



# Analysis of VDOT Contract Values and Times

TR-05-02

A report presented to the Virginia Department of Transportation and  
the VDOT-VT Partnership for Project Scheduling Advisory Board

March 2005

John C. Hildreth  
Virginia Tech

## *Abstract*

Data contained in the VDOT project tracking database maintained by the Scheduling and Contracts Division were analyzed to reveal the distributions of contract times and values, as well as the relationship between these project parameters. Analysis focused on the as-planned and as-built distributions of contract value and time, in terms of both number of contracts and as a percentage of expended monies. For both contract value and time, the as-planned distribution was compared to the as-built distribution. And the relationship between as-planned contract time and value was explored.

*Invent the Future*

## Analysis of VDOT Contract Values and Times

VDOT projects were analyzed to reveal the distributions of contract times and values, as well as the relationship between these project parameters. The project tracking database maintained by the Scheduling and Contracts Division was the source for the data used. This database contains descriptive, monetary, and temporal information on VDOT projects dating back to 1984, with a large majority of the projects being performed since 1988.

This analysis focused on the as-planned and as-built distributions of contract value and time, in terms of both number of contracts and as a percentage of expended monies. For both contract value and time, the as-planned distribution was compared to the as-built distribution. And the relationship between as-planned contract time and value was explored.

The contract award amount and final estimated amount included in the database were used as the as-planned and as-built contract values, respectively. As-planned contract time for fixed duration contracts was contained in the data, while contract time for fixed date contracts was calculated as the number of calendar days between contract award and the fixed completion date. As-built contract time was calculated as the number of calendar days between the date work commenced and the date of final acceptance.

The distributions of contract value and time are shown graphically in Figures 1 and 2, respectively. Key points of the distributions are also described in the following table. It is indicated by the data that a large number of VDOT projects are small in size, but these projects represent a small portion of the total money expended. For example, approximately half of VDOT projects have an estimated value of \$325,000 or less, but these projects represent only approximately 7 percent of the expended monies. The contract time distribution showed similar characteristics.

Figures 3 and 4 are graphical comparisons of as-planned and as-built contract value and time, respectively. From this comparison, contract value estimates appear more accurate than contract time estimates. However, it is important to note that consideration was not given to time adjustments resulting from work orders, weather conditions, seasonal shutdowns, etc. It is believed that this lack of consideration created greater variation between the as-planned and as-built contract times, but that a relative comparison can be reasonably drawn.

As-planned contract size, as defined by contract value and time, was investigated and a frequency plot is provided as Figure 5. It appears that a relationship between planned contract value and time exists. The strength of this relationship has not been evaluated at this time. It is also seen from the plot that a large majority of VDOT projects are small in size, which is an estimated value of less than \$350,000 and planned for less than 180 days.

**Table 1: Data Summary**

<b>Description</b>	<b>As-Planned</b>	<b>As-Built</b>
Number of Contract Time data points	9,090	8,100
Number of Contract Value data points	9,730	8,145
Number of As-Planned & As-Built Contract Time & Value data points	7,752	
50 percent of contracts valued less than	\$ 325,000	\$ 360,000
50 percent of money expended on contracts valued less than	\$ 7,000,000	\$ 6,000,000
Percent of contracts valued less than \$1 million	79	77
Percent of money expended on contracts valued less than \$1 million	18	18
Percent of contracts valued greater than \$10 million	2	2.5
Percent of money expended on contracts valued greater than \$10 million	43	61
50 percent of contract times less than	125	186
50 percent of money expended on contracts with times less than	380	650
Percent of contact times less than 1 season (270 days)	85	67
Percent of money expended on contracts with times less than 1 season	35	22

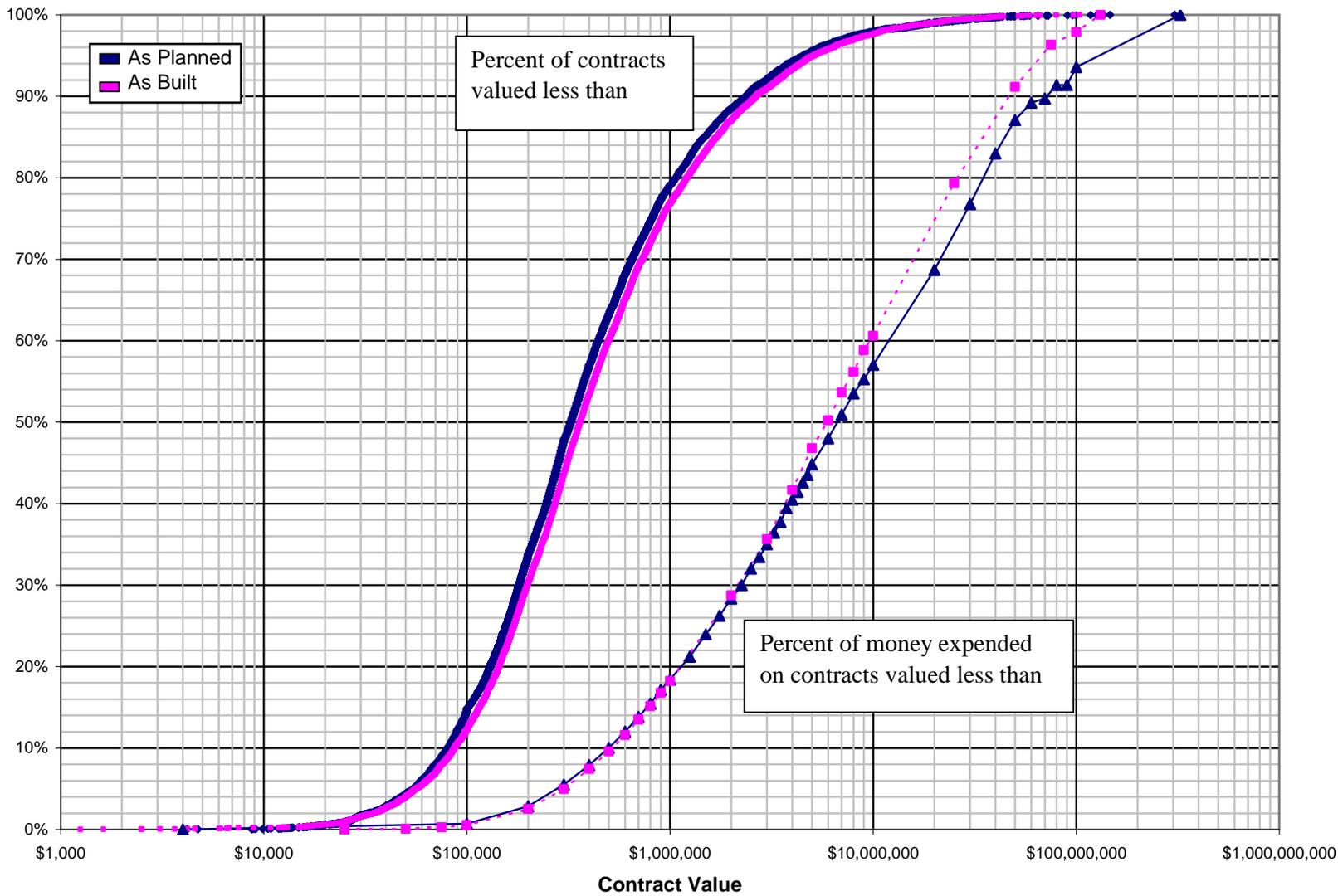


Figure 1: VDOT Contract Value Cumulative Distribution Function

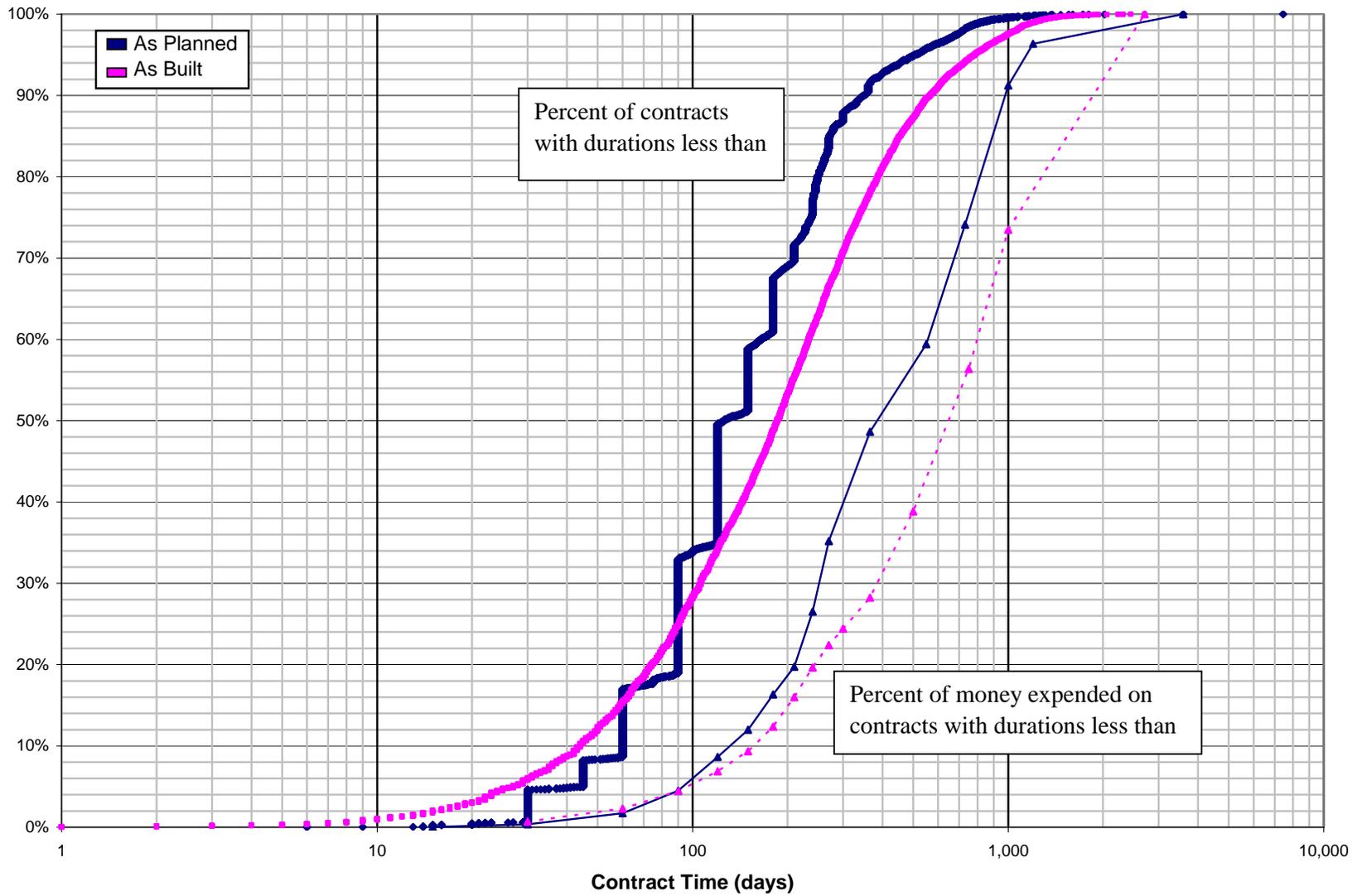
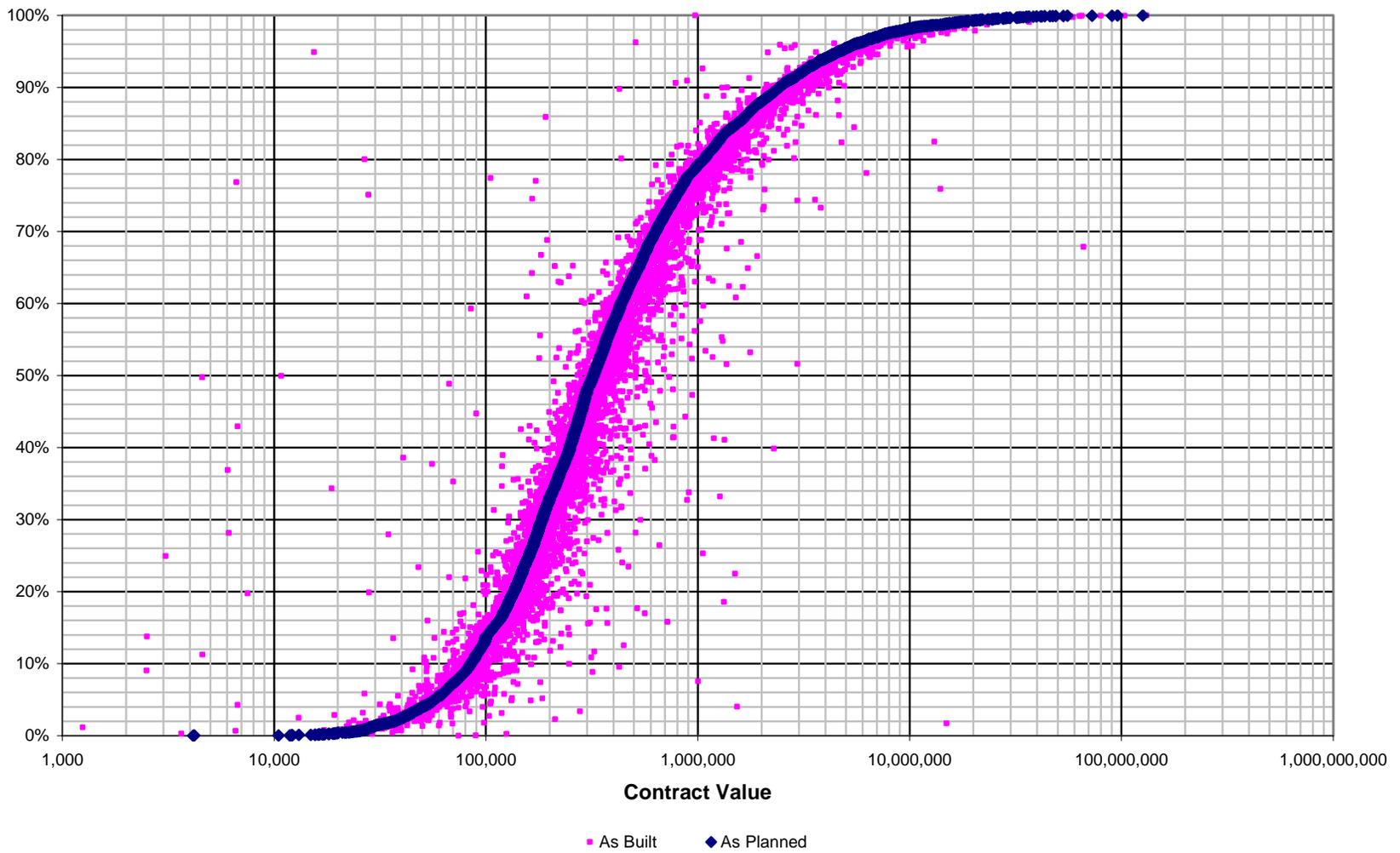
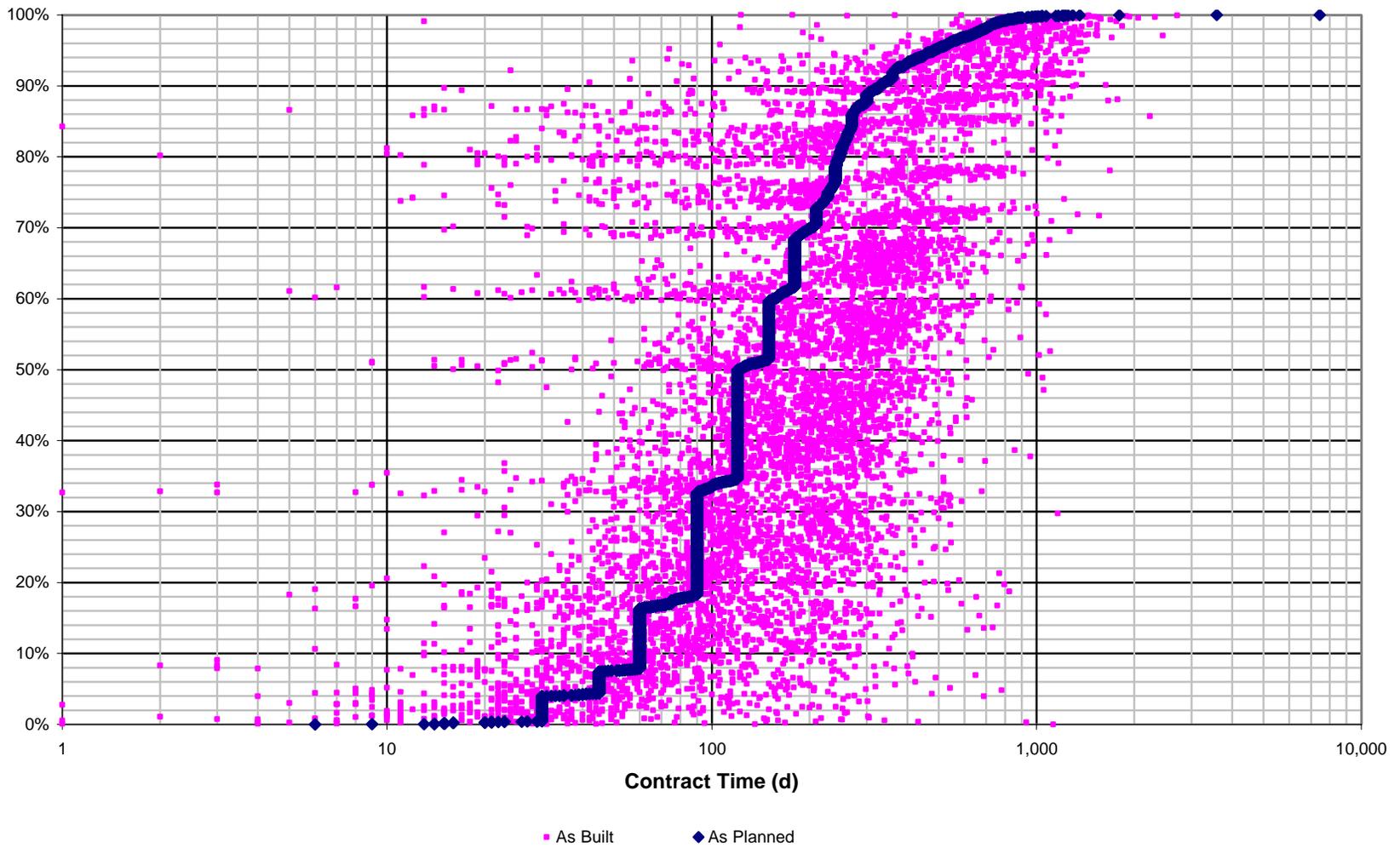


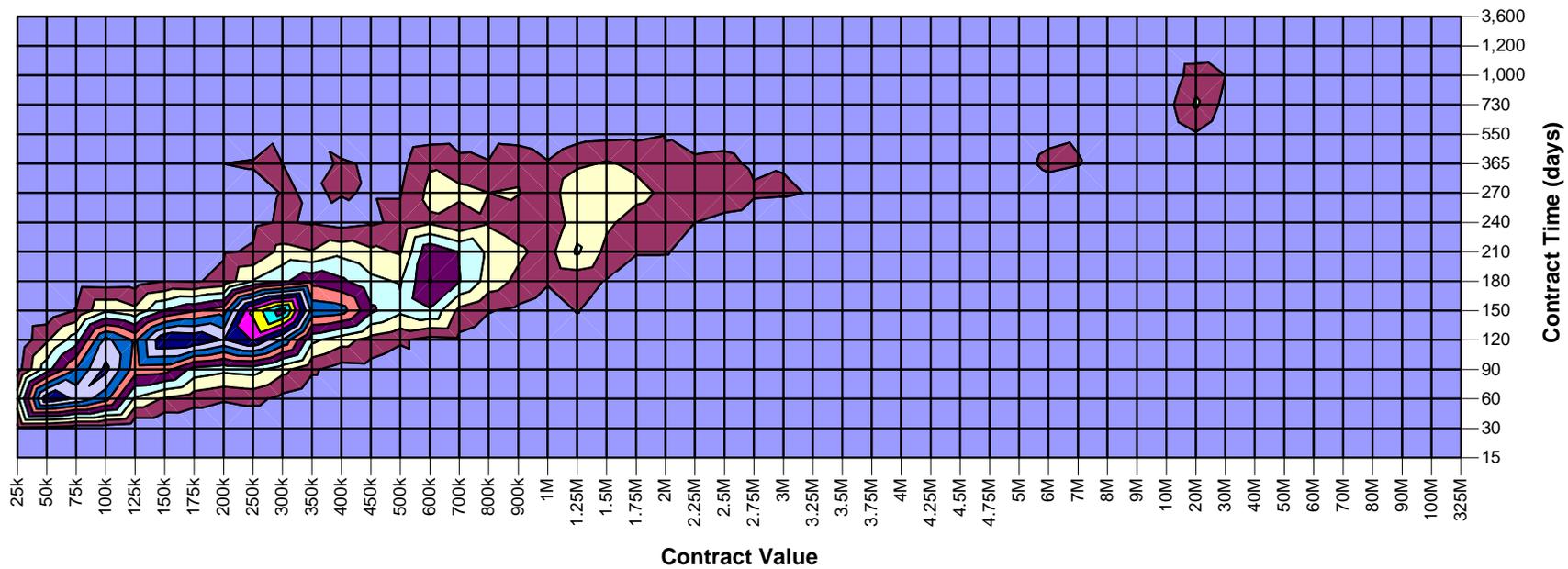
Figure 2: VDOT Contract Time Cumulative Distribution Function



**Figure 3: Comparison of As-Planned and As-Built Contract Values for VDOT Projects**



**Figure 4: Comparison of As-Planned and As-Built Contract Times for VDOT Projects**



**Number of Occurrences**



**Figure 5: VDOT Planned Contract Size Frequency Plot**