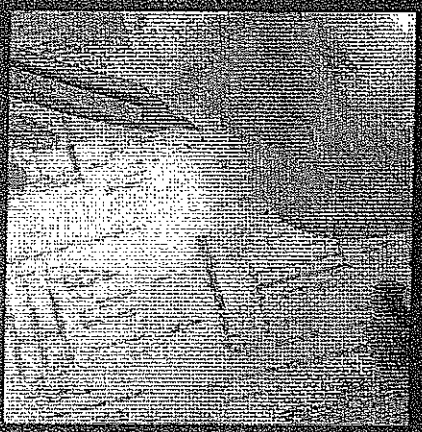

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You know time is money, too. I think the PLA jobs—at least the one hundred percent union jobs—are better scheduled and usually come out ahead of schedule, and I think because of that there is a lot of value added.

An interviewee in the West offered an interesting take on PLAs and costs:

When the union brought the PLA to me, I didn't like it. I don't like anybody dictating what the terms of my project should be. But after I stepped back and talked with other people and after re-reading the PLA, I saw the pony in the coral. Low ball bids are not necessarily a great deal. A way-low bid probably means somebody missed something. With the PLA we now have in place, we have a more experienced group of bidders providing a much closer range of bids compared to the mom and pop organizations that were bidding on our projects previously. By law, we have to accept the lowest responsive and responsible bid. [The] mom and pop organizations come in thinking they can take on a major project, and they lose their shirts. Contractors have left. Contractors have been fired. Contractors have gone broke on our projects. Those are things we don't want to get into.

The traditional low-bid approach to awarding public school jobs rewards stupidity. Let's say a project entails three parts—A, B and C. Everybody bids on A, B and C except Stupid. Stupid is stupid, so he doesn't see the third part. So Stupid bids only thinking about A and B. Guess who's the lowest bidder? Stupid! Now Stupid starts the work. The summer goes along. School's coming and the project has got to be completed. Now Stupid sees the third part of the project, but Stupid doesn't have the money to get it done. So Stupid comes to me and asks for change orders. Now he has no business asking for change orders. We could fire him; we could sue him; we could go after his bond. But like I said, school's coming. The kids have to have somewhere to go. So we bite the bullet and pay Stupid his change order. We reward Stupid for being stupid. It's stupid! PLAs cut through this crap by either chasing Stupid out of the game or getting him to pay attention.

"The traditional low-bid approach to awarding public school jobs rewards stupidity...PLAs cut through this crap by either chasing Stupid out of the game or getting him to pay attention."

A Western public sector construction user.

General comments

Construction users in a Midwest city offer a couple of comments that do not easily fit in a category are offered by construction users in a Midwestern city. In the area, a labor/management committee developed a model PLA known as an IMPACT agreement. A hospital and museum official offered us the following comments on the advantages of using the agreement:

Having an IMPACT agreement facilitated a positive partnership between [the medical center] and the subcontractors who worked on our 7th Street campus project. It gave us the assurance of quality workmanship with stringent safety and production standards. We had confidence in a stable, reliable workforce that completed the project on schedule. We were very pleased with the teamwork on our campus and with the benefits gained from our IMPACT agreement.

At [this organization], we know that success is found in uniting the talents of many and building strong relationships. Our IMPACT agreement has been a critical relationship in our effort to build the institute and advance the cardiovascular health of our community. We take pride in being the Quad City's very own health system. Relying on the talents of local people who share a stake in the Quad Cities

only makes sense and has always brought us tremendous results.

The $14 million construction of the museum's IMAX Theater created numerous challenges as we nestled a 38,000 square foot addition between two existing facilities, while continuing to invite the public to participate in a full range of educational programs and exhibitions on Museum Hill. There is no question in my mind that the IMPACT agreement enabled us to achieve our construction time line.

The successful presentation of IMAX films requires a high degree of precision and attention to detail in the construction process. The complex includes a 270 seat auditorium with its centerpiece of a five story-high, seven story-wide flat screen. The talents and dedication of the highly competent workers employed through the IMPACT agreement enabled us to prepare the building to accept the highly technical IMAX equipment. We are assured that the Quad Cities will have one of the finest large format theaters in the nation.

The men and women who worked on this project took pride in their work and shared the excitement of bringing this spectacular new attraction to the region. We look forward to seeing them come back to enjoy the product they created for all of us to enjoy for many years to come. The IMAX Experience will be another point of pride for everyone in the Quad Cities.

Negative comments

Not all comments about PLAs were positive. And, in fact, nearly all interviewees had some criticisms of their use or overuse.

The effect of PLAs on local labor relations

The strongest negative comments about PLAs were not about their impact on construction outcomes, but rather on how PLAs affect local labor relations. Three respondents from a large Midwestern city told a similar of how PLAs had emboldened building trades unions to seek larger than normal bargaining settlements. Since a majority of workers in the area were covered by the no-strike/no-lockout provisions of various PLAs, they did not fear the consequences of a job action and were not, therefore, as willing to compromise their bargaining position. The result was, in the opinions of our interviewees, an overgenerous settlement with electricians that then spread to other trades.

Subsequent negotiations with the plumbers and pipefitters resulted in strike, under local agreements, of seven weeks. Although work continued on PLA projects, it slowed as traveling workers—at the first hint of labor troubles—left the area, making it difficult for the union to staff PLA jobs. Although the owner and employers were able to find sufficient labor, in part by shifting labor from less urgent work, the situation was viewed as burdensome and not in keeping with the commitments made by labor in the PLA.

The interviewees believed PLAs covered too much work in one area. This, in turn, led to greater worker militancy arising from a lowering of the consequences of such militancy. More expensive and more difficult local area settlements resulted.

It should be noted that interviewees mentioned a considerable evolution in labor relations in the area since that problem. The plumbers and pipefitters and Mechanical Contractors Association agreed to use a dispute resolution procedure in place of a strike in future negotiations, and there has been a general mending of relations.

A New England contractors' association representative also noted problems in local labor relations caused by PLAs. His particular complaint was with unions using the grievance/arbitration mechanisms in the PLAs to make gains that might not have been possible at the bargaining table.

An example he gave was of shacks provided to

workers on worksites. A practice had developed in the area of contractors providing such shacks in which workers would take breaks, change clothes, etc. However, the shacks were not guaranteed by the local collective bargaining agreements. When contractors balked at providing a shack on a particular PLA project, a grievance was filed and, an arbitrator determined that the contractors must provide a shack in accordance with established past practice. Our interviewee was convinced that this decision would be used as precedent on future projects.

Since his industry relies on a bipartite employer/union panel, not neutral, third-party arbitration, he feared the imposition of an outside voice on industry practices. The problem would be most pronounced when a majority of work in an area was covered by PLAs.

> *We've got a lot of nonunion shops that do really good work. I wouldn't be doing the community a service if I excluded the nonunion contractors. Sixty percent of our contractors tend to be union contractors. We don't have any problem with unions; we're happier with their work but not with the price. We have to get through our scope of work with very limited funds."*
>
> *A Western construction user*

The effect of PLAs on bidding and costs

A few respondents indicated that they did believe that PLAs raised the costs of projects, particularly by limiting the number of bidders.

A public sector construction user in Connecticut, though generally happy with his PLA-covered project, noted that only one bid had been received on drywall contract and that the job had to be put out to bid a second time.

Two Western respondents seemed most concerned about the effects of PLAs on bid activity and costs. A public sector user stated:

We've got a lot of nonunion shops that do really good work. I wouldn't be doing the community a service if I excluded the nonunion contractors. Sixty percent of our contractors tend to be union contractors. We don't have any problem with unions; we're happier with their work but not with the price. We have to get through our scope of work with very limited funds.

A traditionally nonunion general contractor in a western state, who had just become a signatory contractor, agreed that PLAs reduce or at least change the number of bidders on a project; although, he was more optimistic about their ultimate effects:

Any conditions or restrictions you place on a

Table 2: Positive and Negative Aspects of PLAs

Positives	Negatives
Ensure a steady flow of highly qualified labor	May interfere with local labor relations
Promote on-time completion	May interfere with established methods of dispute resolution
Enhance safety	May result in fewer bidders under certain circumstances
Aid targeted hiring	
Promote training	
Address a range of project needs	

bid will decrease the number of bidders. If you prequalify your contractors, that will reduce the number of bidders. If you go design-build, that will reduce the number of bidders. If you require a certain [workers compensation] experience modification rate to influence safety on the job, that will reduce the number of bidders on your job. And a PLA will reduce the number of bidders on your job. Anytime you reduce the number of bidders on your job, you will increase the [accepted] bid price. But in the absence of a PLA, prequalification, etc. you increase the possibility that you'll get an irresponsible contractor. That means excessive change orders, litigation as the architect and the contractor fight, scheduling problems, inferior work, and increased construction management costs. PLAs are like insurance. An increased bid price is buying insurance against downstream costs.

When is a PLA appropriate?

Most interviewees agreed that PLAs are not appropriate for all types of work. The regional vice president for construction operations for a large, northeast-based, construction management firm, who often counsels clients in PLA use, said that size and scheduling were the two main factors he urged clients to consider when contemplating a PLA. Moreover, he implied that considering the nature of the work was important. In parts of the Northeast, for example, it is difficult to find nonunion contractors capable of doing certain types of work (e.g. site excavation and iron work). When, on a large project, it is inevitable that much of the basic work would go union, this construction manager advises clients that a PLA makes sense.

Although a PLA would require all contractors to operate in accordance with collective agreements, problems that might arise by having both union and nonunion contractors on a site will be forestalled, and the construction user might, along the way, gain some important concessions. A contractor's association representative also offered that there is "too much conflict on hybrid jobs" to make them worthwhile on large projects where most of the work will go union anyway.

A midwestern respondent offered that PLAs are not a good idea when there are not a sufficient number of union contractors capable of performing the required work in an area. The danger of receiving too few bids under such circumstances is too great.

Although different interviewees suggested different parameters, generally PLAs start to make sense when projects are at least in the five to ten million dollar range. Further factors include the complexity of the work, how tight a schedule the construction user is on and how high the likelihood of essential work going union anyway. According to our interviewees, when such conditions exist, PLAs make sense. Otherwise, the recommend open bidding and construction under area agreements.

Improving PLAs

Now that PLAs have reached a level of maturity and, to an extent, standardization, interviewees did not offer many comments on how PLAs could be improved. But not surprisingly, contractors and contractors' association representatives saw the most room for improvement. The improvements they sought were principally in the ways most PLAs are negotiated. Currently, contractors usually have no formal role in negotiations, which are conducted between the building trades unions and a representative of the construction user, generally a construction manager. As mentioned, the construction manager must be a construction employer under the definitions of the National Labor Relations Act, but most prime and subcontractors, as well as their associations, have no role at the table.

Occasionally, it is clear that the contractors have had input into the process. A Michigan PLA, for example, excluded grievances arising in the electrical and sheet metal industries from the PLA's grievance/arbitration machinery in deference to the bipartite arbitration panels in those industries.

The improvements interviewees sought were principally in the ways most PLAs are negotiated. Currently, contractors usually have no formal role in negotiations, which are conducted between the building trades unions and a representative of the construction user, generally a construction manager.

Where such exclusions do not exist, however, contractors and particularly association representatives are put in a bind. First, their members are clearly bound by the provisions of PLAs. However, since the contractors' associations are not signatory to the PLA, they do not have standing in the grievance/arbitration process and cannot offer full representation to member contractors as a party to the agreement. A further problem is that some PLAs exclude per capita payment to the types of administrative funds that support the involvement of associations in the process.

One possible solution is the development of PLAs through multicraft, multiemployer labor/management associations similar to the National Maintenance Agreements and the IMPACT agreement mentioned above. In fact, in a number of areas, labor/management committees are the main vehicle for developing and promoting PLAs. In such cases, the contractors have a forum to make sure that their concerns are brought into any PLA negotiations.

4. Bidding and Costs

The bidding research compares projects in the East Side Union High School district of San Jose, California with the San Jose Unified School district. The former used a PLA on a series of school construction projects while the latter did not. The research on costs examines 108 school construction projects in New England.

We find that the use of a PLA neither lowers the number of bidders nor increases costs when other important variables are taken into account.

The results show the use of a PLA neither lowers the number of bidders nor increases costs when other important variables are taken into account.

Bidding behavior

The East Side Union High School district in San Jose is responsible for the education of 24,000 high school students. A neighboring district, the San Jose Unified School district, enrolls 32,000 students ranging from kindergarten through high school. In March 2002, voters in both districts approved bond issues for school construction, repair and renovation. The East Side vote allowed the district to borrow up to $300 million. In San Jose, the vote capped borrowing at $429 million. In 2004, the East Side district entered into a PLA with the Santa Clara and San Benito Building and Construction Trades Council. The San Jose district chose to build without a PLA.

The different decisions of the districts with regard to a PLA provided the perfect ingredients for a naturally occurring experiment. We can compare bidding behavior with the East Side district before and after the implementation of the PLA, and we can compare across districts.

There were 21 projects in the East Side district bid under the PLA and 35 projects bid during the same period without a PLA in the San Jose district. Also, there were 12 projects bid prior to the PLA agreement in the East Side district and 96 projects in the San Jose district during the same period. In sum, there were 164 projects, 21 of which were built under a PLA.

The East Side and San Jose districts are adjacent and, therefore, within the same construction market. The time is also the same. However, there are two potentially important differences. The East Side projects were, in dollar value, approximately two to three times larger than the San Jose projects both before and after the use of PLAs. Also, the two districts employ different bidding procedures. The East Side district favors hiring a single prime contractor, who then seeks its own subcontractors, while the San Jose district treats specialty contractors as individual prime contractors.

Statistics indicate that the East Side district received, on average, fewer bidders per bid opening than the San Jose district (approximately 4.5 versus approximately 4.0). This result would be consistent with the findings of those who argue that PLAs reduce the number of bids on a project, except that the result holds for both before and after the implementation of the PLA. In fact, the difference between the two districts decreases after the acceptance of the PLA. Further, there was a drop in the number of bidders across both districts over the

time period. This decrease may be associated with an increase in construction activity in the area at the time. Bureau of the Labor Statistics data for the San Jose-Sunnyvale-Santa Clare area show more employment in construction during 2004 than in 2003. Assuming that this statistic reflects more construction activity, fewer contractors would be willing to bid the projects than if they were experiencing a slack period.

The small difference in the number of bidders both before and after the PLA across districts is likely tied to the differing methods of construction management. The San Jose district favors separate prime contracts on specialty work. Since there are more specialty than general contractors in most construction markets, that fact alone may account for more bidding activity.

One way to find out what the effects of all these possibilities are is to place a number of variables in a multiple regression model.[23] In doing so, the only statistically significant variable that predicts bidding behavior is business cycle. In the period that construction activity increased, the number of bidders per bid opening decreased. Most notably, the results of the study indicate that the presence of a PLA has no statistically significant effect on the number of bidders per bid opening.

Costs

Whether PLAs increase or decrease the number of bidders is probably of little interest to those who ultimately pay for construction projects. What is of keen interest is whether PLAs increase, reduce or have no effect on project costs. In examining 108 school projects in New England, ten of which were built with PLAs, the presence of a PLA does not have a statistically significant effect on the final cost of a project. The research on costs is modeled closely after several studies done by the Beacon Hill Institute (BHI) at Suffolk University in Boston. In 2003 and 2004, BHI produced reports on the effects of PLAs on school construction costs in the Greater Boston area and in Connecticut. Their original study found that PLAs increased construction costs by 17.3% (or $31.74 per square foot) in the Boston area. A subsequent study, which corrected several problems in the first, lowered the estimate to about 12% (or $16.51). In extending the research to Connecticut, the researchers found a PLA premium of $30.00 per square foot.[24]

Similarly, the research includes a model, predicting costs on 108 school projects in New England. Studying schools has several advantages. First, there are more schools than, say, power plant projects in an area, which allows us to have enough observations within a relatively homogenous construction market. Further, while by no means identical, schools are enough alike to provide a basis for meaningful comparison. Finally, there are both public and private schools, which allows us to examine both private and public construction.

Returning to the BHI studies, there were a number of problems with the research. But the main complaint is with the presumption stated in the following paragraph:

> Clearly, other factors also influence the cost of construction—the exact nature of the site, the materials used for flooring and roofing, the outside finish, and the like. As a practical matter, collecting viable information at this level of detail for all 126 projects, would be impossible. Thus, our equation necessarily excludes these unobservable variables. However, this does not undermine our finding of a substantial PLA effect. For the PLA effect shown here to be overstated, it would have to be the case that PLA projects systematically use more expensive materials or add more enhancements and "bells and whistles" than non-PLA projects. Our conversations with builders, town officials and architects suggest that PLA projects are not systematically more upscale.[25]

The BHI researchers dismiss the possibility that PLA projects have more amenities or are more complex than non-PLA projects. Such factors, however, determine why projects are built with PLAs in the first place. To hold otherwise is to ignore prevailing public policy. In many states—particularly in New England—court decisions require public owners to establish the need for a PLA before using one. The size of a project, its complexity and the need for timely completion are all variables that must be considered.

Since the BHI researchers do not believe that PLA projects are "systematically more upscale" they included very few variables in their models that could affect construction costs. Other than whether a PLA had been used, they controlled for little more than the size of the project in square feet, whether a project was new construction or a renovation and, in the Connecticut study, the number of stories and if the project involved an elementary or high school. The methodological problem with such a lean specification is that effects are attributed to the presence of a PLA when they actually result from some unobserved variable or variables.

Finding detailed information for a large number of construction projects is very difficult work. However, we were able to find information—through speaking with architects, construction managers, school department officials, etc.—on thirty variables across the 108 projects in New England.

The descriptive statistics alone tell us that PLA-covered projects are inherently different than non-PLA projects. For example, the average square footage for a PLA school is approximately 157,000 while a non-PLA school is close to 118,000. PLA schools average more than three stories while non-PLA schools average fewer than three. All the PLA projects required prior demolition work, while less than half of the non-PLA schools required such work.

Using the data we assembled, we created a multiple regression model.[26] The dependent variable is the logarithm of the final cost of a project. Using the logarithm of final cost rather than final cost itself allows us to interpret the effects of the independent variables in percentage terms.

When we enter all the variables in a regression equation, we find that significant positive effects are associated with the size of a project (i.e. square footage), whether the building is an elementary school, the construction of an auditorium, cafeteria or kitchen, whether the roof includes both low and steep pitches, and whether the project was located in an urban area. While our model suggests that a PLA adds 7.8% to project costs, the result is not statistically significant. In fact, the PLA variable is so weakly predictive, that the actual effect could range anywhere from -14.4% to 29.9%.

The inherent difficulties in this type of research—identifying the labor relations practices on projects, gathering information on building amenities, materials and aspects of design, etc.—make it unlikely that large samples can ever be used. But small samples, such as the ones by BHI and this one, have a number of problems. Perhaps the main problem is that they can be very sensitive to outlying values. One or two projects that are very different from the majority can skew results. Therefore, results need to be interpreted with caution.

Nonetheless, our conclusion is that the additional costs observed on PLA projects by previous researchers likely have little to do with the PLA itself, but result from the additional amenities or requirements that are inherent in large, complex jobs, which are more likely to be covered by PLAs. We find no strong evidence that PLAs affect final costs either positively or negatively.

To conclude, if PLAs are, in fact, cost neutral, then more attention must be paid for other outcomes that can be achieved with PLAs, such as timely completion, better safety outcomes, training opportunities and industry recruitment. The next chapter investigates some of these issues through case studies of four projects, each of which had distinctive requirements.

5. Case Studies

The following case studies demonstrate how PLAs can be used to address different essential needs. Here, four projects take focus: Route I-15 in Salt Lake City, the Toyota plant in San Antonio, an airport terminal in Rhode Island, and a series of high school projects in San Jose. As we will see, each project was distinctive, with the PLA used in a creative way to address a specific need.

- The Route I-15 project was a critical highway reconstruction needed to support the 2002 Winter Olympics in Salt Lake City. The challenges included getting the project done on time in an area with a very tight labor market. Political concerns over the use of a PLA also had to be addressed.
- Although nonunion at nearly all of its American parts' and assembly plants, Toyota uses PLAs for its construction. This fact, however, proved controversial in San Antonio, where construction is so lightly unionized. Extremely unusual for a private sector PLA, the Toyota San Antonio PLA includes strong accommodations for nonunion contractors and workers.
- In the mid-1990s, the State of Rhode Island replaced the outdated terminal at T.F. Green Airport, which services Providence. A key challenge was completing the project while keeping the airport in full operation. With the help of creative scheduling options in the PLA, the terminal was completed ahead of schedule.
- The East Side Union High School District in San Jose features many specialized vocational academies and programs. With the approval of the $300 million school construction bond issue, the district saw an opportunity for experiential learning and, through a PLA, created the Construction Technology Academy.

Route I-15 in Utah

On Friday, June 16, 1995, Salt Lake City was selected to be the site of the 2002 Winter Olympics.[27] For the games to begin, much had to be done, not the least of which was the complete reconstruction of a seventeen mile freeway bisecting the Salt Lake Valley.[28] Olympic organizers and state officials agonized over the traffic tie-ups associated with a reconstruction project that would rebuild 130 freeway bridges, demolish and rebuild the main freeway interchange in the city connecting I-15 with I-80 and "chop up and replace every cubic inch of asphalt and concrete" for seventeen miles in the heart of the urban Salt Lake area.[29] Worse than a traffic nightmare, many

Worse than a traffic nightmare, many feared not being done in time. The Utah Department of Transportation (UDOT) estimated that the reconstruction of I-15 could not be completed until after the Olympics in 2002 and probably would not be done until 2004. Then-Governor Mike Leavitt later recalled: "I told [Tom Warne, Executive Director of UDOT], 'Tom, we've got to find a way to do this faster. We cannot have this community torn up for nine years.'"

feared not being done in time. The Utah Department of Transportation (UDOT) estimated that the reconstruction of I-15 could not be completed until after the Olympics in 2002 and probably would not be done until 2004.[30] Then Utah Governor Mike Leavitt later said, "I told [Tom Warne, Executive Director of UDOT], 'Tom, we've got to find a way to do this faster. We cannot have this community torn up for nine years.'"[31]

UDOT's solution to this dilemma was to invoke an innovative form of construction—design build—which would hopefully allow the reconstruction project to be completed prior to the 2002 Olympics without completely shutting the I-15 corridor for years. Using design-build meant that construction could begin prior to a complete and detailed design and specification of the overall project. UDOT engineers would provide general guidance, but competing contractors would be free to develop their bids using innovative materials and procedures aimed at speeding construction and reducing costs.[32] At the time, estimates of the cost of the I-15 reconstruction project were at one billion dollars indicating that UDOT thought the design-build approach would save about ten percent on total costs along with cutting construction time by about two years.[33]

Under design-build, construction could be scheduled to begin in early 1997. Contractors would be expected to work around the clock, six or seven days per week. There would be limits on how many lanes could be closed at any given time as well as how many interchanges could be closed.[34] Design-build was particularly cost-effective on large projects but some felt that inevitably out-of-state contractors would be awarded the project. Local contractors were not equipped to handle the scope of work proposed, particularly the engineering required of contractors on a design-build project. However, Warne said that contract language for the I-15 project would stipulate that Utah construction companies would be named as subcontractors.[35]

In September 1996, UDOT prequalified three contractors from a field of ninety that responded to the announcements in March. By September, the project had expanded to include an additional interchange at the north end of the reconstruction project and the relocation of some railroad tracks near the project. The official cost estimate had risen to $1.36 billion due to these additions and other considerations. On March 26, 1997 UDOT announced that Wasatch Constructors (a consortium led by Kiewit Constructors of Omaha and which included several Utah companies) had won the bid.

With design-build, the lowest bidder does not always win the project. UDOT was using a "best-value" approach that combined cost considerations with technical and quality considerations to receive the best bang for the Utah taxpayer's buck.[36] Warne later said that the "I-15 design-build contract was given to the best overall proposal, not the lowest bid."[37] However, Wasatch Constructors had coincidentally come in with the lowest bid.

Wasatch officials indicated they planned to begin immediately. "You have to remember this job isn't even designed yet," said Conway Narby, principal on site for the winning consortium.[38]

With groundbreaking coming within a month of the bid opening and a project-completion deadline of August 2001, this 17 mile reconstruction was a fast-track project. If Wasatch could complete its work on-time and complete it to UDOT's satisfaction, Wasatch stood to win up to $50 million in bonuses. If Wasatch exceeded UDOT's deadline of November 2001, just before the 2002 Winter Olympics, the company risked paying UDOT up to $100 million in fines. Also, Wasatch had to guarantee its work. According to the contract, UDOT could take a default one-year warranty on the project or force Wasatch to cover all road maintenance for ten years for a fee of $27 million. UDOT reasoned that this potential warranty at UDOT's option would focus Wasatch Constructors on qual-

ity as well as speed. In short, Wasatch had won because it had the experience to do what it said it would do including designing on the fly while building on time and within budget.

Ed Mayne, president of the Utah AFL-CIO, was very pleased that Wasatch had won the bid. He felt that Wasatch was the most union-friendly of the three pre-qualified bidders. Indeed, prior to bidding the project, Wasatch had secretly signed a PLA with six local unions agreeing to a uniform set of wages, benefits and work rules that largely corresponded to local union collective bargaining agreements. This agreement was not made public prior to the bid opening because the PLA was part of Wasatch's bidding strategy. Building a fast-track project under design-build, in a tight labor market, with substantial performance awards and penalties in play, involved considerable risks for Wasatch. The PLA was one means of controlling some of those risks—the ones associated with the supply and quality of labor.

Mayne felt the PLA provided another advantage. Just as it was politically wise to require outside general contractors to partner with local subcontractors, it was also politically sensible to encourage local employment on the biggest public project ever financed by Utah tax dollars. Mayne anticipated that the consortium would hire seventy to eighty percent of its workforce locally despite Utah's 3.1% state unemployment rate at the time of the bid award. Narby, the person who signed the PLA for Wasatch, agreed that eighty percent local hire was possible particularly if participating nonunion contractors hired locally.[39] The PLA did not prohibit nonunion contractors, and ten percent of the value of the work was exempt from the provisions of the PLA. But if nonunion contractors from out of state brought in their traveling labor force, the amount of local hiring would go down. Union contractors both in-state and out-of-state were required by the local collective bargaining agreement to give preference to local workers over travelers. However, local labor shortages loomed as a problem for all contractors.

By early 1997 when the project was to begin, the Utah construction industry had been booming for seven years (since 1990). While construction accounted for just under four percent of total Utah state employment in 1990, by 1996 construction accounted for 6.5% of all state civilian, nonagricultural employment. Furthermore, construction employment had been growing in absolute terms at over ten percent per year for each year from 1990 to 1996. While Utah's construction's growth rates peaked in 1994, its share of total state employment would not peak until 1999. I-15 was going to be rebuilt during a period of labor shortages and Wasatch Constructors saw that coming.

The *Salt Lake Tribune* reported at the beginning of the I-15 project that:

> *[Wasatch Constructors] has to find some 1,000 to 1,500 skilled highway construction workers in a state where the unemployment rate is so low that even unskilled jobs in hamburger joints go begging to be filled. "It is hard to say where they are going to find the workers," says Ken Jensen, chief economist for Utah Job Service. "I am not aware of any bunch of workers out there standing in line waiting to climb up on earth movers."*[40]

Estimates of the needed workforce varied. The *Deseret Morning News* estimated 600-1,000 hourly craft workers and 100-150 salaried employees. The *Salt Lake Tribune* estimated 1,000 to 1,500 workers.[41] Several other road construction projects were underway at the time or scheduled to begin, including a light rail project running along the same corridor as I-15. Local highway contractor Richard Clyde, whose firm W.W. Clyde was part of the losing consortium, Salt Lake Constructors, noted that heavy construction workers were already in high demand and stated, "I still do not see where [Wasatch] are going to get all the workers they need without bringing in a lot from out of state."[42]

Having won the contract, Wasatch Constructors announced its PLA with the six key trade unions that were going to complete the project. These unions were the operating engineers (heavy equipment operators), laborers, plasterers-cement finishers, carpenters, iron workers and teamsters (truck drivers). The contract these unions signed with Wasatch was a variant of the heavy-highway construction project agreement used around the country by various highway contractors in conjunction with (typically) these unions—namely the unions that do most of the heavy and highway work. The contract stated in part:

> It is the intent of the parties to set out uniformly standard working conditions for the efficient prosecution of the new construction herein; to establish and maintain harmonious relations between all parties to the Agreement; to secure optimum productivity, and to eliminate strikes, lockouts or delays in the prosecution of the work undertaken by the employer...
>
> The greatest advantage in working with the Unions is the ability of the Employer to acquire an immediate and continuous source of skilled applicants. Within the Unions there exists the capability to activate a recruiting network throughout the United States to ensure a steady flow of skilled applicants to meet project schedules.
>
> The Employer may name hire any individual who has previously worked for the Employer (or any of the individual joint venturers thereof)...[as long as] those hired from "other lists" shall not exceed forty percent of each craft's work force.

This last provision meant that contractors (union or nonunion) could bring onto the project up to forty percent of their own workers (either union or nonunion). In practice, the percentage would likely be smaller because this forty percent limit was applied craft by craft and contractor by contractor. Thus, while one out-of-state nonunion contractor might bring in forty percent outside workers for each craft, an in-state union contractor might name hire few, if any, workers simply taking workers in order from the union hiring hall. Another out-of-state union or nonunion contractor might bring in his skilled crew but take lesser skilled workers from the hall. So the forty percent rule gave contractors flexibility to respond to particular cases but also made it likely that, on average, less than twenty percent of the workers would come from out of state. The unions, in turn, agreed not to discriminate against nonunion workers seeking to be sent out from the hiring hall in this right-to-work state.

> The Unions represent that their local unions administer and control their referrals in a nondiscriminatory manner and in full compliance with Federal, state and local laws and regulations which require equal employment opportunities and non-discrimination.
>
> The Unions agree to engage in active recruitment of minority and female applicants...

The unions also agreed to cooperate jointly with management in enhancing productivity on the job and to forswear any work stoppage:

> The Employer and the Unions recognize the need to continually explore ways and means to increase productivity to enhance the competitive position of the signatory contractors and thereby increase job opportunities for members of the Unions. To this end, signatory contractors and local unions are encouraged to establish Project Productivity Committees to deal with problems affecting job schedules, construction technology, recruitment and similar matters...There shall be a labor-management committee whose purposes are to foster labor-relations communications and to explore ways and means to improve safety, quality and productivity at the jobsite.

> The Parties agree that there is an absolute prohibition against any and all strikes, work stoppages, slowdowns, picketing, sympathy strikes, handbilling or any other forms or types of interference of any kind...There shall be no lockout by the contractor.

An expedited grievance procedure was established for any violation of the no-strike, no-lockout clause. The contract also established uniform work rules, hours, shifts, overtime pay and holidays, including time off for July 24th, a local Utah holiday. Pay scales, including wages and benefits, were set for all craft classifications and these were to be reviewed yearly in July. A section on apprentices stated:

> Recognizing the need to maintain continuing support of programs designed to develop adequate numbers of competent workers in the construction industry, the Employer will employ registered apprentices in the respective Unions. The combined employment of apprentices shall not exceed thirty-three and one-third percent of the individual Union work force...

This meant that the local tax dollars financing the I-15 rebuild would also finance a rebuilding of the skills of the local construction labor force. Finally, subcontractors also were to be covered by this agreement except "the Employer may subcontract up to but not exceeding ten percent cumulative of the final Prime Contract amount to subcontractors...[not] signatory to this agreement or local labor agreements..." Also women and minority subcontractors need not be signatory to the agreement. Thus, the PLA was designed to provide contractors with flexibility permitting contractors to bring in up to forty percent of their own worker while at the same time creating a structure that would likely generate around eighty percent local hiring. The contract required most subcontractors to adhere to its provisions but allowed ten percent of the work to go on outside the requirements of the PLA.

Wastach's Greg Brooks explained part of the rationale for Wasatch signing this agreement: "What we are basically doing is taking Mayne at his word [that he can provide the qualified local labor]. Mayne said, "There is no doubt that we are going to be scrambling, but the seventy to eighty percent [local hire] figure is certainly doable. Each of the major craft unions in the state probably have 100 to 200 apprentices in training as we speak. [Out-of-state skilled workers] are part of the equation. But we are committed that most of these Utah jobs will go to Utah workers."[43] Brooks indicated that Wasatch's policy was: "We'll hire locally and buy our supplies locally. Any time we can't, we'll bring whatever we need in from other sources in the region. If that's not enough, we'll go further out."[44]

Ground broke on the I-15 project on April 15, 1997, but the political ground began to break out from under the PLA almost immediately thereafter. On May 2, under the headline "Does the I-15 Union Deal Violate Utah Law?" the *Deseret Morning News* reported that Republican Governor Mike Leavitt was asking his Democratic Attorney General Jan Graham for a legal opinion on whether the PLA violated Utah's right-to-work law.[45] The *Deseret Morning News* reported:

> Nonunion workers can apply and get Wasatch jobs, and they can do so without dealing with any union. But the reality is most applicants will go through union hall doors to get those jobs, and they will certainly be solicited to join the union in the process. And that is what worries some conservative lawmakers who don't want any Utahns pressured to join a union in order to get an I-15 job.[46]

In actuality, there were several avenues besides union hiring halls for obtaining work on I-15. Anyone who had worked for any contractor working on the project could work for that contractor again by applying to that contractor directly, assuming the forty percent threshold of workers

not coming from hiring halls had not been breached. Nonunion contractors were exempt from the provisions of the contract for ten percent of the work while additional nonunion workers could come with their nonunion contractor under the provisions of the PLA. However, Utah legislators were deeply concerned.

State Transportation Commission chairman, Glen Brown, brother of Utah House speaker, Mel Brown, stated, "We're hearing people saying 'We can't live with [the hiring aspects of the PLA].'" Speaker Brown, himself, stated that if the attorney general's opinion found conflict between the PLA and Utah's right-to-work law, "there is significant support to renegotiate the [labor hiring] part of the contract." But the Deseret News reported that several Republicans worried that the attorney general would side with the unions rather than interpret the right-to-work law as prohibiting the agreement.[47] Senate Majority Leader Craig Peterson indicated that it might be necessary to call a special legislative session to revise state law to prohibit this type of contract. Legislative Attorney Gay Taylor said lawmakers could refine existing law to prohibit unions from having a monopoly in specified situations perhaps forcing Wasatch to renegotiate its contract. Governor Leavitt, stating that "Two heads are better than one," sought legal opinion from lawyers not in the attorney general's office.[48] Senate President Lane Beattie argued:

> *We may not be able to change [the current agreement]. But we can act to make sure this will never happen again. Unions may think they have manipulated the system and made a great step forward. But we are not a union state and won't become one, and they may have just ended up taking a great step backward.*[49]

Wasatch defended itself by restating its belief that the agreement was the best way to ensure the project was completed on time and done well, while focusing hiring on local construction workers. Narby said:

> We work in other right-to-work states like Arizona and Florida under these same kind [of agreements]. Perhaps it was naive of us, but we wanted to ensure enough quality, skilled craftsmen to build this job. And in (other states) working through the unions provided that. Also, we wanted Utahns on this job, and this is a way to do that.[50]

In a clarification of the contract, Wasatch and the six unions agreed that workers could apply directly to Wasatch for employment or to Utah Job Services, the state labor market agency. The state directed UDOT to audit hiring practices specifically monitoring local hiring policies. Furthermore, UDOT would appoint ombudsmen to handle complaints associated with hiring on the I-15 reconstruction.

Senate President Beattie said he was satisfied with this arrangement and would not try to have the legislature called into special session:[51] "You can go through the [union] halls to get a job, but you won't have to. There will be another way," Beattie declared.[52]

At this point, the attorney general's office bowed out of the dispute: "It looks like they've settled all disputes," said Reed Richards, chief deputy attorney general. "If both sides are happy, and my understanding is that they are, then there's no point for us to continue."[53]

With daunting logistical and engineering tasks in front of it and significant economic carrots and sticks at stake, Wasatch Constructors began the demanding task of operating and rebuilding I-15 at the same time, with the design of the project being a work in progress, and with the clock running. Almost immediately labor shortages loomed. "Utah is a tight labor market, no doubt about it," Brooks said. He said, however, that the I-15 project was attractive because it had plenty of work, and it paid union wages to union and non-union workers alike.[54]

Wasatch Project Manager, Bill Murphy, said, "The magnitude [of the project] does get to me sometimes, [but] I-15 will be built, on time and on budget. I have no doubt." Narby, the top Wasatch executive on the I-15 site, said "I know people, and I know what they can do. I only worry about what I cannot control: the weather, for example. Please give me three mild winters."[55] The fact that the PLA required both union and nonunion contractors to pay union wages gave Narby and Wasatch a degree of control over their labor challenges in a tight construction labor market. Scheduling might be pushed back by weather or other factors Wasatch could not control, but the PLA made labor a more reliable and controllable construction input.

Wasatch's PLA labor strategy and UDOT's design-build strategy began to pay off for the contractor and the state within six months of ground breaking. UDOT's first project evaluation covering essentially the first six months of work, April 15 to October 31, 1997, led to the decision to grant Wasatch $2,490,133 of the possible $2,500,000 in bonuses for this stage of the project. The *Deseret Morning News* reported:

> In announcing the award amount Friday morning, UDOT officials had nothing but good things to say about the contractor. And Wasatch officials were obviously pleased that they had earned the bulk of the money they were shooting for.[56]

UDOT inspected the I-15 project on a daily basis, using dozens of UDOT employees and consultants as monitors. Each month, UDOT and Wasatch jointly reviewed the daily inspections and a score was assigned to each category of evaluation. UDOT's Warne said:" This is a lot of money, and because of that, there is a very rigorous process in place [for evaluating Wasatch's work] that we've developed over the last six to eight months. The process was reviewed by a task force established by Governor Leavitt, [Senate President] Lane Beattie and [House Speaker] Mel Brown."[57]

As the reconstruction progressed, Wasatch continued to score well in UDOT's semi-annual evaluations. At the end of the next six month review period, Wasatch received the full $5 million bonus possible for that period. Warne said: "The full award fee for Wasatch during this period is a reflection of what we've been saying all along—that they are ahead of schedule, they are on budget, the quality is good and they have the management system in place to deliver the project...I certainly think that the first couple of periods are the most challenging, while they're getting up and running and putting their organization together. I think this is a good indication they might just win or earn all or most of the award fee [of $50 million for the entire project]."[58]

UDOT, however, was careful to point out that these bonuses were actually Wasatch's possible profit on the project. Essentially, Wasatch won the bid by not including any (or much) profit in their bid price anticipating that by doing the project right they would earn UDOT's bonuses and that would be most, if not all, of their profit.[59]

Wasatch continued to meet UDOT's goals and continued to receive almost all of the potential bonuses available under the contract. In May 2000, the *Salt Lake Tribune* reported:

> Wasatch Constructors continued breezing through its Interstate 15 construction schedule last year and lost only $14,000 of a possible $5 million profit for the six month period ending in October [1999]...The contractor lost money for overlooking incorrectly placed beams that needed to be replaced on a 400 South bridge abutment in Salt Lake City, and for an incident last August when a drainage grate on the road popped loose and caused a multi-car accident. The award means that in its first 2? years on the job, Wasatch took home roughly $22.4 million of a possible $22.5 million [in awards]."[60]

With I-15 very close to completion in April of 2001, ahead of schedule and well ahead of the

Winter 2002 Olympics, John Bourne, UDOT project director said, "We believe we've got very good quality. We'll see some little dings and nicks that will be replaced," but he expected these problems to be resolved by the completion of the project. With seven of the nine award-fee evaluations completed, Wasatch had received from UDOT 99.6% of the possible bonuses from the timely completion and successful inspection of its work.

According to the original contract Wasatch had to guarantee the quality of its work for up to ten years after completion with the state paying $27 million for this insurance.[61] But UDOT had the option of declining the insurance if it thought the quality of the project was sufficiently solid that the anticipated ten-year maintenance costs would be less that $27 million. That was the dilemma UDOT managers faced in the Spring of 2001 as the project came to completion.[62]

In April of 2002, the I-15 reconstruction was declared the top civil engineering achievement of the year by the American Society of Civil Engineers (ASCE). "The I-15 project contributed greatly to Salt Lake City's ability to stage a successful 2002 Winter Olympic Games and will continue to serve the area for years to come," said ASCE President H. Gerald Schwartz, Jr. "The Interstate exemplifies the ideals of innovation, technical excellence and community benefit."

Warne concluded, "We've been out there day in and day out. We've inspected all their work and felt very good about the quality." He predicted that some work would need to be redone, but there were none of the classic signs of poor quality. UDOT therefore decided to decline paying $27 million for 10 years of maintenance guarantees because Warne concluded, "We anticipate spending perhaps half that much on maintenance."[63] Kay Lin Hermansen, Wasatch spokesperson, said, "It's kind of a compliment to us because the [guarantee] provision was put into the contract to protect the state and the people, and we've obviously delivered a very quality project."[64]

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The primary reason I-15 was completed on time was because the project was bid design-build. This allowed the reconstruction to begin prior to the completion of a full set of engineered specification for the work. The greatest threats to the timely completion of the project were factors that could not be brought under the contractor's control. Weather, therefore, was a major concern. Labor supply in tight labor markets was also a concern. But Wasatch brought that factor under control through the implementation of a PLA. This meant that all work on the project whether by Wasatch on any of its many subcontractors would be relatively attractive to workers within a growing and tightening construction labor market. I-15 construction contractors and subcontractors would have their pick of the labor market. It was a labor market version of guaranteeing three mild winters.

Also, the PLA meant that the majority of workers would be local hires so that the benefit of the higher wages would primarily redound to Utah citizens. Given that Utah tax payers were paying for most of the bill for the project, this local hire component had a feeling of fairness about it. Also, there was a certain symmetry with the explicit requirement that the general contractor partner with local construction companies. Significantly, these benefits clearly did not come at additional costs to Utah taxpayers.

The fact remains that Wasatch Constructors was the low bidder on the project. The alternative

two construction consortiums were not intending to use PLAs. They, therefore, may have been intending to pay their workers less than local union rates, and their bids may have reflected that. Wasatch calculated that even though they might have higher hourly wage rates than their competitors, the ability to lure the cream of the crop out of a competitive labor market would facilitate on-time scheduling at a lower (or at least equivalent) cost and with fewer construction defects. Salt Lake Constructors came in only one percent above Wasatch, so it is difficult to claim that the I-15 PLA substantially lowered the project's cost. But the PLA clearly did not raise the cost.

Many studies attempting to assess the effects of PLAs on construction costs compare project costs on two or more different projects. While informative, these studies always must confront the problem of comparing apples to oranges. Very few construction projects are exactly alike. Cost differences might easily be due to something other than whether or not the project has a PLA. But in the case of I-15, we have a true apples-to-apple comparison. Wasatch was going to use a PLA. In fact, prior to bidding on the project, Wasatch had signed a preliminary agreement with the local unions. Salt Lake Constructors and Lake Bonneville Constructors bid on the project without having arranged for a PLA. All three companies were bidding on the same project, and the PLA contractor came in lowest. Wasatch's lower bid may in part have been due to superior engineers, better previous experience or other factors. But implementing a PLA was part of their game plan—namely controlling the supply and quality of labor in order to enhance the contractor's ability to deliver a quality product on time.

Toyota assembly plant in San Antonio

Much of the current controversy over PLAs concerns the public sector. PLA use in the private sector goes largely unnoticed because there are far fewer legal issues and usually less politics than with public projects. For the most part, private construction users can attached whatever stipulation they chose to their projects. However, the fact that so many large private firms, which exist in competitive business environments and are, therefore, very cost conscious, choose to build with PLAs perhaps says something about their benefits.

Toyota is among the leading worldwide automotive manufacturers. During the past forty years, it has moved from being a domestic Japanese firm to a global producer of automobiles and trucks with a substantial presence in North America. In 2004 it produced almost 2.3 million autos and trucks in North America and had a cumulative North American investment of $16.6 billion.

Much of its success has come from its development and implementation of the Toyota manufacturing system.[65] This method, the original lean production model, has become the standard for producing high quality products at low unit costs. Now nearly all successful manufacturers emulate the kanban (pulled production) and kaizen (continuous improvement) methods pioneered at Toyota. The success of the system is reflected in the high consumer satisfaction with Toyota products and a pattern of repeat purchases. The rising demand for Toyota products in North America has lead the company to build four assembly and six parts plants in the United States, Canada and Mexico since 1986. The assembly plants are located in Kentucky, Indiana, Ontario and Texas. The parts plants are in West Virginia, Alabama, British Columbia, Missouri, California and Baja California. There is a joint venture assembly operation between Toyota and General Motors in Fremont, California, the so-called NUMMI (New United Motor Manufacturing, Inc.) plant. With the exception of the NUMMI plant, Toyota production employees are not represented by unions.

Despite the lack of union presence within the firm, all of the Toyota manufacturing facilities in

the United States have been built under PLAs between Toyota, the AFL-CIO's Building and Construction Trades Department and the local unions within whose jurisdictions the projects have taken place. In all, 36 million work hours have been done under the Toyota PLAs. The success of the relationship between Toyota and the building trades unions, and the utility of the PLAs, is reflected in the completion of numerous green field projects and expansions of those projects on time, without interruption and without even a single arbitration decision in the nineteen years in which Toyota has used the agreements.

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A closer look at the dynamics of the Toyota PLA illustrates how it has developed and been adapted to the needs of various projects. We focus on the most recent green field Toyota plant in San Antonio. This plant, which is scheduled to begin yearly production of 150,000 Tundra pickup trucks in 2006, has a projected cost of $800 million and has been the highest valued construction project in Texas for the past two years. The project will require 2,100 construction workers at its peak. The project has six prime contractors and as many as 300 subcontractors. Project management is being provided by a joint venture between Waldbridge-Aldinger, a Detroit firm with considerable experience in the construction of automotive facilities and Bartlett Cocke General Constructors, a San Antonio company.[67]

The San Antonio project presented a number of issues in adapting the PLA to local conditions. First, Texas's right-to-work law is particularly unfavorable to organized labor. The law prohibits both union membership and agency fee payment as a condition of employment, and it also disallows maintenance of membership clauses, which prohibit resignation from a union during the life of a contract. Texas law holds that union members may resign at any time.

A second issue was a requirement to employ a substantial number of individuals from the San Antonio metropolitan area, Bexar County and the surrounding ten counties. Although Toyota's $133 million public subsidy was smaller than that provided for other recent automotive manufacturing plants in the South, a substantial share came from the City of San Antonio and regional bodies. The local subsidies included $15 million for a rail spur to the plant, $27 million for job training and $24 million for site purchase and preparation. In exchange for the subsidies, Toyota agreed to employ local residents on the construction project. As the San Antonio area has relatively low union density in construction—by some estimates 95 percent of construction workers are nonunion—the use of a PLA required balancing the need to use local workers with the use of union labor (not unlike the Utah project described above).[68]

Finally, and also related to the modest union presence in San Antonio, the local construction industry actively lobbied against the PLA. For example, Doug McMurty, the executive vice president of the San Antonio chapter of the Associated General Contractors (AGC), said:

> It's very early and there have been a lot of rumors circulating. But what we're most concerned about is that Toyota will discriminate against nonunion firms. Our concern comes from the fact that 95 percent of the workforce here has chosen to be nonunion. I don't know that Toyota fully understands that yet, and I can't believe it would be their intention to discriminate against 95 percent of the workforce in San Antonio.[69]

The AGC and individual construction firms requested that city and county authorities broker meetings between Toyota and area general contractors to discuss the use of a project agreement. At various times it appeared that Toyota had decided against using a PLA for the project.[70] But despite such rumors, Toyota negotiated a PLA adapted to the conditions in San Antonio, and the agreement was signed on June 18, 2003. Jim Wiseman, vice president of external affairs for Toyota Motor Manufacturing North America stated:

> Toyota has been using this type of agreement on all its U.S. construction projects since the late 1980s. Those projects have been very successful, been completed on time and within budget, and we wanted to do it in Texas.[71]

The Toyota PLA was adapted to the needs of the Texas project with modifications that favored the employment of San Antonio residents by making it easier for nonunion firms to bring their core workers onto the project and by altering the benefits payments language to eliminate the possibility of double obligations.

A major issue for the project was the promotion of local hiring. Under the Toyota PLA, local unions are given 48 hours to refer a qualified resident of the San Antonio area. If they are unsuccessful, a contractor may hire its own local resident, who would then register with the union hiring hall. If the contractor is unsuccessful in locating an area resident within 48 hours, the union could refer any qualified worker without regard to the residency requirements. If the union were unsuccessful in referring a worker within 48 hours, the contractor could hire from any source.

A second issue was providing conditions, which made the project attractive to nonunion contractors. A frequent complaint by nonunion contractors is that they must use the union referral system and cannot bring their own workers to a PLA-covered project. This disrupts their organization and reduces their efficiency. To address this concern, the Toyota PLA specifically allows nonunion employers to use core employees who are San Antonio area residents without referral by a union. Core employees must possess necessary state or federal licenses for their work, have been on the contractor's payroll for sixty of the one hundred working days prior to the contract date for the Toyota project and have the ability to safely perform the basic functions of their trade. Employers are required to provide a Toyota representative satisfactory evidence of qualifications of core employees at the request of the union having jurisdiction over the work. Additional employees used by nonunion employers are hired in accordance with the referral process outlined above. This type of arrangement, sometimes referred to as a drag-along clause, allows nonunion employers to retain their core workforce while protecting the unions' interests in seeing their own members hired.

A further complaint about PLAs by nonunion contractors is that they require double payments of benefits: The nonunion contractors must support their own healthcare and pension plans while, at the same time paying into the union sector's joint funds for work on PLA-covered projects. The Toyota PLA allows nonunion contractors to divert the benefit payments required under the PLA into their own firms' pension, retirement, annuity, health and welfare, vacation or apprenticeship programs. To qualify, the employee for whom deductions are being made must be a core employee and must elect this option. Also, the plan must be a bone fide benefits plan that has been in effect for the preceding twelve months. Finally, the employee contribution must be the actual cost of the benefit, and the employee must have been a participant in the plan at the time of initial employment on the project. To ensure that nonunion employers do not realize a competitive advantage from this arrangement, any difference between the costs of the nonunion employer's plan and the benefit payments under the PLA go to a funds established by

the parties to benefit directly covered workers on whose behalf the benefit is paid. Again, this arrangement addresses the double payment issue while maintaining equality in labor costs between union and nonunion contractors and assuring that the diverted payments benefit the nonunion employees.

Discussions with individuals involved in the Toyota project suggest that, although there was more nonunion participation in the San Antonio project than most Toyota PLAs, participation was generally limited to site and concrete work. This is not surprising as a central purpose of a PLA is to obtain ready access to a skilled union labor force.

Although not intended to address any issues specific to the San Antonio project, the Toyota PLA includes an unusual arrangement with regard to wage increases. The agreement adopts the applicable local wage rates (which is typical for PLAs), but it also allows for negotiated increases so long as rates do not exceed the average percentage increase in journeymen's rates for in the South Central region. This limitation is referred to as the cap.

The cap acts to mitigate any effects of the Toyota project, which is an unusually large project drawing large numbers of workers, on regional wage increases, while allowing for the effects of labor market conditions in a region which is sufficiently large that the Toyota project will have only a modest effect on settlements.

The Toyota PLA is an example of how PLAs can be successfully adapted to specific conditions. As with the other Toyota projects, the San Antonio plant is headed for on-time completion and has gone forward without significant disputes or disruptions. Further, the working out of the alternative arrangements appears to have been accomplished without substantial difficulties, reflecting the long-standing good relationship between Toyota and the Building and Construction Trades Department (BCTD).

T.F. Green Airport terminal

T.F. Green Airport, which serves Providence, Rhode Island, was for many years a very small operation. It is the nation's first state-owned airport, and it opened in 1931. It did not break the two million passengers per year mark until 1990, and it stayed approximately at that level until 1996. However, in 2004, the airport experienced the second busiest year in its history (2001 was the busiest), serving approximately 5.5 million travelers.[72] As the consulting firm of Landrum & Brown noted in a report on the airport, "Since [1996], the airport has become a low fare gateway to southern New England, and offers a congestion-free alternative to [Boston's Logan Airport] for many travelers."[73]

The recent success of T.F. Green is very good news for the State of Rhode Island, which invested $208 million in the construction of a new airport terminal in the early 1990s.

Prior to the construction of what is now called the Governor Bruce G. Sundlun Terminal, the last major renovation of T.F. Green's facilities was in 1981. The small building, which opened in 1960, had only nine gates and one baggage carousel and resembled an old bus terminal more than a modern American airport. Understanding the need to improve the facilities, the state's voters approved a $29 million transportation bond issue in 1988, which called for upgrading the existing terminal building.[74]

However, in 1990, with the state mired in a deep recession, businessman Bruce Sundlun won the governor's office, defeating a Republican incumbent. Sundlun was a WWII pilot who eluded capture after being shot down over Belgium; a businessman who made a fortune in broadcasting (among other ventures), a member of JFK's administration; and socialite with connections to the rich and mighty (he once flew planes with Jordan's King Hussein). He was not one for small projects. After becoming governor, Sundlun managed to circum-

vent both the legislature and the state's voters, and by executive action convert his predecessor's less ambitious renovation proposal into an approximately $200 million total reconstruction project. His plan was to use the earlier approved $29 million as seed money, get the airlines to agree to tripling their rents at the airport and receive most of the balance in federal funds.[75]

The governor's ambitious plan engendered immediate opposition. Residents of the City of Warwick (where the airport is located) and their elected officials opposed the terminal plan, as they do every project that might increase airport traffic. But so did many other legislators, politicians and ordinary citizens. Some of the sniping was purely political, but much of it was motivated by a genuine concern about the state's ability to pay for such a project. After all, this plan was being discussed during one of the deepest economic recessions in recent memory. Consider that the governor's first official act, on the day of his inauguration, was to order the state's credit unions closed to head off a banking collapse; that public employees faced involuntary furloughs because state government could not meet its payroll; and that the transportation department was turning off street lights to save money. In addition, at least one consultant's report found even the more modest plans proposed by Sundlun's predecessor were probably not worth the money at such a small airport.[76] Needless to say, in this environment, an expensive new airport terminal was not an easy sell.

However, by the time the terminal officially opened on the first day of autumn 1996—after Sundlun had lost his bid for a third (two-year) term—all the arguing and acrimony seemed forgotten. As the Providence Journal reported:

> During the [opening] ceremonies, speaker after speaker praised the terminal project and former Governor Bruce Sundlun for envisioning it.
>
> Warwick Mayor [later U.S. Senator] Lincoln Chafee said 'What stands before us is a near-miracle, a government project that came in on time and on budget. For that we congratulate all the many men and women who accomplished this while also maintaining the highest quality workmanship.'[77]

What stands before us is a near miracle, a government project that came in on time and on budget. For that we congratulate all the many men and women who accomplished this while also maintaining the highest quality workmanship.

Mayor (later U.S. Senator) Lincoln Chafee

Unlike the projects in Utah and Texas described above, the PLA at T.F. Green Airport was, in itself, not controversial and received no major press coverage at all. In fact, the only large controversy during the construction phase was a proposal to spend close to $800,000 on what derisively became known as a cloud machine, a terrarium-like art installation that was to have emitted a vapor sending clouds around the terminal's ceiling. The installation had been recommended by a committee in charge of spending the mandated set aside for public art but became fodder for many of the terminal's critics. The idea was scrapped in favor of cheaper and more conventional sculptures and the like.[78]

The lack of debate over the PLA no doubt reflects the reality of construction in Rhode Island, where nearly all large, transportation-related construction is done by union contractors. The agreement was, however, not a typical PLA but had a number of distinctive features.

No doubt, Gilbane Building Company, the construction manager, felt enormous pressure to contain costs. In 1991, Governor Sundlun complained about the price tag of the project, which, at the time, was $135 million. His concern arose from a comparison he made with a similarly styled and recently built terminal at the Rochester, New York

airport. The governor noted that the Rochester project cost $41 million less than the projected costs for T.F. Green. In a memo to his transportation director, the governor wrote:

> *We need to get a very detailed cost breakdown on the T.F. Green project, and I can tell you ahead of time that I am not going to accept a $41 million difference between T.F. Green and the Rochester project. Would we not do much better to go forward on a strictly competitive bid basis? What does it take to review and terminate the construction management contract?*[79]

The Gilbane Building Company is headquartered in Providence, but is one of the larger construction companies in the country. During the past ten years, it has carried out airport projects at O'Hare, Logan and the El Paso International Airport.[80] Over the years, Gilbane has done many jobs in Rhode Island and was awarded the construction management contract for T.F. Green on a no-bid basis by Sundlun's predecessor. Despite the governor's concern, Gilbane's contract was not terminated. By July 1993, the projected cost of the facility had risen to $200 million, but most of the funding puzzle had been put together, including the airlines' agreement—after the creation of an independent airport corporation—to pay increased rents and the Federal Aviation Administration's pledge to cover about half of the project's cost. Gilbane also agreed to take a substantial risk: for an additional $3.8 million fee, it guaranteed the bottom line cost of the project.[81] That fact was, no doubt, on everyone's mind when the PLA was negotiated in the fall of 1993.

The PLA covered construction of the new terminal, demolition of the old terminal, construction of a temporary terminal, improvements to the airfield (particularly taxiways and drainage), the construction of roadways and parking facilities, and the building of a system to capture and isolate ethylene glycol (used in deicing) before it enters the storm drains.

A very unusual aspect of the agreement was a wage and benefit schedule unique to the project. While most PLAs simply state that wages and benefits shall be paid in accordance with Schedule A (i.e. local) agreements, the T.F. Green PLA included its own wage and benefit rates for 21 different occupations from Asbestos Workers to Tile Finishers/Helpers. Where applicable, differentials were provided for building and road work. The length of the wage/benefit agreements varied across trades, from approximately one to four years, with an agreement to reopen negotiations for wages and benefits after dates specified in the PLA. An expedited interest arbitration clause was included to handle impasses that might occur over the negotiations of new wage and benefit rates.

But perhaps the most important provisions of the agreement concerned scheduling and premium pay. As a prominent Rhode Island labor official said:

> *We couldn't get on the airport at certain times. We were able to get on at times that on other jobs...say after 4:30 pm or after normal quitting time...you would be looking at a time-and-a-half situation or maybe a double time situation if it was a weekend. We took that into account knowing that if we were looking for that [premium pay] on that job it would blow the budget there, and you wouldn't end up with any agreement.*

The PLA contained several relatively standard sections on work time and premium pay. One section calls for an eight hour workday, with time and one-half paid for the first two hours of overtime, and double time paid for ten or more hours of work. Double time was also to be paid for Sundays or holidays.

The agreement also allowed Gilbane to schedule "all or part" of the workforce to work second or third shifts. Second shift workers would work seven

hours for eight hours of pay, and third shift workers 6 ? hours for eight hours pay. The agreement also stated that "the parties...recognize that construction work covered by the terms of this Agreement shall be performed in a manner that will cause the least disruption of the continuing operation of the airport, and therefore to achieve that goal a second (2nd) and/or third (3rd) shift may be established without the scheduling of any previous shifts..."

However, the centerpiece of the scheduling provisions was a Flex Time clause, which the parties agreed to with the understanding that the airport needed to maintain "efficient operations...while complying with...noise mitigation requirements, all federal and state requirements, and...[attending to] the needs of the traveling public." The Flex Time arrangements allowed for several possibilities: a staggered work week of seven days on and two days off; four ten hour days; and eight hour days with adjusted start and quit times. The PLA also allowed for "any other mutually agreed upon alternative work schedule."

The project was completed several months ahead of schedule and, in 1997, received an award for construction management from the Associated General Contractors. Simultaneous with the new terminal's opening, Southwest Airlines selected T.F. Green as its access point to the Southeastern New England/Boston market. Southwest is now the airport's leading airline and the main reason for the airport's current success. Certainly, factors other than the PLA—not least a mild winter in 1995—contributed to the early and within-budget delivery of the terminal. But the project remains a source of pride for all those involved in its construction and is frequently cited as an example of the ability of PLAs to accommodate the specific needs of a construction user and produce a favorable outcome on a public project.

East Side Union High School District

In March 2002, voters in San Jose's East Side Union High School District approved a $300 million bond issue to be used for school construction and renovation. Virtually every high school in the district was to undergo comprehensive renovations, and several new facilities—such as adult learning centers, a gymnasium, and even a cable television and radio studio—were to be built at some of the schools. Although some work had already taken place, in 2004, the district entered into a PLA with the Santa Clara and San Benito Counties Building and Construction Trades Council. The district decided on the PLA, in large part, for a rather distinctive reason: it saw it as a mechanism to expand its vocational education programs into both the blue collar and white collar construction occupations. The district has a well-established vocational education program that is part of its overall career services approach to education.

East Side already had up and running several vocational academies and other programs, including the Oracle Internet Academy, an electronics academy, a teaching academy and specialized programs in biotechnology, computer-assisted design and health care. The district viewed a PLA as a means to establish a program in construction occupations.

Hence, the novelty of the East Side PLA and the sweetener that led to its signing was a provision connecting work under the PLA with establishment of a Construction Technology Academy. The Academy would offer pre-apprenticeship training, summer internships, and jobs in both the trades and white collar construction occupations.

An appendix of the PLA contains the essential elements of the plan:

The Parties have agreed to create a Construction Technology Academy ("Academy"), funded by the District, to carry out the

> *training and employment objectives of Appendix B. The overall objectives are to (a) offer opportunities and skills necessary to enter post-secondary study [including construction apprenticeship programs as well as college education] and to pursue lifelong learning within the broader context of the building trades industry; and (b) develop and reinforce academic course content standards in order to maximize career opportunities and technical competency.*

East Side already had up-and-running several vocational academies and other programs, including the Oracle Internet Academy, an electronics academy, a teaching academy, and specialized programs in biotech, computer-assisted design, and health care. The district viewed a PLA as a means to establish a program in construction occupations.

This point (b) recognized that schools would do a better job if the school curricula were tied more closely to industry needs and directions. In construction, unions as well as contractors, pay close attention to technological trends and customer demands. Thus, connecting the school's curricula to the knowledge held by contractors, unions, and joint apprenticeship boards was seen as an effective method of tying industry directions to school curricula in the case of construction.

A sixteen member steering committee was created by the PLA that would oversee the Academy. Membership on the committee included representatives of the joint apprentice training councils, the building trades council and the school district.

One task of the steering committee was to oversee a summer internship program. described in the PLA.

In addition to the foregoing, which bound the school district, the unions and the joint apprenticeship training councils together, the PLA required contractors on East Side's work to provide jobs for graduates of the district's Construction Technology Academy. The PLA's goal was for students to actually obtain jobs as interns, apprentices or in other unskilled positions.

This novel approach to project labor agreements remains experimental. Nonetheless, those involved with East Side's vocational education program are, thus far, very happy with the PLA. One East Side official familiar with the PLA and its internship program stated:

> The PLA says that contractors working on projects will provide thirty internships of five weeks duration every summer. In the first two weeks our students are introduced to construction and rotated through the trades. They also spend five hours a day at the various apprenticeship training facilities with exposure to classroom and benchwork training. Also our students can intern with the contractors with exposure to estimation, engineering and the legal aspects of construction. We have a four year construction and construction engineering program, and the PLA allows us to connect our vocational education to the world of work. It's a perfect fit. We want our contractors working on our schools in the summer when we are out of session and that's just when the students are available for summer internships. This way the district gets double use out of its construction dollars. We have fifteen vocational education programs from aerospace to office clerical. This construction program connected to the PLA is our most exciting effort because it's not just a partnership with an individual or a company. It's a partnership with a whole industry. Our program is considered a pre-apprenticeship program, and its graduates have priority entering into union apprenticeship programs. And it makes sense for the unions too because first of all, a lot of our students are minority students, and the unions are always trying to recruit minorities.

And second of all, our students have exposure to construction. They know what they're getting into. So the unions know these applicants to their apprenticeship programs are serious.

Because the PLA is new and the Construction Technology Academy program takes four years to

PLA language on the East Side district's construction academy

In order to facilitate the goals of the Academy, the [School] District and [Building Trades] Council agree to create a steering committee, which will conduct meetings at least once a month during the district academic year to develop the goals of the Academy; plan for the presentation and content of training lectures to facilitate employable skills in the construction trades; develop a summer schedule for training; organize and develop summer internship positions; assist in planning curriculum scope and sequencing; design co-curricular activities; identify sources for educational and financial support; and otherwise initiate steps to carry out the goals of the Academy. The committee shall consist of sixteen (16) members, of whom five members shall represent the trade JATC's [Joint Apprenticeship Training Councils], three members of the Building Trades Council, six members from the district, including one member who shall be from district management and one member from a community college district. The district management representative shall be the presiding officer of the steering committee. The steering committee shall make recommendations to the district administration. The Academy Steering Committee, in coordination with the district's career services representative, shall develop and implement a plan for annual assessment of the goals and objectives of Appendix B in order to maximize the employability of the summer interns described below.

1) Annual Training Summer Sessions. Annual summer intern training sessions developed by the Academy Steering Committee shall be made available for qualified district students nominated by the district.

a) Purpose of Summer Training Sessions. The purpose of the summer intern training sessions is to teach the interns employable skills in the construction trades. The skill sets to be taught by the District shall, in part, include materials taken from a curriculum known as "SCANS," which identifies and teaches such general employability skills as dependability, responsibility, working with other people, active listening (i.e., receiving and responding to instruction), organizing work tasks and utilizing technology. The other skill sets shall include the proper use of tools of the construction trades in addition to practical application of skills in the construction trades. The sessions shall include classroom and job visit components.

b) Number of Interns. The goal for the summer program of 2003 shall be twenty (20) internships available for students nominated by the district. For the second year of the contract, the goal for internships available shall not exceed thirty (30) per calendar year.

c) Number and Scope of Training Sessions. For the first year, the number of summer training sessions shall not be less than eight (8) in number. The scope of the training sessions and the presenters, shall be developed by the Academy Steering Committee. For subsequent years, the scope

and presenters of the training sessions shall be as developed by the Academy Steering Committee. All training sessions shall be hosted by the Trade JATC's according to the scope developed by the Academy Steering Committee.

2) Employment of Interns. Beginning July, 2003, the Building Trades Council shall make arrangements for contractors working under the Project Labor Agreement to employ up to twenty (20) interns selected by the Academy Steering Committee. The interns shall be paid no less than $10.00 per hour for on-the-job training but not for periods of time attending the classroom training sessions. The sessions shall occur over a minimum of four and a maximum of five weeks for summer internship positions beginning in July 2004, the Program Manager agrees to endeavor to employ or make arrangements for the employment of up to thirty (30) paid intern positions of students selected by the district for the same time and rate of pay as for July, 2003. Each year thereafter, the goal shall be to employ up to thirty (30) interns at the same rate and for the same duration unless otherwise agreed to by the district and the council. The employment shall be practical and relevant to the apprenticeship requirements for the building trades, with emphasis on at least five major crafts selected by the Academy Steering Committee for each year of the contract. Due to safety, prevailing wage and related issues, the interns shall not be employed directly on the public works projects that are the subject of the Project Labor Agreement and this Appendix B.

3) Intern Program and Priority on California Apprenticeship Council Approved Program Apprenticeship Lists.

a) Establishment of an Intern Program through the Academy and Program Manager. An intern program for construction trades careers shall be developed by the Academy Steering Committee to help facilitate placement into a California approved apprenticeship program upon successful completion of the classroom coursework and the summer intern sessions.

b) Priority on Apprenticeship List. The training and employment program of the interns shall be developed by the Academy Steering Committee such that graduating interns shall possess the skills, training, and educational background to help the graduate achieve priority on the lists of the Building Trades Apprenticeship Programs for those which maintain a list and direct entry for those programs where direct entry is possible. It is recognized that the Apprenticeship Programs operate according to existing Standards approved by the Division of Apprenticeship Standards of the State of California Department of Industrial Relations and the standards set forth in the collective bargaining agreements for each building trade. Therefore, in order to maximize the opportunity that graduates may achieve a priority standing on an apprenticeship list or direct entry to an apprenticeship program, the Academy Steering Committee shall develop a plan for an annual assessment of the goals and objectives set out in this appendix B and in so doing, shall coordinate with the District's Career Services representative. The annual program assessment by the Academy Steering Committee shall follow the completion of each summer internship program.

complete, the success of this program in eventually landing these students in apprenticeships or in white collar occupations with contractors has yet to be tested. The unions cannot guarantee entry into apprenticeship programs. All they can do is help create a solid pre-apprenticeship program that will enhance the student's ability to qualify for these post-high-school apprenticeships.

The language of the PLA also establishes a limit on the number of interns at thirty per summer. This reflects the unions' concern that they not promise more downstream work than will be available. The PLA is silent on the number of interns after the second year of the contract. This reflects a reality of this innovative contract—the parties are feeling their way along a new path, and they are not sure whether the program can grow, will remain steady or will have to shrink over time.

Another possible issue is how evenly students get spread across the different trades involved on East Side projects. If all thirty students decided they were interested in only electrical work, the electricians' apprenticeship program might feel unduly burdened. These sorts of potential problems underscore that using PLAs to create journeys from school to work in construction is a work in progress.

On the other hand, there is considerable evidence that the construction labor force is aging. The baby-boom generation is retiring, and the need to adequately train and replace the existing skilled construction labor force is unusually problematic in this period. A recent report by the Construction Labor Research Council concluded:

> Labor shortages during the boom period of the late 1990's and early 2000's, as well as greater focus on the aging work force in the United States, have increased awareness in the construction industry of the importance of attracting new entrants...The years 2005 through 2015 will require large numbers of new entrants into the construction trades. Annual new entrants of craft workers into the construction industry are estimated to be 185,000 persons. Needs will be almost evenly divided between growth and replacement. Like other industries, construction will be significantly affected by an increasing number of older workers leaving the labor force. Available to replace them will be young workers whose numbers will be little changed throughout the period. As this, too, affects all industries, the construction industry will be challenged in attracting an adequate supply of qualified new entrants.[82]

This view of the future is shared by the Santa Clara Building Trades. In a report prepared for the U.S. Department of Labor by the Silicon Valley Workforce Investment Network and the Santa Clara Building Trades, entitled Extending the Ladder, the unions and local construction users state:

> We have seen the average age of an apprentice in the Trades rise to almost 30 years of age. At the same time, we have seen the average age of a journeyperson rise to almost 40 years of age, and last but most significant is the fact the average retirement age is now closer to 50 than 60. These statistics represent two very significant realities: (1) the construction industry is on the precipice of a crisis in the availability of skilled trades people, and (2) an enormous opportunity for youth wishing to pursue a skilled career currently exists.[83]

This concept paper—pitched to the U.S. Department of Labor in the hope of receiving a federal grant—grew out of the experience of the Santa Clara Building Trades with the East Side PLA and proposed to extend this model to other school districts:

> At the core of this proposal is a partnership led by employers, labor, high school and community college districts, and the Silicon Valley Workforce Investment Network (SVWIN) Board. These parties have come together to pur-

sue a unique and creative way to address the needs of the construction industry and youth through a partnership that leverages State and local construction bond dollars to place graduating high school seniors and community college students into full-time, high-wage jobs in the Construction Trades.

A local union leader involved in the creation of the East Side PLA and the establishment of the East Side Construction Academy explained the key unique provision of the PLA was its requirement for internships combined with language that ensured graduating students would actually get jobs either as apprentices or as material handlers. He argued that the unions were motivated by the need to "get back into the high schools" in order to recruit a qualified pool of younger workers to replace an experienced but aging union work force. The key problem, in his view, was to facilitate effectively the movement of younger workers into the union workforce in the face of apprenticeship admissions regulations that require nondiscrimination and equal and fair access to these programs. He indicated the solution was in the PLA proviso that required participating contractors to provide graduating students with jobs either as apprentices or material handlers. This requirement meant that students would at least transition to non-craft material handling jobs from which their additional experience would give them a leg up on admissions to apprenticeship programs. He stated:

We all recognized the need to get back into the high schools and the current practice of begging the districts to allow us to talk to students for an hour or hold a career fair was not going to turn the tide. We needed to get back into the schools in an institutional manner.

> We realized that previous programs that were providing training/assistance to youth and others in the community to gain them knowledge and experience that would hopefully get them into an apprenticeship were not always successful. In fact some were creating unrealistic expectations on behalf of both the applicants and the programs. Upon graduation/completion there was no job available and they became just another name on the out-of-work list.
>
> We saw the opportunity that this PLA could serve in getting back into the schools in a meaningful way that could also solve the problem created by economic uncertainty we had previously experienced with other programs. By contractually binding, through the PLA, contractors to participate in the academy by requiring them to hire individuals that had graduated from the program, we could overcome the downfall of other programs.
>
> However we knew that we faced some traditional hurdles if we were thinking of circumventing long-established and heavily-regulated apprenticeship placement policies/criteria. So we proceeded to sit down with all the [Joint Apprenticeship Training Councils] to find out what they believed would work to make this happen. With their help, we crafted language that met the needs of the program and yet did not ask JATCs to violate their own selection criteria or placement policies. We achieved this by understanding that most graduates of the academy would do well on the entrance exams and interviews, but some may not score at the very top, which would be needed if they were to seamlessly enter into the apprentice program of their choice. So we worded the agreement to accommodate this by requiring contractors to provide jobs that although not apprentice positions were jobs that the student could easily transition into an apprenticeship with that same employer. It is common, for example, for a material handler which is not an apprenticable occupation, to receive an apprenticeship by virtue of their experience and work history.
>
> The important thing was that we were breaching the obstacle that all other programs could

not. We were putting people into jobs and not onto lists. And by putting people directly to work in the industry of their choice upon graduation, we have achieved something that to the best of our knowledge has not yet been previously done.

Thus, the East Side PLA is innovative in several ways. First, it is an example of a new form of PLAs, which attempts to find new areas of win-win in construction collective bargaining by bringing a new player to the table—the construction user. Second, it is an effort to solve a union problem—getting back into the high schools in an established, institutionalized fashion in order to better compete with other industries for talented students in the context of the worker replacement difficulties posed by the retirement of the baby boom generation. Third, it is an effort to solve a school district's problem of creating meaningful education for the non-college bound, an education that provides the student with an awareness of possibilities, prepares the student appropriately for the demands of the labor market, gives the student experiences that will qualify the student for advancement and allows the student in this case to test drive a full range of blue and white collar opportunities within an entire industry. This is what the East Side vocational education official meant when saying that the advantage of the Construction Technology Academy was that it created a relationship not with an individual or a company but "a partnership with a whole industry." Finally, by requiring participating contractors to provide employment, through the auspices of the PLA, this particular institutionalization of a journey from school to job seeks to overcome the weakness of previous similar experiments by putting students to work rather than putting them simply on job lists. Certainly, this PLA, like other PLAs, was motivated by traditional concerns for work and the conditions of work on the part of unions and an effective supply of skilled and qualified labor on the part of owners. But in the case of this PLA, these traditional motivations were not paramount. The novel and experimental motivations listed above were the fundamental reasons for the signing of this PLA.

A local union leader involved in the creation of the East Side PLA and the establishment of the East Side Construction Academy explained the key unique provision of the PLA was its requirement for internships combined with language that insured graduating students would actually get jobs either as apprentices or as material handlers.

Principal Findings

■ Project Labor Agreements (PLAs) have been used for many years, perhaps as early as World War I. However, the use of PLAs has changed over the years. Once reserved for very large, isolated or specialized projects, today PLAs are used on a wide range of projects.

■ PLAs are prehire collective bargaining agreements that cover the terms and conditions of employment on a specified construction project or set of projects. PLAs require that all contractors on a project, whether typically union or not, abide by collectively-bargained terms and conditions of employment, including paying union scale, using union referral systems, etc.

■ An essential difference between PLAs and area agreements is that the principal parties in most negotiations are the building trades' unions and representatives of construction users, rather than unions and contractors.

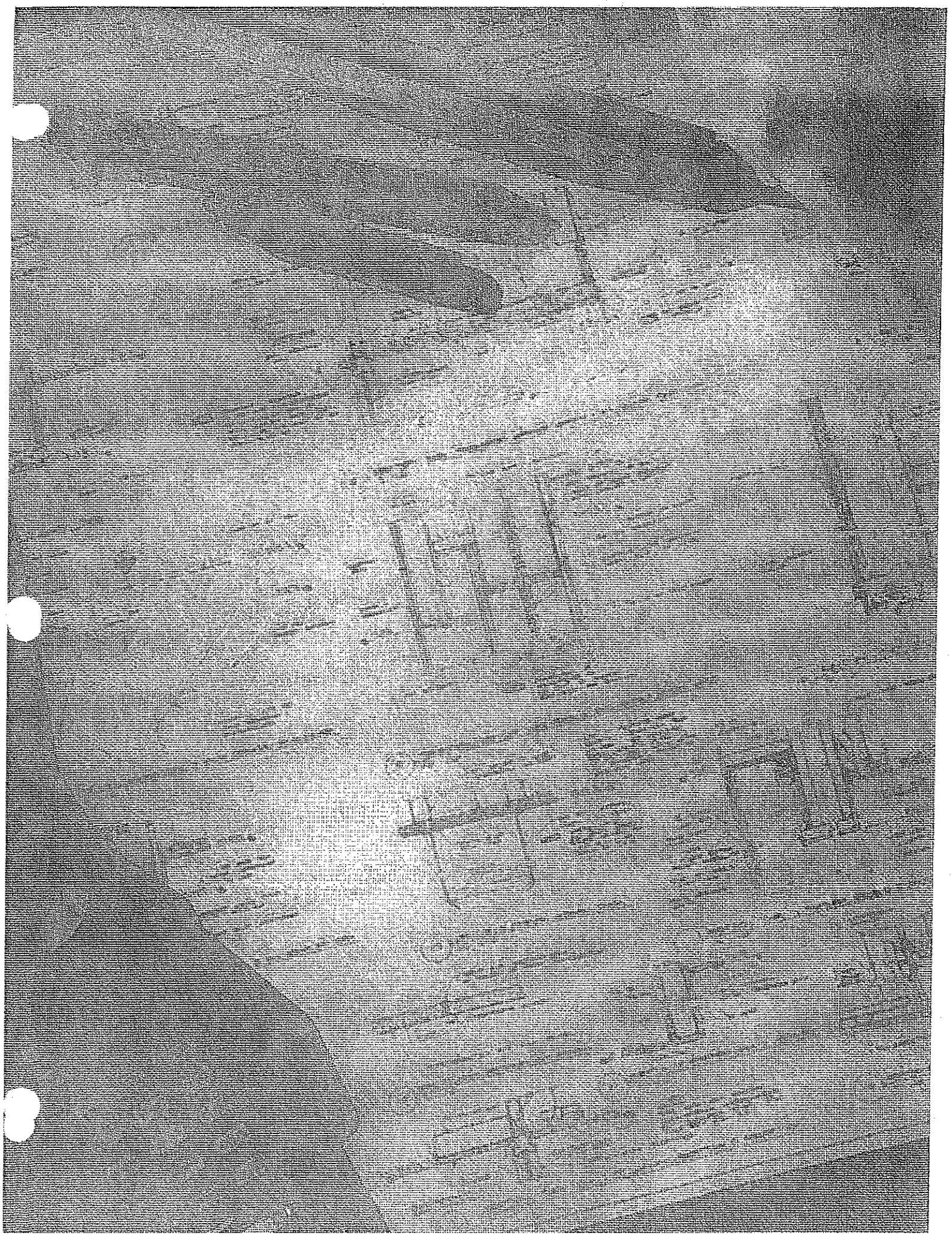
■ The use of PLAs on public sector projects has become increasingly controversial over the past 15 years. All levels and branches of government have been brought into the PLA dispute. Court cases during the period have generally been over the issue of whether a PLA violates state or local bidding laws or regulations.

■ The controversy over PLAs has spawned a number of studies on the effects of PLAs on the bidding behavior of contractors, construction costs, construction wages and several other issues. However, much of this research is flawed because of inherent difficulties in conducting such research, poor methodology or predetermined conclusions.

■ Our research on bidding behavior and costs finds that PLA neither decrease the number of bidders on a project nor increase or decrease a project's cost when other important variables are taken into account. However, previous studies that have found a strong positive effect of PLAs on project cost failed to account for other important variables and, as a result, inflated the presumed impact of a PLA.

■ Assuming cost neutrality, other aspects of PLAs should be considered. Interview and case study evidence finds high satisfaction with PLAs by stakeholders and suggests that PLAs can be used to improve scheduling, safety, training and minority employment.

■ A problem with PLAs in many areas is a lack of contractor participation in negotiations, which can lead to the needs of a specific industry being ignored. One solution, which is used in a number of jurisdictions, is the development of a model PLA through a standing labor/management committee.



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Project Labor Agreements' Effect on School Construction Costs in Massachusetts

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This paper investigates the impact of Project Labor Agreements (PLAs) on school construction cost in Massachusetts. Although simple models exhibit a large positive effect of PLAs on construction costs, such effects are absent from more completely specified models. Further investigation finds sufficient dissimilarity in schools built with and without PLAs that it is difficult to distinguish the cost effects of PLAs from the cost effects of factors that underlie the use of PLAs.

Introduction

CONSTRUCTION INDUSTRY PROJECT LABOR AGREEMENTS (PLAs) are collectively bargained pre-hire labor contracts negotiated between property owners and building trades unions. The essential features of PLAs are that successful bidders—even those operating non-union—must adhere to requirements for union referral, union security, and collectively bargained compensation. In exchange, unions assure timely access to labor and typically agree to harmonize work scheduling provisions among the trades, forego certain types of premium pay or pay increases, and give up the right to strike for the duration of the project. Building trades unions have increasingly used PLAs to protect and expand their position in construction markets. Open shop contractors and their trade organizations have responded with legal and political challenges to many publicly funded PLAs such as the Boston Harbor and New York State Thruway projects. The debate over PLAs has focused on project timeliness, quality, safety, training,

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minority employment, employee benefits, and labor peace; however, the central issue has been their effects on public construction costs. The zigzags in federal policy on PLAs over the last 20 years reflect the intensity of this debate.[1]

The current research investigates the effect of PLAs on the cost of new school construction in Massachusetts between 1996 and 2002. Using models with few explanatory variables, prior research on school construction found that PLAs increased bid price between $12.91 and $25.67 per square foot, or 14–17 percent in the Greater Boston area (Bachman et al. 2003). A concern with leanly specified models is that the PLA variable may proxy omitted characteristics that also influence construction costs. To correct for this, the current authors collected unique data on new school construction in Massachusetts. Using these detailed data, we develop a more complete model of school construction costs incorporating information on features such as swimming pools, mechanical systems, non-classroom space, and athletic facilities that architects and engineers use to estimate project costs. Our initial estimates suggest that (1) much of the PLA effect is attributable to the higher costs of building within the city of Boston and (2) although PLAs are associated with substantially higher costs in leanly specified models, there is not a statistically significant relationship between the PLAs and construction costs in more complete models.

Although more completely specified models are preferred in establishing the *ceteris paribus* effect of PLAs, our research finds substantial multi-collinearity between the PLA variable and measures of school characteristics in the more complete models. This is a product of the relationship between project complexity and the decisions to use a PLA; more complex and expensive projects are more likely to use PLAs. In combination with the relatively small number of observations in construction data sets, this precludes accurate estimation of cost effects of PLAs in an adequately specified model. In essence, using extant data it is not possible to estimate the effect of PLAs *holding all else equal.*

Background and Research on PLAs

Although nascent PLAs date to World War I, PLAs came into widespread use following World War II on atomic energy, defense, and space projects

[1] PLAs were widely used as a federal contracting tool from the 1950s on. President George H. W. Bush barred use of PLAs on new federal or federally funded projects immediately prior to the 1992 election (Executive Order 12818). President Clinton revoked 12818, restoring the prior status quo, in early 1993 (Executive Order 12836). This was augmented in 1997 with a memorandum providing criteria for use of a PLA and the minimum terms to be incorporated into an agreement. President George W. Bush banned the use of PLAs on federal projects shortly after taking office in 2001 (Executive Order 13202). In turn, President Obama revoked 13202 and restored the use of PLAs in federal contracting on February 6, 2009.

(Dunlop 2002; McCartin 1997). These agreements banned work stoppages and provided uniform premium pay, shift, and holiday provisions across trades. Project owners and contractors operating in the densely organized industrial and heavy construction sector favored PLAs as they banned contract and jurisdictional strikes and often provided more favorable terms than local agreements (Belman, Bodah, and Phillips 2007). This began to change with the increasing capacity of the open-shop sector in the 1970s and 1980s (Allen 1988; Linder 1999). Non-union contractors viewed PLA requirements as an impediment to competing for work. Working through the Associated Builders and Contractors, the open-shop sector has mounted legal, political, and media challenges to public sector PLAs. The legal strategy foundered when the U.S. Supreme Court (1993) allowed public bodies to sign PLAs in their role as construction owners in its *Boston Harbor* decision. Parallel decisions by New York and Massachusetts courts have upheld the right of public bodies to use PLAs where they can be shown to provide advantages.

Conflict over PLAs then moved into the political arena of administrative and legislative bodies. There, public debate has centered on the effect of PLAs on construction costs. Opponents of PLAs argue that the requirement to follow union employment practices raises costs by compelling open-shop contractors to pay higher wages and benefits and adopt inefficient labor practices. PLAs are also theorized to raise bid costs by reducing the number of competitors bidding on projects when open-shop firms decide not to compete for work. Proponents argue that PLAs improve projects' timeliness and reduce costs by providing access to skilled labor on a timely basis, by improving labor productivity by harmonizing hours of work across trades, providing favorable overtime rates, replacing strikes with dispute resolution procedures, and sometimes providing wage concessions. These are theorized to reduce costs by shortening time to completion, avoiding delays, and reducing labor input. The effects are especially important on time-sensitive projects such as airports, hospitals, and manufacturing facilities. Timely completion allows projects to begin earning revenues sooner and avoid logistic problems such as those that occur when schools are not completed on time.

The Current Research

The current research is not, in construction parlance, a greenfield project. Prior research found PLAs raised school construction costs by 14–17 percent in the Greater Boston area (Bachman et al. 2003). These results were obtained from leanly specified models: the favored specification included only a PLA indicator, a measure of project size, and whether the project was a new

construction or a renovation.[2] The current research extends this work by measuring the cost impact of PLAs within a more complete model of school construction costs, enlarging the area under study from Greater Boston to all of Massachusetts, limiting the sample to new construction, using final cost rather than bid price, and investigating the relationship between project complexities, use of PLAs, and cost measures. In developing a more complete model of school construction costs, we explore the claim made by Bachman et al. (2003) that PLA and non-PLA schools are similar and little is to be gained from extensive control for the characteristics of construction (Bachman et al. 2003: 8).

The principal source of data for project-based construction research has been the F. W. Dodge Construction Reports. Dodge Reports include virtually every project with a bid price of over one million dollars, with several reports issued during the course of a construction project. All provide the project name, location, type, size, owner, architect and, after the contract award, the general contractor. Depending on when a report is issued, successive reports will also provide an architect's estimate of project costs, the low bid, or the final offered cost. Although the Dodge Reports have long been used by contractors, they can be inadequate for construction research. The specification information is non-uniform and incomplete. Dodge Reports do not include the final cost of the project when completed or information on how the project changed after the final cost offer. The cost measures available from Dodge are then noisy proxies of completed cost—the true measure of concern to the public.[3]

Given these deficiencies in Dodge construction information, we identified factors believed to affect school construction costs from estimating guides and discussions with construction professionals.[4] The basic unit of a school is the classroom, which occupies the majority of school space and accounts for the bulk of school costs. In addition to classrooms, cost is affected by other types of spaces—including offices, libraries, cooking and dining areas, and athletic facilities. Gymnasiums and auditoriums are more costly than classrooms, and exterior appurtenances such as playing fields add to the bottom line. Site preparation, such as demolition and abatement, also increase project costs, as does

[2] Other models included measures of whether the school was an elementary school, the number of floors, and the distance from Boston. The basic model was also estimated by type of school (elementary/non-elementary) and project size (Bachman et al. 2003).

[3] As the primary Dodge audience uses reports to learn about opportunities to bid on projects, timeliness, rather than absolute accuracy, is an overriding concern. Comparisons of Dodge square footage with final size reported to our survey found that the Dodge Reports were within 1000 square feet for thirty-nine of the seventy schools, between 1000 and 5000 feet off for seven schools, between 5000 and 10,000 feet off for four schools, between 10,000 and 20,000 feet off for five schools, and more than 20,000 feet off for six schools.

[4] See *Square Foot Costs* (R.S. Means Co. 2001) and *Building and Renovating Schools* (Macaluso, Lewek, and Murphy 2004).

extensive grading and foundation work. Mechanical systems typically comprise about 15–20 percent of project costs, and systems, such as boilers for heating and water-fed coolers for air conditioning, are more expensive than others. The number of floors in a building has an impact on cost, as does the quality of the construction materials selected. Finally, the educational level of the school is an important determinant of cost as high and middle schools include expensive amenities, such as science and computer laboratories, as well as more elaborate library facilities and auditoriums.

Given our focus on final cost, we used Dodge Reports to identify completed projects from the Dodge List of 2001–2002 starts as well as projects included in prior research. Our study was limited to new construction and projects where the costs of new construction could be separated from the cost of renovations.[5] We contacted architects, contractors, and school officials and, using a consistent list of potential school characteristics, surveyed these parties about project features including the final cost, type of school, type of contract, number of stories, roof pitch, particulars of each project (library, science labs, athletic fields, etc.), site grading, type of mechanical system(s) installed, materials used, and bidding process, and whether there was a liquidated damage clause in the school construction contract. Our survey obtained information on seventy of the seventy-five new schools in Massachusetts for which construction was completed by fall 2003.[6] Information regarding the presence of PLAs was obtained from the Massachusetts Building Trades Council.

Characteristics of PLA and non-PLA Schools

Of the seventy schools in our sample, nine, or 12.9 percent, were built under a PLA (Table 1). PLA schools were larger than non-PLA schools, 172,000 feet against 118,000 square feet; taller, 3.3 against 2.6 stories; more likely to have vocational classrooms, 77.8 vs. 24.6 percent, and more likely to have science classrooms, 100 vs. 65.6 percent. Every PLA project involved demolition work against only half of the non-PLA schools. All nine schools built under a PLA-installed chillers against 45.9 percent of the non-PLA schools. Non-PLA schools were more likely to have tennis courts, 16.4 vs. 0.0 percent. PLA schools also had higher total final costs, $26.8 million against $17.4 million, and cost per square foot, $164.91 against $147.86. Given these

[5] Renovation projects were excluded because of their inherent heterogeneity and problems in defining and measuring key data such as the physical area of the renovation.

[6] We were unable to get responses from contractors or architects for five of the schools on our list.

TABLE 1

VARIABLE NAMES, DEFINITIONS, AND MEANS BY PROJECT LABOR AGREEMENT (PLA) STATUS, MASSACHUSETTS

Variable	Description	Minimum	Maximum	Mean all	Mean w/PLA	Mean non-PLA
PLA	Project built under a PLA	0	1	0.129	1	0
Dodge total cost	Total cost, Dodge Reports	$2.6 mil.	$42.0 mil.	$17.5 mil.	$24.4 mil.	$16.5 mil.
Dodge area (sq. ft.)	Square foot area from Dodge Reports	20,000	284,000	125,337	172,093	117,955
Dodge cost per square foot	dodgetotalcost/ dodgeareaft2	$82.76	$1099.54	$155.34	$141.67	$157.40
Adjusted total cost	Survey total cost, 2002 prices by Engineering News Record Cost Index	$2.9 mil.	$47.0 mil.	$18.6 mil.	$26.8 mil.	$17.4 mil.
Area (sq. ft.)	Survey square foot of the project	23,000	284,000	127,109	162,724	121,855
Cost/square foot, adjusted 2002	totalcostadjusted2002/areaft2	$96.68	$293.15	$150.05	$164.91	$147.86
Elementary	Elementary school	0	1	0.486	0.444	0.491
Other	Other type of school	0	1	0.171	0.333	0.148
Private	Private school dummy	0	1	0.043	0.000	0.049
Story	Number of stories	1	4	2.686	3.333	2.590
Basement	Basement in school	0	1	0.071	0.111	0.066
Demolition	Demolition performed	0	1	0.557	1.000	0.492
Boiler	Boiler installed	0	1	0.971	1.000	0.967
Chiller	Chiller installed	0	1	0.529	1.000	0.459
Central air	Central air installed	0	1	0.386	0.222	0.410
Unit ventilators	Unit ventilators installed	0	1	0.629	0.667	0.623
Ground-coupled heat pump	Ground-coupled heat pump installed	0	1	0.043	0.000	0.049
Unitary package	Unitary package installed	0	1	0.214	0.333	0.197
Steep	Roof pitch—steep	0	1	0.157	0.000	0.180
Low	Roof pitch—low	0	1	0.500	0.889	0.443
Combination	Roof pitch—combination	0	1	0.343	0.111	0.377
Swimming pool	Swimming pool erected	0	1	0.029	0.111	0.016
Cafetorium	Cafetorium erected	0	1	0.614	0.333	0.656
Bandroom	Band room erected	0	1	0.800	0.667	0.820
Auditorium	Auditorium erected	0	1	0.386	0.889	0.311
Elevators	Elevators installed	0	1	0.957	1.000	0.951
Gymnasium	Gymnasium erected	0	1	0.929	0.889	0.934
Kitchen	Kitchen erected	0	1	0.886	1.000	0.869
Library	Library erected	0	1	0.971	1.000	0.967
Science labs	Science labs erected	0	1	0.700	1.000	0.656
Vocational rooms	Vocational shops and labs	0	1	0.314	0.778	0.246
Extensive grading	Leveling of hills, filling of valleys, or similar-scale work	0	1	0.543	0.333	0.574
Normal grading	Clearing urban site, grading a corn field, or similar	0	1	0.457	0.667	0.426
Athletic	Athletic field(s) created (football, soccer, track, etc.)	0	1	0.686	0.667	0.689
Tennis courts	Tennis courts erected	0	1	0.143	0.000	0.164
Boston	Boston School District	0	1	0.057	0.333	0.016

differences, distinguishing the effect of differences in characteristics from the cost effects of a PLA *per se* is central to this research.

Estimation Strategy and Results

We begin by comparing estimates of PLA effects from leanly and more fully specified models using both linear and log cost models. The second section investigates the sensitivity of estimates to controls for construction in the city of Boston as well as difficulties, related to multi-collinearity and over-determination, in distinguishing the effect of PLAs on school costs from the effects on cost-affecting factors that also affect the adoption of PLAs. Finally, we compare the current research with that of Bachman et al. (2003).

Final Cost Models. We estimate our final cost models with two dependent variables: final cost per square foot and log of total cost. Cost per square foot is widely used in construction research but requires costs to be proportional to project size. Although appropriate for characteristics such as classrooms, other features, such as athletic fields and demolition, may not be proportional. Log total cost models estimate the percent increase in total cost associated with a feature.

Cost Per Square Foot Models. Our initial specification is similar to prior work with cost per square foot determined by area in square feet, area-squared, and an indicator that takes a value of one when a school is built under a PLA (Table 2, Model 1). Project size has a negative convex relationship to cost per square foot. Larger projects cost less per square foot but the decline attenuates as project size increases. PLAs are estimated to increase construction costs by $28.57 per square foot; the null of no PLA effect is rejected in better than a 5-percent, one-tailed test. This model accounts for 24 percent of the variation in school costs.

Model 2 adds five characteristics that our interviews suggested should have a large effect on school costs: the number of stories, whether the school was an elementary school, a private school, had a basement, or involved demolition work. Elementary schools cost $25.85 less per square foot, the coefficient is significant in any conventional test. Basements add $13.46 per square foot to school cost, the coefficient is significant in a 10-percent one-tailed test. The private school, story, and demolition coefficients are correctly signed but are not individually statistically significant. r^2 increases, from 24.1 percent in Model 1 to 35.1 percent in Model 2. An F-test for the significance of the

TABLE 2

ESTIMATION OF MASSACHUSETTS SCHOOL CONSTRUCTION COST, ACTUAL COST PER SQUARE FOOT

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*
Project Labor Agreement	28.57	2.18	24.10	1.53	23.28	1.19	13.80	1.18	13.88	0.81
Area (sq. ft.)	−0.0008	−2.30	−0.0010	−4.31	−0.0006	−1.19	−0.0011	−4.63	−0.0008	−1.59
Area-squared	2.02*E*–09	2.20	2.42*E*–09	3.68	1.11*E*–09	0.71	2.76*E*–09	4.00	1.75*E*–09	1.12
Elementary			−25.85	−3.17	−26.90	−2.15	−27.10	−3.33	−29.88	−2.45
Private			−20.97	−0.54	9.10	0.30	−39.34	−0.82	−12.45	−0.35
Story			6.16	0.89	−1.73	−0.24	7.92	1.12	−0.31	−0.04
Basement			13.46	1.29	10.34	0.76	7.81	0.65	5.02	0.32
Demolition			5.47	0.74	−0.22	−0.02	3.69	0.50	−1.67	−0.18
Boiler					69.68	2.22			70.85	2.34
Chiller					9.11	0.95			6.76	0.72
Central air					1.56	0.21			0.39	0.05
Unit ventilators					0.38	0.04			1.26	0.13
Ground coupled					10.57	0.75			12.17	0.74
Unitary packaged					4.58	0.38			−0.34	−0.03
Steep					17.23	1.23			16.89	1.23
Combination					10.41	1.27			11.97	1.34
Swimming pool					33.02	1.85			19.02	1.23
Cafetorium					1.90	0.23			0.44	0.05
Band room					−3.04	−0.21			−7.56	−0.53
Auditorium					14.80	1.45			14.92	1.43
Elevators					12.51	0.84			13.68	0.89
Gymnasium					−53.07	−2.56			−55.81	−2.57
Kitchen					11.05	0.62			8.99	0.48
Library					29.70	0.74			42.30	1.01
Science labs					1.21	0.12			−1.93	−0.18
Vocational rooms					−10.94	−0.92			−9.73	−0.81
Extensive grading					0.56	0.04			1.63	0.12
Athletic					−3.01	−0.28			−0.05	0.00
Tennis courts					18.02	1.01			16.51	0.91
Boston							34.11	2.10	39.65	2.78
Constant	197.51	7.57	213.23	9.22	132.17	2.21	219.57	9.27	140.25	2.22
r^2	0.2409		0.3513		0.6259		0.3878		0.6512	
F-statistic-1/ *p*-value	3.11/0.0156		3.39/0.0001		3.39/0.0001		8.59/0.0043		17.02/0.0000	
F-statistic-2/ *p*-value			2.73/0.0017		4.40/0.0407		7.74/0.0075			

NOTES: All models are estimated with seventy observations. *F*-test-1 tests the current model's specification against Model 1. *F*-test-2 tests the current specification against the immediately prior specification. For Models 4 and 5, the prior specification is the model omitting the Boston variable. Estimates allow for random error components by school district where there is more than one project in a district and for heterogeneity in the error term with the Huber–White correction. Costs are deflated using the *Engineering News Record* construction cost index for Boston.

additional variables rejects the null of all of the coefficients being zero in better than a 1-percent test.[7] With the addition of these variables, the effect of PLAs declines to $24.10 per square foot and is only significant in a one-tailed, 10-percent test.

Model 3 provides a more comprehensive model of school costs with the addition of school and project characteristics. With few exceptions, coefficients are correctly signed and are of moderate magnitude. For example, swimming pools, a particularly expensive amenity, are estimated to add $33.01 per square foot whereas auditoriums add $14.80 per square foot. Many variables are not statistically significant of themselves, but r^2 rises to 62.9 percent; an *F*-test that the coefficients on the additional variables are all equal to zero rejects the null in better than a 1-percent test. The PLA coefficient is smaller in Model 2 and is no longer significant in conventional tests.

Models 4 and 5 add a control for construction in the Boston School District to Models 2 and 3, respectively. Four schools were built in the Boston School District during the period under study; three were public schools built under PLAs and one was a private school. Urban construction is typically more expensive than construction in suburban or rural areas because of the difficulties of working in urban areas. For example, marshalling yards have to be established away from the construction site. Renting yards is costly in itself; moving materials and equipment from yards to the construction site also consumes time and resources. In addition, the more rigorous building standards of central cities also increase costs, as does the need to guard against theft and damage.[8]

Our estimates suggest that construction in Boston adds between $34.11 (Model 4, Table 2) and $39.65 (Model 5, Table 2) to the square foot cost of a school, the null is rejected in a 5-percent test in Model 4 and a 1-percent test in Model 5. Addition of the Boston variable improves the fit of the model; r^2 increases to 38.8 percent in Model 5 and 65.12 percent in Model 6. The Boston variable causes a marked decline in the PLA coefficient, from $23–$24 per square foot in Models 2 and 3 to $13.80–$13.90 in Models 4 and 5, the PLA coefficient is not significant in conventional tests. These results suggest that the PLA coefficient was proxying for the effect of construction in Boston in the leaner models.

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[7] We provide two *F*-tests for group significance. As the ordering of the addition of variables to Model 1 is arbitrary, the upper test in Table 2 compares the specification for the column with Model 1 specification. The lower *F*-test is a comparison with the immediately previous specification. As we allow for non-independence and heterogeneity in our error structure we only calculate r^2 and do not calculate $\bar{r}^2$.

[8] The 24-hour protection of public building sites in Boston add about $3.00 per square foot to costs.

Log Total Cost Models. Estimates from the log total cost models, Table 3, parallel those in the cost per square foot models, but the effect of PLAs is statistically weaker in all but the first specification. Results are consistent with the form of the model: total cost is convex in project size; there are economies of size in construction. An additional thousand square feet is estimated to increase school costs by 1.39 percent for a 50,000-square-foot school, by 1.26 percent for a 100,000-square-foot-school, and by 1.1 percent for a 150,000-square-foot school. Given the parallelism between the models, we focus discussion on the PLA measures.

In Model 1, which controls only for the size of the construction project, PLAs are estimated to increase the cost of construction by 16.6 percent, the coefficient is significant in better than a 5-percent, one-tailed test. Addition of controls for the type of school, ownership, and features including story, basement, and demolition (Model 2) reduces the magnitude of the PLA effect to 12.5 percent; it is no longer significant in even a 10-percent one-tailed test. The PLA coefficient declines to 9.7 percent in Model 3, the null hypothesis that PLAs do not affect school construction costs is not close to rejection in conventional tests.[9] Models 4 and 5 add the Boston variable to Models 2 and 3, respectively. The coefficient of Model 4 on PLA is 6.4 percent and that of Model 5 is 3.3 percent. Neither is close to statistical significance. In both these models, schools in Boston are estimated to have a large positive effect on school construction costs.

In summary, the large effects associated with PLAs in the leanly specified Model 1 are a consequence of omitted variable bias. Consistent with this explanation, the size, and particularly the statistical significance of the PLA variable decline in both sets of estimates as we move toward a specification that is more in keeping with that suggested by architects and engineers. There is however evidence of both multi-collinearity and over-determination in the more complete models. Despite the higher r^2 and the results of the F-tests, many of the variables in Models 2–5 are not individually statistically significant. The decline in the PLA coefficient in the cost per square foot model is smaller than the increase in the standard error of the coefficient. Given the relatively small sample, there is reason to be concerned that over-controlling for characteristics, and the consequent increase in standard errors, is the cause of the decline in the impact of the PLA variable.

[9] Some coefficients seem large, notably those on boiler and library. We suspect that they proxy for omitted characteristics associated with these features. In both cases, few schools were built without these features. The only school without a library was a private religious school for low-income students built at a low cost per square foot. The library indicator may proxy for all of the low-cost features of this school.

TABLE 3

ESTIMATION OF MASSACHUSETTS SCHOOL CONSTRUCTION COST, LN(TOTAL COST), ACTUAL COST

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*
Project Labor Agreement	0.1539	2.38	0.1181	1.20	0.0928	0.76	0.0620	0.77	0.0313	0.29
Area (sq. ft.)	1.52*E*–05	6.29	1.11*E*–05	5.95	1.25*E*–05	3.69	1.05*E*–05	5.48	1.11*E*–05	3.35
Area-squared	–2.58*E*–11	–3.60	–1.60*E*–11	–2.96	–2.15*E*–11	–2.18	–1.41*E*–11	–2.56	–1.74*E*–11	–1.79
Elementary			–0.0988	–1.90	–0.0897	–1.23	–0.1056	–2.05	–0.1092	–1.56
Private			–0.5083	–2.30	–0.2317	–1.46	–0.6083	–2.23	–0.3728	–2.09
Story			0.0651	1.44	0.0038	0.08	0.0747	1.62	0.0131	0.28
Basement			0.0270	0.59	0.0705	0.73	–0.0038	–0.07	0.0356	0.32
Demolition			0.0444	0.90	0.0295	0.49	0.0347	0.70	0.0201	0.32
Boiler					0.4749	2.24			0.4826	2.38
Chiller					0.0358	0.59			0.0204	0.34
Central air					–0.0203	–0.36			–0.0280	–0.49
Unit ventilators					–0.0019	–0.03			0.0039	0.07
Ground coupled					0.0362	0.29			0.0467	0.34
Unitary packaged					0.0390	0.44			0.0068	0.08
Steep					0.1278	1.44			0.1255	1.43
Combination					0.0541	1.02			0.0643	1.08
Swimming pool					0.2234	2.06			0.1317	1.48
Cafetorium					0.0440	0.82			0.0345	0.60
Band room					–0.0544	–0.57			–0.0840	–0.91
Auditorium					0.1548	2.17			0.1556	2.14
Elevators					0.0865	0.75			0.0942	0.78
Gymnasium					–0.2742	–2.39			–0.2922	–2.45
Kitchen					0.0595	0.49			0.0461	0.36
Library					0.5024	1.72			0.5849	2.01
Science labs					0.0413	0.58			0.0208	0.30
Vocational rooms					–0.0957	–1.22			–0.0879	–1.10
Extensive grading					0.0287	0.35			0.0357	0.43
Athletic					–0.0243	–0.36			–0.0049	–0.07
Tennis courts					0.1041	0.96			0.0942	0.86
Boston							0.1856	1.98	0.2597	2.93
Constant	15.1747	156.0	15.3622	81.35	14.5063	34.70	15.3967	80.68	14.5592	33.74
r^2	0.8849		0.9015		0.9421		0.9055		0.9461	
F-statistic-1/ *p*-value			3.46/0.0088		7.42/0.0000		3.03/0.0127		13.47/0.000	
F-statistic-2/ *p*-value					5.45/0.0000		3.94/0.0524		8.66/0.0050	

NOTES: All models are estimated with seventy observations. *F*-test-1 tests the current model's specification against Model 1. *F*-test-2 tests the current specification against the immediately prior specification. For Models 4 and 5, the prior specification is the model omitting the Boston variable. All estimates allow for random error components by school district where there is more than one project in a district and for heterogeneity in the error term with the Huber–White correction. Costs are deflated using the *Engineering News Record* construction cost index for Boston.

Issues with Estimates

The prior estimates bring out two distinct issues: the effect of controlling for construction in the city of Boston and over determination. With respect to the Boston variable, we need to determine whether its apparent impact on the PLA coefficient is due to attributing special properties to one-third of our sample of PLAs. With respect to the issue of over-determination, we face a trade-off between sufficient specification and reducing the degrees of freedom for standard errors and statistical significance (Johnston 1984: 259–264).

Control for Construction in Boston. Although central city construction is more expensive than other construction, Boston construction costs may be particularly high as projects may require pilings; much of Boston is built on fill, and requires 24-hour security. Boston Public Schools are also more expensive than their suburban counterparts as they are permanent buildings.[10] The small data set and the complexity of the interaction between public schools, PLAs, and construction in Boston make separating the effects of PLAs from those of construction in Boston challenging. Three of the nine PLAs in our data are Boston schools. The only non-PLA school built in Boston was one of three private schools in our sample. To better distinguish the effects of location and PLA, we estimate two additional versions of the models that include Boston variables: one with a Boston Public School variable but without the Boston variable and one with both a Boston Public School and Boston variable. We estimate these models for the specifications of the cost per square foot and log total cost for Models 1, 2, and 3 (Table 4). Although these models will not be able to distinguish a Boston Public School and Boston School PLA effect, it will measure PLA effects outside Boston.

Considering the models with just the Boston Public School variable, the PLA coefficient in Models 1′, 2′, and 3′ is about half the size of the estimate obtained in models reported in Tables 2 and 3 and is never statistically significant. The decline in significance is not the result of an increase in the standard error of PLA. The PLA coefficient is estimated with greater precision, a smaller standard error, in models including the Boston Public School variable, but the decline in the standard error is smaller than the decline in the PLA coefficient. Estimates of the PLA effect in models with both the Boston and Boston Public School variable—the lower half of Table 4—are qualitatively similar to models with just the Boston Public School variable. In all models the cost of Boston Public School construction is substantially higher than other schools. In sum, these

[10] Because of these differences, Boston schools, fire stations, and police stations are designed by a city bureau.

TABLE 4

PROJECT LABOR AGREEMENT (PLA) EFFECTS OF CONTROLLING FOR BOSTON PUBLIC SCHOOL CONSTRUCTION

	Model 1′		Model 2′		Model 3′	
	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*
Model with PLA and Boston Public School indicator						
Cost per square foot						
PLA	12.00	0.94	8.34	0.88	8.40	0.47
Boston Public	50.51	2.42	48.37	6.66	48.69	4.16
log total cost						
PLA	0.079	0.92	0.027	0.40	0.0158	0.14
Boston Public	0.228	1.63	0.2779	5.67	0.2521	2.94
Model with PLA, Boston and Boston Public School indicator						
Cost per square foot						
PLA	12.24	0.95	8.11	0.86	5.50	0.29
Boston	−30.77	−0.98	−9.71	−0.15	−47.73	−0.82
Boston Public	81.90	2.14	58.03	0.91	95.24	1.69
log total cost						
PLA	0.083	0.99	0.025	0.36	0.032	0.27
Boston	−0.463	−2.26	−0.097	−0.28	0.269	0.69
Boston Public	0.700	2.81	0.375	1.08	−0.104	−0.03

models indicate that PLAs do not affect school costs outside the Boston area, but it is not possible to distinguish between the Boston Public School cost effect and any effect that PLAs have on the cost of Boston Public Schools.

Sorting Out Multi-Collinearity and Over-Determination. There is evidence of multi-collinearity and over-determination in our more complete specifications. Although the R^2 for the models are reasonable, and F-tests consistently reject the null that additional coefficients are zero, many coefficients are not significant in t-tests and some effects seem large. The variance inflation factor for PLA for Models 2 and 3 were 1.73 and 3.19, respectively, suggesting multi-collinearity between the PLA and other variables. Further, the loss of degrees of freedom in models with large numbers of explanatory variables may inflate standard errors (Johnston 1984: 259–64). The concern then is that the decline in the significance of the PLA coefficient in more complete models is driven more by collinearity and the reduced degrees of freedom in a regression with a modest-sized data set than by the elimination of omitted variable bias.

Although even our most complete model would be viewed as inadequate by a contractor bidding on a school project, the statistical issue differs from such concerns. Our goal is to determine whether a more completely specified model improves our PLA estimates. As our direct approach, adding a reasonable set of variables, has proven problematic, we explore the data by defining a set of

PLA and non-PLA schools that are sufficiently similar that we can compare their costs with few controls.[11] This is implemented using a two-stage propensity score methodology. We first estimate a discrete dependent variable model of the factors determining the use of a PLA on school projects. This model generates the predicted probability, $\ni(Z)$, that the school will be built with a PLA and this is used to weight the second-stage cost regression.[12] Schools that are almost certain to use or not use a PLA have propensity weights of 1, weights for schools for which there is less certainty about using a PLA are larger. In essence, schools that are strongly dissimilar in their likelihood of using a PLA, are given less importance than those that, but for the PLA, are reasonably similar. The latter schools form the "region of common support" (Morgan and Harding 2006).

The first stage was estimated with a logistic model. An issue in estimating discrete choice models on small data sets is that explanatory variables may predict success or failure perfectly, and the perfectly predicted observations are removed from the estimate. For example, as only non-PLA schools were built without demolition, the demolition variable predicted not having a PLA perfectly for thirty-one schools and these observations were eliminated. We initially used the very complete set of explanatory variables for our estimates but, because so many variables were perfect predictors, this specification eliminated all observations. Shorter specifications were also tried with a similar outcome. Finally, we used our prior logistic models to remove variables that were perfect predictors from the logistic model and were able to estimate a model which retained all observations.[13] Even in this greatly simplified model, sixty-two of the seventy observations were predicted perfectly, having probabilities of 0 (non-PLA) or 1 (PLA). Of the eight remaining, only one PLA school had a probability lower than that of some non-PLA schools. PLA and non-PLA schools are then strongly dissimilar and there is no region of common support.

Although this approach did not obtain a set of weights useful for second-stage estimates, it provided insights into the limits of the regression models. PLA and non-PLA schools have different and largely non-comparable characteristics. As the characteristics of PLA and non-PLA schools tend to cluster, there is inherent multi-collinearity and, at least in small data sets, regression

[11] See Rosenbaum and Rubin (1983), Morgan and Harding (2006), Hirano and Imbens (2001), or Robins (1987).

[12] The weight, known as a propensity score, is $100/\ni(Z)$ for schools with PLAs, $100/(1-\ni(Z))$ for non-PLA schools.

[13] The explanatory variables included in this logistic model were size in square feet, story, elementary school unit ventilators, unitary packaged, combination, cafetorium, band room, vocational shops, labs, extensive grading, athletic, ibctype2a, ibctype2b. Comparison of this list with the variable list in Table 1 shows that, once features uniquely associated with PLAs were eliminated from the model, the remaining variables tended to be less important construction characteristics.

analysis cannot distinguish the PLA effect on costs from the effect of characteristics that affect both whether a PLA is used for a school and school costs. It is not possible to make a PLA/non-PLA comparison *other things equal* without expanding the size and variability of the data.[14]

Our results are consistent however with emerging legal doctrine on the use of PLAs. The New York Court of Appeals and the Rhode Island Supreme Court have required that there be an adequate reason to apply a PLA to a project and that sufficient analysis is done to determine whether a PLA advances the purposes of the state's competitive bidding statute. Our finding that PLA projects are fundamentally different from non-PLA projects is consistent with this requirement, countering the view that PLAs are used principally to exclude competitors.

Comparison with Prior Research

How do our results compare with that of Bachman et al. (2003)? Bachman considers the effect of PLAs on the bid price for school construction for 126 schools built in the Boston area between 1995 and 2001 allowing for the effects of project size, the number of stories, and whether the project was a new construction or a renovation. The study was limited to schools with a construction price of at least $5 million and between 40,000 and 400,000 square feet. Seventeen percent of the 126 construction projects were bid with PLAs.[15] Regressing Dodge cost per square foot against area, whether the project was a new construction, and whether the school was built under a PLA, PLAs were estimated to increase the cost of school projects by $18.83 per square foot (Table 5). This estimate suggests that the typical PLA project of 132,000 square feet would cost $2.6 million, 14.0 percent, more than had it been built without a PLA. Models limited to the eighty-five new schools in

[14] The problem may be illustrated with an example from our cost estimates. In some of our work we estimated Model 2 in two stages, first adding elementary and private and then story, basement, and demolition variables. Contrary to expectations by our experts, a referee, and ourselves, it was not possible to reject a null of zero coefficients in an *F*-test of the latter three variables; two out of three of the coefficients were not close to significant individually. Nevertheless, addition of these variables to Model 2 caused a substantial decline in the coefficient on PLA, from about $32 to $24 a square foot. In models that omitted demolition, story and basement had large positive coefficients. The logistic estimates indicate that each of these variables is, in our data set, strongly related to whether a school adopts a PLA. In the final version of the model, story had a coefficient of 6×10^{23}, indicating a strong relationship with adoption of a PLA. There is then an issue of "fundamental" multi-collinearity; our problem in getting clear estimates is not caused by chance correlations but rather by underlying causal relationships.

[15] Bachman et al. report that PLA projects averaged 151,000 square feet against 134,000 square feet for non-PLA projects. PLA schools cost $152 per square foot against $134 for non-PLA schools. The average bid price was $22.92 and $16.95 million for PLA and non-PLA schools, respectively.

TABLE 5

COMPARISON OF BACHMAN ET AL. WITH SIMILARLY SPECIFIED MODEL USING CURRENT DATA

Variable	Bachman et al.		Current research
	Preferred model	New school sample	Dodge bid cost sample
Project Labor Agreement	18.83 (4.79)	14.90 (significant at 1 percent)	16.77 (1.32)
New	−17.89 (6.6)		
Square feet (100,000s)	−12.36 (2.5)	a	−30.0 (1.24)
Sq. ft.-squared (100,000)		a	7.87E-09 (1.20)
Constant	138.7 (28.0)	a	358.70 (2.03)

NOTES: [a]Variable included but estimates not reported.

SOURCE: Bachman et al. 2003. *Project Labor Agreements and the Cost of School Construction in Massachusetts.* Boston: Beacon Hill Institute; http://www.beaconhill.org/BHIStudies/PLApolicystudy12903.pdf

the sample find that PLAs increase the cost of construction by $14.90 per square foot (Table 5, column 2).

How do our estimates compare with these? The PLA coefficient in the most comparable model in our research, Model 1 in Table 2, is $28.77, twice that of Bachman et al. However, our dependent variable is final cost, not bid cost. Substituting costs from the Dodge Reports for final cost for the sixty-one schools for which we have this data, we find that PLAs increase cost per square foot by $16.77, similar to Bachman et al.'s new school estimates.[16] These results provide reasonable assurance that the differences between our work and that of Bachman et al. is not driven by differences in samples or estimation techniques; our finding on the conflation of PLA effects with those of school characteristics associated with the use of PLAs in lean specification extends to prior research.

Conclusion

The effect of PLAs on the performance of school construction has become increasingly controversial. Prior work has found that PLAs substantially increase the cost of school construction. The current research extends this earlier work by examining the effect of more complete specifications and considers the interaction between school characteristics, adoption of PLAs, and distinguishing the cost of characteristics from the cost of PLAs. Our estimates suggest that, although lean specifications find that PLAs raise the cost of school construction, this does not characterize more complete specifications that better fit the data. However, the more complete specifications suffer from

[16] The estimated effect of the PLA variable for the final cost of new schools is $23.28, about $5.00 per square foot lower, in the sample of sixty-one schools for which we have the Dodge bid price.

multi-collinearity and over-determination. Detailed analysis of the data suggests that the measured PLA effect is because of the three public schools in Boston and that PLAs do not affect school costs outside of the Boston School District. Further, propensity analysis suggests it is not possible to disentangle the effect of PLAs on school costs from the effects of school characteristics that underlay the decision to adopt a PLA. Although it should be possible to disentangle these cost effects with a substantially larger data set, assembling such a data set would be challenging.

This study does not provide a certain answer to the question "why PLAs?" Belman, Bodah, and Phillips (2007) suggest that PLAs are often used where there are hard deadlines for the completion of projects, where the success of a construction project depends on timely access to qualified labor, and where delay has large costs.[17] It may then be that PLAs are neutral on direct construction costs, but are advantageous to owners for whom timeliness is paramount.

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[17] Toyota has used PLAs on all of its major construction projects, more than 38 million hours of construction labor, since the mid-1980s.

PROJECT LABOR AGREEMENTS
A Cost-Benefit Analysis for State and Local Governments

The cover of the June 28, 2010 ***TIME Magazine*** has a headline that reads, "The Broken States of America – How the Financial Crisis of the States Affects All of Us." The article contained therein ("The Other Financial Crisis"), which focuses on the widespread issue of states and local governments facing the worst cash squeeze since the Great Depression, is an important aspect to the debate over public construction and the utility of Project Labor Agreements (PLAs), not to mention prevailing wage statutes.

According to the ***TIME*** article, "...state governments are approaching the brink of fiscal calamity, as the crash of 2008 and its persistent aftermath have led to a reckoning in 2010." As lawmakers across the country deal with these fiscal issues, it is imperative that they receive a substantive, countervailing narrative to the claims by the Associated Builders and Contractors (ABC) and others that PLAs and prevailing wage statutes unnecessarily drive up the costs of taxpayer-funded construction, and therefore in these times of fiscal misfortune at the state and local level, they should be summarily cast aside in favor of a "low bid" approach to procuring construction services.

We need to be aggressive in painting a more complete picture of the workings and practices of the U.S. construction as they currently exist today...and how they factor into, and directly affect, the fiscal problems that all jurisdictions are experiencing today.

For example, the ***TIME*** article asserts that over the course of the next year there is expected to be, on average, a 5.4% across-the-board growth in the number of Medicaid recipients. This simply continues the trend of the United States vastly extending taxpayer-funded Medicaid to the working poor. In fact, over the course of the past decade, Medicaid has been the source of the biggest expansion of a government entitlement since the Great Society was launched in the 1960s.

With little notice, the medical care program paid by federal and state taxpayers has grown from covering 34 million people in 1999 to 47 million in 2004.

Medicaid's growth has continued despite debates about spiraling costs and controversial efforts in Tennessee, Missouri and other states to scale it back. The initial growth of Medicaid enrollments was the direct aftershock of welfare reform, which since 1997 has pushed individuals off welfare and into the workforce. But, in order to support low-wage workers (who often do not receive health care insurance coverage through work), Congress and state legislatures have had to expand coverage to low-income working families. Medicaid previously had gone primarily to welfare recipients.

So, where does the construction industry fit into this equation? Well, not only does it fit, but it is one of the main drivers of this trend.

And that's because the American construction industry, as it exists today, is increasingly becoming defined by contractors who have explicitly chosen to not play fair...or play by any rules at all. We refer to this as the "low road" business model.

These unprincipled, "low road" contractors attempt to win bids and fatten their profit margins by intentionally doing things that subvert the law, and by treating their employees as disposable commodities. They will submit drastically low bids knowing they have no intention of following prevailing wage laws, even when mandated by law.

Additionally, many of these contractors are becoming increasingly engaged in misclassifying their employees as "independent contractors" in order to avoid paying Workers' Compensation, Unemployment Insurance, and health care and pension benefits (which allows them to submit even lower bids – while simultaneously ripping off the taxpayers by not paying requisite taxes).

According to a 2000 study commissioned by the U.S. Department of Labor, as many as 30 percent of firms illegally misclassify their employees as independent contractors. In addition to harming workers, independent contractor misclassification costs all levels of government billions each year in lost tax revenue. That lost tax revenue must then be accounted for by cutting other important public services, or by raising taxes on individuals or businesses.

Project Labor Agreements removes the potential for independent contractor misclassification to distort the contracting process, since employers that engage in this misclassification enjoy a substantial—and illegal—cost advantage over law-abiding employers.

It is also become a de facto part of the "low road" business model to utilize and exploit undocumented workers and pay them sub-standard wages (or not pay them at all, in some cases).

And finally, these contractors are not adverse to using inferior materials, and taking unsafe shortcuts that put workers, as well as the project itself, in danger.

Not surprisingly, these contractors, and the organizations that represent them (such as the Associated Builders and Contractors), are the most vocal opponents of project labor agreements and prevailing wage laws.

Now, this is not only unfair to responsible businesses and employees who live and work in our communities, and who find themselves having to compete against this "race to the bottom" business model...but it's also NOT FAIR TO THE TAXPAYERS! And that's because the "low road" business model has a negative affect on the fiscal health of state and local governments.

For example, a close examination of the U.S. construction industry as it exists today reveals an industry that saddles the U.S. health care system with the highest injury and illness rate among all private industries. According to CPWR – the Center for Construction Research and Training, the construction industry has the highest rate of non-fatal injuries and illnesses, and it has three times the fatality rate of other private industries. Accordingly, construction accounts for the highest rate of injuries and illnesses entering the nation's hospitals, particularly hospital emergency services.

Now, couple that disturbing trend with the fact that the construction industry and the agricultural industry have the lowest rate of employer-provided health care coverage on an inter-industry basis...and within construction, coverage is lowest within companies having fewer than 10 employees – which comprises the vast number of construction contractors (over 80% of all employers).

In sum, the U.S. construction industry today is defined by the dual characteristics of high-risk work and chronic un-insurance, primarily because relatively few construction companies offer employee coverage – and significant numbers of employees cannot afford the coverage when it is offered...leaving them to obtain health care services at the public's expense (e.g. Medicaid).

So, when a hospital patient receives a bill that charges $7.00 for one tablet of Tylenol, he or she needs to look no further than the preponderance of the "low road" approach in the construction industry to understand why.

In fact, such cost-shifting has taken, and continues to take, a tremendous toll on families and communities all across the nation. Recent studies have documented the heavy burden on public safety net programs—and resulting costs for the taxpayers—caused when workers are paid poverty wages and do not receive employer-provided health and retirement benefits.

For example, the Center for American Progress has estimated that in Dallas, TX the societal cost of uncompensated health care and other services – in the form

of higher taxes and insurance premiums -- runs as high as $1,800 per family per year!

Similarly, an analysis by the University of California found that $10.1 billion of the $21.2 billion that federal and state taxpayers spent in 2002 on public assistance programs in California went to families of low-wage workers. Similar analyses have demonstrated corresponding public costs attributable to low-wage employers in New York, Wisconsin and Illinois.

These hidden public costs to governments at all levels more than offset the perceived savings that low-wage contractors may appear to offer federal, state and local agencies who contract for construction services. Unfortunately, the contract pricing and evaluation systems currently used by agencies at all levels of government typically do not take into account these indirect costs.

Conversely, a growing body of research demonstrates that in many industries, contractors that provide good wages and benefits and respect workplace laws deliver higher quality services for government agencies and the taxpayers.

In construction contracting in particular, research has indicated that "high road" contractors that comply with workplace laws and provide quality training, along with family-sustaining wages and benefits, typically have better skilled and more productive workforces that increase both the productivity and quality associated with public construction work. And that typically results in savings for the taxpayers.

Indeed, numerous credible academic studies have concluded that there is no evidence to support claims that Project Labor Agreements either limit the pool of bidders or drive up the actual construction costs. We would refer lawmakers and public procurement officials to a series of such studies, including Fred B. Kottler's March 2009 report, ***"Project Labor Agreements in New York State: In the Public Interest*** (Cornell University School of Industrial and Labor Relations). They would also benefit from reading Dale Belman's, Matthew Bodah's and Peter Philips' comprehensive report for ELECTRI International, ***"Project Labor Agreements,"*** which concluded that, "The presence of a PLA does not have a statistically significant effect on the final cost of a project." And there are numerous other studies that can be found at: www.PLAsWork.org.

It's simply a matter of common sense and economics. A highly paid, highly trained workforce is more productive, which can have the effect of producing lower labor costs than a low-wage, low-skill workforce. That is the essence of the PLA business model.

As early as the 1980's, an audit by the U.S. Department of Housing and Urban Development (HUD) of seventeen HUD sites found a "direct correlation between labor law violations and poor quality construction" on HUD projects, and found

that the quality defects on these sites contributed to excessive maintenance costs. The HUD Inspector General concluded that "[T]his systematic cheating costs the public treasury hundreds of millions of dollars, reducing workers' earnings, and driving the honest contractor out of business or underground."

More recently, a survey of New York City construction contractors by New York's Fiscal Policy Institute found that contractors with workplace law violations were more than five times as likely to have a low performance rating than contractors with no workplace law violations. Other studies have found that construction workers who receive higher wages and quality training are at least 20 percent more productive than less skilled and lower paid workers.

On the flip side, a study examining the impact of repealing prevailing wage laws in nine states found that the resulting drop in construction worker wages correlated with increases in cost overruns and delays on construction projects, and led to a workforce that was less skilled and less productive. Yet despite the recognized quality advantages and offsetting savings generated by better paid workforces, many federal, state and local contracting systems do not currently provide any systematic way to factor them in during the contract pricing and evaluation process. As a result, they remain largely ignored, skewing the selection process towards the "race to the bottom" contractors.

The city of El Paso, Texas, discovered that while the bids that the city receives from contractors that provide health benefits tended to be a little higher, the net impact on the taxpayer is about the same because of higher workforce productivity and the offsetting public health care system savings.

In the long run, and especially during these times of fiscal calamity for state and local governments, it is costing government more money to have people not insured than it does to have people insured. It is a huge drain on the economy and on the tax base of local governments.

Therefore, it is important for lawmakers and policymakers to factor those costs into the contracting process, and into their deliberations involving the embrace of PLAs and prevailing wage statutes. The calculation is fairly straightforward: Where an employer is providing health and retirement benefits and saving the health system money, those savings should be weighed when federal, state and local governments seek to invest in construction.

Project Labor Agreements (and prevailing wage statutes) are a valuable tool to ensure that public dollars are leveraged to ensure not just a quality return on publicly-funded construction investments, but also to ensure those dollars are not being used to further prop up a business model that causes so much social and economic damage – and which those same governmental entities will have to clean up with additional taxpayer funds.

The bottom line is that the U.S. construction industry is increasingly becoming characterized by companies willing to do work for bargain-basement prices, but they may not always deliver what they promise and often times that results in more costs for our community as work needs to be corrected or repaired, and poverty-wage workers unduly place increasing burdens on our social safety nets – which results in increased taxes and other costs being placed on individuals and small businesses.

Through the use of Project Labor Agreements, a community can assure itself that it is dealing with only responsible companies, those who possess the proper business registrations, show past compliance with environmental, labor and safety laws, relevant insurance coverage, prevailing wage compliance and apprenticeship and training participation. It is these types of attributes that are ensured through PLAs, and which can go a long way in assuring the financial and structural success of all public construction projects.

In the long run, a Project Labor Agreement is going to provide more taxpayer value than a process that selects the "race to the bottom" contractor who is cutting corners in the areas of workforce skill levels, materials, or safety.

Finally, Project Labor Agreements provide a structured pathway for local residents to gain access to career training in the skilled trades. Most skilled trade apprenticeship offer "earn while you learn" programs that mandate five years of training consisting of over 800 hours of classroom education and 8,000 hours of on-the-job training under the supervision of an experienced and highly skilled tradesperson. In some cases, the completion of a skilled craft apprenticeship program includes the awarding of a two-year Associate's Degree from a local community college.

In the end, PLAs provide local communities with a cost-effective model to obtain quality work and jobsite efficiencies; while helping local jurisdictions handle current fiscal problems associated with an increased strain on public safety net resources – such as Medicaid expenditures. PLAs also ensure a financial boost to the local tax base through the payment of livable wages and benefits; as well ensuring a local pool of skilled and properly trained workers, along with structured pathways to career training for local residents.