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**Evaluation of the Performance of the Department of Design and Construction in  
Improving the Speed and Cost-Efficiency of Capital Construction Projects**

The Department of Design and Construction (DDC) began operation in fiscal year 1997 with the mission of improving the speed, cost-efficiency and quality of the City's capital construction and reconstruction projects. Personnel from the Departments of Transportation (DOT), Environmental Protection (DEP), and General Services (now Citywide Administrative Services, or DCAS) were transferred to the new agency, which consolidated management of certain road and sewer capital infrastructure projects and of construction and renovation of public buildings and facilities.

The Independent Budget Office was asked to evaluate how well DDC has met the goals established for it at its inception.

Data limitations precluded comprehensive comparison of DDC's performance with that of the agencies that managed the same projects prior to DDC's creation. Similarly, comparisons of DDC's performance with that of other agencies that currently manage capital projects were also precluded by the non-comparability of projects.

We were able, however, to make some evaluation of DDC's progress since its creation in the amount of time the department takes to complete projects, and the cost-effectiveness with which it does so. In general, DDC has improved its performance in both of these dimensions over the several years of its existence.

**TIME TO COMPLETE PROJECTS**

We considered three measures to evaluate the speed with which DDC completes capital projects: the time to award contracts; the duration of the construction phase; and the number of active contracts.

***Contract Award.*** A key aspect of the speed of construction work is the speed of the process of awarding contracts. DDC has substantially met its goal of reducing the time spent on the awarding of construction and design contracts. Over the past five years, the average duration of bid processing has steadily shortened. DDC attributes at least some of the reduction in award time to the use of ACCOFlow, a computer application that expedites procurement by generating documents and managing the internal work flow of the procurement process.

A comparison between DDC's contract award phase and that of other current or predecessor agencies was not possible.

| <b>DDC Competitive Sealed Proposal Processing</b>     |     |
|---|-----|
| <i>Average number of days to complete</i>             |     |
| 1998  | 297 |
| 1999  | 252 |
| 2000  | 235 |
| 2001  | 260 |
| 2002  | 198 |
| 2003  | 202 |
| SOURCES: IBO; Department of Design and Construction.. |     |

**Design and Construction Duration.** An examination of the MMR's annual data from 2000 through 2003 shows neither a consistent shortening nor lengthening of construction duration over the several years of DDC's existence. Data provided to us by DDC on the average duration of the design and construction phases of DDC projects from 1998 through 2002 is shown below. While it is not surprising that the construction phase of larger and more complex projects would be longer than that of smaller projects, the *design* phase of both infrastructure and structures projects varied considerably less than the construction phase.

| <b>Average Time to Complete DDC Projects</b>         |        |              |
|--|--------|--------------|
| <i>In days, 1998 - 2002</i>                          |        |              |
|  | Design | Construction |
| <b>Infrastructure</b>                                |        |              |
| Under \$500,000                                      | 213    | 166          |
| Between \$500,000 and \$1 Million                    | 241    | 275          |
| Between \$1 Million and \$5 Million                  | 247    | 392          |
| Greater than \$5 Million                             | 305    | 607          |
| All Projects   | 248    | 353          |
| <b>Structures</b>                                    |        |              |
| Under \$500,000                                      | 174    | 163          |
| Between \$500,000 and \$1 Million                    | 233    | 287          |
| Between \$1 Million and \$5 Million                  | 219    | 288          |
| Greater than \$5 Million                             | 310    | 684          |
| All Projects   | 206    | 257          |
| SOURCES: IBO; Department of Design and Construction. |        |              |

We did not have the data to directly compare the fairly stable construction duration achieved by DDC to the construction duration achieved by its predecessor agencies or by other city agencies.

**Number of Active Contracts.** Another way to measure the timeliness of DDC projects is by the number of active contracts. This is a useful indicator of performance because it shows how many contracts DDC staff must manage at any one time. If the staff is not overburdened with a backlog of delayed or unfinished projects, management should improve, all else equal.

As shown in the table on the following page, the total dollar value of active contracts has fallen considerably over the past several years. This could be caused by either improved speed in completing projects, or simply by fewer project starts. City capital spending slightly increased

during 1997-2002 as compared to 1991-1996, and infrastructure construction project starts have actually increased as compared to the pre-DDC era. The decrease in the value of the stock of active projects appears, therefore, to be caused by improved speed in completing projects, rather than by a decrease in the number of new projects. DDC attributes this to better project management and use of its Key Performance Indicators which benchmark agency performance.

| <b>Active DDC Construction Contracts</b>            |        |                    |               |
|---|--------|--------------------|---------------|
| <i>Inflation-adjusted 2003 dollars, in millions</i> |        |                    |               |
| Year  | Number | Total Dollar Value | Average value |
| 1997  | 1,039  | \$2,656            | \$2.56        |
| 1998  | 1,142  | \$2,520            | \$2.21        |
| 1999  | 1,261  | \$2,420            | \$1.92        |
| 2000  | 942    | \$1,702            | \$1.81        |
| 2001  | 1,123  | \$2,037            | \$1.81        |
| 2002  | 938    | \$1,935            | \$2.06        |
| 2003  | 887    | \$1,225            | \$1.38        |

SOURCES: IBO; Mayor's Management Reports.

| <b>Infrastructure Project Starts and Completions</b> |           |           |
|--|-----------|-----------|
|  | 1992-1996 | 1997-2001 |
| <b>Water main replacements</b>                       |           |           |
| <i>Average in miles per year</i>                     |           |           |
| Designs started                                      | 42.2      | 41.6      |
| Reconstruction started                               | 54.9      | 67.7      |
| Reconstruction completed                             | 56.6      | 69.9      |
| <b>Sewer reconstruction</b>                          |           |           |
| <i>Average in miles per year</i>                     |           |           |
| Designs started                                      | 17.4      | 23.8      |
| Reconstruction started                               | 26.5      | 27.1      |
| Reconstruction completed                             | 17.0      | 25.3      |
| <b>Road reconstruction</b>                           |           |           |
| <i>Average in lane-miles per year</i>                |           |           |
| Designs started                                      | 11.7      | 25.2      |
| Reconstruction started                               | 39.9      | 49.2      |
| Reconstruction completed                             | 52.1      | 51.1      |

SOURCES: IBO; Mayor's Management Reports.

In sum, the available information shows that bid processing has been speeded up under DDC's watch, and the decrease in the number and value of active contracts suggests that DDC is shortening the duration of construction projects.

## **COST-EFFECTIVENESS**

The sorts of projects the DDC now manages were managed by other agencies before 1996. The best measure of DDC's success in reducing project costs, therefore, would be a comparison between the cost of these projects under DDC management and the cost under the management of other agencies. Ideally, we would have learned the average unit cost of road reconstruction, sewer replacement and water main replacement, separately, so as to be able to compare DDC's performance to that of the other agencies. The agencies were not able to provide us this

information, however, so we have examined other measures of cost containment, including cost overruns, contractor defaults, and headcount.

**Cost Overruns.** Perhaps the most common measure of cost-effectiveness in construction is the cost overrun. Cost overruns for DDC projects have decreased since 1997, from 8 percent to around 3 percent, as shown in the table below. We obtained a comparative statistic from the Department of Environmental Protection (DEP): the rate of cost overruns for sewer projects from 1993 through 1996 was 11 percent. This figure, however, includes overruns that were due to the broadening of the scope of the project, whereas the DDC metric excludes such overruns.

| <b>Cost Overruns on DDC-managed Projects</b>   |      |
|--|------|
| <i>Average Percentage Increase/Decrease for all Completed Construction Contracts</i> |      |
| 1997   | 8.0% |
| 1998   | 8.4% |
| 1999   | 4.6% |
| 2000   | 1.5% |
| 2001   | 2.0% |
| 2002   | 3.4% |
| 2003   | 3.1% |

SOURCE: Mayor's Management Report.

It is possible that contractors may have responded to DDC's crackdown on cost overruns by bidding higher. While not definitive evidence, the declining average value of contracts suggests that this has not been occurring.

**Contractor Defaults.** Another goal for DDC is the prevention of contractor defaults. Defaults delay completion of work, increase project costs, and jeopardize the quality of work. In order to reduce the risk of contractor default, DDC states that "in the pre-award process [DDC] reviews the financial status of bidders, their previous performance on City projects and other similar projects, and their technical qualifications." DDC reports that 12 infrastructure contracts and 52 building contracts entered into default from 1998 to 2002. The 64 defaults represent about 1.7 percent of all the projects begun in that time period (assuming that the defaulting contracts each covered only one project), a low ratio by industry standards. On the other hand, the Department of Environmental Protection reports zero contract defaults since 1995, but a large majority of their construction contracts moved to DDC upon the creation of DDC in 1996.

**Headcount.** Another element of the cost of DDC's projects is the cost of DDC employees. We look at both the total number of employees and at the ratio of the value of capital contracts administered to personnel spending. These measures indicate that DDC has made increasingly more efficient use of its labor force.

When DDC was created, employees from three agencies—DEP, DOT, and DCAS—were shifted to the new department. DDC's current headcount and inflation-adjusted expenditures are very similar to—indeed slightly less than—the initial personnel and funding shifted to DDC, as reported in the 1997 Message of the Mayor.

An additional concern has been that total combined spending on capital project management may have risen. Time spent by city employees on capital projects is reimbursed from the capital fund,

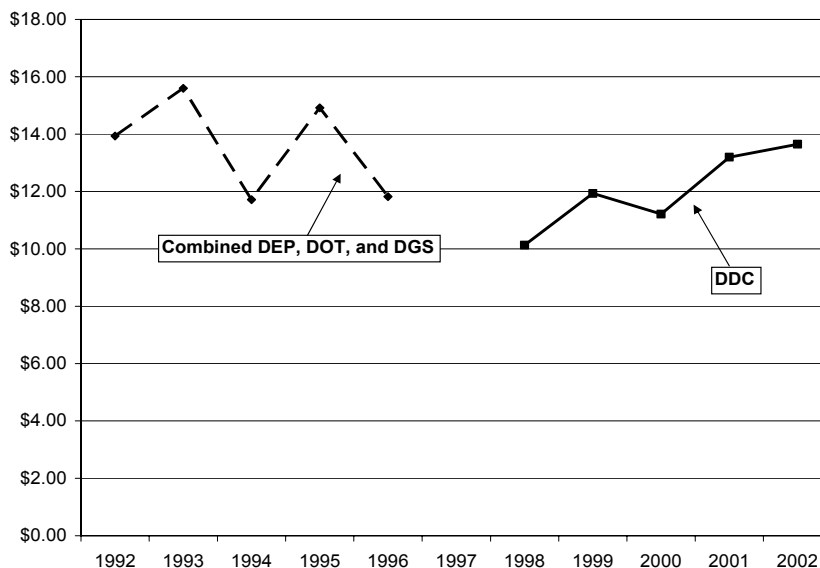
through what is known as an inter-fund agreement, or IFA. The annual combined IFA spending of DDC, DCAS, DEP and DOT—\$203.5 million—is not significantly different than the IFA spending prior to 1997 of DGS, DEP and DOT—\$200.0 million (in inflation-adjusted 2003 dollars). IFA-funded headcount in DCAS, DOT and DEP has increased slightly in the past few years: from 1,675 in 2000 to 1,773 in 2004.

| <b>Personnel and Funding Shifted to Create DDC</b> |                       |                               |
|--|-----------------------|-------------------------------|
| <i>Dollars in millions</i>                         |                       |                               |
| Agency   | Headcount Shift, 1996 | Funding shift, 1996 (2003 \$) |
| DEP  | 400                   | \$24.4                        |
| DOT  | 305                   | 16.5                          |
| DCAS   | 629                   | 46.1                          |
| <b>TOTAL</b>                                       | <b>1,334</b>          | <b>\$87.1</b>                 |
|  | Headcount             | Funding                       |
| DDC 2003 Actuals                                   | 1,198                 | \$79.6                        |

SOURCES: IBO; Financial Management System.

Another measure of efficiency is the dollar amount of construction contract spending per IFA dollar spent—a higher ratio indicates greater efficiency in management of capital projects. DDC, although starting at a lower point than its predecessor agencies (\$10 of capital spending per \$1 of IFA spending in 1998 compared to \$12 to \$1 in 1996), has increased steadily to nearly \$14 of capital spending per IFA dollar in 2002. The mix of projects managed by DDC is not precisely the same sorts of projects managed by DEP, DOT and DGS. Therefore, the trend of this ratio during DDC’s existence is more important than the comparison with previous years. The trend indicates that DDC has made increasingly more efficient use of its labor force (funded through IFA).

**Capital Commitment Dollars Managed per Dollar of IFA Spending**



SOURCES: IBO; Financial Management System.

## **CONCLUSION**

In conclusion, the information available to us indicates that DDC has improved in several respects since the founding of the agency in 1997: speeding the bid process and possibly shortening construction duration; reducing cost overruns; and containing personnel costs.