Interview with Fred Salvucci, former Massachusetts Secretary of Transportation, for Program Four: "The Big Dig"

Note: This transcript is from a videotaped interview for "The Big Dig" segment of "Great Projects." It has been edited lightly for readability.

Interviewer (INT): What are the first three words that jump into your mind when you hear the word "Boston"?

Fred Salvucci (FS): Great city. I like it.

INT: What do you like about it?

FS: Well, it's got all of these exciting assets within walking distance of each other. It's absolutely unique in the United States. We've got the capitol of the state, the finance center, essentially, of New England. We've got the North Station with the Bruins and the Celtics. You've got Fenway Park. You've got Harvard. You've got MIT. You've got Boston University. You've got the Mass General Hospital and all of these assets; you could walk from one to the other. I mean we have all of this intensity in a very concentrated area. Even other cities that that people compare to Boston sometimes don't, like San Francisco, which is a great city, [but] they don't have quite this concentration and residential neighborhoods the North End, the Back Bay, Beacon Hill, the South End really within walking distance. And I love where I live, out in Brighton -- it's accessible. Everything is inter-accessible. And you can get around. It's a nice place to walk, which is important.

INT: How long have you been living in Boston?

FS: Well, I was born in Boston, and the section of Boston I live in is in Brighton. I was born at the Mass General Hospital--I'm sorry--I was born at the Hospital out in New Brigham Circle but I've lived all of my life in the section of Boston called Brighton. My wife and I lived for a year in the North End, but most of my life has really been within six blocks of where I live now, in Brighton Center.

INT: You never felt the urge to leave and live somewhere else?

FS: Well, we lived for a year in Naples, which was great, we really enjoyed it, but I like Boston.

INT: Is it still a nice place to live or visit with all this construction going on?

FS: You see cranes everywhere. It's like they all got together for a coffee break. They're all talkin' to each other and to me … obviously, it's a particular moment in time, but it's really part of the history the city. This is a city that's been created by man, by humans. When the English first got here, most if it was underwater. A lot of the really great parts

of the city, the Back Bay, the South End, parts of the North End, waterfront, were all underwater. Where I teach at MIT was under the Charles River a hundred years ago. So … Boston's a city that people have built. It's not quite like some of the Dutch cities, but it's close in terms of the intrinsic nature of major construction to making the city what it is. And certainly all the construction of the subways -- I mean, the first subway in the Western Hemisphere was begun between Park Street and Boylston Street and the intensive commuter rail network that links Boston to the whole region, those are all parts of what's made Boston what it is. And I find it exciting to see that continuing to happen with the cranes.

INT: Is there a simple way to explain the process of land-making?

FS: Yes well, Boston was initially, when the English settlers first came, a relatively small peninsula with three major hills connected by a very thin neck where Washington Street is now to the mainland. Everything else was tidal basins. You can kind of tell that by the names of the neighborhoods. The Back Bay, which is a wonderful area today, was a bay and that's why it got its name. So the physical nature of the city has been reclaimed with a huge amount of work from what had been tidal basins around the city. And a lot of the process of doing that was inherently linked to the transportation process. Some of the first railroads in the United States were built to haul in dirt from places like Needham to help fill what's now the South End and the Back Bay. So the introduction of rail technology was initially a construction tool and then the railroad became a way of people moving in and out of the city and really linking Boston to the hinterland, to the whole region. So the process of constructing the very land of this city has brought in technology, which then led to better transportation that allowed the city to continue to grow. So it's the cranes, to me, [that] are an exciting symbol of what's happening now, but they also, I think, relate to what's been happening here for 400 years.

FS: Well, fortunately, they didn't totally level the hills. Beacon Hill is still a hill, but it was a much steeper hill before they started. So the early landfills were very direct. Take the top of Beacon Hill and push it into what's now North Station. Take what used to be Fort Hill and use it to expand the seaport down by where Waterfront Park is today. The later process was they ran out of hills. So they went out to places like Needham, which were countryside then, and pulled in gravel on railroads.

INT: What were urban planners thinking about Boston in the '50s?

FS: I think if you look around Boston at the changes that were made in the city in the 1950s you have to conclude that there was a certain amount of hatred for the city going on. I mean the clearing of the West End was really a terrible intrusion into an urban neighborhood, the construction of the Central Artery as an elevated highway just slashing the city off from its own waterfront. In the '50s, there was a certain mentality that has really given up on the city, given up on what an exciting place it is, and it was kind of a defeatist attitude. It was like, “Well, the real future's in the suburbs, so let's build roads to connect to suburbs. Let's make Boston more like a suburb. Let's tear down some of

the dense neighborhoods. It doesn't matter if the road is ugly. You know, this is an old city. Old is bad." I think that was the mentality. I mean I wasn't part of it. I don't like what they did but when I look at the evidence of what happened in the '50s, I have to conclude that there was a real negative feeling about the city and a failure to recognize what it is that really makes this city exciting and a place that people love to come to today. So I think a lot of mistakes were made in the '50s and one of the biggest ones was the elevated Central Artery.

INT: Were they acting out of desperation, in a way?

FS: That was the thinking. I think the thinking was wrong. If the West End, for example, had not been cleared, it would be a wonderful neighborhood today. It was a great neighborhood then. And I think people generally would agree that there were a lot of mistakes made. I mean if you look at the Government Center area, the location where the Liberator was published was torn down. It was a beautiful piece of architecture on that street, but I mean here was the heart of the Anti-Slavery Movement in the United States and just knocked the building down. It would never happen today. There's much more appreciation both for the physical importance of those buildings, but also the spiritual meaning of those buildings, what went on. I mean the Anti-Slavery Movement was, I think, a very important part of the development of the United States and its heart, a good part of its heart was right there in Boston. And in the '50s, we just knocked those buildings down. That's a pretty vandalistic way to deal with what I think is a really great city. I just love Boston. And I'm glad they didn't destroy too much of it but, to me, the Central Artery, the Government Center, the West End were big, big mistakes.

INT: What percentage of Boston is landfill, 80 percent?

FS: I think it's that high, yeah. Certainly more than two-thirds. I think 80 is probably right. There's an interesting visual. I don't know if it works for you, but if you go to the top of the John Hancock Building they have where you can get a view of the city? They also have a display that shows what was the original city.

FS: I think one of the basic things to understand about Boston is that well over two-thirds of the inner city was underwater when the British first got here. And that's done a couple things. One, it means that the process of reclaiming that land from the tidal lands has been from the very beginning a major construction effort. And very early in the city of this history -- the history of this city people have been adding and changing the city. Secondly, every square inch of the land in the city is precious and because it had to be created at such great expense. So, consequently, it's developed very densely and that one of the things I like about the city and I think a lot of people like about the city.

FS: In the 1950s generally there were major efforts to change the city. I'm sure people thought they were doing the right thing, but not just in Boston, but all over the country, you had the Urban Renewal program that really was very destructive. I think the basic philosophy was anti-city viewed the city as sort of old, dirty, something of the past, too

dense. A lot of the things that make Boston great, that I think are among its assets, were things that they were trying to destroy. And they were lucky they didn't have enough money to carry it out, because they -- they did a lot of destruction. You know, the West End urban renewal project took an entire neighborhood of this city of nice brick, bow front, interesting architecture, very interesting mix of people right in the heart of the city just torn out. Those people all relocated in the space of five years. I mean [it was a] terrible thing to do to people, to begin with, and also a very bad thing to do to the architecture of the city, the clearance in what used to be called Scully Square, is now calling Government Center there were major casualties there -- the beautiful buildings along the location of the Sears Crescent, which, fortunately, is still there. The other side of that street was a set of beautiful brick buildings, very nice architecture, but more than architecture, The Liberator was published there. This was the heart of the Anti-Slavery Movement in the United States. This is a really important part of the city that is Boston just eradicated. "Insensitive" doesn't begin to describe the brutality of -- of some of what went on in -- in the 1950s, both in terms of -- of how the citizens of this city were treated, the people were just kicked out of their houses and told to move over, but also what was done to the -- to the historic fabric of the city. We're really lucky that the damage was limited but it was -- it was more than too much what happened to Government Center, West End, and the construction of the Central Artery and a little bit further north. The Tobin Bridge ripped through Chelsea in a very similar way. I mean I'm describing from a point of view of a Bostonian, but this was going on all over the United States. The combination of urban renewal and the interstate highway program did a lot of damage to traditional neighborhoods that I think people wish they had back, I mean, in a lot of those cities. Certainly that's the case in Boston.

INT: Your grandmother and also your brother-in-law lost homes during this period?

FS: Yeah. I mean just to put it in a personal context my brother-in-law lived in the West End. So I read about the West End, you know, studying urban planning, but I also heard about it from my brother-in-law in terms of what kind of neighborhood it was and what kind of process happened. People were treated very badly. My grandmother lived in a house in north Brighton that was taken by eminent domain when they when they built the Mass Turnpike. People were treated very badly in that neighborhood. They were relatively poor and my grandmother's Italian, but most of the family -- most of the neighborhood was Lithuanian, all immigrants. Nobody spoke very good English. Didn't really know how to defend themselves against this giant bureaucracy that came in and basically ripped through the neighborhood, took people's houses. They were given a dollar for the house and told, "When we get around to it, we'll give you an appraisal." I mean imagine a 70 year-old widow gets kicked out of her house with a dollar. I mean what is she supposed to do? It's just outrageous. And the it was so bad that it did generate an understanding that this was no way to treat people, and within five years of this horrible treatment, Massachusetts ended up having some of the best relocation laws to protect people against this happening again. But the initial intrusion of the Mass Turnpike was the same story as what happened on the Central Artery. It's just people didn't matter, they were gonna get pushed out of the way, and that's the way it was in the

highway program. That's the way it was in the urban renewal program and we were lucky that that attitude is substantially gone today.

INT: Do you remember this period?

FS: It was basically you can't fight City Hall was the attitude. I was a student at MIT. I was particularly upset with what was goin' on, 'cause I was studying civil engineering, majoring in transportation, and here civil engineers and a transportation agency were coming and treating my grandmother in this ridiculously horrible way. I mean not just my grandmother, but that whole neighborhood. It was just not dealt with fairly and for me as a student, it was kind of a formative experience because it was like, "This is wrong and I'm not gonna -- if I'm ever in this field, I'm not gonna treat people that way. It's just not the right way to do things."

INT: What motivated you to become a civil engineer?

FS: Most of my family are construction workers. My grandfather came to this country -- on both sides my grandfathers worked on construction. My father's father worked on building the big Clinton Dam that created the reservoir to bring water to Boston. So construction has always been something that everybody in the family did, from my grandparents to my father to my uncles and cousins and civil engineering and architecture and urban planning were things that I was really interested in. It was what had brought us to America in a way and the family literally came over to work on different pieces of infrastructure to make Boston work from the water supply to the South Station. My mother's grandfather came over and worked on that. When I was a little kid, I was always hearing about construction ...

INT: What was the BRA?

FS: Yes, well, the Boston Redevelopment Authority in the '50s was the agency that had tremendous power to condemn land, raze whole neighborhoods, get federal funds under the Urban Renewal program and then sell that land back to other developers who'd come in and do something different with the land. And it was done in a very nasty way. In reaction to that, there've been several reforms in the BRA, and I think it's fair to say that the BRA has come to be viewed as one of the better planning agencies around and is certainly a lot more sensitive in dealing with neighborhoods, as a big shift towards planning with people and the right of people in neighborhoods to participate in planning their own future. So, it's the same letters, the same agency name but a very different approach to people. But the '50s, it was a very tough agency. It had a lot of power and, in my view, would abuse that power and hurt a lot of people and hurt the city in the process.

INT: You became a volunteer for the anti-inner belt movement?

FS: Yeah. There were a group of who worked at the Boston Redevelopment Authority,

young engineers, planners who really felt that the highways were wrong, were bad to the people in the neighborhoods, but also wrong for the city. And we began work as volunteers, supporting initially a community group in Cambridge that was fighting the inner belt, which ultimately broadened to a city-wide movement that included East Boston, South Boston, Roxbury, Jamaica Plain, as well as Cambridge and Sommerville, saying, "Stop! This is a huge mistake both for the people and the city and we need to go in a different direction and we need to emphasize public transportation." I mean, first, we have to stop destroying these neighborhoods because they're valuable. They're not throw-away items. They're -- they're important places that people live. And, secondly, in terms of the real future of this city, we shouldn't be betting on bringing new cars into the city. We've got more cars than we can handle. You know, you're gonna knock down half the city to building parking lots and really destroy what's left of Boston? You know, the whole urban attitude was, "This is a great city. Let's reinforce it with public transportation so people can get here without cars and be part of the city's economy." So it was a combination of reaction against the destruction of the urban neighborhoods but also I think a positive force for a different vision of the city and how the city could really thrive. And I think the record is clear that the roads did not get built, transit did get built, and the City of Boston is thriving. So I think there's substantial evidence out there that that direction has been a good thing for the city not only in terms of avoiding the destruction of those neighborhoods and avoiding the harm to a lot of people, but also in terms of building a different kind of economy that Boston has prospered with.

INT: Please talk about the inner belt?

FS: The inner belt was proposed initially as part of the interstate highway system and it would have basically gone around the center of Boston but it would have done that by going through several neighborhoods in Jamaica Plain, Roxbury, the South End, Cambridge, Sommerville, South Boston, and East Boston. So from the point of view of the center, it was a ring but the ring was in a whole bunch of neighborhoods that were very valuable to the people who lived in 'em. So initially the transportation theory was that the cars would come in and distribute off of this road, but the transportation theory never dealt with the question of where were the cars gonna go when they got off of this road? We've got a city with narrow streets, not much parking and if you try to build more parking you're going to destroy a lot of what's valuable of the city.

So those of us who were working against the highways were, in first instance, doing it out of sympathy with those neighborhoods. Some of us lived in those neighborhoods and feeling this is a wrong thing to do to these neighborhoods, but there was also a second feeling that there was a much better way from a transportation point of view to provide access into the city with public transportation and refurbishing our commuter rail system so that we wouldn't knock down half of what was valuable in the city, that we'd be able to celebrate the history of the city and add to it. I think that theory really has worked, you know. The basic facts are the inner belt did not get built. Most of that money got shifted into public transportation investments like the Red Line extension and the Orange Line and the refurbishing of the commuter rail and the City of Boston economy has done

fabulously well. So I think there's substantial evidence that this was both good for the neighborhoods that avoided the demolition, but also very good for the downtown and for the economy of the City of Boston.

INT: How did you and Dukakis join together?

FS: I first met Michael Dukakis when he was a state representative from Brookline and he called me 'cause he had a radio talk show. Mike was a real leader in the anti-highway movement. He was the first elected representative who really began putting a coalition together to say, "This is crazy. Let's move towards public transportation." And he had heard that there was a civil engineer at the BRA who sounded a lot like him, and he was looking for someone that had sort of civil engineering expertise that would support this view, because most of the civil engineers were making a living off of these highways and nobody would say anything critical. So he called me and said, "Gee, I've heard about you. Would you be willing to come on my radio show and talk about it?" So that's when I first met him and you know, we were just on exactly the same wavelength on a whole number of issues philosophically, but particularly within transportation the emphasis on public transportation, the opposition to the destructiveness of the highway program in the neighborhoods were items that brought us together emotionally right from the first time I met him. But he was there before me. I mean he was out there and organizing when no else was speaking out.

INT: Do you remember your major victory when Frank Sargent publicly reversed his policy on highway building?

FS: Yes, of course. In many ways the most thrilling moment in the history of the anti-highway fight was when we won. And then Governor Sargent went on television and said, basically, he had been the public works commissioner who had fought for the inner belt earlier in his career and, as governor he said it was a mistake and "I'm going to admit that mistake and stop the program and we're going to shift towards public transportation." I mean it was thrilling. It was thrilling for us that had worked hard on it, but also, in fairness to Sargent how often do you see a public official who gets up and says, "I was wrong"? I mean it was an incredibly courageous thing for Frank Sargent to do, and I'm a Democrat. I don't say many good things about Republicans. But he was a great man. I mean he had worked for this program. He always had an environmentalist bent to him. [A] lot of people do political analysis as to why he did this or that. I think he just believed what he said. "This was a mistake and we're going to go in a different direction." It was a thrilling moment in the history of it.

And then we actually moved in that new direction. I mean we shifted the funds, partly under Governor Sargent, partly under Governor Dukakis. Those monies that were going to go into destroying those neighborhoods or building the highways were shifted into refurbishing the commuter rail system, extending the Red Line, relocating the Orange Line, basically rebuilding the public transportation infrastructure of the city. That came out of that decision and another component of the same decision -- you can go check that speech

that Frank Sargent gave -- was that the only highways that would continue to be studied within Route 128 would be the depression and widening of the Central Artery and the extension of I-90 over to Logan in an additional tunnel, the two components that are today called the Big Dig. Those were really part of that, if you will, anti-highway -- "anti-highway's" probably the wrong name -- pro-city decision that was made by Frank Sargent to shift towards a transportation strategy that would build the city instead of destroying it.

And a major component of that was, stop building destructive roads. Another major component was, put a lot of money into improving public transportation, and the third component that we're seeing built now is, take the existing Central Artery that's there and fix it. I mean fix it both from a transportation point of view, because it doesn't work, but also fix what it did to the city by getting it underground and knit the city back together again. That was a very thrilling moment in my life, when Sargent did it. And I've always respected him a great deal because of the courage that it took to do that.

INT: So you think the Big Dig is a direct result of the anti-highway movement?

FS: Yeah. There's no question. The initial project began to be studied literally as part of the Boston Transportation Planning Review as a different kind of highway that would be positive rather than negative. So the very beginning of that project came out of the restudy of highways, which culminated in stopping the inner belt. Those studies started, the depressed Central Artery and the tunnel directly to Logan not going through the neighborhoods -- those were conclusions of that anti-highway movement, if you will, so it's a lot of highway construction for an anti-highway movement; [that's] the way I would characterize it.

INT: Who was Alan Altshuler?

FS: Alan Altshuler was a key figure in all of this. He was initially a political science professor at MIT who was called on by Governor Sargent to take a new look at where we were headed in transportation policy. Later he was made Secretary of Transportation by Governor Sargent and he presided over this Boston Transportation Planning Review, this review that culminated in basically stopping the inner belt and the southwest expressway, two major very destructive interstate highways, and shifting most of the funds into public transportation and initiating the studies that have now led to the Big Dig. Alan was the secretary who led that process and he also did an extremely skillful job at working to get the legislation needed to do these things. It's one thing to make a policy statement that you're going to transform the MBTA or that you're going to take highway funds and use them for transportation, but you had to change the law to make those things happen and Altshuler basically got a major reorganization of the BMTA through in 1973 and the same year he really was one of the primary architects of the change in federal law that permitted cities to make decisions to use interstate highway funds for public transportation, rather than the highway, and give what's now called flexibility.

That really was invented in Boston by Alan Altshuler. It was a very fascinating political process because you had a Republican governor, a Republican secretary of transportation from Massachusetts, John Volpe. You had Tip O'Neil, who was then Majority Leader, and Senator Kennedy, both of whom who has opposed the inner belt, but supported getting the money to come to Massachusetts to help rebuild the transit system. So you had a bipartisan effort coming out of out of this process, which really led to a change in national law along with similar coalitions in other cities, such as San Francisco, Chicago, New York, New Orleans.

There were lots of places in the United States that were getting caught in this same confrontation between the inappropriate scale and disruption of the urban interstate highways when those cities really needed transit much more. And what Altshuler was really a master at was sort of developing the process. Governor Sargent made the strategic decisions. Alan Altshuler probably didn't even agree with all of the decisions, but the Governor made the policy call and Alan then implemented it exquisitely in terms of changing both Massachusetts law and participating in the national coalition to change the federal law. People tend to talk about the 1991 so called Ice Tea Legislation as a big landmark when federal funds became more flexible. It really began in 1973 with the language in the law that was crafted literally by Alan Altshuler.

INT: How did you come up with the idea to suppress the Central Artery?

FS: A lot of people think that depressing the Central Artery was my idea. The fact is I know it's not. A fella named Bill Reynolds is the one who first proposed it to me. As I became convinced that this was the right thing to do and really begin working on it very hard, I found that there were lots of other people who had had the same idea. So I know it's not originally my idea, and Bill Reynolds, again, is the first fella I heard talk about it. But it's an idea that I believe in and am proud to have played a role in getting it rolling.

INT: Can you tell the story about Reynolds coming up to you and explaining it?

FS: Initially Bill Reynolds, who was a highway builder and the head New England Road Builders, came up to me and said that, "This big ugly elevated road is like a neon sign flashing, 'Roads are bad.' And it's just a bad advertisement for our industry and I'm convinced that the only way we'll fix this anti-highway attitude is by correcting the mistake and putting it underground." And my first reaction was, "This is crazy. You know, how are we going to shut the city down for ten years while we build a new road?" But what got me fascinated was first of all, it was a wonderful vision of the city with the road underground, instead of elevated, but, secondly, the more I thought about it, the more I felt and feel that you could build a new road under the existing road and not shut the city down.

INT: Could you tell me how Altshuler reacted when you came to him with the depression of the artery idea.

FS: Well, actually I say we went to Altshuler, but we went to Jack Wofford, who was Altshuler's deputy. So I didn't get the facial expression, but basically Bill Reynolds and I went together to Jack Wofford, who was director of the Boston Transportation Planning Review and reported to Alan Altshuler. And our theory was, since we disagreed on almost everything, if we agreed on something, they'd be willing to at least give it a study, which turned out to be the case. At the same time, Altshuler was really cautious about the idea because I was representing the mayor of Boston, Kevin White, and telling him that the mayor really wanted this to happen, but he was also hearing from the Boston Redevelopment Authority director that the mayor did not want it to happen. So Alan was very concerned that if he got out there identified with this project, the city might decide to oppose it when he thought he was doing it in response to the city. So one of the things he required was that I produce a letter signed by Kevin White requesting the study, to make it clear that the mayor of the city wanted this to go forward. And I did. Kevin, in fact, was very enthusiastic about this idea. He lived on Beacon Hill, walked to work, really cared about what the aesthetic quality of the City of Boston. He was very enthusiastic about this project. So he sent the letter and Altshuler agreed to do the study, but he was always quite cautious about it because he was nervous that there'd be a reaction from the business community, that the disruptiveness of the construction process would be excessive, and it was a rational thing for him to be concerned with.

INT: Talk about how the Big Dig was actually two projects and how they came together.

FS: Well, really the Big Dig, as it's called, is really composed of two major elements that started out as different projects. One element is the depression of are elevated Central Artery, I-93, and that's the idea that -- that Bill Reynolds came to me with and we jointly went to Altshuler about. It will, basically, when it's done, eliminate this highway that divides the city from its own waterfront and at the same time substantially increase the capacity of the highway, 'cause once it's underground, you can widen it somewhat and, in particular, at its key bottlenecks, you can effectively double the capacity of the roadway. So that's the depressed artery part of it.

The tunnel part of it, so called, is the extension of Interstate 90 across Boston Harbor to Logan Airport. Interstate 90 comes all the way from Seattle east to Boston and now ends at I-93 in back of South Station. The idea of the tunnel as it's now being built is to continue under the Fort Point Channel past South Station under what used to be basically a railroad yard complex in South Boston and then across, under Boston Harbor, coming up at Logan Airport with a little connector beyond it to tie into Route 1.

The tunnel had a different history. It had initially been proposed in the '60s and at that time it was proposed to be in the Fort Point Channel, essentially going through the location of the Boston Tea Party and going through the East Boston community on the other side of the harbor in order to access Logan Airport. So there was major controversy. The reason that this Boston community was part of the anti-highway coalition was because that element of the highway was going to basically cut East Boston in half and be very disruptive. And the historic impact on the Boston end, disrupting the

site of the Boston Tea Party, had not yet attracted attention, but anybody who understood federal law would have to realize that that was not gonna happen. In addition to that, the original location of the tunnel in the Fort Point Channel would have disrupted the cooling water supply for the Gillette Company, which is the largest manufacturer in Boston. So the original tunnel idea had many problems with it.

What is getting built is substantially different in that it is located about a half a mile to the east, all underground, and in areas that were formerly basically railroad areas. So it's basically going to enhance the developability of that land. It'll be environmentally compatible because it's below ground, and it, which had been a very controversial item in this relocated location, has been very strong and very popular ever since. The ironic thing is that this location idea also came from Bill Reynolds, the same fella who had the idea about depressing the artery. I mean he's a very creative fellow and really the two central elements of the Big Dig--putting I-93 underground and the relocation of I-90 under and to the east of its original conceived location--are both Bill Reynolds' ideas and in both cases it made all the difference between something that was horrible and eventually something that's going to be extremely nice for the city as well as a good transportation boost.

INT: Now the idea to merge them was your idea?

FS: Yeah. Well, what happened is, generally speaking, the environmentalists and the community activists tended to like depressing the artery because the elevated artery was so ugly and putting it underground was very attractive -- and that was something that the anti-highway people would make an exception for and say, "Well, this one's really different and we're for it."

The additional tunnel over to the airport was more complicated for the residential communities because they also were very concerned with airport expansion and there was a feeling that even if the highway itself didn't destroy the community because it was not relocated into the airport, that it still gave more access to the airport and Logan Airport might, therefore, grow and threaten the community in a different way.

So the tunnel -- the I-90 portion of the project continued to be somewhat controversial with the community and the environmental groups. For the business community it was the opposite. The business community wanted the additional access over to the airport and were nervous about the potential disruption of depressing the artery. So the two elements were being treated as alternatives and there was sort of an argument about which was more important. And around 1982, and precisely when Bill Reynolds came to me with the better location for the tunnel, getting out of the Fort Point Channel and lessening the impact on Gillette and the Boston Tea Party as well as the East Boston community impact, I looked at it and said, "This highway project, which has been a big negative, is now a really big positive. And here we are with Boston doing what it loves to do, which is fight itself about two different highways. The fact is we're entitled to the funding for both of them. One is I-93, the other is I-90 ...

FS: Basically you have two major projects, depression of the artery, which is Interstate 93, and the completion of I-90 across and under Boston Harbor over to Logan Airport. Those are independent interstate highways and we're entitled to 90 percent of the money under the law at the time for both. In the case of I-93, the original elevated Central Artery was built before the interstate program, so it was built a hundred percent with local funds. So the reconstruction of that facility under the rules of the interstate highway program, we're entitled to 90 percent of the funding for that. In the case of I-90, extending it over to Logan Airport, that was simply the completion of Interstate 90 to an interstate facility, that is, Logan Airport. So I went to the governor and said "People are acting like these are alternatives. The fact is we're entitled to the funding for both. Instead of fighting about which one to do, we ought to do both and, number one, the transportation system will benefit as well as the environment of the city, but, in addition to that, we'll get these two constituencies that are fighting against each other unified and fighting for the combined program."

Governor Dukakis accepted that idea and we decided to go in that direction and then he invited John Volpe to come in and meet with him. Volpe had been once highway commissioner of the state and then governor of the state and then US Secretary of Transportation, ultimately, ambassador to Italy. He was retired, but he was the major Republican. On a project as large as this, you know that it's going to be conceptualized in one administration, designed in another, built in another, and if you don't have a really broad bipartisan consensus that this is something the region needs, it's never gonna happen. If this is a political football back and forth unless you intend to get re-elected five times in a row, it's simply not gonna happen. You have to have -- it has to be seen as a civic enterprise.

So Governor Dukakis asked Former Governor Volpe to join him and make this a bipartisan effort and Governor Volpe said he'd be glad to do that, that he had been blessed in his life with a lot of roles that he was proud, but the one thing he always felt badly about was when he became highway commissioner back in the '50s, all the buildings had been knocked down for the Central Artery, the plans were ready to go, and he looked at it and said, "This is a giant mistake. This should not happen," but he felt he had no alternative because all the destruction had been done. So he signed the contracts to construct that elevated portion of the artery and he said, "I've always felt badly about it and I'd really welcome the opportunity to rectify what I consider one of the few mistakes in my whole career."

Volpe was great. I mean he contacted Republican senators for us and really made it a bipartisan civic effort that was very important to the ability to get the project done. Now, obviously, our core Democratic support Congressman O'Neil, Congressman Moakley, Senator Kennedy, Senator Tsongas at that time, and then later Senator Kerry -- it was a remarkable team effort with very strong support and without that, it never would have happened. But Volpe made it bipartisan -- and Silvio Conte, who was the congressman from western Mass, helped make it a bipartisan effort. So that was part of the dynamic of putting these two together was to combine the constituencies and change

the dynamic in a way that was, I think very beneficial for the project and ultimately for the state.

FS: You know, one way to understand what the project will do in transportation terms is to understand that today most travelers from the west and south who are going over to Logan Airport have to get onto the Central Artery, go as far as the Sumner Tunnel, and then go over to the airport, which means that they're loading onto this very overloaded Central Artery in addition to everybody who's going to the city. So the tunnel to the airport component of the project basically takes those trips off of the Central Artery altogether. So it helps relieve the central road by taking a large number of trips totally off of that road and going directly under the tunnel over to Logan Airport. The second element of the project, the depression of I-93, takes this ugly elevated road which is too narrow and puts it underground so that it's less disruptive to the city, but also widens it so that it's not constrained as it is today. So in combination, the two pieces double the east-west capacity to cross Boston Harbor. That's what the tunnel does for you. And depressing the artery effectively doubles the north-south capacity through the city. So the transportation philosophy here is to not encourage more people to come into the city with their cars, because we do have the parking limit at Logan and in downtown. But for those people who do come, to have much better travel circumstances.

So what we're trying to do is take a system that now operates at about six miles an hour during the peak and have it operate not at 55 miles an hour, but have it operate like at 35 miles an hour, kind of a reasonable level of flow. So it's a confusing of the project because some people think, "Well, you're doubling capacity. Does that mean twice as many cars?" Hopefully not, because if you have twice as many cars, you're just gonna have a big traffic jam, twice as big except it's underground. The idea here is not to double the number of cars, but to double the capacity so that the cars that you do have actually can move through at a reasonable rate of flow. And we've got very important facilities here. We're talking about the Mass General Hospital. Someone's getting rushed to the hospital in an ambulance, you don't want seven miles an hour; you want 35 miles an hour. So that's really what the transportation philosophy of the project is -- to get reasonable levels of flow on the two facilities by, in the first instance, decongesting the one and, secondly, widening it a bit.

INT: Why's it not so easy to execute the Big Dig right after the decision was made to do it?

FS: Any large project is going to be complicated, but this one became unfairly complicated, I think, because the Reagan Administration for political reasons, decided to block the project. It was totally unfair. We were, you know, we're part of the United States of America. We've paid our taxes into the interstate highway system. Our money has helped build roads in Texas and California. We had not received the interstate highway funds in Massachusetts because we had built the Central Artery early, before the program existed, but we had been paying our taxes. So what we were proposing is, "Let's complete the interstate in this section using 90/10 funds" --90 percent federal

funds, like everyone else in the country has. There was some political rivalry because of the strength and brilliance of our political leaders. I mean Congressman O'Neil, who became Speaker of the House, Senator Kennedy, were very visible Democratic figures.

So the Reagan Administration basically blocked the project and dragged their feet. They didn't give us approval on our environmental documents. They said, "Well, it's not clear that you're entitled to the money," which was not the case at all. I mean we had legal opinions that showed that we were entitled to the money. But that political intervention basically slowed the project down for over four years. And during that time we had to build a political coalition to change that circumstance. Ultimately it ended up requiring, including language in the federal law, called the Surface Transportation Act of 1987 which, quote, "clarified" that we were indeed entitled to the 90 percent federal funding to do the combination of I-90 and I-93, as we were proposing it.

So that any project of this size again would have delay in it because it's very big and it's very complicated, but this was really unduly delayed by the political blockage created by the Reagan Administration. It's why having Governor Volpe with us advocating with the Republicans that this was unfair and that we had a right to see the project move, particularly since Volpe had been the Washington Bureau of Public Roads chief under Eisenhower and then later Secretary of Transportation, he had a lot of substantive credibility as well as the political credibility of being a Republican. So it made it clear this wasn't a partisan thing from a Massachusetts point of view. It was just a good transportation policy. But there's no question it slowed us down. I mean having the President of the United States trying to stop you, we're darned lucky we survived, but it certainly delayed us by at least four years.

INT: Talk about convincing Dukakis.

FS: Immediately after Governor Dukakis became governor following Governor Sargent, the governor's priority was to get all of the transit to really happen. I mean there had been a very bold change in direction made by Governor Sargent. Governor Dukakis agreed with that change in direction, in fact, had advocated a shift towards transit, and Dukakis wanted to be sure that I stayed focused on getting the transit built. He was concerned that the artery might be a distraction. He was also, I think, somewhat concerned with whether there was going to be traffic disruption, notwithstanding the fact that we seemed to have a technical way to deal with that.

So the governor did have concerns, particularly about the wisdom of pursuing both at the same time. He asked Frank Keefe, who was his sort of economic development coordinator who coordinated several of the cabinet secretaries, myself, environmental affair, economic affairs, et cetera. He asked Frank Keefe essentially for a second opinion. He said, "Does this crazy thing Salvucci's doing make any sense?" And Keefe reviewed and went back to Governor Dukakis with a recommendation that this, indeed, makes a lot of sense and that we should pursue it, that the interstate highway funding that the artery is eligible for did not compete with the funding for the transit project and that we ought to

be able to walk and chew gum at the same time and basically pursue both.

So it did take Governor Dukakis some time to warm up to this idea, because he was, I think, legitimately concerned that it was a very large, ambitious transit agenda. He wanted to be sure that got rolling fast and first. In fact, it did, and if you'll notice the way the project has unfolded, the big transit improvements were almost all essentially completed by 1987 well before we actually started on the digging of the Big Dig. Now had we not been delayed by the Reagan Administration, the Big Dig would have begun at the tail end of the big transit construction

FS: So basically the way the timing, in fact, has worked out on the project, the major subway expansion was substantially complete at the point in time when the Big Dig begins. That's very useful for more than one reason. For one thing, the subway construction was very sophisticated tunneling and it had the effect of proving to the public that we really had the competency in our construction community to do very complicated underground work without shutting the city down. So the sequencing of the transit coming first, and this highway tunneling coming later was useful from a policy point of view 'cause it gave the emphasis to public transportation that Governor Dukakis wanted, which I think the region needed, but, secondly, it also had the effect of really demonstrating to people that this construction technology really could work, that that all of these complicated things -- slurry wall construction and et cetera -- you know, they didn't just hear these catch words; they physically saw that these tunnels had gotten built and that the city had managed to function reasonably well through the construction.

INT: Talk about convincing Frank Keefe of the worthwhileness of the project.

FS: Well, naturally since the governor had asked Frank Keefe to give a second opinion, I did my best to influence that second opinion by going and talking to Frank, making sure he understood exactly what we were proposing and why I felt it was both feasible and that it had major economic benefit. So, I mean, to me, you can't sell ice to Eskimos. The only way to sell something is based on better understanding of what it is you're talking about. If the project has real merit, and I think this one does, it'll tend to sell itself. So the basic approach is you just make sure that people understand what this'll do and why that's benefit. And I was lucky with Frank because Frank's a very smart guy. [T]he key, I think, for Frank [was] the interstate highway funding that we were eligible for was totally independent of the transit funds that we were using to do the subway. So this was additional investment in the economy and additional strengthening the infrastructure and that's very positive. So I was real happy that Frank agreed that this was a good project and helped to convince the governor that we should go forward.

INT: Give me a sense of the ten years of persuading you had to do to get everybody on board.

FS: Let me put it this way: You can win an election 51-49. You cannot get a large public works project underway with a 51-49 constituency. You need to have well over

90 percent of the public really with you, because there are so many procedural points where a project can be stopped that if any significant constituency at all feels offended and has a particular problem with a project, chances are they'll be able to stop it and particularly on the large project which has to be implemented through more than one administration. Every time you have a change in administration, you have a lot of changes in the people involved, and there's a lot of vulnerability in the project to having it derailed. So to get something to really happen, my view is you really need to have over 90 percent of the public really with you in a serious way and you have to go through a process of explaining the project. You can't really sell people. You can't sell ice to the Eskimos. The project has to sell itself, but you have to think through what the concerns of the various constituencies are going to be and why the project is good for them, or at least not bad for them, and get people on board. If you fail to do that, sooner or later the project is likely to get bogged down and stopped. That's been my experience.

INT: What were the names of some of the groups you had to convince?

FS: Well, certainly the environmental community is a very important set of people and they're not one community; it's many different people with a generally environmental consideration, but the environmental lobbies are very powerful and if you can't satisfy the environmental constituencies that it's a reasonably good project, chances are you're going to get stopped.

The business community, again, is not one community. It's many different communities. Obviously, the construction community is likely to be in favor of a project that going to create more construction work. But you're in the middle of the city. You're going to affect the ability to move goods. So anybody who's shipping goods to Logan Airport has a legitimate concern with whether you're gonna do this project in a way that they can continue to do business. The people who are doing business in downtown Boston have a big stake in whether they're workers can get to work. They need to be convinced that you can reasonably maintain access to the city or they're going to say, "Nice idea, but we have to fight this." The suburban residents who have to access the city either in their car or by transit need to be convinced that they're gonna be able to get to work, that this isn't going to make their life miserable. One of the things that was helpful to us was the fact that MBTA did these big subways.

INT: Describe your role in the Big Dig.

FS: Basically my role was initially as transportation advisor to the mayor of the City of Boston I became enthused about this idea and, along with Bill Reynolds, convinced the state to begin the study process to get this to be seriously considered. If I had a contribution there, it was to identify the need to maintain traffic during construction as the essential point that has to be satisfied if we were going to convince people that this was worth going forward with. So I played an important role in that technical issue and I played an important political role because, as the designee of the city and since this project is in the city, that was important in giving the project some credibility.

Later, in 1975, I became Secretary of Transportation with Governor Dukakis, and as secretary, I continued to promote the project, but also we got language in the 1976 federal law that clarified the status of the project and allowed us to continue proceeding it. Then later, we were out of government for four years, came back in 1983 and I basically had the idea of putting the two projects together, so combining the tunnel and the artery into one package was something that I helped to put together. And we had a lot of convincing to do of a lot of different constituencies. Fortunately, I think the facts were there to justify the project moving forward. So I was very active in that '83 to '90 period putting together all of environmental documentation and all of the federal financial justifications to get the project to the point of starting construction.

INT: It sounds very exciting.

FS: Yes it was lot of fun and it's something I enjoyed doing … it's fun to see it happening now.

INT: Give me sense of meeting with people and how frenetic it was for you.

FS: Oh, it was pretty frenetic. I mean at one point -- a key community is the North End and we were trying to do public meetings in the North End to explain the project and there were some project opponents who had a tactic of disrupting the meetings. So you'd go to the meeting and no communication would occur because they'd get up and they'd filibuster and nothing would happen and a lot of people would come to the meeting looking for information and go away disgusted. So we said, "Okay. This isn't gonna work." So we did coffee klatches, and basically I used to live in the North End with my wife when we first got married. I know people in the North End. We basically put the word out, "Look, get ten people together, serve cookies and coffee. The secretary of transportation'll come and explain and answer any questions you have about the artery." And I had these story boards that we had put together that basically relatively simple diagrams to explain what the process was where the problems would be, why I thought it was feasible, why I thought it would be good for the neighborhood. And then people could ask any question they had on their mind and, yes, it was fun. They're nice people. You had a nice cup of coffee and talked about it, and people could see we weren't trying to hide anything, but we were able to get the explanation out.

Somebody used the characterization it was like we did this retail rather than wholesale. We didn't go into the back room and try to convince the power brokers, "This is a great thing. Everyone shut up, we're going forward." We dealt with every constituency that had a concern, beginning with the neighbors and the people who might most reasonably have a concern that that there was gonna be problems, and there are problems during construction. There's no hiding that. So the approach was really to deal with everybody, not to try to deal with people through other people, but to deal directly with the people who had a legitimate concern and be honest. I mean where there were problems, you had to admit there were problems, but you'd explain how you would try to deal with it.

The other piece is it's got to be a two-way communication process because you literally don't understand the problem until you've heard that other person's point of view. I mean I'm an engineer. We know how to build things, but you didn't necessarily know what invisible fabric you're cutting across when you take a certain action. You get that feedback from a community meeting that says, "Hey, you guys don't understand this is what happens on this street and if you do it that way, you're gonna disrupt these three stores and my kids aren't going to be able to get to school." So the meeting process isn't a one-way selling process; it's a two-way communication process and if somebody comes up with a question you don't have an answer for you go back and try to get an answer, then you go back with that answer.

So it really is a two-way process. In my experience, that's the only way you really can get these to happen. You've got to have a great deal of confidence from a lot of people that they understand what's about to happen and to the degree there are problems, they know what they're going to be, and they know you're committed to the best of your ability to mitigate those problems, to deal with them in a way that makes them less severe.

With Governor Dukakis we had terrific support and willingness to take action to lessen the problem that we were creating. For example, in southeast expressway reconstruction when people were worried about whether they could get from the south shore to downtown Boston to work, we provided, as part of the highway project, additional bus service shuttle boat services from Hingham. We heard and understood that people were concerned about how they got to work and we said, "Look, solving your problem is as much a part of rebuilding the southeast expressway as the reinforcing rods in the concrete. You are part of this. If you have a problem, we have problem and we have to solve that problem." So you can only understand the problems with a two-way communications process and then you go back to those people and say, "Okay, here's what we've come up with. It's not perfect, but we think we can deal with most of your problem," and you know, basically that's the process we used and I think it's worked.

If you look at the implementation of the construction process, you certainly know there's something awfully big going on in downtown Boston, and the detours and can be somewhat confusing, but, by and large, you can get through downtown Boston. By and large, the project's kept -- honored -- the commitment to maintain reasonable viability in the city street system through this whole construction process.

INT: Bob Albee's described getting the community involved in large public works projects, something that you had fought for, and now that is the case. So this is now an albatross around your neck?

FS: I guess the way I look at a big project is you don't deserve to get it done if you can't convince people that it's worth doing. This isn't my project. This is the people's project. And if you can't go through a process of two-way communication and answer people's

questions, then maybe the project shouldn't happen. I mean from one point of view, having a very large amount of community involvement makes it more difficult, but I would argue at the same time it also makes it simpler because through that process you understand much better what the problems are going to be and you can deal with it in advance.

If you ignore the community and you just do a traditional, "Oh, we know best, we'll build it our way," then you're halfway through it and you start bumping into real problems and you haven't thought through the solutions in advance. So, yes, it takes time, and … some people say it slows you down, I don't think it slows you down. I think in the end of the day it really expedites the project. You have to take the time to do it right. If it's worth doing, it's worth doing well and you need the information that the community has in its head. You can't, as an engineer, look at a map and understand exactly what impact you're going to have when you do a project like this in the middle of the city. And I think this is something that is not unique to Boston. In a sense what we're dealing with here is a very old piece of infrastructure. The fact that we're in the Northeast with tough, cold winters and a lot of use of road salt has made that facility startin' to fall apart earlier than it should, but it's over a half a century old and it's time to replace it. That's not a problem unique to Boston.

The entire nation is going to be facing the problem of what do you do with old highways when they're no longer viable and they have to rebuilt? It's very complicated to rebuild and I think the standard part of the approach has got to be establishing communication with the neighbors, and understanding both the abutters and their needs and the users, the people who are traveling on that roadway, and their needs because both of those communities are going to be strongly affected during any reconstruction process. I mean I love the artery project; it's been fun to work on it. In some ways I think the project is exploring something that the rest of the country is also going to have to do. So I'm hopeful that people will take seriously lessons learned from this, because we've got to, as a nation, we've got to get better and better at rebuilding. Rebuilding's very different than back in the '50s when they initially built roads through cornfields and the construction was relatively simple. This is not easy in Boston, but it's not going to be any easier in any other city in the country and I think it's an approach that's really necessary to tackling these kind of projects.

FS: I think one way to conceptualize the construction of major infrastructure in the city is, in the '50s, mostly people were used to building things out in the countryside, where things were relatively uncomplicated and engineering factors were the whole ball game. So, the engineers would decide where to build the road. They'd take some land from a farmer, but the farmer had plenty of land. And generally it wasn't very controversial. In fact, people liked the enhancement of their land value. So the highway construction in the rural area tended to be a very popular activity. When those engineers, who were used to being sort of heroes, came into the city to do things like the Central Artery, they tried to use the same methodology, which was, "We're the engineers. We know what we're doing. This is what we're gonna do," and then you had a disaster. You had things like the

original Central Artery, where no one was consulted, where people were treated very badly. I mean those engineers, they're not evil people. Their historical experience was relocating some corn plants. Now they're relocating people and families. They're not prepared to deal with that. So you had a very bad outcome. You had some very brutal projects that hurt a lot of people and left a real scar on the city. We've been trying to rebuild that facility, 'cause it does carry an important transportation capacity for the region.

FS: So what's going on now is we're rebuilding the elevated Central Artery below grade so it'll be compatible with the city and the environment in a manner that respects the need of people to continue using the facility while it's being rebuilt. That's a much more complicated process. It's more expensive. It's very difficult to do. I think it's being done reasonably well. That task is something that I think increasingly is going to be confronting engineers all over the United States. I mean Boston is not unique in having 50 year-old structures that are beginning to fall apart.

As people begin this very complicated task of rebuilding in an urban environment, there are two issues that ought to deal with. Number one, are we simply going to rebuild exactly what we've got as if it were petrified wood? You know, we had an ugly elevated Central Artery. We'll renew it and now we'll have a brand-new ugly elevated Central Artery. Or do you try to say how do we change this to better fit into the environment? Have we learned anything in 60 years? That's one question that I think should be asked and in Boston we asked that question and said, "Let's put this thing underground and really repair the damage that was done to the city."

Secondly, we're asking the question, how do we make it reasonable for both the abutters to live with the construction process and the people who use the road to live with the construction process? That makes it more expensive. It makes it more complicated. It makes it more time-consuming, but it's an essential part of the job. This is simply a more complicated job than building a highway out in a cornfield. And all over the country, as engineers and architects and planners begin to confront the absolute need to deal with these aging facilities that are otherwise going to fall apart -- I mean you can't simply wish this problem away -- I believe that the techniques that are being used in addressing the elevated Central Artery are techniques that are going to be useful across the country because they're very similar problems. Number one: How do you redefine the function based on what we now know? And I think part of that has to be communication with the community. And, secondly, how do we maintain reasonable functionality of the transportation facility while we renew the transportation facility? And that requires communication with the community that uses the facility. So, yes, this is much more complicated than it use to be, but it goes with the territory. If you're going to work on rebuilding these, and it's not an avoidable problem, I think it's something we have to do with, I think these are the kind of techniques you're going to find necessary all over the country.

INT: At over a billion dollars a mile, is this feasible to do?

FS: I guess I'd argue that you can't afford not to do it. I mean, transportation is an essential part of the infrastructure that makes our cities work. The transportation facilities are aging. They have got to be renewed. We don't really have a choice. And, yes, it'll be expensive. On the other hand, the flip side of the expense is it'll generate a lot of jobs for people in the construction industry. So that's a two-edged problem. Yes, the Central Artery has been a very expensive project in Boston and, yes, it's been essential to have a support of the federal government in doing that, but that's not new. It was the federal government's support that led to the creation of the interstate highway system to begin with. So I think it's reasonable to expect the federal government to stay in there and, secondly it's very important to do it right. And I think that involves this sort of two-way communication. Thirdly, if you do it right, there are a lot of jobs in doing that and that's a useful thing for the economy to maintain a construction activity. I happen to think this is a good thing because I'm a civil engineer and I like to build things, but, more fundamentally, even if you're not a civil engineer and you don't like to build things, the bottom line is this is a necessity activity. The alternative of letting transportation simply fall apart is not, I think, an acceptable alternative for the future economy of the United States.

The question of cost of the project is one that often comes up. It's, I think, important to understand that there was not a low-ball estimate at the front end of this project. The way the interstate highway program has always estimated cost is to estimate cost based on the current Construction Cost Index. In the real world, projects are built over time. Big projects take decades and by the time you finish them, they cost much more, because of inflation, than the original cost. That's not a low-ball cost. It's a cost estimate that was carried out with the proper federal highway sanction procedures, with the oversight of the Federal Highway Administration. I mean I'm a Democrat and pretty proud of it. The Reagan Administration didn't even like this project. They reviewed our cost estimates. So if we were low-balling the cost estimates, one would expect that they would have blown the whistle that we were low-balling the cost estimates.

The fact is we were using the proper procedures according to the law at the time, which was not what will this project actually cost out to year 2000, or whenever it's complete, but what will this project cost if it were all built today? That's the way every major highway project in the United States has been estimated. Now the problem with that style of cost estimating is that it leads to misunderstanding and cynicism. People say, "I know they said that the project was going to cost less and -- and it now costs more." There is a different philosophy that you ought to estimate the full cost, including inflation, at the front end of the project. And that's an acceptable point of view. The problem with that is that then if there's any delay in the project, the number's going to change on you all the time and it's also going to lead to confusion. But you need to pick a convention and stick with it.

The artery project used the exact same style of estimating cost that every interstate highway in the United States was done. Now the law has changed. So now the

philosophy has changed to going to full cost estimating, and that's fine. But I think it's unfair to say the original cost was low-balled. It was not. The full cost estimate, including all of the mitigation in 1991, was estimated at $6 billion. It is costing much more than that. So there are two components in the change in cost, and I think you have to be clear about the two components. And we ought to learn from the experience. One component is simply recognizing inflation, and you have to deal with that one way or another. You either do the old style interstate cost estimate based on current costs, not including inflation, or you allow for inflation. And the current philosophy is, "Let's allow for inflation. That'll confuse the public less." Since the public [perception] is so important to these, I think the new system is better. It'll lead to less misunderstanding.

A second issue is, above and beyond inflation, there have been increases in cost, dramatic increases in cost during this project. They substantially came from delays in implementation. The cost estimate that said this project was going to cost $6 billion full was a cost estimate that assumed that you started work in 1991 and moved it expeditiously right through. That did not happen. There was a delay at the beginning of the project while they reconsidered how to cross the Charles River. I happened to disagree with that decision. I was not in the government at the time they decided to review it. That involved three additional years of delay. That's a huge amount of money. There were delays occasioned on the southern side of the project because of some issues with soils.

So the second lesson to the degree that we're trying to say let's not just cast blame here, let's understand what happened and let's learn from it. I think the second lesson is, especially with large projects, it's extremely important that once you go through a process and have decided what you're doing, that you then implement it in an expeditious way, because delays drive your costs up dramatically and on a complex project, delay in one part of the project causes a delay on another part of the project and then it kind of doubles the effect. So these are inherent parts of complex and I think the real lesson to draw is you do that communication process, you involve the neighbors, you involve the users, you make some decisions, then you need to important effectively and on time or you will pay much more money than you originally expected to pay.

FS: In 1978, I had been working on the project since 1970 -- that's 17 years. We had been through a four-year fight with the Reagan Administration. We had finally gotten the congressional approval that clarified the funding. And we had turned the major hurdle in the federal environmental process and we were doing serious engineering and getting ready to construct. And some people from Bechtel come to me and say "This section past the Fort Point Channel and the Gillette Company, we don't know how to build it." I said, "What do you mean you don't know how to build it? We've been through 17 years. We've been through dozens and dozens of hearings. We've done all this environmental analysis. You've gotta build it. We've got approvals. Now you're telling me there's a problem building it? You've gotta solve this problem." And they said, "Well, we're just havin' trouble with it." I said, "Well, you've gotta," you know. "Between you and your partners at Parsons Brinkerhoff, you're the best in the world. You've got to come in with

a solution. Don't come in with a problem."

So they went to the New York office of Parsons Brinkerhoff and there got Lou Silano, who's a terrific guy. He saved the project. You know, I could have kissed the guy. He came in with this elegant, simple, conceptually simple, solution to very difficult problem. It is, I think, *the* major engineering challenge on this project and it's a project that has a lot of major engineering challenges, but the section by the Fort Point Channel where you've got the Red Line subway tunnel under this new highway tunnel, but the Red Line subway tunnel was built in 1910 in the early days of reinforced concrete. And if you put any stress on it, it might crack and fill the subway with water. So you can't touch the Red Line subway tunnel. And Silano came up with this really elegant solution for solving the problem.

INT: What was your first impression of Silano?

FS: He's just a terrific guy. He's a very likable guy and reminds me a lot of my father and a lot of guys I know. You know, he's about five-foot-nine, a little bit chunky, talks real plain, right out of Brooklyn, and brilliant is the thing that comes through. I mean you get past the kind of jovial way of talking and you see a person who's really a great engineer.

INT: Talk very generally about some of the other engineering challenges on this project.
FS: You have a very old East Coast city. Boston was first settled in 1630. And there aren't any accurate plans of what's under the ground. There are telephone wires, water lines, gas lines, electric lines, and in some cases you have drawings and in some cases you don't and even when you have drawings, sometimes the utility is not located where it says. So you're gonna be working underground. You can't shut down the telephone system for the financial district of Boston. I mean there are major consequences from interfering with any of these underground utilities.

So you've got an extremely complicated job to relocate these utilities before you do anything else so that you can then dig without disrupting the continued functioning of all of these services. In a way it's a less visible version of the need to respect the people who are using the road to travel to work or make their deliveries in a truck. Every telephone line, every electric utility, every gas line -- you touch a gas line you could have an explosion. So there's a meticulous job that needs to be done underground even before the quote, "real construction" begins just relocating all these utilities into coherent patterns so that they can be out of the way of the construction, but continue to function. One element of it was to renew almost all of the telephone lines with fiber optic in a totally different part of the city just to relocate them out of the way.

But sometimes when God gives you a lemon, you try to make lemonade. We had to relocate, so why not go to new technology and end up with not the same old telephone lines, but the newest technology? So while you're solving a problem, you try to not just get it out of the way, but actually prepare for the future. So there are a large number of

those kinds of issues that come up any place that you're substantial amount of underground work, but essentially when you're in the middle of an old city with a lot of underground work and especially in a city where the economy is so totally tied to telecommunications functioning without disruption. It's a complicated job.

INT: What about tunneling underneath these historic structures?

FS: You have to prepare and think and plan and do it right. And I think the construction community has gotten very good at that. Internationally, people have become very good at tunneling. A lot of the tunneling work that we do in Boston using methods that were initiated particularly by the French, Italians, and Austrians who started out tunneling under the Alps. And a lot of those techniques and some of the techniques that we used in the Milan subway system were then copied in the Western Hemisphere, initially in Toronto and then we brought them into Boston to do our transit tunnels. Originality isn't what you're after. You'd like to find someone who's solve this problem before and if they had a good solution and it worked, you'd like to copy because every time you do these things you get a little bit better at it.

[With] some of these problems, there's nobody to copy and you have to do an innovative solution and really that's what Lou Silano did with the problem near Gillette; he had a unique problem. He found a brand-new solution for it, but to the best of your ability you try to use things that people have already done before and done successfully, 'cause you really can't afford to fail. There's too much at stake for the abutters and for the project as a whole.

INT: In the future what do you think people will say as they look back at the Big Dig?

FS: Today the Big Dig is very visible. You see all the cranes. You see all the construction activity. People talk about it a lot. It's controversial because of cost. On the other hand, there are people who admire it begin of the engineering skill that's going into it and the construction skill. When you look downstream, I think that there's going to be a memory of to project from the literally thousands of people who participated in it. I think there's tremendous pride among the people who've designed and are building this project and they're going to be taking those skills on to other jobs, I am sure, all over the United States because other cities are going to be confronting this. So I think there's going to be a memory in kind of the hearts and minds of to people who directly participated.

I think 15 years from now, in terms of the city, my expectation is the project is going to be largely forgotten. Most of it's underground and, ironically, the bridge over the Charles, the cable staid bridge is the most visible part and I think people will see the bridge and say, "Oh, that's a unique bridge," and wonder how it came to be and they'll probably still talk about it. But nobody ever talks about, in my experience, remarkable engineering achievements like the New York subway system. I mean do people go into the subway every day and say, "Wow, what a great subway system! Imagine the work back before

they had all these mechanical means when people would sheer muscle power were digging by hand and blasting the rock. It's an incredible engineering achievement. It's underground." You know, people get up in the morning, they get their cup of coffee, and they go ride the subway and you hope it works.

So I think substantially the Big Dig is going to be a lot like the New York subway system. It's a tremendous construction and engineering achievement. I'm really proud to have been a part of it. I think there are thousands of other people who are going to feel that kind of pride and remember it and bring what they've learned to other jobs but I think for the general public as long as it functions well, it's going to recede into the background. I don't think it's going to be visible in the same way that Boulder Dam or the Brooklyn Bridge or things that you can see and generation after generations says, "Wow, how did they do this?" This is going to be like the New York subway system, I think.

INT: How long is the Big Dig expected to function well before something else is needed?

FS: I think the Big Dig is going to last for a very long time. That, in part, is a question of the kind of policies people adopt over the years. The parking limitation in downtown Boston is designed to make sure that people primarily use public transportation to get to the city. The basic objective here, again, is to take a system that now operates at six or seven miles an hour and have it function at 35 miles an hour, reasonable flow, for about the same number of vehicles, slight increase. If people forget that that was a purpose and substantially increase the parking supply and you get twice as many vehicles trying to use it, then they're going to be traveling six miles an hour again. I hope that that's not gonna happen. I think too much money has been invested. There's too much to gain from having smooth flow.

So I'm hoping that what we'll see is a husbanding of this resource, recognition that these aren't things that you can do frequently. They're too expensive and too complicated and this has got to last a very long time. I think what that means is major continued attention to improving the public transportation system so that it's the primary way of getting into the city and that the roadways are really for those trips that have to be made on rubber tired vehicles. I think if you keep it in that balance, I think practically speaking, this is the last big highway construction that you're going to see in the center of Boston for at least a half a century. Other than replacing some other facilities that are reaching age limits, I think basically this is it and we need to make it last by really prioritizing the use of public transportation. So I sort of end where I begin. This project is really -- it looks like a highway. It's the biggest highway construction in United States, but it comes out of what was called the anti-highway movement that comes out of a view that what's really needed to make the city function is upgrading our public transportation system and within that context, I think it's going to work fine.