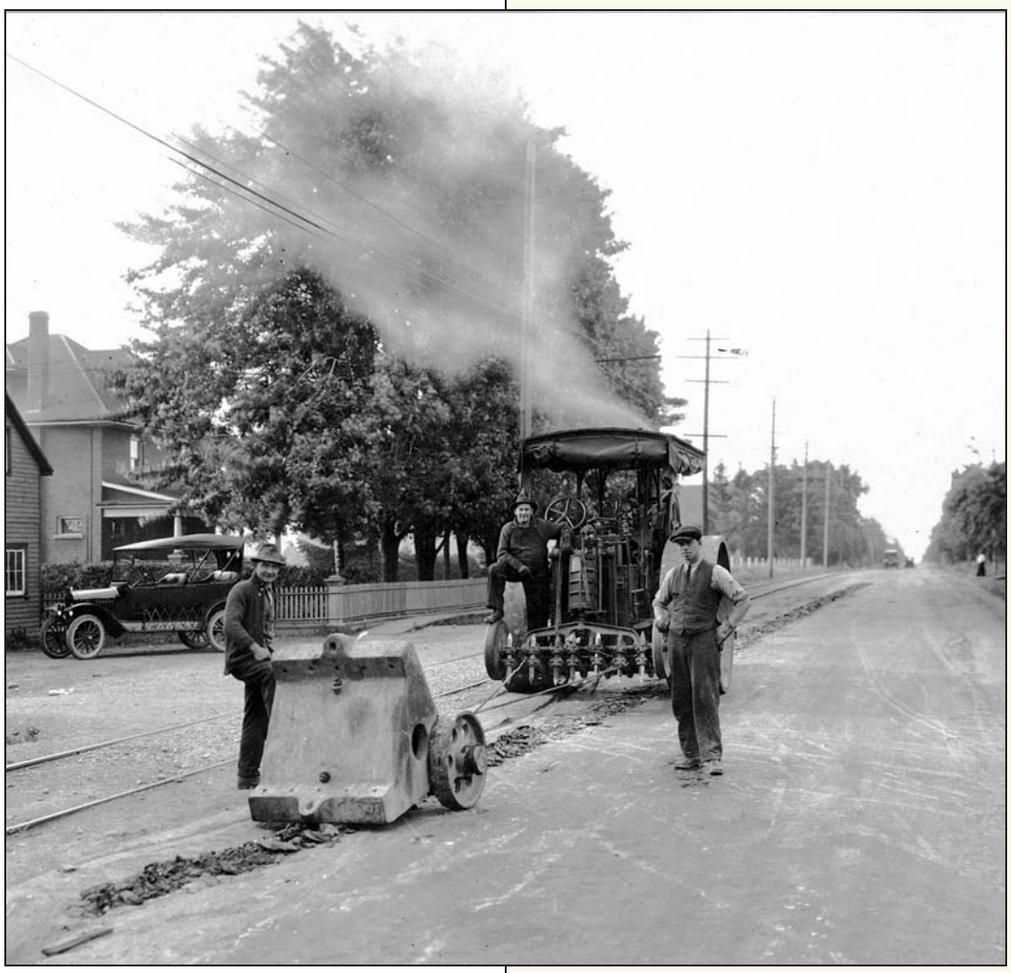
One of the challenges of a municipal engineer's job is to explain to councillors why a problem can't be solved overnight, why a cheap fix isn't always the best fix, and why projects have to be built to standards to ensure longevity. While the majority of councillors are understanding and supportive, there are inevitably some who claim superior knowledge about the principles and skills of engineering and what they perceive to be the proper way to run a public works department.

William Kingsford met one of these 150 years ago. Kingsford was hired in March 1855 as city engineer and surveyor of the City of Toronto, beating out a competitor named Sandford Fleming who was later famous as the inventor of standard time. By September of the same year, Kingsford's accountability to council was challenged, and he resigned.

A generation later, William T. Jennings, then Toronto's city engineer, ran afoul of city aldermen over the way he ran his shop. Charges of engineering incompetence flew from the mouth of a popular alderman, James Gowanlock. Eventually Jennings resigned, to be replaced by his deputy, Granville Cuningham. He in turn sued Gowanlock after the alderman accused him of "incompetence, carelessness and negligence".

A jury found Cuningham not guilty of any incompetence or negligence. Nevertheless, Gowanlock colourfully insisted that the engineer's office was still a place where "carpenters were employed to inspect masonry, pump peddlers, asphalting and elephant hunters, (and) concrete sidewalks." Presumably the elephant hunters were unemployed, there being no elephants left to hunt in Toronto.

Fed up with pressures from politicians, Cuningham, too, resigned. Oddly enough, in the ensuing search for a new city engineer, William T. Jennings was once again considered. He didn't get the job.



TORONTO ARCHIVES

▲ **Smoking Engines**
Smoke spews from machinery being used in construction of a Toronto street during the 1920s.

The clash between politicians and municipal engineers has been around as long as there have been politicians and municipal engineers. The trick for the engineer is to get the job done but let the politician get the glory. At an early session of the County Engineers Association, engineers discussed getting along with their councils. A senior engineer offered this advice: "The county engineer should make the decision but should do so in such a way that the credit for the action be given to the elected representative."

The growth in standards and regulations helped municipal engineers bolster their arguments before their councils. Standards give them an authoritative example of the best industry practice at the time versus cost-conscious councils who would cut corners to save a quarter. And they help engineers handle ambitious politicians who are too eager to bend the rules to bring in badly needed tax dollars.

It can be a tough road. George Spencer almost quit his job in Brant County because of disagreements with councillors.

"Some listened and valued my opinions. Others thought I was excess baggage and they couldn't understand why they couldn't just hire any old truck driver to run the roads operation. One year a whole bunch of new councillors were elected and they thought we were building roads to too high a standard. They wanted me to fire half my engineering staff and use consultants.

"I'd interview consultants I knew could do the job. But when we had to go to tender, the politicians always wanted to hire the one who'd do the job for the least money. We ended up hiring a road design firm that had never designed a rural road, only urban roads. They did a poor job."

Spencer began looking for another post, but he soon came to the same realization reached by many municipal engineers in similar situations. While a politician's taste of power is often transient, engineers are in a job for life. Spencer said, "I stuck it out and I survived those councillors. Some know nothing about engineering but they're in control. Eventually I took early retirement."

David Bonsall, formerly with the City of Peterborough and now in the private sector, found that politicians are often more focused on the present than the future. It's the nature of the job. "Engineers are trained to design infrastructure to prepare for future growth. Sometimes politicians don't appreciate the benefits of long-term planning. They're more for the here and now."

The short-sighted attitude of councillors bothers Gary Carroll, director of engineering services, Oshawa. "Too often, there is a lack of vision or foresight. Build for today, make it go away, if we don't get it right this time we'll do it again. There's too little regard for long-term planning, only for the next election." Carroll is also frustrated when politicians have an "it's all about me, not the electorate" attitude, or take the "my way or the highway" approach.

Ultimately, however, council is the boss and engineers roll with the punches. Sandra Lawson, general manager of engineering operational services in Brantford, gives her best advice then works to implement council's decision. "Some (councillors) aren't forward-thinking but on the whole my philosophy is I'll give you the best advice I can; if you decide to do something different, and if it's not illegal and it's not against my code of ethics, I'll work with you. I'll tell you why it may not work but I'll turn around and work the best I can to make it succeed."

Municipal engineers do realize that councillors are under pressure from a number of sources: budget-conscious taxpayers, demanding citizens, project-promoting developers, professional staff advice, as well as their personal goals, dreams and ideals. The engineer is only one voice, and acceptance of the will of council is part of the job.

"Engineers are pragmatic people," says Rick Kester, director of engineering and public works, Belleville. "Sometimes solutions may solve a problem but create another one. Our role is to give council our best advice. Sometimes they take it, sometimes they don't. I never get offended if they don't take my advice. Their role is to make tough decisions affecting real people."

Drawing a parallel to the corporate world, Kester says, "There are many management challenges in working for a municipality. We have a board of directors that changes every four years. They have changing expectations. One council wants to go in one direction, then you have another election and in comes a council that wants to go in a different direction. Some want to turn the boat around, some want to guide a little bit, and some seem to want to sink the boat. Managers have to look at where council wants to go, and manage staff so that you can go where council wants to go."

Doing that can be easier if you develop good communication skills, he says. "Council has to weigh all perspectives and it is very important to help councils see the municipal engineer's perspective. To get my position across, I have to be very persuasive and have the communication skills to do that. If you can't impart to your council something that is very important and needs to be dealt with, you could lose some of those arguments that you can't afford to lose."

Kester likes to use simple analogies to get his point across. To get councils to understand an out-of-sight, out-of-mind problem, he might say, "We have half a billion dollars of assets in the ground, in water and sewers. That's a lot of money. If you owned a half-million dollar house, and the shingles were leaking, most prudent homeowners would say, 'If I don't fix my shingles, my half-million dollar investment will be worth how much in a couple of years?' So we have to use analogies that people can appreciate and understand."

Then there are the unique subtleties of rural politics. David Thompson, director of engineering services in Loyalist Township, near Napanee, says "The smaller the municipality, the more pressure there is on a personal level. If you get a question, do you think so-and-so's road needs paving, you'd better go out and see about it. If you're doing culverts along this road, you might be asked, can you a leave a piece at so-and-so's place? Or if you're cutting wood for a right-of-way, can you leave it at Joe's house who lives eight miles away? You get those kinds of questions."

Municipal engineers might find it is always a good policy to watch out for the elephant hunters on council, the ones trying to bring down the big game.

Environmental Assessment is a Son of a Beach

Engineers once held a cavalier attitude towards the environment that wouldn't be tolerated today. Environmental assessment has changed all that – and prolonged the process of project completion.

Elgin County is underblessed with a natural supply of sand and gravel. Bob Moore, now retired as county engineer, recalls the days when he was unfettered by regulations and could scoop up sand and gravel wherever he could find it. For instance, there was the time in the 1960s when the county was trying to improve Chatham Street going into Port Burwell to accommodate heavy trucks hauling coal from the docks to mid-western Ontario.

"The local contractor would take a load of crap from the road surface and dump it down by the beach. The beach area was a lot of junk trees and it was a good place to get rid of it. Then he would scoop up a load of sand from the beach and bring it back to build the road."

And who owned the beach? "I didn't really know and I didn't ask. DHO approved the money and said get it done because the flak was unreal from the truckers and local people. But we did them a favour. We stopped the sand from blowing into the harbour."

Today the beach on Lake Erie is called Port Burwell Provincial Park.

On another occasion, the county found a rare supply of gravel for another local project down by the lake. "It was good beach gravel. We set up the crusher in the middle of the land and scraped up gravel in all directions. And we did it pretty damned quick before anybody noticed." And who owned the land? "A guy said he did and I didn't ask questions."

Clearly, those were the days of no-holds-barred engineering, long before the implementation of the Ontario Environmental Assessment Act that has looped a tight rein around construction projects. Moore acknowledges it was a cavalier attitude that wouldn't be tolerated today. "Heck, we'd be arrested now for some of the things we did then. Sometimes you had to be imperious to be an engineer." But at the time, he says, he had the blessing of the local natural resources office. "They knew what I was doing and they left me alone."

Moore retired in 1992 after 35 years of engineering. Most of that time was spent in Elgin County, one of the poorer county

PHOTO BY ORLAND FRENCH

▲ **Down on the Beach**
The beach at Port Burwell where Bob Moore "borrowed" sand to build a nearby county road. It is now Port Burwell Provincial Park.

▲ **A Bridge Too Far?**
The Lockyer Bridge on County Road 109 near Orangeville in Peel Region leaps 80 metres to cross the three-metre-wide Credit River. The county's engineers proposed 20 metres to satisfy hydraulic requirements, then 60 metres to accommodate the geomorphology of the stream (its tendency to wander over time). An EA study in 1991 had identified the need for a span of 140 metres, from top of bank to top of bank. The saw-off structure at 80 metres cost $2.6 million. In an unusual situation, the bridge in Peel Region was built by adjacent Dufferin County.

cousins of Ontario. He is clearly of a practical mind to get things done in the most efficient way possible. Moore was a product of his time and he admits he would have difficulty with his job today. "Now it takes forever to get anything done and I would get frustrated by the process. The one-man show of 50 years ago is likely gone and now there is a need to work together with other disciplines, such as planning and environment."

Few if any engineers would argue against the need for better protection of the environment, and newcomers to the field simply accept the Environmental Assessment Act as one of the necessary regulatory functions of modern government. But those who have been laying pipes in the field for a couple of decades, although they recognize the importance of EA regulations, point out that the process can add up to two years, or maybe more, to a major engineering project. This not only frustrates the engineer, it also gives the yips to impatient politicians who want to see a project completed within their four-year term of office.

Rick Kester, director of engineering and public works for the City of Belleville, has advice for antsy politicians: "My world is highly regulated. Don't expect to get a job built in the same year as you approve it, except maybe installation of traffic lights. Any substantial job, especially requiring environmental assessment, won't take place immediately."

The Environmental Assessment Act is the product of a long process of regulatory development in the 1980s. Out of the excesses of the 1960s and 1970s came an acute awareness that the human species was spoiling the environment and we'd better do something to keep our nest clean.

The Municipal Engineers Association was deeply involved in this process. The first Municipal Class Environmental Assessment committee, from 1981 to 1987, was headed by Gerald M. (Gerry) Desjardins with MEA members Jeff Seaton, John Bull, Ron Dupuis and Mel Holinski. This was a strictly volunteer-based committee of MEA members with no paid staff or consultants. At the end of 1987, President R.B. Strachan (Lanark County) summed up the amount of work that had gone into producing workable documents to implement Class EA.

"At long last the Class Environmental Assessment documents for municipal roads as well as the document for water and sewer projects were finally approved by the minister. This approval finally concluded a long and arduous process for MEA representatives on the committees responsible for these documents and after

REGION OF WATERLOO

It's a Wrap!
This rusting steel through-truss bridge in Waterloo (1) was encased in plastic wrap during restoration work (2). The finished bridge is seen at (3).

approximately eight years we feel we have produced documents that are practical for municipal engineers in Ontario to use. A monitoring process will continue in the next few years to ensure the documents are workable and that municipal projects will consider the wellbeing of the environment of Ontario."

Over the years the committee took in representatives from other organizations and received assistance from executive director Jeff Seaton and outside consultant McCormick Rankin. At various times John Bull, Kathleen Llewellyn-Thomas and Uwe Mader provided leadership, with the monitoring committeee always chaired by Paul Knowles who bore the brunt of producing the annual report and survey data acquisition and analysis.

For municipal engineers, the Municipal Class EA lays down the parameters and process that makes the job easier. David

PHOTO BY ORLAND FRENCH

▲ **Making Things Easier**
David Thompson, engineer, Loyalist Township, says the Class EA process makes work a lot easier for engineers. "It tells us how to have public meetings and public disclosure so that there are no surprises. There is a standard environmental assessment for any public works program. It's updated every five years."

Fore-Word Thinking

Motion passed that "the Municipal Engineers Association concur with the request of the County Engineers Golf Association to change their name to the Municipal Engineers Golf Association." This was done to encourage all engineers to come out to the fairway meetings.
– MEA minutes January 13, 1988

Thompson, director of engineering services in Loyalist Township, says it saves him time. "It tells us how to have public meetings and public disclosure so that there are no surprises. There is a standard environmental assessment for any public works program. It's updated every five years. I know it well enough that I don't have to look at it very often but you'll notice that I knew where it was (on the shelf). If we didn't have that, I'd have to do that from scratch every time."

John Hammer, director of transportation for the Region of Waterloo and a past-president of MEA, remembers what life was like before EA.

"When I first came here (1979), when some area municipalities did road widenings they just went ahead and did them. People complained and they would hear them but tended to ignore them. In the past it was easier because the public sometimes didn't know about it until it was too late."

"At the Region we implemented a public input process which paralleled the Class EA process. I got involved in the EA committee and we worked with the province to establish that process and I think it is a great thing to have. It forced some municipalities and developers to get the public involved, to get their input, and get a great product."

The Environmental Assessment Act makes an engineer's life harder but Hammer likes the end results. "It's better to deal with the issues first rather than after the fact. Public input doesn't necessarily make decisions easier but it makes for better-informed decisions."

And as a result, projects take longer. "We used to be able to take projects from a planning stage to a construction stage in a year or so," says Hammer. "Now some major ones are five years in the planning. Projects that used to be three or four years are now six or seven years. We have to make sure everybody is happy and don't file an objection to the minister of the environment. Sometimes we may think a request is frivolous and yet the minister of the environment takes a year and a half to respond, so that's frustrating."

The delay drives up costs. "The engineering part that used to be five per cent of the cost is now 25 to 30 per cent of the cost. Construction costs also rise, because the longer you wait, the higher inflation pushes construction costs."

Generally speaking, the Municipal Class EA process rates proposed municipal projects according to their anticipated environmental impact. The higher the magnitude of likely environmental impact, the more stringent the review.

Schedule A projects are limited in scale and are the least intrusive. Mostly they are routine maintenance and operational activities such as repairing watermain breaks and installing turn lanes. Schedule A projects are pre-approved and do not require the full Class EA clearance process.

Schedule B projects have the potential for some adverse environmental effects and require some screening. All parties who might be affected by the project are consulted. Most projects in this category include minor modifications to existing facilities, such as deepening a municipal well or minor expansion to an existing road.

Schedule C projects, the big ones that might have a major environmental impact, require the most intense scrutiny. These are for new facilities such as bridges, extensive road widenings and new water treatment operations. All the relevant information must be compiled into a clear and easily understood report called an "Environmental Study Report" (ESR). This must be made available for review by the public and regulatory review agencies. And, of course, it becomes the centre point of discussion at one of the most intellectually challenging highlights of a municipal engineer's life, the Public Meeting.

Rare is the word of praise at a public meeting. Engineers, planners and politicians are more often cursed, insulted, yelled at and, sometimes, spat upon by taxpayers who feel their plan doesn't display the dignity of two cents worth of intelligence.

Steve Carroll, commissioner of public works for the Municipality of Prince Edward, recalls the pains of the public participation process involved in planning a new waste-water treatment plant in Picton. "That took approximately two years with a lot of public

consultation relating to location, treatment and biological processes. The public jumps in on these things. There were a couple of groups that didn't want this, they wanted that, it was quite an exercise to go through."

As frustrating as it might be, Carroll regards it as worth the effort. "Overall the exercise is good and worthwhile. Sometimes the public sees it as an opportunity to go off on a tangent. Schedule C adds a fair amount of cost and other things sidetrack you. It doesn't happen overnight. We created a technical steering committee which involved council, public works and planning staff, a member from the public at large and a member of the environmental advisory committee."

Having met this requirement of the EA Act, the plan, sometimes modified, moves on.

There are five distinct phases of EA activities.

The first phase is the identification of the problem or opportunity, and the serving of notice to the public.

The second phase is to identify alternative solutions, and choosing the preferred route. A public information centre is established and the public and review agencies are asked for input.

The third step is to evaluate various methods of implementing the preferred solution.

The fourth phase is the compilation of the Environmental Study Report which is issued for public review. An appeal process is built into the project review at this point.

Once all objections have been met (or overridden), the project can move into its final phase. Contract drawings and documents are completed, construction begins and the construction monitoring process commences.

Before the arrival of the Environmental Assessment Act, some engineers would have started the project at phase five. But not all. Steve Carroll says, "there has always been a reasonable regard for the environment. We're all fishermen and things of that nature. We don't want to screw things up."

Engineers take pride in their contributions to protecting the environment. John Simmonds, retired city engineer for North Bay, says, "Engineers pushed the environmental issue. Engineers are always looking for better ways of doing things. We always had liaison committees to exchange ideas. The province brought in storm water management and (settling) ponds; this was a major battle with developers. It was initiated by engineers."

Now, all is quiet down on the beach at Port Burwell.

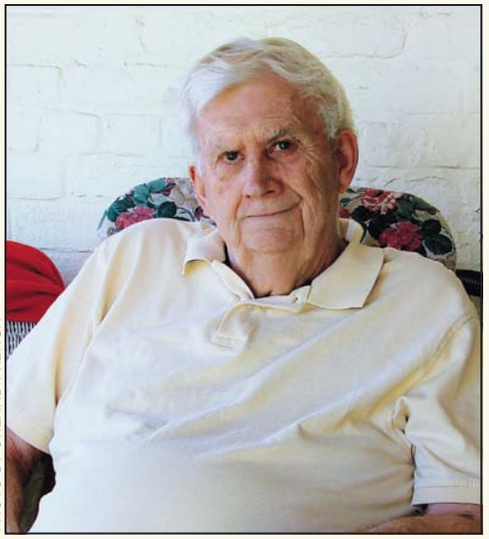
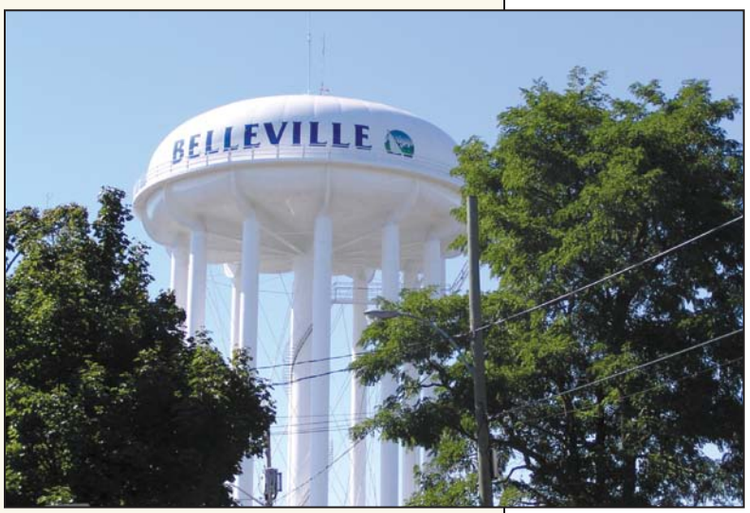


PHOTO BY ORLAND FRENCH

▲ R.G. (Bob) Moore, former engineer, Elgin County

CITY OF HAMILTON

◀ **Climbing the Mountain**
Climbing and descending the face of Hamilton Mountain has been made easier with the construction of these stairs. The stairs provide a pedestrian connection between residential areas above and below the escarpment in the east end of Hamilton. Note the trough to the right of the steps to guide and contain bicycle wheels.



CITY OF BELLEVILLE

▲ **Paint Container**

When the Belleville water tower was repainted in 2005, the $750,000 price of the paint job was approximately three times what the tower cost to build in 1957. The 750,000-gallon (3.4-million-litre) tower stands 42 metres above grade on a hill east of the downtown business district. Originally painted silver aluminum, the tank resembled a spaceship looming over the city.

The price of environmental protection accounted for a good part of the cost of repair. Before the original paint could be removed, the entire tower had to be encased in a plastic wrap to prevent contamination of the surrounding neighbourhood. As the scaffolding and containment system neared the top, work was already beginning on refurbishment of the lower section. When the existing paint had been removed by abrasive blasting, the tower was coated with a zinc primer and two white layers.

Some extremely hot temperatures were recorded during the summer-long project. At times workers were labouring in temperatures of 35° C inside the containment area, with the steel surface of the tank reaching 50° C. The interior lining of the tank has been repaired a number of times and was completely replaced in 2000.

Wow! Computers! Who Needs Them?

In today's world where computers are ubiquitous, it seems hard to imagine that 25 years ago there were seminars to debate the future of computers in public works.

One was organized in Scarborough in 1984. It focused on the use of micro-computers in public works and drew a lot of attention from MEA members who were interested in a province-wide users group.

Out of the seminar came a committee with a cumbersome name: the Tri-Committee on the Utilization of Computers in Public Works. The triumvirate behind it consisted of MEA, OGRA and APWA. No single group had the member capacity to support a computerization committee but together, sufficient resources could be applied to the problem. The purpose of the committee was to encourage and co-ordinate the use of computers in the public works field.

By 1986 there were a few user groups in existence, calling themselves Muskoka District, South Central Ontario, Greater Toronto, Capital Region, Durham and Peninsula. But even in 1986, there were not enough actual working applications that were common enough to provide mutual support within a geographical area.

Part of the problem seemed to be a lack of interest by senior municipal officials. And so the Tri-Committee set up a three-day micro-computer course in Richmond Hill in April 1986 to show that computers could be used by anyone and had many practical applications in public works. The course was aimed at the computer illiterate, of which there were thousands in 1986. The course included titles such as "Word Processing Even On Two Fingers" and "Spread Sheets Not Just For Accounts". They didn't go so far as to call it "Computers for Dummies".

Having a computer was one thing but it wasn't useful unless it had a program that could be applied to public works. While not involved in every development, the committee had a hand in the implementation of a quartet of software products: SIMS, RIMS, WIMS and GIS.

SIMS stood for Sewage Inventory Maintenance System, RIMS meant Road Inventory Maintenance System, WIMS was short for Water Inventory Maintenance System and GIS indicated Geographical Information System.

It was a busy committee. And just like Bill Gates with Microsoft, the Tri-Committee made money: from March 1985 to January 1986 it collected $22,183.88 and spent $9,587.46, for a tidy profit of $12,596.42.

PHOTO BY ORLAND FRENCH

A Fact of Life

Computers have become essential tools, gracing the desk of every engineer, as in the office of Trevor Lewis, director of public works, Dufferin County.

Mean-Spirited Dog-Walkers

The public meeting is one of the essential elements of municipal engineering but it can be unpredictable. John Hammer of Waterloo Region recalls, "My worst public meeting was one where we were putting a brand new road along the back of a golf course. The road had been designated for years but people had gotten used to walking their dogs on the right of way and it was quiet. At a public meeting at a church I stood up and explained what was going to happen, and they threw things at me, and they spit on me, and stuff like that. That was one of the most challenging things but you've got to keep your cool."

PHOTOS BY ORLAND FRENCH

▲ **Passing the Salt**
Main streets get priority for salting to keep traffic and buses running. After a snowstorm in Belleville, bus routes are salted while side streets in the same neighbourhood are only plowed.

Going Too Far

Bob Moore recalls that he received a call from an angry householder one winter when he was county engineer in Elgin County. The woman said, "I don't mind when your snowplow piles snow on my lawn, because my house is pretty close to the road. I don't mind when your snowplow throws snow on my porch because I'm pretty close to the road. But when your snowplow knocks down my door and throws snow down my hall, I thought I should give you a call."

De-icing is a Salty Solution

Road salt is one of the necessary evils of our society. We'd love to get rid of it but so far we have not found a reasonable alternative to de-ice our highway transportation systems.

The application of road salt (NaCl) arguably saves hundreds of lives and millions of dollars in accident-caused vehicle damage every winter. On the other hand, it rusts cars, corrodes bridges, damages concrete and causes environmental havoc. Small wonder that in a society which is increasingly sensitive to the health risks posed by environmental damage, we are constantly looking for ways to cut down on the use of salt in our transportation diet.

On the environmental front, road salt has been blamed for everything from fish kills to damaging aquifers. It is suspected of being a carcinogen in the food chain.

Yet in a society which is largely reliant on land transportation for its survival and growth, no satisfactory alternative has been found. Although Ontario's roads can be coated with snow or ice several months of the year, motorists expect them to be kept as safe as possible. The debate over the use of road salt as a de-icer has been corroding the environment of MEA meetings for years. Donald McDonald was the MEA's chief salt shaker as the association's representative on Environment Canada's Salt Management Working Group. This group was formed by the federal government to investigate ways to control and reduce road salt use by road authorities. As part of this, they investigated the feasibility of using alternative road de-icing products.

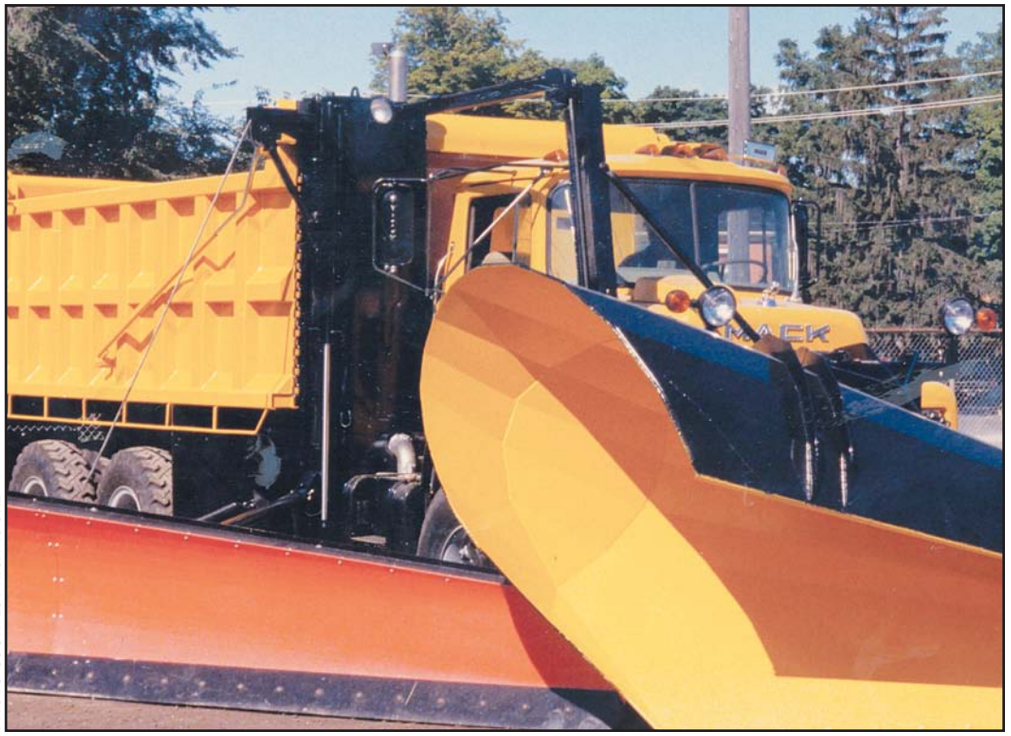
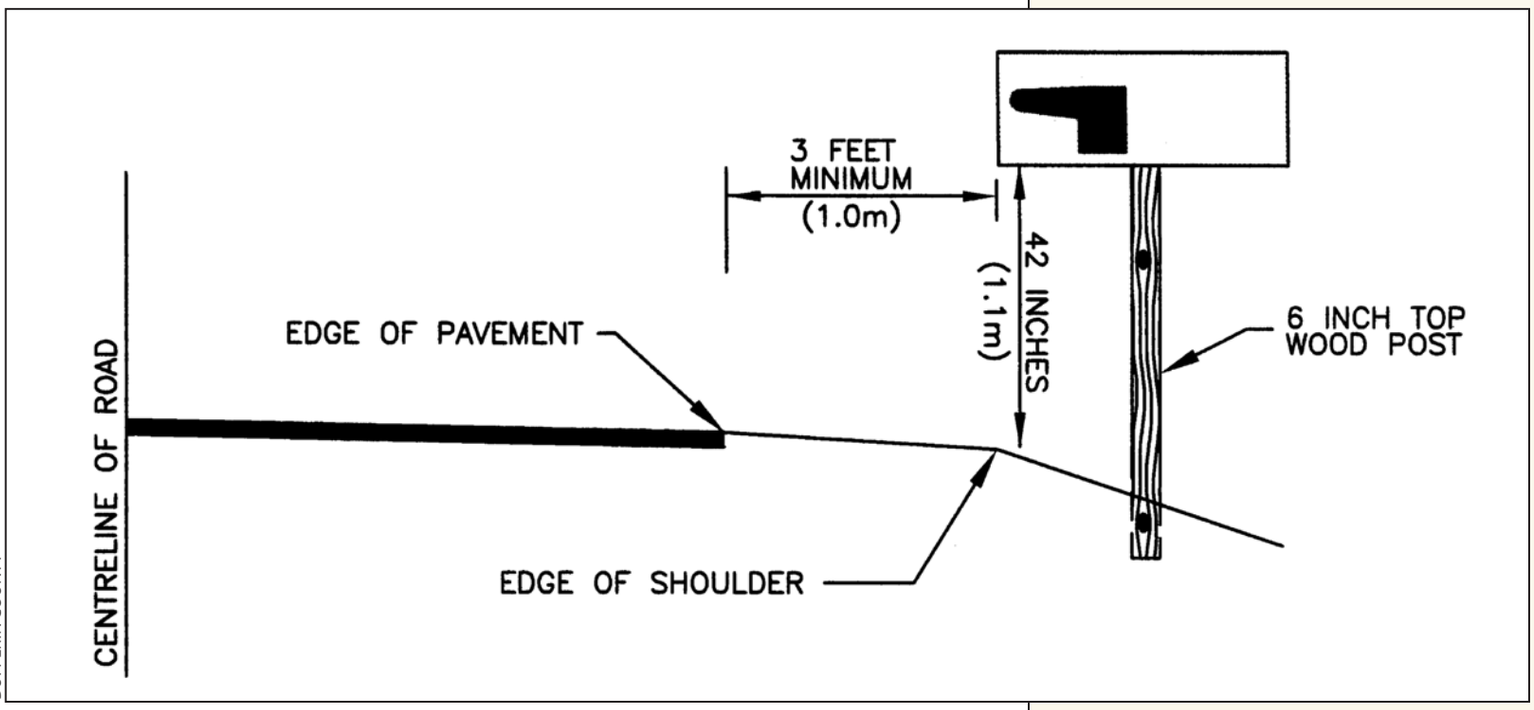


PHOTO COURTESY R.G. MOORE

Snow Control
A 1985 Mack truck with a "hooker" plow, which controlled flying snow during road-clearing operations.

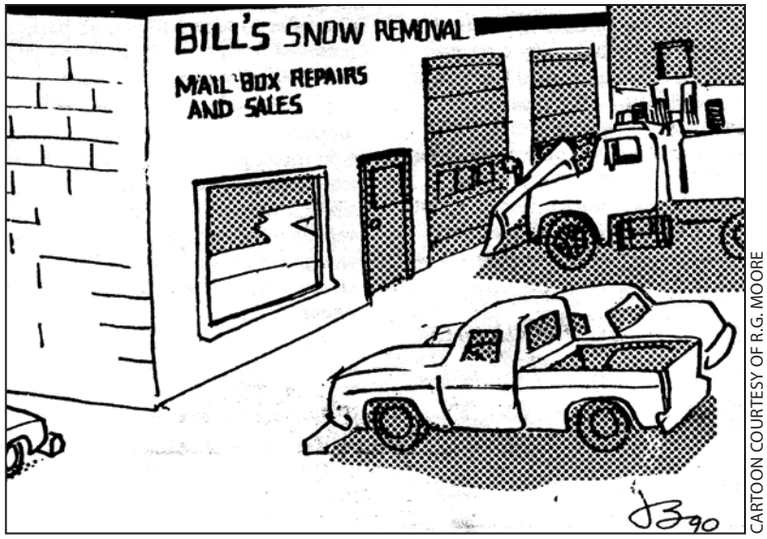
Mailbox Wars
Disputes between snowplows and mailboxes are so common that the Dufferin County Public Works Department provided free plans for rural mailbox installation in 2003. A note on the plans warns that "the mailbox and post must be located so that no part of the box or mounting protrudes towards the roadway beyond the edge of the shoulder."



DUFFERIN COUNTY

CARTOON FROM THE SALT INSTITUTE

▲ **With a Pinch of Salt**
Illustration from a booklet produced by the Salt Institute, an association of manufacturers of sodium chloride. A rabbit named Snowball Snowfighter spreads salt in this 1968 guide to salting roads.



CARTOON COURTESY OF R.G. MOORE

▲ Bill had a lucrative sideline.

One of the first alternative de-icers considered was calcium magnesium acetate, also known as CMA. It is less harmful in some respects than road salt, but is about 10 to 15 times more costly. As the road superintendent and engineer for Stormont, Dundas and Glengarry County, McDonald says this is prohibitively expensive, and no engineer could have sold his council on switching.

Road de-icing products come in several forms: common road salt (NaCl, sodium chloride), magnesium chloride (MgCl) and potassium chloride (KCl), all of which have their own peculiarities. De-icer is usually applied by truck, but not always. In some places, such as at the Salmon River crossing on Highway 401 near Napanee and the 401-416 interchange near Prescott, a solution of KCl is automatically sprayed on the bridge deck when road conditions warrant.

So far, the best solutions to the salt pickle have been to optimize, or minimize, or apply judiciously, the amount of NaCl salt sprinkled onto the roadway. Municipalities have been asked to come up with salt management plans to minimize the impact of road salt use. One solution is to wet the salt with a salt brine to help it stick (saving approximately 30 per cent). Some road managers pre-apply liquids so there is residual salt between the pavement and potential ice. Often this liquid is a mix of NaCl brine with or without CaCl or MgCl added. This is used on Highway 401 and on some heavily trafficked municipal roads.

Using NaCl with discretion still seems to be the answer to winter's slipperiest problem.

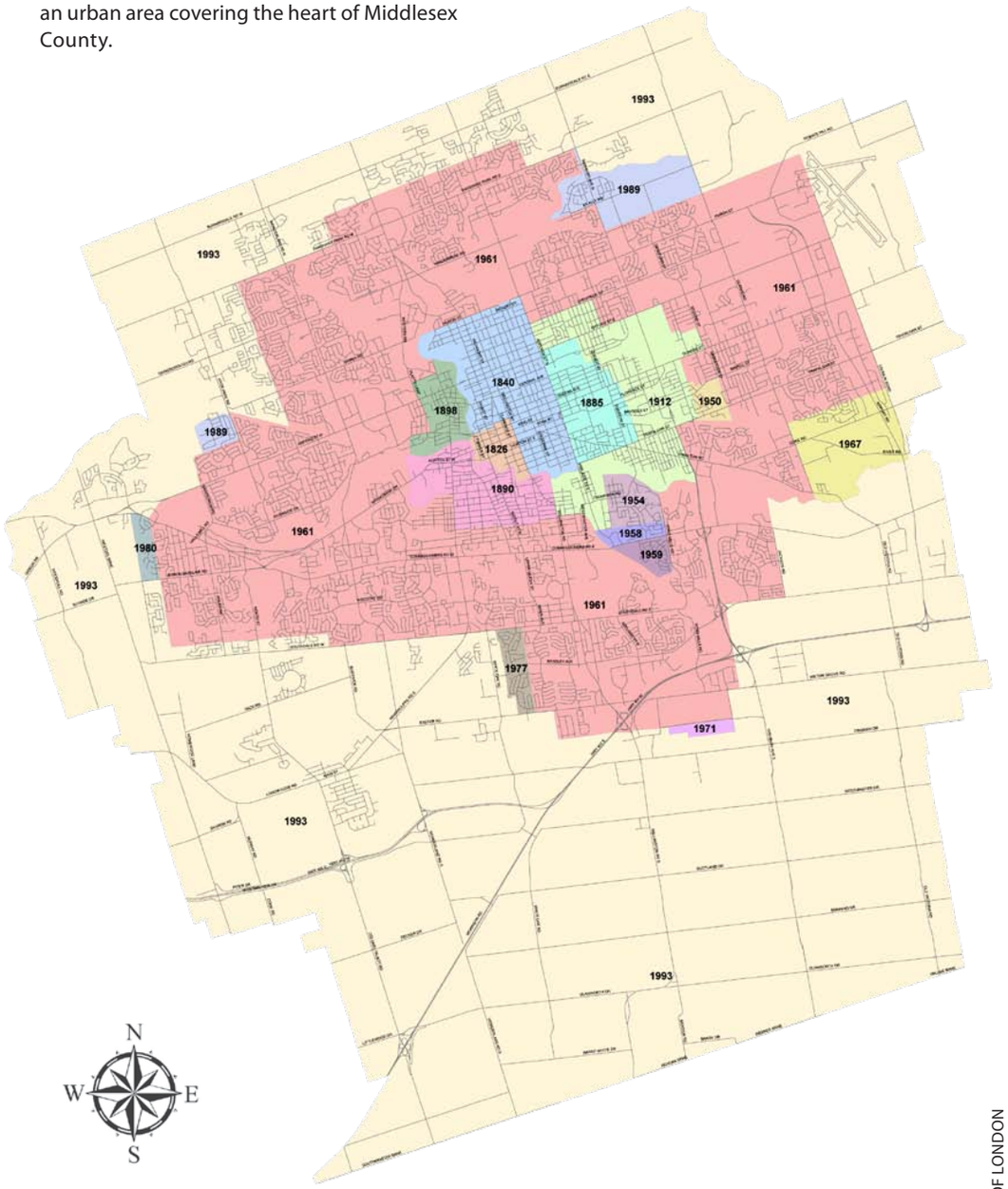
Going Too Far

Bob Moore recalls that he received a call from an angry householder one winter when he was county engineer in Elgin County. The woman said, "I don't mind when your snowplow piles snow on my lawn, because my house is pretty close to the road. I don't mind when your snowplow throws snow on my porch because I'm pretty close to the road. But when your snowplow knocks down my door and throws snow down my hall, I thought I should give you a call."

▶ A snowplow from days gone by.

PHOTO COURTESY R.G. MOORE

▼ **In All Directions**
The City of London, Ontario, has grown from a hamlet at the forks of the Thames River to an urban area covering the heart of Middlesex County.



CITY OF LONDON

Staying on Top of Urban Sprawl

London, Ontario, is a fine example of the engineering challenges presented by a growing city that spreads in all directions. From a hamlet in the 1820s, London has become the sixth-largest city in Ontario.

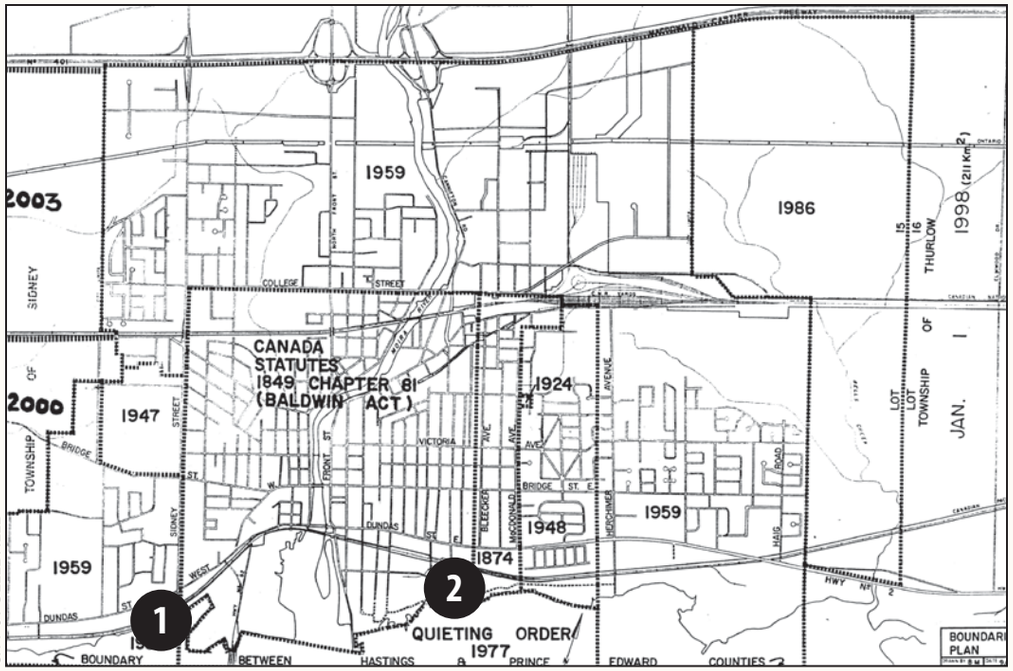
Population growths of cities and the consequent expansion of services have always posed special challenges for engineers. Using the gradual growth of London, Ontario, as an example, we can see how a small settlement has grown in all directions over 200 years to create a large, complex urban centre which also incorporates sizable tracts of rural land. The first permanent settler is recorded in 1801; today the population of the London urban area nears half a million people; the City of London itself is about 350,000.

London has expanded like concentric circles of waves created when a pebble is tossed into a pool. The entry point of the pebble, if you like, is identifiable on the map as "1826". That's when the Village of London was officially established on the forks of the Thames River.

There is archaeological evidence that the London area was the home for aboriginal people for as long as 10,000 years. After Europeans arrived in the 1700s, Lieutenant-Governor John Graves Simcoe chose London as the site for the capital of Upper Canada. However, Guy Carleton, the governor, rejected the site as a capital.

Eventually it became the administrative centre for a large development area known as the Talbot Settlement.

The nickname of London as the Forest City harks back to the days when it was heavily forested with hardwood trees. Although London today is a city of brick and stone, many of the earlier buildings were



▲ **Back from the Waterfront**

Unlike London, which expanded in all directions from a central point, towns and cities established on the Great Lakes grew back from the waterfront. The Baldwin Act of 1849 established the limits of the original Town of Belleville on either side of the Moira River. Water is taken in from the Bay of Quinte on the west side of downtown (1) and discharged back into the bay through the sewage treatment plant on the east side (2).

Although greater capacity for growth can be added to the existing filtration and water treatment plants, existing older pipes restrict the volumes of water and waste that can be carried to and from newly developing suburban areas. Like many other waterfront communities, Belleville may ultimately face a decision to build new water management facilities to support its growth.

(The "quieting order" on the map refers to an edict issued in 1977 to resolve a dispute over municipal boundaries in the Bay of Quinte between Prince Edward County and Hastings County. It was established down the middle of the bay to, among other things, prevent duck hunters from Prince Edward County from hunting in Belleville waters.)

constructed of wood. These were destroyed in a major fire in 1842.

The town had grown substantially since its incorporation as a village in 1826, and a large swatch of land north of the village was annexed in 1840. On January 1, 1855, the community was incorporated as a city, having reached 10,000 residents.

The city was now moving in all directions, as noted on the map. Every expansion meant that the newly acquired residents expected urban services from the city to which they were now paying taxes. Engineers were hard pressed to find ways to provide roads, watermains, sanitary sewers, and other urban services to the new areas of London.

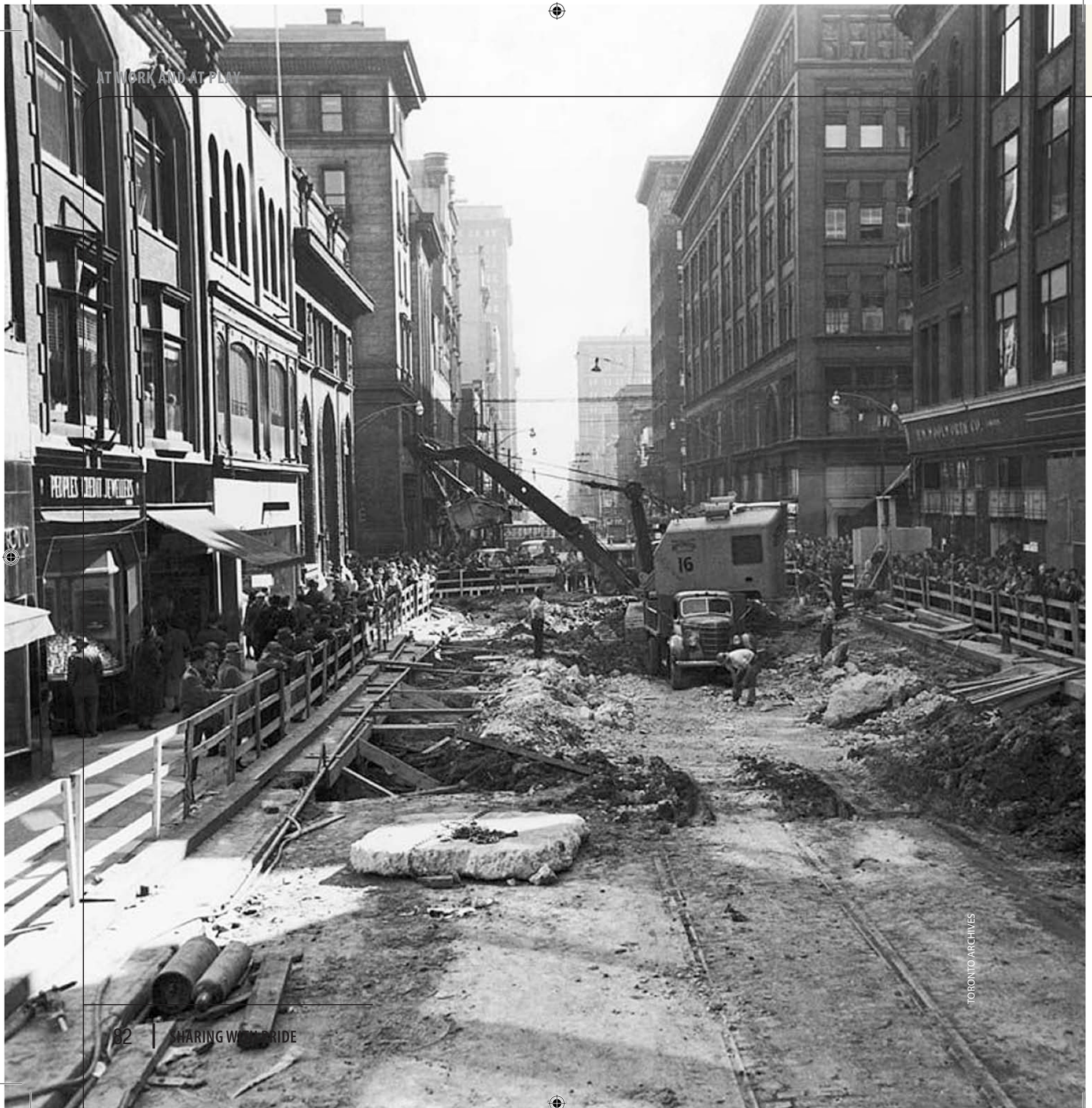
In 1885 London amalgamated with the industrial centre of London East which was concerned about financing expensive new waterworks. The city amalgamated with London South in 1890, and with London West (formerly Petersville) in 1898. The residents of London West, tired of being flooded on their low-lying lands, were looking for big city relief for their own water problems.

These expansions satisfied the city's demands for another decade or so, until a large semi-circular piece of land was added in 1912 on the eastern fringe of London. Smaller chunks of land were annexed on the southeastern corner of the city in the 1950s, and then the city more than doubled in size with the addition of a ring of open land in 1961. This expansion took in many of the surrounding communities, including Byron and Masonville, adding 60,000 new Londoners. A few bits and pieces were added as time went along, but for the most part the 1961 expansion was sufficient for 30 years worth of growth.

By 1990, that expansionary ring had filled up with new subdivisions such as Westmount, Oakridge, Whitehills, Pond Mills and White Oaks, forcing the addition of an even more substantial ring of land in 1993. The Township of Westminster had seen this coming and incorporated as a town in 1988 to ward off annexation. This evasionary tactic was futile and the City of London annexed almost all of the town of Westminster in 1993.

By this time expansion meant taking in large industrial installations such as London airport on the east side of the city, and incorporating the village of Lambeth to the southwest. It also meant absorbing large tracts of rural land well beyond Highway 401 towards the City of St. Thomas, to the boundary with Elgin County.

The 1993 expansion doubled the city in size again, added several thousand new residents and allowed the city to develop industrial and residential areas in the southwestern and northwestern regions. London is now the sixth-largest city in Ontario (after Toronto, Ottawa, Mississauga, Hamilton and Brampton) and the fifteenth-largest in Canada.



TORONTO ARCHIVES

A Tale of Toronto's Sewers

When we consider the care taken today to minimize contamination of our lakes with sewage, we only have to go back relatively few years to realize how abominably we treated our fresh water systems.

For well over a century, the City of Toronto disposed of sewage the way most lake-fronting communities did, by dumping it into the water on its doorstep. Dilution was the solution. Even in the 19th century, this practice was regarded by some as repulsive. In 1853 a newspaper report complained about the foul odour rising from the harbour and the contamination of ice taken from the bay for domestic use.

Complaints about the condition of the contaminated harbour continued but the city didn't do anything about it until 1886. Alarmed by the condition of the local water supply and the frequency of typhoid fever epidemics, the city hired engineering consultants to find a way to deal with the problem.

In 1889 consulting engineers from New York advised that a gravity-fed high-level interceptor sewer and a low-level interceptor sewer, which would require pumping, should be built to carry the sewage eastward to the vicinity of Victoria Park. And there, out of sight and out of mind, it would be dumped into the lake.

Nothing happened for another 10 years. In 1901 the city sent City Engineer C.H. Rust to England to investigate new biological methods of sewage treatment. On his return Rust reported that there was no need of biological treatment when Toronto had such a large lake at hand. Dilution was much the cheaper way to go.

CITY OF TORONTO

For a few more years trunk sewers continued to discharge raw sewage into the bay. Engineer Rust began advocating a plan to carry the raw sewage even farther east, to be discharged into Ashbridge's Bay. He proposed creating sedimentation tanks to remove the heavier solids before discharging the sewage into the lake.

◀ **Digging for Rapid Transit**
Excavation for Toronto's first subway line began on Yonge Street in 1950. Streetcar tracks are still visible as work crews begin tearing up the street. Hordes of shoppers on the sidewalks had a front-row view.

▲ **Clean Water for Toronto**
The R.C. Harris Water Treatment Plant in the Beaches area of East Toronto was built in the 1930s and named after Public Works Commissioner R.C. Harris. The first of four large plants serving the Toronto metropolis, it provides 45 per cent of the clean water for Toronto and York Region.

TORONTO ARCHIVES

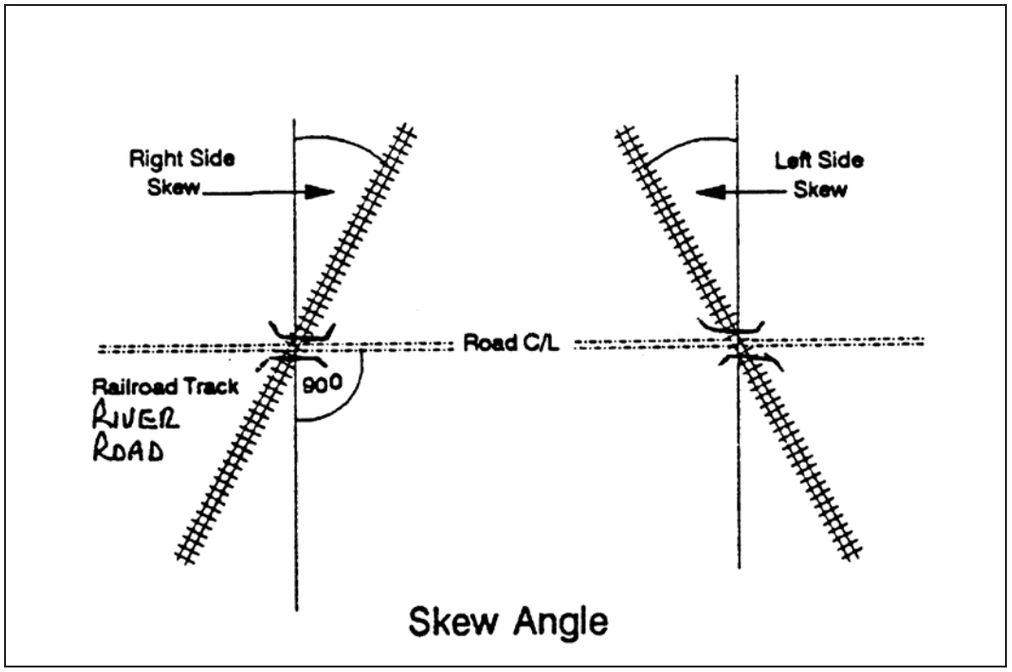
▲ **Down in the Depths**
A power shovel and truck combine to dig out the Yonge Street subway excavation north of Shuter Street in 1950.

Council liked the plan but the residents who lived in the proposed discharge area were not happy. The solution was to build a longer outflow pipe into deeper water. By 1913 a system of high-level interceptor sewer, low-level interceptor sewer, sedimentation tanks, outfall pipe and a pump house were in place. But still, the interceptors only carried away normal dry weather flows of sewage. Whenever the system was overloaded during rainstorms, the excess flooded into the harbour.

Early sedimentation tanks removed about 40 per cent of the solids with the other 60 per cent pumped into the lake. As the sedimentation tanks filled up, the sludge was pumped out and dried in lagoons formed by wooden sheet piling. There it was allowed to digest and consolidate. Each year it was dredged from the lagoons and used to fill in the marsh beside Ashbridge's Bay.

This basic form of treatment did not sit well with the neighbours who complained about, and sued over, the odours and health dangers inherent. The city's answer was to buy their properties. For another 35 years this was the only form of sanitary waste treatment provided by the City of Toronto. The modern era of waste treatment began after the Second World War.

– From a report provided by Frank Horgan, former commissioner of works for Metropolitan Toronto



MEA FILES

Crossing the Line
Crossing skew illustration from the Municipal Bridge Appraisal Manual. The crossing skew angle is the angle between a line projected at a right angle (90 degrees) to the centre line of the bridge and centre line of the river, railway tracks or road, as shown in the diagram.

The Other Side of the Tracks

Many a municipal engineer will confirm that railway companies have always been tough to deal with. As Donald McDonald of Stormont, Dundas and Glengarry puts it, their response to an issue is to send in a battery of lawyers to say "no". Often, says McDonald, municipalities just gave up and spent the money getting things done rather than on words.

Municipal engineers find they don't get much help from the Canadian Transportation Agency, the regulating authority for railways, when a line has been abandoned. "When it is a railway, you can't sneeze on the line without their permission, but they allow abandonment without any thought to the road authority," says McDonald. "Railroads are an independent lot under federal legislation and often act that way."

In one case that came to light in 1951, a city was attempting to install a new water main under two different railways a few hundred metres apart. The standards of the railways varied, so that the standards of construction demanded for a branch line of one railway, over which two trains a day passed, were substantially higher than the standards required by the other railway, which was a main line. The local division engineer had no discretion in the matter since the policy came from head office.

The City Engineers Association complained that the Board of Transport Commissioners ought to standardize the policy for installing sewers, water pipes and pipes for oil and gas under railway lines. It noted that a proposed new policy contained the clause "satisfactory to the railways", perpetuating a system which meant that engineers would keep running into different standards, depending on which railway was involved.

It also objected to the cost-sharing policies imposed by the board which virtually let the railways off the hook for any costs of new crossings. It presented a case where a narrow grade separation bridge, built 50 years earlier and adequate for the time, was now restricting traffic. But the railway refused to share the cost of a new modern bridge, citing precedents that the entire cost of reconstruction should be borne by the

Working On The Railroad

It was reported that some railroads in Scarborough were refusing to review/ authorize sewer work, etc. unless a P.O. was given so they could charge their time to the review. (Report from Ministry of Transportation Advisory Committee)
– MEA minutes September 14, 1988

Dead Skunk in the Middle of the Road

As road superintendent for the Township of Tudor and Cashel, in Hastings County, Ron Carroll oversees the 100 kilometres of roads (27 paved) that serve 700 full-time residents. The township is located in the northern reaches of Hastings County and includes three lakes that attract thousands of summer cottagers to their shores.

Carroll supervises a staff of three. He paused for a brief conversation in the fall of 2008, the day he was getting in the township's winter supply of road sand. As the road superintendent for a small township, Carroll must be prepared for any sort of work that circumstances throw his way. "If someone doesn't show up for work, I'll operate the road grader, plow the snow. I fill in where I have to," he says.

Other days Carroll might have to fix a washed-out road, haul away a fallen tree or even scrape up dead animals from the middle of the road. "It's just an everyday thing around here," says the former owner of his own trucking business.

municipality. The City Engineers Association lobbied for a revised policy which would limit the immunity of the railways on picking up the cost of future reconstruction of crossings. The matter went to Ottawa where it appears it is studied in perpetuity.

At one time the question of who paid what for improvements at crossings was determined by whomever was "senior". If the road was there first, the railway paid. This meant that many county roads, based on concession roads that had been surveyed and built before the railways, had seniority. But the railways had seniority over newer suburban roads. Later changes in legislation made everything negotiable.

Where the railways crossed the county roads, they sometimes crossed the county engineer as well. Jeff Seaton has some good stories from Victoria County. In 1973 Victoria County had 13 level railway crossings; by 2002 that was down to one, so Seaton had to deal with a number of railway abandonment issues. Experience taught him, he says, that the Canadian Transportation Agency, once it accepted an abandonment request, was useless in assisting the municipality in dealing with the physical track removal and road reinstatement. So it was up to the engineer to match wits with the railway.

Seaton recalls, "I had one win. The Woodville spur was under orders for abandonment. But my road reconstruction was first and I left a hump to accommodate the railway. Then I startled the railway's district manager when I proved to him that the road reinstatement to final design grade was to be at his expense, according to the abandonment order."

Sometimes the railways were simply just prickly. "In another lost case the railway contractor removed tracks on a weekend and simply smoothed out the ballast and walked away. That left the county to perform emergency repairs and ultimately excavate the deleterious material and replace and resurface the crossing at its expense."

Stormont, Dundas and Glengarry had a similar experience. A longstanding railway was abandoned. The board order making the railway not a railway listed the crossings but made no reference as to who would remove the crossing. McDonald said, "As in Victoria, a contractor showed up when the steel price was high and yanked the tracks. Luckily we got an asphalt patch down, but when I got in touch with the federal agency, they said, 'We abandoned that line, it's not a railway, we have no jurisdiction'."

On another occasion, Seaton sold aggregate material to a railway to keep the job cost down. When he got his bill for 50 per cent of the work, he discovered that his material sales volume had been doubled prior to the calculation of the county's 50 per cent cost share.

McDonald had a problem with Canadian geopolitics once. "There was a program where the railway paid for some crossing upgrades and the municipality paid part. The split was reasonable. SDG agreed to an upgrade on a failing crossing expecting the normal split, but were told that we would have to pay according to the Quebec agreement (i.e. municipality 100 per cent, railway 0 per cent). I said we were in Ontario, they countered that their office was in Quebec. The upgrade got cancelled."

▶ **Smoothing the Surface**
A works truck repairs the road surface of the St. George Bridge in Elgin County in 1948.

PHOTO COURTESY R.G. MOORE

PHOTO BY ORLAND FRENCH

▲ Steve Carroll at work, a couple of months before retirement, in the municipality of Prince Edward County.

Mixed Blessings of P3s

Some hail public-private partnerships as a way to provide public services in the most efficient and cost-effective manner. Others decry them as government's failure to cope with modern-day public demands.

When Prince Edward County council authorized Works Commissioner Steve Carroll to study the feasibility of a public-private partnership to build and operate a sewage treatment plant in 2008, it was just the latest example of a new approach to providing infrastructure.

Public-private partnerships are ventures funded and operated jointly by government and private business. While they are popular in parts of the United States and in Alberta, they remain much less common, and highly controversial, in Ontario. Some hail them as the wave of the future for providing public services in the most efficient and cost-effective manner, while others decry them as examples of government's failure to cope with modern-day public demands.

The most high-profile example of a public-private partnership in this province is Highway 407, the toll road sold by then Ontario Premier Mike Harris in 1999 to a Spanish consortium. The project has been dogged by criticism that government failed to safeguard users against escalating tolls and long delays in the completion of its eastern extension, delays linked to environmental assessment rules. In fact, Ontario's Liberal government now says it will take over responsibility for the final, eastern leg.

Public-private partnerships rose in popularity as concern grew over the high level of public debt. They have been particularly popular in Britain and Australia. In some such deals, tax revenue provides investment capital and facilities are either jointly run by government and private enterprise, or under contract. Other projects are set up so that the private sector provides the investment for a project under government contract. Sometimes government provides revenue subsidies, either through tax breaks or guaranteed annual revenues for a fixed time.

Steve Carroll says Prince Edward went through the standard process to replace its sewage treatment plant but found tenders were much higher than expected. The plan was cancelled and a committee established to look at alternatives. The group looked at partnerships in Alberta and attended a conference on the topic. "This is an opportunity to do things differently," reasons Carroll. "I have to assess value for money."

Ultimately, the municipality decided to approve a blend of public and private, rather than sign a full design, build and operate contract. While it made sense to hire Maple Reinders Constructors Ltd. to design and build the plant, it was discovered the municipality could still operate it for a better price, says Carroll. He warns others looking at public-private partnerships to not just proceed on faith that the model will save money. "What's most important is for everyone to have a clear understanding of where your savings and opportunities are. When it came to our particular circumstances, we decided it was much cheaper to continue to operate our plant."

Doing things differently was what the City of Hamilton and the former regional municipality of Hamilton-Wentworth had in mind in 1994 when a contract was signed with the U.S.-based company, American Water Services, to operate the waste water and water treatment facility there. And for the term of the decade-long contract, things ran pretty smoothly.

Employees of the region who had operated the facilities were transferred to AWS, with provision made that if the local government ever took over the service again,

Glaciers Move Faster

Donald McDonald (Stormont, Dundas and Glengarry) recalls that soon after he began work in SDG, the county got into a heated argument with a landowner involving the relocation of a river channel designed to stop erosion of the riverbank. Things can sometimes move slowly at the municipal level, says McDonald. So slowly that as of late 2007, the same dispute was still going on with the same landowner over the same river — 36 years later.

CITY OF HAMILTON

1

CITY OF HAMILTON

2

◀ **Treating Sewage by the Bay**
Hamilton's Woodward Avenue water and waste treatment plant is located near the east end of the Burlington Skyway. The aerial view of Hamilton Harbour, Windermere Basin, Red Hill Creek, the Queen Elizabeth Way, Burlington and the western end of Lake Ontario shows one of the more problematic environmental areas of Ontario (1). The treatment plant lies beside the QEW (2).

Under The Carpet?

The Ministry of the Environment is about to declare that this material (road sweepings) is "inert fill" and can be carried by any truck and disposed of as required. A cautionary note in this regard is that large amounts of this material have caused problems of subsequent disposal of municipal land. (May 11, 1988) Later, "Road sweepings are now not a waste and can be disposed of without a certified carrier hauling to a certified site. However, they must be disposed of in a 'safe location' more than specified distances from water and residences."
– MEA minutes March 8, 1989

Wasted Effort, Wasted Dollars

Nothing gets under the skin of municipal taxpayers more than seeing a nice new road dug up no sooner than it's finished, to put in some service like water or sewers. It drives Paul Knowles crazy too, and he's the town engineer in Carleton Place.

Knowles recalls the time the town had embarked on a multi-year project to replace sewer and water lines and rebuild roads. One street was to be completed the first year and an adjacent block the next. The town signed a contract with a firm to do all the work.

The first street was done in Year One. All seemed fine until the next year when the town discovered the contractor hadn't installed connections to the adjacent block. So — you guessed it — the street had to be dug up all over again. An annoying waste of money and time, says Knowles. And the taxpayers don't like it one bit.

their positions and their benefits would be protected. The aim was to save money, maintain existing performance and quality standards and protect staff while paving the way for additional economic benefits to the city. The savings were realized, staff members were protected and the company opened new offices in Hamilton.

So while some in the strongly labour-oriented community objected to letting private enterprise provide this public service, many were quite happy with the results.

As the contract neared its end the new City of Hamilton, which by that time incorporated the former region, instructed staff to call a request for proposals for a new contract. Seven companies expressed interest in the contract, including AWS and the Ontario Clean Water Agency (OCWA), a provincial crown agency that maintains and operates more than 500 water and waste water treatment facilities.

OCWA's proposal was rejected because the agency didn't qualify under the terms established by the city council: it was not a profit-making corporation. OCWA runs an annual deficit which is covered by the province.

In this post-Walkerton era, and based on the experience over the previous decade, the city added certain new stipulations as it went to tender. It toughened the technical language and required that the independent contractor, as system operator, be prepared to accept more responsibility.

For a variety of reasons when it came to choosing a contractor, the city found itself with just a single potential provider: AWS. But the company's services came at a high price. In 2004, the final year of the old contract, Hamilton paid $24 million for the operation of the facilities. The new offer started at $38 million and escalated to $50 million over the next 10 years.

In essence, says Jim Harnum, Hamilton's director of water and waste water treatment, the company was placing a price tag of $14 million on the city's requirement that it toughen procedures and take on a larger share of the responsibility. That, he says, was too dear a price. While Harnum liked the idea of contracting out, "I could not recommend that council accept that price."

AWS offered an alternative deal as well, but Harnum says staff never looked at the price that came attached to it because the technical aspects fell short of what council demanded.

At staff's suggestion, council decided the city would take back responsibility for water and waste water treatment operations. As per the earlier arrangement, the city also inherited the 50 AWS employees who ran the facilities. In order to take on the additional maintenance and oversight the city had demanded, it had to hire 20 more staff members. Yet the budget came in at $27.5 million, says Harnum, nearly $11 million less than the private contractor wanted to perform the job under the city's new standards.

He adds that by using the knowledge and expertise of the new staff in areas of municipal service beyond water treatment, the city gained even more benefits.

Harnum still believes public-private partnerships and other contracting-out arrangements are often a good idea for municipalities. But his advice to other municipalities considering them is to proceed with caution. Ensure your council provides a set of principles or deliverables based on what they want to achieve, he says. Then build the contract proposal around them. And be diligent in sticking to an open, transparent contracting process, he adds; don't be swayed by temptations to change the rules along the way.

"For another municipality," he says, "it might be better to go out to contract." And, he adds, he continues to hold OCWA in high esteem. It's just that in Hamilton's case, the ground rules that were established provided no room for its bid to be considered.

Municipal engineers and politicians need to be open-minded to innovative ways to provide services at a reasonable cost, says University of Toronto engineering professor Barry Adams. And public-private partnerships are one of those ways. Adams says like it or not, it's a subject that's going to land squarely in their laps in coming years.

David Bonsall, former Peterborough public works commissioner and now in private practice in that city, believes public-private partnerships are about to become widespread. "It could become the way of the future. I don't think the public cares whether services (such as waste treatment) are provided by a private firm or the municipality … as long as the service is delivered at the best possible cost."

Oshawa's chief engineer and 2009 MEA president Gary Carroll points to their widespread use in the United States, where private desalination plants sell water, for example. He believes opportunities exist in Ontario to look at privately owned and operated water treatment and garbage gasification plants.

Not everyone is enthusiastic about "design, build and operate" contracts for large municipal infrastructure projects, however. "I see it as a way for senior levels of government to not put debt on the books," says Joe Pitushka of Mississauga. "They transfer debt."

Pitushka doesn't believe municipalities can get a better handle on what final costs will be under partnerships than they do if they undertake the projects themselves. "We've examined public-private partnerships closely. We considered one for bus rapid transit but the city decided to design and build its own."

"We need to see more success stories," adds Chatham-Kent's Gary Northcott. "Some experiences have soured people against them. There have been enough horror stories for people to shy away."

Adds Brantford engineer Sandra Lawson: "We had one bad experience when we had to take over a private ice pad after it went under. There are other examples I've seen of municipalities finding projects more costly than if they'd been done the traditional way with capital borrowing."

Paul Knowles of Carleton Place believes sometimes small municipalities can provide services more economically than private enterprise. He recalls an Ottawa-based firm that thought it could operate the town's arenas and other recreational facilities but when it learned how slim the town's recreation budget was, it quickly bowed out.

But municipal engineering departments have always been places of innovation and engineers are constantly looking for ways to save money. The City of Brockville has experimented with another type of partnership, a smaller version of the sponsorship system used in the naming rights of big-city sports facilities. Sports arenas and stadiums have been named in this fashion in smaller cities, including Barrie, Brampton, London, Guelph and Kingston.

Brockville took the idea a step beyond the high-profile sports facility and brought it down to the community level when it named a skateboard park after the Civitan Club, which donated the largest amount for its construction.

The city also went beyond the traditional when it decided to extend its airport runway. Among those who pressed the expansion were local businesses, which began contributing to the project. One particularly large donation came from G. Tackaberry and Sons Construction. In acknowledgement of the firm's generosity, the airport was renamed the Brockville-1000 Islands Regional Tackaberry Airport.

You Can't Keep A Good Engineer Down

"It was reported that 'Spike' Hennessy of Sudbury, a past-president of the association, was retiring (the third time) and that a party was to be held in his honour on January 23rd, 1988. The president is to send a congratulatory telegram."
– MEA minutes January 13, 1988

The Good Ol' Hockey Grudge

It's East versus West in the annual hockey game at the MEA workshop in November 2008. Since the "modern era" of hockey began in 1994, the West has dominated the series.

PHOTO BY GARY MAY

▲ **Split Personality**
West forward Raymond Northdurft forces East goalie Mark Segsworth to do the splits in the Niagara Falls game.

When the county engineers played their first hockey game in 1966, they faced a difficult choice. Should they play their game in Varsity Arena as scheduled, or should they keep the puck on ice and attend a luncheon to hear the guest speaker, Charles MacNaughton, the province's minister of highways?

They played hooky from the Ontario Good Roads Convention and played hockey. "Well, what could we do?" says Tom Collings, the game's organizer. "We had booked our ice time several months in advance, and we didn't know the minister was going to be speaking at that time."

MacNaughton was not amused. One of the heavyweights in John Robarts' Conservative cabinet, he was expounding on his favourite theme: the necessity of building good roads to improve the provincial economy. And where were the county engineers, the guys who should be hearing his excellent advice on building those good roads? They were playing hockey.

It didn't happen again. More than 40 years after the fact, Collings recalled, "I got a letter or a phone call, I can't remember which, telling me to make sure we didn't schedule a hockey game during the minister's speech again."

In fact, the county engineers didn't play hockey for another eight years. When the game was next organized in 1974, at the North Toronto Memorial Gardens, game time was deliberately set to follow the OGRA meeting. "Since the Ontario Good Roads Convention ends at noon that day, it should be an ideal time and it's on the way to Highway 401 for those driving," said the invitational letter. From then on, the game has been held during the technical tour times scheduled at the annual workshops.

Collings, who was the Perth County engineer from 1962-1994, issued the invitation to the first game from his office at the court house in Stratford. Players wishing to participate would send Collings $3. If you brought your own stick, you sent only $2 for your share of the ice rental. "Goal pads and belly pads will be supplied. If you have equipment, you could wear it. However, there will be a number with no equipment so we won't raise the puck. Shin pads, jock and gloves would be a good idea."

Most of the participants were county engineers (the game predated the creation of MEA) with some suppliers filling in the missing spots. The West team included Peter Crawford (Kent), Russ Luxford (Essex), Roy Lee (Essex), Tom Collings (Perth), Don Derek (Lambton), Paul McIntrye (Middlesex), Jack Corbett (Dufferin), Al Holmes (Wellington) and Paul Stephen (Halton). Ray Rudiak and Bruce Sully from private industry also played. The team was coached by Jack "Punch" Jordan assisted by Wilf "Lefty" Smith. On the East team were Lyle Wells (Lanark), Bill Holman (Lincoln, formerly Ottawa), Charlie Grant (Peterborough), Dave Valentine (Victoria), Jim Britnell (a ringer), Al Lynch (Prescott), Gord Dougall (Leeds and Grenville), Jerry Taylor (Simcoe) and Jack Cox (York), with Jim Lyons and George Clewley from the private sector. The East was coached by Gord "Toe" Weatherell assisted by trainer "Porky" Bosworth. The two coaches had assumed the nicknames of two popular National Hockey

PHOTO COURTESY DONALD MCDONALD

▲ MEA hockey heroes in 2001.

MEA Wants You

It was reported that Bob Wright had been elected (fingered) as chairman (of the Class EA Monitoring Committee).
– MEA minutes May 11, 1989

PHOTO COURTESY DONALD MCDONALD

▲ East and West teams of 1974.

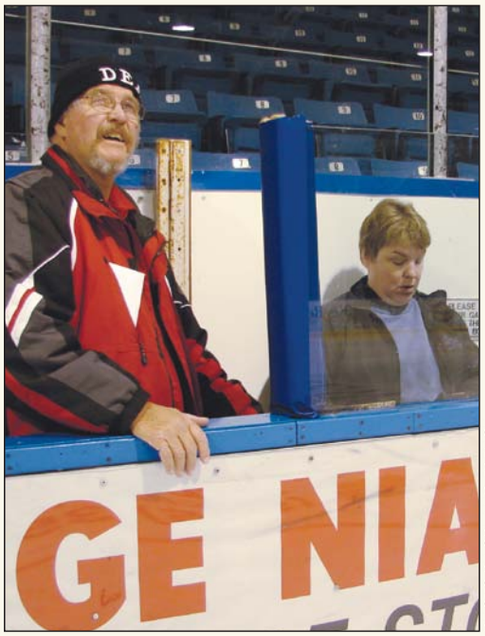


PHOTO BY ORLAND FRENCH

League coaches at the time, George "Punch" Imlach of the Toronto Maple Leafs and Hector "Toe" Blake of the Montreal Canadiens.

The actual score of the game is lost in time but the results were highly favourable to the East. In a challenging letter to rally the eastern troops for the 1974 game, Gord Dougall of Leeds and Grenville wrote, "Those poor losers from the West have been smarting for a rematch ever since they were so thoroughly drubbed way back in 1966…so their ringleader, Tom Collings, has arranged a return grudge match for the Good Roads Convention."

Dougall could spark an emotional fire by rubbing two hockey sticks together. Issued from the court house in Brockville, his challenge was delivered "to all eastern Ontario County Engineers (and their family physicians)".

"The two most pressing questions confronting County Engineers in eastern Ontario are:

"Do you seek to demonstrate the superiority of County Engineers from east of Yonge Street (Hogtown) over those decrepit, overweight, physical disasters and examples of soft living from western Ontario? And,

"Do you own a pair of skates?

"If your answer to these questions is 'yes', then there is a position for you on our hockey team, 'The Golden Blades'."

Dougall accused Collings "and his co-conspirators" of trying "to stack the deck against us by limiting the teams mainly to county or ex-county engineers, thus hoping to defeat us by sheer weight of numbers (West 29 to East 20). However, we feel certain that superior physical conditioning, skill, desire and just being all-round good guys will see us emerge triumphant."

◀ **With a Careful Eye**
Jeff Seaton and Sandra Lawson set up the scoreboard for the Niagara Falls game in 2008.

For all his good-natured bluster, Dougall advised that "this is a friendly game, i.e. no body checking, slashing, boarding, hair-pulling, cussing, etc."

In the eight years since the last game, the players had adopted a little more style. No more were they simply Frank Pinder and Gord Dougall. Now they were "Flashy Frank" Pinder (Hastings), "Groping Gord" Dougall (Leeds and Grenville), "Dazzling Dave" McIntosh (Lennox and Addington), "Sturdy Stu" Watts (Muskoka), "Jack-in-the-box" Cox (Haliburton) and Don "Cartilage" Clark (Prince Edward).

For his part, Collings claimed Dougall had reinforced his team with outsiders. "Gord Dougall is in charge of the East team and they feel quite confident they'll clean our clock and judging by some of the ringers he's signed up, I believe him." But his own team listed Doug Armitage, Paul McIntyre and David Flynn as ringers.

About 1:30 on Wednesday, February 27, give or take half an hour, the ref dropped the puck at the North Toronto Memorial Gardens on Eglinton Avenue west of Yonge. A newsletter report of the game claimed, "The western team, heavily reinforced with ringers, opened the scoring with three quick goals while the eastern team was still lacing up their skates."

By the end of the first period, the score was 6-3 for the West. From then on the East ruled, closing out the score at 13-11 for the East. A neutral and unbiased reporter wrote, "The second and third periods were all for the East, allowing just enough goals so that the western team wouldn't quit and go home." Top scorer for the East was "Flashy Frank" Pinder.

For all the fun they had on the ice, the boys of winter did not organize another hockey game for another 20 years. The Modern Era in MEA hockey began in 1994 in Belleville, a hockey-loving town which had been home to the world-beating Belleville McFarlands 35 years earlier. Belleville also lays claim to the legendary Hull brothers, Bobby and Dennis (of nearby Pointe Anne) and is home to the Belleville Bulls of the Ontario Hockey League.

▼ East and West teams of 2004.

PHOTO COURTESY DONALD MCDONALD

PHOTO COURTESY DONALD MCDONALD

▲ MEA hockey teams were all blue in 2005.

Credit for the revival of the game as an annual event goes to Donald McDonald, assisted by Steve Carroll, engineer for Prince Edward County just across the Bay of Quinte from Belleville. McDonald pressured Carroll into including a hockey game in the 1994 workshop schedule in Belleville. Carroll has since remained an active participant and in the 2008 game coached the East team to within eight goals of victory in an 8-1 loss to the West.

The first MEA game was held in the Belleville Memorial Arena, a post-First World War edifice which deserves being archived as a historic relic. A report pointed out that "this game was a grudge match resulting from serious past trouncings of the western County Engineers by the good guys from the East." The story noted that there were no more county engineers, only municipal engineers from city and county alike.

In one succinct paragraph, Donald (D.J.) McDonald (Stormont, Dundas and Glengarry) described the game:

"The West drew first blood and added a second goal before the East woke up. By the end of the first period, however, the score was tied 2-2. The West scored twice in the second, with the East marking one. Four to three going into the third. The East tied it up in the middle of the last period but fell behind with only a few minutes left after an opportunistic goal off a weird bounce. The East pulled their goaler, and applied the pressure. It was not to be, a lucky clearing pass crossed the goal line … putting the icing on the West's cake. After 23 ½ years in the dark, the West finally beat the East. The final score of this entertaining exhibition of team play, dexterity and stamina was six to four."

Stung by their initial losses, the West has become the dominant member of the two-team Municipal Engineers Association Ontario Provincial Hockey League.

Beautiful Downtown Whitby

Correspondence was received from the Town of Whitby relative to their interest in embarking upon a litter program in order to beautify the Town of Whitby. The executive was asked if we knew of any municipalities that had practical experience in this regard.
– MEA minutes January 10, 1990

PHOTO BY GARY MAY

East-West team assignments are determined by Yonge Street and its extension, Highway 11. If you work east of Yonge, you're on the East team, and vice versa if you're on the west side. In northern Ontario, and on the Niagara Peninsula where Yonge Street extended southerly is a bit negotiable, players can sometimes stray over the line to sit on the other bench. On occasion it is necessary to shift the borders to balance the teams.

The dividing line seems to benefit the West teams, which is probably something the engineers of Lieutenant-Governor John Graves Simcoe didn't take into account when they laid out Yonge Street in the 1790s.

Quite a few players have shown up for every game since 1994. Regulars include the following: East: Donald (D.J.) McDonald, Marc Clermont (Prescott and Russell), Al Korell (North Bay), Wayne Hunt (East Gwillimbury), Dave Shantz (St. Catharines and Welland, now MEA executive director), Steve Carroll (Prince Edward, player then coach), Mark Segsworth (South Frontenac), Ken Becking (Kawartha Lakes), Peter Loukes (Markham), Doug Bleaney (Toronto); West: Joe Pitushka (Mississauga), John Hammer (Waterloo), Steve Lund (Tillsonburg), Clayton Watters (Elgin), Don Kudo (Guelph), Ted Drewlo (Halton Hills), Scott Anderson. Donald McDonald also played in the 1974 game.

Other regulars at the game include timekeepers and scorekeepers Sandra Lawson (Brantford), Kathleen Llewellyn-Thomas (York Region) and Jeff Seaton (Victoria County, which morphed into Kawartha Lakes, now retired as executive director of MEA).

No women have yet played. McDonald says he once tried to encourage one to participate but she declined.

▲ **East and West United**
Red shirts from the West mingle with green shirts from the East in this pre-game photo at Niagara Falls in 2008.

Est, Ouest, Nord, Sud

MTO is extending their bilingual signs to 'close the gaps' on parts of Highway 17 and 11. They are also asking for relief in the Metro area due to the problems on the 401 core and other multi-lane express ways. They also wanted construction exemptions. They were refused exemptions for ordinal directions and must duplicate east, west, north and south in French. (Report from Ministry of Transportation Advisory Committee)
– MEA minutes September 14, 1988

PHOTO BY ORLAND FRENCH

▲ **After the Game**
East goalie Mark Segsworth relaxes with a cold one after the 2008 hockey game in Niagara Falls.

PHOTO BY GARY MAY

▲ **Starting the Game**
Referee prepares to drop the puck at the 2008 MEA game in Niagara Falls.

They Shoot, They Score!

The executive director is directed to purchase two sets of hockey jerseys with 25 sweaters in each of Kelly Green and Red solid colours in various adult sizes with the MEA crest applied on all sweaters plus EAST on the Green sweaters and WEST on the Red sweaters plus individual numbers from 1-25 on units in each set.
– MEA minutes April 12, 2007

Although the game is recognizable as hockey, it is not a Don Cherry rock 'em- sock 'em style. There are no body checks and no slapshots, and the physical conditioning required is minimal. One player said before the 2008 game, "I play one game a year and this is it. The first period is warm-up." Periods are only 15 minutes long, there is little break time between periods, and rarely is anyone sent off for a penalty. Instead, infractions result in penalty shots. Local zebras are hired to officiate the games.

Team colours are red and green: East plays in green and West in red. Sweaters were updated with new versions featuring the MEA crest in the spring of 2007.

For the 2008 game at Niagara Falls, players boarded West and East buses outside the Hilton Fallsview hotel for transportation to the Niagara Falls Memorial Arena. The audience consisted of one single, solitary fan.

East goalie Mark Segsworth, who patrols the rural roads of the Township of South Frontenac with goalie pads and sticks in the back of his truck, had enthusiastically talked up the game for weeks. Of his performance, it can be fairly said that he stopped more shots than his counterpart Jeff Jaeger in the West's net. He was the busier of the two, as his team was outshot 38-15 and outscored 8-1.

The standings in the "modern era" series 1994-2008: West 10, East 4, with one tie.

The grudge tournament continues.

PHOTO BY ORLAND FRENCH

◀ The scoreboard tells the story. West, 8; East, 1.

West Dominates Again

West 8, East 1
East-West Hockey Game, November 20, 2008, Niagara Falls Memorial Arena

Period 1
1. West, Dean Hodgins, from Clayton Watters and Don Kudo, 5:50
2. West, Raymond Northdurft, from Robert Sutton and Bruce Willliams, 8:13
3. West, Bruce Williams from Raymond Northdurft, 16:53

Period 2
4. West, Don Kudo from Christopher Traini and Dean Hodgins, 10.00
5. West, Raymond Northdurft from Robert Sutton, 11:06
6. West, Wesley Hicks from Kelly Walsh, 13:30

Period 3
7. East, Peter Raab from Ken Becking and Donald McDonald, 0.25
8. West, Robert Sutton from Bruce Williams, 8:51
9. West, Robert Sutton, 9:48

Shots on goal: West 7-18-13, total 38; East 8-3-4, total 15. West goalie, Jeff Jaeger; East goalie, Mark Segsworth. West Captain, Steve Lund; East Coach, Steve Carroll.

And the Winner is . . . the Taxpayer

Bill Warwick presided over one of the most dynamic times in the development of Scarborough, watching it grow from township, to borough, to city. When he retired in 1985 he was executive director of engineering and deputy commissioner of works, responsible for nearly 100 design staff.

A municipal engineer wins some battles and loses others, Warwick says philosophically. He likes to think he won most of the biggest, most important battles during his career. One he's particularly pleased about winning involved a developer coming to council with plans to install a pumping station that would pump sewage to another watershed. The existing pumping station wasn't built to take that volume and the second watershed could never handle it, Warwick believed.

In his estimation the developer wanted to build the system, then get out of town, leaving council and the taxpayers of Scarborough to handle the resulting mess. Warwick fought hard and finally persuaded council to listen to his advice. The taxpayers were the real winners, Warwick believes to this day.

Section Three:

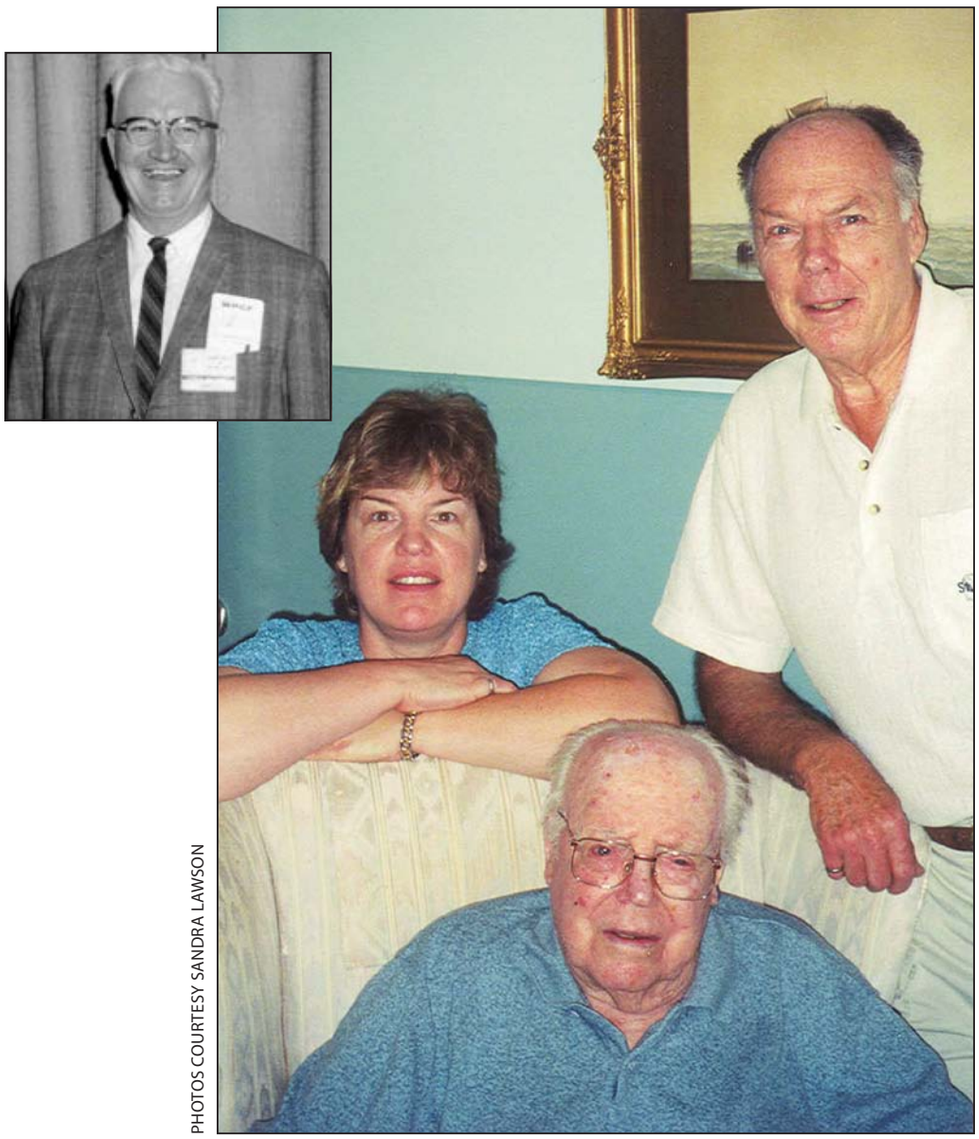
The 21st Century

COUNTY OF DUFFERIN

◀ **A Breezy Place**
High hills in Dufferin County provide excellent grounds for generating electricity from windmills.

All in the Family

The call to engineering seems to be in the genes. It runs in families, with daughters as likely as sons to follow in the footsteps of their parents and even grandparents.



PHOTOS COURTESY SANDRA LAWSON

If there's such a thing as the engineering gene, Sandra Lawson has it. Lawson is a fourth-generation engineer. The family "calling" began with her father's grandfather who was a mechanical engineer. His son became an electrical engineer. In turn his son — Lawson's father — became a mechanical engineer.

On her mother's side, Lawson's grandfather was a civil engineer. Her uncle is an industrial engineer and she's in the civil field, currently manager of engineering operational services for the City of Brantford.

Lawson's path to the profession is not unusual. Many professional engineers tell the same tale of familial connections. In fact Christine Adams says of the seven females in her Queen's University graduating class of '86, six had a father or a brother who was an engineer. The father of the seventh woman was a professor of chemical engineering.

Adams, manager of engineering and construction for the City of St. Catharines, is the daughter of the retired director of environmental services for the former Hamilton-Wentworth. Her sister is watershed engineer for Conservation Halton, a community-based environmental agency that oversees 13 conservation lands and parks.

Did the family link influence her and her sister? "I wouldn't say it was direct lobbying. But I saw what my father did at work and I thought that would be interesting. He never pushed me into engineering. I liked math and science and I liked the idea of building things." By the time Adams was in her mid-teens, she had decided it was the career for her.

◀ **It's in the Genes**
Sandra Lawson comes from a family of engineers. The three generations are, from left: Sandra Lawson, her grandfather, William Dowds, and her father, Donald Dowds. The inset shows her maternal grandfather, George Galimberti.

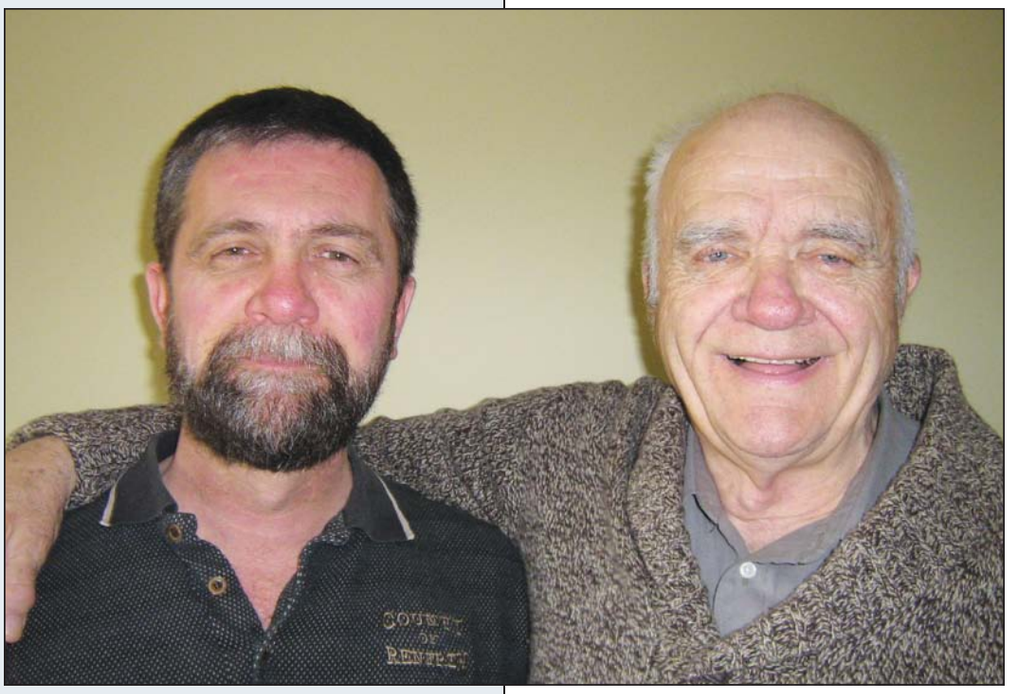


PHOTO COURTESY KEN BECKING

▲ **Two Generations of Beckings**
Jim Becking, right, started with the City of Sault Ste. Marie in 1958, rising to director of public works and traffic. In 1975 he became director of operations for the Regional Municipality of Ottawa Carleton where he remained until he retired in 1992. He then became a consultant working on municipal projects and retired for a second time in 2000. His son Ken Becking, left, graduated from McMaster University in 1984 and took a job with a consulting engineering firm in Ottawa. Nine years later he became county engineer for the County of Renfrew. In 2005 he moved to the City of Kawartha Lakes as director of engineering and public works. In this photo with his father he is wearing the logo of the County of Renfrew.

What are the characteristics of a good engineer? Natural curiosity. Good math skills. Delights in problem solving. Refusal to accept the "it can't be done" argument. In essence, an ability to mentally "crawl into" that engine, that piece of equipment or that bridge plan, imagine what the problem might be and then figure out how to solve it.

So it's probably not that far-fetched to believe that engineering runs in the blood of many families. After all, many of Ontario's engineers currently practising in the municipal sphere count relatives among their list of colleagues, and others have relatives who are engineers working for other governments or for private enterprise.

For Wellington County engineer Gordon Ough it was his uncle who led the way into the profession. For the Ontario Clean Water Agency's director of engineering services John F. Thompson, it was his father. Perhaps some of the elder Thompson's influence rubbed off on his son, who says: "I was proficient in both the maths and sciences, plus I had a high level of interest in the physical world, especially man's contributions — mechanically, electrically and otherwise."

Is it part of the "genetic makeup?" Peter Angelo thinks maybe it is. Angelo, director of engineering for the Town of Port Hope, says "I was always science-minded and did well in math/science and my father was a municipal engineer for 38 years and still practising at 70. My two older brothers went into engineering fields and so did my younger sister, so I guess maybe its just part of our genetic makeup in some way."

Jim Bleaney remembers his sons, Doug and Gord, loved to tinker at the cottage. Taking things apart, putting them back together, fixing. He figures he should have known then that they were destined to carry on the tradition. The elder Bleaney spent 34 years with North York, ending his career as director of engineering. Before joining the municipality he spent time in private industry.

Doug Bleaney followed his father into municipal engineering and now works for the City of Toronto. Brother Gord Bleaney gravitated to the private sector of the profession and moved to the United States. Doug recalls with a chuckle the days when he and his father represented their respective municipalities and they would exchange official letters on municipal business. "As if we were complete strangers," he says.

"I remember there was an aerial survey mapping project we were both involved in," says Jim Bleaney. "Doug was looking after projects and development for Scarborough. It was all very official, our correspondence. You'd have thought we were perfect strangers. But that's the way you do business, one municipality to another. Our relationship meant nothing."

As for his sons' choice of careers, "I guess it's only natural," says Bleaney. "The kids just get exposed to it as they grow up. I didn't push them, one way or the other. All my wife and I promoted was to get a good university education." Adds Doug: "It was sort of like it (engineering) was all I ever considered when the question of higher learning ever came up in my life. My father had gone to Queen's for engineering and that is what I did. My next younger brother did as well."

Paul Mustard, director of transportation and environmental services for St. Catharines,

says he never encouraged his children to enter the field, yet that is exactly what his daughter, Heather Sim, did. Sim is an environmental engineer for Niagara Region. "I can never quite figure out when she decided," says Mustard. "She considered teaching, law. She always liked taking things apart. I suppose my background, indirectly, had an impact."

"I think it was early in high school I decided," reveals Sim. "I always liked problem solving in math and science. It seemed a logical choice for me. To some extent Dad encouraged me. But I'm so similar to him it was natural."

Sim in turn says she has encouraged a younger cousin now in high school to consider engineering as a career. "If you're in the municipal field it's a career choice you can feel good about."

And that's the thing. For many children and younger relatives of engineers, it was seeing the contribution their elders were able to make to society that helped to convince them engineering was for them.

"It's a job you can find rewarding," explains Sim. "It's a good career."

PHOTO BY HELEN ANGELO

▲ **The Angelo Family of Fine Engineers**
Joe Angelo and his wife Helen of Belleville have raised a corps of engineers. From left: Joe, father, (retired director of public works, City of Belleville), son Chris Angelo (director of public works, Quinte West), daughter Cathy Angelo Scott (teacher), son Anthony (Tony) Angelo (engineer, private consulting firm), daughter Linda Angelo Craib (Metro Toronto Conservation Authority), daughter Mary Angelo Boylan (engineer, City of Guelph), son-in-law Kevin Boylan (engineer, private industry in Hamilton) and son Peter Angelo (director of engineering, Town of Port Hope).

More than Hard Hats and Dump Trucks

Go Eng Girl is a program to tell young girls that engineering is more than big boys playing with big toys in the sandbox of life.

"The impressionable young," goes the expression. Or, "they're so impressionable at that age." If children's impressions are set so early in life, isn't it crucial we take care to ensure that young girls aren't turned off careers in science and technology before they get a chance to see what those fields are all about?

Yes, says Valerie Davidson, chair of the University of Guelph's women in science and engineering program. Which is precisely the thinking behind the Go Eng Girl project.

Surveys show that girls in Grade 9 are already quite set in their career path direction. A solid 50 per cent say they would not consider a career in science and engineering. The good news is that 40 per cent more say they're not yet sure. Still, by that young age, half have already been lost to engineering.

Davidson formed Go Eng Girl as a way of getting to elementary school girls and giving them a better idea of what engineering is all about, that it's so much more than the old stereotype of hard hats and dump trucks.

Since 2005, girls in grades 7 to 10 have been invited, along with their parents, to annual day-long events at university campuses across Ontario. There they meet female engineering students, professional engineers including representatives from Engineers Without Borders, and learn about some of the amazing things these professionals are doing. They also get to participate in activities designed to show them the many interesting

PHOTO BY GARY MAY

▲ **A Different View**
Windsor engineers Anna Godo, left, and Tiffany Pocock believe women's perspectives on issues concerning their profession are different from those of men. Women are more relationship-oriented, they believe. Pocock says: "I think about kids and the impact the project will have on them." Godo believes women are more inclined to take a team approach to a project.

ways engineering can be applied in real-life situations.

The parents are along for more than the ride because they are seen as part of the North American societal problem: engineers are looked on as geeks, people holed up in laboratories with non-existent communications skills. It's not an impression found in many other parts of the world, where engineering is regarded on a par with doctors and lawyers. Even engineering parents may be long detached from the cutting edge of the profession and are surprised by what they learn.

If the percentage of female students entering the engineering field remains as low as it is now — about 18 per cent — that augurs poorly for the future of the industry, reasons Mary Wells, associate dean of outreach at the University of Waterloo. "We're losing potentially great engineers."

Davidson, herself a professional engineer, holds the Ontario chair for women in science and engineering, one of five established across the country by the Natural Sciences and Research Council. She says the number of female undergrads in engineering has remained constant since about 2000, while the number of male students has increased, meaning the percentage of females is declining. Part of the reason for this is that engineering fields that traditionally appeal to men — computer, mechanical and electrical — are growing while those such as biological and chemical engineering which appeal more to women are not.

With the conclusion of the 2009 Go Eng Girl classes, about 4,000 girls will have gone through the program and the first of those will now be in their early university years. Davidson hopes her planned follow-up will show many of those girls are choosing engineering but knows it will take a while to show results.

Go Eng Girl is just one program aimed at attracting more female engineers. Each engineering school has its own outreach program and Davidson says officials are working closely to improve the numbers.

But aside from the question of diversity itself, does it really matter that the vast majority of new engineers are men? Do women really look at engineering issues, challenges and problems any differently than their male counterparts? Would the engineering profession be any different today if there were more female engineers?

Two women from the City of Windsor's engineering department sat down at the MEA's 2008 fall workshop to ponder that question. Their conclusion is that yes, they believe women do look at engineering issues differently than men do.

Anna Godo got her bachelor's degree from the University of Windsor in 1986 and Tiffany Pocock graduated from the same school in 1994. Both women are employed by the city – Godo as a senior engineer and Pocock as a project administrator. And both believe that women do bring something different to the job of a municipal engineer.

Women tend to be more flexible, says Pocock, and more likely to accept criticism. Women are more relationship-oriented than men. "I know about people's kids, about relationships. In dealing with projects, I think about kids and the impact the project will have on them."

Godo believes women take less of an adversarial approach and more of a team approach.

The women point to one city project in particular that involved a municipal drain. Municipal engineers, consulting engineers and Chrysler Corp. were all involved and the entire team happened to be women. They look at its success as indicative of what can be accomplished when all parties work together to resolve an issue in the spirit of co-operation, and they believe the gender makeup of the participants had something to do with it.

There was one negative side-effect of the all-female negotiating, they add: The male resident whose complaint instigated the process looked at the female faces sent to deal with his problem and concluded the city must not be taking him seriously.

Sandra Lawson also firmly believes women look at problems and issues differently than men do. By nature women tend to be more accommodating and compassionate, says Brantford's manager of engineering operational services. "Consequently we tend to look at, shall we say, the human aspects of a situation. Men are more technically oriented. Engineering's a technical field but women bring the human quality to it.

"In the municipal field, there's the technical side of engineering and then there's the political side," says Lawson. "Dealing with the politics is easier when you take a more human approach. I think women are more likely to look at the broad range of aspects to the situation."

Lawson offers this example: "More and more, municipal officials are having to deal with the physically challenged. We have to work their needs into our decisions and if there are more engineers who are naturally thinking of the human element, you're going to think about accommodating them."

The University of Waterloo's Mary Wells agrees. "Women look at problems more holistically in general. They think about what people feel. Women value different things than men do. Men focus more on the technical solutions."

Wells offers the example of a female student who came to her with a proposed design project: She wanted to design a habitat for an animal from the animal's perspective. A man would be more inclined to tackle the question from a technical perspective, Wells believes.

Then she considers recent publicity surrounding the potential UV radiation given off by low-energy light bulbs. She contemplates whether a female designer would have been more likely to have considered that during the design stage, not after it was created.

What is really happening to the numbers at the university level? When longtime county engineer Donald McDonald graduated from Queen's University in 1968, there was one woman in his class of nearly 250. When Brantford's Sandra Lawson graduated from the same school in 1981, hers was a class of 400 and 60 (15 per cent) were women. Lawson went on to be elected MEA's first female president in 2004.

So there has been an improvement since the bad old days. But is that trend continuing?

Sherrie Marie Millar graduated from Carleton University in 2001. "When I was in school, my class was about 20 per cent female. It is peculiar to me that the numbers are not (still) going up," says Millar, senior project manager for infrastructure at the Town of Fort Erie.

Mary Wells says the number of women entering university engineering programs likely peaked a few years ago at 20 per cent and fears that it has dropped slightly since then.

There are some areas of engineering, however, to which women are being attracted in larger numbers. Heather Sim, environmental engineer for the Niagara Region, notes that nearly half of her University of Waterloo graduating class of 2005 was female and she believes the increasing opportunities for environmental engineers will continue to entice more women into the profession.

Wells concurs there are certain key areas that attract women, chemical, environmental and management engineering, for example.

But attitudes need to change before further progress can be made, Wells adds. Engineering has been branded as a profession of machines and widgets, while the human aspects have been ignored. Just like doctors and lawyers, engineers are in the business of helping people yet the way it is normally presented "turns women off right away."

Lawson believes high school guidance counsellors have to change their attitudes. "I came from an engineering family so I knew from Grade 9 what I wanted to do. But if you have no idea what you want and you're not directed, that has a lot to do with it. I was lucky: I always had mentors and a supportive family."

"There isn't much of a push (by most parents) to send their daughters into engineering," says Millar. "Parents don't realize all the options there are in engineering. Carleton has quite a number of different streams, from physics engineering to environmental engineering."

Like Wells and Davidson, Millar is doing her part to encourage more participation by women. Millar is part of an educational training team that goes into schools and believes the campaign to win over young girls must begin early. The program is aimed at Grade 8 students but she believes even that's too late. The pressure to stream girls away from science and technology begins on Day One in schools, she says.

Her father was an engineer but she even found misgivings in her own family when she announced she was interested in engineering. "My mother thought I wouldn't make it but my father … was always leading the way. He got me interested."

Wells would like to see engineering courses in elementary schools. Women who enter the field more often than not come from families of other engineers, she says, so they know the truth about the field. If more girls and young women were exposed to the facts — could see what kind of contribution engineers can and do make to society — they would be more inclined to choose it. She, too, is a firm believer in getting to guidance counsellors

and educating them on the true nature of the profession.

In a report by the national associations of engineers, technicians and technologists in conjunction with Human Resources Canada, it is estimated that 12.3 per cent of all engineers in Canada are women while the number is about 19.1 per cent among technologists and technicians. Women constitute about 12.4 per cent of all civil engineers in Canada, says the report. For her part, The University of Guelph's Valerie Davidson believes the percentage of female engineers is likely lower than the 12.3-per-cent estimate.

MEA Executive Director Dave Shantz believes the municipal field probably lags behind those national numbers. While he doesn't know why, he speculates that the long hours associated with municipal work are probably less attractive to women, who place a relatively higher value on their family time.

Engineering in a Strange Land

It is estimated that one in five people employed in engineering in this country received their degrees in other countries. Many of them are members of the Municipal Engineers Association. While they did not doubt that they would be able to land an engineering job in their new homeland, they found they had to learn Canadian culture and adopt unfamiliar tactics to get a position. Here are three of their stories:

FAYAZ KHAN

Fayez Khan speaks in a gentle, respectful tone when asked what advice he'd offer employers who are approached by recently immigrated engineers: "Just give them a chance to prove themselves." Khan makes it clear he has no complaints about his own treatment since arriving in Canada in 1997. But he says it took him a while to get used to the vast cultural differences between this country and his native Pakistan.

Khan graduated from engineering school and worked in Pakistan for six years. He'd met Canadians on the jobsite there, liked them and liked the thought of a new challenge in a new country. If Canada wanted engineers, he was willing to offer himself. He immigrated and enrolled at the University of Toronto where he began working on his master's degree in engineering.

He quickly learned of the giant cultural divide that separates the two countries, a divide that made adjusting to life here all that much harder. For starters, Pakistanis are reluctant to borrow money and Khan had come by himself with no one to help support him. Rather than take advantage of the loans available to students here, Khan found odd jobs he could perform when he wasn't in school, to cover his education and living costs.

"I had expected to at least get in at the bottom (of engineering) and planned to work my way up," says Khan. "But without experience in Canada, there were no jobs open to me." He learned, too, that the Canadian approach to finding a job was quite different from what he was familiar with in Pakistan. In that country, it would be considered rude to follow up a job application or resumé with a phone call. He found that in Canada, such follow-ups were looked on as showing persistence, not rudeness.

At a campus employment counselling service Khan learned it is normal to tailor a resumé to a particular employer, to emphasize the kind of work a job requires. "At first I would refuse to do that. I'd been honest in listing everything I'd done. I thought that was enough."

Finally, he began to land interviews. But "People from Asia don't boast about anything. They won't say why they are the best person for the job. I was told to do this, but I thought it wasn't honest."

And all too frequently interviews would end in the same frustrating question: "Do you have Canadian experience?" Khan had none. "I'd explain I knew the same engineering principles as everyone else. Just give me a job and I'll get that Canadian experience." One day a private consultant conducted an entire interview with Khan without asking what had been, until then, the fatal question. It was a lower-end job as an inspector, but Khan was grateful for the chance to prove himself.

After five years he moved on to the City of Welland and more recently went to the City of St. Catharines as a design and construction engineer. Once you're in the door, he says, other doors will open. But to get in the door you need to follow the rules, or as Khan says, "When in Rome, do as the Romans do."

JUNAID ASGHAR

After graduating in Pakistan in 1981 and practising as a professional engineer in that country, Junaid Asghar says he chose Canada for the quality of life. When he arrived in the late 1990s, "I never thought I wouldn't be able to get a job here," he says.

Asghar knew no one in Canada beyond his immediate family with whom he had arrived. He was advised to turn for help to COSTI, the Toronto-based multicultural agency that provides services to new Canadians. "I had the technical knowledge to be an engineer here but there was a cultural difference I wasn't aware of," he says. He took a full-time three-month program and learned about the Canadian work environment, employers' expectations, how to make cold calls, networking, how to obtain an interview and how to prepare and present himself at that interview.

"They told us when we made a cold call, we had seven seconds to grab the person's attention," says Asghar. "I made 300 phone calls in 10 days and one company said come in for an interview. I'd just called at the right moment." That first interview landed Asghar a job and later he was invited back to COSTI meetings to tell other new Canadians how he'd done it.

But there was still the matter of getting his professional engineer's licence in this country. It's a long road, says Asghar, but "that's the system. You have to accept it and play by the rules." Since then he has become Brantford's director of design and construction services and is the chair of MEA's development engineering committee. He's also on a national storm-water management group.

CENGIZ CAKMAK

A bright young Turkish-educated professional engineer, Cengiz Cakmak had no reason to believe he'd have trouble landing an appropriate posting in Canada. But Cakmak learned otherwise when he heeded the advice of Canadian contractors and immigrated to this country in the late 1990s.

After graduating in 1992, Cakmak began working for a multinational firm in Kazakhstan where he constructed an access road to a gold mine. There he met some Canadians who told him there was a shortage of engineers with his qualifications. His arrival in Canada offered one rude awakening: Not only could Cakmak not get a job, he couldn't even land an interview. He found jobs in restaurants and pizza shops while taking courses at Seneca College. "I realized I needed to get more education in Canada," he says.

He went to Niagara College to learn about geographical information systems. Working on his thesis on asset management brought him into contact with staff from the City of Niagara Falls. As his network of contacts widened, Cakmak began to get interviews and before he finished his studies he was offered his first Canadian engineering job with the City of Welland, where he worked as an asset management technician. After three years he moved to Burlington as an asset management specialist.

Soon Cakmak began the process towards recognition as a professional engineer in Canada. His first interview didn't go well and he was advised to take more courses. He did, and the next time he passed the exam. By the end of 2006, Cakmak had received his full membership in the Professional Engineers of Ontario.

Cakmak's advice to other new-Canadian engineers: "Start the process of being recognized as a professional engineer before you arrive." The professional engineers' website offers direction on how. Immigrants shouldn't expect too much, too fast, warns Cakmak. And networking, he says, is crucial.

PHOTO BY GARY MAY

▲ **JunaidAsghar**

PHOTO BY GARY MAY

▲ **Cengiz Cakmak**

I Became an Engineer Because…

Why does anyone become an engineer? Of the engineers polled for this book, a good many had parents or siblings who were already in the field. Some simply wanted to change the world, while others followed their natural aptitude for maths and sciences and problem solving into the world of engineering.

Since early grade school it was my chosen path. I was proficient in both the maths and sciences plus I had a high level of interest in the physical world, especially man's contributions – mechanically, electrically and otherwise. In addition, my father was a professional engineer.
– John F. Thompson, director of engineering services, Ontario Clean Water Agency

Why did I become an engineer? Remember those computerized career aptitude tests in high school? Plus, minimal blood & guts.
– John Este, chief building official, Parry Sound

It was sort of like it was all I ever considered when the question of higher learning ever came up in my life. My father had gone to Queen's for engineering and that is what I did. My next younger brother did as well. He is now in Wisconsin having moved there with Kimberly-Clark as a civil engineer some years ago. There was no overt pressure to become Queen's civil engineers, just the pressure and expectation to go to university.
– Doug Bleaney, a manager in Toronto's technical services division, City of Toronto

Quite simply, I want to "change the world". I enjoy solving problems and developing practical solutions to help build infrastructure to improve the quality of life for all. Engineering achievements have made major changes to our society and I wanted to be a part of that.
– Arup Mukherjee, senior project manager, transportation services, Regional Municipality of York

I was good in the maths and sciences and my uncle was an engineer.
– Gordon Ough, engineer, Wellington County

I was always science minded and did well in math and science. My father was a municipal engineer for 38 years and still practising at 70. My two older brothers went into engineering fields and so did my younger sister, so I guess maybe it's just part of our genetic makeup.
– Peter Angelo, director, works and engineering, Port Hope

In high school, through a couple of years of various math courses, three of us, good at math, always sat at the back of the class. When our teacher would ask a question that no one would offer an answer to, he would glance to the three of us at the back and ask "What about you engineers at the back?" One of us would usually provide the answer to his original question. The reference stuck.
– Damon Wells, director, public works, Kingston

It was a passion to be creative and build something new for the community.
– Bino Varghese, senior project engineer, engineering, works and transportation, Brampton

To use and manage the available resources to better the life of people and at the same time preserve the environment.
– Dadean Assam, construction manager, Oxford County

I am technically oriented coupled with a history of engineering in my family. A civil engineering career was a natural progression for me.
– Kevin J. Shaw, director of engineering services, City of Greater Sudbury

I became an engineer because the goals and occupations of the profession fit with my values with respect to fixing problems, enjoying civil construction work, making things better and helping people. (And I was too fed up with school to go to teachers college).
– Les Shepherd, director of works, planning services and asset management, United Counties of Leeds and Grenville

I Became a Municipal Engineer Because…

Engineers who choose to work for municipalities have to enjoy working with the public and politicians. It's also a job requiring a knack for finding solutions to problems and situations gone wrong.

As a municipal engineer I get to design and build and operate systems. Unlike consulting where you might design and maybe oversee it, in the municipal sector you identify the problem, find a solution, design and build the system and, if you're around long enough, maybe even see it outlast its design life and do the whole thing all over again.
– Alan Korell, managing director, engineering, environmental and works, North Bay

Municipal engineering is probably the best kind of engineering when it comes to helping the public. It delivers everyday services: snow plowing, garbage collection, ensuring safe drinking water. It provides a lot of invisible services until something goes wrong, such as at Walkerton. It's very fulfilling work. We do a lot of things that keep the country running. Municipal engineers play a vital role in our society.
– Sandra Lawson, general manager, engineering operational services, Brantford

I never thought of the public sector when I was young. I liked dealing with politicians, and you get to build things and you see the results of your work every day, even if it's underground. You're making things better for people.
– John Simmonds, retired city engineer, North Bay

I never felt I missed anything not being in private practice. It's a very noble profession. You're providing for the public's safety and well-being through your expertise. In a smaller county you're the chief cook and bottle washer. Yes, a large part of your time is spent on administration and dealing with the public, but I still had control over design aspects. My job was even more fulfilling than it would have been in a larger municipality. There was more hands-on engineering in directing staff, setting criteria, monitoring their work, field inspections, using my engineering background to come up with solutions.
– George Spencer, retired engineer, County of Brant

A lot of us are history buffs. We like to look at what's been accomplished in terms of building something. We have an intense desire to satisfy the public, to create something with our hands, our technology, and to leave a bit of a legacy. You have to like that kind of thing. It's that need and desire to be involved with the public, to create something that can be used, to leave a bit of a mark. It could be a structure, an edifice, or it could be a procedure or protocol.
– Gary Carroll, director, engineering services, Oshawa

As an engineer, we get to see things built. Even with the small projects, like a new set of traffic lights, there's a lot of satisfaction in being involved from the get-go and having a close relationship with contractors. In other professions, you don't necessarily see the results of your work. We see the problems first-hand, we hear from the public, we design a solution and we implement a solution. And sometimes we get to shake the public's hand and they say, "Thanks, you fixed my problem."
– Rick Kester, director, engineering and public works, Belleville

I was reviewing water and sewer designs (in Metro Toronto). It was boring. I hated it. I was applying everywhere to get out of there. In 1988 I was hired by Kingston Township as the deputy works administrator for operations. It was a fast-growing municipality and I could oversee roads, sewers and so on. I love construction. I love seeing things getting done. I love being out in the field, not stuck in the office.
– Mark Segsworth, public works manager, South Frontenac Township

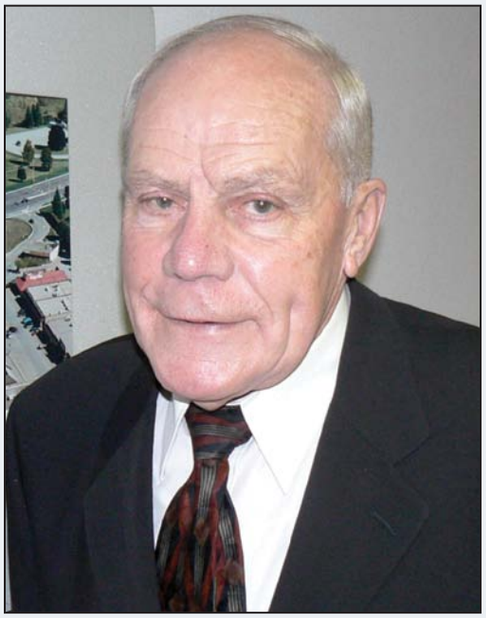


PHOTO BY GARY MAY

▲ **Private Consultant**
George Totten, seen here in 2009, founded the engineering firm of Totten Sims Hubicki.

I Left Municipal Engineering Because…

Senior municipal engineers may find they spend more time on administration than on jobs in the field. For those who savour the joy of pure engineering, there is a strong temptation to move into private consulting work.

The difficulty was the job became increasingly administrative and less technical. The move to consulting was to get back into the technical aspects of engineering. As your municipal career develops you need to be able to go into the administrative side. I was getting away from what I got into the business for. My core training was technical.
– David Bonsall left the City of Peterborough for a job with D.M. Wills Consulting in Peterborough.

Totten Sims Hubicki

The tale of three county engineers who went into the private sector is worth telling. While it is the story of only one engineering firm and its founders, it is typical of the contributions made by many former county, city, and municipal engineers in the municipal consulting industry. The experience of these former civil servants was uniquely suited to addressing the quality of work required to provide the needed consulting services for other municipalities and the provincial government.

George Totten was 35 and a past-president of the County Engineers Association when he saw the light. It was the early '60s, and Ontario was booming. "I felt there would be tremendous growth in eastern Ontario," he said recently. He left his job as county engineer for Northumberland and Durham and established a private consulting company in Cobourg.

Within a year he recruited John Hubicki, drawing him away from his job as county engineer for Peterborough. A lot of county and municipal bridges were coming up for design and Hubicki had experience in that area. A year later, Totten persuaded Ted Sims to give up his job as engineer for Ontario County and join his rapidly growing company. Sims had succeeded him as president of the County Engineers Association in 1962.

By 1965, Totten Sims Hubicki Associates was established and would become the pre-eminent engineering design company in eastern Ontario. "We ruled eastern Ontario," Totten said in an interview. "I don't want to brag but that was the way it was. One of our competitors, a large company, told me one day that Yonge Street was like the Berlin Wall. It was impregnable. Everything east of Yonge Street was Totten Sims Hubicki territory."

Totten says the basis of the company's success was its honesty with municipalities. "We worked closely with them. When we told them we were going to do something, we did it. They could rely on us." Networking helped immensely too. "We were close to all the engineers on a first-name basis, and many of the elected officials as well." TSH got its foot in the door with the Department of Highways (DHO) when it won a contract to design a service centre on the 401 west of Kingston. Totten got help from a local MPP, W.A. Goodfellow, who was minister of highways in 1962. Soon TSH had five or six highways contracts on the books at any given time, and this impressed smaller municipalities.

Totten retired in 1993, by which time the firm had a dozen offices. The huge Cobourg office employed more than 100 people, half of them engineers. When the provincial government began to download its highways to municipalities and downsize its Ministry of Transportation, TSH was at the recruiting door. "They were downloading, we were hiring," Totten said.

The company was acquired in April 2008 by AECOM Technology Corporation, based in Los Angeles. At the time of acquisition, it had 425 employees.

DURHAM REGION

Winning Awards for Controlling Pollution

The Courtice Water Pollution Control Plant (WPCP), located in the Municipality of Clarington, is Durham Region's largest project to date. One of 12 regional waste-water treatment plants, this facility has the current capacity to treat 68.2 million litres of sewage daily, and has been designed to be expanded to 270 million litres per day. Currently providing waste-water treatment for more than 150,000 people who live and work in two neighbouring municipalities, this plant will eventually service portions of another large urban area. The official opening for this $163-million project – which included the construction of the main sewage treatment plant, effluent outfall, a nearby pumping station and the conveyance system – was held in May 2008. Recently the recipient of an Ontario Public Works Association award for Project of the Year (those valued at more than $10 million), the Courtice WPCP was also honoured with a 2008 Central Lake Ontario Conservation Authority Watershed Award.

DURHAM REGION

Anti-Discrimination Policy

After receiving a letter from the City of Toronto regarding the adoption of a declaration of a non-discrimination policy, the MEA agreed "that the Municipal Engineers Association hereby declares that discrimination on the grounds of race, creed, colour, national origin, political or religious affiliation, sex, sexual orientation, age, marital status, family relationship and disability is prohibited by or within the organization."

– MEA minutes March 13, 1991

Been There, Done That, Here's My Advice

The older and the wiser are always willing to pass on advice. We asked a number of experienced engineers what they would tell engineering students and newcomers to the field of municipal engineering. Here's what they said:

Sandra Lawson, general manager, engineering operations for Brantford:

Civil engineering is the best route to the municipal field. It offers the varied background needed to cope with municipal issues. Civil technologists are more inclined to remain in the practical aspects of the job while university-level engineering prepares you for the administrative. College programs are more technical. From the university level you learn how to administer bigger projects; you take your practical knowledge base and you apply it. You have to be innovative, learn how to discipline staff, and get involved with unions.

Gary Carroll, MEA president 2009, director, engineering services, Oshawa:

Many of us starting in the public sector came in as junior engineers, project engineers. You need to design something. I was drawn into engineering by a guidance counsellor. My grandfather worked on the St. Lambert Lock on the Seaway and that nailed it for me. I wanted to build something. Don't pass us by. Municipal engineering is worth looking into. Don't despair or quit. The goal is achievable. Make a commitment to your passion and your community. This is one of the few professions where you can truly contribute on a local level to the daily life of people, whether it's in roadbuilding, water supply, waste management or traffic control. Think long-term now and think of the big picture.

John Simmonds, retired city engineer, North Bay:

The political stress is on you. If you're not a good engineer, you'll still do fine in municipal work. Bright engineers might be better off in consultancy but consulting companies expect you to work 24 hours a day. Some people go into consultancy first and then gravitate to the municipal field. Still, it's amazing how hard managers work at the municipal level. The mayor will call you all hours of the day and night. Civil engineering is the route to the municipal field. When you come from school, though, you will not be very well equipped for municipal engineering work. Here's another advantage of the municipal field: pension. I retired at age 57 with my OMERS pension. You don't think about that when you're young. It's portable to other municipalities and other governments.

Bill Warwick, former MEA president and retired deputy commissioner of works, Scarborough:

Advice to new engineers: A pure engineer will think he's always right and he doesn't have to deal with the politics. A municipal engineer must realize council can choose not to follow his recommendations. You have to realize you're not going to get all your recommendations approved because politicians and the public are involved. Politicians aren't in it for the long run. No council member was there in Scarborough for 31 years like I was.

Message to students: The public sector offered me a sense of accomplishment. You can drive on the roads, look at a well-designed subdivision. You can see what you've done. Yes, it's worth the frustrations in dealing with politicians. I loved the job.

David Bonsall, formerly municipal engineer in the City of Peterborough, now employed in the private sector:

The municipal field is a great opportunity. There is a huge backlog of infrastructure need. Much of it is in the 40-to-50-year range. There's going to be no lack of work and it's varied work. Transportation, structural, water, sewers, environmental all need work. Get a good core of civil engineering training at university. However, university won't prepare you for the administrative side of municipal engineering. I guess to be prepared for the administrative side, it's more a personality trait than a learned skill. You need social behavioural skills. There will always be people eager to get out of the technical side into administration.

Rick Kester, director, engineering and public works department, City of Belleville:

Keep going and get advanced degrees. That's almost a fact of life everywhere, not just in engineering. Most people graduate with their initial training. It's good and well-founded, then you get out in the real world and find there's a lot you don't know yet. In engineering, you get the fundamentals of engineering at university. You get out in the real world and find out that lots of things are run by the dollar. I knew I needed a lot more financial training, so I took my MBA from York as soon as I left Waterloo. Here I am running a $70-$100 million operation, which is a pretty good size.

Communication skills are very important because you have to help councils see the municipal engineer's perspective. Council has to weigh all perspectives. To get my position across, I have to be very persuasive and have

the communication skills to do that. If you can't impart to your council something that is very important and needs to be dealt with, you could lose some of those arguments that you can't afford to lose.

John Hammer, director of transportation, Region of Waterloo:

There are essentially three engineering choices for a graduate. You can work for the provincial government, which is the most conservative and the least innovative but provides good pay. You can go into private consulting and do what the client wants. The pay is very good. Or you can go into municipal engineering, where the pay may not be the best but you enjoy the most creative opportunities.

Robert G. Moore, retired engineer, County of Elgin:

Municipal engineering is a great field to make a difference in our society. It provides an opportunity to see one's work as a useful part of a community. You can say with pride, "I helped build that." My job entailed long hours during the day, at night and on weekends. It was literally 24/7. It was difficult, frustrating at times, but never boring!

Caution: Slow-Moving House

PHOTO COURTESY GEORGE SPENCER

▲ **George Spencer**
He inadvertently set up a collision course on the highway.

George Spencer was always ready to try new things. He's retired now, but once when he was Brant County engineer he was approached by a contractor wanting to try out a new unit, or "train", that was designed to make road repairing a whole lot easier. The process is well known now but was new at the time: huge propane burners are suspended above the pavement. They heat the pavement to make it more pliable and are followed by a machine that injects fresh asphalt to replace the materials that have evaporated.

"They were out on the road with this machine when they came across somebody moving a house in the opposite direction," says Spencer. "My road supervisor called to ask what he should do. I said, 'you've got no choice. Shut down the pavement reformer, hose it down and let the house go by.'

"I thought, who's the d----d fool who signed the permit to move the house on the same day, on the same road, as this paving work was going on? So I pulled the (house moving) permit and whose name do you think was on it?

"Mine."

Moving Day

Ontario Hydro approached George Spencer one day when he was county engineer for Brant. They needed help in moving a 760-tonne transformer from the Copetown railway station to Middleport's transformer station. The soil was clay and Hydro figured the only way to get it done was to move it in winter when the ground was frozen. Otherwise, the weight of the transformer would force the wheels of the transporting trailer down into the clay soil and it would become hopelessly mired.

Hydro and the county set up frost-monitoring stations and the county replaced a culvert they figured wouldn't have held the immense weight. A few days before the operation was to take place, the area was hit by a mid-winter thaw and Spencer figured they'd have to postpone the whole operation. Luckily, the deep freeze set in again just in time.

Moving day arrived and Spencer was out in the field supervising the whole operation. "There was one hill where we were afraid the rig would get hung up on the crest, but they were able to raise the rig's bed sufficiently to just get it up over the hump," he recalls. With a lot of planning and a little luck, the operation went off without a hitch.

PHOTO BY GARY MAY

▲ **Arya Behesti**

PHOTO BY GARY MAY

▲ **Chris Tam**

Reflections from the Classroom

Engineers would do well to listen to what students in today's engineering schools are saying about their chosen profession.

You might call municipal engineering the profession's invisible face. Municipal engineers need to work harder to make themselves known, a group of engineering undergrads thinks. Even young engineers take for granted the services municipalities provide, then gravitate to more glamorous sectors of their chosen profession. Municipal engineers need to become a lot more aggressive, improve their profile, if they want to attract the best and the brightest, say the students.

On February 5, 2009, six fourth-year students in the University of Toronto's civil engineering program sat down to talk about the field they have chosen and what they see for the future. Even those already committed to the municipal field expressed disappointment at how unknown it is to them. Their message to the MEA is: get out and sell yourselves.

The students also talked about the pride they feel in the engineering profession, but say while they know many of the contributions engineers have made to our modern way of life, little is known about the men and women behind those contributions. "We don't have those heroes," said one student.

Here is an edited transcript that highlights their conversation.

WHY ARE YOU IN ENGINEERING?

Arya Beheshti: My father was an architect. But two older brothers graduated from civil engineering. I really wanted to make a difference and change the world. I'm very interested in how the city works. I have a new appreciation when I walk outside and I see the complex workings and see I'm not just a simple citizen anymore.

Ekaterina Tzekova: It's that practical aspect that appeals to me. It's an opportunity to talk with a lot of different people in different fields and create a design that works.

Chris Tam: It's a chance to push the boundaries. Creativity in engineering has to be rooted in certain laws or rules. It's finding out how we can manipulate the sort of things we already know and how we can find new ways of doing things.

Iassen Alexiev: Engineers always start from something that's already given, design codes, and then they express their creativity in terms of making it better.

ENGINEERING AS A PROFESSION HAS A RICH HISTORY. WHAT DOES THIS HISTORY MEAN TO YOU?

Marianne Touchie: I heard a statistic once that civil engineers have actually saved more lives than doctors, purely by providing clean water. Knowing there has been such a contribution is definitely something I'm proud of.

Tzekova: Those past engineers designed great structures without codes and specifications. They went by their intuition and what they'd learned and what was passed on. Current engineers shouldn't lose their intuition and practical sense, not just rely on the codes or someone who says it has to be done this way.

Stephen Perkins: We hear about the great buildings and the things engineers did, but not who they were. We don't have these heroes to look up to. Who designed the CN Tower?

Beheshti: I taught little kids at a science camp and one of the kids said 'my parents say engineers are everyday heroes.' If you think about it, an engineer is involved in almost every minute of your life.

WHAT ARE YOUR THOUGHTS ABOUT THE FIELD OF MUNICIPAL ENGINEERING?

Tam: Municipal engineering isn't as visible as other fields. A challenge for recruitment is getting noticed.
Perkins: I, for one, don't really know what's in the day-to-day job of a municipal engineer.
Tzekova: We should look at some cases of their challenges and how they responded. What are the innovations that are emerging.
Alexiev: I'm interested in municipal engineering but we don't get much exposure to it. At school, we should use the top-down approach, meaning we should start from the global perspective. There is a lot more to it than pipes and water. Nobody thinks about where their water comes from when they turn on the tap or where it goes when they flush the toilet.
Tam: (The municipal service system) works so well, you just take it for granted.
Alexiev: I got interested in municipal engineering because I saw (for myself) what its value to us was.

HOW DO YOU SEE THE ROLE OF THE MEA?

Tzekova: Municipal engineers could come to class and give us some case studies, examples of something that was really challenging and this is how (they) dealt with it. Or this failed totally and this is what went wrong. If a bridge collapses, you just see it on the news and you see the workers going to clean it up. There's no real exposure. We don't know the major disasters and the major success stories.
Perkins: I don't really know what the cutting edge is in the municipal field, if there is one. They should tell us.

WHAT DO YOU SEE FOR YOURSELF AND FOR THE FUTURE OF ENGINEERING?

Alexiev: Municipal engineers should deal with governments a lot more on the social (policy) side. It's very important for me to be part of recognizing that engineering is first and foremost a profession that must protect our civilization.
Touchie: The way infrastructure has been built didn't take into consideration that energy is getting more expensive. Everything was aimed at reducing capital costs and not looking at operating costs. We may have to replace old infrastructure not because it's worn out, but because it's no longer economical to run. I want to be involved in the bigger-picture policy aspect of that, finding incentives for people to make the changes while they still can.
Tzekova: Engineers need to look at how the infrastructure is going to function in a future society, in 10, 50 or 100 years from now. Will it satisfy their needs? If not, then how can we design it in such a way that it can be modified? That's where I would personally like to be involved, figuring out how we can achieve long-lasting design.

PHOTO BY GARY MAY

▲ **Ekaterina Tzekova**

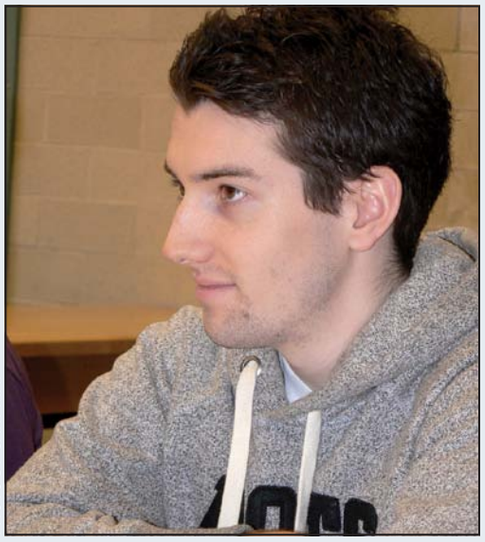


PHOTO BY GARY MAY

▲ **Stephen Perkins**

PHOTO BY GARY MAY

▲ **Iassen Alexiev**

Beheshti: I view engineers of the past as these great thinkers who had to put on so many hats. In the last 50 years, the engineer has become this machine spewing out calculations and trying to get something done for the lowest cost. We need to get back to looking at the bigger picture.

Touchie: Engineers have to lead more. Now, we're given a piece of the pie and told 'optimize this' and then it's put back into the whole pie. That's now how design should work.

Alexiev: The disconnection between engineers and social (policy) is a major problem. Engineers need more exposure to the (politics), and (the politicians) to the engineering side.

Tzekova: Engineers need to understand the other disciplines. If I design a building in the suburbs, what are the transportation impacts going to be? Engineers need to work together with urban planners and architects, not view them as those people who don't understand my calculations, but seeing how their strengths can add to, and complement ours.

Perkins: Engineers say 'social policy makers don't understand our designs.' (But) we don't understand their jobs and what factors they have to consider. Engineers should be more involved with the social decisions and work with each other.

Landfill Site Training

Whereas landfill design has advanced significantly the skill level of landfill operators has developed in a very ad hoc way. In order to ensure a uniform high level of competence in the staff at landfill sites, a landfill operator certification program is required. To achieve this level of competence the MEA makes the following declarations: Be it resolved that the MEA recommends the provincial cabinet expedite the adoption of the certification of environmental operators including landfill operators in order to optimize and conserve the limited landfill space available in the province of Ontario.

– MEA minutes February 22, 1993

CITY OF HAMILTON

▲ **All Aboard at Ferguson Station**

Ferguson Station is the site of the original train station built by the Hamilton and Lake Erie Railway in 1875. It subsequently served as a terminal for the Hamilton and Dundas Railway and Grand Trunk Railway, until it was demolished in 1929. The concept for the urban park includes an open-air shelter that re-establishes the "railway station" site.

The Hard Facts

A GOOD MUNICIPAL ENGINEER IS:

- Practical, pragmatic
- Realistic
- Accepting of change
- A team player who likes to share solutions
- Creative, open to new ideas
- A good communicator
- Comfortable dealing with people
- Accepting of administrative aspects of the job
- Eager to serve the public, leave a legacy
- Not in need of instant gratification (because progress is often slow)
- Someone who can see the big picture, the long-range plan

A MUNICIPAL ENGINEER MUST ALSO BE:

- A labour negotiator
- An advisor to council
- A salesperson
- A generalist
- Prepared to accept blame, and not be recognized when something goes right
- Someone who takes on a sense of ownership in his/her community

ADVICE TO STUDENTS:

- Expose yourself to social sciences, psychology, the humanities. Engineers are notorious for having poor people skills. If you have them, it's a great way to move up the ladder.
- Get a good core of civil engineering training at university.
- Be prepared for public scrutiny if you choose municipal work.
- If you prefer working alone and don't like dealing with people, stay away from municipal engineering.

THE PATH TO ENGINEERING

In order to obtain an engineer's licence in Ontario an applicant must:

- be at least 18;
- be a citizen or permanent resident of Canada;
- be of good character;
- meet the education standards established by Professional Engineers of Ontario;
- meet engineering experience requirements; and
- pass the Professional Practice Exam on engineering law and ethics.

In practice, it takes a young engineer about 20 years of education and on-the-job experience to obtain a licence from the Professional Engineers of Ontario.

The traditional path is to first obtain at least a bachelor's degree in engineering from a Canadian university program accredited by the Canadian Engineering Accreditation Board of the Canadian Council of Professional Engineers, or the equivalent academic qualifications. If the degree was obtained from a non-accredited program, the Professional Engineers of Ontario will assess the applicant's qualifications and may require the applicant to pass specific exams to prove their level of technical competence.

A professional engineer therefore completes 12 years of pre-university education, then four years of university education, or five years in a co-op program. Approximately four years of relevant work experience, including at least one year in Canada, is required before submitting an application for licence to the Professional Engineers of Ontario.

The applicant must then pass the PEO professional practice examination.

▲ **On the Job**
Anyone can don a white hard hat but only an engineer is entitled to wear the iron ring signifying academic achievement.

Knee-Deep on His First Day

John Simmonds is retired now. He's a graduate of Britain's Nottingham University and a self-professed computer geek. He introduced the first computer model of the City of Ottawa's combined sewer system in the late 1970s. That modelling system is taken for granted now and helps city staff identify problems before they occur, or track them down when they do.

Simmonds moved on to North Bay where he became director of engineering and introduced the city's first blue box program. "My first day on the job there, they had a major rainstorm," he recalls. "The sanitary sewer system was overloaded and the pumps went down. Water rose as high as the first floor of the sewage treatment plant. Here I was, my first day and we're up to our knees. We discovered a sluice gate that was supposed to open in emergencies, but it didn't. It hadn't been properly maintained. That was a good lesson — keep things in good running order."

New Ideas for Old Technology

John Thompson was president of the consulting firm Ainley and Associates when they were called in by the Town of Collingwood to advise on a new water treatment plant in the mid-1990s. It was soon discovered the town's drinking water was contaminated by cryptosporidium, the likely source of which was a nearby herd of cattle.

With the municipality relying heavily on tourism, the boil-water order it was under was definitely no long-term solution. Thompson remembered hearing about something called membrane technology, which had been used in sewage treatment and, in New Brunswick, for water treatment. He made some inquiries and decided it could help Collingwood's water.

"It had not previously been employed in Ontario drinking water treatment," says Thompson, and "some of my colleagues thought I was putting my neck out a bit far but I thought it was the best thing."

Not only did the technology work, it is now in common use across Ontario. Thompson is currently director of engineering services for the Ontario Clean Water Agency, which operates 30 per cent of the province's sewage plants. "I am proud to be the single professional engineer who proposed a cutting-edge, novel technological solution," he says.

WHERE TO STUDY ENGINEERING IN CANADA
CANADIAN UNIVERSITIES WITH FACULTIES OF ENGINEERING:

University of Alberta, Edmonton
University of British Columbia, Vancouver
University of Calgary, Calgary
Carleton University, Ottawa
Concordia University, Montréal
Dalhousie University, Halifax
École de technologie supérieure, Montréal
University of Guelph, Guelph
Lakehead University, Thunder Bay
Laurentian University, Sudbury
Université Laval, Québec City
University of Manitoba, Winnipeg
McGill University, Montreal
McMaster University, Hamilton
Memorial University of Newfoundland, St. John's
Université de Moncton, Moncton
Université du Québec à Montréal, Montréal
University of New Brunswick, Fredericton
University of Northern British Columbia, Prince George
University of Ontario Institute of Technology, Oshawa
University of Ottawa, Ottawa
École Polytechnique, Montréal
Université du Québec en Abitibi-Témiscamingue, Rouyn-Noranda
Université du Québec à Chicoutimi, Chicoutimi
Université du Québec en Outaouais, Gatineau
Université du Québec à Rimouski, Rimouski
Université du Québec à Trois-Rivières, Trois-Rivières
Queen's University, Kingston
University of Regina, Regina
Royal Military College of Canada, Kingston
Ryerson University, Toronto
University of Saskatchewan, Saskatoon
Université de Sherbrooke, Sherbrooke
Simon Fraser University, Burnaby
University of Toronto, Toronto
University of Victoria, Victoria
University of Waterloo, Waterloo
University of Western Ontario, London
University of Windsor, Windsor
York University, Toronto

ENGINEERING BY THE NUMBERS

- 725,000: individuals in Canada working in engineering and technology occupations;
- 67%: number of persons with a Canadian university degree in engineering who are employed outside engineering occupations;
- 30%: number of persons in Canada working in engineering without engineering degrees (one-third of those had technician or technologist qualification);
- 20%: number of persons in Canada employed in engineering who received degrees in another country;
- 12.3%: number of women employed in engineering;
- 25.9%: number of engineering grads in engineering occupations;
- 15.2%: number of engineering grads in management occupations;
- 1.1%: number of engineering grads employed in art, culture, recreation and sport;
- 11%: number of Canadian-educated engineering grads employed in occupations for which they are over-qualified;
- 18%: number of foreign-educated engineering grads employed in occupations for which they are over-qualified; 12.4%: number of civil engineers who are female.

Source: Engineering and Technology Labour Market Study

PHOTO BY ORLAND FRENCH

▲ **Crossing the River**
A pedestrian bridge across a dam on the Moira River links two sections of a riverfront trail in Belleville.

Where Seldom is Heard a Discouraging Word

Engineering school might be fine for the technical stuff, but there's nothing like those real-life experiences once you get out into the field. After graduating in 1975 and before he went to work for the City of Mississauga, Joe Pitushka spent three years working for the Province of Saskatchewan. He knew little about country life but he was about to learn.

"We were out on a highway job and we came across a fence line that was down," says Pitushka. "Cattle were wandering up and down and across the road. I was out chasing down cattle all over the place. And me a city boy. I'd just graduated from engineering school. They didn't tell us about that: Other duties as assigned."

The Election Must Go On

Election time in Saskatchewan. It was about 1975, according to Joe Pitushka and he was way out in the country doing some roadwork for the province. Off in the distance was an old schoolhouse. Pitushka figured it was abandoned. Turns out that isolated little schoolhouse was a polling station. Luckily, someone in the know turned up and advised the work crew: "That little old schoolhouse is going to be pretty much needed in a couple of days." Pitushka and his fellow crewmen spent the next two days building an access ramp to the schoolhouse and democracy prevailed.

Engineers Training Other Engineers

Municipal engineers and industry experts teach courses to keep their colleagues up to speed to handle challenges on the job.

OGRA

▼ On the Bridge
Municipal engineers check out a bridge on a field trip of the OGRA/MEA Bridge and Structure Inspection Course. The course co-ordinator is John Stephenson, senior project manager, Regional Municipality of Waterloo.

When former Premier Mike Harris, he of the "Common Sense Revolution", slashed budgets in the 1990s, the Ontario government got out of the business of training municipal employees. It ended its training programs, except for internal purposes.

Although the courses had been designed by engineers, they had been administered by the Ministries of Transport and the Environment. As in any professional field, engineers need to be constantly improving their knowledge to keep up with changes and improvements in technology.

The engineers turned to the Ontario Good Roads Association for help, since the OGRA was already administering other training courses. These two organizations took over the Municipal Training Program, which before 1996 had been administered by the Ministry of Transportation of Ontario. For a brief period (1995-1997) Sir Sandford Fleming College offered the sewer and water main program but it was transferred to the OGRA in 1998 and renamed the municipal infrastructure training program.

The program is administered by Heather Crewe, manager of professional development and training, and is supervised by the training committee of the Municipal Engineers Association, chaired by Les Shepherd, director of works, planning services and asset management, the United Counties of Leeds and Grenville. Others on the committee are Dene Hodgins, City of Brantford, and Rick Henry, City of Guelph.

There are courses in road design and materials, one in road inspections, and one on design and construction inspection for sewer and water mains, formerly offered by the Ministry of the Environment.

Municipal engineers and industry experts teach the courses. This, said Crewe, demonstrates the strong commitment to the value of training by engineers. "It requires tremendous dedication on behalf of engineers," she says. It all falls under the vow of the MEA mission statement, to facilitate the sharing of knowledge and information.

Most of the instructors are recruited from areas within easy driving distance of the Delta Meadowvale Hotel training centre in Mississauga. This helps reduce costs, but there's a double-edged sword for the presenters. Sometimes they have to rush home from the classroom to attend a council meeting in the evening.

Crewe said volunteerism "allows the cost of training to be kept at a level to make it available to those who want it. We have to keep in mind that municipalities have limited budgets." And costs have definitely gone up, since the provincial government used to subsidize the program, completely

Speed Bumps Bumped

MEA opposed the use of speed bumps/humps as safety/speed control devices. It passed a motion that it does not endorse the use of speed bumps, asked that the MTO discourage the use of speed bumps, and that legislation be passed to prohibit the use of speed bumps on public roads.
– MEA minutes February 22, 1993

at first, later with a nominal $20 a day fee. Now all costs are paid by participants or their employers. Costs range from $990 for a 4½-day course to $2,000 for two weeks.

The training program is in a constant state of change. New courses are added and old ones have evolved to meet the changes in the municipal world of engineering. Some were even more relevant to the municipal community. For example, courses on road design included reference to sidewalks and crosswalks, something the courses offered by the Ministry of Transport had not always provided. In addition, "T"-squared workshops (technology transfer) are presented two to three times a year. In 2008, a seminar in roundabout design was offered because more municipalities were discovering the advantages of incorporating roundabouts into the design of their road systems. Seminars are also offered on alternative bridge-building techniques and on erosion and sediment control. Then there is the Snow and Ice Colloquium, an old-fashioned name left over from the days of provincial training which bugs everyone by its pretentiousness, says Crewe. It is offered jointly by MEA, OGRA and the Ontario Road Salt Management Group.

In addition, the MEA offers extensive courses to bring people up to speed on changes in the Municipal Class EA document, when it is revised every four or five years. These classes are targeted at other interested municipal employees, such as legal staff and planners, not solely engineers.

While none of the training offered through MEA and the OGRA is mandatory, it helps municipal engineers better understand the work they do and prepares them for challenges brought about by ever-evolving technologies. The exception lies in waste water management courses, which are not mandatory but will prepare potential waste water management operators for provincial exams.

King of the Road School

If there is a King of the Road School, it is Donald (D.J.) McDonald. He began teaching at the OGRA Guelph Roads School in 1976 and taught every year until his retirement in 2009. In the 1970s and 1980s, instructors taught nine-hour sessions over three days. At first they taught in small classrooms but as enrolment grew they moved to larger lecture halls. In 2003, McDonald took over as director of the T.J. Mahoney Road School and also continued to lecture. During the six sessions he was director, the lecture notes were put in electronic format and the sessions rearranged so that volunteer instructors had to be on site for only one full day of presentations. Les Shepherd from Leeds and Grenville took over in 2009.

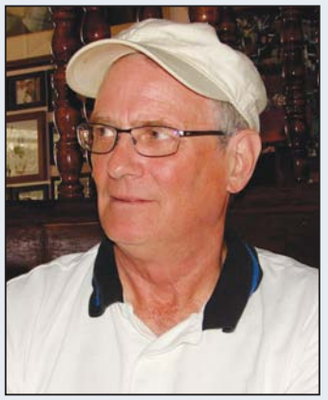


PHOTO BY ORLAND FRENCH

Donald (D.J.) McDonald

For his unflagging support of Roads School, McDonald was awarded an honourary life membership in the OGRA in February, 2009.

Short Snorts and the Novice Engineer

Whatever happens to the MEA and municipal engineering in the future, George Spencer hopes the members never let go of what has become one of the annual workshop's most popular sessions — Short Snorts.

Spencer graduated from Queen's University in 1956 and before the amalgamation of the urban and rural engineers' groups he served on the executive of the County Engineers Association. From the beginning there has been a close relationship among municipal engineers, he says, and somewhere along the line the process was formalized at their annual workshops.

Short Snorts was created, and it became a favourite part of the workshops. The feature appeared intermittently at workshops until 1987 when it became an annual fixture. It continues to this day.

At one of the first sessions Spencer remembers, he used the Short Snorts session to present an innovation used in Brant County, where he was county engineer, to cut down on the problems created by drifting snow on roads.

"I approached a consulting company that was doing wind studies in relation to tall buildings, on how to minimize the effects of wind. They agreed to look into our problem. They asked for us to identify a particular stretch of road and they built a scale model of the road in their lab.

"They used a flume of water and dropped grains of sand through it to replicate the conditions with snow falling, and the wind. We had always constructed our roads with a backslope of two feet horizontal to one foot vertical. They said if we built it flatter —seven feet horizontal to one foot vertical — we'd eliminate our drifting problem.

"And it worked, 100 per cent. We incorporated that into all future (road) designs and it eliminated the need for snow fence, which you had to haul out every winter and take down every spring."

Short Snorts was still going strong at the MEA's 49th annual workshop at Niagara Falls in November 2008. Municipal legal liability, drinking water, material durability and professional training were among the topics up for discussion.

Section Four

Appendices

TIMELINE OF ONTARIO'S HISTORY RELEVANT TO MEA

1945	Second World War ends, thousands of returning soldiers want to become engineers
1945	Conservative government of George Drew in power
1946	City engineers begin to hold meetings
1947	County engineers begin to hold meetings
1947	First section of Highway 401 opens as Highway 2A between Scarborough Township and Oshawa
1949	Conservative government of Leslie Frost elected
1950s	Canada's first major planned subdivision developed at Don Mills
1951	Both City and County Engineers Associations firmly established
1952	Highway 400 opens from Toronto to Barrie
1953	Ontario's first regional government formed as Metropolitan Toronto
1954	Toronto's Yonge Street subway opens
1959	St. Lawrence Seaway opens
1959	City engineers hold first workshop in St. Catharines
1961	Conservative government of John Robarts elected
1966	First East-West engineers hockey game played
1968	Douglas Point nuclear power station on-line, Canada's first commercial nuclear power plant
1968	Carleton County first of counties to be absorbed into regional government
1971	Conservative government of William Davis elected
1974	City Engineers and County Engineers Associations unite into the Municipal Engineers Association
1980s	MEA works with government to develop the Municipal Class EA program
1984	Seminar in Scarborough on using computers in public works
1985	Liberal government of David Peterson formed, breaking 42-year string of Conservative governments
1990	New Democratic Party government of Bob Rae elected
1994	Modern era of annual East-West hockey games instituted
1995	Conservative government of Mike Harris elected, ushering in new era of massive cuts in government spending and downloading of responsibilities and costs to municipalities
1996	Ontario government ends Municipal Training Program, taken over by MEA and OGRA
2003	Liberal government of Dalton McGuinty elected
2003	MEA ends strictly volunteer era, hires an executive director
2004	Sandra Lawson elected as first female president of MEA
2007	MEA incorporated
2009	Fiftieth workshop in Kingston, MEA publishes history book

CITY ENGINEERS ASSOCIATION PRESIDENTS

1946-50	Warren C. Miller		
1949	W.H. Riehl	1961	S.R. Price
1950	O.M. Falls	1962	R.K. Brown
1951	Stan Shupe	1963	R.T. Bailey
1952	Nicol MacNicol	1964	F.E. Crome
1953	J.H. Irvine	1965	J.G. Hooper
1954	V.R. Currie	1966	C.H. Eidt
1955	F.M. Woods	1967	E.C. Aldersley
1956	T.M.S. Kingston	1968	R.R. Bailie
1957	R.J. Desmarais	1969	F.R. Horgan
1958	T.L. Hennessy	1970	R.E. Davey
1959	W.L. Bradley	1971	A.A. Jackson
1960	W.M. Swann		

COUNTY ENGINEERS ASSOCIATION PRESIDENTS

1951-53	Newton L. Powell (Oxford)
1954	Roy F. Smith (Halton)
1955	F. Boyd D. Arnold (Middlesex)
1956	Mr. Jones
1957	Harold J.D. Wilford (Stormont, Dundas and Glengarry)
1958	Jack M. Jordan (Northumberland and Durham)
1959	J. Lea Shearer (Ottawa Suburban Roads Commission)
1960	Wilfred J. Smith (Welland)
1961	George L. Totten (Northumberland and Durham)
1962	R. Edward (Ted) Sims (Ontario)
1963	Dan A. MacIver (Leeds and Grenville)
1964	Mr. Rettie (Toronto and York Suburban Roads Commission)
1965	James W. Britnell (Huron)
1966	Robert G. Moore (Elgin)
1967	Eldon G. Yundt (Bruce)
1968	D. Jack Corbett (Halton)
1969	Denne Bosworth (Toronto and York Suburban Roads Commission)
1970	Gordon F. Wetherall (Carleton)
1971	Roy R. Lee (Essex)
1972	Leighton Clark (Simcoe)
1973	Robert W. Knight (Peel)

MUNICIPAL ENGINEERS ASSOCIATION PRESIDENTS

1974	William P. Taylor (Guelph)
1975	William A. Twelvetrees (Durham Region)
1976	Lucius Donald (Lou) House (St. Thomas)
1977	R. Ward Rodman (Niagara Falls)
1978	Allan R. Holmes (Wellington County)
1979	William J. Anderson (Peel Region)
1980	Raymond F. Allan (Barrie)
1981	Hugh Thomas (Chatham)
1981-82	Gordon D. Dougall (Leeds and Grenville County)
1983	William J. Warwick (Scarborough)
1984	Viktor A. Silgailis (Durham Region)
1985	Raymond D. Funnell (Guelph)
1986	Donald C. Redmond (Sault Ste. Marie)
1987	Robert B. Strachan (Lanark County)
1988	Gerald M. Desjardins (Metro Toronto)
1989	Walter E.C. Coulter (Chatham)
1990	Milion (Mel) Holenski (Niagara Region)
1991	P. Jeffrey (Jeff) Seaton (Victoria County)
1992	David C. Robinson (North Bay)
1993	Donald J. McDonald (Stormont, Dundas and Glengarry County)
1994	Alfred Gretzinger (Brantford)
1995	William S. Beveridge (Ottawa-Carleton Region)
1996	Allan Korell (Sturgeon Falls)
1997	Robert Davies (Peterborough County)
1998	Robert Wright (Thunder Bay)
1999	Joe Pitushka (Mississauga)
2000	Mario Iatonna (Windsor)
2001-02	Wayne Wood (Brantford)
2003	Ken Becking (Renfrew)
2004	Sandra Lawson (Brantford)
2005	William E. Robinson (Vaughan)
2006	John Simmonds (North Bay)
2007	Ron Standish (London)
2008	John Hammer (Waterloo Region)
2009	Gary Carroll (Oshawa)

MEA WORKSHOPS

(1960-1973 includes City Engineers meetings)

1960	St. Catharines	Spalling and Deterioration of Concrete
1961	Peterborough	Asphalt
1962	Kitchener	Better Administration in Public Works Departments
1963	Windsor	Sewers and Sewage Plants, Design, Construction, Maintenance
1964	Scarborough	Control of Subdivision Development
1965	Brockville	Legal Aspects of Municipal Engineering
1966	London	Personnel Relations
1967	Ottawa	The Engineer's Role in Municipal Planning
1968	Sudbury	Refuse Collection and Disposal
1969	Niagara Falls	Public Works Administration
1970	Hamilton	Budgeting and Cost Control
1971	Sault Ste. Marie	Engineering, Ecology and Environment
1972	Windsor	Communications
1973	North Bay	Practical Application of Management Theory
1974	Guelph	Progress and Conscience
1975	North York	Law and the Municipal Engineer
1976	Ottawa	A Spectrum of Challenges
1977	Etobicoke	Something for Everyone
1978	Peterborough	The Road Ahead
1979	Mississauga	Management of Public Works Contracts
1980	Chatham	Resources Management for the Eighties
1981	Rexdale	The Municipal Engineer as Manager
1982	Hamilton	The Municipal Engineer and the Economy
1983	Thunder Bay	Funding, Politics, Technology Management
1984	Scarborough	topic unrecorded
1985	London	topic unrecorded
1986	North York	Legislation to Death or Death to Legislation
1987	Ottawa	Martha's Children
1988	Cambridge	no special theme
1989	Mississauga	no special theme

1990	North Bay	For Better or Worse
1991	Markham	Environment
1992	Windsor	The Real World – Something to Talk About
1993	Halton	Economics and the Environment
1994	Belleville	A Potpourri
1995	Etobicoke	Municipal Response to a Changing Environment
1996	Niagara Falls	New Realities in Municipal Engineering
1997	Ottawa	Martha's Other Kids
1998	Thunder Bay	The New Ontario
1999	Brantford	Then, Now, and Beyond 2000
2000	Kingston	A New Beginning
2001	Mississauga	An Engineering Odyssey
2002	London	A Toolbox
2003	Peterborough	The Road Ahead, 25 Years Later
2004	Chatham	Are Your Assets Covered – Looking Down The Road
2005	North Bay	The Next Crisis
2006	Brockville	Finding New Ways
2007	Vaughan	R U Sustainable?
2008	Niagara Region	Keeping Up With New Technology
2009	Kingston	Emerging Challenges – The Next Fifty Years

PREVIOUS MUNICIPAL ENGINEERS HISTORY WRITERS

Robert G. Moore, County Engineers Association
F.B.D. Arnold, County Engineers Association
Frank J. Horgan, City Engineers Association
W.J. Warwick, early years, Municipal Engineers Association

GLOSSARY

AASHO: American Academy of State Highway Officials
AGA: American Galvanizers Association
AMCTO: Association of Municipal Clerks and Treasurers of Ontario
AMEMSO: Association of Municipal Emergency Medical Services of Ontario
AMO: Association of Municipalities of Ontario
AMRC: Association of Municipal Recycling Co-ordinators
AORS: Association of Ontario Road Supervisors
APEO: Association of Professional Engineers of Ontario
APWA: American Public Waterworks Association (Ontario Chapter)
AWWA: American Water Works Association (Ontario Section)
CAE: Canadian Engineering Association
CATT: Center for the Advancement of Trenchless Technologies
CCIL: Canadian Council of Independent Laboratories – Concrete
CEA: City Engineers Association
CEA: County Engineers Association
CEO: Consulting Engineers of Ontario
CMA: Calcium Magnesium Acetate (alternative to NaCl as road salt)
CSHRP: Canadian Strategic Highway Research Program
CSR: Certified Road Supervisor
Class EA: (Municipal Class) Environmental Act
CUTA: Canadian Urban Transit Association
DWQMS: Drinking Water Quality Management System
ESDM: Emission Summary and Dispersion Modeling Reports
GTA: Greater Toronto Area
HBC: Historic Bridge Committee
MEA: Municipal Engineers Association
MDW: Municipal DataWorks
MIDS 3: Municipal Information Data Standard Version 3
MMAH: Ministry of Municipal Affairs and Housing
MOE: Ministry of the Environment
MOL: Ministry of Labour
MNR: Ministry of Natural Resources
MTAC: Municipal Transportation Advisory Committee
MWIN: Municipal Waste Integration Network
NACE: National Association of County Engineers
OACETT: Ontario Association of Certified Engineering Technologists and Technicians
OAIA: Ontario Association for Impact Assessment
OCPA: Ontario Concrete Pipe Association
OCSI: Ontario Coalition for Sustainable Infrastructure
OGRA: Ontario Good Roads Association
OHMPA: Ontario Hot Mix Producers Association
OIBC: Ontario Infrastructure Business Code
OLS: Ontario Land Surveyors
OMAA: Ontario Municipal Administrators Association
OMERS: Ontario Municipal Employees Retirement System
OMMDB: Ontario Municipal Management Development Board
OMMI: Ontario Municipal Management Institute
OMWA: Ontario Municipal Water Association

OPS: Ontario Provincial Standards
OPWI: Ontario Public Works Institute
ORBA: Ontario Road Builders Association
ORCGA: Ontario Regional Common Ground Alliance
OSWCA: Ontario Sewer and Watermain Contractors Association
OSWMCA: Ontario Sewer and Watermain Contractors Association
OSPE: Ontario Society of Professional Engineers
OWMA: Ontario Waste Management Association
PSAB: Public Sector Accounting Board
RMCAO: Ready Mix Contractors Association of Ontario
ROMA: Rural Ontario Municipal Association (now Rural Caucus of AMO)
RPWCO: Regional Works Commissioners of Ontario
RTCA: Roads and Transportation Association of Canada.
RVM: Riparian Vegetation Maintenance
TRCA: Toronto Region Conservation Authority
UDI: Urban Development Institute
WDO: Waste Diversion Ontario
WEAO: Water Environment Association of Ontario

Section Five

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