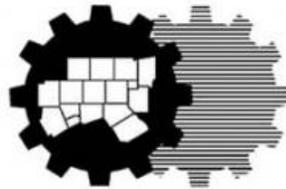


**Dallas Love Field Airport**  
**Departing Airline Passenger Survey**

**Final Report**

*Prepared for:*



**North Central Texas  
Council of Governments**

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**TRANSOLUTIONS**

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# Chapter 1 Introduction

The North Central Texas Council of Governments (NCTCOG) maintains a travel demand forecasting model for the 12-county Metropolitan Planning Area (MPA) of North Central Texas. With the lifting of Wright Amendment restrictions on traffic at Dallas Love Field (DAL) on October 13, 2014, passenger demand at the Airport is expected to change. In order to capture the passenger travel behavior prior to the lifting of Wright Amendment restrictions, NCTCOG retained TransSolutions to conduct a departing passenger survey at DAL. The objective of the survey effort was to provide the NCTCOG with accurate, usable data that reflected the travel patterns and trip-making behavior of DAL-originating passengers on weekdays during the survey period. NCTCOG requested that TransSolutions obtain 2,000 completed passenger surveys.

This Final Report provides a detailed summary of the approach utilized by TransSolutions in planning and conducting the DAL departing passenger survey, as well as overall statistics on the numbers of completed surveys. The passenger survey was conducted at DAL on the weekdays from September 15 through October 2, 2014. The survey summaries will be in a separate report.

## 1.1 Dallas Love Field Airport Background

### 1.1.1 Carriers and Markets

During the survey period, the four carriers operating at DAL served the markets and destinations listed in Table 1.

**Table 1: Markets Served from Dallas Love Field by Carrier, September 2014**

<b>Market</b>	<b>Airline</b>	<b>Destination</b>
Alabama (AL)	Southwest Airlines (WN)	Birmingham (BHM)
Arkansas (AR)	SeaPort Airlines (K5)	El Dorado (ELD)
	Southwest Airlines (WN)	Little Rock (LIT)
Georgia (GA)	Delta Air Lines (DL)	Atlanta (ATL)
Kansas (KS)	Southwest Airlines (WN)	Wichita (ICT)
Louisiana (LA)	Southwest Airlines (WN)	New Orleans (MSY)
Missouri (MO)	Southwest Airlines (WN)	Kansas City (MCI)
		St. Louis (STL)
New Mexico (NM)	Southwest Airlines (WN)	Albuquerque (ABQ)
Oklahoma (OK)	Southwest Airlines (WN)	Oklahoma City (OKC)
		Tulsa (TUL)
		Amarillo (AMA)
		Austin (AUS)
		El Paso (ELP)
		Houston Hobby (HOU)
		Lubbock (LBB)
		Midland (MAF)
San Antonio (SAT)		
Texas (TX)	Southwest Airlines (WN)	Houston Intercontinental (IAH)
		United Airlines (UA)

Source: OAG Flight Schedules

### 1.1.2 Operating Terminals and Gates

During the survey period, the four carriers serving DAL operated from the terminals and gates listed in Table 2.

**Table 2: Carrier Gates at Dallas Love Field, September 2014**

Carrier	Terminal	Gate(s)
Delta Air Lines	1	31 – 32
SeaPort Airlines	1	32 (K5 utilizes the DL counters in Terminal 1)
Southwest Airlines	2	1 – 10, 12, 14, 16, 18; 19 – 20 (as of September 27)
United Airlines	1	29 – 30

Source: City of Dallas and airline websites

## Chapter 2 Survey Preparation

TransSolutions prepared for the DAL departing passenger survey by researching and analyzing the flight schedule, developing a sampling plan, preparing a data collection plan and preparing data collection schedules. The specific details of the survey preparation are provided in this section.

### 2.1 Project Management Plan

TransSolutions first prepared the Project Management Plan which defined the scope and schedule for the DAL departing passenger survey project. This plan was delivered to NCTCOG on September 5, 2014 and is attached as Appendix A.

### 2.2 Sampling Plan

The Sampling Plan defined the approach for ensuring the completed surveys were representative of departing passenger traffic at DAL during the survey period. As neither airline booking nor historical enplanement data were available to TransSolutions in advance of the survey period, carrier capacity (seats) was used to determine the required number of completed surveys by market and time-of-day. Airline capacity on the date of Wednesday, September 17 was used as the basis for the sample, as this was a typical day at DAL during the survey period, with 130 scheduled departures by all four carriers, and capacity of 16,772 seats. Capacity data utilized in the sample was sourced from Official Airline Guide (OAG) Flight Schedules.

NCTCOG defined the following seven time-of-day periods for segmenting the sample: 12:00am – 5:59am, 6:00am – 8:59am, 9:00am – 11:59am, 12:00pm – 2:59pm, 3:00pm – 5:59pm, 6:00pm – 8:59pm, and 9:00pm – 11:59pm. As no flights were scheduled to depart from DAL during the 12:00am – 5:59am period, that time period subsequently was omitted from the sampling plan.

The final survey sample was derived as detailed in

Table 3.

**Table 3: Deriving the Survey Sample**

Step	Task
1	Retrieved from OAG Flight Schedules: <ul style="list-style-type: none"><li>– Total carrier capacity on September 17, 2014: 16,772 seats</li><li>– Capacity (number of seats) by market, carrier, and time-of-day periods</li></ul>
2	Calculated market, carrier, time-of-day capacity share (percentage) of total capacity
3	Determined required number of market, carrier, time-of-day period surveys by multiplying capacity share by 2,000 (total required number of surveys).

The final survey sample, which reflected the number of surveys to collect by market, carrier, and time-of-day periods, appears in Table 4.

Table 4: Survey Sample

Market	Carrier	6:00a - 8:59a	9:00a - 11:59a	12:00p - 2:59p	3:00p - 5:59p	6:00p - 8:59p	9:00p - 11:59p	Total
AL	WN	17	0	17	17	0	0	51
	K5	1	0	0	1	0	0	2
AR	WN	16	17	17	0	17	0	67
	Subtotal	17	17	17	1	17	0	70
GA	DL	6	6	6	12	0	0	30
KS	WN	17	0	0	0	17	0	34
LA	WN	17	33	17	33	32	0	132
MO	WN	67	68	51	67	51	0	306
NM	WN	34	17	34	16	33	0	135
OK	WN	34	17	0	50	15	0	116
	UA	4	6	4	12	0	0	27
TX	WN	277	179	210	244	107	83	1,100
	Subtotal	282	185	214	256	107	83	1,127
Total		492	344	356	453	272	83	2,000

## 2.3 Data Collection Plan

The Data Collection Plan defined TransSolutions' approach to conducting the departing passenger survey to ensure accurate and usable data was collected during the survey period. The plan detailed the survey method and the process and steps for conducting the survey. TransSolutions performed a surveyor-administered passenger intercept method at the gate holding areas for collecting the survey data at DAL.

Two primary resource roles for managing and conducting the data collection effort at DAL were identified in the Data Collection Plan:

### 2.3.1 Surveyors

- Pre-screens survey candidates to ensure that all participants meet NCTCOG selection criteria
- Conducts the survey on qualified departing passengers
- Communicates the method for participating in the survey to qualified, late arriving passengers.

### 2.3.2 Data Collection Coordinator

- Schedules the data collection effort

- b. Coordinates with airport authorities to secure access to boarding areas, and ensures all data collection staff comply with security requirements
- c. Monitors the status of the flights to be surveyed. Proactively addresses issues resulting from gate changes, flight delays and cancellations, and redeploys surveyors as required
- d. Adjusts the data collection schedule as required to ensure survey targets are met
- e. Communicates status of the collection effort to NCTCOG.

## 2.4 Survey Instrument

TransSolutions coded the tablet version of the passenger survey created by NCTCOG. The tablet version of the survey consisted of 32 questions. Survey questions were worded to facilitate passenger response, and coded to minimize the number of required passenger responses. Depending on a passenger’s purpose for travel and mode of transportation to the airport, the passenger was asked between 28 and 31 questions during the survey.

## 2.5 Data Collection Schedule

The passenger survey was scheduled for and conducted at Dallas Love Field airport on the weekdays from September 15 through October 2, 2014. The schedule for conducting the survey was developed to target completion of the required 2,000 usable surveys during the first two weeks of the survey period. A third week of data collection was scheduled as a contingency in the event less than 2,000 usable surveys were gathered during the first two weeks of the collection effort. The collection schedule was developed using scheduled departure data from OAG Flight Schedules.

TransSolutions estimated that during the collection period, 15% of completed surveys would not meet the NCTCOG criteria for a “usable” survey as a result of incomplete data provided by the passenger or surveyor error. Consequently, approximately 2,350 surveys would have to be collected in order to ensure 2,000 usable surveys were completed. As illustrated in Table 5, collection targets of 1,100 surveys the first week, and 1,250 surveys the second week were established to ensure collection goals were met. A lower target was set for the first week of the survey to account for a planned late start on the first survey day, and to provide time for the surveyors to acclimate to the collection process.

**Table 5: Survey Collection Targets**

<b>Week</b>	<b>Survey Target</b>	<b>Estimated Usable Surveys</b>
1	1,100	935
2	1,250	1,065
<b>Total</b>	<b>2,350</b>	<b>2,000</b>

### 2.5.1 Scheduling Assumptions

The following assumptions were made in scheduling the survey effort:

- a. Passengers begin arriving at the departure gate one hour prior to scheduled flight departure time
- b. Boarding begins 20 minutes prior to scheduled flight departure time
- c. Once flight boarding begins, passengers are not likely to agree to be surveyed
  - i. Consequently, from the time passengers begin arriving at the gate to boarding time, a surveyor has a period of approximately 40 minutes to survey passengers on any given flight
- d. A surveyor completes on average of one survey every 5 minutes
  - i. The estimate accounts for time required to verify that the passenger qualifies for the survey, to conduct the survey (2 minutes), and for non-utilized time when candidates are unavailable or unwilling to participate
  - ii. Based on these assumptions, a surveyor completes on average 8 surveys per flight identified (one survey every 5 minutes during a 40 minute time period)
  - iii. An individual flight may need to be surveyed on more than one occasion during the survey period in order to obtain the required number of completed surveys for the flight.

### 2.5.2 Other Scheduling Factors

- a. Carriers were operating at DAL from Terminal 1 (DL, K5, UA) and Terminal 2 (WN)
- b. The Transportation Security Administration (TSA) checkpoint for clearing passengers through security at DAL opened daily at 4:30am
- c. Carriers scheduled on average 130 daily departures from DAL during the survey period
- d. Flights were scheduled to depart from 6:00am through 9:25pm, per OAG Flight Schedules
  - i. Survey teams, therefore, should be in position at departure gates to survey passengers from approximately 5:00am – 9:00pm
- e. Peak departure periods were 6:00am – 8:59am and 3:00pm – 5:59pm.

### 2.5.3 Creating the Schedule

The schedule for the first week of data collection was developed in full in advance of the survey period. The schedule for the second week was developed at the conclusion of the first week of data collection, so that markets for which survey goals had not yet been met could be targeted during the second week of data collection. The detail daily schedule is provided to NCTCOG in an Excel spreadsheet format and is not included in this document.

Collection shifts and surveyor assignments were defined to ensure that survey targets and flight sampling goals were met, while equitably distributing the data collection workload across resources. Assignments were created to provide the surveyors with a 40-minute window for conducting surveys for a given flight (from 60 minutes prior to scheduled departure until shortly before boarding), and ten additional minutes for providing late arriving passengers with instructions on how to complete the survey at a later time.

- a. Three surveyors were assigned to conduct surveys during each of two daily shifts:  
5:00am – 1:00pm and 1:00pm – 9:00pm
  - i. Each shift covered one of the two daily DAL peak departure periods
- b. Each surveyor was assigned to 4 – 6 flights during a shift, depending on the daily flight schedule and whether the surveyor was required to move between terminals to conduct surveys
  - i. Surveyors were assigned, on average, 5.2 flights per day over the duration of the survey period
- c. 30 – 36 flights were scheduled to be surveyed each day during the collection period.

### 2.5.4 Validating the Schedule

Before creating the data collection schedule, TransSolutions validated that assumptions regarding the required number of surveyors, the number of flights to assign to each surveyor, and the number of surveys per flight each surveyor could conduct would yield a schedule that allowed survey goals to be achieved. As illustrated in Table 6, a schedule based on the scheduling assumptions should ensure that targets of 1,100 and 1,250 surveys were met in the first two weeks.

**Table 6: Schedule Validation Exercise**

Each Surveyor	Surveys:	5.2 Flights per Day	26 Flights per Week
	Completes:	8 Surveys per Flight	208 Surveys per Week
6 Surveyors Assigned Per Day			1,248 Completed Surveys per Week

Figure 1 illustrates the data collection schedule, including surveyor flight assignments and survey targets, for the morning data collection shift on Tuesday, September 16.

Time	COLLECTOR 1	COLLECTOR 2	COLLECTOR 3
	Target	Target	Target
4:30	WN 324	WN 622	WN 1628
5:00	San Antonio (SAT)	Austin (AUS)	Houston Hobby (HOU)
5:30	Dept: 6:00 am	Dept: 6:15 am	Dept: 6:15 am
6:00	WN 697	WN 260	WN 1636
6:30	Little Rock (LIT)	Oklahoma City (OKC)	Lubbock (LBB)
7:00	Dept: 7:40 am	Dept: 7:40 am	Dept: 7:45 am
7:30	WN 1029	WN 419	WN 3569
8:00	New Orleans (MSY)	St. Louis (STL)	San Antonio (SAT)
8:30	Dept: 9:15 am	Dept: 9:20 am	Dept: 9:30 am
9:00	Break	Break	Break
9:30			
10:00	WN 752	WN 480	WN 23
10:30	New Orleans (MSY)	Austin (AUS)	Houston Hobby (HOU)
11:00	Dept: 11:40 am	Dept: 11:50 am	Dept: 12:00 pm
11:30	WN 945	WN 24	WN 29
12:00	Kansas City (MCI)	San Antonio (SAT)	Houston Hobby (HOU)
12:30	Dept: 1:20 pm	Dept: 1:30 pm	Dept: 1:30 pm

**Figure 1: Data Collection Schedule, Morning Shift | September 16, 2014**

## 2.6 Training Program

TransSolutions developed and delivered, in advance of the survey period, a comprehensive training program to prepare the surveyors to conduct the passenger survey at DAL. The training program provided the surveyors with a thorough understanding of the following:

- a. Data Collection Plan
- b. Role and responsibilities of the surveyor
- c. Security regulations and zero-tolerance policy for inappropriate behavior while at DAL.

Additionally, the training provided surveyors with hands-on practice and proficiency at completing the survey on the tablet devices.

## Chapter 3 Pilot Study

TransSolutions planned and conducted a pilot survey to test and evaluate the Survey Data Collection Plan, and to revise the plan as necessary to address any issues discovered during the pilot. TransSolutions performed the activities listed in this section in planning and conducting the pilot survey.

### 3.1 Pilot Study Plan

The Pilot Study Plan defined the approach for conducting a Pilot of the passenger survey at DAL in advance of conducting the full survey effort. The Pilot Study Plan, attached in Appendix B, detailed the scope of and the method for conducting and evaluating the pilot study.

### 3.2 Pilot Study

The pilot passenger survey was conducted at DAL on September 10, 2014 by three TransSolutions surveyors. To ensure flights surveyed during the pilot were representative of the DAL flight schedule and passenger traffic mix, TransSolutions targeted the six flights listed in Table 7 to survey during the pilot.

Table 7: Pilot Study Survey Flight Set

Airline	Terminal	Flight Number	Destination	Dept Time
DL	1	5272	ATL	15:22
WN	2	43	HOU	17:00
WN	2	1987	TUL	18:00
UA	1	5263	IAH	16:03
WN	2	3294	ELP	17:20
WN	2	261	ABQ	18:15

#### 3.2.1 Pilot Survey Approach

To test the effectiveness of the Data Collection Plan, the surveyors performed and assessed the outcome of the data collection activities defined in the plan, as detailed below.

- a. Prepare for Day's Data Collection
  - i. Planned Activities. Obtain daily passes permitting access to the secure side of the airport from the DAL Badging office. Pass through the TSA security checkpoint. Check Flight Information Display System (FIDS) monitors to verify that flights to be surveyed are operating as scheduled, and record flight departure gates.
  - ii. Experience. Two surveyors were prevented by TSA from proceeding through the security checkpoint for 40 minutes as TSA agents were unfamiliar with the pass provided by DAL Badging. As a result, the window for surveying the DL and UA

flights was missed. Additionally, the WN flight to Tulsa was not operating as scheduled. A WN flight to Wichita was surveyed instead.

b. Conduct Survey

- i. Planned Activities. Proceed to the departure gate of the collector's first assigned flight. Conduct random sampling exercise (every 5<sup>th</sup> passenger) to begin identifying which passengers to survey. Engage and pre-screen a candidate to determine whether NCTCOG survey participant criteria are met. Survey the qualified passenger utilizing the tablet computer. Select the next candidate utilizing the sampling method. Continue to screen and survey passengers until flight boarding is announced.
- ii. Experience. 25 surveys were completed during the pilot; 2 passengers (7% of total) refused to participate in the survey. The number of connecting (and therefore, unqualified) passengers engaged during the pilot was higher than anticipated. Additionally, the configuration of WN gates and lounges at DAL made locating passengers departing on a specific flight somewhat challenging. Surveyors noted that the order of survey questions in some instances required them to provide additional explanation to solicit an appropriate response from the participant.

In spite of these issues, surveyors validated the assumptions that a passenger completes the survey in approximately 2 minutes, and the collector successfully conducts a survey on average every 5 minutes.

c. Engage Late-Arriving Passengers

- i. Planned Activities. Engage passenger who arrives at the gate after boarding has been called, and request that the passenger complete the survey at a future time, either online or by phone.
- ii. Experience. Passengers who arrived at the gate after the boarding announcement generally were reluctant to engage with the surveyor. No passenger agreed to provide a phone number in order to be contacted to take the survey by phone. Six passengers accepted the NCTCOG card that lists a link to the online version of the survey.

d. Conduct End-of-Collection Day Activities

- i. Planned Activities. Return tablet computers to the data collection coordinator. Download and review the raw survey data for completeness.
- ii. Experience. An examination of the raw survey data indicated that the passenger's flight number and trip purpose were missing from a number of survey records. The surveyors subsequently reviewed the tablet survey and discovered that the manner in which the valid responses to two survey questions appeared on the tablet could lead a collector to believe a response had been recorded when in fact it had not. Additionally, when the raw data files were converted from text (.txt) to comma separated values (.csv) format, commas recorded by the surveyors in address fields resulted in formatting inconsistencies in the csv files.

### 3.2.2 Pilot Results

A review of the pilot study data collection resulted in TransSolutions making the following changes to the tablet survey and the Data Collection Plan.

a. Prepare for Day's Data Collection

Because of the delays experienced by the surveyors at the TSA checkpoint, the planned start time for data collection on the first day of the survey period, September 15, was pushed back from 4:30am to 7:30am, at which time the DAL Badging office would be open. In the event the surveyors were prevented from passing through the TSA security checkpoint on the morning of the fifteenth, the Badging office could be contacted.

b. Conduct Survey

A number of revisions to the tablet survey were made to facilitate data entry by the surveyor and enhance passenger understanding of the survey questions. Flow through the survey was improved by grouping related questions together. Visual cues and survey question and answer placement on the tablet screen were revised to improve the user experience for the surveyor.

c. Engage Late-Arriving Passengers

As the pilot survey revealed a reluctance of the part of passengers to engage with the surveyors once boarding had begun, the process for engaging late-arriving passengers was refined to provide surveyors with the leeway to begin distributing NCTCOG online survey cards once boarding is imminent. For WN flights, the cue for this is when the gate agent advises passengers in the first boarding group to begin queuing for boarding.

d. Conduct End-of-Collection Day Activities

The survey tablet was reprogrammed to delineate raw data fields using a pipe ( | ) rather than a comma to prevent potential formatting problems in the data files.

## Chapter 4

# Departing Passenger Survey

TransSolutions conducted the departing passenger survey at DAL on weekdays from September 15 through September 26, 2014. As a small number of market-specific survey goals were not met during the two full weeks of data collection, additional flights were surveyed September 30 through October 2 in order to collect the required number of surveys by market and time-of-day.

### 4.1 Conducted Passenger Survey

TransSolutions' data collection participants followed the process and procedures for conducting the departing passenger survey as defined in the project Data Collection Plan. TransSolutions utilized the surveyor-administered passenger intercept method for collecting the survey data at DAL. Surveyors engaged departing passengers at the boarding lounges adjacent to the gates. After verifying that a candidate qualifies for the survey, the surveyor posed the survey questions to the passenger and captured responses on the tablet computer.

Five of the final questions in the survey, in which the participant's gender, age, employment status, race and income were requested, could be considered by some participants as particularly personal in nature. Typically at that point in the survey, the surveyor handed the tablet to the passenger to enable the participant to record answers to the questions with a degree of privacy, thereby encouraging the passenger to provide valid responses to those questions. At the conclusion of the survey, the surveyor advised the participant that by voluntarily providing a contact name and phone number, the participant would be entered into a gift card drawing sponsored by NCTCOG assuming that all the survey questions were properly and correctly answered.

During the survey period, the Southwest Airlines DAL duty manager provided the data collection coordinator with a report every morning listing the number of passengers booked on each of the carrier's DAL departures that day. The coordinator used this report to verify that flights targeted for collection were operating as scheduled and, in some instances when a flight to be surveyed was lightly booked, substituted a more heavily booked flight in its place.

### 4.2 Survey Data Review

Twice daily during the collection period, TransSolutions downloaded the raw survey data from the tablet computers to a server. To track the progress of the collection effort, the data collection coordinator reviewed the data to derive a cumulative estimate of the total number of usable surveys by market and time-of-day. Monitoring the number of usable surveys enabled the coordinator to adjust the collection schedule as necessary to ensure the collection effort was progressing towards survey goals.

NCTCOG defined a usable survey as having the following data, at a minimum:

- a. Origin location (e.g., home, place of business) and address
- b. Destination airport

- c. Access mode to the airport
- d. Trip purpose
- e. Parking option and parking cost reimbursement, if applicable
- f. Airline, flight number, terminal number, gate number
- g. Home address (full address, intersection, zip code, and landmark are acceptable)
- h. Survey time and location.

Reviewing the tablet data also allowed the coordinator to identify reoccurring issues that prevented surveys from meeting the NCTCOG criteria for a usable survey. At the start of each survey shift during the collection period, the coordinator met with the data collectors to discuss the issues and propose solutions to ensure the collectors were capturing usable data.

### 4.3 Data Collection Summary – Week 1: September 15 – 19, 2014

#### 4.3.1 Data Collection Objectives

Week 1	Survey Target	1,100	Usable Surveys Goal	935
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Although specific collection targets were set for the first week of data collection to ensure progress towards final survey goals was being made, the overarching goal that week was to collect as many complete, usable surveys as possible. Surveyors, therefore, were given the leeway to survey other flights in addition to those to which they were assigned, time permitting. If while surveying an assigned flight a surveyor engaged a passenger traveling on a different flight, the surveyor still surveyed the passenger.

#### 4.3.2 Data Collection Results

The number of completed surveys and an estimate of the number of usable surveys collected during the first week of data collection appear in Table 8.

**Table 8: Number of Surveys Collected, Week 1**

Date	Daily Total			Cumulative Total		
	Recorded	Usable	% Usable	Recorded	Usable	% Usable
15-Sep	183	131	71.6%	183	131	71.6%
16-Sep	200	171	85.5%	383	302	78.9%
17-Sep	199	174	87.4%	582	476	81.8%
18-Sep	216	195	90.3%	798	671	84.1%
19-Sep	322	300	93.2%	1,120	971	86.7%

As illustrated in the table, survey targets for the week were met indicating that the collection effort was on track to meet survey goals. Initially, the percentage of surveys that were usable was less than anticipated. However, the percentage of usable surveys continuously increased during the survey period as data issues were shared with the surveyor teams they became more adept at conducting the survey.

### 4.3.3 Late Arriving Passengers

- a. Approximately 175 NCTCOG-created cards listing a link to an online version of the survey were distributed to late-arriving and other passengers
- b. No passenger agreed to provide a telephone number in order to take the survey by phone at a later date.

## 4.4 Data Collection Summary – Week 2: September 22 – 26, 2014

### 4.4.1 Data Collection Objectives

Week 2	Survey Target	1,250	Usable Surveys Goal	1,065
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Whereas the goal of the first week of data collection was to collect as many surveys as possible, the goal for collection during the second week was to ensure that market-based survey goals were achieved. The collection schedule for the second week, therefore, was created to target specific flights by market and time-of-day. Surveyors were instructed to survey only flights targeted for data collection.

### 4.4.2 Data Collection Results

The number of completed surveys and an estimate of the number of usable surveys collected during the second week of data collection appear in Table 9.

**Table 9: Number of Surveys Collected, Week 2**

Date	Daily Total			Cumulative Total*		
	Recorded	Usable	% Usable	Recorded	Usable	% Usable
22-Sep	239	211	88.3%	1,359	1,182	87.0%
23-Sep	233	216	92.7%	1,592	1,398	87.8%
24-Sep	288	259	89.9%	1,880	1,657	88.1%
25-Sep	307	294	95.8%	2,187	1,951	89.2%
26-Sep	306	294	96.1%	2,493	2,245	90.1%

\*Includes numbers from Week 1 as a starting point

As illustrated in the table, the survey goal of 2,000 usable surveys was achieved by the end of the second week of data collection. A detailed review of the data indicated, however, that a small number of market-specific survey goals had not yet been met, necessitating additional data collection the following week.

### 4.4.3 Late Arriving Passengers

- a. Approximately 125 NCTCOG-created cards listing a link to an online version of the survey were distributed to late-arriving and other passengers
- b. No passenger agreed to provide a telephone number in order to take the survey by phone at a later date.

## 4.5 Data Collection Summary – Week 3: September 30 – October 2, 2014

### 4.5.1 Data Collection Objectives

The objective during the final week of data collection was to collect approximately 150 outstanding market, time-of-day specific usable surveys. Surveyors were instructed to survey only flights targeted for data collection.

### 4.5.2 Data Collection Results

The number of completed surveys and an estimate of the number of usable surveys collected during the final week of data collection appear in Table 10.

**Table 10: Number of Surveys Collected, Week 3**

Date	Daily Total			Cumulative Total*		
	Recorded	Usable	% Usable	Recorded	Usable	% Usable
30-Sep	130	125	96.2%	2,623	2,370	90.4%
1-Oct	15	15	100.0%	2,638	2,385	90.4%
2-Oct	4	4	100.0%	2,642	2,389	90.4%

\*Includes numbers from Week 2 as a starting point

No data collection occurred on September 29.

A surveyor was scheduled to survey two Delta Air Lines flights in Terminal 1 on the morning of September 30. When the surveyor arrived at the security checkpoint, a TSA agent suggested that she should not conduct surveys that morning, as passengers and agents were angry over a press announcement that DL shortly would not be allowed to operate out of DAL. As a consequence, three surveys (of a required 12) for two DL flights to ATL operating during the 9:00am and 12:00pm time periods were not collected. TransSolutions shared this information with NCTCOG and were given approval not to return to Terminal 1 to attempt to collect the remaining DL surveys.

As illustrated in Table 10, at the conclusion of the collection period, survey targets were exceeded. Appendix C details the completed number of usable surveys, by market, carrier, and time-of-day range, as compared to the survey targets defined in the Sampling Plan.

## Chapter 5

# Post Survey Activities

### 5.1 Raw Survey Data

TransSolutions provided NCTCOG with the raw data (.txt) files at the conclusion of the survey period.

### 5.2 Cleaned Survey Data

To facilitate NCTCOG use of the survey data, TransSolutions merged the raw data files into a single Excel (.xlsx) file, separated the usable surveys from those that failed to meet the NCTCOG criteria for a usable survey, and conducted a comprehensive “cleaning” of the usable survey data. As part of the data cleaning exercise, TransSolutions retrieved street addresses for businesses, schools and hotels, and provided the airport code, city and state for final destination airports captured in the surveys. TransSolutions provided NCTCOG with the cleaned survey file on October 13, 2014.

### 5.3 Geocoded Airport Locations

At the request of NCTCOG, TransSolutions geocoded the 79 airports passengers identified as final destinations during the survey. The airports were geocoded to longitude and latitude coordinates using Google Maps.

### 5.4 Data Expansion

A detail expansion of the survey data would have required access to the actual bookings and share of originating passengers by flight for the whole duration of the survey. However, acquiring this level of detailed data turned out to be much harder than anticipated. The airlines tend to treat this information as confidential. Therefore, the expansion was performed based on an average daily booking during the survey period by flight and an estimated average percentage of connecting passengers by time-of-day. The number of seats by flight could have also been used if no other data was available.

# Appendix A

## Project Management Plan

The Project Management Plan defines the scope and schedule for the Dallas Love Field departing passenger survey project.

### Background

The North Central Texas Council of Governments (NCTCOG) maintains a travel demand forecasting model for the 12-county Metropolitan Planning Area (MPA) of North Central Texas. Due to the upcoming lifting of Wright Amendment restrictions on traffic at Dallas Love Field (DAL) on October 13, 2014, passenger travel characteristics and demand at the airport are expected to change. NCTCOG requested that current passenger travel behavior be updated prior to the lifting of Wright Amendment restrictions.

TransSolutions has been retained by the NCTCOG to conduct a passenger survey at DAL to capture current travel patterns and trip-making behavior data for passengers departing from the airport on weekdays. The survey must be completed before October 13, 2014. Data collected from the DAL departing passenger survey must be accurate, and the subsequent analysis of the data valid, so that the NCTCOG forecasting model will correctly estimate travel demand to and from Dallas Love Field.

### Project Scope

TransSolutions will conduct the activities and produce the deliverables listed in this section during the course of the DAL passenger survey project. The projected delivery dates to NCTCOG appear in the Project Schedule section of the Project Management Plan document.

2. Develop Project Management Plan.
3. Develop Sampling Plan.

The Sampling Plan defines the approach TransSolutions will take to ensure that the completed surveys are representative of current departing passenger traffic at DAL. Carrier-specific historical enplanement data by market and time-of-day will be utilized to determine the required number of completed surveys for a given flight. In the absence of enplanement data, market capacity, time-of-day data will be utilized. NCTCOG's objective is to obtain data from 2,000 completed passenger surveys.

4. Develop Data Collection Plan.

TransSolutions' approach for collecting the survey data at DAL, as detailed in the Data Collection Plan, will entail the use of the surveyor-administered passenger intercept survey method and the use of computer tablets for capturing passenger responses. TransSolutions' surveyor will engage DAL departing passengers and collect survey data post-security, at the boarding lounges. As late-arriving passengers may be reluctant to complete a survey at the departure gate, an approach for engaging these passengers is described in the Data

Collection Plan. Additionally, the Data Collection Plan details actions that will be taken in the event of a gate change or a cancelled or delayed flight, or when the targeted number of surveys for a flight is not collected.

Data Collection Schedule. The Data Collection Schedule is a component of the Data Collection Plan. The schedule identifies by carrier, flight and departure date, the surveyor assigned to survey departing passengers, and the targeted number of completed surveys for the flight as determined and documented in the Sampling Plan.

#### 5. Create Survey.

TransSolutions met with NCTCOG on August 27, 2014 to review an initial version of the passenger survey created by NCTCOG. NCTCOG addressed a number of issues that were raised during the meeting, and provided TransSolutions with an updated version of the survey. TransSolutions will deliver a final version of the survey to NCTCOG by September 5.

TransSolutions will code the survey into tablet computers which will be utilized by the surveyors to conduct the survey with departing passengers. Survey questions will be worded to facilitate passenger response, and coded to minimize the number of required passenger responses. For example, the tablet will recognize that a passenger who indicates he arrived at DAL by hotel shuttle should not be presented with questions related to airport parking. When collecting sensitive or confidential information such as household income, the surveyor will turn the tablet toward the passenger and ask that he or she select the appropriate response. Upon user entry, the table immediately will switch to the next screen in the survey, keeping the sensitive information hidden from the surveyor.

As detailed in subsequent sections of this document related to the Pilot Study, TransSolutions and NCTCOG may determine that the passenger survey requires additional revision, based on the results of the Pilot Study,

#### 6. Develop Pilot Study Plan.

The Pilot Study Plan defines the approach for conducting a pilot of the passenger survey at DAL, the purpose of which is to test the Data Collection Plan and passenger response to the survey. The Pilot Study Plan details the:

- Scope of the pilot survey,
- Method for conducting and evaluating the pilot study, and
- Time required for evaluation and analysis of the results of the pilot study.

#### 7. Conduct Pilot Study.

TransSolutions will conduct a pilot passenger survey at DAL in advance of conducting the full survey effort. The purpose of the pilot is to test and assess the Data Collection Plan and the passenger survey, and to revise the plan and survey as necessary to address any issues discovered during the pilot.

Pilot Study Findings. At the conclusion of the Pilot Study, TransSolutions will create a Pilot Study Findings document that summarizes the results and conclusions of the Pilot Study. The document may include recommendations for changes to the Data Collection Plan or to the passenger survey in order to facilitate the full survey effort. The plan and / or survey will be updated to reflect any recommendations adopted by the PRC.

8. Develop Training Program.

TransSolutions will develop a comprehensive training program for preparing the surveyors to conduct the passenger survey at DAL. The program will include creation of training materials that illustrate the Data Collection Plan, and delivery of instructor-led training. The training program will provide the surveyors with a thorough understanding of the:

- Data Collection Plan
- Role and responsibilities of the surveyor
- Security regulations and zero-tolerance policy for inappropriate behavior while at DAL.

Additionally, the training program will provide the surveyors with hands-on practice and proficiency at completing the survey on the tablet computer.

9. Conduct Full Survey.

TransSolutions will conduct the full departing passenger survey at DAL, as defined in the Data Collection Plan, with the understanding that the effort must be completed before October 13, 2014. TransSolutions anticipates that data collection will occur during a period of two consecutive weeks. Data collection may have to be extended to a third week, however, in the event that the required 2,000 completed surveys are not collected during the first two week period. The full survey schedule will be finalized after completion of the Pilot Study.

During the survey period, a TransSolutions' coordinator will be onsite at DAL during the hours of data collection to monitor the status of the collection effort. The coordinator will ensure that the surveyors are effectively deployed throughout the day, will monitor the status of flights to be surveyed, and proactively address issues resulting from gate changes, flight delays and cancellations.

Raw Survey Data. During the survey period, raw survey data will be downloaded from the tablet computers to text (.txt) files in Comma Separated Values (CSV) format on a daily basis. The raw survey data will be provided to NCTCOG at the conclusion of the data collection effort, or during the collection period upon request.

Daily Update. During the survey period, TransSolutions will provide NCTCOG with a daily update on the progress of the data collection effort, as of the previous day. The update will include the following data:

- Total number of surveys collected the previous day
- Total number of usable surveys collected the previous day
- Percentage of previous day usable surveys to previous day total surveys
- Total number of surveys collected to date

- Total number of usable surveys collected to date
- Percentage of to-date usable surveys to to-date total surveys.

#### 10. Validate Data Quality.

During the data collection period, TransSolutions will evaluate the survey data in order to assess the quality of the data. TransSolutions will evaluate the data to ensure that completed surveys are usable and representative of current departing passenger traffic at DAL, as defined in the Sampling Plan. Regular evaluation of the data during the survey period will allow TransSolutions to adjust the collection schedule should the number of usable surveys fall short of daily targets.

NCTCOG defines a usable survey as having the following data, at a minimum:

- Origin location (i.e. Home, Place of business) and Address
- Destination airport
- Access mode to the airport
- Trip purpose
- Parking Option and Parking cost reimbursement, if applicable
- Airline, Flight number, Terminal number, Gate number
- Home address (full address, intersection, zip code, and landmark are acceptable)
- Survey Time and Location.

#### 11. Geocode Data.

TransSolutions will supply staff to geocode the following data for each usable survey:

- Home address
- Origin location
- Parking location
- Terminal
- Destination airport

The data elements will be geocoded to longitude and latitude coordinates.

TransSolutions will load all geocoded survey data into a Microsoft Access database. Each record in the database will include the corresponding survey identification number.

TransSolutions will conduct a quality control check of the database, utilizing an approach first reviewed with and approved by the PRC.

#### 12. Weight and Expand Survey Data / Analyze Data.

Weight and Expand Survey Data. TransSolutions will perform a weighting and expansion process on the survey data. If the airlines included in the survey do not provide data required for the weighting and expansion process, TransSolutions will use other sources of carrier and enplanement data to complete the task, after obtaining approval from NCTCOG.

Survey Database. TransSolutions will provide the Microsoft Access survey database to NCTCOG within four months of completing the survey effort.

Data Analysis. TransSolutions will perform analyses on the survey data in order to identify the travel characters of departing passengers at Dallas Love Field. One analysis will focus on the characteristics of the trips being made by each passenger group and the factors that affect decision-making regarding the trips. A second analysis will focus on the origin-destination patterns of departing airline passenger trips, and will identify similarities and differences in patterns among the various passenger groups. TransSolutions will review with and obtain approval from the PRC before proceeding on the proposed analyses.

### 13. Create Final Survey Report.

TransSolutions will produce a final Survey Report that includes the following:

- A description of the survey process
- Key findings from the survey
- Results of the data analyses detailed in the Data Analysis section of this document
- Lessons learned in conducting the survey, for future use.

TransSolutions also will produce an Executive Summary version of the final report that is suitable for distribution to board members, stakeholders, and other interested parties. TransSolutions will submit an outline of the Survey Report and the Executive Summary to NCTCOG for approval before creating draft versions of the documents. Draft versions of the two reports will be sent to NCTCOG for review and comment. NCTCOG feedback will be incorporated into both documents, and returned to NCTCOG for final review. After incorporating final revisions to the documents, TransSolutions will distribute the following to NCTCOG:

- Four bound copies of the Survey Report
- Electronic copies of the Survey Report and Executive Summary.

## **Project Schedule**

The project schedule appears below. The data collection component of the project is the least flexible of the project constraints; data collection must be completed prior to lifting of Wright Amendment restrictions on October 13, 2014. All tasks leading up to and including the Conduct Full Survey at DAL task are on the critical path.

	<b>Aug</b>	<b>Sep</b>			<b>Oct</b>				<b>Nov</b>		
Week Ending:	<b>29</b>	<b>5</b>	<b>12</b>	<b>19</b>	<b>26</b>	<b>3</b>	<b>10</b>	<b>17</b>	<b>24</b>	<b>1</b>	<b>8</b>
Develop Project Management Plan	█										
Develop Data Collection Plan	█										
Develop Sampling Plan	█	█									
Create Passenger Survey		█									
Develop Pilot Study Plan		█									
Conduct Pilot Study at DAL			█								
Document Pilot Study Findings			█								
Revise Passenger Survey			█								
Revise Data Collection Plan			█								
Finalize Data Collection Schedule			█								
Create Training Program		█									
Conduct Data Collection Training		█									
Conduct Full Survey at DAL			█								
Validate Survey Data Quality			█								
Provide Daily Survey Update			█								
Provide Raw Survey Data					█						
Geocode Survey Data						█					
Weight and Expand Survey Data						█					
Analyze Survey Data						█					
Create, Deliver Survey Database									█		
Create, Deliver Final Report										█	

## Appendix B Pilot Study Plan

The Pilot Study Plan defines the approach for conducting and evaluating a pilot of the departing passenger survey at Dallas Love Field (DAL).

### Pilot Study Purpose

The purpose of the Pilot Study is to test and assess the project Data Collection Plan, and to revise the plan as necessary to address any issues discovered during the pilot. At the conclusion of the pilot study, TransSolutions will create and deliver to NCTCOG a Pilot Study Findings document that summarizes the results and conclusions of the pilot study. The document may include recommendations for changes to the Data Collection Plan in order to facilitate the full survey effort.

### Pilot Study Scope

#### Selection Criteria

To ensure that flights surveyed during the pilot are representative of the current DAL flight schedule and traffic, the pilot study flight set will contain a:

- Representative mix of carriers serving Dallas Love Field
- Representative mix of destinations within and outside of Texas
- Passenger mix that includes both business and leisure travelers.

#### Flights to Survey

Given the pilot selection criteria, flights departing from DAL during the late afternoon peak travel period (3:00pm – 5:59pm) will be surveyed. Conducting the pilot during this time period increases the likelihood that business travelers are included in the passenger mix, and enables TransSolutions to survey flights operated by a mix of carriers, and flights traveling to destinations within and outside of Texas.

#### Data Collection Schedule

The target date for the pilot survey is September 10, 2014. The flights listed in Table 11 below will be surveyed.

**Table 11: Pilot Study Survey Flight Set**

<b>Airline</b>	<b>Terminal</b>	<b>Flight Number</b>	<b>Destination</b>	<b>Dept Time</b>	<b>Capacity</b>
DL	1	5272	ATL	15:22	50
WN	2	43	HOU	17:00	143
WN	2	1987	TUL	18:00	122
UA	1	5263	IAH	16:03	50
WN	2	3294	ELP	17:20	143
WN	2	261	ABQ	18:15	143

The 6 flights to be surveyed during the pilot represent:

- 4.5% of total flights scheduled for the day (6 of 132)
- 3.9% of total flight capacity scheduled for the day (651 of 16,772 seats)
- Three of the four carriers (DL, K5, UA, WN) currently operating at DAL.

In the event that a flight scheduled to be surveyed is cancelled, a backup flight will be surveyed in its place.

### Resources

Two to three TransSolutions data collection resources will conduct the pilot survey at DAL. Surveyors will arrive at DAL approximately 90 minutes prior to the scheduled departure time of the first flight to be surveyed, in order to obtain access passes and pass through TSA security before proceeding to departure gates to begin data collection.

### **Pilot Study Approach**

As the goal of the pilot study is to test and assess the Data Collection Plan, the participants in the pilot study will perform the data collection activities defined in that plan, as follows:

#### 14. Prepare for Day's Data Collection.

- a. Obtain Access Passes. Pilot surveyors will meet at DAL at a designated time and place to complete the process for receiving an airport access pass from airport authorities.
  - i. Time required to obtain the access pass will be recorded
- b. Proceed to Terminal and Gate. Pilot surveyors will proceed to the terminal and gate of the first flight they are schedule to survey, passing through the TSA security checkpoint en route.
  - i. Time required to complete the security check will be recorded

#### 15. Conduct Survey.

- a. Conduct Passenger Sampling Exercise. Pilot surveyors will conduct a simple sampling exercise to determine which passengers at the departure gate to survey.
  - i. Obstacles to conducting the sampling exercise will be noted
- b. Pre-screen Survey Candidates. To ensure that all survey participants meet the selection criteria defined by NCTCOG, pilot surveyors will pre-screen survey candidates.
  - i. Passenger resistance or obstacles to completing the pre-screening process will be noted
- c. Survey Passenger. After selecting a candidate who meets the pre-screening criteria, the pilot surveyor will survey the passenger utilizing a tablet computer.
  - i. Time required to complete the passenger pre-screening and survey will be recorded

- ii. Passenger resistance or obstacles to completing the survey will be noted  
After conducting the survey, the Surveyor will select the next candidate utilizing the sampling approach reviewed during data collection training.
- iii. Approximate amount of time between successful pre-screening of candidates will be recorded

#### 16. Engage Late-Arriving Passengers.

Pilot surveyors will engage late arriving passengers, those who arrive at the departure gate shortly before boarding is called, and request that they provide a phone number. TransSolutions then will call the passenger at a convenient time and conduct the survey over the phone.

- i. Passenger phone number, airline, flight number and gate will be recorded

If a passenger prefers not to provide a phone number, the surveyor will offer the passenger a card that lists a link to the NCTCOG website. The passenger then can go to the site and complete an online version of the survey that NCTCOG has linked to the website.

#### 17. Conduct End-of-Collection Day Activities.

- a. Return Daily Passes. At the conclusion of the day's data collection period, the pilot surveyors will return their airport access passes as required.
- b. Download Survey Data. Tablet computers will be returned to the TransSolutions office daily, and the raw survey data downloaded to text (.txt) files in Comma Separated Values (CSV) format. The raw data will be assessed to determine whether each of the completed survey is usable, as defined by NCTCOG.

### **Pilot Assessment**

At the conclusion of the survey pilot, TransSolutions will conduct an assessment to determine whether adjustments to the project Data Collection Plan are required to ensure the success of the full data collection effort. TransSolutions will complete the following activities in evaluating the results of the pilot study:

- 1. Conduct Pilot Review Meeting. The pilot team will meet to share observations and review the data collected during the pilot. It is anticipated that this meeting will take place the day following the pilot. The meeting will focus on identifying solutions to obstacles identified by the pilot surveyors during the pilot period.
- 2. Validate Data Quality. TransSolutions will evaluate the pilot survey data in order to assess the quality of the data, as defined by NCTCOG.

Survey data collected during the pilot that meets NCTCOG quality standards will be incorporated into the full passenger survey dataset.

- 3. Project Planning Updates. Recommendations from the pilot team, and any issues identified with the data during quality validation, will be evaluated to determine whether changes to

Data Collection Plan are warranted. Recommended revisions will be communicated to NCTCOG.

4. Pilot Study Findings. TransSolutions will create and deliver to NCTCOG a Findings document that summarizes the results and conclusions of the pilot study, and recommendations for changes to the Data Collection Plan in order to facilitate the full survey effort. TransSolutions will update the Data Collection Plan to reflect all changes approved by NCTCOG, including making required revisions to the passenger survey and data collection schedule.

### Project Schedule

The DAL survey project schedule appears below. Tasks related to the planning, conducting, and assessment of the Pilot Study are highlighted in gray, as are tasks resulting from the Pilot Study.

	Aug	Sep				Oct					Nov			
Week Ending:	29	5	12	19	26	3	10	17	24	31	7	14	21	28
Develop Project Management Plan														
Develop Data Collection Plan														
Develop Sampling Plan														
Create Passenger Survey														
Develop Pilot Study Plan														
Conduct Pilot Study at DAL														
Document Pilot Study Findings														
Revise Passenger Survey														
Revise Data Collection Plan														
Finalize Data Collection Schedule														
Create Training Program														
Conduct Data Collection Training														
Conduct Full Survey at DAL														
Validate Survey Data Quality														
Provide Daily Survey Update														
Provide Raw Survey Data														
Geocode Survey Data														
Weight and Expand Survey Data														
Analyze Survey Data														
Create, Deliver Survey Database														
Create, Deliver Final Report														

## Appendix C

# Survey Targets and Completed Surveys

Survey Targets and Completed Number of Usable Surveys  
by Market, Carrier, and Time-of-Day Period

Market	6:00a - 8:59a			9:00a - 11:59a			12:00p - 2:59p		
	Rqd Usable	Complete	% Complete	Rqd Usable	Complete	% Complete	Rqd Usable	Complete	% Complete
AL	17	18	105.6%	0	0	-	17	17	99.7%
K5 WN	1	2	186.4%	0	0	-	0	0	-
	16	17	104.1%	17	17	99.7%	17	27	158.3%
AR	17	19	109.1%	17	17	99.7%	17	27	158.3%
GA	6	10	167.7%	6	4	67.1%	6	5	83.9%
KS	17	18	105.6%	0	0	-	0	0	-
LA	17	21	123.2%	33	35	104.8%	17	21	123.2%
MO	67	70	103.7%	68	91	133.4%	51	52	101.6%
NM	34	33	96.8%	17	19	111.4%	34	38	111.4%
OK	34	36	105.6%	17	24	140.7%	0	0	-
UA WN	4	0	0.0%	6	5	83.9%	4	4	90.7%
	277	278	100.2%	179	186	103.7%	210	274	130.8%
TX	282	278	98.7%	185	191	103.1%	214	278	130.0%
	492	503	102.2%	344	381	110.7%	356	438	122.9%

Market	3:00p - 5:59p			6:00p - 8:59p			9:00p - 12:00a		
	Rqd Usable	Complete	% Complete	Rqd Usable	Complete	% Complete	Rqd Usable	Complete	% Complete
AL	17	17	99.7%	0	0	-	0	0	-
K5 WN	1	1	93.2%	0	0	-	0	0	-
	0	0	-	17	17	99.7%	0	0	-
AR	1	1	93.2%	17	17	99.7%	0	0	-
GA	12	13	109.0%	0	0	-	0	0	-
KS	0	0	-	17	18	105.6%	0	0	-
LA	33	43	131.6%	32	41	129.7%	0	0	-
MO	67	75	111.1%	51	82	160.3%	0	0	-
NM	16	19	116.3%	33	38	113.8%	0	0	-
OK	50	55	109.0%	15	21	144.3%	0	0	-
UA WN	12	17	142.6%	0	0	-	0	0	-
	244	276	113.0%	107	249	233.0%	83	83	100.3%
TX	256	293	114.3%	107	249	233.0%	83	83	100.3%
	453	516	113.8%	272	466	171.5%	83	83	100.3%

Market	<u>TOTAL</u>		
	Required Usable	Complete	% Complete
AL	51	52	101.6%
K5	2	3	139.8%
WN	67	78	115.6%
AR	70	81	116.3%
GA	30	32	107.3%
KS	34	36	105.6%
LA	132	161	122.2%
MO	306	370	121.1%
NM	135	147	108.9%
OK	116	136	117.1%
UA	27	26	97.3%
WN	1,100	1,346	122.3%
TX	1,127	1,372	121.8%
	2,000	2,387	119.4%

Note: Rounding in calculations resulted in % Complete values of exactly 100% as showing either slightly above or below 100%.