Cities of the Future: Creating Blue Water in Green Cities
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The Importance of Water Infrastructure And the Environment in Tomorrow's Cities

Paul R. Brown, AICP
President, Public Services Group
CDM

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Welcome and thanks to everyone participating in this week's symposium at Wingspread. CDM is pleased to be a sponsor and participant in this event. In our view, it is an important occasion that brings together an exceptional panel of experts from around the world to address a critical issue – ensuring that cities and their water resources become ecologically sustainable and are able to provide clean water for all beneficial uses.

I need to offer special recognition and thanks to Dr. Vladimir Novotny and Northeastern University, as well as our co-sponsors: the International Water Association, the National Science Foundation, and The Johnson Foundation. We are anxious to begin exploring the complex issues affecting cities with such a distinguished group.

For those who may not be familiar with CDM, we are an interdisciplinary consulting, engineering, construction, and operations firm whose corporate mission is "to improve the environment and infrastructure." We work for public and private sector clients from 90 offices worldwide.

While many different perspectives are reflected here, I hope CDM can represent the voice of our public sector clients – those municipal government and utility leaders directly responsible for providing urban infrastructure, protecting the urban environment, and delivering reliable services in the areas of water, wastewater, and stormwater management.

Our clients are confronted by many challenges that the experts at this symposium are among the best qualified in the world to address. Their issues and concerns should be ours as well. What are those on the front line of urban infrastructure management dealing with? What help do they (and we) need from you? Let me briefly share some thoughts on five areas and close with a challenge to all of us.

Increasing the Social and Economic Benefits Provided by Environmental Infrastructure

More than ever before, we are working with our clients to address the social and economic needs of their communities, in addition to providing reliable services and keeping them in compliance with regulatory requirements. Reliability and compliance are the minimum expectation. We need to do more. This means that every project needs to be viewed as a multi-purpose, multi-benefit opportunity. We push the triple bottom line when addressing industry – challenging corporations to put more focus on the environmental and social returns they produce. Our challenge may be to create greater economic and social returns from projects designed primarily to protect and improve the environment. How can we take the billions of dollars that will be spent on controlling combined sewer overflows, for example, and use those dollars to do more than simply hollow-out caverns underground. Triple bottom line performance should be expected from every institution in our society, and we need your help and creativity in delivering those benefits in traditional civil, sanitary, and hydraulic infrastructure projects.

Improving Collaboration among Agencies and Jurisdictions

Every day we are addressing the convergence of urban utility functions. The most obvious example is the overlap and, in some cases, consolidation of water, wastewater, and stormwater utilities. But convergence goes beyond that. The desire for sustainability in every aspect of urban development heightens the environmental and energy aspects of all urban infrastructure – particularly in buildings and transportation systems. We need better inter-jurisdictional collaboration that goes beyond building a fence around the silos. This means more integrated planning efforts, improved system modeling capabilities, and a sustained commitment to joint project planning, implementation, monitoring, and accountability for results.

In a similar vein, we are seeing the erosion of governmental borders and legal property lines in favor of the softer natural transitions that define the boundaries of topography and ecosystems. Looking for watershed-based approaches in densely urbanized, multi-jurisdictional settings introduces conflicts and incongruities in the way individual stakeholders literally "see the world." We need to recognize and address the inherent conflicts that exist between "bright-line" legal borders and the borderless continuum of natural systems.

Making the Transition from Fast-Conveyance to Closed-Loop Systems

Almost everywhere, we are attempting to transition from what Vladimir likes to call "fast-conveyance" systems to more closed-loop, self-sufficient systems, and that is not easy. The increased demands for water reclamation and reuse creates concerns about water quality degradation and public health, while at the same time offering increased sustainability and greater independence from over-committed sources of supply. This public policy debate is far from over, and we need much better tools for presenting and discussing health and safety risks in open public meetings.

Introducing Public Stakeholders into Technical Decision-Making

We are seeing a much more diverse group of community stakeholders participating in the public decision-making process and becoming increasingly well educated regarding complex technical issues and choices. The public setting that we are working in is populated by increasing numbers of activists and interest groups, who are demanding to see how their concerns are likely to be impacted by future infrastructure and programmatic investments. We need structured, documented, and transparent decision-making combined with improved communication, simulation, and visualization tools for public stakeholder dialogue.

Preparing for Extreme Events

In spite of the politics, we are seeing the wide acceptance of the notion that something is changing with the weather. In most cases the discussion has evolved from "is it real?" to "what are we going to do about it?" That reality has led to a much greater emphasis on planning for and adapting to extreme events. What are the implications on our engineered systems? The public looks to us to rise to the occasion – not necessarily with bigger and bolder structural solutions (although these are no doubt part of the answer) but with fundamental re-thinking of the relationships between human settlements and natural ecosystems – a challenge beyond any we have undertaken to date.

Leading in a Time of Rapidly Changing Priorities

Finally, I think that we are seeing a significant shift in the priorities placed on urban infrastructure, with the environment and energy moving ahead of mobility and economic growth in terms of their relative importance to the public. These priorities have been well documented by Gallup and others.

> "When asked if they 'think the U.S. government is doing too much, too little, or about the right amount in terms of protecting the environment' a clear majority of Americans (58%) say 'too little' and only a small minority (5%) say 'too much.'
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> "Similarly, Americans continue to favor the environment when asked to choose between environmental protection and economic growth. After dipping slightly below 50% last year [2004], a majority (53%) once again says that protection of the environment should be given priority, when environmental protection conflicts with economic growth."[1]

Are we keeping up with the challenges reflected in those changed priorities? I don't think we are, and here again we could use your help. Let me over-simplify to make a point.

Historically, urban water infrastructure has been something of an enlightened afterthought. After the shelter, after the roads, after the commerce, and after the disease and squalor, the plumbing followed. Hydraulic and sanitary systems were developed from antiquity through the modern age largely in response to the demands and problems created by the evolution of cities themselves. They are a reaction to increasing populations and urbanization. In this respect, they have been a lagging technology in the urban environment – and maybe in some respects they still are.

Cities grew at locations offering opportunities for transportation, housing, agricultural, and industry – that, of course, frequently led to the establishment of cities along waterways. But those waterways were almost always viewed as a means of transportation, a raw water supply, a source of energy, and a convenient location for waste disposal. Our growing cities have beneficially exploited rivers in almost every conceivable way, always looking at the river as a means to an end – rarely an end in itself.

Our core business of environmental engineering lagged behind those roads and buildings, providing the "plumbing" – often after-the-fact – in response to public health crises, flooding, and deadly levels of pollution and environmental degradation.

It's not that the contributions resulting from better plumbing haven't been appreciated for their public health and quality of life benefits. Lewis Mumford stated it well:

> "Perhaps the greatest contribution made by the industrial town was the reaction it produced against its own greatest misdemeanors; and, to begin with, the art of sanitation or public hygiene. . . . Nineteenth-century achievements in molding large glazed drains and casting iron pipes, made possible the tapping of distant supplies of relatively pure water and the disposal, at least as far as a neighboring stream, of sewage; while the repeated outbreaks of malaria, cholera, typhoid, and distemper served as a stimulus to these innovations, since a succession of public health officers had no difficulty in establishing the relation between dirt and congestion, of befouled water and tainted food, to these conditions."[2]

In the development of cities, we have responded heroically to the failures of economic success. For the future, our clients are looking for something more proactive and pre-emptive in avoiding that kind of failure. It is often referred to as "sustainability."

Today, urban planners are working urgently to redefine themselves in this rapidly urbanizing world. In a joint position paper entitled, "Reinventing Planning: A New Governance Paradigm for Managing Human Settlements,"[3] leaders from the American Planning Association, the Canadian Institute of Planners, the Commonwealth Association of Planners, the Royal Town Planning Institute, the Council of European Spatial Planners, and UN-Habitat joined together to address "the challenges of rapid urbanisation, the urbanisation of poverty and the hazards posed by climate change and natural disasters."

What do they identify as the most important contributions that this reinvention can produce? First "Reduce vulnerability to natural disasters," and second "Create environmentally-friendly cities." Who are the experts most qualified to participate in that dialogue? I would offer that many of them are in this room.

Have we been equally ambitious in reinventing our role in shaping the future of rapid urbanization worldwide? Will we remain leaders in lagging technologies – following the parade with brooms and shovels, cleaning up environmental damage and compensating for the impacts of economic development? There is clearly an opportunity for us to re-invent our role in the future of sustainable urban development. To help environmental decision-makers incorporate economic and social ends in their pursuit of environmental and public health protection. We cannot be accused of ignoring the environment. We may be guilty, however, of being isolated from the economic and social issues related to urbanization and land use.

If it is fair to say that virtually all the problems associated with water quantity and quality in urban watersheds are significantly impacted by land use, doesn't it follow that we could have a huge influence on the future by directly engaging as a stakeholder in the planning and decision-making surrounding those land use decisions?

This would not put the environmental engineering community in charge. On the contrary, it would merely establish parity with the other drivers affecting land use. What would change if the aquatic ecosystem in the urban watershed served as the starting point for planning tomorrow's cities? Those scientists, planners, engineers who have followed development with sophisticated plumbing would have to take into consideration many new issues that are currently handled by others.

Of course, the process isn't linear and no one really leads in the complicated dance of urbanization. And yet, if for a moment, the urban watershed came first and every other profession, institution, agency, and law was designed to protect its long-term integrity (while allowing for increasing population and economic growth) would we see more green roofs, porous pavement, solar energy, recycled water, rapid transit, and innovations in technology and behavior too numerous to quantify?

If there was ever a time to step forward and contribute to our understanding of what "sustainability" in urban infrastructure means, now is it. Again, this doesn't mean "taking over" from the developers, architects and planners who have largely driven the form or our urban landscape – in those fortunate cases where planning is discernible. It means joining with them as leaders (not followers) in the creation of something brand new.

If there was ever a time when we should be challenging ourselves to be as bold in vision, confident in one another's intelligence and values, and tireless in our search for innovation, this is the moment. This is our moment. Thank you.

[1] Center for American Progress, "Public Opinion Watch," (quoting from 2005 Gallup Poll). http://www.americanprogress.org/site/pp.asp?c=biJRJ8OVF&b=596339 (Accessed July 10, 2006).
[2]Mumford, Lewis. *The City in History*. San Diego: Harcourt, Inc., 1961. P. 474-475.
[3]American Planning Association, "Reinventing Planning: A New Governance Paradigm for Managing Human Settlements." http://www.planning.org/knowledge/reinventingplanning.htm (Accessed July 10, 2006).