

A Bridge to Somewhere

The Case for a National Infrastructure Policy

Filling potholes and making trains run on time is not enough.

PARTICIPANTS

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Opposite: Form work rebars for Big Dig/Central Artery. Page 18: Deer Island Wastewater Treatment Plant. Page 21: Ted Williams Tunnel. All photos by Peter Vanderwarker.

Elizabeth Padjen: Over the last year, infrastructure has become associated in the public mind with the federal stimulus package and, as a result, the phrase “shovel-ready” has become the measure of good infrastructure or, at least, infrastructure that we'll support. Which means that timing is the real yardstick for determining what gets built. That is obviously not a good way to make policy, nevertheless it seems to be what's driving the public discussion right now. Do you detect any real impetus or any real desire to develop a cohesive infrastructure policy?

Jeffrey Simon: The stimulus program is not just an indication of infrastructure policy — it was driven by a different goal: creating and retaining jobs. The decision to fund shovel-ready projects was a means to an entirely different end, the end being getting people back to work quickly. It was completely divorced from whether infrastructure had any inherent value or not. A lot of people say to me, “Why are you spending all this money on a bunch of paving projects?” It's an absolutely legitimate question for everyone except for the unemployed person who now has a job paving roads. In that person's mind, that's a completely legitimate project. But even though this was conceived as a jobs program, each of the projects itself has value.

Hubert Murray: Just as taxes are supposed to be the price of civilization, I think infrastructure is the cement that holds our civilization together. The crisis in infrastructure — the disrepair — is a manifestation of a lack of faith in our public realm, which we had in the past, say, in the 1930s, when money went to the construction of highways and dams and electrical grids. That issue, which is both political and philosophical, has to be addressed before we can even begin to talk about the nature of the infrastructure that we need to hold us together or how to pay for it.

Elizabeth Padjen: A couple of years ago, Sarah, you wrote an essay for *The New Republic* that I still think is one of the smartest pieces about infrastructure that I've read [“American Collapse,” August 27, 2007; www.sarahwilliamsgoldhagen.com/articles/American_Collapse.pdf]. It appeared right after the bridge collapse in Minnesota and the Con Edison steam pipe bursting in New York. You said, “Infrastructure is one crucial point at which politics and architecture merge.” Nothing's really happened since you wrote that piece.

Sarah Williams Goldhagen: That's not exactly true; a lot has actually happened. The tagline of my article, which I had nothing to do with, was "Making Infrastructure Sexy." And now infrastructure *is* part of the public discussion. But it's all about putting fingers in dikes — the shovel-ready projects that are connected to stimulus. The Obama administration has lots of good intentions, but I don't see anyone articulating what steps need to be taken to realize the goals that most people agree are necessary for a humane 21st-century urbanism: denser communities, pedestrian-friendly development, and multiple, overlapping, regional transportation systems incorporating air, fast rail, and automobile.

I think Hubert is right — nobody has faith in the public realm. But a larger issue is that the infrastructure problems we now have cannot be solved by the current political system, which is balkanized into municipalities and state systems and the federal system. Infrastructural problems now are regional: they cross municipal and state lines. That means that discussions about infrastructure must include not only big visions but also concrete plans for implementation.

David Luberoff: "Infrastructure" is a word that really didn't come into play until the '80s; before then, we had what was called "public works." It's very hard to get people excited about infrastructure, because it's a conceptual word. But there are elements of infrastructure that people really like: people love trains, people love bridges. We lose something when we talk about infrastructure, although the word does capture the sense of these networks and systems that bind us together.

Sarah's right that they're a hodgepodge not only at different levels of government but also between public and private sectors. The telecommunications infrastructure is almost purely private, subject to public regulation, somewhat similar to electrical infrastructure. The transportation infrastructure is a mix — we provide the roads, but the cars are privately owned; we provide airports for private airlines. On the other hand, outside of the Northeast Corridor, publicly owned Amtrak trains generally use privately owned tracks.

Infrastructure is critical to regional economic development, and there's a long history in the United States of trying to figure out whether this is a national or a regional responsibility. For the most part, we've regionalized most of the important forms of infrastructure, such as roads, airports, sewage treatment. But I suspect we'll never create a cohesive regional infrastructure system, because in the American political system, we tend to solve problems one at a time. So when a crisis emerges, the response tends to be to turn it over to a regional entity, and often to govern it in such a way that is supposed to remove it from day-to-day politics by creating authorities, such as Massport, to run airports, or the Massachusetts Water Resources Authority, to run water and wastewater treatment systems.

Elizabeth Padjen: One of the most enduring symbols of infrastructure implemented on the national level is the interstate highway system, which may also represent the last time there was a significant national focus on infrastructure. If we think of infrastructure as providing some kind of public good that will support economic activity and health and welfare for all of the people, are we working off old definitions and an outdated understanding of infrastructure? We now have new technologies that weren't even imagined when the highway system was developed.

David Lazer: You just said the last big national effort was the highway system, but what about the Internet? Doesn't that qualify as infrastructure? I'd say absolutely yes. Obviously, it's revolutionary, but what makes it especially interesting in this discussion is its potential interplay with more traditional forms of infrastructure. For example, it allows us to collect information in a very decentralized fashion so we can use our existing infrastructure more efficiently or develop a new infrastructure that is smarter. We talk about having a smarter electricity grid. Well, one way of dealing with peak load, rather than building more electricity plants,



Infrastructure both opens up and closes down opportunities. If it's working well, infrastructure provides equal access to resources. If it's not working well, it funnels access to resources to certain segments of society and closes out opportunities for other folks.

Anne Whiston Spirn FASLA

is to program everyone's thermostats to be sensitive to peak loads so they'll all turn off when it's really hot. Similarly, we can now track road use, which can lead to more efficient transportation systems. And the SENSEable City Lab at MIT has developed devices to understand trash flow. There's a growing effort to apply data-driven processes to the use and design of infrastructure.

David Luberoff: In addition to the Internet, I would mention the parallel construction of the cellular telephone system. It has had obvious implications for traditional infrastructure, but also tremendous implications for where people are in space and time. If we are always connected, that is probably as powerfully transformative as a lot of traditional infrastructure, whether the automobile/highway system or the mass transit system. It's less obvious because we don't see it.

David Lazer: That's right. With an iPhone, you have the Internet and GPS in your pocket. Suddenly people can interact with infrastructure in entirely different ways. They are more actively involved in decision-making on the personal level, such as where to drive or when to turn on the air-conditioning at home, as well as simply reporting information.

Hubert Murray: We need to think about why we are building infrastructure in the first place. The examples you're giving of modern technology as infrastructure represent an infrastructure that supports individuation. These are centrifugal forces in society, whereas a couple of generations ago, we were talking about bridges, highways, tunnels, even airports, that brought us together as a society. Is it any coincidence that this beautiful object, the iPhone, is blossoming simultaneously with the collapse of our common infrastructure, our bridges and our tunnels and our streets?

David Luberoff: I would argue that the bridges and roads were a decentralizing force in their time. There was this new technology—the automobile. The car was the iPhone of its time—the technology that everybody wanted.

Anne Whiston Spirn: It's not just the focus on the individual cell phone as opposed to bridges and highways, but the focus on the individual cell phone as opposed to the public telephones that used to exist throughout our cities and towns. Have you tried to find one lately? A lot of people can't afford a cell phone. Infrastructure both opens up and closes down opportunities. If it's working well, infrastructure provides equal access to resources. If it's not working

well, it funnels access to resources to certain segments of society and closes out opportunities for other folks. We see that especially in communication infrastructure, with access to high-speed Internet in some parts of the country and not in others, and even within some city neighborhoods but not others. Which means that certain kinds of economic activity are not going to occur in the areas that are not well-served.

Elizabeth Padjen: The Rural Electrification Project in this country was at some level a social-justice exercise, providing federal funding in support of a national goal to be implemented locally by private electrical companies. Today we largely leave the new technology networks to private enterprise, in terms of decisions about location, markets, and coverage. I have an aunt who lives just outside Madison, Wisconsin, and has dial-up service. It drives her crazy. Verizon is bringing 4G service to Boston and Seattle—logical rollout cities, from a private enterprise point of view—but when is that ever going to get to my aunt?

Jeffrey Simon: You don't even have to go that far. Massachusetts has submitted an application under the Recovery Act to bring broadband technology to the western part of the state. Broadband is in place as far out as Route 91, but beyond that, as soon as you leave the Mass Pike, there's nothing. There's no G, let alone 4G. It's shocking, especially when you think about schools and fire and police and hospitals. It's one thing to talk about promoting medical e-records, but if you have no way to get them, it makes no sense.

Anne Whiston Spirn: The implications for national policy are enormous and the questions are tough ones. Do you subsidize new infrastructure in new areas to the same extent as funding the reconstruction of existing infrastructure that was built 100 years ago or more? Infrastructure by its very nature will structure urban development for years to come. So when we make decisions about how and where to build infrastructure, we are making decisions that are going to affect human settlement forms for centuries, as well as the lives of individuals and the well-being of communities in terms of their access to resources.

David Lazer: The issue is complicated by the simple fact that we are a large country. People like to compare infrastructure here to Europe. But it's an unfair contest, because Europe is much smaller, with a much higher population density. Speaking very generally, you're never going to be very far from key infrastructure in Europe, whereas we have vast tracts of rural areas. To some degree, we recognize, and even accept, that rural areas have always had inferior access to certain things. But it's always been an interesting and important question: what should be the coverage guarantees of infrastructure? We decided, for example, that the postal system would cover everyone, regardless of the cost. And of course, if we subsidize new infrastructure, including new communication infrastructure, in the rural areas, we end up encouraging the very kind of development that many people think we should discourage.

Jeffrey Simon: Where infrastructure tends to be done especially well is where there are constraints of geography or location. I really got an appreciation for this living in Bermuda for a couple of years.

Bermuda is 21 square miles: one mile wide, 20 miles long, 750 miles out in the middle of the Atlantic Ocean. In the US, if you need to build an incinerator, people typically say put it out of town, somewhere “out there,” wherever “there” is. You can’t do that in Bermuda. Everything has to go somewhere within that 21 square miles that 60,000 people live on. So the way they approach infrastructure is very different, with a different attitude toward efficiency. They were doing sustainable development out of necessity long before the term had even been created. When all of my drinking water came off my roof, the prospect of running out was not only real but actually happened a number of times. My habits changed very quickly.

Elizabeth Padjen: Your example is a reminder of a profound change in the way we think about infrastructure now, which is sustainability. It’s an overlay that wasn’t really part of the equation 100 years ago.

The communities that didn’t get highway ramps 50 and 75 years ago died. Arguably, the communities that aren’t on the broadband/wireless grid are going to die. Which form of infrastructure do we think people really need?

David Luberoff

Hubert Murray: I think that global warming and the possible effects of climate change are beginning to seep into the public consciousness and give us a common purpose; and on that common purpose we can build a new infrastructure. That’s an optimistic view. Only three years ago, just before Al Gore released his film, most people were clueless about the issue. Now it’s the constant subject of tabloid newspapers and radio talk shows. A general consciousness is building up, one we have to respond to with the building of an infrastructure that goes beyond the shovel-ready, because it actually needs some thought.

Jeffrey Simon: But if I had to weigh the price of gas against global-warming consciousness for its ability to get people mobilized quickly in the way that you’re talking about, I would go with the price of gas. You certainly could argue that the best thing we could do is to establish a five-dollar-a-gallon federal tax on gas — all of a sudden you’d find all of the incentives lining up in the right direction. But that has social impacts that are unacceptable.

Sarah Williams Goldhagen: Our land-use patterns are the result of social engineering through infrastructure that started in the 1930s and went through to the ’50s and ’60s. Now the discussion should be, can we use infrastructure to create the right kind of new land-use patterns without too much undesirable, class-based

social fallout? That is not a discussion that I hear people having. What would those land-use patterns be? How do we get there, what do we use, and how does technology fit into all that?

David Luberoff: The danger of using infrastructure to push land-use patterns is that somebody will inevitably say, “Why am I paying for a thing I don’t want?” because infrastructure investments can create tremendous winners and big losers.

Jeffrey Simon: I think you’re right. Consumers want to see a direct connection between what they pay and what they get. We’re seeing that now with the Big Dig, which has vastly improved the quality of life in the city of Boston, despite the cost. But the decision to pay for it through turnpike tolls led a group of toll-payers, mostly from western Massachusetts, to pursue a lawsuit — they don’t see that the Big Dig is of any benefit to them.

David Luberoff: I recently read the state’s new plan for the South Coast Rail, which would extend the line from Fall River to New Bedford and is being touted as an economic-development project. We know there’s a link between infrastructure settlement patterns and economic productivity. But the South Coast Rail is going to be about a \$2-billion project, and the state’s numbers say it will carry about 5,000 people a day, which is 2,500 round-trip riders. For \$2 billion dollars, I could probably wire all of western Massachusetts, or make Fall River and New Bedford completely wireless. The communities that the railroads bypassed 150 years ago died. The communities that didn’t get highway ramps 50 and 75 years ago died. Arguably, the communities that aren’t on the grid are going to die. Which form of infrastructure do we think people really need?

Jeffrey Simon: You’re always making a choice. It’s always a tradeoff.

Elizabeth Padjen: But how do you make that choice?

Jeffrey Simon: It’s a difficult discussion because you’re not usually presented with the total cost of A versus the total cost of B. You’re always looking at the margin. The South Coast Rail is a good example of an infrastructure investment that relates to a number of complex issues. For example, is it worthwhile to connect Fall River and New Bedford to Boston? Probably. And it certainly encourages people to get out of their cars.

The 2,500 people who will ride the train daily are the ones who have the most direct benefit, but that’s just one side of the equation. The South Coast Rail is also part of a larger discussion about rail in New England. Governor Patrick has joined with the other New England governors to work on a regional rail initiative and to pursue federal stimulus funding to make that happen.

Sarah Williams Goldhagen: The federal stimulus program seems to be driving a lot of discussion about rail across the country. The administration’s current focus on high-speed rail seems to be the closest thing we’ve seen to an infrastructure policy or vision.

Jeffrey Simon: The stimulus program gets all the publicity, but it’s not the only thing driving infrastructure spending. Massachusetts



has accelerated its program to repair bridges — it seems as though you can't drive anywhere now without seeing some bridge being worked on. Crumbling infrastructure has a huge impact on the psyche of the average citizen. The world isn't crumbling down in the way that spalling concrete and exposed rebar might suggest, but just seeing deteriorating bridges is discouraging. Conversely, seeing them being repaired not only creates the feeling that things are getting better, but also reinforces the fact that someone cares enough about the public to fix them.

Elizabeth Padjen: Fixing bridges is one thing, welcome as that is, but don't we really need to fix the system that disinvests in maintenance, that encourages deferred maintenance? We developed the One Percent for Arts program a long while ago. It seems to me there should be One Percent for Maintenance associated with any public investment.

Hubert Murray: *The New York Review of Books* recently ran an essay by Everett Ehrlich and Felix Rohatyn on the \$3-trillion deficit in deferred maintenance that we have across the country. They're proposing a new way of financing infrastructure, the National Infrastructure Bank. And I think that the new administration is listening.

David Luberoff: When agencies such as Massport that are primarily funded by user fees borrow money for big capital projects, the

lenders often require that the agency keep those new facilities in a state of good repair. In contrast, maintenance of highways and bridges often comes out of the general operating budget, which means it's an easy thing to cut. No politician ever got any votes for cutting a ribbon on a maintained bridge; you only get that with a new bridge.

I recently talked to someone at the Deer Island sewage treatment facility — a huge piece of infrastructure — who said the most striking thing about the facility is not that it was built right, but that 15 years later, the Massachusetts Water Resources Authority, a user-funded entity that built and operates the plant, is maintaining it right. They have a total schedule of maintenance; they can tell you when things are going to be replaced. What is fascinating here is that this is an agency that has become utterly obscure to the general public, yet has maintained a professional culture that says this thing's got to keep working.

Jeffrey Simon: You think those two things are connected? I see it as cause and effect. The challenge is to have great professionalism combined with authentic transparency, to have professional decisions made in public and to have accountability for those decisions become the accepted practice.

David Luberoff: Sometimes it's cause and effect, but sometimes agencies become obscure and then they become ossified.

Anne Whiston Spirm: One thing that we haven't addressed yet is the issue of amenities. Some of the great landmarks in infrastructure are green infrastructure projects like Boston's Riverway and the Fens, which were projects that addressed important issues like sewage, storm runoff, water quality, and new transportation routes. But they were accomplished in a way that provided tremendous public amenities.

Hubert Murray: And pride.

Anne Whiston Spirm: Yes, and pride. Which goes back to your comment about the public realm and the notion of finding ways to enhance and elevate projects that need to be implemented for all kinds of pragmatic reasons. The Denver Urban Drainage and Flood Control District is a contemporary example of the Fens and Riverway. Taxes were assessed on individual property owners in proportion to the amount of stormwater they were contributing to the system. These assessments funded the district, which then promoted projects that addressed flood control and storm drainage but also provided parks, trails, and bikeways. We tend to have tunnel vision, addressing one thing at a time and not looking at ways of combining functions. It leads to missed opportunities and frequently to greater expense.

Going back to Deer Island, I would not agree that it was the right solution, even though it seems to work fine now. There were many advocates of a more decentralized approach that would have included protecting groundwater supplies and watersheds in

the region. That approach would have been much less expensive, and could have provided other amenities including parks and recreation, as well as the restoration of vacant land in urban neighborhoods like Roxbury and Dorchester.

Hubert Murray: The outcome might be different now. There is growing interest in decentralization, especially in terms of energy infrastructure. Typically you lose 65 percent of the power just in the distribution of electricity; it's an incredibly inefficient way of doing things, although it is very efficient politically, because one decision-maker can run the show. But Woking, a city just south of London, has converted over the last few years much of its power generation to a distributed energy network, through small neighborhood power stations using alternative technologies. They are small enough that you can individually power housing projects or institutions like schools and hospitals, too. If this model takes off, you can imagine that the structure and the politics of cities will need to change accordingly.

Anne Whiston Spirm: Although maintenance might be a challenge. The one advantage to Deer Island is that it's one facility to focus on. On the other hand, if something goes wrong, all the sewage in Boston flows out.

Elizabeth Padjen: Where does the leadership come from that can change perceptions or create a value system that is going to support something like the Denver project?



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Jeffrey Simon

Anne Whiston Spirm: When I stepped back after writing *The Granite Garden: Urban Nature and Human Design*, which is a series of success stories about how cities have adapted to their urban natural environments and ecosystems, I started to look for the common ingredients that made these successes happen. In almost all of them, it was response to disaster. Very few were the result of an idealist with a marvelous vision of what the city could be. Rather, it was a catastrophe that galvanized public support to rebuild and do things right. The Denver project emerged from a series of devastating floods of the Platte River — lives were lost, bridges wiped out, with millions of dollars of damage. So, to answer your question, I would say that every city or region is vulnerable to certain natural disasters. Know what they are and when they are likely to occur, and have a cadre of people who are ready with visions to present to the public as soon as the disaster happens. Because there's always a lag time. If it's shovel-ready when the catastrophe happens, then the impetus to rebuild is so strong that it can happen immediately.

Elizabeth Padjen: We've talked about private investments, particularly in communication infrastructure, which seems to be

largely driven by the private sector. We've talked about public investment. Have you seen any innovations in public/private partnerships that have worked?

David Luberoff: In one sense, everything that gets done today is a public/private partnership because, unlike the '30s when people worked for WPA and were on the government's payroll, we made a policy decision a long time ago to move to a system of contractors.

Hubert Murray: We're seeing highway authorities engage in what are called DBOM contracts: design/build/operate/maintain. Firms like Bechtel do this all over the world — public facilities run by private firms for profit.

Jeffrey Simon: What's happening now is that the privatization of infrastructure is being driven by investment bankers, not engineers. Look at Macquarie Bank coming in from Sydney and buying the Chicago Skyway and the Indiana toll road.

David Luberoff: But the public reaction has not been positive and several deals proposed after the Indiana and Chicago deals have been scuttled. The result is puzzling: we have no problem putting companies like Verizon in charge of the cellular system, but we seem to always want the government to run the roads. Most toll roads have a fairly predictable revenue stream — money that can be used to pay back a large loan, particularly if you assume that tolls will rise in the future. Sooner or later, somebody in government

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will say, “I could really use a lot of money now, rather than a little bit of money each year for the foreseeable future, particularly if the toll hikes required to support the loan occur after I leave office.” This is basically what Massachusetts did when it had the Turnpike Authority borrow money to help pay for some of the Big Dig.

Jeffrey Simon: There is another way of looking at public/private partnerships, which is to consider how incremental actions or changes in the private sector influence public policy. The focus on sustainability through LEED certification is a fascinating example. No government policy came up with or imposed LEED certification. It was developed in the private sector and then took off as tenants and buyers started to demand it until eventually it was adopted as policy by environmentally conscious cities. The market made that happen.

Hubert Murray: It’s a very good point. I think we’re about to see another example here in Boston, which has some of the highest-priced real estate in the country. It is also in one of the most vulnerable places in the country. If the sea level rises, as it is predicted to do within the lifetime of many of these buildings, they’re going to have swamped basements at the very least. We have a huge impending crisis on our hands; perhaps this relates to Anne’s observation about preparing for catastrophes. Partners Healthcare is addressing this head-on in the development of the proposed new Spaulding Hospital. We anticipate a 24-inch rise in sea level in Boston Harbor within the projected lifetime of the

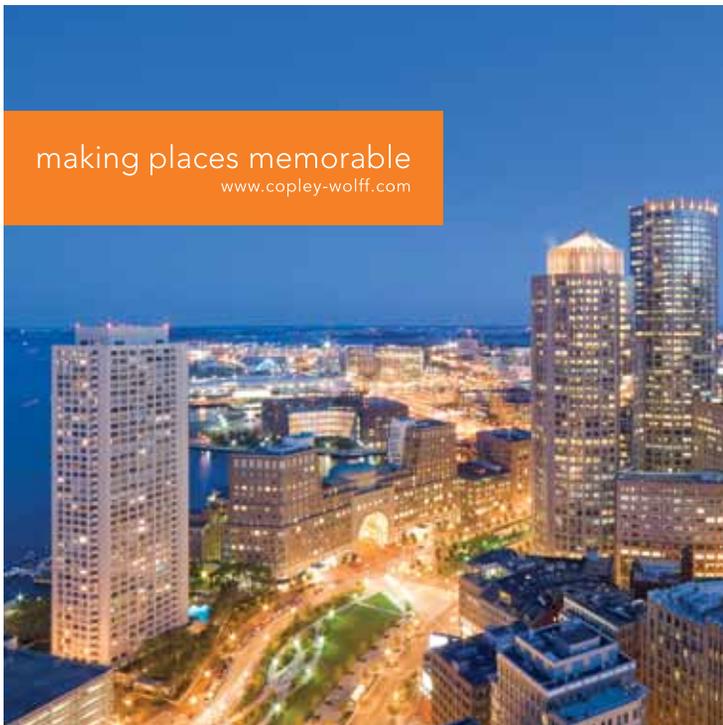
building. So we’ve raised the ground-floor datum and taken all the electrical equipment out of the basement as originally proposed. The term we used for looking strategically at possible disasters is “resiliency.” Every single building on the waterfront has to think in the same way. And if I may say so, the Central Artery Tunnel has to think in that way, because within an 80-year time period, the Central Artery is vulnerable.

Jeffrey Simon: That must have been an interesting meeting. You go in and you say, “We’ve raised all the utilities up to the first floor.” They ask, “Why did you do that?” And you answer, “Well, we think the harbor’s going to rise 24 inches.”

Hubert Murray: We did a considerable amount of research and wrote a protocol that we want to share with the city and the state.

Jeffrey Simon: But this touches on something I think about a lot, which is the long-term implications of what we do. How do you use short-term money to accomplish long-term goals and do it in a really responsible way? And along the way, how can you make fundamental changes to the way state government does business? People who talk about infrastructure now invariably get around to talking about the ’30s. There’s a whole legacy from that period of beautiful work, which we’re not getting out of the current program, because it wasn’t designed with those goals in mind.

Hubert Murray: One of the things that thrilled me about coming to



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this country from the UK was the opportunity to see the work of the Tennessee Valley Authority. The quality of design on purely utilitarian structures, and the multi-disciplinary nature of the TVA, transformed that part of the country in a remarkable way. It was something of which the country could be proud, and for which it was known all across Europe. And somehow, we've lost that. Coming from Madrid Airport to Logan Airport, for example, is like going from a cathedral to a hovel.

Jeffrey Simon: We have the Zakim Bridge. We haven't totally lost it.

Anne Whiston Spurr: The fault lies on both sides. Designers have relinquished a role in infrastructure, but on the other hand, architects and landscape architects aren't the first professions that come to a public agency's mind when they are planning an infrastructure project. But there's an optimistic sign: over the past few years, we're seeing architecture and landscape architecture departments taking on large infrastructure projects as studio projects. At MIT, for example, a collaborative workshop between the department of architecture and the civil and environmental engineering department is in the works.

Sarah Williams Goldhagen: Landscape architects right now are doing a better job than architects are of convincing the public that the design of the built environment, whether it be a public monument, a park, a sewage-treatment plant, or the High Line, directly affects people's quality of life, both in the present and in

the future. In general, landscape architects seem to view working for an improved public realm as part of their professional obligations. And the Landscape Urbanists have done an especially impressive job of creating a public profile for themselves, one that could potentially translate into their playing a major role in the public's views of how the built environment might best be reconfigured.

David Lazer: Maybe design has been left out of the old forms of infrastructure, but it's certainly part of the new forms. We talked earlier about the iPhone, which is all about design, as is the whole structure — in a very real way, the whole infrastructure — that Apple has built behind it.

Jeffrey Simon: Design gets left out of the discussion because designers let that happen. I heard a designer at a conference complaining about the whole role of the owner's rep on a construction project. Well, the owner's rep developed because architects failed to interface with their customers in an acceptable manner. It's the same with design — the design profession has failed to communicate perceived value in good design. There was a time when the finest design was reserved for public buildings.

David Lazer: The one thing that building infrastructure has going for it is the very fact that it leaves a lasting legacy, which provides an incentive to politicians. When you leave a TVA or even a Big Dig, you get a little touch of immortality. ■

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