

April 26, 2007

TO: Larry Reser, Chief of Surveys
FROM: Daryl K. Williams, Professional Land Surveyor
SUBJECT: SWO 4251(1) - J/P No. 20947(04) - US 54- Texas County
Section 1 - From NS 105 Section line northeasterly to NS 109 Section line.

HISTORICAL LETTER AND WRITTEN REPORT

I. GENERAL

Survey began October 16, 2006
Survey completed April 26, 2007

The measurement unit for this project will be the U.S. Survey Foot.

II. SURVEY ASSIGNMENT

This project was assigned to and completed by my crew based at Clinton.

III. PURPOSE OF SURVEY

The purpose of this survey was to obtain adequate information for the design and construction of a four lane highway.

IV. SURVEY LIMITS

Section One:
Survey began at NS 105 Section line and continues northeasterly to NS 109 Section Line.
Section Two:
Survey began at NS 109 Section Line and continues northeasterly to the Kansas State Line.

V. ALIGNMENT

Alignment is along present SH 54 as shown on S.A.P. No. 589(1) plans. This alignment is identical to SWO 2331(1) survey.

VI. STATIONING

Stationing was taken from SWO 2331(1) survey and extend southwest without equation except with existing plans and projects.

VII. HORIZONTAL CONTROL

A. Horizontal Control for this survey is the National Geodetic Survey's Oklahoma State Plane Coordinate System of 1983, North Zone. Project control was adjusted to the HARN adjustment of 1993: NAD83(1993) and the CORS network.
B. Primary Control for this survey was established following ODOT Survey Division Standards. I established control points using double, one hour static GPS sessions. Controlling monuments for this project were the NGS Monument #20 PR, E15 and ODOT, Mon. No. T-70-224. In addition, I established a new coordinate on existing monument T-70-120 set under SWO2468(2) survey. Monument T-70-389 was the only new monument established by me for this survey.
C. Secondary Control for this survey was established performing dual RTK occupations.
D. Accuracy
The secondary control network and the section boundaries for this survey are within general compliance with NGS Second Order, Class II standards for horizontal control (1 : 20,000).

VIII. VERTICAL CONTROL

A. A double line of levels were ran from USC&GS monument L15, the last BM on SWO3964(1), thru my project and tied to ODOT Mon. T-70-224. A comparison of the differential levels and the established static GPS elevation was made. The conventional level run fit within 3rd order tolerance and was held for this survey.
B. Level datum for this survey is NGS NAVD 88.
C. All Control Leveling for this project was done using the Digital Level.
D. Benchmarks established and used on this survey are the accuracy requirements of NGS Third Order standards as a minimum.
E. A "BENCHMARKS & CHECK LEVELS" list was placed in the .DGN file and a hardcopy submitted with the completed survey showing the benchmark number, the differences of each run between benchmarks, and the elevation and full description of each benchmark.

IX. PHOTO CONTROLS

Aerial targets were established by me, as depicted on a flight map prepared by the Aerial Survey Branch. I established both horizontal and vertical positions on each of these aerial targets. As ODOT Survey Division procedures dictate, each target was controlled by at least 2 independent ties, both horizontally and vertically. I tied a minimum of 12 NSSDA check points per mile throughout the length of the project.

X. TOPOGRAPHY

The majority of the topography on this survey was obtained by the Aerial Survey Branch (ASB) and furnished to the field crew for topo identification. Upon completion of identifying aerial topo in the field, this information will then be added to the Topography .DGN File generated by ASB, and archived on the ODOT Mainframe Computer, as per Standard ODOT Survey Division Archiving Procedures.

B. Topography obtained by the conventional method consist of the following:

1. All drainage structures within 200 feet of the Survey Centerline.
 - a. Drain flowlines crossing the Survey Centerline.
 1. Areas that were not obscured by vegetation or inundated by water at the time of the Aerial Photography: Profiles consist of a series of "check shots" only, at 2 or 3 points on both the upstream and downstream sides, taken at locations that were easily accessible to the field crew.
 2. Areas that were obscured by vegetation or inundated by water at the time of the aerial photography were located by the conventional field method.

2. Gate widths along the existing Right of Way fences.
3. Underground utilities within 200 feet of the Survey Centerline.
4. Overhead wires/cables crossing the Survey Centerline.
5. Utility meters, valves, hydrants, etc. within 200 feet of the Survey Centerline.
6. Mail boxes within 200 feet of the Survey Centerline.
7. Underground storage tanks within 200 feet of the Survey Centerline.
8. Existing remnants of piers and abutments from the old bridge upstream from current structure.

XI. DTM

No DTM data was collected by the conventional field method on this project.

XII. LAND TIES

- A. Complete land tie information was obtained by the conventional field method as needed to purchase new right-of-way, including the bounding out of all sections through which the survey centerline passes.
- B. Local surveyors Tim Campbell and Ted Harder were contacted for land corner and subdivision information.
- C. The existing land corners established under the Plans were checked and used, if at all possible.
- D. All corporate boundary lines, subdivisions and all other property divisions adjacent to and/or crossing the Survey Centerline throughout the project limits were computed mathematically, based upon the best available information.

XIII. EXISTING RIGHT-OF-WAY

Existing right-of-way, easements and property ownerships for this survey were obtained from deeds on file at the Texas County Court House in Guyman, and the ODOT Right of Way Division, Engineering Branch. All Right of Way deeds on the existing alignment through the town of Tyrone were obtained from Division 6 headquarters.

XIV. UTILITIES

- A. All utility companies servicing the project area were contacted thru "CALL OKIE" and the locations were obtained by either conventional field methods, RTK, or from utility plats, maps, or other information provided by the owning companies and the city of Tyrone.
- B. The information was placed in the submitted Microstation Design File, and a hardcopy of ODOT Form SD-7, "List of Public/Private Owned Utilities", were submitted with the completed survey.

XV. HAZARDOUS WASTE

During the performance of required conventional survey work, survey crew members watched for areas/sites that could have previously or are now being used to store or dispose of possible contaminants. The following were found:

1. station 585+87 63' ft. There are three filler caps set in concrete.
2. station 589+25 70' ft. Junk yard
3. station 606+32 105' ft. Septic tank

XVI. UNDERGROUND STORAGE TANKS

8,000 gallon tank of super unleaded 88' ft. sta. 595+78.
10,000 gallon tank of unleaded 99' ft. 595+74.
tanks are owned by MV Petroleum, Wichita KS.

XVII. DRAINAGE INFORMATION

- A. Drainage areas for all drains crossing the Survey Centerline were taken from USGS quad maps that have been scanned into a Microstation Design File. This file was provided to me by the Aerial Survey Branch. These areas (divide lines) were field checked for accuracy prior to submittal of the project.
- B. Highwater information was obtained by the conventional field method and placed in the submitted Microstation Design File.
- C. Ravine sections are to be generated by bridge or design from the ASB DTM file.
- D. Flowline profile check points were obtained on all cross drains.

XVIII. SURVEY DATA SHEETS

Survey Data Sheets were submitted in the form of a Microstation Design File archived on the ODOT Mainframe Computer, as per ODOT Survey Division Standards.

XIX. SUBMISSION OF SURVEY DATA

Upon completion of this survey, a hard copy of the following will be submitted, in addition to the digital survey data:

- A. Historical Letter & Written Report
- B. Form SD-1, Transmittal Letter w/FSVARCH.INDEX attached.
Note: The FSVARCH.INDEX will include a listing of all computer files archived during the course of the survey, as well as a written description of what is contained in each of the files, and the date they are archived.
- C. Form SD-7, Public and Privately Owned Utilities List w/ vicinity map on back.
- D. Form SD-9, Final Cost Report of Survey
- E. Form SD-11, Position and Description of Survey Monuments (GPS control monuments, Brass/Aluminum Caps for benchmarks, etc. if applicable).
- F. Form SD-20, Survey Control Data Statement.
- H. Form SD-41, Surveyor's Certification.
- I. Cogo Data (coordinate list with alignments).
- J. Benchmarks & Check Levels list, including the SWO and description of the project.
- K. Original and reduced copy (8 23/64 " x 11") of each Certified Land Corner form.

XX. PERSONNEL

Kevin Fleck, Trans. Spec. III
Steve Perring, LS Trans. Spec. IV
Lloyd Teeter, Trans. Spec. II
John Wilson, Trans. Spec. I

Daryl Williams, PLS
Professional Land Surveyor

Project Name:		SWO4251(1)		
Description:		FROM NS105 TO NS109		
Horizontal Alignment Name:		A001		
Description:		SECTION ONE ALIGNMENT		
Style:		Centerline		
Input Factor:		1.0000		
		STATION	EASTING	NORTHING
Element: Linear	PB (1000)	380+05.11	1054717.1106	712104.3424
	PC (1006)	560+07.10	1068885.5746	723209.5828
Tangent Direction:		N 51°54'38.36" E		
Tangent Length:		18001.99		
Element: Circular	PC (1006)	560+07.10	1068885.5746	723209.5828
	PI (1001)	569+36.34	1069616.9270	723782.8167
	CC (1007)	1074187.3494	716445.3884	
	PT (1008)	578+58.38	1070453.9027	724186.4812
Radius:		8594.37		
Delta:		12°20'30.57" Right		
Degree of Curvature(Arc):		0°40'00.00"		
	Length:	1851.27		
	Tangent:	929.23		
	Chord:	1847.70		
	Middle Ordinate:	49.80		
	External:	50.09		
Tangent Direction:		N 51°54'38.36" E		
Radial Direction:		S 38°05'21.64" E		
Chord Direction:		N 58°04'53.65" E		
Radial Direction:		S 25°44'51.07" E		
Tangent Direction:		N 64°15'08.93" E		
Element: Linear	PT (1008)	578+58.38	1070453.9027	724186.4812
	PC (1009)	583+80.59	1070924.2639	724413.3314
Tangent Direction:		N 64°15'08.93" E		
Tangent Length:		522.21		
Element: Circular	PC (1009)	583+80.59	1070924.2639	724413.3314
	PI (1002)	596+96.44	1072109.4737	724984.9455
	CC (1010)	1068435.2994	729574.0600	
	PT (1011)	609+67.43	1072926.5243	726016.3975
Radius:		5729.58		
Delta:		25°52'06.44" Left		
Degree of Curvature(Arc):		1°00'00.00"		
	Length:	2586.85		
	Tangent:	1315.85		
	Chord:	2564.93		
	Middle Ordinate:	145.37		
	External:	149.16		
Tangent Direction:		N 64°15'08.93" E		
Radial Direction:		S 25°44'51.07" E		
Chord Direction:		N 51°19'05.71" E		
Radial Direction:		S 51°36'57.51" E		
Tangent Direction:		N 38°23'02.49" E		
Element: Linear	PT (1011)	609+67.43	1072926.5243	726016.3975
	PC (1012)	615+00.94	1073257.7940	726434.5953
Tangent Direction:		N 38°23'02.49" E		
Tangent Length:		533.51		
Element: Circular	PC (1012)	615+00.94	1073257.7940	726434.5953
	PI (1003)	621+80.43	1073679.7096	726967.2252
	CC (1013)	1077749.0189	722876.9328	
	PT (1014)	628+53.60	1074214.5024	727386.3958
Radius:		5729.58		
Delta:		13°31'35.87" Right		
Degree of Curvature(Arc):		1°00'00.00"		
	Length:	1352.66		
	Tangent:	679.49		
	Chord:	1349.52		
	Middle Ordinate:	39.87		
	External:	40.15		
Tangent Direction:		N 38°23'02.49" E		
Radial Direction:		S 51°36'57.51" E		
Chord Direction:		N 45°08'50.42" E		
Radial Direction:		S 38°05'21.64" E		
Tangent Direction:		N 51°54'38.36" E		
Element: Linear	PT (1014)	628+53.60	1074214.5024	727386.3958
	POE (1031)	656+28.92	1076398.8162	729098.4607
Tangent Direction:		N 51°54'38.36" E		
Tangent Length:		2775.32		

PLS	DKW		OKLAHOMA DEPARTMENT OF TRANSPORTATION	
			SURVEY DIVISION	
DRAWN	DKW		SURVEY DATA SHEET	
CHECKED	LRT			
APPROVED			SHEET 3 OF 22	
CREW	CLINTON	SWO 4251 (1) PROJECT NO. 20839(08) SHEET NO. 3003		