

GAO

Fact Sheet for the Honorable
Hank Brown, U.S. Senate

August 1995

DENVER
INTERNATIONAL
AIRPORT

Baggage Handling,
Contracting, and Other
Issues



564342



United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-261887

August 9, 1995

The Honorable Hank Brown
United States Senate

In January of this year, you requested that we provide you with information about the Denver International Airport (DIA). You specifically asked that we provide you with (1) a cash flow analysis; (2) an examination of the Securities and Exchange Commission's rule governing the requirements for financial reporting in bond prospectuses; (3) a chronology of major events that occurred in building DIA's automated baggage-handling system; (4) an assessment of the contract award process, including any special considerations for disadvantaged businesses; and (5) a list of major concerns expressed about the project and their resolution. Our work to address the first two areas is ongoing; when it is completed, we will provide you with the results in a separate report. This report provides information on the last three issues.

SUMMARY

Initially, the City of Denver planned to open the airport with a conventional tug-and-cart baggage system. The City decided to go with a conventional system after it was advised that proceeding with a technologically sophisticated automated system posed a high risk of not meeting the airport's scheduled October 1993 opening date. However, the City later decided to accept the risk associated with building an airportwide automated baggage system. During the development and construction of the system, significant software and hardware problems were encountered. These problems, coupled with major modifications that were made to the system, contributed to four delays in opening the airport. Overall, the delays shifted the opening date from October 1993 to February 1995. The cost of the baggage handling system has increased from about \$195 million to over \$290 million, which will be largely passed on to the airlines serving the airport. (See sec. 1 for a detailed chronology of the development and construction of the baggage system at DIA.)

The City awarded 37 prime contracts that were paid for, in

part, with funds from the federal Airport Improvement Program (AIP). The total value of these contracts was \$776.1 million, which included \$331.1 million in AIP funds. In accordance with a federally approved process, the City awarded these prime contracts on the basis of competitive qualifications, including the contractors' ability to perform the work, price, and agreement to meet goals for hiring disadvantaged businesses. The prime contractors exceeded the City's goals for hiring disadvantaged businesses. (See sec. 2 for a detailed discussion of the contracts funded with AIP moneys.)

From its inception, the project has been beset with numerous concerns. Over time, many of these concerns have been resolved. Others still remain, including some long-term issues such as uncertainty about the airport's ability to obtain funding for a rail system from downtown Denver to the airport and ongoing investigations concerning the disclosure of information to bondholders. (See sec. 3 for a list of concerns expressed about the project and information on the extent to which they have been resolved.)

AGENCY COMMENTS

We provided copies of a draft of this report to senior officials from the Department of Transportation, including the Assistant Administrator of Airports, and the City of Denver, including the City's Director of Public Works and Director of Aviation. They agreed with the overall facts presented, although they suggested clarifying wording in a few instances. We have incorporated their comments as appropriate.

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To develop information for this report, we interviewed officials from the City of Denver and DIA, airline officials and airline consultants, contractors who worked on the project, and officials from the Federal Aviation Administration. We also reviewed records and reports on the baggage-handling system and awarded contracts involving AIP funds. In addition, we conducted a comprehensive literature search to identify concerns about the project since its inception. (See app. I for a detailed explanation of our scope and methodology.) We conducted our review between January and July 1995 in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of

B-261887

this report until 7 days after the date of this letter. At that time, we will send copies to the Secretary of Transportation; the Director, Office of Management and Budget; officials of the City of Denver; and interested congressional committees. We will also make copies available to others upon request.

Please contact me at (202) 512-2834 if you or your staff have any questions. Major contributors to this report are listed in appendix II.

Sincerely yours,

A handwritten signature in cursive script that reads "John H. Anderson, Jr.".

John H. Anderson, Jr.
Director, Transportation and
Telecommunications Issues

CONTENTS

	<u>Page</u>	
LETTER	1	
SECTION		
1	CHRONOLOGY OF THE DEVELOPMENT AND INSTALLATION OF THE BAGGAGE- HANDLING SYSTEM AT DENVER INTERNATIONAL AIRPORT	6
2	INFORMATION ON CONTRACTS AT DIA THAT WERE FUNDED WITH FEDERAL GRANTS Process Used by the City to Award Prime Contracts	14
	Participation of Disadvantaged Businesses in Contracts Involving AIP Funds	17
3	CONCERNS ABOUT DIA AND THEIR RESOLUTION	22
	Construction	22
	Airlines' Costs	25
	Airport Operations	27
	Transportation Infrastructure	29
	Environmental Issues	30
	Other Concerns	31
APPENDIX		
I	SCOPE AND METHODOLOGY	35
II	MAJOR CONTRIBUTORS TO THIS REPORT	37
TABLE		
1.1	Key Events in the Development and Construction of the Baggage System	7
2.1	Prime Contracts at DIA Involving AIP Funds	15
2.2	Disadvantaged Businesses' Overall Participation in Design/Engineering and Construction Contracts at DIA, Fiscal Years 1990-94	19
2.3	Disadvantaged Businesses' Participation for Each Design/Engineering and Construction Contract at DIA, Fiscal Years 1990-94	20

3.1	Concerns About Construction at DIA	23
3.2	Concerns About Airlines' Operating Costs at DIA	26
3.3	Concerns About Airport Operations	28
3.4	Concerns About the Transportation to DIA	30
3.5	Concerns About Environmental Issues at DIA	31
3.6	Other Concerns About DIA	32

ABBREVIATIONS

AIP	Airport Improvement Program
BAE	BAE Automated Systems
BNP	Breier Neidle Patrone Associates
DIA	Denver International Airport
FAA	Federal Aviation Administration
GAO	General Accounting Office

SECTION 1

CHRONOLOGY OF THE DEVELOPMENT AND INSTALLATION OF THE BAGGAGE-HANDLING SYSTEM AT DENVER INTERNATIONAL AIRPORT

Developing a state-of-the-art automated baggage system for the Denver International Airport (DIA) proved too difficult within the time frame allowed. Initially, following the advice of its baggage-handling expert, the City decided against an airportwide automated system. However, the City later decided to proceed with an automated system that was technologically unproven and would have to be completed and tested in less than 2 years. The City decided to proceed with the automated system because it wanted a common system for the entire airport and it was assured by baggage-handling experts from two major airlines that an automated system could be built by the scheduled opening date of October 1993. After the development and installation of the system began, a variety of factors complicated its timely and successful completion. The City initiated numerous change orders for a variety of work, including relocating baggage carousels, modifying subsystems for such things as odd-sized baggage in the terminal and concourses, and adding conveyors. Also, according to the contractor, timely access to work areas in the terminal and concourses was not always provided, which it claims slowed work on the system. Collectively, these factors contributed to four delays in opening the airport--shifting the opening from October 1993 to February 1995--and an increase in the cost of the baggage system, from about \$195 million to over \$290 million.

Table 1.1 provides a chronology of key events during the development and construction of the baggage system.

Table 1.1: Key Events in the Development and Construction of the Baggage System

Date	Major events
April 1990	TRA Architecture, Engineering, Planning, and Interiors, a consulting firm hired by the City, expressed concern that there was insufficient time available to design, install, and test an airportwide automated baggage-handling system at DIA by the scheduled opening date for the airport of October 1993. No alternative systems were proposed.
August 1990	A second consultant hired by the City, Breier Neidle Patrone Associates (BNP), expressed strong reservations about choosing an airportwide automated baggage system. BNP evaluated five alternative baggage systems. In its report to the City, the company said it did not believe an airportwide automated system could be implemented within the schedule. Instead, it recommended that the City employ a different system for each concourse--a high-speed conveyor belt system for Concourse A; an automated system for Concourse B; and a conventional tug-and-cart system for Concourse C.
August 1990	On the basis of BNP's assessment, the City decided against an airportwide automated baggage system, opting instead for a conventional tug-and-cart system for all concourses.
October 1990	The City sent a letter to the Denver Airlines Airport Baggage Subcommittee saying that the City would consider the airlines' requests to build their own baggage systems as long as these systems did not jeopardize the City's plans for any future integrated automated baggage system. ^a

Date	Major events
November 1990	The hub carriers (United and Continental Airlines) began designing their own baggage systems. Continental Airlines hired BNP to design a conventional high-speed conveyor system for Concourse A; United Airlines hired BAE Automated Systems (BAE) to design an automated system for Concourse B. The plans for a tug-and-cart system for Concourse C remained unchanged.
July 1991	The City decided to pursue building an integrated airportwide automated baggage system like the one rejected a year earlier. The former aviation director for the City--who made the decision to build the automated baggage system at DIA--said he favored having a common baggage system for the airport rather than a different system for each concourse. Also, he received assurances from baggage-handling experts working for United and American Airlines that the automated system could be completed by the scheduled October 1993 opening date for DIA.
August 1991	The City issued a "request for proposal" for an airportwide automated baggage system.
September 1991	BAE submitted a discussion paper to the City for building an integrated automated baggage system. In this paper, BAE said that an automated system was possible within the current schedule, although some testing and commissioning of subsystems would follow the airport's planned opening of October 1993. After reviewing the discussion paper, the City asked BAE to furnish additional information.
October 1991	In response to the City's request, BAE submitted additional information on an integrated automated system (not in response to the City's request for proposal). The information included the scope of and schedule for the project and listed a price of \$185 million.

Date	Major events
November 1991	The Denver Airlines Airport Baggage Subcommittee sent a letter to the City expressing the airlines' concerns about the feasibility of opening the airport by October 1993. In its letter, the subcommittee pointed out that the baggage system--a critical item--was not going to be completed until mid-1994, according to the master project schedule.
December 1991	The City rejected the proposals of the only two firms that responded to the request for proposal, Harnischfeger Engineers, Inc., and Sanvik Process Systems, saying that they were not fully responsive to the design criteria set forth in the request. (BAE did not submit a proposal because it did not have enough time to prepare an adequate one.)
December 1991	BAE signed a contract for \$20 million to begin developing an airportwide automated system, including the first 2 miles of track and associated structural systems.
February 1992	The City began to receive letters from several airlines expressing concerns about the feasibility of an integrated automated baggage system at DIA. The airlines questioned both the operational and financial feasibility of an integrated system and urged the City to defer further work on such a system until they had more time to evaluate their concerns.
May 1992	The City proceeded with the implementation of an integrated automated baggage system and awarded BAE a final contract for \$195.6 million to design, build, and test it.
August 1992	The City executed a change order--reducing the contract price by \$23 million--for major alterations in the design of the baggage system, including relocating baggage carousels and lifts in the terminal.
September 1992	The City executed a change order for \$5.5 million for revisions in the system's design and a subsystem for Concourse A.

Date	Major events
January 1993	The City executed a change order for \$1.6 million, mainly for maintenance items in all of the concourses and the terminal and for other changes in the terminal building.
January 1993	The City sent a letter to BAE saying that the company's installation schedule was inadequate and had created a serious problem with planning and coordinating work.
January 1993	In response, BAE sent to the City a letter saying that the City was a direct contributor to the problem with the baggage system. BAE contended that it did not have access to certain airport facilities on the dates promised by the City and that the City's indecision about the configuration of the building had forced multiple redesigns of curbside subsystems.
March 1993	The City executed a change order for \$7.2 million for modifications to the east side of Concourse C.
March 1993	The City announced a delay in the opening of DIA, from October 1993 to late December 1993, due in part to delays with the baggage system.
May 1993	The City sent a letter to BAE saying that the company's schedule showing the completion of the baggage system by December 1993 was unacceptable. The City directed BAE to present a justification for the December date and to submit a plan for completing the work in October, as required in the contract.
May 1993	A City engineer's evaluation of BAE's progress noted that the company had yet to begin software development for a key system to control and route the baggage telecarts to the correct destinations.

Date	Major events
June 1993	BAE sent to the City a letter saying that it was implementing a revised installation plan for the baggage system and that the system would be installed by October 1993, allowing the company to test the complete system by the newly established December 1993 opening date. The letter further stated that certain components (curbside subsystems, conveyor subsystems on Concourse B, and subsystems for odd-sized baggage on Concourse A) would not be completed and tested by opening day.
June 1993	The City executed a change order for \$1.1 million, mainly for the addition of a conveyor system and guardrails in Concourse B.
August 1993	In a status report on BAE's progress on the system, a City engineer commented that completing the mechanical and electrical work was problematic by the December 1993 opening date and that the testing of the full system would likely not be completed until the end of January 1994.
September 1993	A City engineer's evaluation of BAE's progress again noted that the company would likely not meet its testing schedule.
September 1993	BAE sent a letter to the City saying that testing of the full system would be completed in December 1993.
October 1993	The City executed a no-cost change order extending the completion date for the system from October to December 1993.
October 1993	The City announced that DIA's opening would be delayed until March 1994 mainly because of problems with implementing the automated baggage-handling and fire safety systems.
November 1993	The City executed two change orders. One was for \$3.1 million, mainly for maintenance equipment and spare parts for the baggage system and a modification, requested by United Airlines, of equipment for handling odd-sized baggage. The other change order was for \$2 million for operation and maintenance services.

Date	Major events
February 1994	The first large-scale test of the baggage system was conducted, and major failures occurred. BNP, now serving as United's baggage consultant at DIA, concluded that the system would not be operational by the scheduled opening date of March 1994 and that extensive testing would be required to "debug" the system's software and hardware.
February 1994	The City announced a further delay in the opening date for DIA to May 1994. Delays in completing the baggage system were cited for the latest postponement.
March 1994	The City executed a change order for \$350,000 for operation and maintenance services.
May 1994	The City announced an indefinite postponement of DIA's opening date pending the completion of the baggage system.
May 1994	The City hired Logplan, a baggage system consulting firm, to assess the automated system and examine feasible alternatives to enable the airport to open as soon as possible. Logplan recommended that (1) the system be tested and made operational in smaller increments and (2) the City build a conventional baggage system until the automated system could be completed.
July 1994	Numerous problems continued to occur as further testing proceeded. For example, bags were misloaded and misrouted, causing the system to jam. The City decided to build an alternative baggage system and modify the automated system to allow the airport to open early in 1995.
September 1994	The City executed a change order for \$1.4 million for repair and maintenance services provided by a subcontractor for the system.

Date	Major events
September 1994	BAE, the City, and United Airlines reached an agreement for modifying the automated system at an estimated cost of about \$35 million. The modifications included changing the routing of the telecarts so that more of them would serve United at Concourse B, simplifying the car management system, and reducing the speed from 65 bags per minute per line to 30 bags per minute per line.
September 1994	The City signed a contract with Rapistan, Demag, Inc., to build an alternative baggage system, consisting of conveyors, carousels, and tugs and carts to transfer bags from a newly created staging area in the parking garage via existing tunnels to the concourses. The total cost of this system was estimated at \$63 million.
November 1994	The City executed three change orders. One, which added \$1.1 million to the contract price, was to relieve BAE of its obligation to provide an integrated system to all concourses and make modifications to the lines running to Concourse B. The second added \$2.1 million for modifications to the system. The third was to formally reduce the specifications for the baggage-handling capability of the automated system from 65 bags per minute per line to 30.
December 1994	The City executed a change order for \$605,000 for electrical and other work to provide an interface between the automated system and the alternative system being built.
February 1995	The airport opened with an automated system for United's outbound and odd-sized baggage and a tug-and-cart system for Concourses A and C. Later this year, the City plans to have the automated system working fully for Concourse B and extend it to Concourse A. The City has hired Logplan to evaluate alternatives for the baggage system for Concourse C.

^aThe Denver Airlines Airport Baggage Subcommittee was composed of representatives from each airline that planned to serve Denver through DIA. It was formed to provide input to the City on the implementation of DIA's baggage-handling system.

SECTION 2
INFORMATION ON CONTRACTS AT DIA
THAT WERE FUNDED WITH FEDERAL GRANTS

In total, the City awarded 37 contracts for work at DIA that were paid for, in part, with federal funds under the Airport Improvement Program (AIP). The total value of these contracts was \$776.1 million, of which \$331.1 million, or about 43 percent, was funded by the AIP. Of the 37 prime contracts, 17 were for professional services (e.g., management and airfield design/engineering) and were awarded on the basis of contractors' experience and competitive qualifications. Another 16 contracts were for construction (primarily of the airfield) and were awarded to the lowest responsive, responsible bidder. The remaining four contracts were for acquiring land or relocating pipelines and were negotiated between the City and the owners of the land or the rights-of-way. The 37 prime contractors hired over 400 subcontractors for a wide range of products and services. These included traffic control, earthmoving, painting, seeding and mulching, supplying concrete and related materials, and pavement marking. The City established federally approved goals for DIA's prime contractors to award a percentage of the contracts' value to disadvantaged businesses. In the aggregate, the prime contractors exceeded these goals.

Table 2.1 shows, for each of the 37 prime contracts involving AIP funds, the total contract amount (including change orders), the amount of federal funds committed to the contract, and the purpose of the contract.

Table 2.1: Prime Contracts at DIA Involving AIP Funds

Dollars in millions

Contract number	Total contract amount	Amount of federal funding	Purpose of contract
Design/engineering contracts			
E001A	\$2.82	\$1.35	Grading and drainage of east airfield
E004A	1.74	1.18	Grading and drainage of terminal
E005A	3.33	2.22	Tunnels for passenger train and baggage
E009A	2.71	1.48	Grading and drainage of west airfield
E010A	0.56	0.42	Environmental mitigation program
E111B	1.43	1.05	Paving and lighting of runway 17R-35L
E111C	1.67	1.07	Paving and lighting of runway 17L-35R
E112A	3.83	2.66	Paving and lighting of runways 16L-34R and 16R-34L
E113A	2.86	1.56	Paving and lighting of runway 7-25 and paving of runway 8-26
E114A	2.39	0.09	Airfield lighting vaults and controls
E115B	5.60	2.72	Paving and lighting of apron and terminal taxiways
E175A	0.78	0.002	Paving and lighting of air cargo apron and taxiways
F024A	84.23	48.74	Passenger train system
S001A	1.87	1.10	Standards for the passenger train system

Contract number	Total contract amount	Amount of federal funding	Purpose of contract
S002A	9.62	1.42	Civil/infrastructure design standards
S003A	7.65	2.88	Architectural standards
Construction contracts			
F001A	35.24	23.26	Grading and drainage of runways 17R-35L and 17L-35R
F001B	25.91	15.00	Grading and drainage of runway 8-26
F004A	51.58	35.80	Site preparation of runway 8-26
F005A	50.87	12.80	Tunnels for passenger train and baggage
F009A	60.41	24.48	Grading and drainage of runway 7-25
F009B	33.09	19.07	Grading and drainage of runway 16L-34R
F111A	34.85	1.54	Paving and lighting of runway 17R-35L
F111B	39.65	21.47	Paving and lighting of runway 17L-35R
F112A	36.12	20.50	Paving and lighting of runway 16L-34R
F113A	36.66	16.39	Paving and lighting of runway 7-25
F113B	33.32	1.68	Paving and lighting of runway 8-26
F114A	8.21	1.80	Airfield lighting vaults and controls
F115D	34.58	19.51	Paving and lighting of west perimeter taxiways
F115E	31.47	2.53	Paving and lighting of east perimeter taxiways
F115F	30.14	13.40	Grading and drainage of apron
F115G	23.19	0.43	Paving and lighting of south cargo apron

Contract number	Total contract amount	Amount of federal funding	Purpose of contract
Management contract			
M001A	41.67	5.54	Management support
Others			
O0000	26.31	19.73	Land acquisition
O003A	3.00	1.88	Pipeline relocation
O008A	5.17	3.87	Pipeline relocation
O011A	1.54	0.89	Pipeline relocation
Total	\$776.07	\$331.51	

Source: GAO's analysis of the City of Denver's data.

PROCESS USED BY THE CITY TO AWARD PRIME CONTRACTS

For the 37 prime contracts in which federal funds were involved, the City had in place procedures, approved by the Federal Aviation Administration (FAA), to ensure that the awards were in compliance with federal regulations. These procedures required, among other things, that contractors be selected on the basis of their price or ability to perform the job, depending on the type of contract. Also, according to an FAA official, the selection of the contractors was done in accordance with FAA's procurement standards.

The selection of the 17 design/engineering or management prime contractors, as required by statute, was based primarily on their ability to perform the job. The City's procedures for selecting these contractors included advertising for contractors' statement of qualifications and evaluating those received; requesting proposals from the firms judged to be best qualified; and selecting the prime contractor from those submitting proposals. According to the City's Public Works Manager, the selections, which were generally made by a selection committee, took into account contractors' experience and

price. Our review of contract files did not reveal any irregularities.

The selection of the 16 construction prime contractors was based primarily on the price. The City's procedures for selecting these contractors, approved by FAA, included advertising the notice of bid; issuing invitations for bids; evaluating the bids and judging the responsiveness of the bidders; and selecting the contractor that submitted the lowest bid and that was a responsible bidder. Our review of contract files did not reveal any irregularities. FAA concurred with the City's selection of construction contractors.

Competition was not an issue for the remaining four contracts, which involved the relocation of pipelines and the acquisition of land. For these contracts, the City negotiated agreements with the holders of the rights-of-way or with the landowners, as appropriate.

PARTICIPATION OF DISADVANTAGED BUSINESSES
IN CONTRACTS INVOLVING AIP FUNDS

The City required prime contractors to consider disadvantaged businesses in awarding subcontracts. Accordingly, the City established, with FAA's approval, goals for disadvantaged businesses' participation in subcontracts for design/engineering and construction projects. We were told by several prime contractors that they generally selected subcontractors who were the lowest responsive bidders but, to meet the City's goals, also considered whether or not the subcontractors were disadvantaged businesses.

Between fiscal years 1990 and 1994, the City's annual goals called for between 14.4 and 20 percent of the value of prime

contracts at DIA to go to disadvantaged businesses.¹ As shown in table 2.2, overall, prime contractors exceeded these goals.

Table 2.2: Disadvantaged Businesses' Overall Participation in Design/Engineering and Construction Contracts at DIA, Fiscal Years 1990-94

Fiscal year	Percentage of total contract amount for disadvantaged businesses	
	Goal (percent)	Actual percentage
1990	14.4	19.2
1991	18.7	20.3
1992	18.5	23.9
1993	18.5	18.7
1994	20.0	^a

^aAmount not calculated because there were no new contracts.

Source: City of Denver.

Table 2.3 shows, by contract, the initial goal for disadvantaged businesses' participation (expressed as a percentage of the total contract amount) and the actual participation achieved.

¹The annual goals established by the City were an average for all of the design/engineering and construction contracts. To achieve this overall average, the City set separate goals for each of the contracts, expressed as a percentage of the contract's total value. (See table 2.3.)

Table 2.3: Disadvantaged Businesses' Participation for Each Design/Engineering and Construction Contract at DIA, Fiscal Years 1990-94

Contract number	Total contract amount	Percentage of contract amount for disadvantaged businesses	
		Goal	Actual percentage
Design/engineering contracts			
E001A	\$2,823,006	35.0	23.1
E004A	1,744,463	35.0	31.3
E005A	3,331,000	40.0	33.0
E009A	2,708,767	35.0	26.7
E010A	563,280	0	0
E111B	1,425,125	18.0	19.9
E111C	1,671,786	18.0	85.9
E112A	3,825,000	18.0	19.5
E113A	2,859,674	18.0	22.0
E114A	2,388,455	44.0	95.6
E115B	5,595,000	18.0	18.3
E175A	780,403	18.0	33.5
F024A	84,230,941	25.0	18.9
S001A	1,866,805	15.0	6.6
S002A	9,623,484	30.0	17.2
S003A	7,654,067	36.0	37.1
Construction contracts			
F001A	35,236,749	18.0	15.7
F001B	25,914,527	18.0	12.1
F004A	51,580,956	10.0	14.4
F005A	50,873,652	10.0	15.6
F009A	60,406,968	18.0	14.4
F009B	33,088,579	12.0	9.8

Contract number	Total contract amount	Percentage of contract amount for disadvantaged businesses	
		Goal	Actual percentage
F111A	34,848,431	18.0	18.2
F111B	39,647,893	20.0	20.3
F112A	36,115,319	18.0	19.2
F113A	36,657,785	18.0	18.8
F113B	33,324,824	18.0	16.1
F114A	8,207,583	23.0	35.7
F115D	34,580,946	19.0	28.0
F115E	31,473,991	19.0	18.2
F115F	30,142,797	15.0	14.2
F115G	23,190,021	16.0	21.0
Management contract			
M001A	41,665,200	33.0	24.2

Note: The table excludes the four contracts for acquiring land and relocating pipelines; the goals for disadvantaged businesses' participation did not apply because these contracts were negotiated with individual landowners and holders of rights-of-way.

Source: City of Denver.

Neither FAA nor the City require prime contractors to disclose their process for awarding contracts, the details of the contracts, whether the subcontractors performed their work properly, and the schedule for completing work.² Therefore, the City's contract files did not contain sufficient information to either evaluate subcontractors' performance or to link their performance with any changes in contract costs or schedules.

²Overall, the City required a construction schedule for each contract to promote coordination among the prime contractors.

SECTION 3
CONCERNS ABOUT DIA AND THEIR RESOLUTION

Like many projects of its scope and cost, DIA generated a wide range of concerns during the time it was being designed and built. These concerns have come from many sources--airlines, inspectors, citizen groups, agency officials, and others. In total, our review of periodical and newspaper databases surfaced 143 concerns.

This section lists these concerns and their status as of June 1995. We excluded from the list any of the topics on the baggage system or contracting issues already covered in sections 1 and 2 or any that will be reported after our ongoing financial work is completed. We also excluded some concerns that we believed to be relatively unimportant. For example, we omitted concerns about the hazards of flying sightseers over the new airport before it opened.

We grouped the remaining concerns into the following six categories: (1) construction; (2) airlines' operating costs at DIA; (3) airport operations; (4) transportation infrastructure; (5) environmental issues; and (6) other concerns. Over time, many of the concerns have been resolved, and a few still remain. The status of each concern is summarized below.

CONSTRUCTION

As shown in table 3.1, items in this category ranged from concerns about runway construction and settling beneath buildings to concerns about minority hiring.

Table 3.1: Concerns About Construction at DIA

Concern expressed	Status
A local attorney alleged in March 1991 that too few minority workers were being hired for the construction of DIA.	The U.S. Commission on Civil Rights performed a preliminary investigation into this matter. Hearings were held, and no action was taken.
In February 1992, airport committee members questioned the planned use of 3/8" granite tile at DIA instead of the more traditional 3/4" (which would have cost about \$4 million more).	The City proceeded with the use of the 3/8" tile recommended by its consulting architect.
Adams County sought legal action in June 1992 to prohibit the City from removing dirt from City-owned land because the City did not obtain a permit from the county.	The district and appellate courts ruled in Denver's favor.
A bid protest was filed in late 1992 on the contract awarded to Teledyne INET for the passenger bridge. An unsuccessful bidder, Jetway Systems, said it misunderstood the work requirements in the original bid.	The bid protest was denied and the contract was awarded and the work completed.
A series of injuries and deaths occurred during construction, raising questions about the City's safety program.	The City claims that its owner-controlled insurance program and aggressive safety and workers' compensation programs resulted in fewer lost man-hours due to injuries, fewer fatalities, and fewer severe injuries than the average for projects of this size.

Concern expressed	Status
<p>In December 1992, FAA engineers found cracks in the walls of and water damage in its Terminal Radar Approach Control facility, raising fears that substantial and costly repairs would be necessary.</p>	<p>FAA is making repairs to the building to fix these problems. FAA is paying for the repair costs, which are estimated to be \$275,000.</p>
<p>A concern was raised in early 1994 that DIA's accelerated construction schedule would add more than \$500 million to contracts. Change orders promoted by the pace of construction were one reason for delays in opening the airport.</p>	<p>According to the City, the majority of construction was completed on schedule, and any savings or additional costs from the accelerated schedule are unknown.</p>
<p>In April 1994, cracks in a portion of the granite floor in the DIA terminal were found.</p>	<p>The cracking has been brought to the attention of the contractor, which is responsible for making and paying for any repairs.</p>
<p>In July 1994, the basement floor of Concourse C heaved as much as 2" owing to expansion of the soil.</p>	<p>According to the City, the affected areas are small and isolated. They are being monitored and evaluated.</p>
<p>According to a local soils engineer who visited DIA in mid-1994, the runways contained too many cracks for their newness.</p>	<p>According to the City, normal shrinkage occurred and was corrected under warranty by the contractors.</p>
<p>Repairs made to the apron outside Concourse A in September 1994 affected the building's basement wall, shifting it inward and crumpling some supports for the automated baggage system, which were improperly installed.</p>	<p>According to the City, this movement was predicted. The contractor has now properly installed the structural supports, and the problem has been eliminated.</p>

Concern expressed	Status
In October 1994, a former inspector at DIA alleged that work on Concourse C was improperly done. He said that support columns were not properly built and the steel reinforcement bars were not properly set in a concrete wall.	Follow-up testing by the City established that the work was properly completed.
In late 1994, a former inspector at DIA said that welds in the 15,000-space parking garage were done incorrectly.	Subsequent testing by the City showed that the welds met industry standards.
In October 1994, repairs due to settling soils at DIA were blamed for crushing sewer and storm drain lines that exit Concourse B.	Contractors corrected the problem and paid for the repairs in accordance with warranty provisions.
In late 1994, electrical trouble (power surges) that helped delay the opening of DIA resurfaced.	Filters were installed to improve the quality of the power; this corrected the problem.
A GAO review disclosed that some runways did not conform to contract specifications.	As requested by the City, contractors have begun remedying the problems, which are covered under warranty.
There have been numerous reports that DIA's air traffic control tower was leaning.	FAA's tests--the latest conducted in January 1995--have shown that the tower is plumb.

AIRLINES' COSTS

Much concern has been expressed, mainly by airlines, about the relatively high cost of operating at DIA. Table 3.2 lists a variety of concerns about such things as the costs of gate leases and increases in ticket prices.

Table 3.2: Concerns About Airlines' Operating Costs at DIA

Concern expressed	Status
<p>In 1991, there was concern whether or not United Airlines would sign a lease committing the airline to DIA for an extended period.</p>	<p>United Airlines signed a 30-year lease with the City in December 1991 committing the airline to 42 gates at DIA.</p>
<p>There was concern that under its lease agreement, United Airlines could terminate its lease with DIA if the cost per enplaned passenger exceeds \$20 (in 1990 dollars). Such an action could adversely affect DIA's revenues.</p>	<p>Costs have not yet reached this level.</p>
<p>Expansion of Front Range Airport (which is located adjacent to DIA in Adams County) for air cargo and passenger service was being considered in late 1991, possibly siphoning air traffic from DIA. Front Range asked FAA for \$38 million in AIP grants to extend its runway even though DIA had adequate runway capacity.</p>	<p>Adams County, Front Range Airport, and the City of Denver executed an intergovernmental agreement in February 1992 to prohibit commercial passenger traffic at Front Range. FAA did not provide the \$38 million in AIP grants to Front Range for extending its runway.</p>
<p>Mainly because of financial problems that Continental Airlines was having in the early 1990s, there was concern that the airline could no longer afford to operate a hub at Denver, thus adversely affecting the revenues for the airport.</p>	<p>Continental Airlines has substantially reduced its operations at Denver and no longer considers DIA as one of its major hubs. The City contends that over time other carriers will absorb the majority of the passenger traffic lost by Continental's reduced operations.</p>
<p>In February 1993, American Airlines received a guarantee that it can end its lease if the cost per enplaned passenger exceeds \$25. Such an action could adversely affect DIA's revenues.</p>	<p>All 10-year airline tenant leases at DIA contain a cap of \$25 per enplaned passenger (in 1990 dollars). Costs have not reached this level for the affected airlines.</p>

Concern expressed	Status
<p>Continental Airlines originally signed a lease for the use of 20 gates at DIA but in late 1994 told the City that it did not want that many. The airline threatened legal action to break the lease, an action that would have threatened DIA's revenues.</p>	<p>In April 1995, the City and Continental Airlines negotiated a new agreement to settle the issue. Continental agreed to lease 10 gates with the right to sublet a portion of these gates to other airlines.</p>
<p>In late 1994, MarkAir studied the feasibility of operating out of Colorado Springs versus DIA because of the high cost of operating at DIA.</p>	<p>MarkAir is still flying out of DIA.</p>
<p>Because of the relatively high cost of operating at DIA, the airlines increased ticket prices, raising the prospect of decreased air traffic at DIA. United Airlines imposed an increase of \$40 for round trip tickets for passengers on flights originating and terminating at DIA. Some other airlines matched the increases in certain markets and fare classes.</p>	<p>Where not matched, United rolled back increases. Air traffic at DIA has been slightly lower than during comparable periods last year at Stapleton.</p>

AIRPORT OPERATIONS

As table 3.3 shows, numerous concerns about the efficient and safe operation of the airport have been raised, including concerns about the adequacy of emergency services, the assignment of airlines to the three concourses, and landing procedures.

Table 3.3: Concerns About Airport Operations

Concerns expressed	Status
<p>In line with Denver's strict smoking ban, Mayor Webb said in late 1991 that cigarette companies would have to pay for independently vented smoking lounges at DIA.</p>	<p>Two independently vented smoking lounges were constructed as a paying concession.</p>
<p>Local fire and rescue experts expressed concern in March 1994 that DIA would not have access to adequate emergency services if a major disaster occurred. These experts believe that airport fire fighters would be on their own for at least 20 minutes.</p>	<p>Additional fire-fighting support is available in about 10 to 20 minutes, according to the City.</p>
<p>Visitors to DIA's open house in May 1994 said that road signs on Peña Blvd. were confusing and that the lettering was too small. They also noted that there was no overhang to protect passengers who were being dropped off outside the terminal (rain pours into car trunks).</p>	<p>Signage has been improved, and lettering made larger. Also, with the roof manufacturer and installer, DIA is studying options to better protect arriving passengers from the weather.</p>
<p>In mid-1994, a number of airlines assigned to Concourse C expressed to the City their desire to move to Concourse A for several reasons, including better baggage-handling service there.</p>	<p>According to a 1995 agreement with the air carriers, they can move if they agree to pay for the automated baggage system that will serve Concourse A.</p>
<p>With more passengers shifting from Continental Airlines' flights to United Airlines', it was thought that more passengers would be using the underground train. There was concern that the two-car trains would not be sufficient for the increased traffic.</p>	<p>A consultant for the City recommended adding a third car to the trains. A third car was added prior to the opening.</p>

Concerns expressed	Status
<p>The City will proceed with planning and constructing a \$60 million sixth runway at DIA even though some think it is not needed.</p>	<p>The City believes that a sixth runway is needed to enhance the operational efficiency of the airfield and maximize the airport's design potential. FAA has supported this runway and has obligated \$10 million in AIP funds for it. The City has not requested additional funds for it.</p>

TRANSPORTATION INFRASTRUCTURE

As shown in table 3.4, several concerns have arisen about the adequacy of the transportation to DIA from downtown Denver and the surrounding area.

Table 3.4: Concerns About the Transportation to DIA

Concerns expressed	Status
<p>In mid-1992, concerns were expressed about the lack of public transportation to DIA, which is located 28 miles from downtown. This distance was thought to be an obstacle for low-income people competing for jobs at DIA.</p>	<p>According to the City, bus service is now being provided by the Regional Transportation District, in addition to the transportation provided by shuttles, vans, and taxis. The monthly bus pass is about \$38; the one-way fee from Stapleton is \$4; the one-way fee from the central business district is \$6; the one-way fee from Boulder is \$8.</p>
<p>There was concern in September 1992 that roadways to the airport would not be able to handle the traffic there.</p>	<p>The airport constructed a 10-mile, 4-lane freeway connected to the interstate; according to the City, surrounding local jurisdictions are working to improve their roads.</p>
<p>In October 1992, there was concern that a proposed 23-mile commuter rail line to DIA could be in jeopardy unless the City could raise 20 percent of the cost to qualify for federal funds.</p>	<p>According to the City, it is pursuing federal assistance for the project although it has not yet raised the 20-percent match required. Other financing avenues are being reviewed, including a public-private partnership.</p>
<p>In July 1994, there was concern that Denver would not meet clean air standards, thereby jeopardizing some road projects including the \$16.2 million Adams County link from E. 120th Avenue to DIA.</p>	<p>According to the City, the 120th Avenue project will be judged on its merits as it relates to air quality and the availability of funding on the local, state, and federal levels. Air quality is a concern throughout the Denver area.</p>

ENVIRONMENTAL ISSUES

As shown in table 3.5, the environmental concerns expressed

about the project have been resolved except for an outstanding fine levied on the City for polluting a local stream.

Table 3.5: Concerns About Environmental Issues at DIA

Concerns expressed	Status
The construction of the airport was threatened by a \$2.3 billion lawsuit challenging FAA's environmental impact statement.	The City and FAA were successful in a lawsuit that preserved the environmental impact statement.
In March 1993, the State Department of Health cited the City for a minor violation of its construction storm water permit allowing too much mud to flow into First Creek, thereby threatening aquatic life in the stream.	The City's contractor will be liable for any fine imposed; the fine is currently estimated to be between \$35,000 and \$50,000. Action has been taken to prevent a recurrence of this problem.
In mid-1990, the City wanted to shift 16 miles of power lines and poles from the middle of DIA to Adams County and Aurora. There was concern regarding possible cancer risks from electromagnetic fields.	In 1991, a permit was granted for relocating the power lines, and the work was completed.
In July 1995, Adams County officials raised questions about noise from aircraft at DIA after data collected by monitoring devices around the airport showed that DIA is violating the noise agreement between Adams County and the City of Denver.	The City has formed a task force, which includes experts from the FAA and United Airlines, to analyze current takeoff and landing procedures to determine whether operations are consistent with the federal government's approved environmental criteria and traffic management procedures.

OTHER CONCERNS

Table 3.6 lists a wide range of other issues raised about the

project, including concerns about the existence of an Indian burial site on the airport's property and the use of airport funds. Some issues have not been resolved and are the subject of federal investigations.

Table 3.6: Other Concerns About DIA

Concerns expressed	Status
An ancient Indian burial ground was said to exist at the airport construction site.	According to the City, an extensive archeological survey was performed prior to excavation, and representatives of various Indian tribes participated; artifacts were found but no human remains were discovered during construction.
In 1984, the City paid \$19.5 million for 640 acres of land slated for the airport's use. In early 1991, concern was expressed that the land was worth far less than the City paid for it and that it could not be used at the new airport.	According to the City, the property remains an asset of the airport system; it has water and sewer service available but has not been recently valued.
In early 1992, real estate activity around DIA had been slow, leading some to think that adequate hotel and other facilities would not be available close to the airport.	According to the City, real estate activity has been increasing significantly. Two hotels near the airport and a gas station at the airport are scheduled to open during 1995 and 1996.
Questions about a potential conflict of interest arose in February 1993 regarding Mayor Webb's brother's involvement with a concessionaire's bid.	The Mayor disqualified the bidder who had hired the Mayor's brother as an attorney.
The Mayor's office was said to have intervened to get the airport to pay \$10,000 for a Denver-based trade group's trip to Africa to promote air travel and marketing opportunities.	The City considers the trip to be a legitimate marketing cost and plans no further review of this matter.

Concerns expressed	Status
<p>In early 1994, DIA vendors and concessionaires feared significant business losses because of DIA's delayed opening and sought financial aid.</p>	<p>The Mayor assembled a business community task force to work with his administration and concessionaires. Vendors were provided a relief package for impacts due to the delayed opening (including extensions of leases, some rent reductions, low-cost economic development loans, and approval to increase their prices in the short term).</p>
<p>There was an allegation in mid-1994 of improper influence by bond houses in the sale of bonds to finance DIA.</p>	<p>A Securities and Exchange Commission investigation into this matter is ongoing.</p>
<p>In October 1994, there were reports of a federal investigation of charges of cronyism against the Webb administration involving King Harris, a minority business owner and political supporter of Mayor Webb.</p>	<p>The City believes it is not the subject of an investigation on this matter.</p>
<p>The Denver District Attorney's office investigated contracting and construction practices at DIA.</p>	<p>The investigation is now ongoing.</p>
<p>In January 1995, The Department of Transportation Inspector General's Office began a review to assess the adequacy of DIA's internal controls over the use of funds from the AIP and passenger facility charges.</p>	<p>The review is ongoing; the results should be available later this year.</p>
<p>In March 1995, the Department of Transportation Inspector General's Office began a review of the possible misapplication of airport revenues.</p>	<p>The review is ongoing; the results should be available later this year.</p>

Concerns expressed	Status
<p>In June 1995, Trans World Airlines filed a complaint with the Department of Transportation alleging that a settlement agreement (relating to contract disputes on the use of airport facilities) between the City and United and Continental Airlines caused the rates and charges to increase, making them unreasonable, discriminatory, or otherwise unlawful.</p>	<p>In late July 1995, the Department denied the complaint because it did not present a significant dispute within the terms of the relevant statute.</p>
<p>In July 1995, concerns were raised about the moving expenses for FAA employees relocating from Stapleton to DIA. These expenses, which now exceed \$500,000, could increase to over a million dollars as additional FAA employees submit expenses.</p>	<p>FAA is investigating the appropriateness of these expenses. Also, the House Appropriations Committee has directed FAA and the General Services Administration to examine and reform current practices and rules to prevent a recurrence of this experience.</p>

SCOPE AND METHODOLOGY

To obtain information on the baggage-handling system, we interviewed officials of the Denver International Airport (DIA) project management team, including contractors and two former Directors of Aviation. We also interviewed officials from the airlines and an airline and City baggage system consultant. We reviewed documents about the selection of the type of baggage system to be installed at DIA, including consultants' studies, and about the award of the contract for the baggage system; other contract documents, including system specifications, change orders, and completion schedules; and documents showing the system's performance and test results.

To gather information on the contract award process and obtain contract data, we interviewed City and Federal Aviation Administration (FAA) officials responsible for contracting activities; we also interviewed several contractors about their subcontracting practices. In addition, we reviewed contract files maintained by the City and by FAA. We did not verify the completeness, accuracy, and reliability of the contracting data because of the immense volume of data contained in the files and the large number of contractor and subcontractor personnel that we would have had to locate and interview.

To develop a list of concerns expressed about the project, we conducted an extensive literature search for the period 1990 through February 1995. To conduct the literature search, we used two databases: ABI/INFORM (Newspaper and Periodical Abstracts), a database that catalogs 1,500 academic and business journals, and (2) DataTimes, a database that contains the nation's major newspapers. We focused our search on five major newspapers--the Denver Post, the Rocky Mountain News, the Chicago Tribune, the New York Times, and

the Washington Post. We synthesized hundreds of articles into six major categories--construction, airlines' operating costs at DIA, airport operations, transportation infrastructure, environmental issues, and other concerns. We sent the list of concerns to the City's Director of Public Works, who responded to each of the 143 concerns that we developed.

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