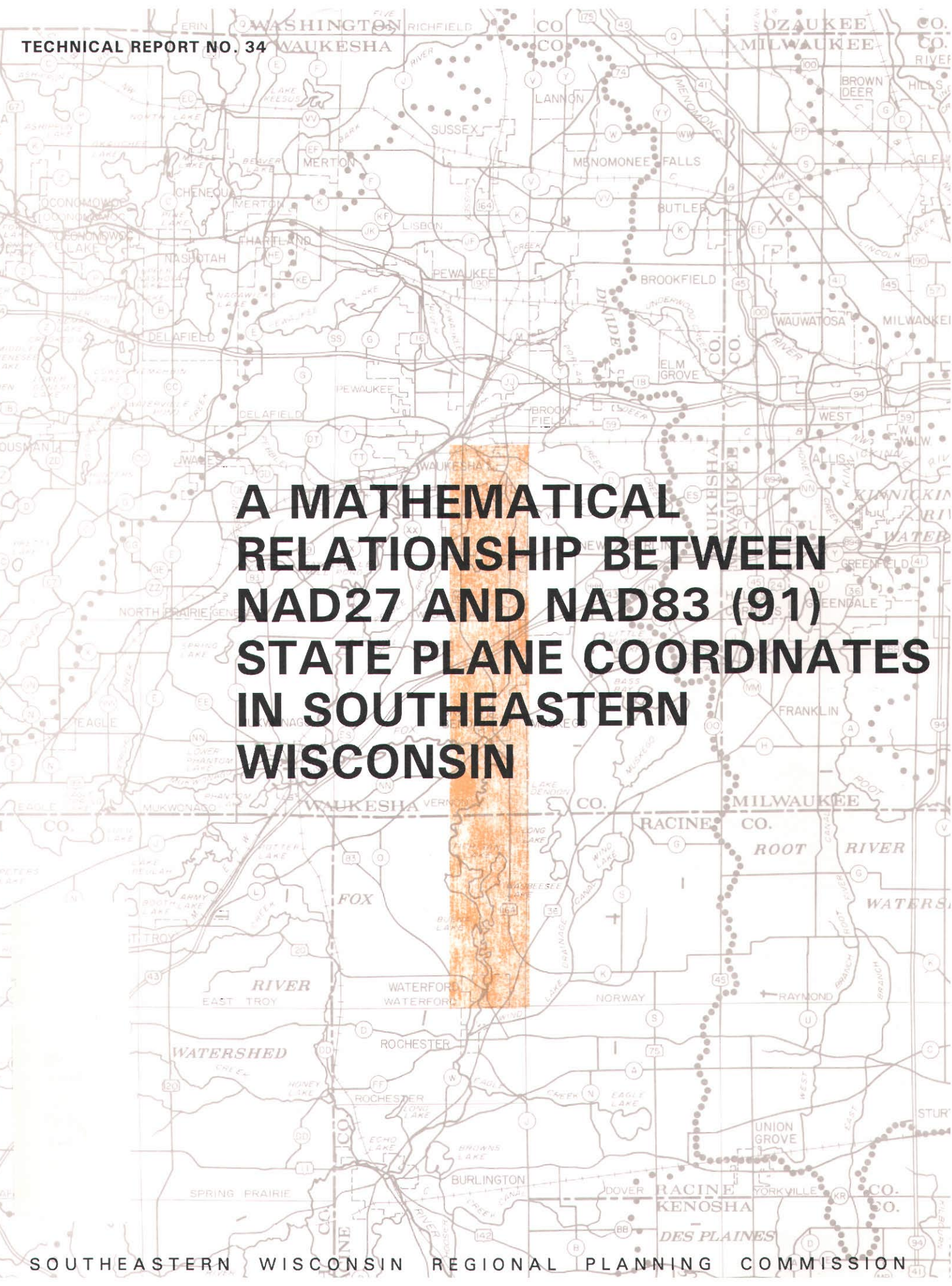
TECHNICAL REPORT NO. 34



A MATHEMATICAL RELATIONSHIP BETWEEN NAD27 AND NAD83 (91) STATE PLANE COORDINATES IN SOUTHEASTERN WISCONSIN

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TECHNICAL REPORT NUMBER 34

A MATHEMATICAL RELATIONSHIP BETWEEN NAD27 AND NAD83 (91) STATE PLANE COORDINATES IN SOUTHEASTERN WISCONSIN

Prepared by

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Southeastern Wisconsin Regional Planning Commission

December 1994

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December 21, 1994

STATEMENT OF THE EXECUTIVE DIRECTOR

Since early 1964, the Regional Planning Commission has recommended to the governmental agencies operating within the Southeastern Wisconsin Region the use of a unique system of survey control as a basis for the compilation of large-scale topographic and cadastral maps and as a basis for the conduct of land and engineering surveys. More recently, the Commission has also recommended the use of this system as a basis for the development of automated, parcel-based land information systems within the Region. The recommended control survey system, which combines the U. S. Public Land Survey and State Plane Coordinate Systems, has been widely adopted and applied within the Region. As of January 1995, the recommended survey control system will have been extended over a total area of almost 1,600 square miles, or about 60 percent of the approximately 2,700-square- mile Region; and almost 8,400 U. S. Public Land Survey corners, or over 70 percent of all such corners in the Region, will have been relocated, monumented, and positioned on the State Plane Coordinate System.

All of this horizontal control survey work within the Region has been referenced to the North American Datum of 1927, a datum based upon the Clarke Spheroid of 1866, a spheroid which fits the North American Continent and the Southeastern Wisconsin Region well. The Federal government in 1973 determined to undertake a readjustment of the national control survey network, and to adopt a new datum known as the North American Datum of 1983 (NAD-83), utilizing a new reference spheroid known as Geographic Reference System of 1980. The center of the new reference spheroid was designed to provide a good fit to the entire earth.

The use by the Federal government of existing geodetic survey data in the readjustment, combined with the introduction of global positioning system (GPS) technology, subsequent to the completion of the readjustment, however, has resulted in the further readjustments of the new national control survey network within some areas, such as the adjustment accomplished by the Wisconsin Department of Transportation in 1991, resulting in a datum identified as NAD-83(91).

The rationale for changing datums at the Federal level originally related largely to military considerations, such as missile guidance and satellite surveillance systems, and to considerations of intercontinental navigation of both military and commercial aircraft and of ocean-going vessels. While these are important considerations at the national level, they have no bearing on local area surveying and mapping, and use of the new datum does not provide any significant advantages over the continued use of the old datum within the Region. Indeed, no benefits can be shown as attendant to the very large cost that would be entailed in shifting from NAD-27 to NAD-83, or NAD-83(91) within the Region. The Southeastern Wisconsin Regional Planning Commission has, therefore, determined to continue to utilize NAD-27 as the basis of its surveying and mapping activities within Southeastern Wisconsin.

In order to facilitate the use of the NAD-83(91) datum within the Region by such agencies as may determine to do so in spite of good reasons to the contrary, the Commission in July 1993 entered into an agreement with Mr. Earl F. Burkholder, Consulting Geodetic Engineer, for the development of an operational computation system that would permit the ready and reliable bi-directional transformation of coordinates between the Wisconsin plane coordinate system, South Zone, North American Datum of 1927, and the Wisconsin plane coordinate system, South Zone, North American Datum of 1983(91 adjustment). The requested development work was completed in November, 1994, and the results are presented in this report. The transformation methodology herein presented permits the ready conversion of State plane coordinates between the two datums concerned so as to maintain Third Order Class I accuracy in distances and bearings computed from the coordinates of adjacent stations, and thus to maintain the integrity of the control survey network for use in local land and engineering surveys, in large-scale topographic and cadastral mapping operations, and in the creation of automated, parcel-based land information systems.

The information presented in this report is intended to permit potential users to utilize the Commission system to directly transform State Plane Coordinates between the two datums concerned.

Respectfully submitted,

Kurt W. Bauer
Executive Director

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October, 1994

Dr. Kurt Bauer, Executive Director
Southeastern Wisconsin Regional Planning Commission
P.O. Box 1607
Waukesha, Wisconsin 53187

Dear Dr. Bauer,

Transmitted herewith is the report entitled, "A Mathematical Relationship Between the NAD27 and NAD83 (91) State Plane Coordinates in the Southeastern Wisconsin Region". This report documents the process used to determine appropriate transformation parameters which can be used to convert NAD27 coordinates to NAD83 (91) values and conversely, NAD83 (91) coordinates to NAD27 values. Tests and comparisons are included to show that the accuracy of the transformed values is comparable to that of the coordinates being transformed.

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) has, over a period of more than 30 years, established, maintained and promoted use of the North American Datum of 1927 as the basis of location for land records and municipal engineering projects throughout the SEWRPC area. That investment in the survey control system has been a sound one and the quality of the developed network still meets the original design criteria. However, another newer, slightly different datum, the NAD83 (91), has been implemented by the federal government and many users--both federal, state and local agencies and private practice professionals--within the SEWRPC area are basing their work and records on the newer datum. The value of information within the existing NAD27 database is preserved and enhanced by establishing a reliable relationship by which existing information can be freely exchanged between the two datums.

Exchanging data between the two datums is an issue which was addressed for the mapping community by the National Geodetic Survey in the development of a transformation program called NADCON. Although that program is readily available, there are two drawbacks to its use:

- NADCON was developed for use throughout the United States and works very well at a stated level of accuracy of about 0.5 feet (one sigma = 0.15 meters). That is sufficient for most mapping applications, but not sufficiently accurate for transforming thousands of surveyed control point coordinates as contained in the SEWRPC NAD27 database.

- NADCON is relatively difficult to use. Due to incremental adjustment of the NAD83 and the subsequent high-precision statewide GPS network computed in 1991, using NADCON is a two-step process which is somewhat involved and becomes easy only with lots of practice.

The process of developing sets of simple transformation parameters for use in the SEWRPC area was a formidable task, but the results are quite satisfying and the benefits will accrue for years to come. The procedure developed and reported in the study is very easy to use, whether converting NAD27 coordinates to NAD83 (91) values or converting NAD83 (91) coordinates to NAD27 values. And, comparisons included in the report show that transformed coordinate inverse distances compare favorably with both the NAD27 inversed distances and the corresponding field measured values. The goal of preserving the value of the existing third-order survey control network has been achieved.

Thank you for the opportunity to be of service to the Commission.

Yours truly,

Earl F. Burkholder

Earl F. Burkholder, PLS, PE
Consulting Geodetic Engineer

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INTRODUCTION

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) has over a period of more than 30 years established and promoted the use of a network of horizontal and vertical survey control stations throughout the approximately 2,700-square-mile, seven-county Region consisting of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington and Waukesha Counties in Wisconsin. Since publishing SEWRPC Planning Guide No. 2, "Official Mapping Guide," in 1964, the Commission has provided leadership and guidance in promulgating standards and specifications for the conduct of the surveys necessary to densify the geodetic survey control network; to collect data for the planning and design and for the layout of public works; and to locate real property corners throughout the Region. Numerous users from both the public and private sectors—including land surveyors, public works engineers, planners, appraisers, attorneys, and abstractors—benefit from those control surveys and from the related maps and other spatial data referred to a common survey control system known to be reliable to a specified and stated level of accuracy.

During the past 30 years modern positioning technology has evolved from transit and tape surveying methods to include use of electronic distance measuring instruments, digital theodolites, and at least two distinct generations of satellite based positioning instrumentation: doppler and global positioning systems. Other modern positioning technology includes use of remotely sensed data in photogrammetry, laser altimetry, infrared imaging and various forms of radar.

The development of computer technology over the past 30 years has also revolutionized the way society uses and manages information, in this case spatial data. Current computer technology accommodates individual access to large quantities of spatially related data stored in large databases. The specific organization and integrity of those data are critical to preserving the value of the data to the individual user.

The control survey network and the surveying and mapping procedures espoused by the Regional Planning Commission are described in SEWRPC Technical Report No. 7, Horizontal and Vertical Survey Control in Southeastern Wisconsin (2nd Edition), published in August 1990. The survey control system described in that report accommodates both advances in positioning technology—i.e., in geodetic surveying—and the integration of spatial data into a modern parcel based land information system. A change which affects the survey control network, but which is external to and not under control of the Commission, is that made by the Federal government in the national survey datums; specifically replacing the North American Datum of 1927 (NAD27) with the North American Datum of 1983 (NAD83). The horizontal survey control system described in SEWRPC Technical Report No. 7 is based upon the NAD27 and ramifications of the Federal adoption of the NAD83 are described in Appendix G of that report. As noted there, the national network has been readjusted and published in two versions, the NAD83 as based upon a major readjustment of the national network involving doppler satellite positioning technology, and a later refinement, the NAD83 (91), based upon a high precision global positioning system survey conducted within the State of Wisconsin by the Wisconsin Department of Transportation.

Although the NAD27 network is sufficiently accurate for land surveying, public works engineering, and land information system development purposes within the seven county Region, some users may need to exchange spatial data with other users who are basing their data on the newer datum. Therefore, the Regional Planning Commission in July of 1993 commissioned a study to develop a sound mathematical procedure by which NAD27 coordinates in the Southeastern Wisconsin Region could be converted to NAD83 (91) coordinates while retaining, insofar as possible, the inherent accuracy of the NAD27 network.

BACKGROUND

The NAD27 is a **regional geodetic datum** (Brinker & Minnick 1987, p 424) established in 1927 using five parameters; two parameters (semi-major and semi-minor axes) to define the mathematical ellipsoid; two parameters to fix the location of the triangulation network on the surface of the earth; and a reference azimuth to provide orientation at the origin. The parameters are:

a = 6,378,206.4 meters b = 6,356,583.8 meters	semi-major and semi-minor axes of the mathematical ellipsoid known as the Clark Spheroid of 1866.
ϕ = 39° 13' 26."686 N λ = 98° 32' 30."506 W	latitude and longitude of Station "Meades Ranch" in Kansas.
α_o = 75° 28' 09."64	South azimuth, Station "Meades Ranch" to Station "Waldo."

Unstated in the definition is the assumption that the geoid height and the deflection-of-the-vertical at the origin are both zero and that the spin axis of the earth is parallel to the minor axis of the ellipse. Subsequent precise measurements and refinements to the mathematical model have shown that these assumptions are not perfect and that residual values do exist. However, those imperfections have little, if any, impact on local use of control survey networks based upon the NAD27.

The NAD83 is a **global geodetic datum** having its origin at the center of mass of the earth—instead of at Station Meades Ranch—and having the size, shape and orientation of the mathematical ellipsoid, known as the Geodetic Reference System of 1980 (GRS 80), positioned such that it fits the entire Earth much better than does the Clarke Spheroid of 1866. Geometrical parameters of the GRS 80 are:

semi-major axis, a = 6,378,137.000 meters (exact) and reciprocal flattening, 1/f = 298.25722210088 (accurate to 14 digits).

Reflecting 50 years of advancement in geodetic science, the definition of a global geodetic datum is more complex than the definition of a regional geodetic datum and involves physical geodesy parameters in the mathematical model. For purposes of local survey control networks, however, the procedures for using NAD83 or NAD27 are essentially the same. The differences are in the numbers defining the datum and the coordinates of control points throughout the network.

At the national level, reasons for recomputing and upgrading the NAD27 to the NAD83 include, but are not limited to (Schwartz 1989):

- Analysis of satellite orbits and other data indicated that the Clarke Spheroid of 1866, while it fits North America quite well, does not fit the entire Earth well enough for some scientific and military purposes.

- When the NAD27 was being developed in the 1920's, the triangulation network in the United States was relatively sparse in some areas and large uncontrolled gaps existed between triangulation arcs.

- In the 50 years following publication of the NAD27 many additional geodetic observations were added to the network. In many cases, the quality of new observations exceeded that of the existing network. These observations, however, had to be adjusted and forced to fit previously published values. In some cases, regional readjustments were required.

- Orientation throughout the network needed to be strengthened with additional astronomical observations.

- With the introduction of electronic distance measuring instruments in the 1960's, it became possible for users to conduct surveys of higher accuracy than that of the network to which the surveys were expected to be attached and adjusted.

When the project to readjust the national network was begun in 1974, it appeared to be the right time to do so. Electronic distance measurement technology was established, proven and productive. Distance observations and precise angles could be combined into an ultra-precise transcontinental traverse which provided accurate scale to the entire network. And, new technology, in the form of doppler satellite positioning, promised to provide additional strength to the entire national network. In the mid 1970's it was not possible to anticipate the dramatic impact global positioning system (GPS) technology would have during the next decade or that use of GPS technology would force another cycle of network readjustments.

By the time the NAD83 was published in 1986, GPS technology was well proven and becoming affordable for routine practice. Again, it became possible to conduct surveys of a higher order accuracy than the NAD83 network to which the surveys were expected to be attached and adjusted. This has been the primary argument used to justify installation of statewide high precision GPS networks (HPGN) utilizing GPS technology.

Another argument used in support of the establishment of statewide high precision networks is that geodetic control points need to be more readily accessible to the user. In the past, many geodetic control stations were established on mountain tops or other prominent high points—often remote locations—in order to obtain unobstructed lines-of-sight to adja-

cent stations. It was also important to choose station locations which would preserve the geometrical strength-of-figure in the network. With GPS technology station intervisibility is no longer needed—except for azimuth pairs—and the quality of an observed position is more a function of the GPS satellite constellation in the sky than the configuration of the network on the ground. Therefore, new GPS stations are now established at convenient locations in readily accessible areas, thus economically densifying the control survey network in areas where primary stations are widely spaced (Strange & Love, 1991).

The development of yet another set of coordinate values for the same set of existing monuments gives the appearance of yet another new datum. However, the National Geodetic Survey—the Federal agency responsible for the National Geodetic Reference System—is careful to point out that the 1983 datum has not changed and that the NAD83 (91) represents a refinement to the previous NAD83 values (Bodnar 1990). The difference between NAD83 and each statewide refinement is noted by including in parentheses the year in which the high precision GPS network (HPGN) was published. Accordingly, the high precision network in Wisconsin is known as the NAD83 (91). A generic name, irrespective of the state, is NAD83 (HPGN).

CURRENT STATUS — SEWRPC AREA

The horizontal survey control network in the SEWRPC area is based upon the nationally defined North American Datum of 1927 (NAD27). The vertical survey control network is based upon a separate network of bench marks known as the National Geodetic Vertical Datum of 1929. As of early 1994, about 8,400 U.S. Public Land Survey corners throughout the seven county Southeastern Wisconsin Region were monumented and connected to the horizontal and vertical survey control networks so that a common convenient set of monumented points provides both horizontal and vertical references for users throughout the area. The monuments are described, coordinate values listed, and traverse diagrams shown in SEWRPC Technical Report No. 7. Significant effort was made to assure that the horizontal control information in the report meets Federal Third Order, Class I standards, and that the vertical control data meets Federal Second Order Class II standards, all as defined by the Federal Geodetic Control Committee.

Arguments for changing from the NAD27 to NAD83 are given in the previous section and are applicable at the national or global level. The same arguments do not necessarily hold given a geometrically consistent NAD27 network in the Southeastern Wisconsin Region area that meets the needs of local users. Nevertheless, a need may exist at times to integrate existing NAD27 data for the Region with data defined in another system, the NAD83 (91). Some agencies and users accept and work with data on the NAD83 (91) and may need to relate those data to existing records. Without established compatibility, the benefits of having and using a common database may be significantly reduced.

With respect to transformation of coordinates between datums, two questions need to be addressed:

1. Is there a unique one-to-one correspondence between NAD27 and NAD83 (91) coordinate values for a given point?

   Theoretically, "yes" there is a unique correspondence between the two datums, but practically, the answer is "no." A unique correspondence may exist, but can not be found with respect to either datum due to imperfect survey measurements, both past and present.

2. What is the accuracy of NAD83 (91) coordinates obtained by transforming existing NAD27 coordinate values to the new datum?

   The accuracy of NAD83 (91) coordinates obtained by transforming existing NAD27 coordinates can not be expected to be better than the accuracy of the original NAD27 coordinates. However, if the value of the transformed coordinates for control survey purposes is to be maintained, it is essential to preserve the accuracy and value of the existing NAD27 network in the transformation process.

STATISTICAL CONSIDERATIONS

The term "accuracy" as used above may be appropriately represented by the statistical measure, "standard deviation". The standard deviation of each coordinate value and of subsequently derived directions and distances is one way of assessing the quality of the information. The smaller the standard deviation of the coordinates for a given point, the greater the reliability of the coordinates. The objective of any survey procedure is to keep the standard

deviation as small as possible by controlling the accumulation of error whether random or systematic.

Strictly speaking, random error is the only legitimate component of standard deviation. However, unidentified, or unmodeled, systematic error—sometimes referred to as a bias—also contributes to the uncertainty of a measured or computed quantity. When systematic error can be identified, through analysis of a measurement system or selection of a better mathematical model, the effect of the systematic error can be eliminated by applying a mathematical correction. If systematic error is not identified and/or eliminated then the standard deviation of the result is "polluted" accordingly.

Given that coordinates for a survey control point—on either datum—are the result of a measurement and computation process, the exact, true values of the coordinates can never be known. Random error is always present to some degree and can not be avoided. Systematic error creeps in through imperfections of the measurement instrumentation and/or by way of an imperfect mathematical model. It is important to note that coordinates on each of the two datums concerned contain some of both kinds of errors.

With regard to the differences in coordinate values between the NAD27, NAD83 and NAD83 (HPGN) throughout North America, each difference has four error components: i.e., the systematic error and random error on each datum. A goal of the national change in datums was to eliminate as much systematic error as possible and to control the accumulation of random error to acceptable levels. The extent to which that goal was met is documented, in part, by the HPGN projects in which the NAD83—and NAD27—can be compared to a precise GPS network.

Some of the difference between datums is due to random error and should be expected; and some is due to systematic error which should change rather slowly over small areas such as the Southeastern Wisconsin Region. An evaluation of differences between surveyed positions of points common to both datums provides insight on the relative magnitude of those error components. Ideally, the variation of datum differences—primarily random error in the NAD27 values—in the Southeastern Wisconsin area is small enough that acceptable interpolations between known common points is possible.

The quality of monumented geodetic survey control coordinates is given by the order of accuracy associated with the published values. A list of all points used in this study and the order of accuracy associated with each is given in Appendix A. In order to use individual order-of-accuracy information as weights in computing transformation parameters, the data must be input as the standard deviation associated with each coordinate value. Material in Appendix A also describes how standard deviations were estimated for the various orders of accuracy. Finally, Appendix A includes a listing of all point coordinate values and associated standard deviations on both datums.

NADCON

The National Geodetic Survey (NGS)—formerly the U.S. Coast and Geodetic Survey (USC & GS)—is, as already noted, the Federal agency responsible for the National Geodetic Reference System and has studied the difference between the NAD27, NAD83, and NAD83 (HPGN) on the national level. Using the surveyed positions of control points in both datums, NGS developed a procedure and program—referred to as NADCON—to convert coordinates published on the NAD27 to NAD83 values and vice versa (Dewhurst 1990). Separately, NADCON can also be used to convert NAD83 coordinates to NAD83 (HPGN) values in those states for which a GPS high precision survey has been performed. Reverse transformations can also be computed. And, as stated in the Federal Register, Volume 55, Number 155, dated August 10, 1990, NADCON is the Federal standard for NAD27 to NAD83 transformations.

NADCON was designed to model the differences between datums as accurately as possible. However, the differences contain both random and systematic errors and it is impossible to model local variations of those differences precisely throughout the entire United States. The result is that NADCON will provide values for the difference between datums at any point in the United States. And, regardless whether one works with a small data set in a restricted area or uses points scattered over a much larger area, the NADCON program will give the same result for a given point transformation.

The accuracy of NADCON transformations within the conterminous United States is stated by the NGS (Dewhurst 1990) to be about 0.15 meter at the 67 percent confidence level—one standard deviation. That level of accuracy is generally acceptable for transforming points for mapping purposes, but an uncertainty of 0.15 meter—about one-half a foot—is too large when transforming coordinate values from NAD27 to NAD83 (91) for control survey purposes. Given that refinement is required, local common

points—along with their standard deviations—can be used to compute parameters of a local best fit between the two coordinate systems. Those parameters can then be used to transform coordinates from one datum to the other, and within limits of local linear interpolation, to provide a better approximation of the datum differences than would NADCON. NADCON results are included in the comparisons made under this study, and are considered in the conclusions of the study.

OBJECTIVES

The objectives of the study commissioned by SEWRPC to address the datum conversion problem are to:

- Develop procedures for the transformation of NAD27 coordinates to NAD83 (91) coordinates and NAD83 (91) coordinates to NAD27 coordinates with acceptable accuracy and integrity. The specified criterion for accuracy and integrity is a comparison of the field measured distance—reduced for elevation and state plane coordinate system scale factor—to the inverse distance between the transformed coordinates of the same pair of points. A maximum allowable comparison difference of the distance between two points is 1:10,000.

- Maximize the utility of the existing NAD27 survey control system in the seven county SEWRPC area.

- Document the veracity of all models and computational procedures used.

- Design a transformation procedure which is easy to use and which provides a basis for which for making informed decisions when choosing the best transformation parameters for use in the Southeastern Wisconsin Region.

MODEL

The mathematical model chosen for the project is the "four parameter similarity transformation" which relates two systems of plane coordinates to each other (Mikhail & Gracie, 1981). Features of the model are:

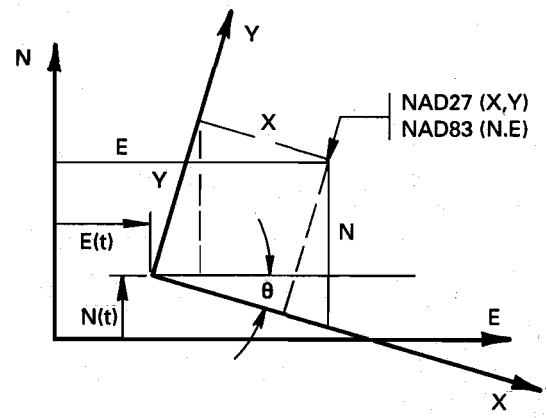
- The relationship between the two coordinate systems is based strictly on the plane coordinates of the points common to both systems.

- Four simple parameters define the mathematical relationship between the two coordinate systems. They are:

  1. Translation in easting (x value)
  2. Translation in northing (y value)
  3. Rotation of one system with respect to the other.
  4. Scale to accommodate changes in length units.

Figure 1

RELATIONSHIP OF COORDINATE SYSTEMS



Parameters

S = Scalar (feet to meters)
θ = Rotation, NAD27 to NAD83 (91) (Positive, counterclockwise)
N(t) = Northing translation, meters
E(t) = Easting translation, meters

- The standard deviation of the coordinates in each system can be accommodated. If no weights are desired, a unit standard deviation (1.00) assigned to each coordinate will weigh all inputs equally and give the same result as if no weights were used. If reasonable estimates of standard deviations are available, they can be used and the least squares computation of the transformation parameters will appropriately reflect the variation of quality of published coordinates in both datums.

- A minimum of two common points will give a unique combination of transformation parameters. A third common point adds redundancy to the model which is useful first to assure absence of blunders. Given blunder free data, each additional common point selected by the

user adds redundancy to the solution and provides a better approximation of the local relationship between the two coordinate systems. The model is limited by large random errors and non-linear distortions likely to be encountered over increasingly large areas.

- Once "best fit" transformation parameters are determined for a given area, individual transformations within the area are very straightforward and can be performed easily with a hand-held calculator. The equations can also be programmed into a computer for more efficient transformations of multiple points.

DESIGN

The transformation procedure is designed so that points common to both datums in a given area can be used to determine the best set of transformation parameters for the local area. The user controls the overall procedure by establishing appropriate standard deviations for the common coordinates—in both datums—and by deciding which points are to be used in computing a set of transformation parameters. Up to 20 common points weighted by their standard deviations can be used in program GEOTRAN5 developed during this study. If no weights are desired, all standard deviations are input as unity (1.0).

EQUATIONS

Once transformation parameters have been determined for a given area, the following equations are used with the transformation parameters (listed in Table 1) to convert between NAD27 and NAD83 (91) coordinates within the specified area. The NAD27 values, X & Y coordinates, have U.S. Survey Foot units and the NAD83 (91) values, N & E coordinates, have metric units. Conversion of NAD83 (91) values to U.S. Survey Foot units can be performed using the exact conversion, 12 meters = 39.37 U.S. Survey Feet.

NAD27 to NAD83 (91):

$$N = -X(S)\sin\theta + Y(S)\cos\theta + N(t) \quad (1)$$

$$E = X(S)\cos\theta + Y(S)\sin\theta + E(t) \quad (2)$$

NAD83 (91) to NAD27:

$$X = [(E - E(t))\cos\theta]/S - [(N - N(t))\sin\theta]/S \quad (3)$$

$$Y = [(E - E(t))\sin\theta]/S + [(N - N(t))\cos\theta]/S \quad (4)$$

The 4 parameter similarity transformation is a conformal transformation—which can be verified by applying the Cauchy/Riemann differential equations to the equations above. That means an angle in one datum is transformed without distortion to the other datum as long as one uses the same transformation parameters. When performing transformations on two lines coming into the same point using different sets of parameters, the angle between the two lines will be distorted by the **difference** in rotation angles of the two parameter sets.

PROJECT PLAN

The initial approach used in the study was to conduct a small pilot project. Field survey coordinates in both the NAD27 and the NAD83 (91) datums for a group of 14 points in and adjacent to Ozaukee County were obtained. Those points were then used to find a best fitting relationship between the two datums for that localized area. Estimated NAD83 (91) values were computed for all 14 common points and compared to the known surveyed position in a blind test to check the integrity of the transformation. Pilot test results are presented in Appendix B.

Two significant results shown in Appendix B are worth noting. First, the standard deviation of the coordinate differences (published — transformed) on the NAD83 (91) are 0.16 feet for the X (easting) component and 0.19 feet for the Y (northing) component. Secondly, a comparison of measured distances—reduced for elevation and state plane scale factor—with the inverse distance computed from the transformed coordinates shows agreement on the order of 1/40,000 or better.

Based upon favorable results of the test project, three further levels of effort were considered:

Scenario A: A network of 10 to 12 common points would be established throughout the SEWRPC area having reliable coordinate values in both datums, NAD27 and NAD83 (91). The transformation model would be applied to various combinations of those points to determine if one set of transformation parameters could be found which would be applicable throughout the entire seven county area. If it became apparent that one set of parameters would not model the local distortions with sufficient accuracy, then Scenario B would be considered.

Scenario B: A network of approximately 100 common points having reliable coordinate values in both datums would be established throughout the SEWRPC area . In this case, several sets of trans-

Table 1

TRANSFORMATION PARAMETERS

County (Area)	Northing Translation	Easting Translation	Scale: Unit Conversion[a]	Rotation: Seconds
Ozaukee (Entire)	-0.590 m	-9,598.068 m	0.304795128718	-1.518645
Washington (North half)	-5.260 m	-9,600.871 m	0.304796556791	-2.553476
Washington (South half)	1.808 m	-9,596.422 m	0.304794291549	-0.949075
Milwaukee (North half)	-8.214 m	-9,598.934 m	0.304795950476	-3.492291
Milwaukee (South half)	-9.331 m	-9,609.516 m	0.304800108763	-3.403161
Waukesha (NE quarter)	-2.559 m	-9,600.196 m	0.304796052668	-1.942071
Waukesha (SE quarter)	-4.546 m	-9,605.690 m	0.304798339692	-2.267438
Waukesha (SW quarter)	-6.047 m	-9,609.556 m	0.304799930427	-2.497101
Waukesha (NW quarter)	-3.659 m	-9,602.463 m	0.304796992107	-2.123928
Walworth (North half)	-4.811 m	-9,614.744 m	0.304801819276	-2.017859
Walworth (South half)	-3.858 m	-9,612.638 m	0.304800856344	-1.820220
Racine (West half)	-0.913 m	-9,616.239 m	0.304802270072	-0.960376
Racine (East half)	-4.291 m	-9,620.262 m	0.304804050643	-1.762366
Kenosha (Entire)	-2.316 m	-9,625.585 m	0.304806024072	-1.112379

[a] *This value was found in the "best fit" computation and very nearly equals meters per foot. It is not an exact unit conversion and is to be used only as one of the transformation parameters in the specified area.*

formation parameters would be used throughout the region, with the objective of establishing a set of transformation parameters for each county. For those points on or near a county boundary, it was intended that acceptable estimated NAD83 (91) values could be obtained using the transformation parameters applicable in either county.

Scenario C: If it became apparent that adequate transformation of NAD27 control survey coordinate values to NAD83 (91) was not possible on a county-by-county basis, then a much denser network of common points would needed and a set of transformation parameters determined for many smaller areas, for example for each U.S. Public Land Survey System Township. There are 68 full—i.e., approximately 36 square mile—survey townships within the seven county Region; and 14 partial townships, the latter located along the Lake Michigan shoreline. Before undertaking the effort and expense of establishing the number of additional common points required to establish a set of transformation parameters for each township, other unnamed alternatives would also be considered.

STUDY PROCEDURE

With the transformation model validated by the pilot test, the next step—Scenario A—was to determine if one set of parameters applicable to the entire seven county Region could be determined. Sixteen additional common points were established throughout the seven county Region as shown in the diagram in Appendix C. The transformation model was applied to the Scenario A data in two modes; 1) assuming equal weights among the various common points and 2) assigning standard deviations to the published coordinates of each point. In each case, differences between published and estimated NAD83 (91) coordinate values range up to and sometimes exceed 2 feet as shown in the printouts in Appendix C. The analysis indicated that apparently significant random exists within the area and/or the systematic error varies more rapidly than can be approximated with a linear model covering the entire seven county Region.

Although the original plan for Scenario B was to establish approximately 100 common points throughout the seven county Region, it was decided instead to use the existing first- and second-order NAD27 monuments whose NAD83 (91) coordinates were recently published by the National Geodetic Survey. NAD27 and NAD83 (91) coordinates for these points were tabulated and added to the common points used for Scenario A and the Pilot Test Project. Additionally, standard deviations for each point in each datum were estimated and combined into the master file of 200 Scenario B common points listed in Appendix A.

Using the larger set of Scenario B data, the model was applied four times, first to the entire seven county Region, then to three smaller subareas of the Region. The subareas consisted of the northern approximately third of the Region consisting of Ozaukee and Washington counties; the middle third consisting of Waukesha and Milwaukee counties; and the southern third consisting of Walworth, Racine, and Kenosha counties. In each case, some differences between published and estimated NAD83 (91) coordinates exceeded 1 foot and were considered larger than acceptable. The transformation model was then applied to each county area separately.

RESULTS

Appendix D contains the results of using the GEOTRAN5 program and Scenario B data to compute transformation parameters for various areas in the SEWRPC region. For each trial, a map showing the common points utilized is followed by a computer printout which lists the input data, the points used, the computed transformation parameters, and differences between the computed NAD83 (91) coordinates and published coordinates for the same point. The differences fall into two categories; 1) those associated with the common points used to compute the transformation parameters and 2) other common points compared in a blind test. At the end of each printout the standard deviations are listed. The first set of numbers applies to differences at all common points in the trial data set. In those cases where a second set of numbers appear, they are based only on those points which are within or very near the targeted area. This second set of values gives a better indication of the results expected in the area when using the transformation parameters derived for the specific area.

Results of various computation trials and comments on them are given in Appendix D. While it is not possible—at the desired level of accuracy—to use one set of transformation parameters for the entire seven county Region, it was possible in two cases, Ozaukee and Kenosha Counties, to use one set of transformation parameters over the entire county to convert between NAD27 and NAD83 (91) coordinates. With the exception of Waukesha County, the other counties in the SEWRPC area each needed two sets of transformation parameters to adequately model the differences between coordinate systems. Waukesha County was divided into quarters with a different set of transformation parameters applicable in each quadrant. A summary of the transformation parameters determined for each county and fractional county is given in Table 1. Within the specified area, these parameters are used with equations (1) and (2) to transform NAD27 coordinates to NAD83 (91) values and with equations (3) and (4) to transform NAD83 (91) coordinates to NAD27 values.

The transformation parameters for the 14 subareas of the Region listed in Table 1 were developed to produce transformed coordinates which are usable for most control survey purposes, including the control of land and ordinary public works surveys. However, should it be found necessary to develop more refined transformation parameters using smaller subareas of the Region, the Commission will provide the desired parameters on a case-by-case as needed basis, at cost.

EXAMPLES

As a part of testing the transformation results throughout the seven county Region, coordinates for 17 pairs of intervisible points were converted from NAD27 to NAD83(91) using both GEOTRAN5 and NADCON. The coordinates for each point are listed in Appendix E and the field measured distances between points—reduced for elevation and state plane scale factor—are compared to: 1) the published NAD27 state plane coordinate inverse; 2) the inverse of NAD83 (91) coordinates for each point obtained using NADCON; 3) the inverse of NAD83 (91) coordinates using the transformation parameters for the local area; and 4) the inverse of NAD83 (91) coordinates using transformation parameters from an adjacent area. In all cases, the distances compare on the order of magnitude of 1:20,000 or better.

Appendix E also includes a listing of point—pair NAD83 (91) coordinates as computed using each set of transformation parameters. In each case, the point—pairs within and adjacent to the intended area—county, half county, etc.—are listed and the inverses of the derived coordinates are compared to the field measured distances. Again, the comparisons were all at the level of 1:20,000 or better.

CONCLUSIONS

Conclusions that may be drawn from this study include:

1. The four parameter similarity transformation is a simple efficient method for converting NAD27 coordinates to NAD83 (91) values and for converting NAD83 (91) coordinates to NAD27 values.

2. In applications for which differences up to 3 feet between estimated and surveyed NAD83 (91) coordinates can be tolerated, one set of four transformation parameters can be used for the entire seven county Southeastern Wisconsin Region. Better results with standard deviations approximately 0.2 to 0.4 feet can be obtained by computing separate sets of transformation parameters based upon common points in smaller areas such as a county or portion thereof.

3. Comparison of inversed distances agree quite well. Although the absolute coordinate values may differ by up to 0.5 foot—the excellent inversed distance comparisons indicate very reliable relative accuracy between points in the same general area.

   Pilot Test Project: Appendix B contains a comparison of 26 fairly long lines and, along with the excellent agreement of coordinate values, indicates very little random error in the NAD27 network in the northeastern portion of the Southeastern Wisconsin Region.

   Intervisible Point-Pair Comparisons: Measurement data and published NAD27 coordinates for 17 intervisible point-pairs scattered throughout the seven county Region were provided by SEWRPC. NAD83 (91) coordinates for each point were determined using NADCON and the GEOTRAN5 derived transformation parameters for the specific area. Where applicable NAD83 (91) coordinates were also computed using the parameters from an adjacent area to provide a more comprehensive comparison. As shown by the printouts in Appendix E, the worst case comparison was between points 61 and 288 in Washington County where the published distance disagreed with the measured distance by 1:20,000 but the NAD83 (91) comparisons were consistently better, about 1:30,000. The next worst comparison was the line between Waukesha and Milwaukee Counties for which the NAD27 comparison was 1:36,000, while the Waukesha County NAD83 (91) comparison was 1:28,000.

4. As expected from a conformal transformation, the angles are transformed without angular distortion. The exception is an angle formed by the intersection of two lines for which at least one endpoint was transformed using a different set of transformation parameters than used at the vertex. In those cases, the angle will be distorted by the difference in rotation parameters of the two sets.

5. The accuracy estimates made for NADCON appear to be rather conservative, at least for the Southeastern Wisconsin Region. NADCON results from the Pilot Test Project have a standard deviation smaller than the 0.15 meters (0.5 feet) as claimed by National Geodetic Survey and match the excellent results obtained by applying the transformation parameters in the limited test area concerned, as indicated by the comparisons set forth in Ap-

pendix B. Although more complex and difficult to use than the linear transformation equations applied in this study, NADCON does model non-linear distortions and can be applied throughout the Southeastern Wisconsin Region. More tests in addition to the comparisons made in the Pilot Test Project—as documented in Appendix B—and the comparison made on Scenario A data—as documented in Appendix C—are needed to more fully demonstrate the actual level of accuracy attainable using NADCON within the Southeastern Wisconsin Region.

6. The advantages of using the linear transformation equations used and recommended in this study include:

    - Local common point coordinates and standard deviations can be used to establish a reliable local relationship between datums.
    - The user has control over the weights assigned to the coordinate values and over which points are used to determine the least squares "best fit" transformation parameters.
    - Given sufficient common points, a separate set of transformation parameters can be computed for smaller and smaller areas as necessary to model local distortions at the required level of accuracy.
    - Once transformation parameters are determined for a specified area, they can be used in simple transformation equations to convert from NAD27 to NAD83 (91) or from NAD83 (91) to NAD27. The computation is simple enough to perform using a handheld calculator or can be easily programmed to convert many points very efficiently by computer.

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APPENDICES

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Appendix A

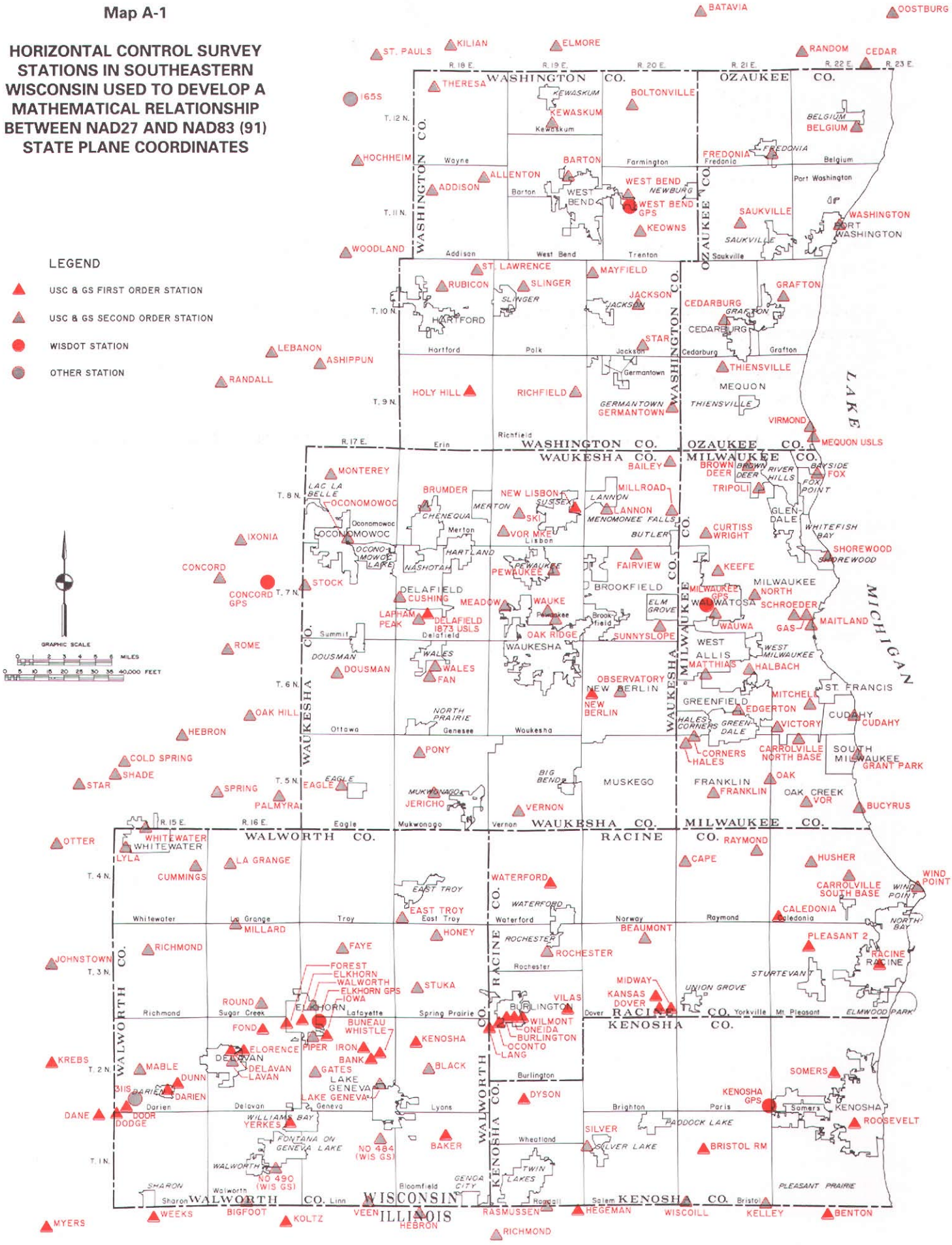
LISTING OF COMMON POINT NUMBERS, NAMES, ORDER OF ACCURACY, COORDINATES, AND ESTIMATED STANDARD DEVIATIONS

This appendix contains the following:

- A map of the seven county Southeastern Wisconsin Region showing the location of all first- and second-order horizontal survey control stations published by the National Geodetic Survey (former U.S. Coast and Geodetic Survey).
- A listing of stations by name and 4-digit identification number assigned to each along with its order-of-accuracy classification on both the NAD27 and NAD83 (91).
- An explanation of how standard deviations for each point were estimated from the order-of-accuracy classification.
- A listing of coordinate values and standard deviations for all common control points used in the study.

Map A-1

HORIZONTAL CONTROL SURVEY STATIONS IN SOUTHEASTERN WISCONSIN USED TO DEVELOP A MATHEMATICAL RELATIONSHIP BETWEEN NAD27 AND NAD83 (91) STATE PLANE COORDINATES



LISTING OF COMMON POINT NUMBERS, NAMES, AND ORDER OF ACCURACY

Pt No.	Station Name	Order of Accuracy NAD27	NAD83 (91)	T	R
0203	Offset - Fredonia	3	2	12	21
0204	Offset - Grafton4	3	2	10	22
0205	Offset - Grafton5	3	2	10	22
0304	Virmond	2	2	9	22
0305	Lannon	2	3	8	20
0306	Belgium	2	2	12	22
1001	Offset - Saukville Az	3	2	11	21
1002	Cedar-2	3	2	13	22
1003	Cedarburg	2	3	10	21
1004	Germantown	2	2	9	20
1005	Random	2	2	13	22
1006	Offset - Washington	3	2	11	22
1007	Thiensville	2	3	9	21
1008	Tripoli	2	2	8	21
4401	Kilian	2	2	13	18
4402	Random	2	2	13	22
4403	Woodland	2	2	11	17
4404	Cold Spring	2	3	5	15
4405	New Berlin	1	2	6	20
4406	Carrolville NB	2	2	5	22
4407	Weeks (Ill)	1	1	46	4
4408	Bristol RM	1	1	1	21
4409	165S	2	B	12	17
4410	West Bend GPS	2	B	11	20
4411	Concord GPS	2	B	7	16
4412	Milwaukee GPS	2	B	7	21
4413	311S	2	B	2	15
4414	Elkhorn GPS	2	B	2	17
4415	Kenosha GPS	2	B	2	21
4416	Somers Reset	1	B	2	22
4421	Addison	2	3	11	18
4422	Allenton	2	2	11	18
4423	Ashippun	2	3	9	17
4424	Bailey	2	3	8	20
4425	Barton	2	3	11	19
4426	Barton-2	2	3	11	19
4427	Bativia	2	2	13	20
4428	Boltonville	2	2	12	20
4429	Brown Deer	2	3	8	21
4430	Cedar	2	3	13	19
4431	Elmore-2	2	3	13	19
4432	Fox	2	2	8	22
4433	Fredonia	2	2	12	21
4434	Fredonia-2	2	3	12	21
4435	Grafton	2	2	10	22
4436	Hochheim	2	2	11	17
4437	Holy Hill	2	2	9	18
4438	Jackson	2	3	10	20
4439	Keowns	2	2	11	20
4440	Kewaskum	2	2	12	19
4441	Mayfield	2	3	10	20
4442	Monterey	2	2	8	17
4443	Oostburg	2	2	13	23
4444	Richfield	2	2	9	19
4445	Rubicon	2	3	10	18
4446	Saukville	2	3	11	21
4447	Slinger	2	2	10	19
4448	Star (Wash. Co.)	2	2	10	20
4449	St Lawrence	2	3	10	18
4450	St Pauls	2	3	13	17
4451	St Pauls-2	2	3	13	17
4452	Theresa	2	3	12	18
4453	Theresa-2	2	3	12	18
4454	Washington	2	3	11	22
4455	West Bend	2	3	11	20
4456	484	2	2	1	17
4457	490	2	2	1	16
4458	Baker	1	1	1	18
4459	Bank	1	2	2	17
4460	Beaumont	2	3	3	20
4461	Benton Reset (Ill)	1	1	46	12
4462	Bigfoot	2	3	1	16
4463	Black Reset	2	3	2	18
4464	Bristol (destroyed)	1	1	1	21
4465	Brumder	2	2	8	18
4466	Bucyrus	2	2	5	22
4467	Burlington	1	2	3	19
4468	Caledonia	2	2	4	22
4469	Cape	2	2	4	21
4470	Carrolville NB (4406)	2	2	5	22
4471	Carrolville SB	2	2	4	22
4472	Cold Spring	2	3	5	15
4473	Concord	2	2	7	16
4474	Corners	2	3	5	21
4475	Cudahy	2	2	6	22
4476	Cummings (no NAD 83(91) data)			4	15
4477	Curtis Wright	2	3	8	21
4478	Cushing-2	2	3	7	18
4479	Dane	1	2	1	14
4480	Darien	1	2	2	15
4481	Delavan	1	2	2	16
4482	Delafield	1	1	7	18
4483	Dodge	1	2	1	15
4484	Door	1	2	2	15
4485	Dousman	2	3	6	17
4486	Dover	1	1	3	20
4487	Dunn-2	1	2	2	15
4488	Dyson	1	1	2	19
4489	Eagle	2	3	5	17
4490	East Troy	2	2	4	18
4491	Edgerton	2	3	6	21
4492	Elkhorn	1	2	3	17
4493	Elorence	1	2	2	16
4494	Fond	1	2	2	16

LISTING OF COMMON POINT NUMBERS, NAMES, AND ORDER OF ACCURACY (continued)

Pt No.	Station Name	Order of Accuracy NAD27	NAD83 (91)	T	R
4495	Fairview	2	2	7	20
4496	Fan	2	3	6	18
4497	Faye	2	3	3	17
4498	Forest	1	2	2	16
4499	Iowa	1	2	2	17
4500	Franklin	2	3	5	21
4501	Gas	2	3	7	22
4502	Gates	1	1	2	17
4503	Grant Park	2	3	5	22
4504	Halbach	2	2	6	21
4505	Hales	2	2	5	21
4506	Hebron (Ill)	2	3	46	7
4507	Hebron (Wis)	2	3	5	15
4508	Hegeman (Ill)	1	1	46	9
4509	Honey	2	3	3	18
4510	Husher	2	3	4	22
4511	Iron	1	2	2	17
4512	Kansas	1	2	3	20
4513	Ixonia	2	3	7	16
4514	Jericho	2	3	5	18
4515	Johnstown	2	2	3	14
4516	Keefe	2	2	7	21
4517	Kelley	2	3	1	21
4518	Kenosha	1	2	2	18
4519	Koltz (Ill)	1	1	46	6
4520	Krebs	1	1	2	14
4521	La Grange	2	2	4	16
4522	Lake Geneva	2	3	2	17
4523	Lang	1	2	3	19
4524	Lannon	2	3	8	20
4525	Lapham Peak	2	2	7	18
4526	Lavan	2	3	2	16
4527	Lebanon Reset	2	1	9	16
4528	Lyla	2	3	4	15
4529	Mable	2	3	2	15
4530	Maitland	2	3	7	22
4531	Matthias	2	2	6	21
4532	Meadow	2	3	7	19
4533	Mequon	2	2	9	22
4534	Midway	1	2	3	20
4535	Millard	2	3	3	16
4536	Millroad	2	3	8	20
4537	Mitchell	2	3	6	22
4538	Myers (Ill)	1	1	46	3
4539	New Berlin	1	2	6	20
4540	New Lisbon Reset	1	B	8	19
4541	North	2	2	7	21
4542	Oak Reset	2	3	5	22
4543	Oak Hill	2	2	6	16
4544	Oak Ridge	2	2	7	19
4545	Observatory	2	2	6	20
4546	Oconomowoc	2	2	8	17
4547	Oconto	1	2	2	19
4548	Oneida	1	2	3	19
4549	Otter-2	2	3	4	14
4550	Palmyra	2	2	5	16
4551	Pewaukee	2	2	7	19
4552	Piper	2	3	2	17
4553	Pleasant	1	1	3	22
4554	Pony	2	2	5	18
4555	Racine	1	1	3	23
4556	Randall	2	2	9	16
4557	Rasmussen (Ill)	2	2	46	9
4558	Raymond	2	2	4	21
4559	Richmond (Ill)	2	2	46	8
4560	Richmond (Wis)	2	2	3	15
4561	Rochester	2	3	3	19
4562	Rome	2	3	6	16
4563	Roosevelt	1	1	1	22
4564	Round	2	2	3	16
4565	Schroeder	2	2	7	22
4566	Shade	2	3	5	15
4567	Shorewood	2	2	7	22
4568	Silver	1	1	1	20
4569	Ski	2	2	8	19
4570	Spring-2	2	3	5	16
4571	Star (Jeff. Co.)	2	3	5	14
4572	Stock	2	3	7	17
4573	Stuka	2	2	3	18
4574	Sunnyslope	2	2	7	20
4575	Veen	2	2	1	17
4576	Vernon	2	3	5	19
4577	Victory	2	3	6	22
4578	Vilas	1	2	3	19
4579	Vor	2	3	5	22
4580	Vor MKE-2	2	3	8	19
4581	Wales	2	2	6	18
4582	Walworth	2	3	3	17
4583	Waterford	1	2	4	19
4584	Wauke	2	3	7	19
4585	Wauwa	2	3	7	21
4586	Buneau Whistle	1	2	2	17
4587	Whitewater	2	2	4	15
4588	Wilmont	1	2	3	19
4589	Wind Point	2	2	4	23
4590	Wiscoill	2	1	1	16
4591	Yerkes	1	1	1	16

NOTE: T — U.S. Public Land Survey Township
R — U.S. Public Land Survey Range

ESTIMATES OF STANDARD DEVIATIONS FOR VARIOUS ORDERS OF ACCURACY

When using existing common NAD27 and NAD83 (91) control points to establish a reliable relationship between the two datums, the quality of the data (order of accuracy) is used to determine weights in the adjustment so that points of greater accuracy contribute to and affect the outcome more than points of lower accuracy.

The least squares computation of the transformation parameters readily accommodates the weights chosen by the user and input as standard deviations of each coordinate value. The table below shows a numerical value for the standard deviation associated with each order of accuracy.

As used in this manner, weights are relative. That means the magnitude or units of the numbers in immaterial. Of primary importance is the relative size of one value with respect to the other values used.

The numbers in the table were computed assuming a line length of 0.5 mile for the NAD27 and 1 kilometer for the NAD83 (91), with U.S. Survey Foot and metric units respectively. Different assumptions will give different numbers but the important feature is the relative size of the numbers in each case.

Order of Accuracy		NAD27	NAD83 (91)
GPS B	1:1,000,000	- -	0.001 m
First	1: 100,000	0.026 ft	0.010 m
Second I	1: 50,000	0.053 ft	0.020 m
Second II	1: 20,000	0.132 ft	0.050 m
Third I	1: 10,000	0.264 ft	0.100 m

The Federal Geodetic Control Committee (FGCC) specifications for distance accuracy standards list only the proportional line-length dependent error in the standards for conventional traverse or triangulation surveys. The preliminary FGCC specifications for relative GPS positioning also include a base error in addition to the line-length component. Since the relative location of transformed points is more critical than their absolute coordinate values, the base error component has not been included in the above estimates.

MASTER DATA SET

This is a listing of all points used in the NAD27 and NAD83 (91) conversion project. Each point occupies one line with comma delimited information listed in the following sequence:

Station 4-digit point number,
NAD27 X coordinate - feet,
Standard deviation of X coordinate - feet,
NAD27 Y coordinate - feet,
Standard deviation of Y coordinate - feet,
NAD83 (91) Easting coordinate - meters,
Standard deviation of Easting - meters,
NAD83 (91) Northing coordinate - meters,
Standard deviation of Northing - meters,
Station name (Quotes are required to identify character string.)

The first group of 14 points was used in the **pilot test project**.

```
0203,2546506.9573,0.264,542256.6093,0.264,766563.674,0.050,165282.232,0.050,'OFFSET - FREDONIA'
0204,2549485.0969,0.264,491959.4696,0.264,767471.453,0.050,149951.881,0.050,'OFFSET - GRAFTON4'
0205,2552008.0268,0.264,491999.8496,0.264,768240.443,0.050,149964.188,0.050,'OFFSET - GRAFTON5'
0304,2560313.8858,0.053,448430.9336,0.053,770772.086,0.020,136684.743,0.020,'VIRMOND'
0305,2491874.1695,0.132,418620.4165,0.132,749912.023,0.100,127598.398,0.100,'LANNON'

0306,2573695.4279,0.132,550647.2221,0.132,774850.613,0.050,167839.707,0.050,'BELGIUM'
1001,2535690.2660,0.264,516240.2843,0.264,763266.821,0.050,157352.521,0.050,'OFFSET - SAUKVILLE AZ MK'
1002,2576517.1571,0.264,569954.2487,0.264,775710.641,0.050,173724.437,0.050,'CEDAR 2'
1003,2530675.9719,0.132,483041.7217,0.132,761738.477,0.100,147233.732,0.100,'CEDARBURG'
1004,2514021.3294,0.053,453439.1896,0.053,756662.381,0.020,138211.078,0.020,'GERMANTOWN'

1005,2553155.1300,0.053,575224.6200,0.053,768589.960,0.020,175330.799,0.020,'RANDOM'
1006,2567814.8239,0.264,516606.5148,0.264,773058.255,0.050,157464.230,0.050,'OFFSET - WASHINGTON'
1007,2529785.1548,0.132,467514.8298,0.132,761467.085,0.100,142501.319,0.100,'THIENSVILLE'
1008,2542801.6669,0.053,426749.5282,0.053,765434.573,0.020,130076.373,0.020,'TRIPOLI'
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The next group of 16 points was added for **Scenario A**. Points 1005 & 4402 are the same.

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4401,2434846.2900,0.053,573428.9600,0.053,732529.657,0.020,174783.132,0.020,'KILIAN'
4402,2553155.1300,0.053,575224.6200,0.053,768589.960,0.020,175330.799,0.020,'RANDOM'
4403,2399811.4200,0.053,503195.7100,0.053,721851.542,0.020,153376.080,0.020,'WOODLAND'
4404,2328463.9200,0.132,325928.1500,0.132,700104.608,0.100,099345.434,0.100,'COLD SPRING'
4405,2486446.5300,0.026,359571.4900,0.026,748257.816,0.020,109600.685,0.020,'NEW BERLIN'

4406,2557875.3300,0.053,345504.3600,0.053,770029.455,0.020,105313.266,0.020,'CARROLVILLE NB'
4407,2344993.2100,0.026,177691.1500,0.026,705142.798,0.010,054162.904,0.010,'WEEKS'
4408,2529372.5700,0.026,205887.6000,0.026,761342.007,0.010,062757.608,0.010,'BRISTOL RM'
4409,2402498.9250,0.053,555800.1450,0.053,722670.345,0.001,169409.938,0.001,'165S'
4410,2495574.7960,0.053,523613.2340,0.053,751039.690,0.001,159599.648,0.001,'WEST BEND GPS'

4411,2377012.6480,0.053,394830.0860,0.053,714902.335,0.001,120346.789,0.001,'CONCORD GPS'
4412,2525664.8010,0.053,385885.1470,0.053,760211.603,0.001,117621.111,0.001,'MILWAUKEE GPS'
4413,2335430.9460,0.053,216819.6750,0.053,702228.331,0.001,066089.333,0.001,'311S'
4414,2399199.4860,0.053,245976.7320,0.053,721664.981,0.001,074976.435,0.001,'ELKHORN GPS'
4415,2550478.4330,0.053,222012.5870,0.053,767775.309,0.001,067672.716,0.001,'KENOSHA GPS'

4416,2571723.9500,0.026,233048.6600,0.026,774251.030,0.001,071036.606,0.001,'SOMERS RESET'
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The remaining points represent NAD27 first- and second-order geodetic control points whose NAD83 (91) coordinate values have also been published by the National Geodetic Survey.

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4421,2431339.4100,0.132,524704.4900,0.132,731460.997,0.100,159932.046,0.100,'ADDISON'
4422,2448352.2300,0.053,530038.9500,0.053,736646.447,0.020,161558.050,0.020,'ALLENTON'
4423,2392112.9600,0.132,465719.3700,0.132,719505.319,0.100,141953.556,0.100,'ASHIPPUN'
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4424,2513363.7200,0.132,434937.6200,0.132,756461.978,0.100,132571.880,0.100,'BAILEY'
4425,2479438.5000,0.132,530530.4400,0.132,746121.362,0.100,161708.058,0.100,'BARTON'

4426,2479346.9400,0.132,530495.7500,0.132,746093.463,0.100,161697.492,0.100,'BARTON-2'
4427,2516558.5600,0.053,590751.8000,0.053,757435.293,0.020,180063.390,0.020,'BATAVIA'
4428,2498545.9300,0.053,555253.2300,0.053,751945.201,0.020,169243.471,0.020,'BOLTONVILLE'
4429,2538918.4200,0.132,435628.9500,0.132,764250.975,0.100,132782.689,0.100,'BROWN DEER'
4430,2576533.0900,0.132,569936.1200,0.132,775715.496,0.100,173718.908,0.100,'CEDAR'

4431,2464578.5500,0.132,575158.3600,0.132,741592.081,0.100,175310.351,0.100,'ELMORE-2'
4432,2564093.1800,0.053,432631.9500,0.053,771924.036,0.020,131869.425,0.020,'FOX'
4433,2546755.1900,0.053,542652.4800,0.053,766639.342,0.020,165402.900,0.020,'FREDONIA'
4434,2546823.2700,0.132,542784.1000,0.132,766660.087,0.100,165443.011,0.100,'FREDONIA-2'
4435,2549951.3800,0.053,492857.8100,0.053,767613.576,0.020,150225.695,0.020,'GRAFTON'

4436,2406544.3000,0.053,534498.7500,0.053,723903.541,0.020,162917.140,0.020,'HOCHHEIM'
4437,2445313.4100,0.053,459320.1900,0.053,735720.585,0.020,140003.362,0.020,'HOLY HILL'
4438,2500998.9200,0.132,487970.4000,0.132,752693.132,0.100,148735.869,0.100,'JACKSON'
4439,2503109.3900,0.053,513129.3000,0.053,753336.330,0.020,156404.207,0.020,'KEOWNS'
4440,2470830.7100,0.053,549358.4800,0.053,743497.802,0.020,167446.673,0.020,'KEWASKUM'

4441,2484389.3500,0.132,498545.9200,0.132,747630.562,0.100,151959.261,0.100,'MAYFIELD'
4442,2400548.8080,0.053,428960.9670,0.053,722076.133,0.020,130749.949,0.020,'MONTEREY'
4443,2584180.2300,0.053,588661.3000,0.053,778046.326,0.020,179426.336,0.020,'OOSTBURG'
4444,2481761.8500,0.053,459998.2800,0.053,746829.813,0.020,140210.183,0.020,'RICHFIELD'
4445,2436666.4300,0.132,492503.2500,0.132,733084.918,0.100,150117.268,0.100,'RUBICON'

4446,2535105.0200,0.132,517261.0400,0.132,763088.438,0.100,157663.648,0.100,'SAULKVILLE'
4447,2462704.0600,0.053,493523.8000,0.053,741020.999,0.020,150428.420,0.020,'SLINGER'
4448,2503891.2200,0.053,475364.5500,0.053,753574.688,0.020,144893.786,0.020,'STAR'
4449,2446758.8900,0.132,498917.7000,0.132,736161.033,0.100,152072.388,0.100,'ST LAWRENCE'
4450,2413196.3700,0.132,569115.5100,0.132,725930.837,0.100,173468.310,0.100,'ST PAULS'

4451,2413195.2500,0.132,569281.7700,0.132,725930.501,0.100,173518.995,0.100,'ST PAULS-2'
4452,2431677.2300,0.132,561746.8800,0.132,731563.739,0.100,171222.338,0.100,'THERESA'
4453,2431782.7900,0.132,561807.5300,0.132,731595.916,0.100,171240.825,0.100,'THERESA-2'
4454,2568115.3600,0.132,516805.8600,0.132,773149.859,0.100,157524.990,0.100,'WASHINGTON'
4455,2496718.3100,0.132,525424.0000,0.132,751388.284,0.100,160151.630,0.100,'WEST BEND'

4456,2419453.2900,0.053,207188.7200,0.053,727838.148,0.020,063154.010,0.020,'484 RESET'
4457,2384794.7500,0.053,196817.7400,0.053,717274.220,0.020,059992.692,0.020,'490'
4458,2441249.9500,0.026,207140.6800,0.026,734481.757,0.010,063139.380,0.010,'BAKER'
4459,2416224.1400,0.026,236539.2500,0.026,726854.104,0.020,072100.155,0.020,'BANK'
4460,2508227.6900,0.132,276268.3400,0.132,754896.899,0.100,084209.894,0.100,'BEAUMONT'

4461,2572193.2300,0.026,183720.5000,0.026,774394.063,0.010,056001.021,0.010,'BENTON'
4462,2375925.6200,0.132,183617.6900,0.132,714571.039,0.100,055969.283,0.100,'BIGFOOT'
4463,2436327.1700,0.132,229135.9500,0.132,732981.451,0.100,069843.465,0.100,'BLACK'
4464,2529345.0400,0.026,205835.4100,0.026,761333.646,0.010,062741.729,0.010,'BRISTOL'
4465,2430816.0400,0.053,417270.0100,0.053,731301.820,0.020,127186.236,0.020,'BRUMDER'

4466,2579157.8800,0.053,321418.3800,0.053,776516.567,0.020,097972.014,0.020,'BUCYRUS'
4467,2462191.2300,0.026,248288.1600,0.026,740864.834,0.020,075681.515,0.020,'BURLINGTON'
4468,2551538.5600,0.053,284218.3500,0.053,768098.302,0.020,086633.292,0.020,'CALEDONIA'
4469,2520408.5200,0.053,303167.2800,0.053,758609.708,0.020,092408.799,0.020,'CAPE'
4470, (Duplicate Point - Removed)

4471,2576343.0800,0.053,297856.7000,0.053,775658.772,0.020,090790.340,0.020,'CARROLVILLE SB'
4472, (duplicate with 4404, station Cold Spring)
4473,2363539.7300,0.053,392609.8600,0.053,710795.784,0.020,119669.699,0.020,'CONCORD'
4474,2523450.5300,0.132,344502.8500,0.132,759536.738,0.100,105007.854,0.100,'CORNERS'
4475,2576732.6800,0.053,352803.8500,0.053,775777.101,0.020,107538.287,0.020,'CUDAHY'

4476,.....'CUMMINGS' (no NAD83 (91) data available.)
4477,2525113.2000,0.132,412870.9700,0.132,760043.236,0.100,125846.235,0.100,'CURTIS WRIGHT'
4478,2422692.3700,0.132,388318.9700,0.132,728825.899,0.100,118361.926,0.100,'CUSHING'
4479,2325217.6600,0.026,212885.5500,0.026,699115.191,0.020,064890.050,0.020,'DANE'
4480,2347774.8400,0.026,222034.6200,0.026,705990.527,0.020,067678.782,0.020,'DARIEN'
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4481,2369863.4800,0.026,234600.3600,0.026,712723.133,0.020,071508.873,0.020,'DELAVAN'
4482,2429749.6400,0.026,380441.4700,0.026,730976.818,0.010,115961.492,0.010,'DELAFIELD'
4483,2330572.5300,0.026,214167.1800,0.026,700747.335,0.020,065280.725,0.020,'DODGE'
4484,2333391.2700,0.026,214954.0400,0.026,701606.477,0.020,065520.564,0.020,'DOOR'
4485,2401868.5800,0.132,364061.1400,0.132,722478.213,0.100,110968.508,0.100,'DOUSMAN'

4486,2515200.1700,0.026,251454.9700,0.026,757022.118,0.010,076646.762,0.010,'DOVER RESET'
4487,2350106.8200,0.026,223765.3000,0.026,706701.286,0.020,068206.276,0.020,'DUNN-2'
4488,2467084.7400,0.026,223031.5600,0.026,742356.324,0.010,067983.088,0.010,'DYSON'
4489,2405922.9000,0.132,324613.8800,0.132,723714.090,0.100,098945.102,0.100,'EAGLE'
4490,2425814.0000,0.053,281006.3700,0.053,729776.994,0.020,085653.649,0.020,'EAST TROY'

4491,2537715.6300,0.132,353578.0500,0.132,763884.691,0.100,107774.036,0.100,'EDGERTON'
4492,2391941.5400,0.026,246201.8200,0.026,719452.590,0.020,075045.042,0.020,'ELKHORN'
4493,2372488.5500,0.026,236484.5400,0.026,713523.270,0.020,072083.184,0.020,'ELORENCE'
4494,2380547.6300,0.026,242185.2300,0.026,715979.716,0.020,073820.764,0.020,'FOND'
4495,2500294.5200,0.053,403199.5300,0.053,752478.542,0.020,122898.242,0.020,'FAIRVIEW'

4496,2433382.0200,0.132,364122.8900,0.132,732083.694,0.100,110987.757,0.100,'FAN'
4497,2407247.2800,0.132,271324.7800,0.132,724117.773,0.100,082702.709,0.100,'FAYE'
4498,2387871.2100,0.026,244590.2900,0.026,718211.959,0.020,074553.844,0.020,'FOREST'
4499,2401585.9200,0.026,242625.4500,0.026,722392.250,0.020,073955.054,0.020,'IOWA'
4500,2529049.0300,0.132,325475.9000,0.132,761243.347,0.100,099208.427,0.100,'FRANKLIN'

4501,2560536.8100,0.132,385819.7300,0.132,770840.368,0.100,117601.351,0.100,'GAS'
4502,2395248.3600,0.026,228622.7000,0.026,720460.527,0.010,069686.973,0.010,'GATES'
4503,2578536.9900,0.132,340375.1000,0.132,776327.130,0.100,103750.029,0.100,'GRANT PARK'
4504,2540652.2600,0.053,367523.7600,0.053,764779.694,0.020,112024.689,0.020,'HALBACH'
4505,2519676.4200,0.053,342172.5800,0.053,758386.444,0.020,104297.586,0.020,'HALES'

4506,2433266.1700,0.132,181595.1600,0.132,732048.351,0.100,055352.891,0.100,'HEBRON (ILL)'
4507,2350417.8400,0.132,337135.1900,0.132,706795.951,0.100,102761.571,0.100,'HEBRON (WIS)'
4508,2487325.5600,0.026,185239.8400,0.026,748525.840,0.010,056463.977,0.010,'HEGEMAN'
4509,2437484.3600,0.132,274604.4300,0.132,733334.129,0.100,083702.362,0.100,'HONEY'
4510,2563997.4200,0.132,303942.9400,0.132,771895.689,0.100,092645.413,0.100,'HUSHER'

4511,2414841.9600,0.026,237823.7000,0.026,726432.790,0.020,072491.638,0.020,'IRON'
4512,2514682.4800,0.026,255477.0500,0.026,756864.342,0.020,077872.691,0.020,'KANSAS'
4513,2366580.8380,0.132,408317.9360,0.132,711722.932,0.100,124458.001,0.100,'IXONIA'
4514,2434418.2900,0.132,323224.0300,0.132,732399.554,0.100,098521.960,0.100,'JERICHO'
4515,2306936.6400,0.053,263130.5100,0.053,693542.984,0.020,080204.677,0.020,'JOHNSTOWN'

4516,2529746.8900,0.053,400880.4400,0.053,761455.636,0.020,122191.569,0.020,'KEEFE'
4517,2550594.8400,0.132,187083.7300,0.132,767810.724,0.100,057026.116,0.100,'KELLEY'
4518,2430564.2200,0.026,239335.6200,0.026,731224.961,0.020,072952.590,0.020,'KENOSHA'
4519,2389236.5300,0.026,174721.1900,0.026,718628.081,0.010,053257.730,0.010,'KOLTZ'
4520,2306848.3300,0.026,229641.2300,0.026,693516.123,0.010,069997.126,0.010,'KREBS'

4521,2367339.5500,0.053,298908.8000,0.053,711953.843,0.020,091110.021,0.020,'LAGRANGE'
4522,2419897.1400,0.132,226071.7500,0.132,727973.565,0.100,068909.458,0.100,'LAKE GENEVA'
4523,2455960.6100,0.026,245083.6600,0.026,738965.732,0.020,074704.797,0.020,'LANG'
4524,2491874.1700,0.132,418620.3900,0.132,749912.024,0.100,127598.398,0.100,'LANNON'
4525,2429718.0600,0.053,380386.4800,0.053,730966.931,0.020,115944.626,0.020,'LAPHAM PEAK'

4526,2368186.6700,0.132,231849.5200,0.132,712212.109,0.100,070670.446,0.100,'LAVAN'
4527,2374744.4400,0.053,468368.9700,0.053,714211.232,0.010,142760.811,0.010,'LEBANON RESET'
4528,2332741.9700,0.132,303993.4100,0.132,701408.584,0.100,092659.746,0.100,'LYLA'
4529,2338566.7000,0.132,228727.1300,0.132,703183.848,0.100,069718.598,0.100,'MABLE'
4530,2561455.2300,0.132,382858.5100,0.132,771120.296,0.100,116698.821,0.100,'MAITLAND'

4531,2527249.5100,0.053,366063.3700,0.053,760694.564,0.020,111579.494,0.020,'MATTHIAS'
4532,2458836.6100,0.132,386031.2900,0.132,739842.408,0.100,117665.311,0.100,'MEADOW'
4533,2560686.6300,0.053,447920.1700,0.053,770885.700,0.020,136529.088,0.020,'MEQUON USLS'
4534,2516101.4100,0.026,252222.3200,0.026,757296.845,0.020,076880.655,0.020,'MIDWAY RESET'
4535,2369895.2700,0.132,278429.3000,0.132,712732.791,0.100,084867.891,0.100,'MILLARD'

4536,2513320.1900,0.132,419802.5800,0.132,756448.691,0.100,127958.951,0.100,'MILLROAD'
4537,2561841.9700,0.132,356460.7600,0.132,771238.398,0.100,108652.794,0.100,'MITCHELL'
4538,2302299.4200,0.026,175017.6000,0.026,692129.828,0.010,053347.864,0.010,'MYERS'
4539,2486446.5300,0.026,359571.4900,0.026,748257.816,0.020,109600.685,0.020,'NEW BERLIN'
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4540,2480652.1000,0.026,419948.7000,0.026,746491.568,0.001,128003.250,0.001,'NEW LIBSON RESET'

4541,2541685.6100,0.053,393567.1200,0.053,765094.538,0.020,119962.701,0.020,'NORTH'
4542,2549168.3200,0.132,331559.8800,0.132,767375.659,0.100,101062.949,0.100,'OAK RESET'
4543,2373526.7000,0.053,348327.8700,0.053,713839.741,0.020,106172.967,0.020,'OAK HILL'
4544,2475317.1800,0.053,382978.7100,0.053,744865.572,0.020,116734.940,0.020,'OAK RIDGE'
4545,2495538.2900,0.132,358581.0200,0.132,751028.996,0.020,109298.814,0.020,'OBSERVATORY'

4546,2405080.5550,0.132,407746.3960,0.132,723457.408,0.020,124283.807,0.020,'OCONOMOWOC'
4547,2458958.3600,0.026,246320.1200,0.026,739879.449,0.020,075081.660,0.020,'OCONTO'
4548,2463993.9000,0.026,248318.2100,0.026,741414.301,0.020,075690.667,0.020,'ONEIDA'
4549,2306773.6900,0.132,305066.3100,0.132,693493.382,0.100,092986.661,0.100,'OTTER-2'
4550,2385548.2700,0.053,320081.0700,0.053,717503.939,0.020,097563.457,0.020,'PALMYRA'

4551,2474213.9700,0.053,398927.8600,0.053,744529.284,0.020,121596.192,0.020,'PEWAUKEE'
4552,2397396.8100,0.132,240585.9500,0.132,721115.325,0.100,073333.321,0.100,'PIPER'
4553,2562969.7700,0.026,275128.3600,0.026,771582.692,0.010,083862.631,0.010,'PLEASANT'
4554,2428672.9400,0.053,337627.0400,0.053,730648.424,0.020,102911.672,0.020,'PONY'
4555,2587083.5400,0.026,269538.5700,0.026,778932.569,0.010,082158.875,0.010,'RACINE'

4556,2358060.9600,0.053,460100.7600,0.053,709126.043,0.020,140240.552,0.020,'RANDALL'
4557,2476856.5700,0.053,185464.0900,0.053,745334.830,0.020,056532.248,0.020,'RASMUSSEN'
4558,2543758.9900,0.053,306345.8400,0.053,765727.014,0.020,093377.719,0.020,'RAYMOND'
4559,2462492.0000,0.053,174424.0700,0.053,740956.424,0.020,053167.166,0.020,'RICHMOND (ILL)'
4560,2338683.0700,0.053,268341.9300,0.053,703219.316,0.020,081793.190,0.020,'RICHMOND (WIS)'

4561,2474733.4200,0.132,271373.8100,0.132,744687.945,0.100,082717.738,0.100,'ROCHESTER'
4562,2368134.7000,0.132,368969.7900,0.132,712196.228,0.100,112464.505,0.100,'ROME'
4563,2579267.2600,0.026,215555.5800,0.026,776550.292,0.010,065704.675,0.010,'ROOSEVELT'
4564,2379121.7600,0.053,250925.7100,0.053,715545.061,0.020,076484.863,0.020,'ROUND'
4565,2556635.8000,0.053,385466.5400,0.053,769651.375,0.020,117493.708,0.020,'SCHROEDER'

4566,2327656.8700,0.132,323208.2100,0.132,699858.619,0.100,098516.413,0.100,'SHADE'
4567,2565273.7100,0.053,404703.6700,0.053,772284.025,0.020,123357.038,0.020,'SHOREWOOD'
4568,2488304.6900,0.026,206176.2600,0.026,748824.291,0.010,062845.549,0.010,'SILVER'
4569,2462533.5700,0.053,417368.3300,0.053,740969.050,0.020,127216.754,0.020,'SKI'
4570,2362924.6000,0.132,319575.9800,0.132,710608.107,0.100,097409.453,0.100,'SPRING-2'

4571,2317307.6900,0.132,321003.8300,0.132,696704.150,0.100,097844.472,0.100,'STAR'
4572,2390732.5750,0.132,390553.6410,0.132,719084.130,0.100,119043.370,0.100,'STOCK'
4573,2431469.4800,0.053,258712.6700,0.053,731500.802,0.020,078858.538,0.020,'STUKA'
4574,2510599.2800,0.132,379356.0600,0.132,755619.434,0.020,115631.063,0.020,'SUNNYSLOPE'
4575,2416417.0800,0.053,184161.7100,0.053,726913.019,0.020,056135.257,0.020,'VEEN'

4576,2464677.6400,0.132,317096.0400,0.132,741622.796,0.100,096654.129,0.100,'VERNON'
4577,2550620.7100,0.132,348088.5900,0.132,767818.166,0.100,106100.954,0.100,'VICTORY'
4578,2483995.0900,0.026,250919.5400,0.026,747510.744,0.020,076483.563,0.020,'VILAS'
4579,2560384.2000,0.132,323532.2000,0.132,770794.302,0.100,098616.151,0.100,'VOR'
4580,2458029.9800,0.132,411816.7100,0.132,739596.347,0.100,125524.579,0.100,'VOR MKE -2'

4581,2434865.2400,0.053,364943.8200,0.053,732535.766,0.020,111237.975,0.020,'WALES'
4582,2394755.7100,0.132,251048.0000,0.132,720310.309,0.100,076522.199,0.100,'WALWORTH'
4583,2474924.1600,0.026,294061.0200,0.026,744746.022,0.020,089633.012,0.020,'WATERFORD'
4584,2473895.6600,0.132,384685.7900,0.132,744432.284,0.100,117255.258,0.100,'WAUKE'
4585,2526967.3100,0.132,384787.1300,0.132,760608.447,0.100,117286.482,0.100,'WAUWA'

4586,2417660.9000,0.026,236147.0600,0.026,727292.036,0.020,071980.615,0.020,'WHISTLE'
4587,2338046.6200,0.053,309303.1700,0.053,703025.420,0.020,094278.148,0.020,'WHITEWATER'
4588,2466129.3300,0.026,248313.0800,0.026,742065.195,0.020,075689.117,0.020,'WILMONT'
4589,2598850.5700,0.053,295780.6600,0.053,782519.181,0.020,090157.653,0.020,'WIND POINT'
4590,2525653.5300,0.053,186760.1600,0.053,760208.466,0.010,056927.388,0.010,'WISCOLL'

4591,2389084.9600,0.026,211590.9000,0.026,718581.883,0.010,064495.562,0.010,'YERKES'
```

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Appendix B

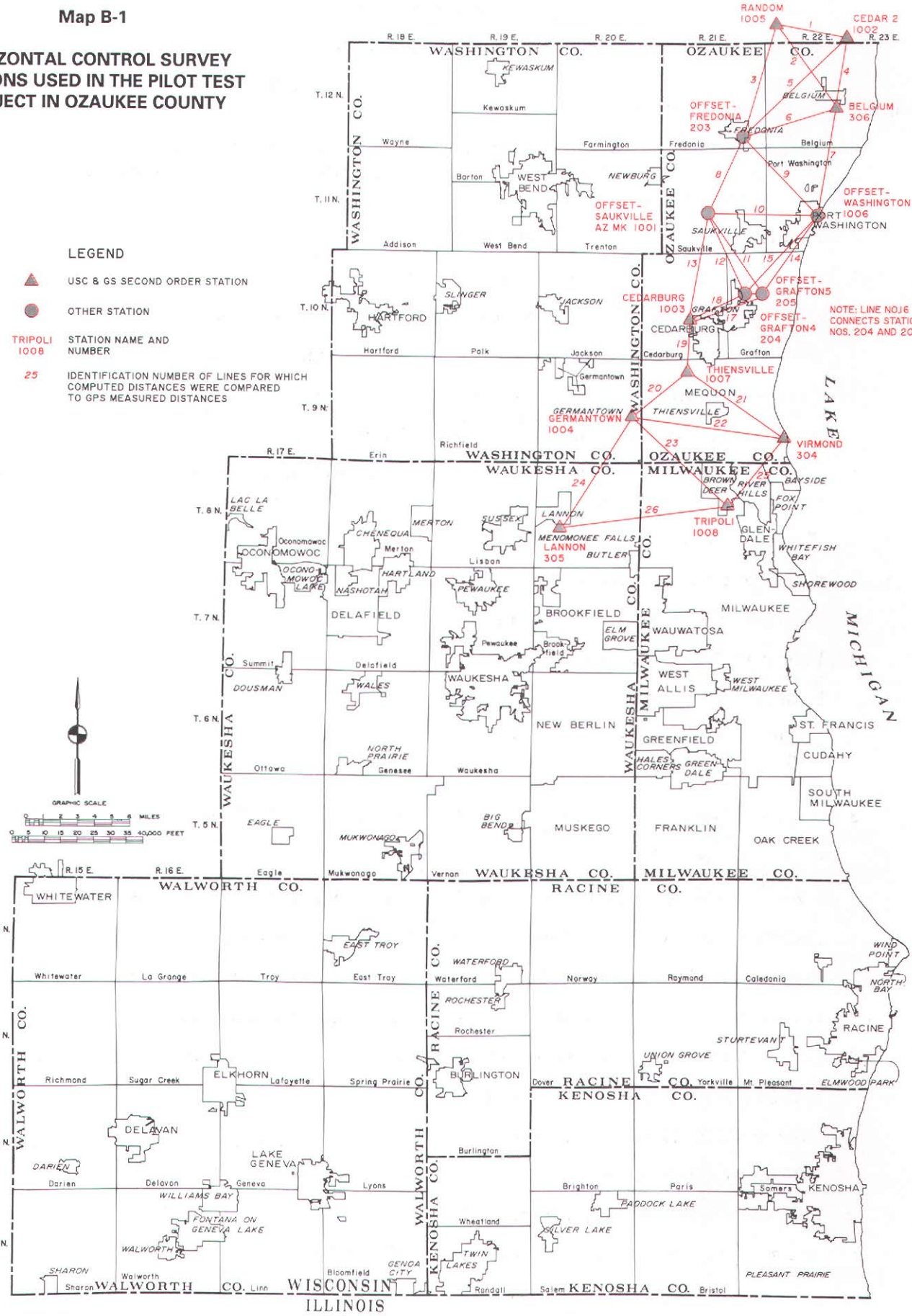
PILOT TEST RESULTS

This appendix contains the following:

- A map of the relative location of 14 common control points used in the Pilot Test Project to determine if acceptable NAD83 (91) results could be obtained by transforming NAD27 coordinates using a "best fit" 4 parameter similarity transformation.
- A computer printout of GEOTRAN5 showing:
  1. The common points, coordinates, along with standard deviations, and point names used in the test.
  2. A listing of all 14 points used in computing the transformation parameters.
  3. The "best fit" transformation parameters for the test points.
  4. The transformation equations to be used:
     a. to convert NAD27 coordinates to NAD83 (91) values.
     b. to convert NAD83 (91) coordinates to NAD27 values.
  5. A comparison of published NAD83 (91) coordinates with those obtained by using the computed transformation parameters.
  6. The standard deviation of the differences in each component.
- A listing of test point coordinates:
  1. Published NAD27 values in U.S. Survey Feet.
  2. Published NAD83 (91) values:
     a. in meters.
     b. in U.S. Survey Feet.
  3. NADCON derived NAD83 (91) coordinates:
     a. in meters.
     b. in U.S. Survey Feet.
  4. Computed using transformation parameters obtained from GEOTRAN5:
     a. in meters.
     b. in U.S. Survey Feet
- A comparison of 26 inversed distances and directions for numbered lines shown on project map:
  1. NAD27 coordinate inversed distances with GPS measured distances.
  2. Published NAD83 (91) inversed distances with GPS measured distances.
  3. NADCON NAD83 (91) coordinate inverse with GPS measured distances.
  4. GEOTRAN5 derived NAD83 (91) distances with GPS measured distances.
  5. NAD83 (91) azimuths with NAD27 azimuth.
- A summary of GEOTRAN5 distances compared to:
  1. GPS measured distances.
  2. Published NAD27 coordinate inversed distances.
- Comparisons of the Pilot Test results between GEOTRAN5 and NADCON

Map B-1

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE PILOT TEST PROJECT IN OZAUKEE COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 21, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: TEST14PT.295
RESULTS: RESULT14.SDV

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - 14 PILOT TEST POINTS WITH STANDARD DEVIATIONS

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
203	X =	2546506.957	.264	E =	766563.6740	.0500	OFFSET - FREDONIA
	Y =	542256.609	.264	N =	165282.2320	.0500	
204	X =	2549485.097	.264	E =	767471.4530	.0500	OFFSET - GRAFTON4
	Y =	491959.470	.264	N =	149951.8810	.0500	
205	X =	2552008.027	.264	E =	768240.4430	.0500	OFFSET - GRAFTON5
	Y =	491999.850	.264	N =	149964.1880	.0500	
304	X =	2560313.886	.053	E =	770772.0860	.0200	VIRMOND
	Y =	448430.934	.053	N =	136684.7430	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
306	X =	2573695.428	.132	E =	774850.6130	.0500	BELGIUM
	Y =	550647.222	.132	N =	167839.7070	.0500	
1001	X =	2535690.266	.264	E =	763266.8210	.0500	OFFSET - SAUKVILLE AZ MK
	Y =	516240.284	.264	N =	157352.5210	.0500	
1002	X =	2576517.157	.264	E =	775710.6410	.0500	CEDAR 2
	Y =	569954.249	.264	N =	173724.4370	.0500	
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1005	X =	2553155.129	.053	E =	768589.9590	.0200	RANDOM
	Y =	575224.633	.053	N =	175330.7980	.0200	
1006	X =	2567814.824	.264	E =	773058.2550	.0500	OFFSET - WASHINGTON
	Y =	516606.515	.264	N =	157464.2300	.0500	
1007	X =	2529785.155	.132	E =	761467.0850	.1000	THIENSVILLE
	Y =	467514.830	.132	N =	142501.3190	.1000	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

203	OFFSET - FREDONIA	204	OFFSET - GRAFTON4
205	OFFSET - GRAFTON5	304	VIRMOND
305	LANNON	306	BELGIUM
1001	OFFSET - SAUKVILLE AZ MK	1002	CEDAR 2
1003	CEDARBURG	1004	GERMANTOWN
1005	RANDOM	1006	OFFSET - WASHINGTON
1007	THIENSVILLE	1008	TRIPOLI

NORTHING TRANSLATION: NT = .6112 METERS
EASTING TRANSLATION: ET = -9597.3572 METERS
SCALE: S = .304794780637
ROTATION: THETA = -.000006031314 RADIANS
0 0 -1.244048 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
203	E =	766563.674	766563.675	DELTA E = -.0014	-.004	OFFSET - FREDONIA
	N =	165282.232	165282.277	DELTA N = -.0448	-.147	
204	E =	767471.453	767471.489	DELTA E = -.0362	-.119	OFFSET - GRAFTON4
	N =	149951.881	149951.977	DELTA N = -.0956	-.314	
205	E =	768240.443	768240.465	DELTA E = -.0220	-.072	OFFSET - GRAFTON5
	N =	149964.188	149964.289	DELTA N = -.1008	-.331	
304	E =	770772.086	770772.128	DELTA E = -.0416	-.136	VIRMOND
	N =	136684.743	136684.726	DELTA N = .0171	.056	
305	E =	749912.023	749912.114	DELTA E = -.0911	-.299	LANNON
	N =	127598.398	127598.510	DELTA N = -.1121	-.368	
306	E =	774850.613	774850.564	DELTA E = .0491	.161	BELGIUM
	N =	167839.707	167839.742	DELTA N = -.0348	-.114	
1001	E =	763266.821	763266.852	DELTA E = -.0311	-.102	OFFSET - SAUKVILLE AZ MK
	N =	157352.521	157352.617	DELTA N = -.0958	-.314	
1002	E =	775710.641	775710.577	DELTA E = .0643	.211	CEDAR 2
	N =	173724.437	173724.428	DELTA N = .0091	.030	
1003	E =	761738.477	761738.582	DELTA E = -.1055	-.346	CEDARBURG
	N =	147233.732	147233.859	DELTA N = -.1270	-.417	
1004	E =	756662.381	756662.389	DELTA E = -.0078	-.026	GERMANTOWN
	N =	138211.078	138211.131	DELTA N = -.0531	-.174	
1005	E =	768589.959	768589.943	DELTA E = .0162	.053	RANDOM
	N =	175330.798	175330.771	DELTA N = .0274	.090	
1006	E =	773058.255	773058.249	DELTA E = .0060	.020	OFFSET - WASHINGTON
	N =	157464.230	157464.301	DELTA N = -.0710	-.233	
1007	E =	761467.085	761467.095	DELTA E = -.0096	-.032	THIENSVILLE
	N =	142501.319	142501.342	DELTA N = -.0228	-.075	
1008	E =	765434.573	765434.535	DELTA E = .0385	.126	TRIPOLI
	N =	130076.373	130076.315	DELTA N = .0585	.192	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .158 FEET

Y/NORTH DIRECTION: .190 FEET

LISTING OF COORDINATE DATA FOR PILOT TEST PROJECT OF 14 POINTS

PT	PUB NAD27 FT NORTHING	EASTING
203	542256.609	2546506.957
204	491959.470	2549485.097
205	491999.850	2552008.027
304	448430.934	2560313.886
305	418620.417	2491874.170
306	550647.222	2573695.428
1001	516240.284	2535690.266
1002	569954.249	2576517.157
1003	483041.722	2530675.972
1004	453439.190	2514021.329
1005	575224.633	2553155.129
1006	516606.515	2567814.824
1007	467514.830	2529785.155
1008	426749.528	2542801.667

PT	PUB NAD83 (91) M NORTHING	EASTING
203	165282.2320	766563.6740
204	149951.8810	767471.4530
205	149964.1880	768240.4430
304	136684.7430	770772.0860
305	127598.3980	749912.0230
306	167839.7070	774850.6130
1001	157352.5210	763266.8210
1002	173724.4370	775710.6410
1003	147233.7320	761738.4770
1004	138211.0780	756662.3810
1005	175330.7980	768589.9590
1006	157464.2300	773058.2550
1007	142501.3190	761467.0850
1008	130076.3730	765434.5730

PT	PUB NAD83 (91) FT NORTHING	EASTING
203	542263.456	2514967.654
204	491967.130	2517945.925
205	492007.507	2520468.853
304	448439.861	2528774.752
305	418629.077	2460336.362
306	550654.105	2542155.719
1001	516247.396	2504151.229
1002	569960.924	2544977.328
1003	483049.336	2499136.987
1004	453447.512	2482483.162
1005	575231.126	2521615.557
1006	516613.895	2536275.292
1007	467523.077	2498246.595
1008	426758.900	2511263.262

PT	NADCON NAD83 (91) M NORTHING	EASTING
203	165282.281	766563.695
204	149951.970	767471.577
205	149964.283	768240.563
304	136684.732	770772.318
305	127598.437	749912.064
306	167839.750	774850.676
1001	157352.611	763266.859
1002	173724.496	775710.710
1003	147233.836	761738.608
1004	138211.087	756662.401
1005	175330.861	768589.978
1006	157464.307	773058.380
1007	142501.311	761467.135
1008	130076.329	765434.674

PT	NADCON NAD83 (91) FT NORTHING	EASTING
203	542263.617	2514967.723
204	491967.422	2517946.332
205	492007.818	2520469.247
304	448439.825	2528775.513
305	418629.205	2460336.497
306	550654.246	2542155.926
1001	516247.691	2504151.353
1002	569961.117	2544977.554
1003	483049.677	2499137.416
1004	453447.541	2482483.227
1005	575231.333	2521615.619
1006	516614.147	2536275.702
1007	467523.051	2498246.759
1008	426758.756	2511263.593

PT	GEOTRAN5 RESULT14 M NORTHING	EASTING
203	165282.277	766563.675
204	149951.977	767471.489
205	149964.289	768240.465
304	136684.726	770772.128
305	127598.510	749912.114
306	167839.742	774850.564
1001	157352.617	763266.852
1002	173724.428	775710.577
1003	147233.859	761738.582
1004	138211.131	756662.389
1005	175330.771	768589.943
1006	157464.301	773058.249
1007	142501.342	761467.095
1008	130076.315	765434.535

PT	GEOTRAN5 RESULT14 FT NORTHING	EASTING
203	542263.604	2514967.657
204	491967.444	2517946.043
205	492007.838	2520468.925
304	448439.805	2528774.890
305	418629.445	2460336.660
306	550654.220	2542155.558
1001	516247.711	2504151.330
1002	569960.894	2544977.118
1003	483049.752	2499137.331
1004	453447.686	2482483.188
1005	575231.038	2521615.504
1006	516614.128	2536275.272
1007	467523.153	2498246.627
1008	426758.710	2511263.137

PT	STATION NAMES
203	'OFFSETS FREDONIA'
204	'OFFSETS GRAFTON'
205	'OFFSETS GRAFTON'
304	'VIRMOND'
305	'LANNON'
306	'BELGIUM'
1001	'SAUKVILLE AZIMITH MARK'
1002	'CEDAR 2'
1003	'CEDARBURG'
1004	'GERMANTOWN'
1005	'RANDOM'
1006	'OFFSETS - WASHINGTON'
1007	'THEINSVILLE'
1008	'TRIPOLI'

COMPARISON OF RESULTS FOR 14 TEST POINTS

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
1	MEASURED	1005	1002	23,948.889	-	-	-	-
	NAD27	575224.633	569954.249					
	PUBLISHED	2553155.129	2576517.157	23,949.140	-0.251	95,362	102 42 46.4	-
	NAD83 (91)	575231.126	569960.924					
	PUBLISHED	2521615.557	2544977.328	23,948.849	0.040	600,608	102 42 45.4	1.0
	NAD83 (91)	575231.333	569961.117					
	NADCON	2521615.619	2544977.554	23,949.012	-0.123	194,653	102 42 45.2	1.2
	NAD83 (91)	575231.038	569960.894					
	GEOTRAN5 RESULT14	2521615.504	2544977.118	23,948.683	0.206	116,364	102 42 45.2	1.2
2	MEASURED	1005	306	32,030.189	-	-	-	-
	NAD27	575224.633	550647.222					
	PUBLISHED	2553155.129	2573695.428	32,030.501	-0.312	102,557	140 6 47.5	-
	NAD83 (91)	575231.126	550654.105					
	PUBLISHED	2521615.557	2542155.719	32,030.114	0.075	429,729	140 6 46.5	1.0
	NAD83 (91)	575231.333	550654.246					
	NADCON	2521615.619	2542155.926	32,030.257	-0.068	468,379	140 6 46.1	1.4
	NAD83 (91)	575231.038	550654.220					
	GEOTRAN5 RESULT14	2521615.504	2542155.558	32,029.889	0.300	106,767	140 6 46.2	1.3
3	MEASURED	1005	203	33,631.301	-	-	-	-
	NAD27	575224.633	542256.609					
	PUBLISHED	2553155.129	2546506.957	33,631.663	-0.362	92,817	191 24 3.9	-
	NAD83 (91)	575231.126	542263.456					
	PUBLISHED	2521615.557	2514967.654	33,631.264	0.037	903,512	191 24 2.7	1.2
	NAD83 (91)	575231.333	542263.617					
	NADCON	2521615.619	2514967.723	33,631.308	-0.007	5,169,690	191 24 2.6	1.3
	NAD83 (91)	575231.038	542263.604					
	GEOTRAN5 RESULT14	2521615.504	2514967.657	33,631.021	0.280	120,116	191 24 2.7	1.2
4	MEASURED	1002	306	19,511.979	-	-	-	-
	NAD27	569954.249	550647.222					
	PUBLISHED	2576517.157	2573695.428	19,512.136	-0.157	124,676	188 18 53.8	-
	NAD83 (91)	569960.924	550654.105					
	PUBLISHED	2544977.328	2542155.719	19,511.912	0.067	291,143	188 18 52.8	1.0
	NAD83 (91)	569961.117	550654.246					
	NADCON	2544977.554	2542155.926	19,511.967	0.012	1,595,384	188 18 52.9	0.9
	NAD83 (91)	569960.894	550654.220					
	GEOTRAN5 RESULT14	2544977.118	2542155.558	19,511.762	0.217	89,731	188 18 52.5	1.3

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
5	MEASURED	203	1002	40,837.809	-	-	-	-
	NAD27	542256.609	569954.249					
	PUBLISHED	2546506.957	2576517.157	40,838.356	-0.547	74,658	47 17 41.4	-
	NAD83 (91)	542263.456	569960.924					
	PUBLISHED	2514967.654	2544977.328	40,837.853	-0.044	923,065	47 17 40.2	1.2
	NAD83 (91)	542263.617	569961.117					
	NADCON	2514967.723	2544977.554	40,837.991	-0.182	224,116	47 17 40.6	0.8
	NAD83 (91)	542263.604	569960.894					
	GEOTRAN5	2514967.657	2544977.118	40,837.576	0.233	175,352	47 17 40.1	1.3
6	MEASURED	203	306	28,453.230	-	-	-	-
	NAD27	542256.609	550647.222					
	PUBLISHED	2546506.957	2573695.428	28,453.740	-0.510	55,797	72 50 57.4	-
	NAD83 (91)	542263.456	550654.105					
	PUBLISHED	2514967.654	2542155.719	28,453.364	-0.134	212,666	72 50 56.3	1.1
	NAD83 (91)	542263.617	550654.246					
	NADCON	2514967.723	2542155.926	28,453.490	-0.260	109,581	72 50 56.8	0.6
	NAD83 (91)	542263.604	550654.220					
	GEOTRAN5	2514967.657	2542155.558	28,453.197	0.033	852,403	72 50 56.2	1.2
7	MEASURED	306	1006	34,544.570	-	-	-	-
	NAD27	550647.222	516606.515					
	PUBLISHED	2573695.428	2567814.824	34,544.917	-0.347	99,692	189 48 4.4	-
	NAD83 (91)	550654.105	516613.895					
	PUBLISHED	2542155.719	2536275.292	34,544.397	0.173	199,992	189 48 3.9	0.5
	NAD83 (91)	550654.246	516614.147					
	NADCON	2542155.926	2536275.702	34,544.253	0.317	108,877	189 48 2.8	1.6
	NAD83 (91)	550654.220	516614.128					
	GEOTRAN5	2542155.558	2536275.272	34,544.256	0.314	110,036	189 48 3.2	1.2
8	MEASURED	203	1001	28,174.770	-	-	-	-
	NAD27	542256.609	516240.284					
	PUBLISHED	2546506.957	2535690.266	28,175.343	-0.573	49,134	202 34 33.1	-
	NAD83 (91)	542263.456	516247.396					
	PUBLISHED	2514967.654	2504151.229	28,174.997	-0.227	124,262	202 34 32.0	1.1
	NAD83 (91)	542263.617	516247.691					
	NADCON	2514967.723	2504151.353	28,174.851	-0.081	347,313	202 34 32.0	1.1
	NAD83 (91)	542263.604	516247.711					
	GEOTRAN5	2514967.657	2504151.330	28,174.805	-0.035	812,656	202 34 31.8	1.3
9	MEASURED	203	1006	33,345.649	-	-	-	-
	NAD27	542256.609	516606.515					
	PUBLISHED	2546506.957	2567814.824	33,345.952	-0.303	109,986	140 16 59.3	-
	NAD83 (91)	542263.456	516613.895					
	PUBLISHED	2514967.654	2536275.292	33,345.396	0.253	131,832	140 16 58.3	1.0
	NAD83 (91)	542263.617	516614.147					
	NADCON	2514967.723	2536275.702	33,345.543	0.106	315,853	140 16 56.3	3.0
	NAD83 (91)	542263.604	516614.128					
	GEOTRAN5	2514967.657	2536275.272	33,345.316	0.333	100,032	140 16 58.1	1.3

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
10	MEASURED	1001	1006	32,125.969	-	-	-	-
	NAD27	516240.284	516606.515					
	PUBLISHED	2535690.266	2567814.824	32,126.645	-0.676	47,495	89 20 48.6	-
	NAD83 (91)	516247.396	516613.895					
	PUBLISHED	2504151.229	2536275.292	32,126.154	-0.185	173,989	89 20 46.9	1.8
	NAD83 (91)	516247.691	516614.147					
	NADCON	2504151.353	2536275.702	32,126.439	-0.470	68,415	89 20 47.2	1.5
	NAD83 (91)	516247.711	516614.128					
	GEOTRAN5	2504151.330	2536275.272	32,126.032	-0.063	512,621	89 20 47.3	1.3
11	MEASURED	1001	205	29,220.660	-	-	-	-
	NAD27	516240.284	491999.850					
	PUBLISHED	2535690.266	2552008.027	29,221.020	-0.360	81,237	146 3 10.9	-
	NAD83 (91)	516247.396	492007.507					
	PUBLISHED	2504151.229	2520468.853	29,220.491	0.169	173,148	146 3 9.5	1.4
	NAD83 (91)	516247.691	492007.818					
	NADCON	2504151.353	2520469.247	29,220.628	0.032	909,323	146 3 7.9	3.0
	NAD83 (91)	516247.711	492007.838					
	GEOTRAN5	2504151.330	2520468.925	29,220.461	0.199	146,948	146 3 9.6	1.3
12	MEASURED	1001	204	27,925.469	-	-	-	-
	NAD27	516240.284	491959.470					
	PUBLISHED	2535690.266	2549485.097	27,925.890	-0.421	66,360	150 23 51.0	-
	NAD83 (91)	516247.396	491967.130					
	PUBLISHED	2504151.229	2517945.925	27,925.347	0.122	228,620	150 23 49.8	1.1
	NAD83 (91)	516247.691	491967.422					
	NADCON	2504151.353	2517946.332	27,925.489	-0.020	1,390,406	150 23 48.0	2.9
	NAD83 (91)	516247.711	491967.444					
	GEOTRAN5	2504151.330	2517946.043	27,925.355	0.114	245,757	150 23 49.7	1.3
13	MEASURED	1001	1003	33,574.559	-	-	-	-
	NAD27	516240.284	483041.722					
	PUBLISHED	2535690.266	2530675.972	33,575.105	-0.546	61,444	188 35 20.4	-
	NAD83 (91)	516247.396	483049.336					
	PUBLISHED	2504151.229	2499136.987	33,574.601	-0.042	801,127	188 35 20.6	-0.1
	NAD83 (91)	516247.691	483049.677					
	NADCON	2504151.353	2499137.416	33,574.510	0.049	684,158	188 35 18.7	1.7
	NAD83 (91)	516247.711	483049.752					
	GEOTRAN5	2504151.330	2499137.331	33,574.465	0.094	355,362	188 35 19.2	1.2
14	MEASURED	205	1006	29,245.329	-	-	-	-
	NAD27	491999.850	516606.515					
	PUBLISHED	2552008.027	2567814.824	29,246.244	-0.915	31,951	32 42 57.0	-
	NAD83 (91)	492007.507	516613.895					
	PUBLISHED	2520468.853	2536275.292	29,245.817	-0.488	59,937	32 42 55.9	1.1
	NAD83 (91)	492007.818	516614.147					
	NADCON	2520469.247	2536275.702	29,245.776	-0.447	65,408	32 42 56.2	0.7
	NAD83 (91)	492007.838	516614.128					
	GEOTRAN5	2520468.925	2536275.272	29,245.685	-0.356	82,065	32 42 55.7	1.3

SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
15 MEASURED	204	1006	30,714.689	-	-	-	-
NAD27	491959.470	516606.515					
PUBLISHED	2549485.097	2567814.824	30,715.724	-1.035	29,663	36 38 15.9	-
NAD83 (91)	491967.130	516613.895					
PUBLISHED	2517945.925	2536275.292	30,715.284	-0.595	51,592	36 38 15.1	0.8
NAD83 (91)	491967.422	516614.147					
NADCON	2517946.332	2536275.702	30,715.255	-0.566	54,295	36 38 15.3	0.6
NAD83 (91)	491967.444	516614.128					
GEOTRAN5	2517946.043	2536275.272	30,715.137	-0.448	68,492	36 38 14.7	1.3
16 MEASURED	204	205	2,523.190	-	-	-	-
NAD27	491959.470	491999.850					
PUBLISHED	2549485.097	2552008.027	2,523.253	-0.063	40,035	89 4 59.0	-
NAD83 (91)	491967.130	492007.507					
PUBLISHED	2517945.925	2520468.853	2,523.251	-0.061	41,293	89 4 59.2	-0.2
NAD83 (91)	491967.422	492007.818					
NADCON	2517946.332	2520469.247	2,523.238	-0.048	52,242	89 4 57.6	1.4
NAD83 (91)	491967.444	492007.838					
GEOTRAN5	2517946.043	2520468.925	2,523.205	-0.015	163,400	89 4 57.8	1.2
17 MEASURED	1003	205	23,136.391	-	-	-	-
NAD27	483041.722	491999.850					
PUBLISHED	2530675.972	2552008.027	23,136.651	-0.260	88,970	67 13 14.3	-
NAD83 (91)	483049.336	492007.507					
PUBLISHED	2499136.987	2520468.853	23,136.494	-0.103	223,936	67 13 13.3	1.0
NAD83 (91)	483049.677	492007.818					
NADCON	2499137.416	2520469.247	23,136.450	-0.059	394,752	67 13 13.4	0.9
NAD83 (91)	483049.752	492007.838					
GEOTRAN5	2499137.331	2520468.925	23,136.210	0.181	128,886	67 13 13.1	1.2
18 MEASURED	1003	204	20,815.920	-	-	-	-
NAD27	483041.722	491959.470					
PUBLISHED	2530675.972	2549485.097	20,816.085	-0.165	125,861	64 38 0.7	-
NAD83 (91)	483049.336	491967.130					
PUBLISHED	2499136.987	2517945.925	20,815.937	-0.017	1,239,995	64 37 59.5	1.2
NAD83 (91)	483049.677	491967.422					
NADCON	2499137.416	2517946.332	20,815.895	0.025	831,053	64 37 59.8	0.9
NAD83 (91)	483049.752	491967.444					
GEOTRAN5	2499137.331	2517946.043	20,815.688	0.232	89,824	64 37 59.4	1.3
19 MEASURED	1003	1007	15,551.829	-	-	-	-
NAD27	483041.722	467514.830					
PUBLISHED	2530675.972	2529785.155	15,552.425	-0.596	26,088	183 17 1.0	-
NAD83 (91)	483049.336	467523.077					
PUBLISHED	2499136.987	2498246.595	15,551.768	0.061	255,927	183 16 55.8	5.1
NAD83 (91)	483049.677	467523.051					
NADCON	2499137.416	2498246.759	15,552.150	-0.321	48,403	183 16 59.1	1.9
NAD83 (91)	483049.752	467523.153					
GEOTRAN5	2499137.331	2498246.627	15,552.126	-0.297	52,322	183 16 59.7	1.3

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
20	MEASURED	1004	1007	21,133.521	-	-	-	-
	NAD27	453439.190	467514.830					
	PUBLISHED	2514021.329	2529785.155	21,133.429	0.092	230,720	48 14 17.1	-
	NAD83 (91)	453447.512	467523.077					
	PUBLISHED	2482483.162	2498246.595	21,133.087	0.434	48,706	48 14 15.1	2.0
	NAD83 (91)	453447.541	467523.051					
	NADCON	2482483.227	2498246.759	21,133.123	0.398	53,149	48 14 16.2	1.0
	NAD83 (91)	453447.686	467523.153					
	GEOTRAN5	2482483.188	2498246.627	21,133.025	0.495	42,678	48 14 15.9	1.3
21	MEASURED	1007	304	36,001.591	-	-	-	-
	NAD27	467514.830	448430.934					
	PUBLISHED	2529785.155	2560313.886	36,002.757	-1.166	30,877	122 0 36.1	-
	NAD83 (91)	467523.077	448439.861					
	PUBLISHED	2498246.595	2528774.752	36,001.910	-0.319	112,746	122 0 34.5	1.6
	NAD83 (91)	467523.051	448439.825					
	NADCON	2498246.759	2528775.513	36,002.422	-0.831	43,331	122 0 32.8	3.3
	NAD83 (91)	467523.153	448439.805					
	GEOTRAN5	2498246.627	2528774.890	36,002.070	-0.479	75,169	122 0 34.8	1.3
22	MEASURED	1004	304	46,561.730	-	-	-	-
	NAD27	453439.190	448430.934					
	PUBLISHED	2514021.329	2560313.886	46,562.683	-0.953	48,881	96 10 28.7	-
	NAD83 (91)	453447.512	448439.861					
	PUBLISHED	2482483.162	2528774.752	46,561.657	0.073	639,079	96 10 26.5	2.2
	NAD83 (91)	453447.541	448439.825					
	NADCON	2482483.227	2528775.513	46,562.356	-0.626	74,415	96 10 26.5	2.2
	NAD83 (91)	453447.686	448439.805					
	GEOTRAN5	2482483.188	2528774.890	46,561.793	-0.063	741,783	96 10 27.5	1.3
23	MEASURED	1004	1008	39,250.118	-	-	-	-
	NAD27	453439.190	426749.528					
	PUBLISHED	2514021.329	2542801.667	39,251.062	-0.944	41,587	132 50 29.5	-
	NAD83 (91)	453447.512	426758.900					
	PUBLISHED	2482483.162	2511263.262	39,250.174	-0.056	706,259	132 50 26.3	3.2
	NAD83 (91)	453447.541	426758.756					
	NADCON	2482483.227	2511263.593	39,250.487	-0.369	106,465	132 50 26.0	3.5
	NAD83 (91)	453447.686	426758.710					
	GEOTRAN5	2482483.188	2511263.137	39,250.310	-0.193	198,885	132 50 28.3	1.2
24	MEASURED	305	1004	41,264.820	-	-	-	-
	NAD27	418620.417	453439.190					
	PUBLISHED	2491874.170	2514021.329	41,265.526	-0.706	58,433	32 27 33.1	-
	NAD83 (91)	418629.077	453447.512					
	PUBLISHED	2460336.362	2482483.162	41,265.047	-0.227	181,855	32 27 32.5	0.6
	NAD83 (91)	418629.205	453447.541					
	NADCON	2460336.497	2482483.227	41,264.927	-0.107	386,054	32 27 32.5	0.6
	NAD83 (91)	418629.445	453447.686					
	GEOTRAN5	2460336.660	2482483.188	41,264.738	0.082	503,721	32 27 31.9	1.2

SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
25 MEASURED	1008	304	27,869.820	-	-	-	-
NAD27	426749.528	448430.934					
PUBLISHED	2542801.667	2560313.886	27,870.435	-0.615	45,312	38 55 41.0	-
NAD83 (91)	426758.900	448439.861					
PUBLISHED	2511263.262	2528774.752	27,869.631	0.189	147,758	38 55 38.8	2.1
NAD83 (91)	426758.756	448439.825					
NADCON	2511263.593	2528775.513	27,869.986	-0.166	168,234	38 55 40.8	0.2
NAD83 (91)	426758.710	448439.805					
GEOTRAN5 RESULT14	2511263.137	2528774.890	27,869.901	-0.081	331,837	38 55 39.7	1.3
26 MEASURED	305	1008	51,571.600	-	-	-	-
NAD27	418620.417	426749.528					
PUBLISHED	2491874.170	2542801.667	51,572.206	-0.606	85,079	80 55 51.2	-
NAD83 (91)	418629.077	426758.900					
PUBLISHED	2460336.362	2511263.262	51,571.728	-0.128	403,477	80 55 48.0	3.2
NAD83 (91)	418629.205	426758.756					
NADCON	2460336.497	2511263.593	51,571.879	-0.279	184,659	80 55 49.2	2.0
NAD83 (91)	418629.445	426758.710					
GEOTRAN5 RESULT14	2460336.660	2511263.137	51,571.223	0.377	136,679	80 55 49.9	1.3

COMPARISON OF DISTANCES ON PILOT PROJECT TEST POINTS

Three different distances are shown and compared on this sheet:

1. The field measured distances between points reduced for elevation and state plane scale factor.
2. The inversed distances from the adjusted coordinates of the control points.
3. Distances obtained from the inverse between NAD27 coordinates transformed to NAD83 (91) using GEOTRAN.

GEOTRAN NO.	PT	PT	MEASURED METERS	RESULT14 METERS	DIFF METERS	RATIO: ONE PART IN
1	1005	1002	7299.636	7299.573	0.063	116,302
2	1005	0306	9762.821	9762.730	0.091	107,513
3	1005	0203	10250.841	10250.756	0.085	121,091
4	1002	0306	5947.263	5947.197	0.066	89,858
5	1002	0203	12447.389	12447.318	0.071	175,538
6	0306	0203	8672.562	8672.552	0.010	912,288
7	0306	1006	10529.206	10529.110	0.096	110,035
8	0203	1001	8587.687	8587.698	-0.011	746,977
9	0203	1006	10163.774	10163.672	0.102	100,080
10	1001	1006	9792.015	9792.034	-0.019	514,340
11	1001	0205	8906.475	8906.415	0.061	146,904
12	1001	0204	8511.700	8511.666	0.034	251,838
13	1001	1003	10233.546	10233.518	0.028	363,028
14	1006	0205	8913.994	8914.103	-0.109	81,983
15	1006	0204	9361.856	9361.993	-0.137	68,199
16	0204	0205	769.070	769.075	-0.005	168,774
17	0205	1003	7051.986	7051.931	0.055	129,077
18	0204	1003	6344.705	6344.635	0.070	90,668
19	1003	1007	4740.207	4740.298	-0.091	52,259
20	1007	1004	6441.510	6441.360	0.150	42,946
21	1007	0304	10973.307	10973.453	-0.146	75,229
22	1004	0304	14192.044	14192.063	-0.019	754,094
23	1004	1008	11963.460	11963.519	-0.059	241,855
24	1004	0305	12577.542	12577.517	0.025	509,625
25	0304	1008	8494.738	8494.763	-0.025	342,958
26	1008	0305	15719.055	15718.941	0.114	138,122

GEOTRAN NO.	PT	PT	INVERSED METERS	RESULT14 METERS	DIFF METERS	RATIO: ONE PART IN
1	1005	1002	7299.624	7299.573	0.051	143,795
2	1005	0306	9762.798	9762.730	0.068	143,107
3	1005	0203	10250.830	10250.756	0.073	139,743
4	1002	0306	5947.243	5947.197	0.046	129,707
5	1002	0203	12447.403	12447.318	0.085	146,595
6	0306	0203	8672.603	8672.552	0.050	172,983
7	0306	1006	10529.153	10529.110	0.043	246,642
8	0203	1001	8587.756	8587.698	0.058	148,871
9	0203	1006	10163.697	10163.672	0.025	413,115
10	1001	1006	9792.071	9792.034	0.037	264,923
11	1001	0205	8906.424	8906.414	0.010	925,054
12	1001	0204	8511.663	8511.666	-0.003	2,461,515
13	1001	1003	10233.559	10233.518	0.041	249,516
14	1006	0205	8914.143	8914.103	0.040	221,359
15	1006	0204	9362.037	9361.993	0.044	212,214
16	0204	0205	769.088	769.075	0.014	55,258
17	0205	1003	7052.018	7051.931	0.086	81,804
18	0204	1003	6344.710	6344.635	0.075	84,372
19	1003	1007	4740.188	4740.298	-0.109	43,381
20	1007	1004	6441.378	6441.360	0.018	361,400
21	1007	0304	10973.404	10973.453	-0.049	225,535
22	1004	0304	14192.021	14192.063	-0.042	339,360
23	1004	1008	11963.477	11963.519	-0.042	287,031
24	1004	0305	12577.611	12577.517	0.094	134,261
25	0304	1008	8494.681	8494.763	-0.082	103,886
26	1008	0305	15719.094	15718.941	0.153	102,818

COMPARISON OF PILOT TEST RESULTS
(GEOTRAN vs NADCON)

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	GEOTRAN RESULTS (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
203	E =	766563.674	766563.675	DELTA E = -.0014	-.004	OFFSET - FREDONIA
	N =	165282.232	165282.277	DELTA N = -.0448	-.147	
204	E =	767471.453	767471.489	DELTA E = -.0362	-.119	OFFSET - GRAFTON4
	N =	149951.881	149951.977	DELTA N = -.0956	-.314	
205	E =	768240.443	768240.465	DELTA E = -.0220	-.072	OFFSET - GRAFTON5
	N =	149964.188	149964.289	DELTA N = -.1008	-.331	
304	E =	770772.086	770772.128	DELTA E = -.0416	-.136	VIRMOND
	N =	136684.743	136684.726	DELTA N = .0171	.056	
305	E =	749912.023	749912.114	DELTA E = -.0911	-.299	LANNON
	N =	127598.398	127598.510	DELTA N = -.1121	-.368	
306	E =	774850.613	774850.564	DELTA E = .0491	.161	BELGIUM
	N =	167839.707	167839.742	DELTA N = -.0348	-.114	
1001	E =	763266.821	763266.852	DELTA E = -.0311	-.102	OFFSET - SAUKVILLE AZ MK
	N =	157352.521	157352.617	DELTA N = -.0958	-.314	
1002	E =	775710.641	775710.577	DELTA E = .0643	.211	CEDAR 2
	N =	173724.437	173724.428	DELTA N = .0091	.030	
1003	E =	761738.477	761738.582	DELTA E = -.1055	-.346	CEDARBURG
	N =	147233.732	147233.859	DELTA N = -.1270	-.417	
1004	E =	756662.381	756662.389	DELTA E = -.0078	-.026	GERMANTOWN
	N =	138211.078	138211.131	DELTA N = -.0531	-.174	
1005	E =	768589.959	768589.943	DELTA E = .0162	.053	RANDOM
	N =	175330.798	175330.771	DELTA N = .0274	.090	
1006	E =	773058.255	773058.249	DELTA E = .0060	.020	OFFSET - WASHINGTON
	N =	157464.230	157464.301	DELTA N = -.0710	-.233	
1007	E =	761467.085	761467.095	DELTA E = -.0096	-.032	THIENSVILLE
	N =	142501.319	142501.342	DELTA N = -.0228	-.075	
1008	E =	765434.573	765434.535	DELTA E = .0385	.126	TRIPOLI
	N =	130076.373	130076.315	DELTA N = .0585	.192	

X/EAST DIRECTION: MEAN DIFF. = -0.04 FT, STANDARD DEVIATION = 0.16 FEET

Y/NORTH DIRECTION: MEAN DIFF. = -0.15 FT, STANDARD DEVIATION = 0.19 FEET

PT #		PUBLISHED (NAD83-HPGN)	NADCON RESULTS (NAD83-HPGN)	DIFFERENCE (M)	(FT)	STATION NAME
203	E =	766563.674	766563.695	DELTA E = -.021	-.069	OFFSET - FREDONIA
	N =	165282.232	165282.281	DELTA N = -.049	-.161	
204	E =	767471.453	767471.577	DELTA E = -.124	-.407	OFFSET - GRAFTON4
	N =	149951.881	149951.970	DELTA N = -.089	-.292	
205	E =	768240.443	768240.563	DELTA E = -.120	-.394	OFFSET - GRAFTON5
	N =	149964.188	149964.283	DELTA N = -.095	-.312	
304	E =	770772.086	770772.318	DELTA E = -.232	-.761	VIRMOND
	N =	136684.743	136684.732	DELTA N = .011	.036	
305	E =	749912.023	749912.064	DELTA E = -.041	-.135	LANNON
	N =	127598.398	127598.437	DELTA N = -.039	-.128	
306	E =	774850.613	774850.676	DELTA E = -.063	-.207	BELGIUM
	N =	167839.707	167839.750	DELTA N = -.043	-.141	
1001	E =	763266.821	763266.859	DELTA E = -.038	-.125	OFFSET - SAUKVILLE AZ MK
	N =	157352.521	157352.611	DELTA N = -.090	-.295	
1002	E =	775710.641	775710.710	DELTA E = -.069	-.226	CEDAR - 2
	N =	173724.437	173724.496	DELTA N = -.059	-.194	
1003	E =	761738.477	761738.608	DELTA E = -.131	-.430	CEDARBURG
	N =	147233.732	147233.836	DELTA N = -.104	-.341	
1004	E =	756662.381	756662.401	DELTA E = -.020	-.066	GERMANTOWN
	N =	138211.078	138211.087	DELTA N = -.009	-.030	
1005	E =	768589.959	768589.978	DELTA E = -.019	-.062	RANDOM
	N =	175330.798	175330.861	DELTA N = -.063	-.207	
1006	E =	773058.255	773058.380	DELTA E = -.125	-.410	OFFSET - WASHINGTON
	N =	157464.230	157464.307	DELTA N = -.077	-.253	
1007	E =	761467.085	761467.135	DELTA E = -.050	-.164	THIENSVILLE
	N =	142501.319	142501.311	DELTA N = .008	.026	
1008	E =	765434.573	765434.674	DELTA E = -.101	-.331	TRIPOLI
	N =	130076.373	130076.329	DELTA N = .044	.144	

X/EAST DIRECTION: MEAN DIFF. = -0.27 FT, STANDARD DEVIATION = 0.20 FT.

Y/NORTH DIRECTION: MEAN DIFF. = -0.15 FT, STANDARD DEVIATION = 0.15 FT.

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Appendix C

SCENARIO A RESULTS

This appendix contains information on the effort referred to as Scenario A. For this effort, 16 additional common control points were added to the previous 14 Pilot Test Project points. The 16 additional points were scattered throughout the seven county Southeastern Wisconsin Region whereas the 14 pilot test points were concentrated in the northeastern portion of the Region, notably, in and around Ozaukee County. Ideally, the same quality of results would be realized taking the entire Region as were obtained in the Pilot Test. However, that was not the case as individual differences ranged up to and in some instances exceeded 2 feet.

More specifically, this appendix contains the following exhibits:

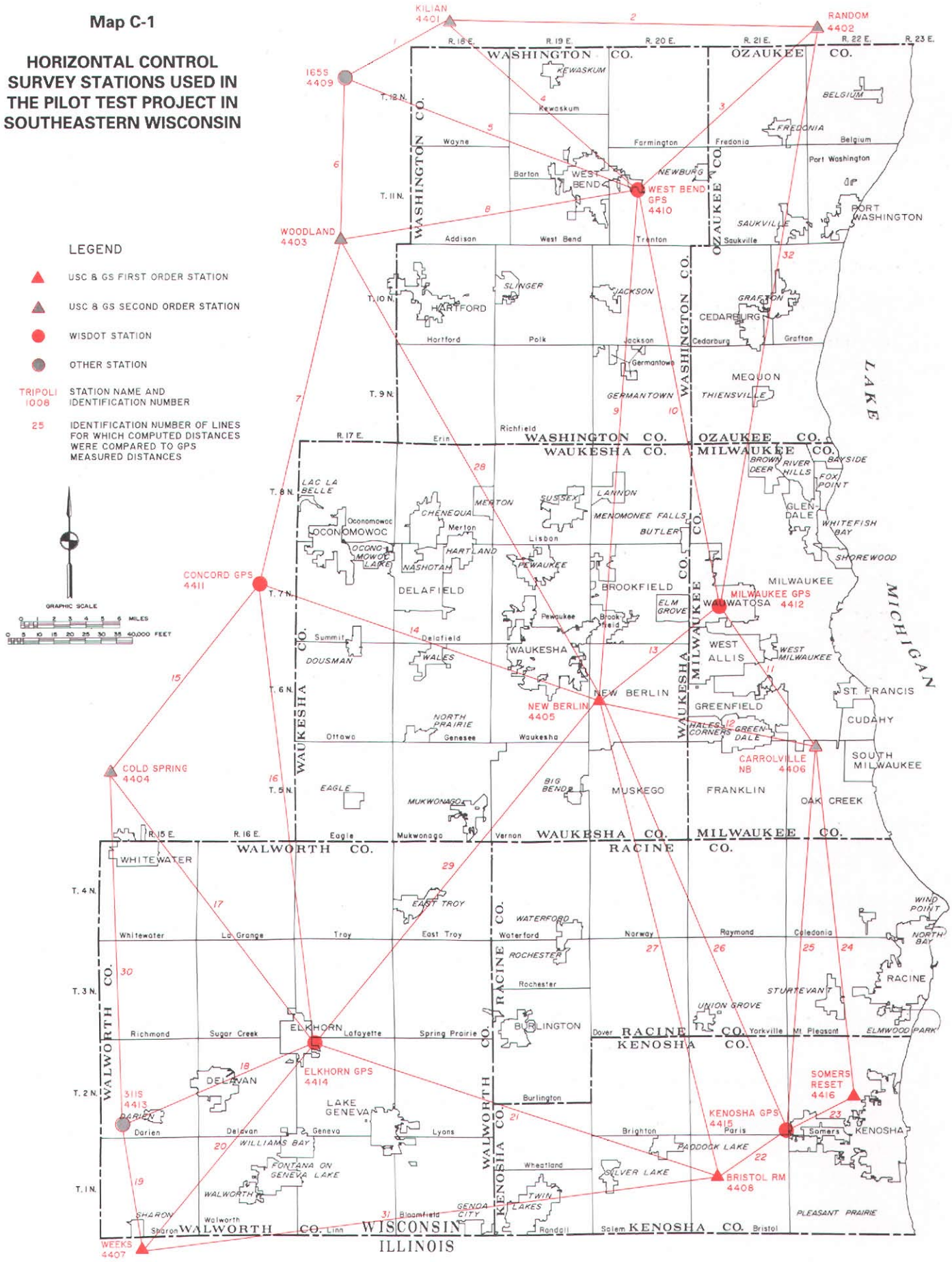
- Map of entire Southeastern Wisconsin Region showing distribution of the 16 additional points.
- Computer printout (SCENARIO.A01) showing the comparison at all 30 points. The transformation parameters were determined using the coordinates and standard deviations for the 16 Scenario A points. The standard deviation of the comparisons—published minus computed—for all points is 0.7 feet in easting and 1.2 feet in northing.
- Computer printout (SCENARIO.A02) showing results obtained using only the 16 weighted Scenario A points. The standard deviation of the comparison—published minus computed—for the 16 points is 0.9 feet in easting and 1.3 feet in northing.
- Computer printout (SCENARIO.A03) showing results obtained using the 16 points weighted equally. The standard deviation of the comparison—published minus computed—for the 16 points is 1.0 feet in each component, easting and northing.
- A comparison of Scenario A results using local transformation parameters—program GEOTRAN—and the NGS program NADCON.
- A comparison of 32 inversed distances and directions for numbered lines shown on project map:
    1. NAD27 coordinate inversed distances with GPS measured distances.
    2. Published NAD83 (91) inversed distances with GPS measured distances.
    3. NADCON NAD83 (91) coordinate inverse with GPS measured distances.
    4. GEOTRAN5 derived NAD83 (91) distances with GPS measured distances.
    5. NAD83 (91) azimuths with NAD27 azimuth.

Conclusions drawn from Scenario A results include:

1. While GEOTRAN results for the 14 test points were excellent, it does not appear that the entire seven county Region can be successfully modeled with one set of transformation parameters at the desired level of accuracy.
2. The results obtained from NADCON indicate—at least in the Southeastern Wisconsin Region—that the official estimate of accuracy (0.5 feet at the one sigma level) for NADCON is a conservative one.
3. Weighting the input coordinates of the common points does make a difference. The advantage of assigning weights is that common points of different orders of accuracy can be used and each will contribute accordingly to the solution. Another advantage is that weights can be assigned or changed according to the professional judgement of the user.

Map C-1

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE PILOT TEST PROJECT IN SOUTHEASTERN WISCONSIN



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: SCNR-ASD.395
RESULTS: SCENARIO.A01

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - 29 SCENARIO A POINTS WITH STANDARD DEVIATIONS

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
203	X =	2546506.957	.264	E =	766563.6740	.0500	OFFSET - FREDONIA
	Y =	542256.609	.264	N =	165282.2320	.0500	
204	X =	2549485.097	.264	E =	767471.4530	.0500	OFFSET - GRAFTON4
	Y =	491959.470	.264	N =	149951.8810	.0500	
205	X =	2552008.027	.264	E =	768240.4430	.0500	OFFSET - GRAFTON5
	Y =	491999.850	.264	N =	149964.1880	.0500	
304	X =	2560313.886	.053	E =	770772.0860	.0200	VIRMOND
	Y =	448430.934	.053	N =	136684.7430	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
306	X =	2573695.428	.132	E =	774850.6130	.0500	BELGIUM
	Y =	550647.222	.132	N =	167839.7070	.0500	
1001	X =	2535690.266	.264	E =	763266.8210	.0500	OFFSET - SAUKVILLE AZ MK
	Y =	516240.284	.264	N =	157352.5210	.0500	
1002	X =	2576517.157	.264	E =	775710.6410	.0500	CEDAR 2
	Y =	569954.249	.264	N =	173724.4370	.0500	
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1006	X =	2567814.824	.264	E =	773058.2550	.0500	OFFSET - WASHINGTON
	Y =	516606.515	.264	N =	157464.2300	.0500	
1007	X =	2529785.155	.132	E =	761467.0850	.1000	THIENSVILLE
	Y =	467514.830	.132	N =	142501.3190	.1000	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4401	X =	2434846.290	.053	E =	732529.6570	.0200	KILIAN
	Y =	573428.960	.053	N =	174783.1320	.0200	
4402	X =	2553155.130	.053	E =	768589.9600	.0200	RANDOM
	Y =	575224.620	.053	N =	175330.7990	.0200	
4403	X =	2399811.420	.053	E =	721851.5420	.0200	WOODLAND
	Y =	503195.710	.053	N =	153376.0800	.0200	
4404	X =	2328463.920	.132	E =	700104.6080	.1000	COLD SPRING
	Y =	325928.150	.132	N =	99345.4340	.1000	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4406	X =	2557875.330	.053	E =	770029.4550	.0200	CARROLVILLE NB
	Y =	345504.360	.053	N =	105313.2660	.0200	
4407	X =	2344993.210	.026	E =	705142.7980	.0100	WEEKS
	Y =	177691.150	.026	N =	54162.9040	.0100	
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4409	X =	2402498.925	.053	E =	722670.3450	.0010	165S
	Y =	555800.145	.053	N =	169409.9380	.0010	
4410	X =	2495574.796	.053	E =	751039.6900	.0010	WEST BEND GPS
	Y =	523613.234	.053	N =	159599.6480	.0010	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4413	X =	2335430.946	.053	E =	702228.3310	.0010	311S
	Y =	216819.675	.053	N =	66089.3330	.0010	
4414	X =	2399199.486	.053	E =	721664.9810	.0010	ELKHORN GPS

	Y =	245976.732	.053	N =	74976.4350	.0010	
4415	X =	2550478.433	.053	E =	767775.3090	.0010	KENOSHA GPS
	Y =	222012.587	.053	N =	67672.7160	.0010	
4416	X =	2571723.950	.026	E =	774251.0300	.0010	SOMERS RESET
	Y =	233048.660	.026	N =	71036.6060	.0010	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4401	KILIAN	4402	RANDOM
4403	WOODLAND	4404	COLD SPRING
4405	NEW BERLIN	4406	CARROLVILLE NB
4407	WEEKS	4408	BRISTOL RM
4409	165S	4410	WEST BEND GPS
4411	CONCORD GPS	4412	MILWAUKEE GPS
4413	311S	4414	ELKHORN GPS
4415	KENOSHA GPS	4416	SOMERS RESET

NORTHING TRANSLATION:	NT =	-3.1454 METERS
EASTING TRANSLATION:	ET =	-9608.1193 METERS
SCALE:	S =	.304799192098
ROTATION:	THETA =	-.000008336374 RADIANS
		0 0 -1.719501 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4401	E =	732529.657	732529.606	DELTA E =	.0513	.168	KILIAN
	N =	174783.132	174783.725	DELTA N =	-.5931	-1.946	
4402	E =	768589.960	768590.040	DELTA E =	-.0800	-.262	RANDOM
	N =	175330.799	175331.341	DELTA N =	-.5425	-1.780	
4403	E =	721851.542	721851.184	DELTA E =	.3579	1.174	WOODLAND
	N =	153376.080	153376.598	DELTA N =	-.5182	-1.700	
4404	E =	700104.608	700104.974	DELTA E =	-.3661	-1.201	COLD SPRING
	N =	99345.434	99345.408	DELTA N =	.0261	.086	
4405	E =	748257.816	748257.861	DELTA E =	-.0445	-.146	NEW BERLIN
	N =	109600.685	109600.272	DELTA N =	.4128	1.354	
4406	E =	770029.455	770029.337	DELTA E =	.1182	.388	CARROLVILLE NB
	N =	105313.266	105312.804	DELTA N =	.4622	1.516	
4407	E =	705142.798	705143.465	DELTA E =	-.6670	-2.188	WEEKS
	N =	54162.904	54162.932	DELTA N =	-.0280	-.092	
4408	E =	761342.007	761342.073	DELTA E =	-.0663	-.218	BRISTOL RM
	N =	62757.608	62757.656	DELTA N =	-.0477	-.157	
4409	E =	722670.345	722670.200	DELTA E =	.1453	.477	165S
	N =	169409.938	169410.394	DELTA N =	-.4564	-1.497	
4410	E =	751039.690	751039.732	DELTA E =	-.0418	-.137	WEST BEND GPS
	N =	159599.648	159600.086	DELTA N =	-.4384	-1.438	
4411	E =	714902.335	714902.412	DELTA E =	-.0771	-.253	CONCORD GPS
	N =	120346.789	120346.786	DELTA N =	.0033	.011	
4412	E =	760211.603	760211.491	DELTA E =	.1120	.367	MILWAUKEE GPS
	N =	117621.111	117620.753	DELTA N =	.3578	1.174	
4413	E =	702228.331	702228.795	DELTA E =	-.4643	-1.523	311S
	N =	66089.333	66089.251	DELTA N =	.0824	.270	

4414	E =	721664.981	721665.321	DELTA E =	-.3396	-1.114	ELKHORN GPS
	N =	74976.435	74976.460	DELTA N =	-.0250	-.082	
4415	E =	767775.309	767775.082	DELTA E =	.2266	.744	KENOSHA GPS
	N =	67672.716	67672.592	DELTA N =	.1236	.406	
4416	E =	774251.030	774250.671	DELTA E =	.3593	1.179	SOMERS RESET
	N =	71036.606	71036.432	DELTA N =	.1735	.569	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
203	E =	766563.674	766563.766	DELTA E =	-.0921	-.302	OFFSET - FREDONIA
	N =	165282.232	165282.702	DELTA N =	-.4695	-1.540	
204	E =	767471.453	767471.628	DELTA E =	-.1754	-.575	OFFSET - GRAFTON4
	N =	149951.881	149952.182	DELTA N =	-.3006	-.986	
205	E =	768240.443	768240.615	DELTA E =	-.1723	-.565	OFFSET - GRAFTON5
	N =	149964.188	149964.496	DELTA N =	-.3078	-1.010	
304	E =	770772.086	770772.345	DELTA E =	-.2591	-.850	VIRMOND
	N =	136684.743	136684.746	DELTA N =	-.0035	-.011	
305	E =	749912.023	749912.051	DELTA E =	-.0276	-.091	LANNON
	N =	127598.398	127598.351	DELTA N =	.0470	.154	
306	E =	774850.613	774850.769	DELTA E =	-.1556	-.511	BELGIUM
	N =	167839.707	167840.223	DELTA N =	-.5156	-1.692	
1001	E =	763266.821	763266.913	DELTA E =	-.0924	-.303	OFFSET - SAUKVILLE AZ MK
	N =	157352.521	157352.919	DELTA N =	-.3982	-1.306	
1002	E =	775710.641	775710.780	DELTA E =	-.1393	-.457	CEDAR 2
	N =	173724.437	173724.996	DELTA N =	-.5589	-1.834	
1003	E =	761738.477	761738.645	DELTA E =	-.1680	-.551	CEDARBURG
	N =	147233.732	147234.011	DELTA N =	-.2794	-.917	
1004	E =	756662.381	756662.399	DELTA E =	-.0176	-.058	GERMANTOWN
	N =	138211.078	138211.141	DELTA N =	-.0632	-.207	
1006	E =	773058.255	773058.452	DELTA E =	-.1968	-.646	OFFSET - WASHINGTON
	N =	157464.230	157464.628	DELTA N =	-.3976	-1.304	
1007	E =	761467.085	761467.164	DELTA E =	-.0791	-.259	THIENSVILLE
	N =	142501.319	142501.425	DELTA N =	-.1060	-.348	
1008	E =	765434.573	765434.690	DELTA E =	-.1170	-.384	TRIPOLI
	N =	130076.373	130076.227	DELTA N =	.1459	.479	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .722 FEET

Y/NORTH DIRECTION: 1.017 FEET

TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: SCNR-A.395
RESULTS: SCENARIO.A02

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - 16 SCENARIO A POINTS WITH STANDARD DEVIATIONS

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4401	X =	2434846.290	.053	E =	732529.6570	.0200	KILIAN
	Y =	573428.960	.053	N =	174783.1320	.0200	
4402	X =	2553155.130	.053	E =	768589.9600	.0200	RANDOM
	Y =	575224.620	.053	N =	175330.7990	.0200	
4403	X =	2399811.420	.053	E =	721851.5420	.0200	WOODLAND
	Y =	503195.710	.053	N =	153376.0800	.0200	
4404	X =	2328463.920	.132	E =	700104.6080	.1000	COLD SPRING
	Y =	325928.150	.132	N =	99345.4340	.1000	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4406	X =	2557875.330	.053	E =	770029.4550	.0200	CARROLVILLE NB
	Y =	345504.360	.053	N =	105313.2660	.0200	
4407	X =	2344993.210	.026	E =	705142.7980	.0100	WEEKS
	Y =	177691.150	.026	N =	54162.9040	.0100	
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4409	X =	2402498.925	.053	E =	722670.3450	.0010	165S
	Y =	555800.145	.053	N =	169409.9380	.0010	
4410	X =	2495574.796	.053	E =	751039.6900	.0010	WEST BEND GPS
	Y =	523613.234	.053	N =	159599.6480	.0010	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4413	X =	2335430.946	.053	E =	702228.3310	.0010	311S
	Y =	216819.675	.053	N =	66089.3330	.0010	
4414	X =	2399199.486	.053	E =	721664.9810	.0010	ELKHORN GPS
	Y =	245976.732	.053	N =	74976.4350	.0010	
4415	X =	2550478.433	.053	E =	767775.3090	.0010	KENOSHA GPS
	Y =	222012.587	.053	N =	67672.7160	.0010	
4416	X =	2571723.950	.026	E =	774251.0300	.0010	SOMERS RESET
	Y =	233048.660	.026	N =	71036.6060	.0010	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4401	KILIAN	4402	RANDOM
4403	WOODLAND	4404	COLD SPRING
4405	NEW BERLIN	4406	CARROLVILLE NB
4407	WEEKS	4408	BRISTOL RM
4409	165S	4410	WEST BEND GPS
4411	CONCORD GPS	4412	MILWAUKEE GPS
4413	311S	4414	ELKHORN GPS
4415	KENOSHA GPS	4416	SOMERS RESET

NORTHING TRANSLATION: NT = -3.1454 METERS
EASTING TRANSLATION: ET = -9608.1193 METERS
SCALE: S = .304799192098
ROTATION: THETA = -.000008336374 RADIANS
0 0 -1.719501 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4401	E =	732529.657	732529.606	DELTA E = .0513	.168	KILIAN
	N =	174783.132	174783.725	DELTA N = -.5931	-1.946	
4402	E =	768589.960	768590.040	DELTA E = -.0800	-.262	RANDOM
	N =	175330.799	175331.341	DELTA N = -.5425	-1.780	
4403	E =	721851.542	721851.184	DELTA E = .3579	1.174	WOODLAND
	N =	153376.080	153376.598	DELTA N = -.5182	-1.700	
4404	E =	700104.608	700104.974	DELTA E = -.3661	-1.201	COLD SPRING
	N =	99345.434	99345.408	DELTA N = .0261	.086	
4405	E =	748257.816	748257.861	DELTA E = -.0445	-.146	NEW BERLIN
	N =	109600.685	109600.272	DELTA N = .4128	1.354	
4406	E =	770029.455	770029.337	DELTA E = .1182	.388	CARROLVILLE NB
	N =	105313.266	105312.804	DELTA N = .4622	1.516	
4407	E =	705142.798	705143.465	DELTA E = -.6670	-2.188	WEEKS
	N =	54162.904	54162.932	DELTA N = -.0280	-.092	
4408	E =	761342.007	761342.073	DELTA E = -.0663	-.218	BRISTOL RM
	N =	62757.608	62757.656	DELTA N = -.0477	-.157	
4409	E =	722670.345	722670.200	DELTA E = .1453	.477	165S
	N =	169409.938	169410.394	DELTA N = -.4564	-1.497	
4410	E =	751039.690	751039.732	DELTA E = -.0418	-.137	WEST BEND GPS
	N =	159599.648	159600.086	DELTA N = -.4384	-1.438	
4411	E =	714902.335	714902.412	DELTA E = -.0771	-.253	CONCORD GPS
	N =	120346.789	120346.786	DELTA N = .0033	.011	
4412	E =	760211.603	760211.491	DELTA E = .1120	.367	MILWAUKEE GPS
	N =	117621.111	117620.753	DELTA N = .3578	1.174	
4413	E =	702228.331	702228.795	DELTA E = -.4643	-1.523	311S
	N =	66089.333	66089.251	DELTA N = .0824	.270	
4414	E =	721664.981	721665.321	DELTA E = -.3396	-1.114	ELKHORN GPS
	N =	74976.435	74976.460	DELTA N = -.0250	-.082	
4415	E =	767775.309	767775.082	DELTA E = .2266	.744	KENOSHA GPS
	N =	67672.716	67672.592	DELTA N = .1236	.406	
4416	E =	774251.030	774250.671	DELTA E = .3593	1.179	SOMERS RESET
	N =	71036.606	71036.432	DELTA N = .1735	.569	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .948 FEET

Y/NORTH DIRECTION: 1.143 FEET

TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 21, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: SCENR-A.295
RESULTS: SCENARIO.A03

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - 16 EQUALLY WEIGHTED SCENARIO A POINTS

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4401	X =	2434846.290	1.000	E =	732529.6570	1.0000	KILIAN
	Y =	573428.960	1.000	N =	174783.1320	1.0000	
4402	X =	2553155.130	1.000	E =	768589.9600	1.0000	RANDOM
	Y =	575224.620	1.000	N =	175330.7990	1.0000	
4403	X =	2399811.420	1.000	E =	721851.5420	1.0000	WOODLAND
	Y =	503195.710	1.000	N =	153376.0800	1.0000	
4404	X =	2328463.920	1.000	E =	700104.6080	1.0000	COLD SPRING
	Y =	325928.150	1.000	N =	99345.4340	1.0000	
4405	X =	2486446.530	1.000	E =	748257.8160	1.0000	NEW BERLIN
	Y =	359571.490	1.000	N =	109600.6850	1.0000	
4406	X =	2557875.330	1.000	E =	770029.4550	1.0000	CARROLVILLE NB
	Y =	345504.360	1.000	N =	105313.2660	1.0000	
4407	X =	2344993.210	1.000	E =	705142.7980	1.0000	WEEKS
	Y =	177691.150	1.000	N =	54162.9040	1.0000	
4408	X =	2529372.570	1.000	E =	761342.0070	1.0000	BRISTOL RM
	Y =	205887.600	1.000	N =	62757.6080	1.0000	
4409	X =	2402498.925	1.000	E =	722670.3450	1.0000	165S
	Y =	555800.145	1.000	N =	169409.9380	1.0000	
4410	X =	2495574.796	1.000	E =	751039.6900	1.0000	WEST BEND GPS
	Y =	523613.234	1.000	N =	159599.6480	1.0000	
4411	X =	2377012.648	1.000	E =	714902.3350	1.0000	CONCORD GPS
	Y =	394830.086	1.000	N =	120346.7890	1.0000	
4412	X =	2525664.801	1.000	E =	760211.6030	1.0000	MILWAUKEE GPS
	Y =	385885.147	1.000	N =	117621.1110	1.0000	
4413	X =	2335430.946	1.000	E =	702228.3310	1.0000	311S
	Y =	216819.675	1.000	N =	66089.3330	1.0000	
4414	X =	2399199.486	1.000	E =	721664.9810	1.0000	ELKHORN GPS
	Y =	245976.732	1.000	N =	74976.4350	1.0000	
4415	X =	2550478.433	1.000	E =	767775.3090	1.0000	KENOSHA GPS
	Y =	222012.587	1.000	N =	67672.7160	1.0000	
4416	X =	2571723.950	1.000	E =	774251.0300	1.0000	SOMERS RESET
	Y =	233048.660	1.000	N =	71036.6060	1.0000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4401	KILIAN	4402	RANDOM
4403	WOODLAND	4404	COLD SPRING
4405	NEW BERLIN	4406	CARROLVILLE NB
4407	WEEKS	4408	BRISTOL RM
4409	165S	4410	WEST BEND GPS
4411	CONCORD GPS	4412	MILWAUKEE GPS
4413	311S	4414	ELKHORN GPS
4415	KENOSHA GPS	4416	SOMERS RESET

NORTHING TRANSLATION: NT = -2.1443 METERS
EASTING TRANSLATION: ET = -9606.7291 METERS
SCALE: S = .304798555847
ROTATION: THETA = -.000007225413 RADIANS
0 0 -1.490348 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4401	E =	732529.657	732529.641	DELTA E =	.0160	.053	KILIAN
	N =	174783.132	174783.537	DELTA N =	-.4048	-1.328	
4402	E =	768589.960	768590.001	DELTA E =	-.0406	-.133	RANDOM
	N =	175330.799	175331.112	DELTA N =	-.3129	-1.027	
4403	E =	721851.542	721851.218	DELTA E =	.3241	1.063	WOODLAND
	N =	153376.080	153376.466	DELTA N =	-.3865	-1.268	
4404	E =	700104.608	700104.993	DELTA E =	-.3853	-1.264	COLD SPRING
	N =	99345.434	99345.413	DELTA N =	.0209	.069	
4405	E =	748257.816	748257.791	DELTA E =	.0254	.083	NEW BERLIN
	N =	109600.685	109600.202	DELTA N =	.4826	1.583	
4406	E =	770029.455	770029.217	DELTA E =	.2384	.782	CARROLVILLE NB
	N =	105313.266	105312.719	DELTA N =	.5472	1.795	
4407	E =	705142.798	705143.423	DELTA E =	-.6255	-2.052	WEEKS
	N =	54162.904	54163.026	DELTA N =	-.1219	-.400	
4408	E =	761342.007	761341.924	DELTA E =	.0830	.272	BRISTOL RM
	N =	62757.608	62757.669	DELTA N =	-.0612	-.201	
4409	E =	722670.345	722670.250	DELTA E =	.0953	.313	165S
	N =	169409.938	169410.228	DELTA N =	-.2902	-.952	
4410	E =	751039.690	751039.712	DELTA E =	-.0216	-.071	WEST BEND GPS
	N =	159599.648	159599.909	DELTA N =	-.2612	-.857	
4411	E =	714902.335	714902.424	DELTA E =	-.0887	-.291	CONCORD GPS
	N =	120346.789	120346.731	DELTA N =	.0584	.192	
4412	E =	760211.603	760211.405	DELTA E =	.1980	.650	MILWAUKEE GPS
	N =	117621.111	117620.653	DELTA N =	.4575	1.501	
4413	E =	702228.331	702228.773	DELTA E =	-.4420	-1.450	311S
	N =	66089.333	66089.323	DELTA N =	.0102	.033	
4414	E =	721664.981	721665.268	DELTA E =	-.2867	-.941	ELKHORN GPS
	N =	74976.435	74976.492	DELTA N =	-.0571	-.187	
4415	E =	767775.309	767774.925	DELTA E =	.3839	1.260	KENOSHA GPS
	N =	67672.716	67672.588	DELTA N =	.1275	.418	
4416	E =	774251.030	774250.504	DELTA E =	.5263	1.727	SOMERS RESET
	N =	71036.606	71036.414	DELTA N =	.1916	.629	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: 1.027 FEET

Y/NORTH DIRECTION: .997 FEET

COMPARISON OF SCENARIO A RESULTS
(GEOTRAN vs NADCON)

PT #		PUBLISHED (NAD83-HPGN)	GEOTRAN RESULTS (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4401	E =	732529.657	732529.606	DELTA E =	.0513	.168	KILIAN
	N =	174783.132	174783.725	DELTA N =	-.5931	-1.946	
4402	E =	768589.960	768590.040	DELTA E =	-.0800	-.262	RANDOM
	N =	175330.799	175331.341	DELTA N =	-.5425	-1.780	
4403	E =	721851.542	721851.184	DELTA E =	.3579	1.174	WOODLAND
	N =	153376.080	153376.598	DELTA N =	-.5182	-1.700	
4404	E =	700104.608	700104.974	DELTA E =	-.3661	-1.201	COLD SPRING
	N =	99345.434	99345.408	DELTA N =	.0261	.086	
4405	E =	748257.816	748257.861	DELTA E =	-.0445	-.146	NEW BERLIN
	N =	109600.685	109600.272	DELTA N =	.4128	1.354	
4406	E =	770029.455	770029.337	DELTA E =	.1182	.388	CARROLVILLE NB
	N =	105313.266	105312.804	DELTA N =	.4622	1.516	
4407	E =	705142.798	705143.465	DELTA E =	-.6670	-2.188	WEEKS
	N =	54162.904	54162.932	DELTA N =	-.0280	-.092	
4408	E =	761342.007	761342.073	DELTA E =	-.0663	-.218	BRISTOL RM
	N =	62757.608	62757.656	DELTA N =	-.0477	-.157	
4409	E =	722670.345	722670.200	DELTA E =	.1453	.477	165S
	N =	169409.938	169410.394	DELTA N =	-.4564	-1.497	
4410	E =	751039.690	751039.732	DELTA E =	-.0418	-.137	WEST BEND GPS
	N =	159599.648	159600.086	DELTA N =	-.4384	-1.438	
4411	E =	714902.335	714902.412	DELTA E =	-.0771	-.253	CONCORD GPS
	N =	120346.789	120346.786	DELTA N =	.0033	.011	
4412	E =	760211.603	760211.491	DELTA E =	.1120	.367	MILWAUKEE GPS
	N =	117621.111	117620.753	DELTA N =	.3578	1.174	
4413	E =	702228.331	702228.795	DELTA E =	-.4643	-1.523	311S
	N =	66089.333	66089.251	DELTA N =	.0824	.270	
4414	E =	721664.981	721665.321	DELTA E =	-.3396	-1.114	ELKHORN GPS
	N =	74976.435	74976.460	DELTA N =	-.0250	-.082	
4415	E =	767775.309	767775.082	DELTA E =	.2266	.744	KENOSHA GPS
	N =	67672.716	67672.592	DELTA N =	.1236	.406	
4416	E =	774251.030	774250.671	DELTA E =	.3593	1.179	SOMERS RESET
	N =	71036.606	71036.432	DELTA N =	.1735	.569	

X/EAST DIRECTION: MEAN DIFF. = -0.16 FT, STANDARD DEVIATION = 0.95 FEET
Y/NORTH DIRECTION: MEAN DIFF. = -0.21 FT, STANDARD DEVIATION = 1.14 FEET

PT #		PUBLISHED (NAD83-HPGN)	NADCON RESULTS (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4401	E =	732529.657	732529.717	DELTA E =	-.060	-.197	KILIAN
	N =	174783.132	174783.148	DELTA N =	-.016	-.052	
4402	E =	768589.960	768589.978	DELTA E =	-.018	-.059	RANDOM
	N =	175330.799	175330.857	DELTA N =	-.058	-.190	
4403	E =	721851.542	721851.338	DELTA E =	.204	.669	WOODLAND
	N =	153376.080	153376.216	DELTA N =	-.136	-.446	
4404	E =	700104.608	700104.694	DELTA E =	-.086	-.282	COLD SPRING
	N =	99345.434	99345.257	DELTA N =	.177	.581	
4405	E =	748257.816	748257.831	DELTA E =	-.015	-.049	NEW BERLIN
	N =	109600.685	109600.542	DELTA N =	.143	.469	
4406	E =	770029.455	770029.454	DELTA E =	.001	.003	CARROLVILLE NB
	N =	105313.266	105313.200	DELTA N =	.066	.217	
4407	E =	705142.798	705142.801	DELTA E =	-.003	-.010	WEEKS
	N =	54162.904	54162.919	DELTA N =	-.015	-.049	
4408	E =	761342.007	761342.012	DELTA E =	-.005	-.016	BRISTOL RM
	N =	62757.608	62757.543	DELTA N =	.065	.213	
4409	E =	722670.345	722670.404	DELTA E =	-.059	-.194	165S
	N =	169409.938	169409.774	DELTA N =	.164	.538	
4410	E =	751039.690	751039.764	DELTA E =	-.074	-.243	WEST BEND GPS
	N =	159599.648	159599.738	DELTA N =	-.090	-.295	
4411	E =	714902.335	714902.389	DELTA E =	-.054	-.177	CONCORD GPS
	N =	120346.789	120346.670	DELTA N =	.119	.390	
4412	E =	760211.603	760211.481	DELTA E =	.122	.400	MILWAUKEE GPS
	N =	117621.111	117621.055	DELTA N =	.056	.184	
4413	E =	702228.331	702228.159	DELTA E =	.172	.564	311S
	N =	66089.333	66089.237	DELTA N =	.096	.315	
4414	E =	721664.981	721664.809	DELTA E =	.172	.564	ELKHORN GPS
	N =	74976.435	74976.494	DELTA N =	-.059	-.194	
4415	E =	767775.309	767775.208	DELTA E =	.101	.331	KENSOHA GPS
	N =	67672.716	67672.590	DELTA N =	.126	.413	
4416	E =	774251.030	774250.968	DELTA E =	.062	.203	SOMERS RESET
	N =	71036.606	71036.541	DELTA N =	.065	.213	

X/EAST DIRECTION: MEAN DIFF. = -0.09 FT, STANDARD DEVIATION = 0.32 FEET
Y/NORTH DIRECTION: MEAN DIFF. = -0.14 FT, STANDARD DEVIATION = 0.31 FEET

COMPARISON OF RESULTS FOR 16 TEST POINTS

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
1	MEASURED	4401	4409	36,838.565	-	-	-	-
	NAD27	573,428.960	555,800.145					
	PUBLISHED	2,434,846.290	2,402,498.925	36,839.207	-0.642	57,381	241 24 37.1	-
	NAD83 (91)	573,434.326	555,805.772					
	PUBLISHED	2,403,307.716	2,370,960.957	36,838.550	0.015	2,455,904	241 24 36.7	0.4
	NAD83 (91)	573,434.378	555,805.234					
	NADCON	2,403,307.913	2,370,961.150	36,838.835	-0.270	136,439	214 24 33.8	3.3
	NAD83 (91)	573,436.793	555,807.750					
	GEOTRAN5	2,403,307.529	2,370,960.412	36,839.098	-0.533	69,116	241 24 35.3	1.8
2	MEASURED	4401	4402	118,321,712	-	-	-	-
	NAD27	573,428.960	575,224.620					
	PUBLISHED	2,434,846.290	2,553,155.130	118,322.466	-0.754	156,925	89 07 49.6	-
	NAD83 (91)	573,434.326	575,231.130					
	PUBLISHED	2,403,307.716	2,521,615.560	118,321.488	0.224	528,222	89 07 47.6	2.0
	NAD83 (91)	573,434.378	575,231.320					
	NADCON	2,403,307.913	2,521,615.619	118,321.352	0.360	328,671	89 07 47.3	2.3
	NAD83 (91)	573.436.793	575,233.466					
	GEOTRAN5	2,403,307.529	2,521,615.993	118,322.106	-0.394	300,309	89 07 47.8	1.8
3	MEASURED	4402	4410	77,324.782	-	-	-	-
	NAD27	575,224.620	523,613.234					
	PUBLISHED	2,553,155.130	2,495,574.796	77,325.481	-0.699	110,622	228 07 44.2	-
	NAD83 (91)	575,231.130	523,619.845					
	PUBLISHED	2,521,615.560	2,464,036.050	77,324.800	-0.018	4,295,821	228 07 43.0	1.2
	NAD83 (91)	575,231.320	523,620.140					
	NADCON	2,521,615.619	2,464,036.292	77,324.594	0.188	411,302	228 07 42.8	1.4
	NAD83 (91)	575,233.466	523,621.738					
	GEOTRAN5	2,521,615.993	2,464,036.279	77,325.248	-0.466	165,933	228 07 42.4	1.8

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
4	MEASURED	4410	4401	78,545.879	-	-	-	-
	NAD27 PUBLISHED	523,613.234 2,495,574.796	573,428.960 2,434,846.290	78,546.534	-0.655	119,917	309 21 43.6	-
	NAD83 (91) PUBLISHED	523,619.845 2,464,036.050	573,434.326 2,403,307.716	78,545.611	0.268	293,082	309 21 41.3	2.3
	NAD83 (91) NADCON	523,620.140 2,464,036.292	573,434.378 2,403,307.913	78,545.492	0.387	202,961	309 21 40.8	2.8
	NAD83 (91) GEOTRAN5	523,621.738 2,464,036.279	573,436.793 2,403,307.529	78,546.297	-0.418	187,909	309 21 41.8	1.8
5	MEASURED	4410	4409	98,483.262	-	-	-	-
	NAD27 PUBLISHED	523,613.234 2,495,574.796	555,800.145 2,402,498.925	98,484.085	-0.823	119,664	289 04 33.9	-
	NAD83 (91) PUBLISHED	523,619.845 2,464,036.050	555,805.772 2,370,960.957	98,483.028	0.234	420,869	289 04 32.5	1.4
	NAD83 (91) NADCON	523,620.140 2,464,036.292	555,805.234 2,370,961.150	98,482.802	0.460	214,094	289 04 30.8	3.1
	NAD83 (91) GEOTRAN5	523,621.738 2,464,036.279	555,807.750 2,370,960.412	98,483.787	-0.525	187,587	289 04 32.1	1.8
6	MEASURED	4409	4403	52,672.975	-	-	-	-
	NAD27 PUBLISHED	555,800.145 2,402,498.925	503,195.710 2,399,811.420	52,673.041	-0.066	798,075	182 55 28.7	-
	NAD83 (91) PUBLISHED	555,805.772 2,370,960.957	503,201.385 2,368,274.597	52,672.935	0.040	1,316,824	182 55 24.2	4.5
	NAD83 (91) NADCON	555,805.234 2,370,961.150	503,201.802 2,368,273.931	52,672.025	0.950	55,445	182 55 27.8	0.9
	NAD83 (91) GEOTRAN5	555,807.750 2,370,960.412	503,203.452 2,368,273.370	52,672.881	0.094	560,351	182 55 26.9	1.8

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
7	MEASURED	4403	4411	110,736.245	-	-	-	-
	NAD27	503,195.710	394,830.086					
	PUBLISHED	2,399,811.420	2,377,012.648	110,737.945	-1.700	65,139	191 52 51.7	-
	NAD83 (91)	503,201.385	394,837.757					
	PUBLISHED	2,368,274.597	2,345,475.411	110,736.077	0.168	659,144	191 52 53.3	-1.6
	NAD83 (91)	503,201.802	394,837.366					
	NADCON	2,368,273.931	2,345,475.588	110,736.694	-0.449	246,629	191 52 51.4	0.3
	NAD83 (91)	503,203.452	394,837.960					
	GEOTRAN5	2,368,273.370	2,345,475.601	110,737.609	-1.364	81,185	191 52 50.0	1.7
8	MEASURED	4403	4410	97,914.317	-	-	-	-
	NAD27	503,195.710	523,613.234					
	PUBLISHED	2,399,811.420	2,495,574.796	97,915.777	-1.460	67,065	77 57 51.4	-
	NAD83 (91)	503,201.385	523,619.845					
	PUBLISHED	2,368,274.597	2,464,036.050	97,914.092	0.225	435,175	77 57 48.7	2.7
	NAD83 (91)	503,201.802	523,620.140					
	NADCON	2,368,273.931	2,464,036.292	97,914.954	-0.637	153,712	77 57 49.3	2.1
	NAD83 (91)	503,203.452	523,621.738					
	GEOTRAN5	2,368,273.370	2,464,036.279	97,915.480	-1.163	84,191	77 57 49.7	0.7
9	MEASURED	4405	4410	164,292.168	-	-	-	-
	NAD27	359,571.490	523,613.234					
	PUBLISHED	2,486,446.530	2,495,574.796	164,295.523	-3.355	48,969	3 11 06.0	-
	NAD83 (91)	359,581.581	523,619.845					
	PUBLISHED	2,454,909.184	2,464,036.050	164,291.971	0.197	833,970	3 11 04.5	1.5
	NAD83 (91)	359,581.112	523,620.140					
	NADCON	2,454,909.234	2,464,036.292	164,292.744	-0.576	285,229	3 11 04.7	1.3
	NAD83 (91)	359,580.416	523,621.738					
	GEOTRAN5	2,454,909.453	2,464,036.279	164,295.022	-2.854	57,566	3 11 04.2	1.8

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
10	MEASURED	4412	4410	140,973.842	-	-	-	-
	NAD27	385,885.147	523,613.234					
	PUBLISHED	2,525,664.801	2,495,574.796	140,976.716	-2.874	49,051	347 40 33.6	-
	NAD83 (91)	385,895.262	523,619.845					
	PUBLISHED	2,494,127.567	2,464,036.050	140,973.615	0.227	621,030	347 40 30.4	3.2
	NAD83 (91)	385,895.078	523,620.140					
	NADCON	2,494,127.167	2,464,036.292	140,973.946	-0.104	1,355,518	347 40 31.4	2.2
	NAD83 (91)	385,894.330	523,621.738					
	GEOTRAN5	2,494,127.380	2,464,036.279	140,976.286	-2.444	57,682	347 40 31.8	1.8
11	MEASURED	4406	4412	51,653,758	-	-	-	-
	NAD27	345,504.360	385,885.147					
	PUBLISHED	2,557,875.330	2,525,664.801	51,653.907	-0.149	346,670	321 25 18.1	-
	NAD83 (91)	345,515.274	385,895.262					
	PUBLISHED	2,526,338.303	2,494,127.567	51,653.412	0.346	149,288	321 25 15.5	2.6
	NAD83 (91)	345,515,057	385,895.078					
	NADCON	2,526,338.300	2,494,127.167	51,653.685	0.073	707,586	321 25 14.3	3.8
	NAD83 (91)	345,513.945	385,894.330					
	GEOTRAN5	2,526,338.159	2,494,127.380	51,653.749	0.009	5,739,306	321 25 16.3	1.8
12	MEASURED	4406	4405	72,801.199	-	-	-	-
	NAD27	345,504.360	359,571.490					
	PUBLISHED	2,557,875.330	2,486,446.530	72,800.808	0.391	186,192	281 08 28.3	-
	NAD83 (91)	345,515.274	359,581.581					
	PUBLISHED	2,526,338.303	2,454,909.184	72,800.962	0.237	307,178	281 08 25.9	2.4
	NAD83 (91)	345,515,057	359,581.112					
	NADCON	2,526,338.300	2,454,909.234	72,800.861	0.338	215,388	281 08 25.2	3.1
	NAD83 (91)	345,513.945	359,580.416					
	GEOTRAN5	2,526,338.159	2,454,909.453	72,800.588	0.611	119,151	281 08 26.6	1.7

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
13	MEASURED	4405	4412	47,228.161	-	-	-	-
	NAD27	359,571.490	385,885.147					
	PUBLISHED	2,486,446.530	2,525,664.801	47,227.972	0.189	249,884	56 08 24.7	-
	NAD83 (91)	359,581.581	385,895.262					
	PUBLISHED	2,454,909.184	2,494,127.567	47,228.078	0.083	569,014	56 08 24.9	-0.2
	NAD83 (91)	359,581.112	385,895.078					
	NADCON	2,454,909.234	2,494,127.167	47,227.863	0.298	158,484	56 08 22.8	1.9
	NAD83 (91)	359,580.416	385,894.330					
	GEOTRAN5	2,454,909.453	2,494,127.380	47,227.892	0.332	142,253	56 08 23.0	1.7
14	MEASURED	4405	4411	114,972.911	-	-	-	-
	NAD27	359,571.490	394,830.086					
	PUBLISHED	2,486,446.530	2,377,012.648	114,973.663	-0.752	152,890	287 51 30.5	-
	NAD83 (91)	359,581.581	394,837.757					
	PUBLISHED	2,454,909.184	2,345,475.411	114,972.817	0.094	1,223,116	287 51 26.4	4.1
	NAD83 (91)	359,581.112	394,837.366					
	NADCON	2,454,909.234	2,345,475.588	114,972.720	0.191	601,952	287 51 26.7	3.8
	NAD83 (91)	359,580.416	394,837.960					
	GEOTRAN5	2,454,909.453	2,345,475.601	114,973.312	-0.401	286,715	287 51 28.7	1.8
15	MEASURED	4411	4404	84,287.979	-	-	-	-
	NAD27	394,830.086	325,928.150					
	PUBLISHED	2,377,012.648	2,328,463.920	84,287.934	0.045	1,873.066	215 10 07.5	-
	NAD83 (91)	394,837.757	325,935.811					
	PUBLISHED	2,345,475.411	2,296,926.535	84,288.027	-0.048	1,756,000	215 10 07.3	0.2
	NAD83 (91)	394,837.366	325,935.231					
	NADCON	2,345,475.588	2,296,926.817	84,288.121	-0.142	593,577	215 10 07.3	0.2
	NAD83 (91)	394,837.960	325,935.818					
	GEOTRAN5	2,345,475.601	2,296,927.614	84,287.675	0.304	277,263	215 10 05.8	1.7

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
16	MEASURED	4411	4414	150,497.380	-	-	-	-
	NAD27	394,830.086	245,976.732					
	PUBLISHED	2,377,012.648	2,399,199.486	150,497.763	-0.383	392,944	171 31 20.6	-
	NAD83 (91)	394,837.757	245,985.187					
	PUBLISHED	2,345,475.411	2,367,662.525	150,497.029	0.351	428,767	171 31 20.0	0.6
	NAD83 (91)	394,837.366	245,985.381					
	NADCON	2,345,475.588	2,367,661.961	150,496.341	1.039	144,848	171 31 20.9	-0.3
	NAD83 (91)	394,837.960	245,985.250					
	GEOTRAN5	2,345,475.601	2,367,663.654	150,497.306	0.074	2,033,748	171 31 18.8	1.8
17	MEASURED	4414	4404	106,750.819	-	-	-	-
	NAD27	245,976.732	325,928.150					
	PUBLISHED	2,399,199.486	2,328,463.920	106,750.876	-0.057	1,872,821	318 29 59.2	-
	NAD83 (91)	245,985.187	325,935.811					
	PUBLISHED	2,367,662.525	2,296,926.535	106,750.562	0.257	415,373	318 29 57.6	1.6
	NAD83 (91)	245,985.381	325,935.231					
	NADCON	2,367,661.961	2,296,926.817	106,749.422	1.397	76,414	318 29 57.8	1.4
	NAD83 (91)	245,985.250	325,935.818					
	GEOTRAN5	2,367,663.654	2,296,927.614	106,750.554	0.265	402,833	318 29 57.5	1.7
18	MEASURED	4414	4413	70,118.147	-	-	-	-
	NAD27	245,976.732	216,819.675					
	PUBLISHED	2,399,199.486	2,335,430.946	70,118.191	-0.044	1,593,594	245 25 42.9	-
	NAD83 (91)	245,985.187	216,828.087					
	PUBLISHED	2,367,662.525	2,303,894.116	70,118.089	0.058	1,208,934	245 25 42.6	0.3
	NAD83 (91)	245,985.381	216,827.772					
	NADCON	2,367,661.961	2,303,893.551	70,118.302	-0.155	452,375	245 25 41.2	1.7
	NAD83 (91)	245,985.250	216,827.732					
	GEOTRAN5	2,367,663.654	2,303,895.559	70,117.978	0.169	414,900	245 25 41.1	1.8

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
19	MEASURED	4407	4413	40,279.908	-	-	-	-
	NAD27	177,691.150	216,819.675					
	PUBLISHED	2,344,993.210	2,335,430.946	40,280.000	-0.092	437,825	346 16 01.8	-
	NAD83 (91)	177,699.461	216,828.087					
	PUBLISHED	2,313,455.996	2,303,894.116	40,280.006	-0.098	411,019	346 16 03.8	-2.0
	NAD83 (91)	177,699.510	216,827.772					
	NADCON	2,313,456.006	2,303,893.551	40,279.789	0.119	338,487	346 16 00.5	1.3
	NAD83 (91)	177,699.408	216,827.732					
	GEOTRAN5	2,313,458.132	2,303,895.559	40,279.878	0.030	1,342,664	346 16 00.0	1.8
20	MEASURED	4407	4414	87,185.075	-	-	-	-
	NAD27	177,691.150	245,976.732					
	PUBLISHED	2,344,993.210	2,399,199.486	87,185.097	-0.022	3,962,958	38 26 35.4	-
	NAD83 (91)	177,699.461	245,985.187					
	PUBLISHED	2,313,455.996	2,367,662.525	87,185.367	-0.292	298,579	38 26 35.6	-0.2
	NAD83 (91)	177,699.510	245,985.381					
	NADCON	2,313,456.006	2,367,661.961	87,185.123	-0.048	1,816,356	38 26 34.3	1.1
	NAD83 (91)	177,699.408	245,985.250					
	GEOTRAN5	2,313,458.132	2,367,663.654	87,184.831	0.244	357,316	38 26 33.6	1.8
21	MEASURED	4414	4408	136,207.241	-	-	-	-
	NAD27	245,976.732	205,887.600					
	PUBLISHED	2,399,199.486	2,529,372.570	136,206.352	0.889	153,214	107 07 01.8	-
	NAD83 (91)	245,985.187	205,897.252					
	PUBLISHED	2,367,662.525	2,497,836.234	136,206.597	0.644	211,502	107 06 59.7	2.1
	NAD83 (91)	245,985.381	205,897.039					
	NADCON	2,367,661.961	2,497,836.251	136,207.272	-0.031	4,393,782	107 07 00.1	1.7
	NAD83 (91)	245,985.250	205,897.360					
	GEOTRAN5	2,367,663.654	2,497,836.687	136,205.938	1.303	104,534	107 07 00.0	1.8

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
22	MEASURED	4408	4415	26,561.155	-	-	-	-
	NAD27	205,887.600	222,012.587					
	PUBLISHED	2,529,372.570	2,550,478.433	26,560.735	0.420	63,241	52 37 12.0	-
	NAD83 (91)	205,897.252	222,022.902					
	PUBLISHED	2,497,836.234	2,518,942.826	26,561.717	-0.562	47,262	52 37 11.3	0.7
	NAD83 (91)	205,897.039	222,022.489					
	NADCON	2,497,836.251	2,518,942.495	26,561.319	-0.164	161,958	52 37 10.9	1.1
	NAD83 (91)	205,897.360	222,022.482					
	GEOTRAN5	2,497,836.687	2,518,942.347	26,560.656	0.499	53,229	52 37 10.2	1.8
23	MEASURED	4416	4415	23,941.288	-	-	-	-
	NAD27	233,048.660	222,012.587					
	PUBLISHED	2,571,723.950	2,550,478.433	23,940.904	0.384	62,347	242 33 00.7	-
	NAD83 (91)	233,059.265	222,022.902					
	PUBLISHED	2,540,188.587	2,518,942.826	23,941.255	0.033	725,494	242 32 59.4	1.3
	NAD83 (91)	233,059.052	222,022.489					
	NADCON	2,540,188.384	2,518,942.495	23,941.460	-0.172	139,194	242 32 58.4	2.3
	NAD83 (91)	233,058.806	222,022.482					
	GEOTRAN5	2,540,187.587	2,518,942.347	23,940.774	0.514	46,578	242 32 57.7	3.0
24	MEASURED	4416	4406	113,305.531	-	-	-	-
	NAD27	233,048.660	345,504.360					
	PUBLISHED	2,571,723.950	2,557,875.330	113,305.202	0.329	344,394	352 58 46.3	-
	NAD83 (91)	233,059.265	345,515.274					
	PUBLISHED	2,540,188.587	2,526,338.303	113,305.712	-0.181	625,997	352 58 43.3	3.0
	NAD83 (91)	233,059.052	345,515,057					
	NADCON	2,540,188.384	2,526,338.300	113,305.683	-0.152	745,431	352 58 43.7	2.6
	NAD83 (91)	233,058.806	345,513.945					
	GEOTRAN5	2,540,187.587	2,526,338.159	113,304.744	0.787	143,971	352 58 44.7	1.6

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
25	MEASURED	4415	4406	123,713.464	-	-	-	-
	NAD27	222,012.587	345,504.360					
	PUBLISHED	2,550,478.433	2,557,875.330	123,713.104	0.360	343,649	3 25 40.1	-
	NAD83 (91)	222,022.902	345,515.274					
	PUBLISHED	2,518,942.826	2,526,338.303	123,713.617	-0.153	808,585	3 25 37.7	2.4
	NAD83 (91)	222,022.489	345,515,057					
	NADCON	2,518,942.495	2,526,338.300	123,713.832	-0.368	336,178	3 25 38.2	1.9
	NAD83 (91)	222,022.482	345,513.945					
	GEOTRAN5	2,518,942.347	2,526,338.159	123,712.730	0.734	168,547	3 25 38.3	1.8
26	MEASURED	4415	4405	151,732.657	-	-	-	-
	NAD27	222,012.587	359,571.490					
	PUBLISHED	2,550,478.433	2,486,446.530	151,731.791	0.866	175,211	335 02 19.1	-
	NAD83 (91)	222,022.902	359,581.581					
	PUBLISHED	2,518,942.826	2,454,909.184	151,732.322	0.335	452,933	335 02 16.8	2.3
	NAD83 (91)	222,022.489	359,581.112					
	NADCON	2,518,942.495	2,454,909.234	151,732.110	0.547	277,391	335 02 17.2	1.9
	NAD83 (91)	222,022.482	359,580.416					
	GEOTRAN5	2,518,942.347	2,454,909.453	151,731.331	1.326	144,492	335 02 17.3	1.8
27	MEASURED	4408	4405	159,567.140	-	-	-	-
	NAD27	205,887.600	359,571.490					
	PUBLISHED	2,529,372.570	2,486,446.530	159,566.234	0.906	176,123	344 23 39.2	-
	NAD83 (91)	205,897.252	359,581.581					
	PUBLISHED	2,497,836.234	2,454,909.184	159,566.928	0.212	752,675	344 23 38.1	1.1
	NAD83 (91)	205,897.039	359,581.112					
	NADCON	2,497,836.251	2,454,909.234	159,566.673	0.467	341,686	344 23 38.0	1.2
	NAD83 (91)	205,897.360	359,580.416					
	GEOTRAN5	2,497,836.687	2,454,909.453	159,565.752	1.388	114,962	344 23 37.4	1.8

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
28	MEASURED	4403	4405	167,726.776	-	-	-	-
	NAD27	503,195.710	359,571.490					
	PUBLISHED	2,399,811.420	2,486,446.530	167,730.614	-3.838	43,702	148 54 04.8	-
	NAD83 (91)	503,201.385	359,581.581					
	PUBLISHED	2,368,274.597	2,454,909.184	167,726.562	0.214	783,770	148 54 02.5	2.3
	NAD83 (91)	503,201.802	359,581.112					
	NADCON	2,368,273.931	2,454,909.234	167,727.691	-0.915	183,308	148 54 02.4	2.4
	NAD83 (91)	503,203.452	359,580.416					
	GEOTRAN5	2,368,273.370	2,454,909.453	167,730.103	-3.327	50,414	148 54 03.0	1.8
29	MEASURED	4405	4414	143,234.856	-	-	-	-
	NAD27	359,571.490	245,976.732					
	PUBLISHED	2,486,446.530	2,399,199.486	143,233.431	1.425	100,516	217 31 34.5	-
	NAD83 (91)	359,581.581	245,985.187					
	PUBLISHED	2,454,909.184	2,367,662.525	143,234.494	0.362	395,676	217 31 32.6	1.9
	NAD83 (91)	359,581.112	245,985.381					
	NADCON	2,454,909.234	2,367,661.961	143,234.342	0.514	278,667	217 31 33.9	0.6
	NAD83 (91)	359,580.416	245,985.250					
	GEOTRAN5	2,454,909.453	2,367,663.654	143,232.996	1.860	77,008	217 31 32.7	1.8
30	MEASURED	4404	4413	109,330.386	-	-	-	-
	NAD27	325,928.150	216,819.675					
	PUBLISHED	2,328,463.920	2,335,430.946	109,330.685	-0.299	365,653	176 20 47.0	-
	NAD83 (91)	325,935.811	216,828.087					
	PUBLISHED	2,296,926.535	2,303,894.116	109,329.971	0.415	263,447	176 20 45.9	1.1
	NAD83 (91)	325,935.231	216,827.772					
	NADCON	2,296,926.817	2,303,893.551	109,329.653	0.733	149,155	176 20 47.4	-0.2
	NAD83 (91)	325,935.818	216,827.732					
	GEOTRAN5	2,296,927.614	2,303,895.559	109,330.356	0.030	3,644,346	176 20 45.2	1.8

	SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 PUBLISHED MINUS NAD83 (91)
31	MEASURED	4407	4408	186,524.476	-	-	-	-
	NAD27	177,691.150	205,887.600					
	PUBLISHED	2,344,993.210	2,529,372.570	186,522.889	1.587	117,533	81 18 19.2	-
	NAD83 (91)	177,699.461	205,897.252					
	PUBLISHED	2,313,455.996	2,497,836.234	186,523.960	0.516	361,482	81 18 17.9	1.3
	NAD83 (91)	177,699.510	205,897.039					
	NADCON	2,313,456.006	2,497,836.251	186,523.927	0.549	339,753	81 18 18.2	1.0
	NAD83 (91)	177,699.408	205,897.360					
	GEOTRAN5	2,313,458.132	2,497,836.687	186,522.320	2.156	86,514	81 18 17.4	1.8
32	MEASURED	4412	4402	191,321.062	-	-	-	-
	NAD27	385,885.147	575,224.620					
	PUBLISHED	2,525,664.801	2,553,155.130	191,324.735	-3.673	52,089	8 15 39.9	-
	NAD83 (91)	385,895.262	575,231.130					
	PUBLISHED	2,494,127.567	2,521,615.560	191,320.832	0.230	831,831	8 15 38.0	1.9
	NAD83 (91)	385,895.078	575,231.320					
	NADCON	2,494,127.167	2,521,615.619	191,321.268	-0.206	928,743	8 15 38.4	1.5
	NAD83 (91)	385,894.330	575,233.466					
	GEOTRAN5	2,494,127.380	2,521,615.993	191,324.155	-3.093	61,856	8 15 38.1	1.8

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Appendix D

SCENARIO B RESULTS

Appendix D contains maps and computer output related to the computational trials using the Scenario B data to find the most appropriate combination of transformation parameters for the various areas throughout the SEWRPC region. All computations are based upon the common point coordinate values and standard deviations contained in the master file and listed in Appendix A. In the first attempt, all Scenario B points were used. In all other cases, the input file is a sub-set of points from the master file.

There are maps and printouts for 23 trials. Each trial is assigned a sequence number for identification purposes and given as B01, B02, ... B23. The first trial covers the entire area, the next three trials break the SEWRPC region into thirds; north, middle and south. Following that, the trials are county based, either covering an entire county or some identified portion such as north ½ etc.

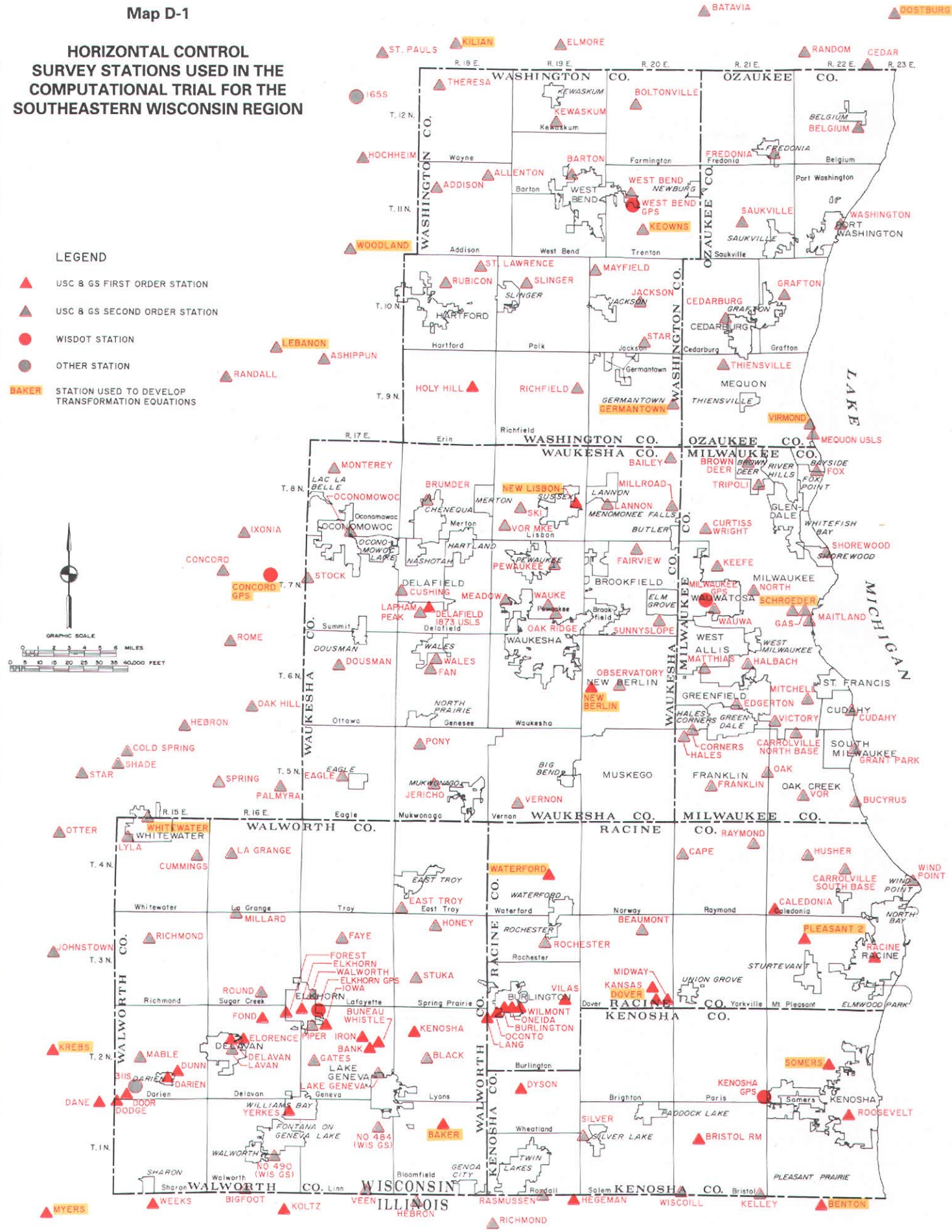
Comments on and a summary of the results in Appendix D include:

Code	Description of area	Comments
• B01	Entire SEWRPC area	Differences range up to 3.0 feet (#4452) and standards deviations are about 1 foot.
• B02	North 1/3 - Ozaukee & Washington	Five differences over 1.0 feet and standard deviations are about 0.4 feet.
• B03	Middle 1/3 - Waukesha & Milwaukee	Numerous differences over 2 feet with standard deviations 0.6 feet and 1.0 feet.
• B04	South 1/3 - Racine, Kenosha & Walworth	Numerous differences over 1 foot with standard deviations about 0.5 feet.
• B05	Ozaukee County	Excellent agreement, especially within county. Standard deviations about 0.2 feet.
• B06	Washington Co, N 1/2	Excellent agreement, especially in N 1/2 of county. Standard deviations about 0.2 feet.
• B07	Washington Co, S 1/2	Fairly large differences on points within S 1/2 of county. Controlled by exterior points.
• B08	Washington Co, S 1/2	Differences on points within S 1/2 of county agree much better. Standard deviations of 0.12 & 0.25 feet. Watch for problems at edges.
• B09	Milwaukee Co, N 1/2	Good fit within area except points "North" "Sunnyslope," & "Milwaukee GPS." Standard deviations of 0.27 & 0.15 feet.
• B10	Milwaukee Co, S 1/2	Excellent fit for points within target area with standard deviations of 0.09 & 0.14 feet. Points outside area have fairly large differences.
• B11	Kenosha County	Points in target area fit well with standard deviations of 0.17 & 0.16 feet. Control point "Kenosha" (across the line in Walworth County) is a misfit for Kenosha County.

Code	Description of area	Comments
• B12	Racine County	"Waterford" & "Rochester" are in area and fit badly. Other points in county fit much better.
• B13	Racine Co, E 1/2	Except for "Dover Reset," points in E 1/2 of county fit quite well with standard deviations of 0.14 & 0.21 feet.
• B14	Racine Co, W 1/2	Except for "Waterford" and "Rochester" other points within target area fit generally well. Standard deviations of 0.33 & 0.29 feet.
• B15	Walworth County	"Whitewater," "Waterford," "Burlington" and "Koltz" are key points which don't fit well.
• B16	Walworth Co, S 1/2	"Burlington" & other nearby points are problem. GPS points don't fit well. Standard deviation of points in area are 0.33 & 0.32 feet.
• B17	Walworth Co, N 1/2	Differences on "Burlington," "Waterford," "La-Grange," "Palmyra," & "Whitewater" are large. Standard deviations are 0.36 & 0.23 feet.
• B18	Waukesha County	Many controlling points have large differences and no apparent pattern. Try smaller areas.
• B19	Waukesha Co, NE 1/4	With exception of "Sunnyslope," all points with-in NE quadrant fit quite well with standard deviations of 0.16 & 0.23 feet.
• B20	Waukesha Co, SE 1/4	Including "Sunnyslope," points in & immediately adjacent to SE quadrant fit very well with standard deviations of 0.32 & 0.21 feet.
• B21	Waukesha Co, SW 1/4	Few points in or near SW 1/4 fit well, standard deviations are 0.35 & 0.56 feet. Try again using only interior points. See B23.
• B22	Waukesha Co, NW 1/4	A few key points fit well. Others like "Lapham Peak" & "Brumder" do not. Standard deviations are 0.60 & 0.70 feet.
• B23	Waukesha Co, SW 1/4	All controlling points are within SW 1/4. Of those, "Jericho" & "Dousman" still do not fit. Use option B21.

Map D-1

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE SOUTHEASTERN WISCONSIN REGION



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: MASTERSD.395
RESULTS: SEWRPC-B.B01

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - MASTER DATA SET: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
203	X =	2546506.957	.264	E =	766563.6740	.0500	OFFSET - FREDONIA
	Y =	542256.609	.264	N =	165282.2320	.0500	
204	X =	2549485.097	.264	E =	767471.4530	.0500	OFFSET - GRAFTON4
	Y =	491959.470	.264	N =	149951.8810	.0500	
205	X =	2552008.027	.264	E =	768240.4430	.0500	OFFSET - GRAFTON5
	Y =	491999.850	.264	N =	149964.1880	.0500	
304	X =	2560313.886	.053	E =	770772.0860	.0200	VIRMOND
	Y =	448430.934	.053	N =	136684.7430	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
306	X =	2573695.428	.132	E =	774850.6130	.0500	BELGIUM
	Y =	550647.222	.132	N =	167839.7070	.0500	
1001	X =	2535690.266	.264	E =	763266.8210	.0500	OFFSET - SAUKVILLE AZ MK
	Y =	516240.284	.264	N =	157352.5210	.0500	
1002	X =	2576517.157	.264	E =	775710.6410	.0500	CEDAR 2
	Y =	569954.249	.264	N =	173724.4370	.0500	
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1006	X =	2567814.824	.264	E =	773058.2550	.0500	OFFSET - WASHINGTON
	Y =	516606.515	.264	N =	157464.2300	.0500	
1007	X =	2529785.155	.132	E =	761467.0850	.1000	THIENSVILLE
	Y =	467514.830	.132	N =	142501.3190	.1000	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4401	X =	2434846.290	.053	E =	732529.6570	.0200	KILIAN
	Y =	573428.960	.053	N =	174783.1320	.0200	
4402	X =	2553155.130	.053	E =	768589.9600	.0200	RANDOM
	Y =	575224.620	.053	N =	175330.7990	.0200	
4403	X =	2399811.420	.053	E =	721851.5420	.0200	WOODLAND
	Y =	503195.710	.053	N =	153376.0800	.0200	
4404	X =	2328463.920	.132	E =	700104.6080	.1000	COLD SPRING
	Y =	325928.150	.132	N =	99345.4340	.1000	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4406	X =	2557875.330	.053	E =	770029.4550	.0200	CARROLVILLE NB
	Y =	345504.360	.053	N =	105313.2660	.0200	
4407	X =	2344993.210	.026	E =	705142.7980	.0100	WEEKS
	Y =	177691.150	.026	N =	54162.9040	.0100	
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4409	X =	2402498.925	.053	E =	722670.3450	.0010	165S
	Y =	555800.145	.053	N =	169409.9380	.0010	
4410	X =	2495574.796	.053	E =	751039.6900	.0010	WEST BEND GPS
	Y =	523613.234	.053	N =	159599.6480	.0010	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4413	X =	2335430.946	.053	E =	702228.3310	.0010	311S
	Y =	216819.675	.053	N =	66089.3330	.0010	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4414	X =	2399199.486	.053	E =	721664.9810	.0010	ELKHORN GPS
	Y =	245976.732	.053	N =	74976.4350	.0010	
4415	X =	2550478.433	.053	E =	767775.3090	.0010	KENOSHA GPS
	Y =	222012.587	.053	N =	67672.7160	.0010	
4416	X =	2571723.950	.026	E =	774251.0300	.0010	SOMERS RESET
	Y =	233048.660	.026	N =	71036.6060	.0010	
4421	X =	2431339.410	.132	E =	731460.9970	.1000	ADDISON
	Y =	524704.490	.132	N =	159932.0460	.1000	
4422	X =	2448352.230	.053	E =	736646.4470	.0200	ALLENTON
	Y =	530038.950	.053	N =	161558.0500	.0200	
4423	X =	2392112.960	.132	E =	719505.3190	.1000	ASHIPPUN
	Y =	465719.370	.132	N =	141953.5560	.1000	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4425	X =	2479438.500	.132	E =	746121.3620	.1000	BARTON
	Y =	530530.440	.132	N =	161708.0580	.1000	
4426	X =	2479346.940	.132	E =	746093.4630	.1000	BARTON-2
	Y =	530495.750	.132	N =	161697.4920	.1000	
4427	X =	2516558.560	.053	E =	757435.2930	.0200	BATAVIA
	Y =	590751.800	.053	N =	180063.3900	.0200	
4428	X =	2498545.930	.053	E =	751945.2010	.0200	BOLTONVILLE
	Y =	555253.230	.053	N =	169243.4710	.0200	
4429	X =	2538918.420	.132	E =	764250.9750	.1000	BROWN DEER
	Y =	435628.950	.132	N =	132782.6890	.1000	
4430	X =	2576533.090	.132	E =	775715.4960	.1000	CEDAR
	Y =	569936.120	.132	N =	173718.9080	.1000	
4431	X =	2464578.550	.132	E =	741592.0810	.1000	ELMORE-2
	Y =	575158.360	.132	N =	175310.3510	.1000	
4432	X =	2564093.180	.053	E =	771924.0360	.0200	FOX
	Y =	432631.950	.053	N =	131869.4250	.0200	
4433	X =	2546755.190	.053	E =	766639.3420	.0200	FREDONIA
	Y =	542652.480	.053	N =	165402.9000	.0200	
4434	X =	2546823.270	.132	E =	766660.0870	.1000	FREDONIA-2
	Y =	542784.100	.132	N =	165443.0110	.1000	
4435	X =	2549951.380	.053	E =	767613.5760	.0200	GRAFTON
	Y =	492857.810	.053	N =	150225.6950	.0200	
4436	X =	2406544.300	.053	E =	723903.5410	.0200	HOCHHEIM
	Y =	534498.750	.053	N =	162917.1400	.0200	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4438	X =	2500998.920	.132	E =	752693.1320	.1000	JACKSON
	Y =	487970.400	.132	N =	148735.8690	.1000	
4439	X =	2503109.390	.053	E =	753336.3300	.0200	KEOWNS
	Y =	513129.300	.053	N =	156404.2070	.0200	
4440	X =	2470830.710	.053	E =	743497.8020	.0200	KEWASKUM
	Y =	549358.480	.053	N =	167446.6730	.0200	
4441	X =	2484389.350	.132	E =	747630.5620	.1000	MAYFIELD
	Y =	498545.920	.132	N =	151959.2610	.1000	
4442	X =	2400548.808	.053	E =	722076.1330	.0200	MONTEREY
	Y =	428960.967	.053	N =	130749.9490	.0200	
4443	X =	2584180.230	.053	E =	778046.3260	.0200	OOSTBURG
	Y =	588661.300	.053	N =	179426.3360	.0200	
4444	X =	2481761.850	.053	E =	746829.8130	.0200	RICHFIELD
	Y =	459998.280	.053	N =	140210.1830	.0200	
4445	X =	2436666.430	.132	E =	733084.9180	.1000	RUBICON
	Y =	492503.250	.132	N =	150117.2680	.1000	
4446	X =	2535105.020	.132	E =	763088.4380	.1000	SAULKVILLE
	Y =	517261.040	.132	N =	157663.6480	.1000	
4447	X =	2462704.060	.053	E =	741020.9990	.0200	SLINGER
	Y =	493523.800	.053	N =	150428.4200	.0200	
4448	X =	2503891.220	.053	E =	753574.6880	.0200	STAR
	Y =	475364.550	.053	N =	144893.7860	.0200	
4449	X =	2446758.890	.132	E =	736161.0330	.1000	ST LAWRENCE
	Y =	498917.700	.132	N =	152072.3880	.1000	
4450	X =	2413196.370	.132	E =	725930.8370	.1000	ST PAULS
	Y =	569115.510	.132	N =	173468.3100	.1000	
4451	X =	2413195.250	.132	E =	725930.5010	.1000	ST PAULS-2
	Y =	569281.770	.132	N =	173518.9950	.1000	
4452	X =	2431677.230	.132	E =	731563.7390	.1000	THERESA
	Y =	561746.880	.132	N =	171222.3380	.1000	
4453	X =	2431782.790	.132	E =	731595.9160	.1000	THERESA-2
	Y =	561807.530	.132	N =	171240.8250	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4454	X =	2568115.360	.132	E =	773149.8590	.1000	WASHINGTON
	Y =	516805.860	.132	N =	157524.9900	.1000	
4455	X =	2496718.310	.132	E =	751388.2840	.1000	WEST BEND
	Y =	525424.000	.132	N =	160151.6300	.1000	
4456	X =	2419453.290	.053	E =	727838.1480	.0200	484 RESET
	Y =	207188.720	.053	N =	63154.0100	.0200	
4457	X =	2384794.750	.053	E =	717274.2200	.0200	490
	Y =	196817.740	.053	N =	59992.6920	.0200	
4458	X =	2441249.950	.026	E =	734481.7570	.0100	BAKER
	Y =	207140.680	.026	N =	63139.3800	.0100	
4459	X =	2416224.140	.026	E =	726854.1040	.0200	BANK
	Y =	236539.250	.026	N =	72100.1550	.0200	
4460	X =	2508227.690	.132	E =	754896.8990	.1000	BEAUMONT
	Y =	276268.340	.132	N =	84209.8940	.1000	
4461	X =	2572193.230	.026	E =	774394.0630	.0100	BENTON
	Y =	183720.500	.026	N =	56001.0210	.0100	
4462	X =	2375925.620	.132	E =	714571.0390	.1000	BIGFOOT
	Y =	183617.690	.132	N =	55969.2830	.1000	
4463	X =	2436327.170	.132	E =	732981.4510	.1000	BLACK
	Y =	229135.950	.132	N =	69843.4650	.1000	
4464	X =	2529345.040	.026	E =	761333.6460	.0100	BRISTOL
	Y =	205835.410	.026	N =	62741.7290	.0100	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
4466	X =	2579157.880	.053	E =	776516.5670	.0200	BUCYRUS
	Y =	321418.380	.053	N =	97972.0140	.0200	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4468	X =	2551538.560	.053	E =	768098.3020	.0200	CALEDONIA
	Y =	284218.350	.053	N =	86633.2920	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4471	X =	2576343.080	.053	E =	775658.7720	.0200	CARROLVILLE SB
	Y =	297856.700	.053	N =	90790.3400	.0200	
4473	X =	2363539.730	.053	E =	710795.7840	.0200	CONCORD
	Y =	392609.860	.053	N =	119669.6990	.0200	
4474	X =	2523450.530	.132	E =	759536.7380	.1000	CORNERS
	Y =	344502.850	.132	N =	105007.8540	.1000	
4475	X =	2576732.680	.053	E =	775777.1010	.0200	CUDAHY
	Y =	352803.850	.053	N =	107538.2870	.0200	
4477	X =	2525113.200	.132	E =	760043.2360	.1000	CURTIS WRIGHT
	Y =	412870.970	.132	N =	125846.2350	.1000	
4478	X =	2422692.370	.132	E =	728825.8990	.1000	CUSHING
	Y =	388318.970	.132	N =	118361.9260	.1000	
4479	X =	2325217.660	.026	E =	699115.1910	.0200	DANE
	Y =	212885.550	.026	N =	64890.0500	.0200	
4480	X =	2347774.840	.026	E =	705990.5270	.0200	DARIEN
	Y =	222034.620	.026	N =	67678.7820	.0200	
4481	X =	2369863.480	.026	E =	712723.1330	.0200	DELAVAN
	Y =	234600.360	.026	N =	71508.8730	.0200	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	
4483	X =	2330572.530	.026	E =	700747.3350	.0200	DODGE
	Y =	214167.180	.026	N =	65280.7250	.0200	
4484	X =	2333391.270	.026	E =	701606.4770	.0200	DOOR
	Y =	214954.040	.026	N =	65520.5640	.0200	
4485	X =	2401868.580	.132	E =	722478.2130	.1000	DOUSMAN
	Y =	364061.140	.132	N =	110968.5080	.1000	
4486	X =	2515200.170	.026	E =	757022.1180	.0100	DOVER RESET
	Y =	251454.970	.026	N =	76646.7620	.0100	
4487	X =	2350106.820	.026	E =	706701.2860	.0200	DUNN-2
	Y =	223765.300	.026	N =	68206.2760	.0200	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4490	X =	2425814.000	.053	E =	729776.9940	.0200	EAST TROY
	Y =	281006.370	.053	N =	85653.6490	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4491	X =	2537715.630	.132	E =	763884.6910	.1000	EDGERTON
	Y =	353578.050	.132	N =	107774.0360	.1000	
4492	X =	2391941.540	.026	E =	719452.5900	.0200	ELKHORN
	Y =	246201.820	.026	N =	75045.0420	.0200	
4493	X =	2372488.550	.026	E =	713523.2700	.0200	ELORENCE
	Y =	236484.540	.026	N =	72083.1840	.0200	
4494	X =	2380547.630	.026	E =	715979.7160	.0200	FOND
	Y =	242185.230	.026	N =	73820.7640	.0200	
4495	X =	2500294.520	.053	E =	752478.5420	.0200	FAIRVIEW
	Y =	403199.530	.053	N =	122898.2420	.0200	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4497	X =	2407247.280	.132	E =	724117.7730	.1000	FAYE
	Y =	271324.780	.132	N =	82702.7090	.1000	
4498	X =	2387871.210	.026	E =	718211.9590	.0200	FOREST
	Y =	244590.290	.026	N =	74553.8440	.0200	
4499	X =	2401585.920	.026	E =	722392.2500	.0200	IOWA
	Y =	242625.450	.026	N =	73955.0540	.0200	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4501	X =	2560536.810	.132	E =	770840.3680	.1000	GAS
	Y =	385819.730	.132	N =	117601.3510	.1000	
4502	X =	2395248.360	.026	E =	720460.5270	.0100	GATES
	Y =	228622.700	.026	N =	69686.9730	.0100	
4503	X =	2578536.990	.132	E =	776327.1300	.1000	GRANT PARK
	Y =	340375.100	.132	N =	103750.0290	.1000	
4504	X =	2540652.260	.053	E =	764779.6940	.0200	HALBACH
	Y =	367523.760	.053	N =	112024.6890	.0200	
4505	X =	2519676.420	.053	E =	758386.4440	.0200	HALES
	Y =	342172.580	.053	N =	104297.5860	.0200	
4506	X =	2433266.170	.132	E =	732048.3510	.1000	HEBRON (ILL)
	Y =	181595.160	.132	N =	55352.8910	.1000	
4507	X =	2350417.840	.132	E =	706795.9510	.1000	HEBRON (WIS)
	Y =	337135.190	.132	N =	102761.5710	.1000	
4508	X =	2487325.560	.026	E =	748525.8400	.0100	HEGEMAN
	Y =	185239.840	.026	N =	56463.9770	.0100	
4509	X =	2437484.360	.132	E =	733334.1290	.1000	HONEY
	Y =	274604.430	.132	N =	83702.3620	.1000	
4510	X =	2563997.420	.132	E =	771895.6890	.1000	HUSHER
	Y =	303942.940	.132	N =	92645.4130	.1000	
4511	X =	2414841.960	.026	E =	726432.7900	.0200	IRON
	Y =	237823.700	.026	N =	72491.6380	.0200	
4512	X =	2514682.480	.026	E =	756864.3420	.0200	KANSAS
	Y =	255477.050	.026	N =	77872.6910	.0200	
4513	X =	2366580.838	.132	E =	711722.9320	.1000	IXONIA
	Y =	408317.936	.132	N =	124458.0010	.1000	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4515	X =	2306936.640	.053	E =	693542.9840	.0200	JOHNSTOWN
	Y =	263130.510	.053	N =	80204.6770	.0200	
4516	X =	2529746.890	.053	E =	761455.6360	.0200	KEEFE
	Y =	400880.440	.053	N =	122191.5690	.0200	
4517	X =	2550594.840	.132	E =	767810.7240	.1000	KELLEY
	Y =	187083.730	.132	N =	57026.1160	.1000	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4519	X =	2389236.530	.026	E =	718628.0810	.0100	KOLTZ
	Y =	174721.190	.026	N =	53257.7300	.0100	
4520	X =	2306848.330	.026	E =	693516.1230	.0100	KREBS
	Y =	229641.230	.026	N =	69997.1260	.0100	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4522	X =	2419897.140	.132	E =	727973.5650	.1000	LAKE GENEVA
	Y =	226071.750	.132	N =	68909.4580	.1000	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4524	X =	2491874.170	.132	E =	749912.0240	.1000	LANNON
	Y =	418620.390	.132	N =	127598.3980	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4526	X =	2368186.670	.132	E =	712212.1090	.1000	LAVAN
	Y =	231849.520	.132	N =	70670.4460	.1000	
4527	X =	2374744.440	.053	E =	714211.2320	.0100	LEBANON RESET
	Y =	468368.970	.053	N =	142760.8110	.0100	
4528	X =	2332741.970	.132	E =	701408.5840	.1000	LYLA
	Y =	303993.410	.132	N =	92659.7460	.1000	
4529	X =	2338566.700	.132	E =	703183.8480	.1000	MABLE
	Y =	228727.130	.132	N =	69718.5980	.1000	
4530	X =	2561455.230	.132	E =	771120.2960	.1000	MAITLAND
	Y =	382858.510	.132	N =	116698.8210	.1000	
4531	X =	2527249.510	.053	E =	760694.5640	.0200	MATTHIAS
	Y =	366063.370	.053	N =	111579.4940	.0200	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4533	X =	2560686.630	.053	E =	770885.7000	.0200	MEQUON USLS
	Y =	447920.170	.053	N =	136529.0880	.0200	
4534	X =	2516101.410	.026	E =	757296.8450	.0200	MIDWAY RESET
	Y =	252222.320	.026	N =	76880.6550	.0200	
4535	X =	2369895.270	.132	E =	712732.7910	.1000	MILLARD
	Y =	278429.300	.132	N =	84867.8910	.1000	
4536	X =	2513320.190	.132	E =	756448.6910	.1000	MILLROAD
	Y =	419802.580	.132	N =	127958.9510	.1000	
4537	X =	2561841.970	.132	E =	771238.3980	.1000	MITCHELL
	Y =	356460.760	.132	N =	108652.7940	.1000	
4538	X =	2302299.420	.026	E =	692129.8280	.0100	MYERS
	Y =	175017.600	.026	N =	53347.8640	.0100	
4539	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4541	X =	2541685.610	.053	E =	765094.5380	.0200	NORTH
	Y =	393567.120	.053	N =	119962.7010	.0200	
4542	X =	2549168.320	.132	E =	767375.6590	.1000	OAK RESET
	Y =	331559.880	.132	N =	101062.9490	.1000	
4543	X =	2373526.700	.053	E =	713839.7410	.0200	OAK HILL
	Y =	348327.870	.053	N =	106172.9670	.0200	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4545	X =	2495538.290	.132	E =	751028.9960	.0200	OBSERVATORY
	Y =	358581.020	.132	N =	109298.8140	.0200	
4546	X =	2405080.555	.053	E =	723457.4080	.0200	OCONOMOWOC
	Y =	407746.396	.053	N =	124283.8070	.0200	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4549	X =	2306773.690	.132	E =	693493.3820	.1000	OTTER-2
	Y =	305066.310	.132	N =	92986.6610	.1000	
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4552	X =	2397396.810	.132	E =	721115.3250	.1000	PIPER
	Y =	240585.950	.132	N =	73333.3210	.1000	
4553	X =	2562969.770	.026	E =	771582.6920	.0100	PLEASANT
	Y =	275128.360	.026	N =	83862.6310	.0100	
4554	X =	2428672.940	.053	E =	730648.4240	.0200	PONY
	Y =	337627.040	.053	N =	102911.6720	.0200	
4555	X =	2587083.540	.026	E =	778932.5690	.0100	RACINE
	Y =	269538.570	.026	N =	82158.8750	.0100	
4556	X =	2358060.960	.053	E =	709126.0430	.0200	RANDALL
	Y =	460100.760	.053	N =	140240.5520	.0200	
4557	X =	2476856.570	.053	E =	745334.8300	.0200	RASMUSSEN
	Y =	185464.090	.053	N =	56532.2480	.0200	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4559	X =	2462492.000	.053	E =	740956.4240	.0200	RICHMOND (ILL)
	Y =	174424.070	.053	N =	53167.1660	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4560	X =	2338683.070	.053	E =	703219.3160	.0200	RICHMOND (WIS)
	Y =	268341.930	.053	N =	81793.1900	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	
4562	X =	2368134.700	.132	E =	712196.2280	.1000	ROME
	Y =	368969.790	.132	N =	112464.5050	.1000	
4563	X =	2579267.260	.026	E =	776550.2920	.0100	ROOSEVELT
	Y =	215555.580	.026	N =	65704.6750	.0100	
4564	X =	2379121.760	.053	E =	715545.0610	.0200	ROUND
	Y =	250925.710	.053	N =	76484.8630	.0200	
4565	X =	2556635.800	.053	E =	769651.3750	.0200	SCHROEDER
	Y =	385466.540	.053	N =	117493.7080	.0200	
4566	X =	2327656.870	.132	E =	699858.6190	.1000	SHADE
	Y =	323208.210	.132	N =	98516.4130	.1000	
4567	X =	2565273.710	.053	E =	772284.0250	.0200	SHOREWOOD
	Y =	404703.670	.053	N =	123357.0380	.0200	
4568	X =	2488304.690	.026	E =	748824.2910	.0100	SILVER
	Y =	206176.260	.026	N =	62845.5490	.0100	
4569	X =	2462533.570	.053	E =	740969.0500	.0200	SKI
	Y =	417368.330	.053	N =	127216.7540	.0200	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4571	X =	2317307.690	.132	E =	696704.1500	.1000	STAR
	Y =	321003.830	.132	N =	97844.4720	.1000	
4572	X =	2390732.575	.132	E =	719084.1300	.1000	STOCK
	Y =	390553.641	.132	N =	119043.3700	.1000	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	
4574	X =	2510599.280	.132	E =	755619.4340	.0200	SUNNYSLOPE
	Y =	379356.060	.132	N =	115631.0630	.0200	
4575	X =	2416418.080	.053	E =	726913.0190	.0200	VEEN
	Y =	184161.710	.053	N =	56135.2570	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4577	X =	2550620.710	.132	E =	767818.1660	.1000	VICTORY
	Y =	348088.590	.132	N =	106100.9540	.1000	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4579	X =	2560384.200	.132	E =	770794.3020	.1000	VOR
	Y =	323532.200	.132	N =	98616.1510	.1000	
4580	X =	2458029.980	.132	E =	739596.3470	.1000	VOR MKE -2
	Y =	411816.710	.132	N =	125524.5790	.1000	
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	
4582	X =	2394755.710	.132	E =	720310.3090	.1000	WALWORTH
	Y =	251048.000	.132	N =	76522.1990	.1000	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	
4585	X =	2526967.310	.132	E =	760608.4470	.1000	WAUWA
	Y =	384787.130	.132	N =	117286.4820	.1000	
4586	X =	2417660.900	.026	E =	727292.0360	.0200	WHISTLE
	Y =	236147.060	.026	N =	71980.6150	.0200	
4587	X =	2338046.620	.053	E =	703025.4200	.0200	WHITEWATER
	Y =	309303.170	.053	N =	94278.1480	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	
4589	X =	2598850.570	.053	E =	782519.1810	.0200	WIND POINT
	Y =	295780.660	.053	N =	90157.6530	.0200	
4590	X =	2525653.530	.053	E =	760208.4660	.0100	WISCOLL
	Y =	186760.160	.053	N =	56927.3880	.0100	
4591	X =	2389084.960	.026	E =	718581.8830	.0100	YERKES
	Y =	211590.900	.026	N =	64495.5620	.0100	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4411	CONCORD GPS	4416	SOMERS RESET
4540	NEW LIBSON RESET	4527	LEBANON RESET
4520	KREBS	4538	MYERS
4458	BAKER	4461	BENTON
4553	PLEASANT	4486	DOVER RESET
4401	KILIAN	4443	OOSTBURG
4403	WOODLAND	1004	GERMANTOWN
4439	KEOWNS	304	VIRMOND
4565	SCHROEDER	4405	NEW BERLIN
4587	WHITEWATER	4583	WATERFORD

NORTHING TRANSLATION: NT = -3.3080 METERS
EASTING TRANSLATION: ET = -9609.8773 METERS
SCALE: S = .304799888069
ROTATION: THETA = -.000008308168 RADIANS
0 0 -1.713683 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4411	E =	714902.335	714902.312	DELTA E =	.0231	.076	CONCORD GPS
	N =	120346.789	120346.877	DELTA N =	-.0884	-.290	
4416	E =	774251.030	774250.705	DELTA E =	.3254	1.068	SOMERS RESET
	N =	71036.606	71036.410	DELTA N =	.1960	.643	
4540	E =	746491.568	746491.542	DELTA E =	.0264	.087	NEW LIBSON RESET
	N =	128003.250	128003.291	DELTA N =	-.0406	-.133	
4527	E =	714211.232	714210.776	DELTA E =	.4559	1.496	LEBANON RESET
	N =	142760.811	142761.515	DELTA N =	-.7043	-2.311	
4520	E =	693516.123	693516.654	DELTA E =	-.5309	-1.742	KREBS
	N =	69997.126	69997.155	DELTA N =	-.0289	-.095	
4538	E =	692129.828	692130.285	DELTA E =	-.4570	-1.499	MYERS
	N =	53347.864	53347.867	DELTA N =	-.0031	-.010	
4458	E =	734481.757	734482.310	DELTA E =	-.5526	-1.813	BAKER
	N =	63139.380	63139.330	DELTA N =	.0498	.164	
4461	E =	774394.063	774393.866	DELTA E =	.1970	.646	BENTON
	N =	56001.021	56001.194	DELTA N =	-.1725	-.566	
4553	E =	771582.692	771582.325	DELTA E =	.3671	1.204	PLEASANT
	N =	83862.631	83862.276	DELTA N =	.3554	1.166	
4486	E =	757022.118	757022.216	DELTA E =	-.0982	-.322	DOVER RESET
	N =	76646.762	76646.508	DELTA N =	.2539	.833	
4401	E =	732529.657	732529.547	DELTA E =	.1098	.360	KILIAN
	N =	174783.132	174783.941	DELTA N =	-.8087	-2.653	
4443	E =	778046.326	778046.477	DELTA E =	-.1508	-.495	OOSTBURG
	N =	179426.336	179427.134	DELTA N =	-.7984	-2.619	
4403	E =	721851.542	721851.101	DELTA E =	.4414	1.448	WOODLAND
	N =	153376.080	153376.765	DELTA N =	-.6852	-2.248	
1004	E =	756662.381	756662.394	DELTA E =	-.0132	-.043	GERMANTOWN
	N =	138211.078	138211.273	DELTA N =	-.1946	-.638	
4439	E =	753336.330	753336.285	DELTA E =	.0449	.147	KEOWNS
	N =	156404.207	156404.784	DELTA N =	-.5769	-1.893	
304	E =	770772.086	770772.373	DELTA E =	-.2869	-.941	VIRMOND
	N =	136684.743	136684.874	DELTA N =	-.1310	-.430	
4565	E =	769651.375	769651.452	DELTA E =	-.0772	-.253	SCHROEDER
	N =	117493.708	117493.325	DELTA N =	.3835	1.258	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4405	E =	748257.816	748257.836	DELTA E =	-.0201	-.066	NEW BERLIN
	N =	109600.685	109600.338	DELTA N =	.3466	1.137	
4587	E =	703025.420	703025.687	DELTA E =	-.2675	-.877	WHITEWATER
	N =	94278.148	94278.184	DELTA N =	-.0363	-.119	
4583	E =	744746.022	744745.985	DELTA E =	.0371	.122	WATERFORD
	N =	89633.012	89632.725	DELTA N =	.2867	.941	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
203	E =	766563.674	766563.785	DELTA E =	-.1110	-.364	OFFSET - FREDONIA
	N =	165282.232	165282.894	DELTA N =	-.6624	-2.173	
204	E =	767471.453	767471.649	DELTA E =	-.1960	-.643	OFFSET - GRAFTON4
	N =	149951.881	149952.339	DELTA N =	-.4584	-1.504	
205	E =	768240.443	768240.638	DELTA E =	-.1947	-.639	OFFSET - GRAFTON5
	N =	149964.188	149964.654	DELTA N =	-.4656	-1.528	
305	E =	749912.023	749912.031	DELTA E =	-.0075	-.025	LANNON
	N =	127598.398	127598.458	DELTA N =	-.0604	-.198	
306	E =	774850.613	774850.807	DELTA E =	-.1936	-.635	BELGIUM
	N =	167839.707	167840.421	DELTA N =	-.7141	-2.343	
1001	E =	763266.821	763266.925	DELTA E =	-.1036	-.340	OFFSET - SAUKVILLE AZ MK
	N =	157352.521	157353.094	DELTA N =	-.5731	-1.880	
1002	E =	775710.641	775710.820	DELTA E =	-.1794	-.589	CEDAR 2
	N =	173724.437	173725.208	DELTA N =	-.7708	-2.529	
1003	E =	761738.477	761738.652	DELTA E =	-.1754	-.575	CEDARBURG
	N =	147233.732	147234.163	DELTA N =	-.4312	-1.415	
1006	E =	773058.255	773058.485	DELTA E =	-.2303	-.756	OFFSET - WASHINGTON
	N =	157464.230	157464.802	DELTA N =	-.5725	-1.878	
1007	E =	761467.085	761467.171	DELTA E =	-.0858	-.281	THIENSVILLE
	N =	142501.319	142501.566	DELTA N =	-.2471	-.811	
1008	E =	765434.573	765434.705	DELTA E =	-.1324	-.434	TRIPOLI
	N =	130076.373	130076.340	DELTA N =	.0333	.109	
4402	E =	768589.960	768590.064	DELTA E =	-.1038	-.341	RANDOM
	N =	175330.799	175331.557	DELTA N =	-.7582	-2.488	
4404	E =	700104.608	700104.839	DELTA E =	-.2315	-.759	COLD SPRING
	N =	99345.434	99345.452	DELTA N =	-.0181	-.059	
4406	E =	770029.455	770029.362	DELTA E =	.0930	.305	CARROLVILLE NB
	N =	105313.266	105312.860	DELTA N =	.4063	1.333	
4407	E =	705142.798	705143.341	DELTA E =	-.5426	-1.780	WEEKS
	N =	54162.904	54162.873	DELTA N =	.0310	.102	
4408	E =	761342.007	761342.077	DELTA E =	-.0705	-.231	BRISTOL RM
	N =	62757.608	62757.615	DELTA N =	-.0067	-.022	
4409	E =	722670.345	722670.119	DELTA E =	.2264	.743	165S
	N =	169409.938	169410.598	DELTA N =	-.6599	-2.165	
4410	E =	751039.690	751039.715	DELTA E =	-.0252	-.083	WEST BEND GPS
	N =	159599.648	159600.267	DELTA N =	-.6188	-2.030	
4412	E =	760211.603	760211.494	DELTA E =	.1089	.357	MILWAUKEE GPS
	N =	117621.111	117620.837	DELTA N =	.2735	.897	
4413	E =	702228.331	702228.665	DELTA E =	-.3335	-1.094	311S
	N =	66089.333	66089.219	DELTA N =	.1142	.375	
4414	E =	721664.981	721665.235	DELTA E =	-.2535	-.832	ELKHORN GPS
	N =	74976.435	74976.448	DELTA N =	-.0130	-.043	
4415	E =	767775.309	767775.101	DELTA E =	.2077	.681	KENOSHA GPS
	N =	67672.716	67672.562	DELTA N =	.1537	.504	
4421	E =	731460.997	731460.774	DELTA E =	.2231	.732	ADDISON
	N =	159932.046	159932.719	DELTA N =	-.6728	-2.207	
4422	E =	736646.447	736646.266	DELTA E =	.1809	.594	ALLENTON
	N =	161558.050	161558.705	DELTA N =	-.6547	-2.148	
4423	E =	719505.319	719504.706	DELTA E =	.6133	2.012	ASHIPPUN
	N =	141953.556	141953.961	DELTA N =	-.4055	-1.330	
4424	E =	756461.978	756462.002	DELTA E =	-.0238	-.078	BAILEY
	N =	132571.880	132571.995	DELTA N =	-.1146	-.376	
4425	E =	746121.362	746121.356	DELTA E =	.0056	.018	BARTON
	N =	161708.058	161708.590	DELTA N =	-.5315	-1.744	
4426	E =	746093.463	746093.449	DELTA E =	.0140	.046	BARTON-2
	N =	161697.492	161698.016	DELTA N =	-.5238	-1.718	
4427	E =	757435.293	757435.394	DELTA E =	-.1011	-.332	BATAVIA
	N =	180063.390	180064.147	DELTA N =	-.7573	-2.485	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4428	E =	751945.201	751945.236	DELTA E =	-.0354	-.116	BOLTONVILLE
	N =	169243.471	169244.142	DELTA N =	-.6705	-2.200	
4429	E =	764250.975	764251.070	DELTA E =	-.0947	-.311	BROWN DEER
	N =	132782.689	132782.777	DELTA N =	-.0876	-.287	
4430	E =	775715.496	775715.677	DELTA E =	-.1808	-.593	CEDAR
	N =	173718.908	173719.682	DELTA N =	-.7742	-2.540	
4431	E =	741592.081	741591.932	DELTA E =	.1487	.488	ELMORE-2
	N =	175310.351	175311.137	DELTA N =	-.7859	-2.578	
4432	E =	771924.036	771924.341	DELTA E =	-.3053	-1.002	FOX
	N =	131869.425	131869.355	DELTA N =	.0699	.229	
4433	E =	766639.342	766639.445	DELTA E =	-.1033	-.339	FREDONIA
	N =	165402.900	165403.556	DELTA N =	-.6564	-2.154	
4434	E =	766660.087	766660.196	DELTA E =	-.1088	-.357	FREDONIA-2
	N =	165443.011	165443.674	DELTA N =	-.6633	-2.176	
4435	E =	767613.576	767613.770	DELTA E =	-.1938	-.636	GRAFTON
	N =	150225.695	150226.155	DELTA N =	-.4597	-1.508	
4436	E =	723903.541	723903.202	DELTA E =	.3386	1.111	HOCHHEIM
	N =	162917.140	162917.945	DELTA N =	-.8054	-2.642	
4437	E =	735720.585	735720.213	DELTA E =	.3718	1.220	HOLY HILL
	N =	140003.362	140003.627	DELTA N =	-.2649	-.869	
4438	E =	752693.132	752693.078	DELTA E =	.0542	.178	JACKSON
	N =	148735.869	148736.349	DELTA N =	-.4797	-1.574	
4440	E =	743497.802	743497.655	DELTA E =	.1467	.481	KEWASKUM
	N =	167446.673	167447.352	DELTA N =	-.6792	-2.228	
4441	E =	747630.562	747630.456	DELTA E =	.1060	.348	MAYFIELD
	N =	151959.261	151959.724	DELTA N =	-.4629	-1.519	
4442	E =	722076.133	722076.044	DELTA E =	.0886	.291	MONTEREY
	N =	130749.949	130750.026	DELTA N =	-.0767	-.252	
4444	E =	746829.813	746829.692	DELTA E =	.1211	.397	RICHFIELD
	N =	140210.183	140210.401	DELTA N =	-.2179	-.715	
4445	E =	733084.918	733084.531	DELTA E =	.3874	1.271	RUBICON
	N =	150117.268	150117.798	DELTA N =	-.5299	-1.739	
4446	E =	763088.438	763088.539	DELTA E =	-.1011	-.332	SAULKVILLE
	N =	157663.648	157664.219	DELTA N =	-.5708	-1.873	
4447	E =	741020.999	741020.795	DELTA E =	.2043	.670	SLINGER
	N =	150428.420	150428.927	DELTA N =	-.5074	-1.665	
4448	E =	753574.688	753574.682	DELTA E =	.0055	.018	STAR
	N =	144893.786	144894.094	DELTA N =	-.3083	-1.012	
4449	E =	736161.033	736160.695	DELTA E =	.3380	1.109	ST LAWRENCE
	N =	152072.388	152072.947	DELTA N =	-.5591	-1.834	
4450	E =	725930.837	725930.665	DELTA E =	.1721	.565	ST PAULS
	N =	173468.310	173469.147	DELTA N =	-.8368	-2.745	
4451	E =	725930.501	725930.323	DELTA E =	.1779	.584	ST PAULS-2
	N =	173518.995	173519.823	DELTA N =	-.8278	-2.716	
4452	E =	731563.739	731563.648	DELTA E =	.0914	.300	THERESA
	N =	171222.338	171223.236	DELTA N =	-.8980	-2.946	
4453	E =	731595.916	731595.822	DELTA E =	.0938	.308	THERESA-2
	N =	171240.825	171241.722	DELTA N =	-.8974	-2.944	
4454	E =	773149.859	773150.088	DELTA E =	-.2292	-.752	WASHINGTON
	N =	157524.990	157525.564	DELTA N =	-.5736	-1.882	
4455	E =	751388.284	751388.254	DELTA E =	.0305	.100	WEST BEND
	N =	160151.630	160152.191	DELTA N =	-.5609	-1.840	
4456	E =	727838.148	727838.690	DELTA E =	-.5420	-1.778	484 RESET
	N =	63154.010	63153.918	DELTA N =	.0925	.303	
4457	E =	717274.220	717274.797	DELTA E =	-.5771	-1.893	490
	N =	59992.692	59992.756	DELTA N =	-.0642	-.211	
4459	E =	726854.104	726854.371	DELTA E =	-.2671	-.876	BANK
	N =	72100.155	72099.948	DELTA N =	.2074	.680	
4460	E =	754896.899	754896.942	DELTA E =	-.0432	-.142	BEAUMONT
	N =	84209.894	84209.603	DELTA N =	.2912	.955	
4462	E =	714571.039	714571.521	DELTA E =	-.4817	-1.580	BIGFOOT
	N =	55969.283	55969.360	DELTA N =	-.0770	-.253	
4463	E =	732981.451	732981.791	DELTA E =	-.3401	-1.116	BLACK
	N =	69843.465	69843.474	DELTA N =	-.0085	-.028	
4464	E =	761333.646	761333.686	DELTA E =	-.0405	-.133	BRISTOL
	N =	62741.729	62741.707	DELTA N =	.0219	.072	
4465	E =	731301.820	731301.523	DELTA E =	.2971	.975	BRUMDER
	N =	127186.236	127186.700	DELTA N =	-.4640	-1.522	
4466	E =	776516.567	776516.342	DELTA E =	.2252	.739	BUCYRUS
	N =	97972.014	97971.510	DELTA N =	.5044	1.655	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4467	E =	740864.834	740865.105	DELTA E =	-.2712	-.890	BURLINGTON
	N =	75681.515	75681.130	DELTA N =	.3845	1.262	
4468	E =	768098.302	768098.070	DELTA E =	.2316	.760	CALEDONIA
	N =	86633.292	86632.875	DELTA N =	.4174	1.369	
4469	E =	758609.708	758609.590	DELTA E =	.1183	.388	CAPE
	N =	92408.799	92408.428	DELTA N =	.3715	1.219	
4471	E =	775658.772	775658.451	DELTA E =	.3212	1.054	CARROLVILLE SB
	N =	90790.340	90789.905	DELTA N =	.4350	1.427	
4473	E =	710795.784	710795.774	DELTA E =	.0104	.034	CONCORD
	N =	119669.699	119670.119	DELTA N =	-.4197	-1.377	
4474	E =	759536.738	759536.689	DELTA E =	.0487	.160	CORNERS
	N =	105007.854	105007.512	DELTA N =	.3416	1.121	
4475	E =	775777.101	775777.062	DELTA E =	.0393	.129	CUDAHY
	N =	107538.287	107537.791	DELTA N =	.4958	1.627	
4477	E =	760043.236	760043.298	DELTA E =	-.0618	-.203	CURTIS WRIGHT
	N =	125846.235	125846.112	DELTA N =	.1231	.404	
4478	E =	728825.899	728825.502	DELTA E =	.3965	1.301	CUSHING
	N =	118361.926	118362.406	DELTA N =	-.4797	-1.574	
4479	E =	699115.191	699115.666	DELTA E =	-.4750	-1.559	DANE
	N =	64890.050	64890.072	DELTA N =	-.0221	-.072	
4480	E =	705990.527	705991.069	DELTA E =	-.5418	-1.778	DARIEN
	N =	67678.782	67678.765	DELTA N =	.0173	.057	
4481	E =	712723.133	712723.652	DELTA E =	-.5190	-1.703	DELAVAN
	N =	71508.873	71508.857	DELTA N =	.0162	.053	
4482	E =	730976.818	730976.578	DELTA E =	.2405	.789	DELAFIELD
	N =	115961.492	115961.362	DELTA N =	.1296	.425	
4483	E =	700747.335	700747.827	DELTA E =	-.4916	-1.613	DODGE
	N =	65280.725	65280.726	DELTA N =	-.0013	-.004	
4484	E =	701606.477	701606.976	DELTA E =	-.4992	-1.638	DOOR
	N =	65520.564	65520.568	DELTA N =	-.0043	-.014	
4485	E =	722478.213	722478.475	DELTA E =	-.2621	-.860	DOUSMAN
	N =	110968.508	110968.569	DELTA N =	-.0611	-.200	
4487	E =	706701.286	706701.852	DELTA E =	-.5657	-1.856	DUNN-2
	N =	68206.276	68206.282	DELTA N =	-.0057	-.019	
4488	E =	742356.324	742356.710	DELTA E =	-.3865	-1.268	DYSON
	N =	67983.088	67982.934	DELTA N =	.1540	.505	
4489	E =	723714.090	723714.331	DELTA E =	-.2412	-.791	EAGLE
	N =	98945.102	98945.059	DELTA N =	.0431	.141	
4490	E =	729776.994	729777.247	DELTA E =	-.2527	-.829	EAST TROY
	N =	85653.649	85653.545	DELTA N =	.1039	.341	
4491	E =	763884.691	763884.667	DELTA E =	.0238	.078	EDGERTON
	N =	107774.036	107773.668	DELTA N =	.3676	1.206	
4492	E =	719452.590	719453.013	DELTA E =	-.4228	-1.387	ELKHORN
	N =	75045.042	75045.036	DELTA N =	.0056	.018	
4493	E =	713523.270	713523.768	DELTA E =	-.4983	-1.635	ELORENCE
	N =	72083.184	72083.161	DELTA N =	.0227	.075	
4494	E =	715979.716	715980.161	DELTA E =	-.4445	-1.458	FOND
	N =	73820.764	73820.751	DELTA N =	.0126	.041	
4495	E =	752478.542	752478.591	DELTA E =	-.0494	-.162	FAIRVIEW
	N =	122898.242	122898.195	DELTA N =	.0468	.154	
4496	E =	732083.694	732083.768	DELTA E =	-.0739	-.242	FAN
	N =	110987.757	110987.470	DELTA N =	.2867	.941	
4497	E =	724117.773	724118.137	DELTA E =	-.3641	-1.194	FAYE
	N =	82702.709	82702.551	DELTA N =	.1585	.520	
4498	E =	718211.959	718212.381	DELTA E =	-.4218	-1.384	FOREST
	N =	74553.844	74553.832	DELTA N =	.0121	.040	
4499	E =	722392.250	722392.628	DELTA E =	-.3778	-1.240	IOWA
	N =	73955.054	73954.984	DELTA N =	.0704	.231	
4500	E =	761243.347	761243.160	DELTA E =	.1873	.615	FRANKLIN
	N =	99208.427	99208.114	DELTA N =	.3127	1.026	
4501	E =	770840.368	770840.479	DELTA E =	-.1107	-.363	GAS
	N =	117601.351	117600.987	DELTA N =	.3643	1.195	
4502	E =	720460.527	720460.976	DELTA E =	-.4487	-1.472	GATES
	N =	69686.973	69686.931	DELTA N =	.0420	.138	
4503	E =	776327.130	776327.047	DELTA E =	.0834	.274	GRANT PARK
	N =	103750.029	103749.514	DELTA N =	.5149	1.689	
4504	E =	764779.694	764779.716	DELTA E =	-.0224	-.074	HALBACH
	N =	112024.689	112024.327	DELTA N =	.3623	1.189	
4505	E =	758386.444	758386.347	DELTA E =	.0971	.318	HALES
	N =	104297.586	104297.237	DELTA N =	.3492	1.146	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4506	E =	732048.351	732048.919	DELTA E =	-.5680	-1.864	HEBRON (ILL)
	N =	55352.891	55353.038	DELTA N =	-.1473	-.483	
4507	E =	706795.951	706796.363	DELTA E =	-.4125	-1.353	HEBRON (WIS)
	N =	102761.571	102761.412	DELTA N =	.1588	.521	
4508	E =	748525.840	748526.206	DELTA E =	-.3658	-1.200	HEGEMAN
	N =	56463.977	56464.073	DELTA N =	-.0963	-.316	
4509	E =	733334.129	733334.387	DELTA E =	-.2583	-.848	HONEY
	N =	83702.362	83702.264	DELTA N =	.0979	.321	
4510	E =	771895.689	771895.480	DELTA E =	.2094	.687	HUSHER
	N =	92645.413	92644.959	DELTA N =	.4540	1.489	
4511	E =	726432.790	726433.080	DELTA E =	-.2895	-.950	IRON
	N =	72491.638	72491.444	DELTA N =	.1937	.635	
4512	E =	756864.342	756864.414	DELTA E =	-.0721	-.237	KANSAS
	N =	77872.691	77872.436	DELTA N =	.2547	.836	
4513	E =	711722.932	711722.663	DELTA E =	.2688	.882	IXONIA
	N =	124458.001	124457.946	DELTA N =	.0548	.180	
4514	E =	732399.554	732399.726	DELTA E =	-.1724	-.566	JERICHO
	N =	98521.960	98521.505	DELTA N =	.4551	1.493	
4515	E =	693542.984	693543.486	DELTA E =	-.5020	-1.647	JOHNSTOWN
	N =	80204.677	80204.684	DELTA N =	-.0069	-.023	
4516	E =	761455.636	761455.676	DELTA E =	-.0404	-.133	KEEFE
	N =	122191.569	122191.411	DELTA N =	.1576	.517	
4517	E =	767810.724	767810.671	DELTA E =	.0534	.175	KELLEY
	N =	57026.116	57026.251	DELTA N =	-.1349	-.443	
4518	E =	731224.961	731225.219	DELTA E =	-.2578	-.846	KENOSHA
	N =	72952.590	72952.317	DELTA N =	.2728	.895	
4519	E =	718628.081	718628.707	DELTA E =	-.6261	-2.054	KOLTZ
	N =	53257.730	53257.742	DELTA N =	-.0115	-.038	
4521	E =	711953.843	711954.196	DELTA E =	-.3526	-1.157	LAGRANGE
	N =	91110.021	91110.056	DELTA N =	-.0347	-.114	
4522	E =	727973.565	727973.928	DELTA E =	-.3626	-1.190	LAKE GENEVA
	N =	68909.458	68909.464	DELTA N =	-.0061	-.020	
4523	E =	738965.732	738966.021	DELTA E =	-.2890	-.948	LANG
	N =	74704.797	74704.383	DELTA N =	.4135	1.357	
4524	E =	749912.024	749912.031	DELTA E =	-.0067	-.022	LANNON
	N =	127598.398	127598.450	DELTA N =	-.0523	-.172	
4525	E =	730966.931	730966.952	DELTA E =	-.0211	-.069	LAPHAM PEAK
	N =	115944.626	115944.601	DELTA N =	.0246	.081	
4526	E =	712212.109	712212.567	DELTA E =	-.4585	-1.504	LAVAN
	N =	70670.446	70670.397	DELTA N =	.0492	.161	
4528	E =	701408.584	701408.844	DELTA E =	-.2602	-.854	LYLA
	N =	92659.746	92659.757	DELTA N =	-.0106	-.035	
4529	E =	703183.848	703184.412	DELTA E =	-.5638	-1.850	MABLE
	N =	69718.598	69718.618	DELTA N =	-.0197	-.065	
4530	E =	771120.296	771120.421	DELTA E =	-.1245	-.409	MAITLAND
	N =	116698.821	116698.409	DELTA N =	.4115	1.350	
4531	E =	760694.564	760694.563	DELTA E =	.0006	.002	MATTHIAS
	N =	111579.494	111579.166	DELTA N =	.3279	1.076	
4532	E =	739842.408	739842.269	DELTA E =	.1394	.457	MEADOW
	N =	117665.311	117665.213	DELTA N =	.0984	.323	
4533	E =	770885.700	770885.987	DELTA E =	-.2866	-.940	MEQUON USLS
	N =	136529.088	136529.194	DELTA N =	-.1062	-.348	
4534	E =	757296.845	757296.912	DELTA E =	-.0671	-.220	MIDWAY RESET
	N =	76880.655	76880.399	DELTA N =	.2565	.841	
4535	E =	712732.791	712733.231	DELTA E =	-.4396	-1.442	MILLARD
	N =	84867.891	84867.913	DELTA N =	-.0219	-.072	
4536	E =	756448.691	756448.772	DELTA E =	-.0812	-.266	MILLROAD
	N =	127958.951	127958.836	DELTA N =	.1150	.377	
4537	E =	771238.398	771238.366	DELTA E =	.0323	.106	MITCHELL
	N =	108652.794	108652.379	DELTA N =	.4148	1.361	
4539	E =	748257.816	748257.836	DELTA E =	-.0201	-.066	NEW BERLIN
	N =	109600.685	109600.338	DELTA N =	.3466	1.137	
4541	E =	765094.538	765094.615	DELTA E =	-.0774	-.254	NORTH
	N =	119962.701	119962.343	DELTA N =	.3585	1.176	
4542	E =	767375.659	767375.502	DELTA E =	.1574	.516	OAK RESET
	N =	101062.949	101062.562	DELTA N =	.3873	1.271	
4543	E =	713839.741	713839.913	DELTA E =	-.1720	-.564	OAK HILL
	N =	106172.967	106172.998	DELTA N =	-.0314	-.103	
4544	E =	744865.572	744865.552	DELTA E =	.0198	.065	OAK RIDGE
	N =	116734.940	116734.828	DELTA N =	.1117	.367	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4545	E =	751028.996	751029.006	DELTA E = -.0101	-.033	OBSERVATORY
	N =	109298.814	109298.466	DELTA N = .3477	1.141	
4546	E =	723457.408	723457.374	DELTA E = .0339	.111	OCONOMOWOC
	N =	124283.807	124283.838	DELTA N = -.0313	-.103	
4547	E =	739879.449	739879.732	DELTA E = -.2828	-.928	OCONTO
	N =	75081.660	75081.264	DELTA N = .3961	1.299	
4548	E =	741414.301	741414.559	DELTA E = -.2577	-.846	ONEIDA
	N =	75690.667	75690.294	DELTA N = .3727	1.223	
4549	E =	693493.382	693493.713	DELTA E = -.3306	-1.085	OTTER-2
	N =	92986.661	92986.711	DELTA N = -.0497	-.163	
4550	E =	717503.939	717504.158	DELTA E = -.2188	-.718	PALMYRA
	N =	97563.457	97563.407	DELTA N = .0497	.163	
4551	E =	744529.284	744529.254	DELTA E = .0305	.100	PEWAUKEE
	N =	121596.192	121596.125	DELTA N = .0674	.221	
4552	E =	721115.325	721115.793	DELTA E = -.4677	-1.535	PIPER
	N =	73333.321	73333.334	DELTA N = -.0127	-.042	
4554	E =	730648.424	730648.508	DELTA E = -.0839	-.275	PONY
	N =	102911.672	102911.526	DELTA N = .1458	.478	
4555	E =	778932.569	778932.213	DELTA E = .3555	1.166	RACINE
	N =	82158.875	82158.569	DELTA N = .3057	1.003	
4556	E =	709126.043	709125.674	DELTA E = .3688	1.210	RANDALL
	N =	140240.552	140241.324	DELTA N = -.7716	-2.531	
4557	E =	745334.830	745335.258	DELTA E = -.4283	-1.405	RASMUSSEN
	N =	56532.248	56532.398	DELTA N = -.1501	-.493	
4558	E =	765727.014	765726.802	DELTA E = .2117	.695	RAYMOND
	N =	93377.719	93377.311	DELTA N = .4076	1.337	
4559	E =	740956.424	740956.967	DELTA E = -.5429	-1.781	RICHMOND (ILL)
	N =	53167.166	53167.365	DELTA N = -.1989	-.652	
4560	E =	703219.316	703219.781	DELTA E = -.4651	-1.526	RICHMOND (WIS)
	N =	81793.190	81793.205	DELTA N = -.0146	-.048	
4561	E =	744687.945	744687.905	DELTA E = .0402	.132	ROCHESTER
	N =	82717.738	82717.666	DELTA N = .0722	.237	
4562	E =	712196.228	712196.380	DELTA E = -.1518	-.498	ROME
	N =	112464.505	112464.640	DELTA N = -.1346	-.442	
4563	E =	776550.292	776549.949	DELTA E = .3431	1.126	ROOSEVELT
	N =	65704.675	65704.540	DELTA N = .1348	.442	
4564	E =	715545.061	715545.533	DELTA E = -.4724	-1.550	ROUND
	N =	76484.863	76484.845	DELTA N = .0179	.059	
4566	E =	699858.619	699858.858	DELTA E = -.2386	-.783	SHADE
	N =	98516.413	98516.413	DELTA N = .0003	.001	
4567	E =	772284.025	772284.237	DELTA E = -.2125	-.697	SHOREWOOD
	N =	123357.038	123356.821	DELTA N = .2165	.710	
4568	E =	748824.291	748824.592	DELTA E = -.3005	-.986	SILVER
	N =	62845.549	62845.494	DELTA N = .0548	.180	
4569	E =	740969.050	740969.022	DELTA E = .0278	.091	SKI
	N =	127216.754	127216.748	DELTA N = .0058	.019	
4570	E =	710608.107	710608.467	DELTA E = -.3600	-1.181	SPRING-2
	N =	97409.453	97409.399	DELTA N = .0543	.178	
4571	E =	696704.150	696704.434	DELTA E = -.2843	-.933	STAR
	N =	97844.472	97844.492	DELTA N = -.0197	-.065	
4572	E =	719084.130	719084.155	DELTA E = -.0249	-.082	STOCK
	N =	119043.370	119043.452	DELTA N = -.0822	-.270	
4573	E =	731500.802	731501.093	DELTA E = -.2908	-.954	STUKA
	N =	78858.538	78858.442	DELTA N = .0958	.314	
4574	E =	755619.434	755619.542	DELTA E = -.1075	-.353	SUNNYSLOPE
	N =	115631.063	115630.734	DELTA N = .3287	1.078	
4575	E =	726913.019	726913.617	DELTA E = -.5976	-1.961	VEEN
	N =	56135.257	56135.280	DELTA N = -.0228	-.075	
4576	E =	741622.796	741622.788	DELTA E = .0076	.025	VERNON
	N =	96654.129	96653.771	DELTA N = .3581	1.175	
4577	E =	767818.166	767818.148	DELTA E = .0179	.059	VICTORY
	N =	106100.954	106100.514	DELTA N = .4397	1.443	
4578	E =	747510.744	747510.913	DELTA E = -.1686	-.553	VILAS
	N =	76483.563	76483.230	DELTA N = .3330	1.092	
4579	E =	770794.302	770794.121	DELTA E = .1811	.594	VOR
	N =	98616.151	98615.754	DELTA N = .3969	1.302	
4580	E =	739596.347	739596.343	DELTA E = .0044	.015	VOR MKE -2
	N =	125524.579	125524.604	DELTA N = -.0247	-.081	
4581	E =	732535.766	732535.851	DELTA E = -.0851	-.279	WALES
	N =	111237.975	111237.693	DELTA N = .2816	.924	

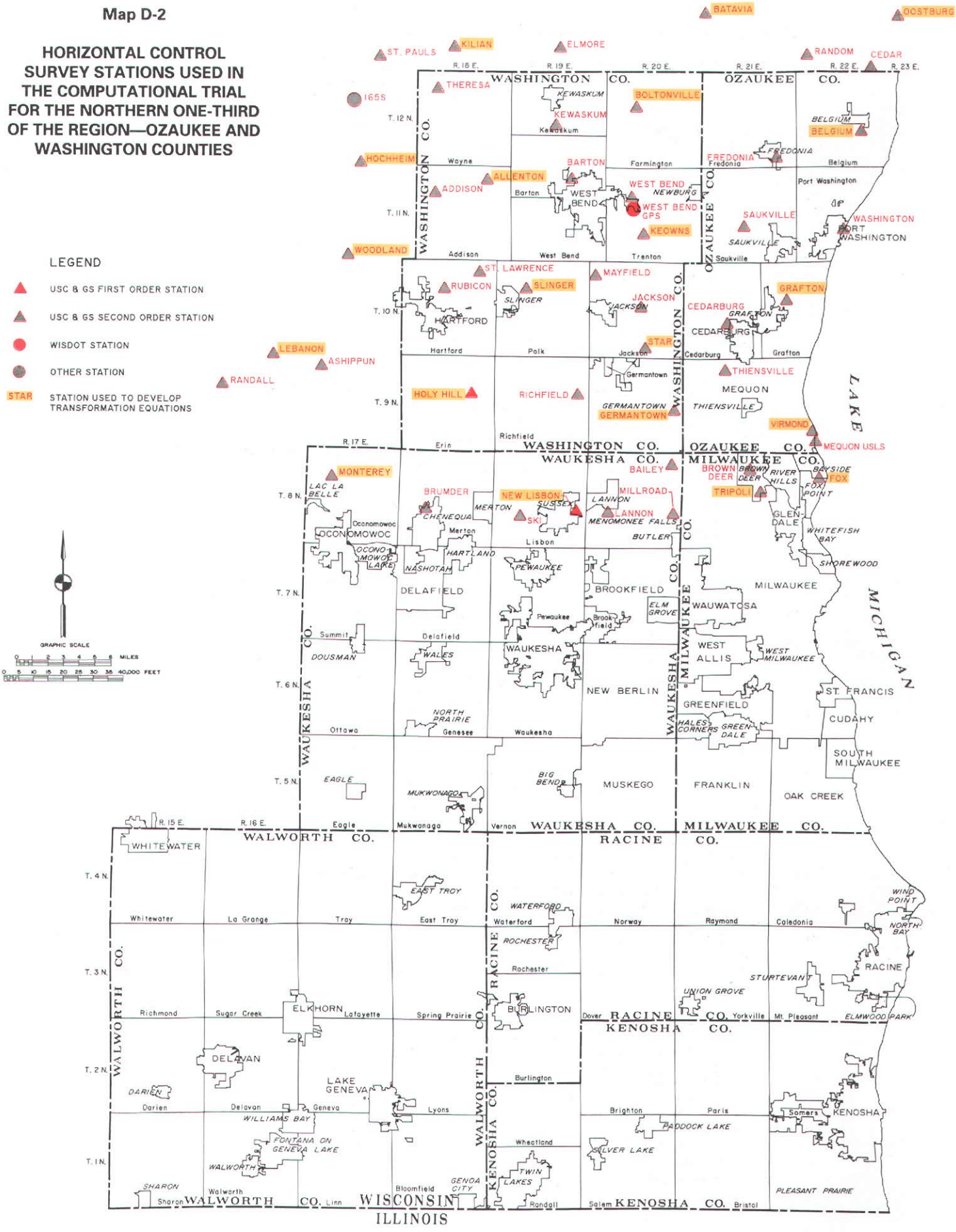
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4582	E =	720310.309	720310.759	DELTA E = -.4503	-1.477	WALWORTH
	N =	76522.199	76522.159	DELTA N = .0404	.132	
4584	E =	744432.284	744432.269	DELTA E = .0152	.050	WAUKE
	N =	117255.258	117255.142	DELTA N = .1155	.379	
4585	E =	760608.447	760608.501	DELTA E = -.0545	-.179	WAUWA
	N =	117286.482	117286.165	DELTA N = .3167	1.039	
4586	E =	727292.036	727292.296	DELTA E = -.2603	-.854	WHISTLE
	N =	71980.615	71980.412	DELTA N = .2032	.667	
4588	E =	742065.195	742065.438	DELTA E = -.2426	-.796	WILMONT
	N =	75689.117	75688.736	DELTA N = .3809	1.250	
4589	E =	782519.181	782518.736	DELTA E = .4445	1.458	WIND POINT
	N =	90157.653	90157.185	DELTA N = .4678	1.535	
4590	E =	760208.466	760208.563	DELTA E = -.0969	-.318	WISCOLL
	N =	56927.388	56927.564	DELTA N = -.1757	-.576	
4591	E =	718581.883	718582.415	DELTA E = -.5322	-1.746	YERKES
	N =	64495.562	64495.625	DELTA N = -.0626	-.205	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .861 FEET
Y/NORTH DIRECTION: 1.206 FEET

Map D-2

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE NORTHERN ONE-THIRD OF THE REGION—OZAUKEE AND WASHINGTON COUNTIES



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: NORTH-SD.395
RESULTS: NORTH.B02

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - NORTH 1/3: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
203	X =	2546506.957	.264	E =	766563.6740	.0500	OFFSET - FREDONIA
	Y =	542256.609	.264	N =	165282.2320	.0500	
204	X =	2549485.097	.264	E =	767471.4530	.0500	OFFSET - GRAFTON4
	Y =	491959.470	.264	N =	149951.8810	.0500	
205	X =	2552008.027	.264	E =	768240.4430	.0500	OFFSET - GRAFTON5
	Y =	491999.850	.264	N =	149964.1880	.0500	
304	X =	2560313.886	.053	E =	770772.0860	.0200	VIRMOND
	Y =	448430.934	.053	N =	136684.7430	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
306	X =	2573695.428	.132	E =	774850.6130	.0500	BELGIUM
	Y =	550647.222	.132	N =	167839.7070	.0500	
1001	X =	2535690.266	.264	E =	763266.8210	.0500	OFFSET - SAUKVILLE AZ MK
	Y =	516240.284	.264	N =	157352.5210	.0500	
1002	X =	2576517.157	.264	E =	775710.6410	.0500	CEDAR 2
	Y =	569954.249	.264	N =	173724.4370	.0500	
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1006	X =	2567814.824	.264	E =	773058.2550	.0500	OFFSET - WASHINGTON
	Y =	516606.515	.264	N =	157464.2300	.0500	
1007	X =	2529785.155	.132	E =	761467.0850	.1000	THIENSVILLE
	Y =	467514.830	.132	N =	142501.3190	.1000	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4401	X =	2434846.290	.053	E =	732529.6570	.0200	KILIAN
	Y =	573428.960	.053	N =	174783.1320	.0200	
4402	X =	2553155.130	.053	E =	768589.9600	.0200	RANDOM
	Y =	575224.620	.053	N =	175330.7990	.0200	
4403	X =	2399811.420	.053	E =	721851.5420	.0200	WOODLAND
	Y =	503195.710	.053	N =	153376.0800	.0200	
4409	X =	2402498.925	.053	E =	722670.3450	.0010	165S
	Y =	555800.145	.053	N =	169409.9380	.0010	
4410	X =	2495574.796	.053	E =	751039.6900	.0010	WEST BEND GPS
	Y =	523613.234	.053	N =	159599.6480	.0010	
4421	X =	2431339.410	.132	E =	731460.9970	.1000	ADDISON
	Y =	524704.490	.132	N =	159932.0460	.1000	
4422	X =	2448352.230	.053	E =	736646.4470	.0200	ALLENTON
	Y =	530038.950	.053	N =	161558.0500	.0200	
4423	X =	2392112.960	.132	E =	719505.3190	.1000	ASHIPPUN
	Y =	465719.370	.132	N =	141953.5560	.1000	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4425	X =	2479438.500	.132	E =	746121.3620	.1000	BARTON
	Y =	530530.440	.132	N =	161708.0580	.1000	
4426	X =	2479346.940	.132	E =	746093.4630	.1000	BARTON-2
	Y =	530495.750	.132	N =	161697.4920	.1000	
4427	X =	2516558.560	.053	E =	757435.2930	.0200	BATAVIA
	Y =	590751.800	.053	N =	180063.3900	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4428	X =	2498545.930	.053	E =	751945.2010	.0200	BOLTONVILLE
	Y =	555253.230	.053	N =	169243.4710	.0200	
4429	X =	2538918.420	.132	E =	764250.9750	.1000	BROWN DEER
	Y =	435628.950	.132	N =	132782.6890	.1000	
4430	X =	2576533.090	.132	E =	775715.4960	.1000	CEDAR
	Y =	569936.120	.132	N =	173718.9080	.1000	
4431	X =	2464578.550	.132	E =	741592.0810	.1000	ELMORE-2
	Y =	575158.360	.132	N =	175310.3510	.1000	
4432	X =	2564093.180	.053	E =	771924.0360	.0200	FOX
	Y =	432631.950	.053	N =	131869.4250	.0200	
4433	X =	2546755.190	.053	E =	766639.3420	.0200	FREDONIA
	Y =	542652.480	.053	N =	165402.9000	.0200	
4434	X =	2546823.270	.132	E =	766660.0870	.1000	FREDONIA-2
	Y =	542784.100	.132	N =	165443.0110	.1000	
4435	X =	2549951.380	.053	E =	767613.5760	.0200	GRAFTON
	Y =	492857.810	.053	N =	150225.6950	.0200	
4436	X =	2406544.300	.053	E =	723903.5410	.0200	HOCHHEIM
	Y =	534498.750	.053	N =	162917.1400	.0200	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4438	X =	2500998.920	.132	E =	752693.1320	.1000	JACKSON
	Y =	487970.400	.132	N =	148735.8690	.1000	
4439	X =	2503109.390	.053	E =	753336.3300	.0200	KEOWNS
	Y =	513129.300	.053	N =	156404.2070	.0200	
4440	X =	2470830.710	.053	E =	743497.8020	.0200	KEWASKUM
	Y =	549358.480	.053	N =	167446.6730	.0200	
4441	X =	2484389.350	.132	E =	747630.5620	.1000	MAYFIELD
	Y =	498545.920	.132	N =	151959.2610	.1000	
4442	X =	2400548.808	.053	E =	722076.1330	.0200	MONTEREY
	Y =	428960.967	.053	N =	130749.9490	.0200	
4443	X =	2584180.230	.053	E =	778046.3260	.0200	OOSTBURG
	Y =	588661.300	.053	N =	179426.3360	.0200	
4444	X =	2481761.850	.053	E =	746829.8130	.0200	RICHFIELD
	Y =	459998.280	.053	N =	140210.1830	.0200	
4445	X =	2436666.430	.132	E =	733084.9180	.1000	RUBICON
	Y =	492503.250	.132	N =	150117.2680	.1000	
4446	X =	2535105.020	.132	E =	763088.4380	.1000	SAULKVILLE
	Y =	517261.040	.132	N =	157663.6480	.1000	
4447	X =	2462704.060	.053	E =	741020.9990	.0200	SLINGER
	Y =	493523.800	.053	N =	150428.4200	.0200	
4448	X =	2503891.220	.053	E =	753574.6880	.0200	STAR
	Y =	475364.550	.053	N =	144893.7860	.0200	
4449	X =	2446758.890	.132	E =	736161.0330	.1000	ST LAWRENCE
	Y =	498917.700	.132	N =	152072.3880	.1000	
4450	X =	2413196.370	.132	E =	725930.8370	.1000	ST PAULS
	Y =	569115.510	.132	N =	173468.3100	.1000	
4451	X =	2413195.250	.132	E =	725930.5010	.1000	ST PAULS-2
	Y =	569281.770	.132	N =	173518.9950	.1000	
4452	X =	2431677.230	.132	E =	731563.7390	.1000	THERESA
	Y =	561746.880	.132	N =	171222.3380	.1000	
4453	X =	2431782.790	.132	E =	731595.9160	.1000	THERESA-2
	Y =	561807.530	.132	N =	171240.8250	.1000	
4454	X =	2568115.360	.132	E =	773149.8590	.1000	WASHINGTON
	Y =	516805.860	.132	N =	157524.9900	.1000	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
4524	X =	2491874.170	.132	E =	749912.0240	.1000	LANNON
	Y =	418620.390	.132	N =	127598.3980	.1000	
4527	X =	2374744.440	.053	E =	714211.2320	.0100	LEBANON RESET
	Y =	468368.970	.053	N =	142760.8110	.0100	
4533	X =	2560686.630	.053	E =	770885.7000	.0200	MEQUON USLS
	Y =	447920.170	.053	N =	136529.0880	.0200	
4536	X =	2513320.190	.132	E =	756448.6910	.1000	MILLROAD
	Y =	419802.580	.132	N =	127958.9510	.1000	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4556	X =	2358060.960	.053	E =	709126.0430	.0200	RANDALL
	Y =	460100.760	.053	N =	140240.5520	.0200	
4569	X =	2462533.570	.053	E =	740969.0500	.0200	SKI
	Y =	417368.330	.053	N =	127216.7540	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4401	KILIAN	4427	BATAVIA
4443	OOSTBURG	4428	BOLTONVILLE
306	BELGIUM	4436	HOCHHEIM
4422	ALLENTON	4439	KEOWNS
4403	WOODLAND	4447	SLINGER
4435	GRAFTON	4448	STAR
4527	LEBANON RESET	4437	HOLY HILL
1004	GERMANTOWN	4442	MONTEREY
4540	NEW LIBSON RESET	1008	TRIPOLI
4432	FOX	304	VIRMOND

NORTHING TRANSLATION: NT = -3.1883 METERS
EASTING TRANSLATION: ET = -9598.8612 METERS
SCALE: S = .304795589693
ROTATION: THETA = -.000010398233 RADIANS
0 0 -2.144789 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4401	E =	732529.657	732529.732	DELTA E =	-.0751	-.246	KILIAN
	N =	174783.132	174783.147	DELTA N =	-.0145	-.048	
4427	E =	757435.293	757435.217	DELTA E =	.0763	.250	BATAVIA
	N =	180063.390	180063.331	DELTA N =	.0593	.195	
4443	E =	778046.326	778046.010	DELTA E =	.3158	1.036	OOSTBURG
	N =	179426.336	179426.370	DELTA N =	-.0338	-.111	
4428	E =	751945.201	751945.159	DELTA E =	.0419	.138	BOLTONVILLE
	N =	169243.471	169243.466	DELTA N =	.0050	.016	
306	E =	774850.613	774850.409	DELTA E =	.2038	.669	BELGIUM
	N =	167839.707	167839.813	DELTA N =	-.1063	-.349	
4436	E =	723903.541	723903.534	DELTA E =	.0072	.024	HOCHHEIM
	N =	162917.140	162917.300	DELTA N =	-.1605	-.527	
4422	E =	736646.447	736646.421	DELTA E =	.0264	.087	ALLENTON
	N =	161558.050	161558.106	DELTA N =	-.0556	-.182	
4439	E =	753336.330	753336.215	DELTA E =	.1149	.377	KEOWNS
	N =	156404.207	156404.292	DELTA N =	-.0854	-.280	
4403	E =	721851.542	721851.481	DELTA E =	.0611	.201	WOODLAND
	N =	153376.080	153376.251	DELTA N =	-.1706	-.560	
4447	E =	741020.999	741020.911	DELTA E =	.0882	.289	SLINGER
	N =	150428.420	150428.494	DELTA N =	-.0744	-.244	
4435	E =	767613.576	767613.511	DELTA E =	.0647	.212	GRAFTON
	N =	150225.695	150225.780	DELTA N =	-.0851	-.279	
4448	E =	753574.688	753574.633	DELTA E =	.0549	.180	STAR
	N =	144893.786	144893.766	DELTA N =	.0203	.067	
4527	E =	714211.232	714211.286	DELTA E =	-.0543	-.178	LEBANON RESET
	N =	142760.811	142761.134	DELTA N =	-.3234	-1.061	
4437	E =	735720.585	735720.426	DELTA E =	.1592	.522	HOLY HILL
	N =	140003.362	140003.330	DELTA N =	.0322	.106	
1004	E =	756662.381	756662.315	DELTA E =	.0658	.216	GERMANTOWN
	N =	138211.078	138211.045	DELTA N =	.0334	.110	
4442	E =	722076.133	722076.469	DELTA E =	-.3357	-1.102	MONTEREY
	N =	130749.949	130749.831	DELTA N =	.1183	.388	
4540	E =	746491.568	746491.627	DELTA E =	-.0594	-.195	NEW LIBSON RESET
	N =	128003.250	128003.185	DELTA N =	.0647	.212	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
1008	E =	765434.573	765434.520	DELTA E = .0532	.175	TRIPOLI
	N =	130076.373	130076.245	DELTA N = .1283	.421	
4432	E =	771924.036	771924.060	DELTA E = -.0244	-.080	FOX
	N =	131869.425	131869.248	DELTA N = .1766	.579	
304	E =	770772.086	770772.098	DELTA E = -.0121	-.040	VIRMOND
	N =	136684.743	136684.697	DELTA N = .0460	.151	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
203	E =	766563.674	766563.510	DELTA E = .1641	.539	OFFSET - FREDONIA
	N =	165282.232	165282.305	DELTA N = -.0734	-.241	
204	E =	767471.453	767471.393	DELTA E = .0599	.197	OFFSET - GRAFTON4
	N =	149951.881	149951.968	DELTA N = -.0875	-.287	
205	E =	768240.443	768240.371	DELTA E = .0721	.237	OFFSET - GRAFTON5
	N =	149964.188	149964.284	DELTA N = -.0961	-.315	
305	E =	749912.023	749912.069	DELTA E = -.0459	-.151	LANNON
	N =	127598.398	127598.366	DELTA N = .0321	.105	
1001	E =	763266.821	763266.713	DELTA E = .1085	.356	OFFSET - SAUKVILLE AZ MK
	N =	157352.521	157352.610	DELTA N = -.0890	-.292	
1002	E =	775710.641	775710.399	DELTA E = .2424	.795	CEDAR 2
	N =	173724.437	173724.519	DELTA N = -.0818	-.268	
1003	E =	761738.477	761738.483	DELTA E = -.0060	-.020	CEDARBURG
	N =	147233.732	147233.819	DELTA N = -.0866	-.284	
1006	E =	773058.255	773058.135	DELTA E = .1201	.394	OFFSET - WASHINGTON
	N =	157464.230	157464.337	DELTA N = -.1072	-.352	
1007	E =	761467.085	761467.015	DELTA E = .0699	.229	THIENSVILLE
	N =	142501.319	142501.288	DELTA N = .0314	.103	
4402	E =	768589.960	768589.739	DELTA E = .2209	.725	RANDOM
	N =	175330.799	175330.831	DELTA N = -.0317	-.104	
4409	E =	722670.345	722670.454	DELTA E = -.1088	-.357	165S
	N =	169409.938	169409.859	DELTA N = .0791	.259	
4410	E =	751039.690	751039.671	DELTA E = .0192	.063	WEST BEND GPS
	N =	159599.648	159599.725	DELTA N = -.0774	-.254	
4421	E =	731460.997	731461.005	DELTA E = -.0080	-.026	ADDISON
	N =	159932.046	159932.132	DELTA N = -.0858	-.282	
4423	E =	719505.319	719505.143	DELTA E = .1760	.577	ASHIPPUN
	N =	141953.556	141953.603	DELTA N = -.0471	-.154	
4424	E =	756461.978	756461.937	DELTA E = .0406	.133	BAILEY
	N =	132571.880	132571.846	DELTA N = .0343	.113	
4425	E =	746121.362	746121.377	DELTA E = -.0150	-.049	BARTON
	N =	161708.058	161708.008	DELTA N = .0499	.164	
4426	E =	746093.463	746093.470	DELTA E = -.0071	-.023	BARTON-2
	N =	161697.492	161697.434	DELTA N = .0575	.189	
4429	E =	764250.975	764250.895	DELTA E = .0799	.262	BROWN DEER
	N =	132782.689	132782.641	DELTA N = .0480	.157	
4430	E =	775715.496	775715.255	DELTA E = .2410	.791	CEDAR
	N =	173718.908	173718.993	DELTA N = -.0853	-.280	
4431	E =	741592.081	741591.988	DELTA E = .0926	.304	ELMORE-2
	N =	175310.351	175310.354	DELTA N = -.0032	-.011	
4433	E =	766639.342	766639.169	DELTA E = .1732	.568	FREDONIA
	N =	165402.900	165402.966	DELTA N = -.0658	-.216	
4434	E =	766660.087	766659.919	DELTA E = .1681	.552	FREDONIA-2
	N =	165443.011	165443.083	DELTA N = -.0722	-.237	
4438	E =	752693.132	752693.033	DELTA E = .0992	.325	JACKSON
	N =	148735.869	148735.964	DELTA N = -.0950	-.312	
4440	E =	743497.802	743497.701	DELTA E = .1011	.332	KEWASKUM
	N =	167446.673	167446.684	DELTA N = -.0114	-.037	
4441	E =	747630.562	747630.476	DELTA E = .0864	.283	MAYFIELD
	N =	151959.261	151959.283	DELTA N = -.0222	-.073	
4444	E =	746829.813	746829.747	DELTA E = .0656	.215	RICHFIELD
	N =	140210.183	140210.124	DELTA N = .0588	.193	
4445	E =	733084.918	733084.759	DELTA E = .1587	.521	RUBICON
	N =	150117.268	150117.353	DELTA N = -.0848	-.278	
4446	E =	763088.438	763088.329	DELTA E = .1091	.358	SAULKVILLE
	N =	157663.648	157663.730	DELTA N = -.0820	-.269	
4449	E =	736161.033	736160.876	DELTA E = .1568	.514	ST LAWRENCE
	N =	152072.388	152072.481	DELTA N = -.0928	-.305	

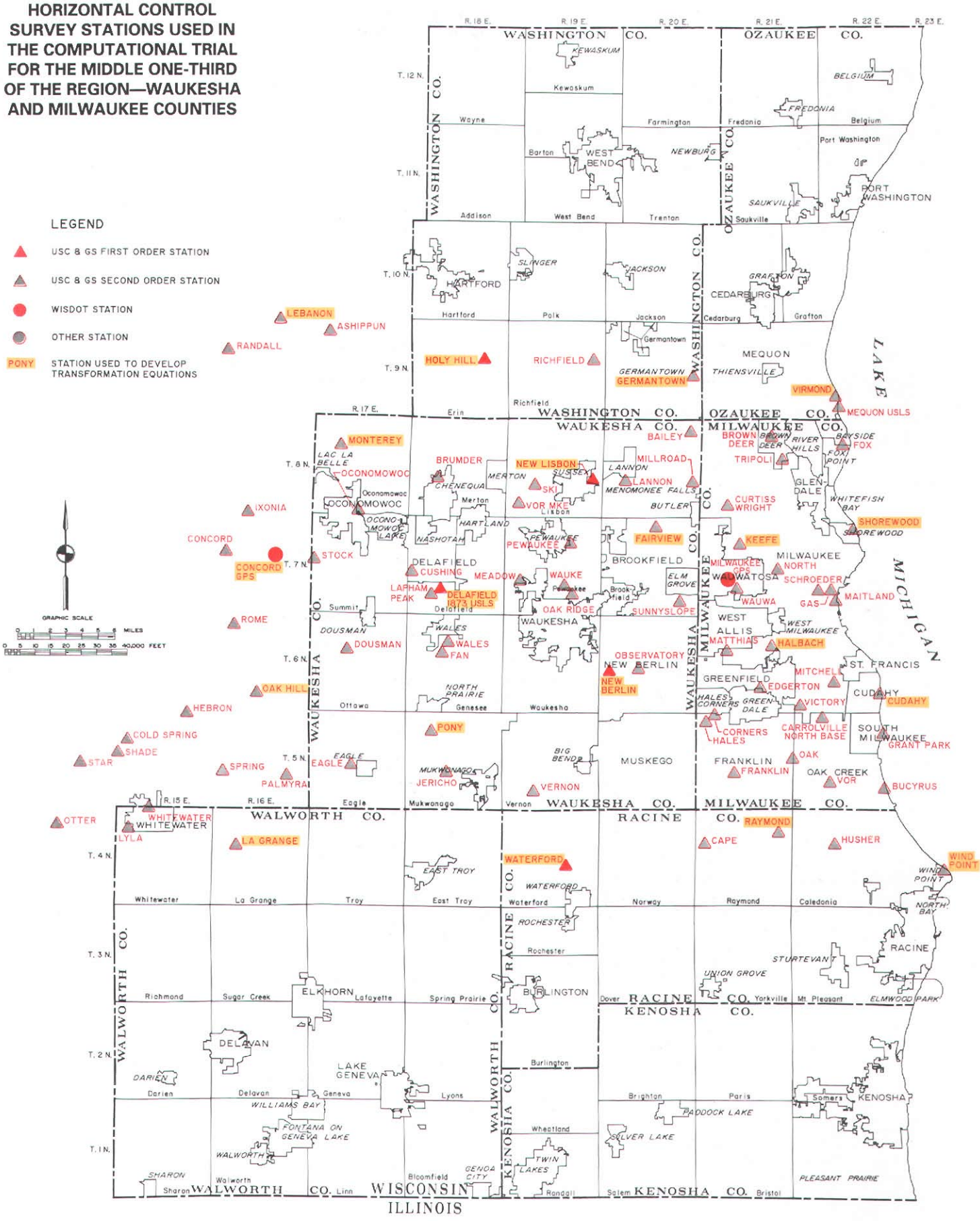
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4450	E =	725930.837	725930.946	DELTA E =	-.1087	-.357	ST PAULS
	N =	173468.310	173468.357	DELTA N =	-.0473	-.155	
4451	E =	725930.501	725930.604	DELTA E =	-.1028	-.337	ST PAULS-2
	N =	173518.995	173519.033	DELTA N =	-.0377	-.124	
4452	E =	731563.739	731563.854	DELTA E =	-.1146	-.376	THERESA
	N =	171222.338	171222.490	DELTA N =	-.1520	-.499	
4453	E =	731595.916	731596.028	DELTA E =	-.1117	-.366	THERESA-2
	N =	171240.825	171240.976	DELTA N =	-.1512	-.496	
4454	E =	773149.859	773149.736	DELTA E =	.1226	.402	WASHINGTON
	N =	157524.990	157525.098	DELTA N =	-.1077	-.353	
4465	E =	731301.820	731301.825	DELTA E =	-.0046	-.015	BRUMDER
	N =	127186.236	127186.574	DELTA N =	-.3385	-1.110	
4524	E =	749912.024	749912.069	DELTA E =	-.0451	-.148	LANNON
	N =	127598.398	127598.358	DELTA N =	.0401	.132	
4533	E =	770885.700	770885.711	DELTA E =	-.0105	-.035	MEQUON USLS
	N =	136529.088	136529.020	DELTA N =	.0683	.224	
4536	E =	756448.691	756448.718	DELTA E =	-.0266	-.087	MILLROAD
	N =	127958.951	127958.752	DELTA N =	.1989	.652	
4556	E =	709126.043	709126.261	DELTA E =	-.2184	-.716	RANDALL
	N =	140240.552	140240.968	DELTA N =	-.4156	-1.364	
4569	E =	740969.050	740969.188	DELTA E =	-.1376	-.451	SKI
	N =	127216.754	127216.643	DELTA N =	.1115	.366	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .382 FEET
Y/NORTH DIRECTION: .364 FEET

Map D-3

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE MIDDLE ONE-THIRD OF THE REGION—WAUKESHA AND MILWAUKEE COUNTIES



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: MIDDLESD.395
RESULTS: MIDDLE.B03

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - MIDDLE 1/3: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
304	X =	2560313.886	.053	E =	770772.0860	.0200	VIRMOND
	Y =	448430.934	.053	N =	136684.7430	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4404	X =	2328463.920	.132	E =	700104.6080	.1000	COLD SPRING
	Y =	325928.150	.132	N =	99345.4340	.1000	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4406	X =	2557875.330	.053	E =	770029.4550	.0200	CARROLVILLE NB
	Y =	345504.360	.053	N =	105313.2660	.0200	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4423	X =	2392112.960	.132	E =	719505.3190	.1000	ASHIPPUN
	Y =	465719.370	.132	N =	141953.5560	.1000	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4429	X =	2538918.420	.132	E =	764250.9750	.1000	BROWN DEER
	Y =	435628.950	.132	N =	132782.6890	.1000	
4432	X =	2564093.180	.053	E =	771924.0360	.0200	FOX
	Y =	432631.950	.053	N =	131869.4250	.0200	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4442	X =	2400548.808	.053	E =	722076.1330	.0200	MONTEREY
	Y =	428960.967	.053	N =	130749.9490	.0200	
4444	X =	2481761.850	.053	E =	746829.8130	.0200	RICHFIELD
	Y =	459998.280	.053	N =	140210.1830	.0200	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
4466	X =	2579157.880	.053	E =	776516.5670	.0200	BUCYRUS
	Y =	321418.380	.053	N =	97972.0140	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4473	X =	2363539.730	.053	E =	710795.7840	.0200	CONCORD
	Y =	392609.860	.053	N =	119669.6990	.0200	
4474	X =	2523450.530	.132	E =	759536.7380	.1000	CORNERS
	Y =	344502.850	.132	N =	105007.8540	.1000	
4475	X =	2576732.680	.053	E =	775777.1010	.0200	CUDAHY
	Y =	352803.850	.053	N =	107538.2870	.0200	
4477	X =	2525113.200	.132	E =	760043.2360	.1000	CURTIS WRIGHT
	Y =	412870.970	.132	N =	125846.2350	.1000	
4478	X =	2422692.370	.132	E =	728825.8990	.1000	CUSHING
	Y =	388318.970	.132	N =	118361.9260	.1000	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4485	X =	2401868.580	.132	E =	722478.2130	.1000	DOUSMAN
	Y =	364061.140	.132	N =	110968.5080	.1000	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4491	X =	2537715.630	.132	E =	763884.6910	.1000	EDGERTON
	Y =	353578.050	.132	N =	107774.0360	.1000	
4495	X =	2500294.520	.053	E =	752478.5420	.0200	FAIRVIEW
	Y =	403199.530	.053	N =	122898.2420	.0200	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4501	X =	2560536.810	.132	E =	770840.3680	.1000	GAS
	Y =	385819.730	.132	N =	117601.3510	.1000	
4503	X =	2578536.990	.132	E =	776327.1300	.1000	GRANT PARK
	Y =	340375.100	.132	N =	103750.0290	.1000	
4504	X =	2540652.260	.053	E =	764779.6940	.0200	HALBACH
	Y =	367523.760	.053	N =	112024.6890	.0200	
4505	X =	2519676.420	.053	E =	758386.4440	.0200	HALES
	Y =	342172.580	.053	N =	104297.5860	.0200	
4507	X =	2350417.840	.132	E =	706795.9510	.1000	HEBRON (WIS)
	Y =	337135.190	.132	N =	102761.5710	.1000	
4510	X =	2563997.420	.132	E =	771895.6890	.1000	HUSHER
	Y =	303942.940	.132	N =	92645.4130	.1000	
4513	X =	2366580.838	.132	E =	711722.9320	.1000	IXONIA
	Y =	408317.936	.132	N =	124458.0010	.1000	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4516	X =	2529746.890	.053	E =	761455.6360	.0200	KEEFE
	Y =	400880.440	.053	N =	122191.5690	.0200	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4524	X =	2491874.170	.132	E =	749912.0240	.1000	LANNON
	Y =	418620.390	.132	N =	127598.3980	.1000	
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4527	X =	2374744.440	.053	E =	714211.2320	.0100	LEBANON RESET
	Y =	468368.970	.053	N =	142760.8110	.0100	
4528	X =	2332741.970	.132	E =	701408.5840	.1000	LYLA
	Y =	303993.410	.132	N =	92659.7460	.1000	
4530	X =	2561455.230	.132	E =	771120.2960	.1000	MAITLAND
	Y =	382858.510	.132	N =	116698.8210	.1000	
4531	X =	2527249.510	.053	E =	760694.5640	.0200	MATTHIAS
	Y =	366063.370	.053	N =	111579.4940	.0200	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4533	X =	2560686.630	.053	E =	770885.7000	.0200	MEQUON USLS
	Y =	447920.170	.053	N =	136529.0880	.0200	
4536	X =	2513320.190	.132	E =	756448.6910	.1000	MILLROAD
	Y =	419802.580	.132	N =	127958.9510	.1000	
4537	X =	2561841.970	.132	E =	771238.3980	.1000	MITCHELL
	Y =	356460.760	.132	N =	108652.7940	.1000	
4539	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4541	X =	2541685.610	.053	E =	765094.5380	.0200	NORTH
	Y =	393567.120	.053	N =	119962.7010	.0200	
4542	X =	2549168.320	.132	E =	767375.6590	.1000	OAK RESET
	Y =	331559.880	.132	N =	101062.9490	.1000	
4543	X =	2373526.700	.053	E =	713839.7410	.0200	OAK HILL
	Y =	348327.870	.053	N =	106172.9670	.0200	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4545	X =	2495538.290	.132	E =	751028.9960	.0200	OBSERVATORY
	Y =	358581.020	.132	N =	109298.8140	.0200	
4546	X =	2405080.555	.132	E =	723457.4080	.0200	OCONOMOWOC
	Y =	407746.396	.132	N =	124283.8070	.0200	
4549	X =	2306773.690	.132	E =	693493.3820	.1000	OTTER-2
	Y =	305066.310	.132	N =	92986.6610	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4554	X =	2428672.940	.053	E =	730648.4240	.0200	PONY
	Y =	337627.040	.053	N =	102911.6720	.0200	
4556	X =	2358060.960	.053	E =	709126.0430	.0200	RANDALL
	Y =	460100.760	.053	N =	140240.5520	.0200	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4562	X =	2368134.700	.132	E =	712196.2280	.1000	ROME
	Y =	368969.790	.132	N =	112464.5050	.1000	
4565	X =	2556635.800	.053	E =	769651.3750	.0200	SCHROEDER
	Y =	385466.540	.053	N =	117493.7080	.0200	
4566	X =	2327656.870	.132	E =	699858.6190	.1000	SHADE
	Y =	323208.210	.132	N =	98516.4130	.1000	
4567	X =	2565273.710	.053	E =	772284.0250	.0200	SHOREWOOD
	Y =	404703.670	.053	N =	123357.0380	.0200	
4569	X =	2462533.570	.053	E =	740969.0500	.0200	SKI
	Y =	417368.330	.053	N =	127216.7540	.0200	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4571	X =	2317307.690	.132	E =	696704.1500	.1000	STAR
	Y =	321003.830	.132	N =	97844.4720	.1000	
4572	X =	2390732.575	.132	E =	719084.1300	.1000	STOCK
	Y =	390553.641	.132	N =	119043.3700	.1000	
4574	X =	2510599.280	.132	E =	755619.4340	.0200	SUNNYSLOPE
	Y =	379356.060	.132	N =	115631.0630	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4577	X =	2550620.710	.132	E =	767818.1660	.1000	VICTORY
	Y =	348088.590	.132	N =	106100.9540	.1000	
4579	X =	2560384.200	.132	E =	770794.3020	.1000	VOR
	Y =	323532.200	.132	N =	98616.1510	.1000	
4580	X =	2458029.980	.132	E =	739596.3470	.1000	VOR MKE -2
	Y =	411816.710	.132	N =	125524.5790	.1000	
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	
4585	X =	2526967.310	.132	E =	760608.4470	.1000	WAUWA
	Y =	384787.130	.132	N =	117286.4820	.1000	
4587	X =	2338046.620	.053	E =	703025.4200	.0200	WHITEWATER
	Y =	309303.170	.053	N =	94278.1480	.0200	
4589	X =	2598850.570	.053	E =	782519.1810	.0200	WIND POINT
	Y =	295780.660	.053	N =	90157.6530	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4527	LEBANON RESET	4442	MONTEREY
4437	HOLY HILL	4540	NEW LIBSON RESET
1004	GERMANTOWN	304	VIRMOND
4411	CONCORD GPS	4482	DELAFIELD
4495	FAIRVIEW	4516	KEEFE
4567	SHOREWOOD	4543	OAK HILL
4554	PONY	4539	NEW BERLIN
4504	HALBACH	4475	CUDAHY
4521	LAGRANGE	4583	WATERFORD
4558	RAYMOND	4589	WIND POINT

NORTHING TRANSLATION: NT = -5.7711 METERS
EASTING TRANSLATION: ET = -9605.0491 METERS
SCALE: S = .304798160011
ROTATION: THETA = -.000012523974 RADIANS
0 0 -2.583255 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4527	E =	714211.232	714210.899	DELTA E =	.3332	1.093	LEBANON RESET
	N =	142760.811	142761.294	DELTA N =	-.4832	-1.585	
4442	E =	722076.133	722076.173	DELTA E =	-.0401	-.132	MONTEREY
	N =	130749.949	130749.906	DELTA N =	.0431	.141	
4437	E =	735720.585	735720.226	DELTA E =	.3595	1.179	HOLY HILL
	N =	140003.362	140003.512	DELTA N =	-.1501	-.493	
4540	E =	746491.568	746491.543	DELTA E =	.0245	.080	NEW LIBSON RESET
	N =	128003.250	128003.289	DELTA N =	-.0393	-.129	
1004	E =	756662.381	756662.295	DELTA E =	.0856	.281	GERMANTOWN
	N =	138211.078	138211.256	DELTA N =	-.1783	-.585	
304	E =	770772.086	770772.201	DELTA E =	-.1145	-.376	VIRMOND
	N =	136684.743	136684.926	DELTA N =	-.1828	-.600	
4411	E =	714902.335	714902.525	DELTA E =	-.1901	-.624	CONCORD GPS
	N =	120346.789	120346.786	DELTA N =	.0026	.009	
4482	E =	730976.818	730976.718	DELTA E =	.0998	.328	DELAFIELD
	N =	115961.492	115961.364	DELTA N =	.1280	.420	
4495	E =	752478.542	752478.581	DELTA E =	-.0389	-.128	FAIRVIEW
	N =	122898.242	122898.248	DELTA N =	-.0061	-.020	
4516	E =	761455.636	761455.618	DELTA E =	.0181	.059	KEEFE
	N =	122191.569	122191.506	DELTA N =	.0628	.206	
4567	E =	772284.025	772284.113	DELTA E =	-.0877	-.288	SHOREWOOD
	N =	123357.038	123356.955	DELTA N =	.0828	.272	
4543	E =	713839.741	713840.192	DELTA E =	-.4511	-1.480	OAK HILL
	N =	106172.967	106172.983	DELTA N =	-.0162	-.053	
4554	E =	730648.424	730648.705	DELTA E =	-.2814	-.923	PONY
	N =	102911.672	102911.600	DELTA N =	.0716	.235	
4539	E =	748257.816	748257.906	DELTA E =	-.0896	-.294	NEW BERLIN
	N =	109600.685	109600.449	DELTA N =	.2361	.775	
4504	E =	764779.694	764779.682	DELTA E =	.0120	.039	HALBACH
	N =	112024.689	112024.493	DELTA N =	.1959	.643	
4475	E =	775777.101	775776.984	DELTA E =	.1172	.385	CUDAHY
	N =	107538.287	107538.029	DELTA N =	.2577	.845	
4521	E =	711953.843	711954.549	DELTA E =	-.7058	-2.316	LAGRANGE
	N =	91110.021	91110.118	DELTA N =	-.0970	-.318	
4583	E =	744746.022	744746.158	DELTA E =	-.1365	-.448	WATERFORD
	N =	89633.012	89632.934	DELTA N =	.0778	.255	
4558	E =	765727.014	765726.841	DELTA E =	.1729	.567	RAYMOND
	N =	93377.719	93377.588	DELTA N =	.1315	.431	
4589	E =	782519.181	782518.694	DELTA E =	.4873	1.599	WIND POINT
	N =	90157.653	90157.550	DELTA N =	.1026	.337	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
305	E =	749912.023	749912.015	DELTA E =	.0083	.027	LANNON
	N =	127598.398	127598.474	DELTA N =	-.0758	-.249	
1008	E =	765434.573	765434.591	DELTA E =	-.0182	-.060	TRIPOLI
	N =	130076.373	130076.406	DELTA N =	-.0335	-.110	
4404	E =	700104.608	700105.225	DELTA E =	-.6172	-2.025	COLD SPRING
	N =	99345.434	99345.418	DELTA N =	.0163	.053	
4405	E =	748257.816	748257.906	DELTA E =	-.0896	-.294	NEW BERLIN
	N =	109600.685	109600.449	DELTA N =	.2361	.775	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4406	E =	770029.455	770029.326	DELTA E =	.1289	.423	CARROLVILLE NB
	N =	105313.266	105313.086	DELTA N =	.1798	.590	
4412	E =	760211.603	760211.462	DELTA E =	.1410	.463	MILWAUKEE GPS
	N =	117621.111	117620.953	DELTA N =	.1581	.519	
4423	E =	719505.319	719504.802	DELTA E =	.5172	1.697	ASHIPPUN
	N =	141953.556	141953.767	DELTA N =	-.2113	-.693	
4424	E =	756461.978	756461.928	DELTA E =	.0501	.164	BAILEY
	N =	132571.880	132572.009	DELTA N =	-.1294	-.425	
4429	E =	764250.975	764250.951	DELTA E =	.0242	.080	BROWN DEER
	N =	132782.689	132782.823	DELTA N =	-.1341	-.440	
4432	E =	771924.036	771924.183	DELTA E =	-.1467	-.481	FOX
	N =	131869.425	131869.439	DELTA N =	-.0141	-.046	
4444	E =	746829.813	746829.640	DELTA E =	.1726	.566	RICHFIELD
	N =	140210.183	140210.332	DELTA N =	-.1488	-.488	
4465	E =	731301.820	731301.614	DELTA E =	.2057	.675	BRUMDER
	N =	127186.236	127186.639	DELTA N =	-.4033	-1.323	
4466	E =	776516.567	776516.300	DELTA E =	.2669	.876	BUCYRUS
	N =	97972.014	97971.805	DELTA N =	.2089	.685	
4469	E =	758609.708	758609.673	DELTA E =	.0351	.115	CAPE
	N =	92408.799	92408.679	DELTA N =	.1199	.393	
4473	E =	710795.784	710796.013	DELTA E =	-.2290	-.751	CONCORD
	N =	119669.699	119670.014	DELTA N =	-.3151	-1.034	
4474	E =	759536.738	759536.714	DELTA E =	.0238	.078	CORNERS
	N =	105007.854	105007.696	DELTA N =	.1576	.517	
4477	E =	760043.236	760043.232	DELTA E =	.0040	.013	CURTIS WRIGHT
	N =	125846.235	125846.180	DELTA N =	.0550	.181	
4478	E =	728825.899	728825.645	DELTA E =	.2538	.833	CUSHING
	N =	118361.926	118362.385	DELTA N =	-.4586	-1.504	
4485	E =	722478.213	722478.685	DELTA E =	-.4719	-1.548	DOUSMAN
	N =	110968.508	110968.563	DELTA N =	-.0551	-.181	
4489	E =	723714.090	723714.585	DELTA E =	-.4948	-1.623	EAGLE
	N =	98945.102	98945.126	DELTA N =	-.0243	-.080	
4491	E =	763884.691	763884.656	DELTA E =	.0352	.115	EDGERTON
	N =	107774.036	107773.855	DELTA N =	.1809	.593	
4496	E =	732083.694	732083.923	DELTA E =	-.2292	-.752	FAN
	N =	110987.757	110987.505	DELTA N =	.2523	.828	
4500	E =	761243.347	761243.199	DELTA E =	.1477	.484	FRANKLIN
	N =	99208.427	99208.338	DELTA N =	.0886	.291	
4501	E =	770840.368	770840.386	DELTA E =	-.0184	-.060	GAS
	N =	117601.351	117601.147	DELTA N =	.2040	.669	
4503	E =	776327.130	776326.982	DELTA E =	.1484	.487	GRANT PARK
	N =	103750.029	103749.776	DELTA N =	.2529	.830	
4505	E =	758386.444	758386.381	DELTA E =	.0627	.206	HALES
	N =	104297.586	104297.420	DELTA N =	.1660	.545	
4507	E =	706795.951	706796.697	DELTA E =	-.7458	-2.447	HEBRON (WIS)
	N =	102761.571	102761.387	DELTA N =	.1843	.605	
4510	E =	771895.689	771895.487	DELTA E =	.2025	.664	HUSHER
	N =	92645.413	92645.265	DELTA N =	.1477	.485	
4513	E =	711722.932	711722.877	DELTA E =	.0549	.180	IXONIA
	N =	124458.001	124457.818	DELTA N =	.1826	.599	
4514	E =	732399.554	732399.933	DELTA E =	-.3785	-1.242	JERICHO
	N =	98521.960	98521.611	DELTA N =	.3486	1.144	
4524	E =	749912.024	749912.015	DELTA E =	.0091	.030	LANNON
	N =	127598.398	127598.466	DELTA N =	-.0677	-.222	
4525	E =	730966.931	730967.093	DELTA E =	-.1618	-.531	LAPHAM PEAK
	N =	115944.626	115944.603	DELTA N =	.0230	.075	
4528	E =	701408.584	701409.251	DELTA E =	-.6667	-2.187	LYLA
	N =	92659.746	92659.766	DELTA N =	-.0197	-.065	
4530	E =	771120.296	771120.330	DELTA E =	-.0344	-.113	MAITLAND
	N =	116698.821	116698.576	DELTA N =	.2449	.803	
4531	E =	760694.564	760694.554	DELTA E =	.0100	.033	MATTHIAS
	N =	111579.494	111579.318	DELTA N =	.1762	.578	
4532	E =	739842.408	739842.352	DELTA E =	.0562	.185	MEADOW
	N =	117665.311	117665.242	DELTA N =	.0691	.227	
4533	E =	770885.700	770885.814	DELTA E =	-.1142	-.375	MEQUON USLS
	N =	136529.088	136529.247	DELTA N =	-.1594	-.523	
4536	E =	756448.691	756448.718	DELTA E =	-.0268	-.088	MILLROAD
	N =	127958.951	127958.877	DELTA N =	.0741	.243	
4537	E =	771238.398	771238.309	DELTA E =	.0892	.293	MITCHELL
	N =	108652.794	108652.592	DELTA N =	.2021	.663	

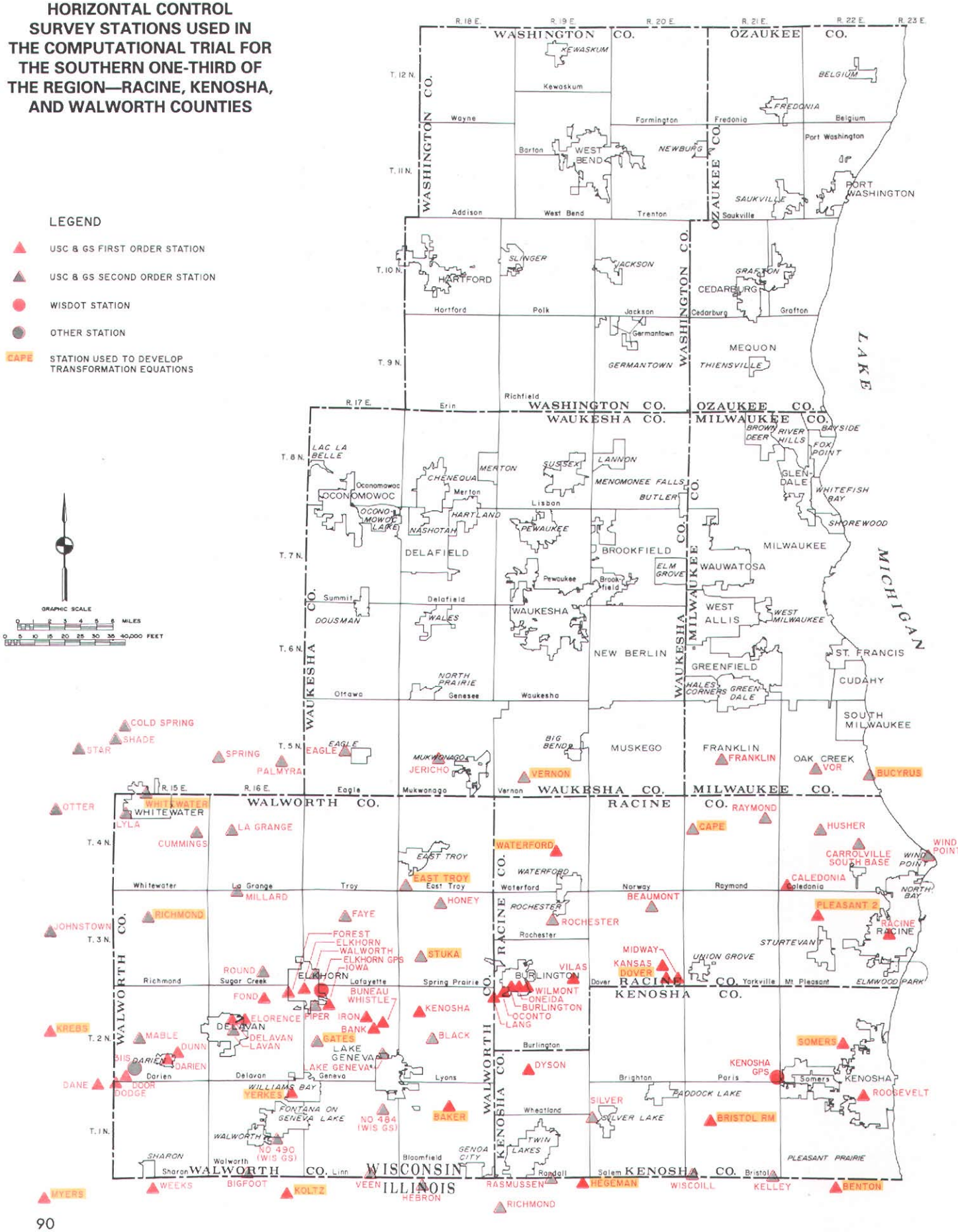
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4541	E =	765094.538	765094.546	DELTA E =	-.0077	-.025	NORTH
	N =	119962.701	119962.465	DELTA N =	.2357	.773	
4542	E =	767375.659	767375.499	DELTA E =	.1603	.526	OAK RESET
	N =	101062.949	101062.801	DELTA N =	.1478	.485	
4544	E =	744865.572	744865.611	DELTA E =	-.0388	-.127	OAK RIDGE
	N =	116734.940	116734.884	DELTA N =	.0560	.184	
4545	E =	751028.996	751029.061	DELTA E =	-.0651	-.214	OBSERVATORY
	N =	109298.814	109298.590	DELTA N =	.2238	.734	
4546	E =	723457.408	723457.522	DELTA E =	-.1142	-.375	OCONOMOWOC
	N =	124283.807	124283.761	DELTA N =	.0460	.151	
4549	E =	693493.382	693494.163	DELTA E =	-.7806	-2.561	OTTER-2
	N =	92986.661	92986.684	DELTA N =	-.0235	-.077	
4550	E =	717503.939	717504.452	DELTA E =	-.5133	-1.684	PALMYRA
	N =	97563.457	97563.456	DELTA N =	.0006	.002	
4551	E =	744529.284	744529.294	DELTA E =	-.0096	-.031	PEWAUKEE
	N =	121596.192	121596.151	DELTA N =	.0406	.133	
4556	E =	709126.043	709125.836	DELTA E =	.2067	.678	RANDALL
	N =	140240.552	140241.095	DELTA N =	-.5434	-1.783	
4562	E =	712196.228	712196.642	DELTA E =	-.4136	-1.357	ROME
	N =	112464.505	112464.582	DELTA N =	-.0768	-.252	
4565	E =	769651.375	769651.367	DELTA E =	.0079	.026	SCHROEDER
	N =	117493.708	117493.480	DELTA N =	.2276	.747	
4566	E =	699858.619	699859.248	DELTA E =	-.6292	-2.064	SHADE
	N =	98516.413	98516.382	DELTA N =	.0311	.102	
4569	E =	740969.050	740969.059	DELTA E =	-.0087	-.029	SKI
	N =	127216.754	127216.728	DELTA N =	.0259	.085	
4570	E =	710608.107	710608.801	DELTA E =	-.6943	-2.278	SPRING-2
	N =	97409.453	97409.420	DELTA N =	.0335	.110	
4571	E =	696704.150	696704.846	DELTA E =	-.6956	-2.282	STAR
	N =	97844.472	97844.451	DELTA N =	.0205	.067	
4572	E =	719084.130	719084.350	DELTA E =	-.2199	-.722	STOCK
	N =	119043.370	119043.386	DELTA N =	-.0162	-.053	
4574	E =	755619.434	755619.544	DELTA E =	-.1098	-.360	SUNNYSLOPE
	N =	115631.063	115630.842	DELTA N =	.2214	.726	
4576	E =	741622.796	741622.950	DELTA E =	-.1541	-.506	VERNON
	N =	96654.129	96653.927	DELTA N =	.2022	.663	
4577	E =	767818.166	767818.121	DELTA E =	.0446	.146	VICTORY
	N =	106100.954	106100.727	DELTA N =	.2269	.744	
4579	E =	770794.302	770794.109	DELTA E =	.1931	.633	VOR
	N =	98616.151	98616.022	DELTA N =	.1291	.424	
4580	E =	739596.347	739596.394	DELTA E =	-.0470	-.154	VOR MKE -2
	N =	125524.579	125524.587	DELTA N =	-.0084	-.027	
4581	E =	732535.766	732536.003	DELTA E =	-.2368	-.777	WALES
	N =	111237.975	111237.728	DELTA N =	.2467	.809	
4584	E =	744432.284	744432.328	DELTA E =	-.0436	-.143	WAUKE
	N =	117255.258	117255.193	DELTA N =	.0646	.212	
4585	E =	760608.447	760608.469	DELTA E =	-.0215	-.071	WAUWA
	N =	117286.482	117286.284	DELTA N =	.1977	.649	
4587	E =	703025.420	703026.078	DELTA E =	-.6580	-2.159	WHITEWATER
	N =	94278.148	94278.191	DELTA N =	-.0430	-.141	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .933 FEET
Y/NORTH DIRECTION: .577 FEET

Map D-4

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE SOUTHERN ONE-THIRD OF THE REGION—RACINE, KENOSHA, AND WALWORTH COUNTIES



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: SOUTH-SD.395
RESULTS: SOUTH.B04

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - SOUTH 1/3: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4404	X =	2328463.920	.132	E =	700104.6080	.1000	COLD SPRING
	Y =	325928.150	.132	N =	99345.4340	.1000	
4407	X =	2344993.210	.026	E =	705142.7980	.0100	WEEKS
	Y =	177691.150	.026	N =	54162.9040	.0100	
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4413	X =	2335430.946	.053	E =	702228.3310	.0010	311S
	Y =	216819.675	.053	N =	66089.3330	.0010	
4414	X =	2399199.486	.053	E =	721664.9810	.0010	ELKHORN GPS
	Y =	245976.732	.053	N =	74976.4350	.0010	
4415	X =	2550478.433	.053	E =	767775.3090	.0010	KENOSHA GPS
	Y =	222012.587	.053	N =	67672.7160	.0010	
4416	X =	2571723.950	.026	E =	774251.0300	.0010	SOMERS RESET
	Y =	233048.660	.026	N =	71036.6060	.0010	
4456	X =	2419453.290	.053	E =	727838.1480	.0200	484 RESET
	Y =	207188.720	.053	N =	63154.0100	.0200	
4457	X =	2384794.750	.053	E =	717274.2200	.0200	490
	Y =	196817.740	.053	N =	59992.6920	.0200	
4458	X =	2441249.950	.026	E =	734481.7570	.0100	BAKER
	Y =	207140.680	.026	N =	63139.3800	.0100	
4459	X =	2416224.140	.026	E =	726854.1040	.0200	BANK
	Y =	236539.250	.026	N =	72100.1550	.0200	
4460	X =	2508227.690	.132	E =	754896.8990	.1000	BEAUMONT
	Y =	276268.340	.132	N =	84209.8940	.1000	
4461	X =	2572193.230	.026	E =	774394.0630	.0100	BENTON
	Y =	183720.500	.026	N =	56001.0210	.0100	
4462	X =	2375925.620	.132	E =	714571.0390	.1000	BIGFOOT
	Y =	183617.690	.132	N =	55969.2830	.1000	
4463	X =	2436327.170	.132	E =	732981.4510	.1000	BLACK
	Y =	229135.950	.132	N =	69843.4650	.1000	
4464	X =	2529345.040	.026	E =	761333.6460	.0100	BRISTOL
	Y =	205835.410	.026	N =	62741.7290	.0100	
4466	X =	2579157.880	.053	E =	776516.5670	.0200	BUCYRUS
	Y =	321418.380	.053	N =	97972.0140	.0200	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4468	X =	2551538.560	.053	E =	768098.3020	.0200	CALEDONIA
	Y =	284218.350	.053	N =	86633.2920	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4471	X =	2576343.080	.053	E =	775658.7720	.0200	CARROLVILLE SB
	Y =	297856.700	.053	N =	90790.3400	.0200	
4479	X =	2325217.660	.026	E =	699115.1910	.0200	DANE
	Y =	212885.550	.026	N =	64890.0500	.0200	
4480	X =	2347774.840	.026	E =	705990.5270	.0200	DARIEN
	Y =	222034.620	.026	N =	67678.7820	.0200	
4481	X =	2369863.480	.026	E =	712723.1330	.0200	DELAVAN
	Y =	234600.360	.026	N =	71508.8730	.0200	
4483	X =	2330572.530	.026	E =	700747.3350	.0200	DODGE
	Y =	214167.180	.026	N =	65280.7250	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4484	X =	2333391.270	.026	E =	701606.4770	.0200	DOOR
	Y =	214954.040	.026	N =	65520.5640	.0200	
4486	X =	2515200.170	.026	E =	757022.1180	.0100	DOVER RESET
	Y =	251454.970	.026	N =	76646.7620	.0100	
4487	X =	2350106.820	.026	E =	706701.2860	.0200	DUNN-2
	Y =	223765.300	.026	N =	68206.2760	.0200	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4490	X =	2425814.000	.053	E =	729776.9940	.0200	EAST TROY
	Y =	281006.370	.053	N =	85653.6490	.0200	
4492	X =	2391941.540	.026	E =	719452.5900	.0200	ELKHORN
	Y =	246201.820	.026	N =	75045.0420	.0200	
4493	X =	2372488.550	.026	E =	713523.2700	.0200	ELORENCE
	Y =	236484.540	.026	N =	72083.1840	.0200	
4494	X =	2380547.630	.026	E =	715979.7160	.0200	FOND
	Y =	242185.230	.026	N =	73820.7640	.0200	
4497	X =	2407247.280	.132	E =	724117.7730	.1000	FAYE
	Y =	271324.780	.132	N =	82702.7090	.1000	
4498	X =	2387871.210	.026	E =	718211.9590	.0200	FOREST
	Y =	244590.290	.026	N =	74553.8440	.0200	
4499	X =	2401585.920	.026	E =	722392.2500	.0200	IOWA
	Y =	242625.450	.026	N =	73955.0540	.0200	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4502	X =	2395248.360	.026	E =	720460.5270	.0100	GATES
	Y =	228622.700	.026	N =	69686.9730	.0100	
4506	X =	2433266.170	.132	E =	732048.3510	.1000	HEBRON (ILL)
	Y =	181595.160	.132	N =	55352.8910	.1000	
4508	X =	2487325.560	.026	E =	748525.8400	.0100	HEGEMAN
	Y =	185239.840	.026	N =	56463.9770	.0100	
4509	X =	2437484.360	.132	E =	733334.1290	.1000	HONEY
	Y =	274604.430	.132	N =	83702.3620	.1000	
4510	X =	2563997.420	.132	E =	771895.6890	.1000	HUSHER
	Y =	303942.940	.132	N =	92645.4130	.1000	
4511	X =	2414841.960	.026	E =	726432.7900	.0200	IRON
	Y =	237823.700	.026	N =	72491.6380	.0200	
4512	X =	2514682.480	.026	E =	756864.3420	.0200	KANSAS
	Y =	255477.050	.026	N =	77872.6910	.0200	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4515	X =	2306936.640	.053	E =	693542.9840	.0200	JOHNSTOWN
	Y =	263130.510	.053	N =	80204.6770	.0200	
4517	X =	2550594.840	.132	E =	767810.7240	.1000	KELLEY
	Y =	187083.730	.132	N =	57026.1160	.1000	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4519	X =	2389236.530	.026	E =	718628.0810	.0100	KOLTZ
	Y =	174721.190	.026	N =	53257.7300	.0100	
4520	X =	2306848.330	.026	E =	693516.1230	.0100	KREBS
	Y =	229641.230	.026	N =	69997.1260	.0100	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4522	X =	2419897.140	.132	E =	727973.5650	.1000	LAKE GENEVA
	Y =	226071.750	.132	N =	68909.4580	.1000	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4526	X =	2368186.670	.132	E =	712212.1090	.1000	LAVAN
	Y =	231849.520	.132	N =	70670.4460	.1000	
4528	X =	2332741.970	.132	E =	701408.5840	.1000	LYLA
	Y =	303993.410	.132	N =	92659.7460	.1000	
4529	X =	2338566.700	.132	E =	703183.8480	.1000	MABLE
	Y =	228727.130	.132	N =	69718.5980	.1000	
4534	X =	2516101.410	.026	E =	757296.8450	.0200	MIDWAY RESET
	Y =	252222.320	.026	N =	76880.6550	.0200	
4535	X =	2369895.270	.132	E =	712732.7910	.1000	MILLARD
	Y =	278429.300	.132	N =	84867.8910	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4538	X =	2302299.420	.026	E =	692129.8280	.0100	MYERS
	Y =	175017.600	.026	N =	53347.8640	.0100	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4549	X =	2306773.690	.132	E =	693493.3820	.1000	OTTER-2
	Y =	305066.310	.132	N =	92986.6610	.1000	
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4552	X =	2397396.810	.132	E =	721115.3250	.1000	PIPER
	Y =	240585.950	.132	N =	73333.3210	.1000	
4553	X =	2562969.770	.026	E =	771582.6920	.0100	PLEASANT
	Y =	275128.360	.026	N =	83862.6310	.0100	
4555	X =	2587083.540	.026	E =	778932.5690	.0100	RACINE
	Y =	269538.570	.026	N =	82158.8750	.0100	
4557	X =	2476856.570	.053	E =	745334.8300	.0200	RASMUSSEN
	Y =	185464.090	.053	N =	56532.2480	.0200	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4559	X =	2462492.000	.053	E =	740956.4240	.0200	RICHMOND (ILL)
	Y =	174424.070	.053	N =	53167.1660	.0200	
4560	X =	2338683.070	.053	E =	703219.3160	.0200	RICHMOND (WIS)
	Y =	268341.930	.053	N =	81793.1900	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	
4563	X =	2579267.260	.026	E =	776550.2920	.0100	ROOSEVELT
	Y =	215555.580	.026	N =	65704.6750	.0100	
4564	X =	2379121.760	.053	E =	715545.0610	.0200	ROUND
	Y =	250925.710	.053	N =	76484.8630	.0200	
4566	X =	2327656.870	.132	E =	699858.6190	.1000	SHADE
	Y =	323208.210	.132	N =	98516.4130	.1000	
4568	X =	2488304.690	.026	E =	748824.2910	.0100	SILVER
	Y =	206176.260	.026	N =	62845.5490	.0100	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4571	X =	2317307.690	.132	E =	696704.1500	.1000	STAR
	Y =	321003.830	.132	N =	97844.4720	.1000	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	
4575	X =	2416417.080	.053	E =	726913.0190	.0200	VEEN
	Y =	184161.710	.053	N =	56135.2570	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4579	X =	2560384.200	.132	E =	770794.3020	.1000	VOR
	Y =	323532.200	.132	N =	98616.1510	.1000	
4582	X =	2394755.710	.132	E =	720310.3090	.1000	WALWORTH
	Y =	251048.000	.132	N =	76522.1990	.1000	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4586	X =	2417660.900	.026	E =	727292.0360	.0200	WHISTLE
	Y =	236147.060	.026	N =	71980.6150	.0200	
4587	X =	2338046.620	.053	E =	703025.4200	.0200	WHITEWATER
	Y =	309303.170	.053	N =	94278.1480	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	
4589	X =	2598850.570	.053	E =	782519.1810	.0200	WIND POINT
	Y =	295780.660	.053	N =	90157.6530	.0200	
4590	X =	2525653.530	.053	E =	760208.4660	.0100	WISCOLL
	Y =	186760.160	.053	N =	56927.3880	.0100	
4591	X =	2389084.960	.026	E =	718581.8830	.0100	YERKES
	Y =	211590.900	.026	N =	64495.5620	.0100	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4538	MYERS	4520	KREBS
4560	RICHMOND (WIS)	4587	WHITEWATER
4519	KOLTZ	4591	YERKES
4502	GATES	4458	BAKER
4573	STUKA	4490	EAST TROY
4583	WATERFORD	4576	VERNON
4508	HEGEMAN	4408	BRISTOL RM
4486	DOVER RESET	4469	CAPE
4461	BENTON	4416	SOMERS RESET
4553	PLEASANT	4466	BUCYRUS

NORTHING TRANSLATION: NT = -4.2262 METERS
EASTING TRANSLATION: ET = -9618.1233 METERS
SCALE: S = .304803175597
ROTATION: THETA = -.000008648598 RADIANS
0 0 -1.783901 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4538	E =	692129.828	692129.590	DELTA E =	.2383	.782	MYERS
	N =	53347.864	53347.763	DELTA N =	.1008	.331	
4520	E =	693516.123	693515.968	DELTA E =	.1550	.509	KREBS
	N =	69997.126	69997.231	DELTA N =	-.1051	-.345	
4560	E =	703219.316	703219.196	DELTA E =	.1202	.394	RICHMOND (WIS)
	N =	81793.190	81793.411	DELTA N =	-.2213	-.726	
4587	E =	703025.420	703025.096	DELTA E =	.3242	1.064	WHITEWATER
	N =	94278.148	94278.526	DELTA N =	-.3776	-1.239	
4519	E =	718628.081	718628.298	DELTA E =	-.2167	-.711	KOLTZ
	N =	53257.730	53257.646	DELTA N =	.0843	.277	
4591	E =	718581.883	718582.002	DELTA E =	-.1185	-.389	YERKES
	N =	64495.562	64495.650	DELTA N =	-.0880	-.289	
4502	E =	720460.527	720460.581	DELTA E =	-.0535	-.176	GATES
	N =	69686.973	69687.013	DELTA N =	-.0399	-.131	
4458	E =	734481.757	734482.068	DELTA E =	-.3108	-1.020	BAKER
	N =	63139.380	63139.346	DELTA N =	.0337	.111	
4573	E =	731500.802	731500.814	DELTA E =	-.0116	-.038	STUKA
	N =	78858.538	78858.627	DELTA N =	-.0888	-.291	
4490	E =	729776.994	729776.947	DELTA E =	.0474	.156	EAST TROY
	N =	85653.649	85653.802	DELTA N =	-.1535	-.504	
4583	E =	744746.022	744745.845	DELTA E =	.1771	.581	WATERFORD
	N =	89633.012	89633.031	DELTA N =	-.0187	-.061	
4576	E =	741622.796	741622.612	DELTA E =	.1837	.603	VERNON
	N =	96654.129	96654.151	DELTA N =	-.0220	-.072	
4508	E =	748525.840	748526.118	DELTA E =	-.2778	-.912	HEGEMAN
	N =	56463.977	56464.022	DELTA N =	-.0452	-.148	
4408	E =	761342.007	761342.126	DELTA E =	-.1186	-.389	BRISTOL RM
	N =	62757.608	62757.636	DELTA N =	-.0278	-.091	
4486	E =	757022.118	757022.213	DELTA E =	-.0949	-.311	DOVER RESET
	N =	76646.762	76646.678	DELTA N =	.0844	.277	
4469	E =	758609.708	758609.598	DELTA E =	.1098	.360	CAPE
	N =	92408.799	92408.768	DELTA N =	.0314	.103	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4461	E =	774394.063	774394.057	DELTA E =	.0058	.019	BENTON
	N =	56001.021	56001.146	DELTA N =	-.1252	-.411	
4416	E =	774251.030	774250.889	DELTA E =	.1409	.462	SOMERS RESET
	N =	71036.606	71036.525	DELTA N =	.0812	.266	
4553	E =	771582.692	771582.476	DELTA E =	.2157	.708	PLEASANT
	N =	83862.631	83862.528	DELTA N =	.1031	.338	
4466	E =	776516.567	776516.542	DELTA E =	.0254	.083	BUCYRUS
	N =	97972.014	97971.916	DELTA N =	.0983	.323	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4404	E =	700104.608	700104.215	DELTA E =	.3934	1.291	COLD SPRING
	N =	99345.434	99345.847	DELTA N =	-.4131	-1.355	
4407	E =	705142.798	705142.785	DELTA E =	.0125	.041	WEEKS
	N =	54162.904	54162.782	DELTA N =	.1217	.399	
4413	E =	702228.331	702228.074	DELTA E =	.2571	.844	311S
	N =	66089.333	66089.256	DELTA N =	.0772	.253	
4414	E =	721664.981	721664.851	DELTA E =	.1305	.428	ELKHORN GPS
	N =	74976.435	74976.587	DELTA N =	-.1524	-.500	
4415	E =	767775.309	767775.217	DELTA E =	.0919	.301	KENOSHA GPS
	N =	67672.716	67672.639	DELTA N =	.0773	.254	
4456	E =	727838.148	727838.377	DELTA E =	-.2285	-.750	484 RESET
	N =	63154.010	63153.932	DELTA N =	.0784	.257	
4457	E =	717274.220	717274.371	DELTA E =	-.1508	-.495	490
	N =	59992.692	59992.733	DELTA N =	-.0406	-.133	
4459	E =	726854.104	726854.044	DELTA E =	.0600	.197	BANK
	N =	72100.155	72100.058	DELTA N =	.0972	.319	
4460	E =	754896.899	754896.913	DELTA E =	-.0145	-.047	BEAUMONT
	N =	84209.894	84209.853	DELTA N =	.0408	.134	
4462	E =	714571.039	714571.067	DELTA E =	-.0276	-.091	BIGFOOT
	N =	55969.283	55969.292	DELTA N =	-.0090	-.030	
4463	E =	732981.451	732981.531	DELTA E =	-.0799	-.262	BLACK
	N =	69843.465	69843.561	DELTA N =	-.0965	-.316	
4464	E =	761333.646	761333.734	DELTA E =	-.0885	-.290	BRISTOL
	N =	62741.729	62741.728	DELTA N =	.0009	.003	
4467	E =	740864.834	740864.928	DELTA E =	-.0940	-.308	BURLINGTON
	N =	75681.515	75681.284	DELTA N =	.2309	.758	
4468	E =	768098.302	768098.183	DELTA E =	.1188	.390	CALEDONIA
	N =	86633.292	86633.156	DELTA N =	.1364	.447	
4471	E =	775658.772	775658.644	DELTA E =	.1283	.421	CARROLVILLE SB
	N =	90790.340	90790.233	DELTA N =	.1066	.350	
4479	E =	699115.191	699115.042	DELTA E =	.1488	.488	DANE
	N =	64890.050	64890.095	DELTA N =	-.0450	-.148	
4480	E =	705990.527	705990.518	DELTA E =	.0088	.029	DARIEN
	N =	67678.782	67678.820	DELTA N =	-.0381	-.125	
4481	E =	712723.133	712723.173	DELTA E =	-.0397	-.130	DELAVAN
	N =	71508.873	71508.956	DELTA N =	-.0828	-.272	
4483	E =	700747.335	700747.220	DELTA E =	.1148	.376	DODGE
	N =	65280.725	65280.754	DELTA N =	-.0291	-.095	
4484	E =	701606.477	701606.379	DELTA E =	.0979	.321	DOOR
	N =	65520.564	65520.599	DELTA N =	-.0349	-.115	
4487	E =	706701.286	706701.309	DELTA E =	-.0226	-.074	DUNN-2
	N =	68206.276	68206.343	DELTA N =	-.0670	-.220	
4488	E =	742356.324	742356.552	DELTA E =	-.2280	-.748	DYSON
	N =	67983.088	67983.005	DELTA N =	.0829	.272	
4489	E =	723714.090	723713.961	DELTA E =	.1288	.423	EAGLE
	N =	98945.102	98945.458	DELTA N =	-.3556	-1.167	
4492	E =	719452.590	719452.605	DELTA E =	-.0149	-.049	ELKHORN
	N =	75045.042	75045.176	DELTA N =	-.1338	-.439	
4493	E =	713523.270	713523.297	DELTA E =	-.0274	-.090	ELORENCE
	N =	72083.184	72083.267	DELTA N =	-.0827	-.271	
4494	E =	715979.716	715979.716	DELTA E =	.0004	.001	FOND
	N =	73820.764	73820.876	DELTA N =	-.1124	-.369	
4497	E =	724117.773	724117.777	DELTA E =	-.0039	-.013	FAYE
	N =	82702.709	82702.774	DELTA N =	-.0652	-.214	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4498	E =	718211.959	718211.960	DELTA E = -.0007	-.002	FOREST
	N =	74553.844	74553.966	DELTA N = -.1216	-.399	
4499	E =	722392.250	722392.252	DELTA E = -.0020	-.007	IOWA
	N =	73955.054	73955.112	DELTA N = -.0583	-.191	
4500	E =	761243.347	761243.194	DELTA E = .1527	.501	FRANKLIN
	N =	99208.427	99208.529	DELTA N = -.1016	-.333	
4506	E =	732048.351	732048.654	DELTA E = -.3027	-.993	HEBRON (ILL)
	N =	55352.891	55352.970	DELTA N = -.0786	-.258	
4509	E =	733334.129	733334.126	DELTA E = .0028	.009	HONEY
	N =	83702.362	83702.502	DELTA N = -.1396	-.458	
4510	E =	771895.689	771895.631	DELTA E = .0577	.189	HUSHER
	N =	92645.413	92645.306	DELTA N = .1069	.351	
4511	E =	726432.790	726432.748	DELTA E = .0422	.139	IRON
	N =	72491.638	72491.559	DELTA N = .0794	.260	
4512	E =	756864.342	756864.409	DELTA E = -.0668	-.219	KANSAS
	N =	77872.691	77872.619	DELTA N = .0720	.236	
4514	E =	732399.554	732399.450	DELTA E = .1038	.341	JERICHO
	N =	98521.960	98521.902	DELTA N = .0580	.190	
4515	E =	693542.984	693542.797	DELTA E = .1872	.614	JOHNSTOWN
	N =	80204.677	80204.870	DELTA N = -.1932	-.634	
4517	E =	767810.724	767810.790	DELTA E = -.0664	-.218	KELLEY
	N =	57026.116	57026.212	DELTA N = -.0965	-.317	
4518	E =	731224.961	731224.939	DELTA E = .0225	.074	KENOSHA
	N =	72952.590	72952.438	DELTA N = .1519	.498	
4521	E =	711953.843	711953.701	DELTA E = .1417	.465	LAGRANGE
	N =	91110.021	91110.366	DELTA N = -.3449	-1.131	
4522	E =	727973.565	727973.614	DELTA E = -.0486	-.160	LAKE GENEVA
	N =	68909.458	68909.540	DELTA N = -.0823	-.270	
4523	E =	738965.732	738965.824	DELTA E = -.0917	-.301	LANG
	N =	74704.797	74704.526	DELTA N = .2711	.890	
4526	E =	712212.109	712212.083	DELTA E = .0260	.085	LAVAN
	N =	70670.446	70670.487	DELTA N = -.0406	-.133	
4528	E =	701408.584	701408.236	DELTA E = .3483	1.143	LYLA
	N =	92659.746	92660.080	DELTA N = -.3339	-1.096	
4529	E =	703183.848	703183.830	DELTA E = .0177	.058	MABLE
	N =	69718.598	69718.694	DELTA N = -.0961	-.315	
4534	E =	757296.845	757296.912	DELTA E = -.0667	-.219	MIDWAY RESET
	N =	76880.655	76880.571	DELTA N = .0843	.277	
4535	E =	712732.791	712732.747	DELTA E = .0441	.145	MILLARD
	N =	84867.891	84868.156	DELTA N = -.2650	-.869	
4547	E =	739879.449	739879.544	DELTA E = -.0952	-.312	OCONTO
	N =	75081.660	75081.411	DELTA N = .2493	.818	
4548	E =	741414.301	741414.387	DELTA E = -.0865	-.284	ONEIDA
	N =	75690.667	75690.448	DELTA N = .2188	.718	
4549	E =	693493.382	693493.019	DELTA E = .3634	1.192	OTTER-2
	N =	92986.661	92987.035	DELTA N = -.3738	-1.226	
4550	E =	717503.939	717503.721	DELTA E = .2178	.715	PALMYRA
	N =	97563.457	97563.789	DELTA N = -.3320	-1.089	
4552	E =	721115.325	721115.403	DELTA E = -.0784	-.257	PIPER
	N =	73333.321	73333.455	DELTA N = -.1342	-.440	
4555	E =	778932.569	778932.445	DELTA E = .1243	.408	RACINE
	N =	82158.875	82158.806	DELTA N = .0692	.227	
4557	E =	745334.830	745335.136	DELTA E = -.3058	-1.003	RASMUSSEN
	N =	56532.248	56532.347	DELTA N = -.0987	-.324	
4558	E =	765727.014	765726.887	DELTA E = .1267	.416	RAYMOND
	N =	93377.719	93377.664	DELTA N = .0547	.179	
4559	E =	740956.424	740956.798	DELTA E = -.3744	-1.228	RICHMOND (ILL)
	N =	53167.166	53167.276	DELTA N = -.1097	-.360	
4561	E =	744687.945	744687.767	DELTA E = .1785	.586	ROCHESTER
	N =	82717.738	82717.897	DELTA N = -.1586	-.520	
4563	E =	776550.292	776550.160	DELTA E = .1320	.433	ROOSEVELT
	N =	65704.675	65704.598	DELTA N = .0766	.251	
4564	E =	715545.061	715545.083	DELTA E = -.0218	-.072	ROUND
	N =	76484.863	76484.999	DELTA N = -.1357	-.445	
4566	E =	699858.619	699858.230	DELTA E = .3886	1.275	SHADE
	N =	98516.413	98516.799	DELTA N = -.3856	-1.265	
4568	E =	748824.291	748824.505	DELTA E = -.2136	-.701	SILVER
	N =	62845.549	62845.512	DELTA N = .0369	.121	

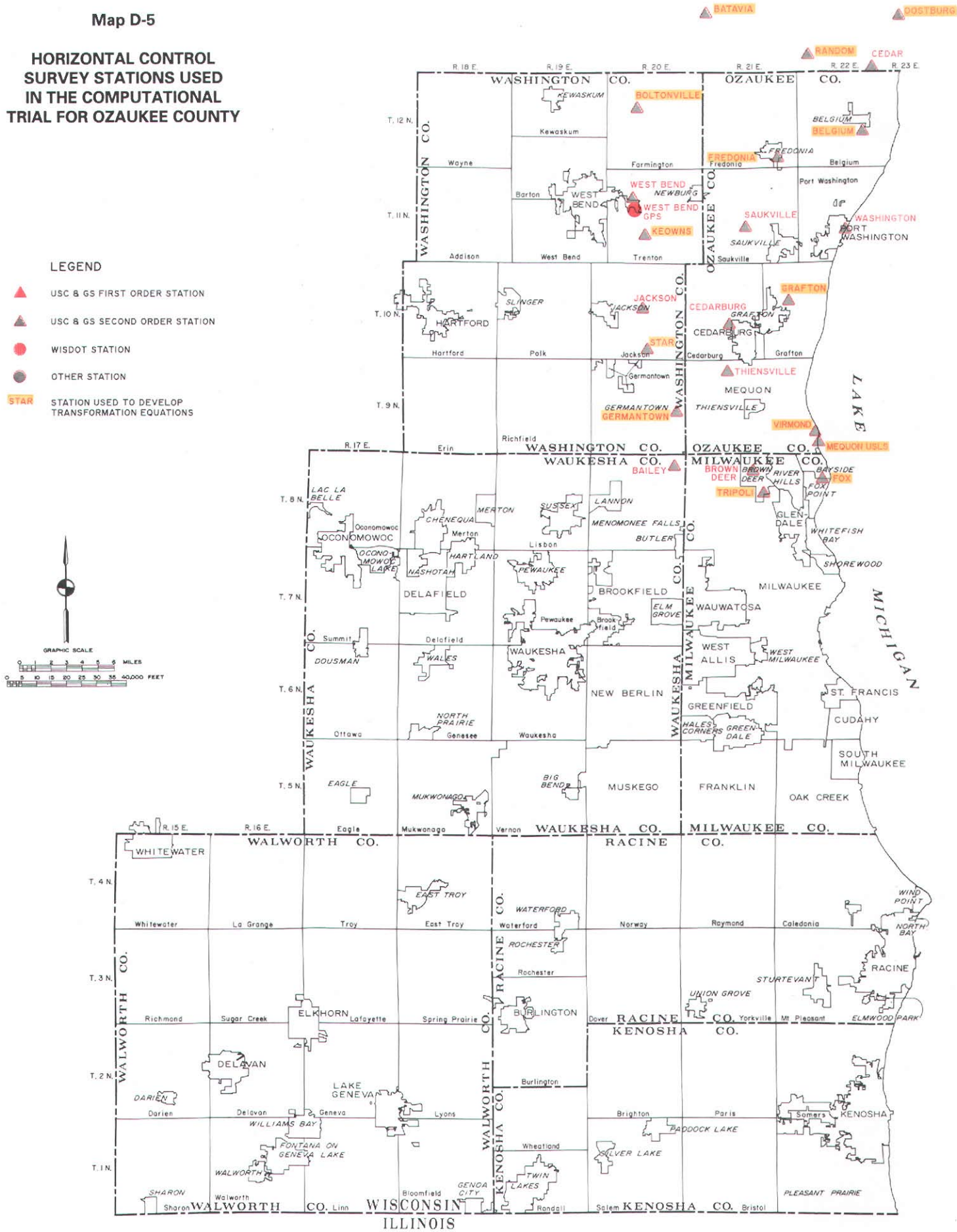
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4570	E =	710608.107	710607.956	DELTA E = .1510	.495	SPRING-2
	N =	97409.453	97409.776	DELTA N = -.3233	-1.061	
4571	E =	696704.150	696703.773	DELTA E = .3767	1.236	STAR
	N =	97844.472	97844.869	DELTA N = -.3973	-1.303	
4575	E =	726913.019	726912.991	DELTA E = .0282	.093	VEEN
	N =	56135.257	56135.218	DELTA N = .0392	.129	
4578	E =	747510.744	747510.807	DELTA E = -.0629	-.206	VILAS
	N =	76483.563	76483.395	DELTA N = .1685	.553	
4579	E =	770794.302	770794.259	DELTA E = .0433	.142	VOR
	N =	98616.151	98616.165	DELTA N = -.0143	-.047	
4582	E =	720310.309	720310.360	DELTA E = -.0511	-.168	WALWORTH
	N =	76522.199	76522.314	DELTA N = -.1153	-.378	
4586	E =	727292.036	727291.974	DELTA E = .0620	.203	WHISTLE
	N =	71980.615	71980.521	DELTA N = .0941	.309	
4588	E =	742065.195	742065.273	DELTA E = -.0783	-.257	WILMONT
	N =	75689.117	75688.890	DELTA N = .2268	.744	
4589	E =	782519.181	782519.004	DELTA E = .1774	.582	WIND POINT
	N =	90157.653	90157.509	DELTA N = .1439	.472	
4590	E =	760208.466	760208.601	DELTA E = -.1348	-.442	WISCOLL
	N =	56927.388	56927.522	DELTA N = -.1336	-.438	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .526 FEET
Y/NORTH DIRECTION: .517 FEET

Map D-5

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR OZAUKEE COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: OZAK-SD1.395
RESULTS: OZAUKEE.B05

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) WITH SD - OZAUKEE CO, SCENARIO B

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4402	X =	2553155.130	.053	E =	768589.9600	.0200	RANDOM
	Y =	575224.620	.053	N =	175330.7990	.0200	
4410	X =	2495574.796	.053	E =	751039.6900	.0010	WEST BEND GPS
	Y =	523613.234	.053	N =	159599.6480	.0010	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4427	X =	2516558.560	.053	E =	757435.2930	.0200	BATAVIA
	Y =	590751.800	.053	N =	180063.3900	.0200	
4428	X =	2498545.930	.053	E =	751945.2010	.0200	BOLTONVILLE
	Y =	555253.230	.053	N =	169243.4710	.0200	
4429	X =	2538918.420	.132	E =	764250.9750	.1000	BROWN DEER
	Y =	435628.950	.132	N =	132782.6890	.1000	
4430	X =	2576533.090	.132	E =	775715.4960	.1000	CEDAR
	Y =	569936.120	.132	N =	173718.9080	.1000	
4432	X =	2564093.180	.053	E =	771924.0360	.0200	FOX
	Y =	432631.950	.053	N =	131869.4250	.0200	
4433	X =	2546755.190	.053	E =	766639.3420	.0200	FREDONIA
	Y =	542652.480	.053	N =	165402.9000	.0200	
4434	X =	2546823.270	.132	E =	766660.0870	.1000	FREDONIA-2
	Y =	542784.100	.132	N =	165443.0110	.1000	
4435	X =	2549951.380	.053	E =	767613.5760	.0200	GRAFTON
	Y =	492857.810	.053	N =	150225.6950	.0200	
4438	X =	2500998.920	.132	E =	752693.1320	.1000	JACKSON
	Y =	487970.400	.132	N =	148735.8690	.1000	
4439	X =	2503109.390	.053	E =	753336.3300	.0200	KEOWNS
	Y =	513129.300	.053	N =	156404.2070	.0200	
4443	X =	2584180.230	.053	E =	778046.3260	.0200	OOSTBURG
	Y =	588661.300	.053	N =	179426.3360	.0200	
4446	X =	2535105.020	.132	E =	763088.4380	.1000	SAULKVILLE
	Y =	517261.040	.132	N =	157663.6480	.1000	
4448	X =	2503891.220	.053	E =	753574.6880	.0200	STAR
	Y =	475364.550	.053	N =	144893.7860	.0200	
4454	X =	2568115.360	.132	E =	773149.8590	.1000	WASHINGTON
	Y =	516805.860	.132	N =	157524.9900	.1000	
4455	X =	2496718.310	.132	E =	751388.2840	.1000	WEST BEND
	Y =	525424.000	.132	N =	160151.6300	.1000	
203	X =	2546506.957	.264	E =	766563.6740	.0500	OFFSETS FREDONIA
	Y =	542256.609	.264	N =	165282.2320	.0500	
204	X =	2549485.097	.264	E =	767471.4530	.0500	OFFSETS GRAFTON
	Y =	491959.470	.264	N =	149951.8810	.0500	
205	X =	2552008.027	.264	E =	768240.4430	.0500	OFFSETS GRAFTON
	Y =	491999.850	.264	N =	149964.1880	.0500	
304	X =	2560313.886	.053	E =	770772.0860	.0200	VIRMOND
	Y =	448430.934	.053	N =	136684.7430	.0200	
306	X =	2573695.428	.132	E =	774850.6130	.0500	BELGIUM
	Y =	550647.222	.132	N =	167839.7070	.0500	
1001	X =	2535690.266	.264	E =	763266.8210	.0500	SAUKVILLE AZIMUTH MARK
	Y =	516240.284	.264	N =	157352.5210	.0500	
1002	X =	2576517.157	.264	E =	775710.6410	.0500	CEDAR 2
	Y =	569954.249	.264	N =	173724.4370	.0500	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1006	X =	2567814.824	.264	E =	773058.2550	.0500	OFFSETS - WASHINGTON
	Y =	516606.515	.264	N =	157464.2300	.0500	
1007	X =	2529785.155	.132	E =	761467.0850	.1000	THEINSVILLE
	Y =	467514.830	.132	N =	142501.3190	.1000	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4533	X =	2560686.630	.053	E =	770885.7000	.0200	MEQUON USLS
	Y =	447920.170	.053	N =	136529.0880	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4427	BATAVIA	4443	OOSTBURG
4402	RANDOM	4428	BOLTONVILLE
306	BELGIUM	4433	FREDONIA
4439	KEOWNS	4435	GRAFTON
4448	STAR	1004	GERMANTOWN
1008	TRIPOLI	4432	FOX
304	VIRMOND	4533	MEQUON USLS

NORTHING TRANSLATION:	NT =	-.5905 METERS
EASTING TRANSLATION:	ET =	-9598.0685 METERS
SCALE:	S =	.304795128718
ROTATION:	THETA =	-.000007362600 RADIANS
		0 0 -1.518645 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4427	E =	757435.293	757435.396	DELTA E =	-.1030	-.338	BATAVIA
	N =	180063.390	180063.328	DELTA N =	.0622	.204	
4443	E =	778046.326	778046.156	DELTA E =	.1697	.557	OOSTBURG
	N =	179426.336	179426.305	DELTA N =	.0307	.101	
4402	E =	768589.960	768589.887	DELTA E =	.0729	.239	RANDOM
	N =	175330.799	175330.801	DELTA N =	-.0021	-.007	
4428	E =	751945.201	751945.314	DELTA E =	-.1128	-.370	BOLTONVILLE
	N =	169243.471	169243.496	DELTA N =	-.0251	-.082	
306	E =	774850.613	774850.525	DELTA E =	.0880	.289	BELGIUM
	N =	167839.707	167839.776	DELTA N =	-.0690	-.226	
4433	E =	766639.342	766639.290	DELTA E =	.0523	.172	FREDONIA
	N =	165402.900	165402.957	DELTA N =	-.0571	-.187	
4439	E =	753336.330	753336.329	DELTA E =	.0013	.004	KEOWNS
	N =	156404.207	156404.338	DELTA N =	-.1307	-.429	
4435	E =	767613.576	767613.585	DELTA E =	-.0086	-.028	GRAFTON
	N =	150225.695	150225.791	DELTA N =	-.0964	-.316	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4448	E =	753574.688	753574.711	DELTA E =	-.0235	-.077	STAR
	N =	144893.786	144893.828	DELTA N =	-.0416	-.137	
1004	E =	756662.381	756662.369	DELTA E =	.0123	.041	GERMANTOWN
	N =	138211.078	138211.107	DELTA N =	-.0293	-.096	
1008	E =	765434.573	765434.535	DELTA E =	.0378	.124	TRIPOLI
	N =	130076.373	130076.293	DELTA N =	.0799	.262	
4432	E =	771924.036	771924.071	DELTA E =	-.0355	-.116	FOX
	N =	131869.425	131869.274	DELTA N =	.1506	.494	
304	E =	770772.086	770772.126	DELTA E =	-.0396	-.130	VIRMOND
	N =	136684.743	136684.719	DELTA N =	.0238	.078	
4533	E =	770885.700	770885.737	DELTA E =	-.0373	-.123	MEQUON USLS
	N =	136529.088	136529.042	DELTA N =	.0463	.152	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

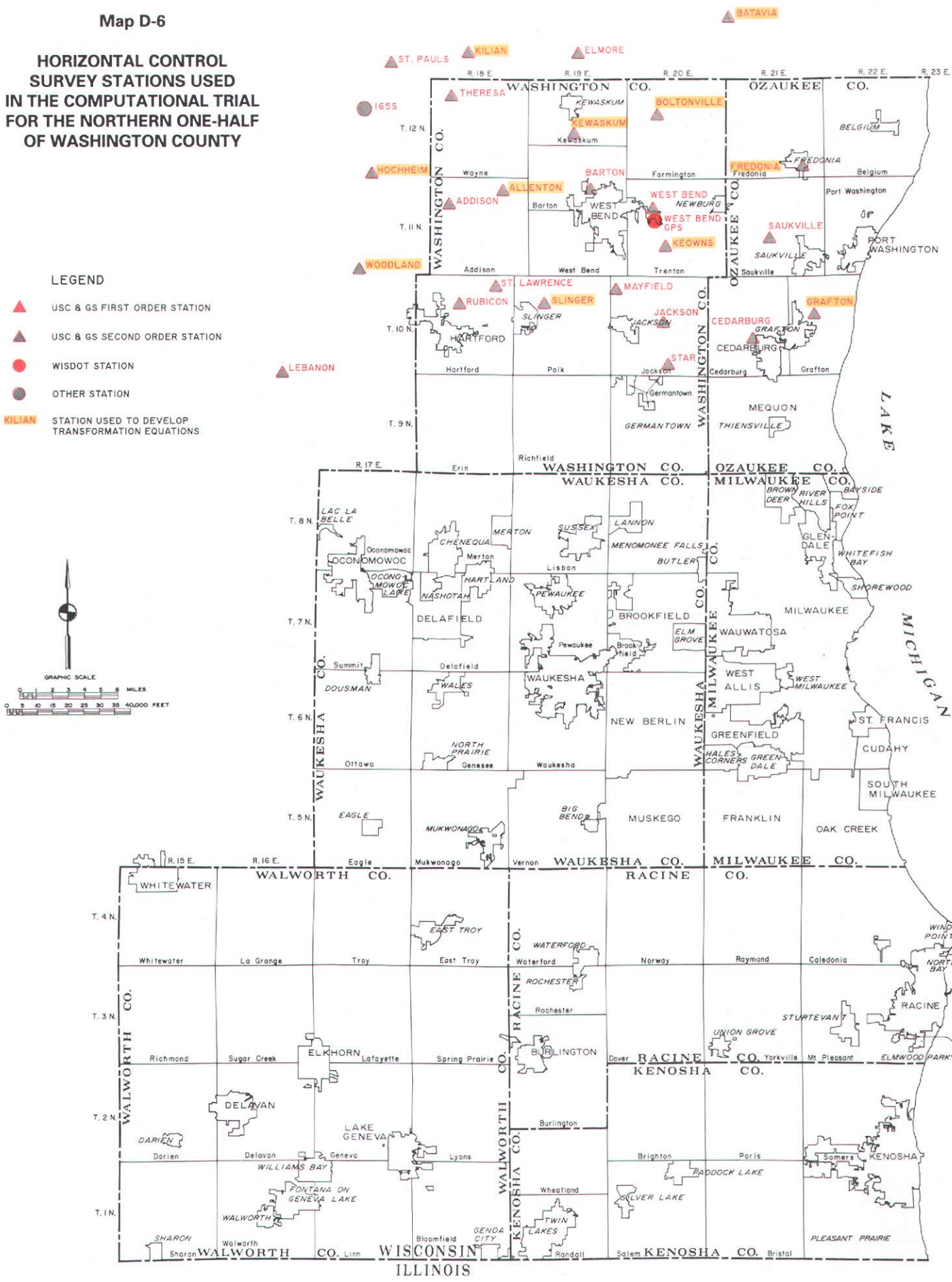
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4410	E =	751039.690	751039.798	DELTA E =	-.1077	-.353	WEST BEND GPS
	N =	159599.648	159599.773	DELTA N =	-.1248	-.410	
4424	E =	756461.978	756461.974	DELTA E =	.0040	.013	BAILEY
	N =	132571.880	132571.918	DELTA N =	-.0376	-.123	
4429	E =	764250.975	764250.921	DELTA E =	.0544	.179	BROWN DEER
	N =	132782.689	132782.689	DELTA N =	.0001	.000	
4430	E =	775715.496	775715.387	DELTA E =	.1087	.356	CEDAR
	N =	173718.908	173718.944	DELTA N =	-.0365	-.120	
4434	E =	766660.087	766660.040	DELTA E =	.0471	.155	FREDONIA-2
	N =	165443.011	165443.074	DELTA N =	-.0634	-.208	
4438	E =	752693.132	752693.124	DELTA E =	.0078	.026	JACKSON
	N =	148735.869	148736.023	DELTA N =	-.1538	-.505	
4446	E =	763088.438	763088.432	DELTA E =	.0064	.021	SAULKVILLE
	N =	157663.648	157663.744	DELTA N =	-.0957	-.314	
4454	E =	773149.859	773149.823	DELTA E =	.0355	.117	WASHINGTON
	N =	157524.990	157525.081	DELTA N =	-.0912	-.299	
4455	E =	751388.284	751388.331	DELTA E =	-.0471	-.154	WEST BEND
	N =	160151.630	160151.688	DELTA N =	-.0580	-.190	
203	E =	766563.674	766563.630	DELTA E =	.0435	.143	OFFSETS FREDONIA
	N =	165282.232	165282.297	DELTA N =	-.0651	-.214	
204	E =	767471.453	767471.466	DELTA E =	-.0128	-.042	OFFSETS GRAFTON
	N =	149951.881	149951.981	DELTA N =	-.0996	-.327	
205	E =	768240.443	768240.442	DELTA E =	.0006	.002	OFFSETS GRAFTON
	N =	149964.188	149964.294	DELTA N =	-.1059	-.347	
1001	E =	763266.821	763266.814	DELTA E =	.0070	.023	SAUKVILLE AZIMUTH MARK
	N =	157352.521	157352.624	DELTA N =	-.1027	-.337	
1002	E =	775710.641	775710.531	DELTA E =	.1100	.361	CEDAR 2
	N =	173724.437	173724.470	DELTA N =	-.0330	-.108	
1003	E =	761738.477	761738.556	DELTA E =	-.0791	-.260	CEDARBURG
	N =	147233.732	147233.852	DELTA N =	-.1203	-.395	
1006	E =	773058.255	773058.222	DELTA E =	.0330	.108	OFFSETS - WASHINGTON
	N =	157464.230	157464.321	DELTA N =	-.0910	-.299	
1007	E =	761467.085	761467.074	DELTA E =	.0107	.035	THEINSVILLE
	N =	142501.319	142501.329	DELTA N =	-.0103	-.034	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .212 FEET
Y/NORTH DIRECTION: .226 FEET

Map D-6

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE NORTHERN ONE-HALF OF WASHINGTON COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WASH-SD2.395
RESULTS: WASH-NOR.B06

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) WITH SD - NORTH 1/2 WASHINGTON CO

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4401	X =	2434846.290	.053	E =	732529.6570	.0200	KILIAN
	Y =	573428.960	.053	N =	174783.1320	.0200	
4403	X =	2399811.420	.053	E =	721851.5420	.0200	WOODLAND
	Y =	503195.710	.053	N =	153376.0800	.0200	
4409	X =	2402498.925	.053	E =	722670.3450	.0010	165S
	Y =	555800.145	.053	N =	169409.9380	.0010	
4410	X =	2495574.796	.053	E =	751039.6900	.0010	WEST BEND GPS
	Y =	523613.234	.053	N =	159599.6480	.0010	
4421	X =	2431339.410	.132	E =	731460.9970	.1000	ADDISON
	Y =	524704.490	.132	N =	159932.0460	.1000	
4422	X =	2448352.230	.053	E =	736646.4470	.0200	ALLENTON
	Y =	530038.950	.053	N =	161558.0500	.0200	
4425	X =	2479438.500	.132	E =	746121.3620	.1000	BARTON
	Y =	530530.440	.132	N =	161708.0580	.1000	
4426	X =	2479346.940	.132	E =	746093.4630	.1000	BARTON-2
	Y =	530495.750	.132	N =	161697.4920	.1000	
4427	X =	2516558.560	.053	E =	757435.2930	.0200	BATAVIA
	Y =	590751.800	.053	N =	180063.3900	.0200	
4428	X =	2498545.930	.053	E =	751945.2010	.0200	BOLTONVILLE
	Y =	555253.230	.053	N =	169243.4710	.0200	
4431	X =	2464578.550	.132	E =	741592.0810	.1000	ELMORE-2
	Y =	575158.360	.132	N =	175310.3510	.1000	
4433	X =	2546755.190	.053	E =	766639.3420	.0200	FREDONIA
	Y =	542652.480	.053	N =	165402.9000	.0200	
4436	X =	2406544.300	.053	E =	723903.5410	.0200	HOCHHEIM
	Y =	534498.750	.053	N =	162917.1400	.0200	
4438	X =	2500998.920	.132	E =	752693.1320	.1000	JACKSON
	Y =	487970.400	.132	N =	148735.8690	.1000	
4439	X =	2503109.390	.053	E =	753336.3300	.0200	KEOWNS
	Y =	513129.300	.053	N =	156404.2070	.0200	
4440	X =	2470830.710	.053	E =	743497.8020	.0200	KEWASKUM
	Y =	549358.480	.053	N =	167446.6730	.0200	
4441	X =	2484389.350	.132	E =	747630.5620	.1000	MAYFIELD
	Y =	498545.920	.132	N =	151959.2610	.1000	
4445	X =	2436666.430	.132	E =	733084.9180	.1000	RUBICON
	Y =	492503.250	.132	N =	150117.2680	.1000	
4446	X =	2535105.020	.053	E =	763088.4380	.0200	SAULKVILLE
	Y =	517261.040	.053	N =	157663.6480	.0200	
4447	X =	2462704.060	.053	E =	741020.9990	.0200	SLINGER
	Y =	493523.800	.053	N =	150428.4200	.0200	
4448	X =	2503891.220	.053	E =	753574.6880	.0200	STAR
	Y =	475364.550	.053	N =	144893.7860	.0200	
4449	X =	2446758.890	.132	E =	736161.0330	.1000	ST LAWRENCE
	Y =	498917.700	.132	N =	152072.3880	.1000	
4450	X =	2413196.370	.132	E =	725930.8370	.1000	ST PAULS
	Y =	569115.510	.132	N =	173468.3100	.1000	
4451	X =	2413195.250	.132	E =	725930.5010	.1000	ST PAULS-2
	Y =	569281.770	.132	N =	173518.9950	.1000	
4452	X =	2431677.230	.132	E =	731563.7390	.1000	THERESA
	Y =	561746.880	.132	N =	171222.3380	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4453	X =	2431782.790	.132	E =	731595.9160	.1000	THERESA-2
	Y =	561807.530	.132	N =	171240.8250	.1000	
4455	X =	2496718.310	.132	E =	751388.2840	.1000	WEST BEND
	Y =	525424.000	.132	N =	160151.6300	.1000	
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
4527	X =	2374744.440	.053	E =	714211.2320	.0100	LEBANON RESET
	Y =	468368.970	.053	N =	142760.8110	.0100	
4435	X =	2549951.380	.053	E =	767613.5760	.0200	GRAFTON
	Y =	492857.810	.053	N =	150225.6950	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4401	KILIAN	4427	BATAVIA
4440	KEWASKUM	4428	BOLTONVILLE
4436	HOCHHEIM	4422	ALLENTON
4433	FREDONIA	4403	WOODLAND
4447	SLINGER	4439	KEOWNS
4435	GRAFTON		

NORTHING TRANSLATION:	NT =	-5.2605 METERS
EASTING TRANSLATION:	ET =	-9600.8713 METERS
SCALE:	S =	.304796556791
ROTATION:	THETA =	-.000012379602 RADIANS
		0 0 -2.553476 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)		DIFFERENCE (M)	(FEET)	STATION
4401	E =	732529.657	732529.730	DELTA E =	-.0734	-.241	KILIAN **
	N =	174783.132	174783.099	DELTA N =	.0327	.107	
4427	E =	757435.293	757435.284	DELTA E =	.0094	.031	BATAVIA
	N =	180063.390	180063.350	DELTA N =	.0404	.132	
4440	E =	743497.802	743497.749	DELTA E =	.0535	.175	KEWASKUM **
	N =	167446.673	167446.636	DELTA N =	.0373	.122	
4428	E =	751945.201	751945.230	DELTA E =	-.0289	-.095	BOLTONVILLE **
	N =	169243.471	169243.440	DELTA N =	.0312	.102	
4436	E =	723903.541	723903.528	DELTA E =	.0128	.042	HOCHHEIM **
	N =	162917.140	162917.199	DELTA N =	-.0586	-.192	
4422	E =	736646.447	736646.458	DELTA E =	-.0111	-.037	ALLENTON **
	N =	161558.050	161558.025	DELTA N =	.0254	.083	
4433	E =	766639.342	766639.294	DELTA E =	.0481	.158	FREDONIA
	N =	165402.900	165402.956	DELTA N =	-.0565	-.185	
4403	E =	721851.542	721851.488	DELTA E =	.0543	.178	WOODLAND **
	N =	153376.080	153376.114	DELTA N =	-.0344	-.113	
4447	E =	741020.999	741020.984	DELTA E =	.0147	.048	SLINGER **
	N =	150428.420	150428.387	DELTA N =	.0332	.109	
4439	E =	753336.330	753336.316	DELTA E =	.0142	.047	KEOWNS **
	N =	156404.207	156404.228	DELTA N =	-.0212	-.069	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4435	E =	767613.576	767613.670	DELTA E =	-.0935	-.307	GRAFTON
	N =	150225.695	150225.725	DELTA N =	-.0296	-.097	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4409	E =	722670.345	722670.431	DELTA E =	-.0865	-.284	165S
	N =	169409.938	169409.775	DELTA N =	.1628	.534	
4410	E =	751039.690	751039.758	DELTA E =	-.0679	-.223	WEST BEND GPS **
	N =	159599.648	159599.667	DELTA N =	-.0187	-.061	
4421	E =	731460.997	731461.029	DELTA E =	-.0323	-.106	ADDISON **
	N =	159932.046	159932.035	DELTA N =	.0106	.035	
4425	E =	746121.362	746121.444	DELTA E =	-.0823	-.270	BARTON **
	N =	161708.058	161707.946	DELTA N =	.1116	.366	
4426	E =	746093.463	746093.537	DELTA E =	-.0743	-.244	BARTON-2 **
	N =	161697.492	161697.373	DELTA N =	.1193	.392	
4431	E =	741592.081	741592.014	DELTA E =	.0666	.219	ELMORE-2 **
	N =	175310.351	175310.327	DELTA N =	.0243	.080	
4438	E =	752693.132	752693.147	DELTA E =	-.0147	-.048	JACKSON **
	N =	148735.869	148735.874	DELTA N =	-.0051	-.017	
4441	E =	747630.562	747630.567	DELTA E =	-.0051	-.017	MAYFIELD **
	N =	151959.261	151959.194	DELTA N =	.0675	.221	
4445	E =	733084.918	733084.808	DELTA E =	.1098	.360	RUBICON
	N =	150117.268	150117.228	DELTA N =	.0396	.130	
4446	E =	763088.438	763088.458	DELTA E =	-.0200	-.066	SAULKVILLE **
	N =	157663.648	157663.689	DELTA N =	-.0410	-.135	
4448	E =	753574.688	753574.757	DELTA E =	-.0694	-.228	STAR
	N =	144893.786	144893.665	DELTA N =	.1207	.396	
4449	E =	736161.033	736160.931	DELTA E =	.1020	.335	ST LAWRENCE **
	N =	152072.388	152072.369	DELTA N =	.0192	.063	
4450	E =	725930.837	725930.926	DELTA E =	-.0886	-.291	ST PAULS
	N =	173468.310	173468.293	DELTA N =	.0171	.056	
4451	E =	725930.501	725930.584	DELTA E =	-.0826	-.271	ST PAULS-2
	N =	173518.995	173518.968	DELTA N =	.0266	.087	
4452	E =	731563.739	731563.856	DELTA E =	-.1169	-.384	THERESA **
	N =	171222.338	171222.430	DELTA N =	-.0916	-.301	
4453	E =	731595.916	731596.030	DELTA E =	-.1140	-.374	THERESA-2 **
	N =	171240.825	171240.916	DELTA N =	-.0909	-.298	
4455	E =	751388.284	751388.290	DELTA E =	-.0062	-.020	WEST BEND **
	N =	160151.630	160151.586	DELTA N =	.0437	.143	
1003	E =	761738.477	761738.629	DELTA E =	-.1515	-.497	CEDARBURG
	N =	147233.732	147233.742	DELTA N =	-.0099	-.033	
4527	E =	714211.232	714211.290	DELTA E =	-.0579	-.190	LEBANON RESET
	N =	142760.811	142760.949	DELTA N =	-.1383	-.454	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

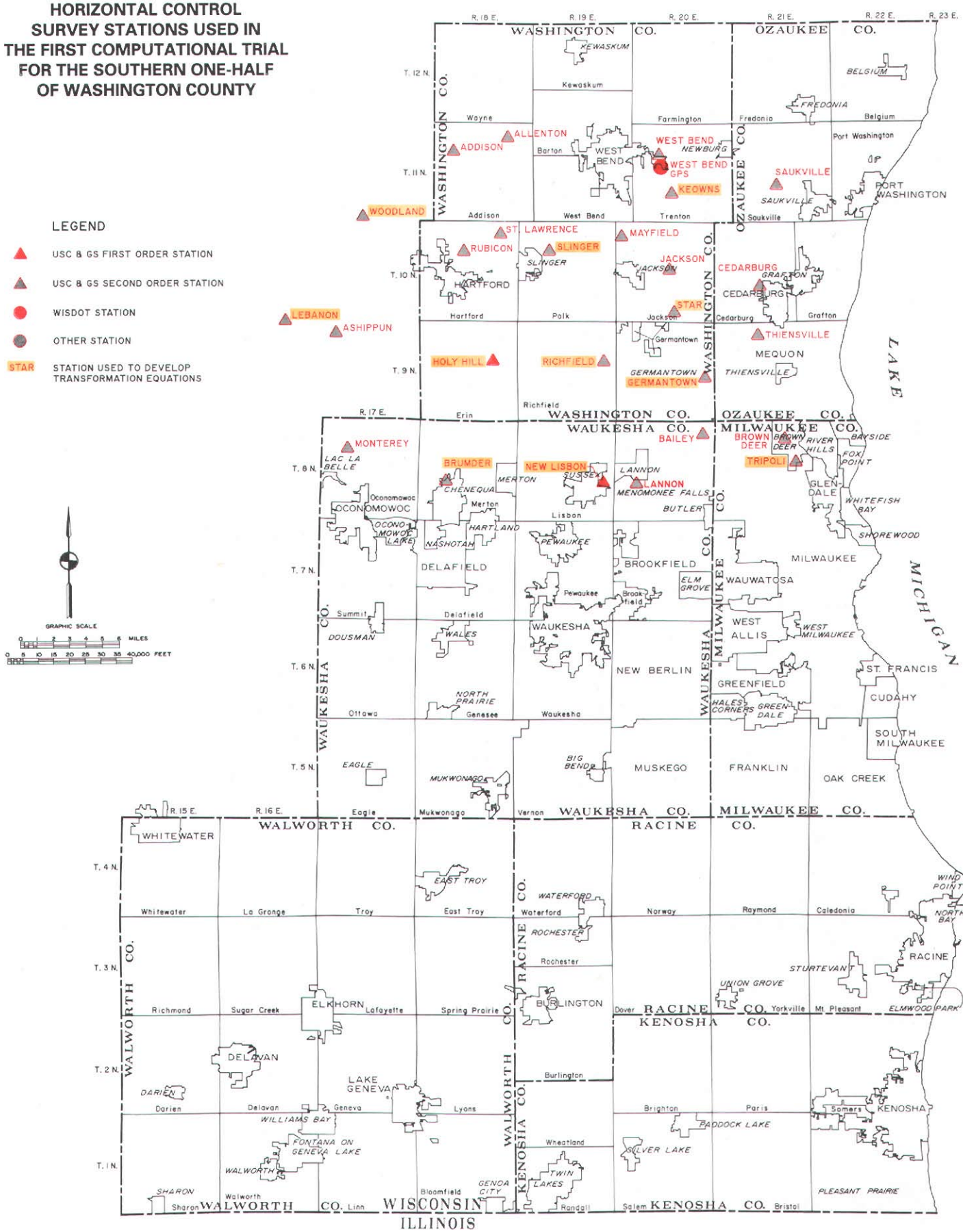
X/EAST DIRECTION: .218 FEET
Y/NORTH DIRECTION: .217 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	-0.05 FT	0.20 FT
Y/NORTH DIRECTION:	0.02 FT	0.19 FT

Map D-7

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE FIRST COMPUTATIONAL TRIAL FOR THE SOUTHERN ONE-HALF OF WASHINGTON COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 8, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WASH-SD3.395
RESULTS: WASH-SO1.B07

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) WITH SD - SOUTH 1/2 WASHINGTON CO

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4403	X =	2399811.420	.053	E =	721851.5420	.0200	WOODLAND
	Y =	503195.710	.053	N =	153376.0800	.0200	
4410	X =	2495574.796	.053	E =	751039.6900	.0010	WEST BEND GPS
	Y =	523613.234	.053	N =	159599.6480	.0010	
4421	X =	2431339.410	.132	E =	731460.9970	.1000	ADDISON
	Y =	524704.490	.132	N =	159932.0460	.1000	
4422	X =	2448352.230	.053	E =	736646.4470	.0200	ALLENTON
	Y =	530038.950	.053	N =	161558.0500	.0200	
4423	X =	2392112.960	.132	E =	719505.3190	.1000	ASHIPPUN
	Y =	465719.370	.132	N =	141953.5560	.1000	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4429	X =	2538918.420	.132	E =	764250.9750	.1000	BROWN DEER
	Y =	435628.950	.132	N =	132782.6890	.1000	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4438	X =	2500998.920	.132	E =	752693.1320	.1000	JACKSON
	Y =	487970.400	.132	N =	148735.8690	.1000	
4439	X =	2503109.390	.053	E =	753336.3300	.0200	KEOWNS
	Y =	513129.300	.053	N =	156404.2070	.0200	
4441	X =	2484389.350	.132	E =	747630.5620	.1000	MAYFIELD
	Y =	498545.920	.132	N =	151959.2610	.1000	
4442	X =	2400548.808	.053	E =	722076.1330	.0200	MONTEREY
	Y =	428960.967	.053	N =	130749.9490	.0200	
4444	X =	2481761.850	.053	E =	746829.8130	.0200	RICHFIELD
	Y =	459998.280	.053	N =	140210.1830	.0200	
4445	X =	2436666.430	.132	E =	733084.9180	.1000	RUBICON
	Y =	492503.250	.132	N =	150117.2680	.1000	
4446	X =	2535105.020	.053	E =	763088.4380	.0200	SAULKVILLE
	Y =	517261.040	.053	N =	157663.6480	.0200	
4447	X =	2462704.060	.053	E =	741020.9990	.0200	SLINGER
	Y =	493523.800	.053	N =	150428.4200	.0200	
4448	X =	2503891.220	.053	E =	753574.6880	.0200	STAR
	Y =	475364.550	.053	N =	144893.7860	.0200	
4449	X =	2446758.890	.132	E =	736161.0330	.1000	ST LAWRENCE
	Y =	498917.700	.132	N =	152072.3880	.1000	
4455	X =	2496718.310	.132	E =	751388.2840	.1000	WEST BEND
	Y =	525424.000	.132	N =	160151.6300	.1000	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1007	X =	2529785.155	.132	E =	761467.0850	.1000	THEINSVILLE
	Y =	467514.830	.132	N =	142501.3190	.1000	
1008	X =	2542801.670	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4527	X =	2374744.440	.053	E =	714211.2320	.0100	LEBANON RESET
	Y =	468368.970	.053	N =	142760.8110	.0100	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4403	WOODLAND	4527	LEBANON RESET
4437	HOLY HILL	4444	RICHFIELD
1004	GERMANTOWN	1008	TRIPOLI
4439	KEOWNS	4465	BRUMDER
4540	NEW LIBSON RESET	4447	SLINGER
4448	STAR		

NORTHING TRANSLATION:	NT =	-5.8257 METERS
EASTING TRANSLATION:	ET =	-9596.8302 METERS
SCALE:	S =	.304794976938
ROTATION:	THETA =	-.000014243700 RADIANS
		0 0 -2.937974 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4403	E =	721851.542	721851.452	DELTA E =	.0904	.297	WOODLAND
	N =	153376.080	153376.118	DELTA N =	-.0376	-.124	
4527	E =	714211.232	714211.313	DELTA E =	-.0812	-.266	LEBANON RESET
	N =	142760.811	142760.993	DELTA N =	-.1824	-.598	
4437	E =	735720.585	735720.420	DELTA E =	.1650	.541	HOLY HILL
	N =	140003.362	140003.277	DELTA N =	.0849	.279	
4444	E =	746829.813	746829.719	DELTA E =	.0945	.310	RICHFIELD
	N =	140210.183	140210.114	DELTA N =	.0693	.227	
1004	E =	756662.381	756662.274	DELTA E =	.1067	.350	GERMANTOWN
	N =	138211.078	138211.076	DELTA N =	.0020	.007	
1008	E =	765434.573	765434.493	DELTA E =	.0796	.261	TRIPOLI
	N =	130076.373	130076.326	DELTA N =	.0468	.154	
4439	E =	753336.330	753336.111	DELTA E =	.2192	.719	KEOWNS
	N =	156404.207	156404.274	DELTA N =	-.0674	-.221	
4465	E =	731301.820	731301.877	DELTA E =	-.0570	-.187	BRUMDER
	N =	127186.236	127186.531	DELTA N =	-.2945	-.966	
4540	E =	746491.568	746491.646	DELTA E =	-.0782	-.256	NEW LIBSON RESET
	N =	128003.250	128003.198	DELTA N =	.0519	.170	
4447	E =	741020.999	741020.854	DELTA E =	.1447	.475	SLINGER
	N =	150428.420	150428.441	DELTA N =	-.0211	-.069	
4448	E =	753574.688	753574.573	DELTA E =	.1154	.379	STAR
	N =	144893.786	144893.772	DELTA N =	.0143	.047	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

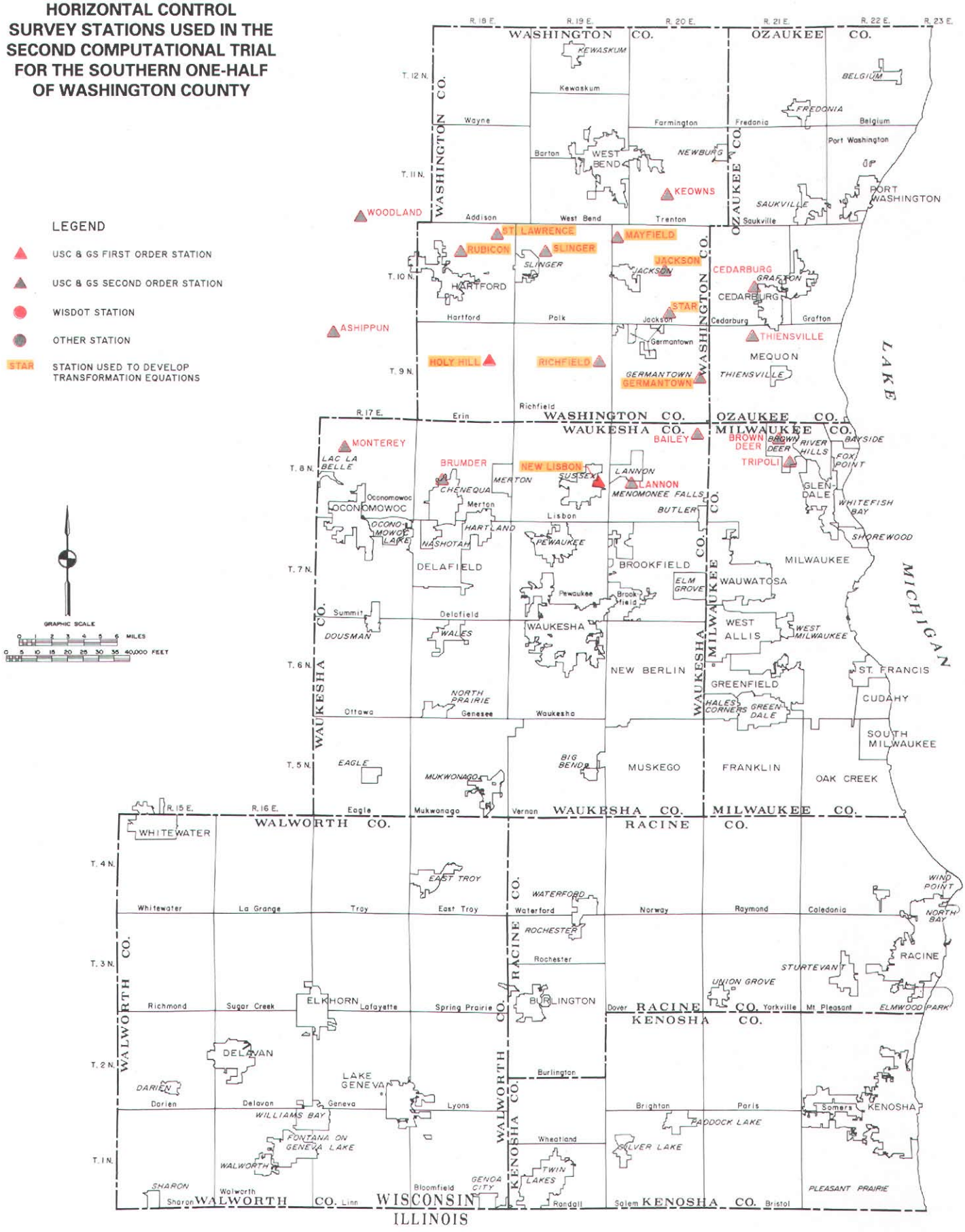
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4410	E =	751039.690	751039.559	DELTA E =	.1311	.430	WEST BEND GPS
	N =	159599.648	159599.692	DELTA N =	-.0442	-.145	
4421	E =	731460.997	731460.931	DELTA E =	.0658	.216	ADDISON
	N =	159932.046	159932.023	DELTA N =	.0234	.077	
4422	E =	736646.447	736646.330	DELTA E =	.1169	.384	ALLENTON
	N =	161558.050	161558.013	DELTA N =	.0369	.121	
4423	E =	719505.319	719505.162	DELTA E =	.1567	.514	ASHIPPUN
	N =	141953.556	141953.484	DELTA N =	.0720	.236	
4424	E =	756461.978	756461.919	DELTA E =	.0594	.195	BAILEY
	N =	132571.880	132571.888	DELTA N =	-.0077	-.025	
4429	E =	764250.975	764250.860	DELTA E =	.1152	.378	BROWN DEER
	N =	132782.689	132782.713	DELTA N =	-.0235	-.077	
4438	E =	752693.132	752692.959	DELTA E =	.1726	.566	JACKSON
	N =	148735.869	148735.959	DELTA N =	-.0899	-.295	
4441	E =	747630.562	747630.400	DELTA E =	.1620	.532	MAYFIELD
	N =	151959.261	151959.252	DELTA N =	.0088	.029	
4442	E =	722076.133	722076.526	DELTA E =	-.3930	-1.289	MONTEREY
	N =	130749.949	130749.744	DELTA N =	.2049	.672	
4445	E =	733084.918	733084.720	DELTA E =	.1981	.650	RUBICON
	N =	150117.268	150117.270	DELTA N =	-.0016	-.005	
4446	E =	763088.438	763088.200	DELTA E =	.2378	.780	SAULKVILLE
	N =	157663.648	157663.747	DELTA N =	-.0989	-.325	
4449	E =	736161.033	736160.823	DELTA E =	.2098	.688	ST LAWRENCE
	N =	152072.388	152072.406	DELTA N =	-.0175	-.057	
4455	E =	751388.284	751388.088	DELTA E =	.1956	.642	WEST BEND
	N =	160151.630	160151.609	DELTA N =	.0205	.067	
305	E =	749912.023	749912.082	DELTA E =	-.0593	-.195	LANNON
	N =	127598.398	127598.393	DELTA N =	.0053	.017	
1003	E =	761738.477	761738.397	DELTA E =	.0799	.262	CEDARBURG
	N =	147233.732	147233.851	DELTA N =	-.1194	-.392	
1007	E =	761467.085	761466.948	DELTA E =	.1370	.450	THEINSVILLE
	N =	142501.319	142501.329	DELTA N =	-.0099	-.032	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .428 FEET
Y/NORTH DIRECTION: .304 FEET

Map D-8

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE SECOND COMPUTATIONAL TRIAL FOR THE SOUTHERN ONE-HALF OF WASHINGTON COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 21, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WASH-SD4.295
RESULTS: WASH-SD2.B08

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) WITH SD - SOUTH 1/2 WASHINGTON CO

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4403	X =	2399811.420	.053	E =	721851.5420	.0200	WOODLAND
	Y =	503195.710	.053	N =	153376.0800	.0200	
4423	X =	2392112.960	.132	E =	719505.3190	.1000	ASHIPPUN
	Y =	465719.370	.132	N =	141953.5560	.1000	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4429	X =	2538918.420	.132	E =	764250.9750	.1000	BROWN DEER
	Y =	435628.950	.132	N =	132782.6890	.1000	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4438	X =	2500998.920	.132	E =	752693.1320	.1000	JACKSON
	Y =	487970.400	.132	N =	148735.8690	.1000	
4439	X =	2503109.390	.053	E =	753336.3300	.0200	KEOWNS
	Y =	513129.300	.053	N =	156404.2070	.0200	
4441	X =	2484389.350	.132	E =	747630.5620	.1000	MAYFIELD
	Y =	498545.920	.132	N =	151959.2610	.1000	
4442	X =	2400548.808	.053	E =	722076.1330	.0200	MONTEREY
	Y =	428960.967	.053	N =	130749.9490	.0200	
4444	X =	2481761.850	.053	E =	746829.8130	.0200	RICHFIELD
	Y =	459998.280	.053	N =	140210.1830	.0200	
4445	X =	2436666.430	.132	E =	733084.9180	.1000	RUBICON
	Y =	492503.250	.132	N =	150117.2680	.1000	
4447	X =	2462704.060	.053	E =	741020.9990	.0200	SLINGER
	Y =	493523.800	.053	N =	150428.4200	.0200	
4448	X =	2503891.220	.053	E =	753574.6880	.0200	STAR
	Y =	475364.550	.053	N =	144893.7860	.0200	
4449	X =	2446758.890	.132	E =	736161.0330	.1000	ST LAWRENCE
	Y =	498917.700	.132	N =	152072.3880	.1000	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
1003	X =	2530675.972	.132	E =	761738.4770	.1000	CEDARBURG
	Y =	483041.722	.132	N =	147233.7320	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1007	X =	2529785.155	.132	E =	761467.0850	.1000	THEINSVILLE
	Y =	467514.830	.132	N =	142501.3190	.1000	
1008	X =	2542801.670	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4449	ST LAWRENCE	4445	RUBICON
4447	SLINGER	4441	MAYFIELD
4438	JACKSON	4448	STAR
4437	HOLY HILL	4444	RICHFIELD
1004	GERMANTOWN	4540	NEW LIBSON RESET

NORTHING TRANSLATION: NT = 1.8080 METERS
EASTING TRANSLATION: ET = -9596.4221 METERS
SCALE: S = .304794291549
ROTATION: THETA = -.000004601245 RADIANS
0 0 -.949075 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4449	E =	736161.033	736161.021	DELTA E =	.0123	.040	ST LAWRENCE **
	N =	152072.388	152072.506	DELTA N =	-.1183	-.388	
4445	E =	733084.918	733084.905	DELTA E =	.0125	.041	RUBICON **
	N =	150117.268	150117.404	DELTA N =	-.1364	-.448	
4447	E =	741020.999	741021.025	DELTA E =	-.0260	-.085	SLINGER **
	N =	150428.420	150428.499	DELTA N =	-.0788	-.258	
4441	E =	747630.562	747630.571	DELTA E =	-.0086	-.028	MAYFIELD **
	N =	151959.261	151959.243	DELTA N =	.0183	.060	
4438	E =	752693.132	752693.088	DELTA E =	.0445	.146	JACKSON **
	N =	148735.869	148735.908	DELTA N =	-.0389	-.127	
4448	E =	753574.688	753574.662	DELTA E =	.0262	.086	STAR **
	N =	144893.786	144893.721	DELTA N =	.0652	.214	
4437	E =	735720.585	735720.502	DELTA E =	.0828	.272	HOLY HILL **
	N =	140003.362	140003.409	DELTA N =	-.0473	-.155	
4444	E =	746829.813	746829.778	DELTA E =	.0353	.116	RICHFIELD **
	N =	140210.183	140210.138	DELTA N =	.0446	.146	
1004	E =	756662.381	756662.292	DELTA E =	.0890	.292	GERMANTOWN **
	N =	138211.078	138211.010	DELTA N =	.0677	.222	
4540	E =	746491.568	746491.588	DELTA E =	-.0204	-.067	NEW LIBSON RESET
	N =	128003.250	128003.253	DELTA N =	-.0035	-.011	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4403	E =	721851.542	721851.694	DELTA E =	-.1518	-.498	WOODLAND
	N =	153376.080	153376.354	DELTA N =	-.2735	-.897	
4423	E =	719505.319	719505.300	DELTA E =	.0193	.063	ASHIPPUN
	N =	141953.556	141953.768	DELTA N =	-.2122	-.696	
4424	E =	756461.978	756461.882	DELTA E =	.0956	.314	BAILEY
	N =	132571.880	132571.837	DELTA N =	.0434	.142	
4429	E =	764250.975	764250.808	DELTA E =	.1669	.548	BROWN DEER
	N =	132782.689	132782.586	DELTA N =	.1031	.338	
4439	E =	753336.330	753336.311	DELTA E =	.0185	.061	KEOWNS
	N =	156404.207	156404.200	DELTA N =	.0071	.023	
4442	E =	722076.133	722076.550	DELTA E =	-.4166	-1.367	MONTEREY
	N =	130749.949	130750.029	DELTA N =	-.0797	-.261	
4465	E =	731301.820	731301.846	DELTA E =	-.0255	-.084	BRUMDER
	N =	127186.236	127186.734	DELTA N =	-.4981	-1.634	
305	E =	749912.023	749912.013	DELTA E =	.0101	.033	LANNON
	N =	127598.398	127598.416	DELTA N =	-.0180	-.059	
1003	E =	761738.477	761738.490	DELTA E =	-.0135	-.044	CEDARBURG
	N =	147233.732	147233.716	DELTA N =	.0155	.051	
1007	E =	761467.085	761466.996	DELTA E =	.0887	.291	THEINSVILLE
	N =	142501.319	142501.207	DELTA N =	.1118	.367	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
1008	E =	765434.573	765434.413	DELTA E = .1600	.525	TRIPOLI
	N =	130076.373	130076.194	DELTA N = .1788	.587	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

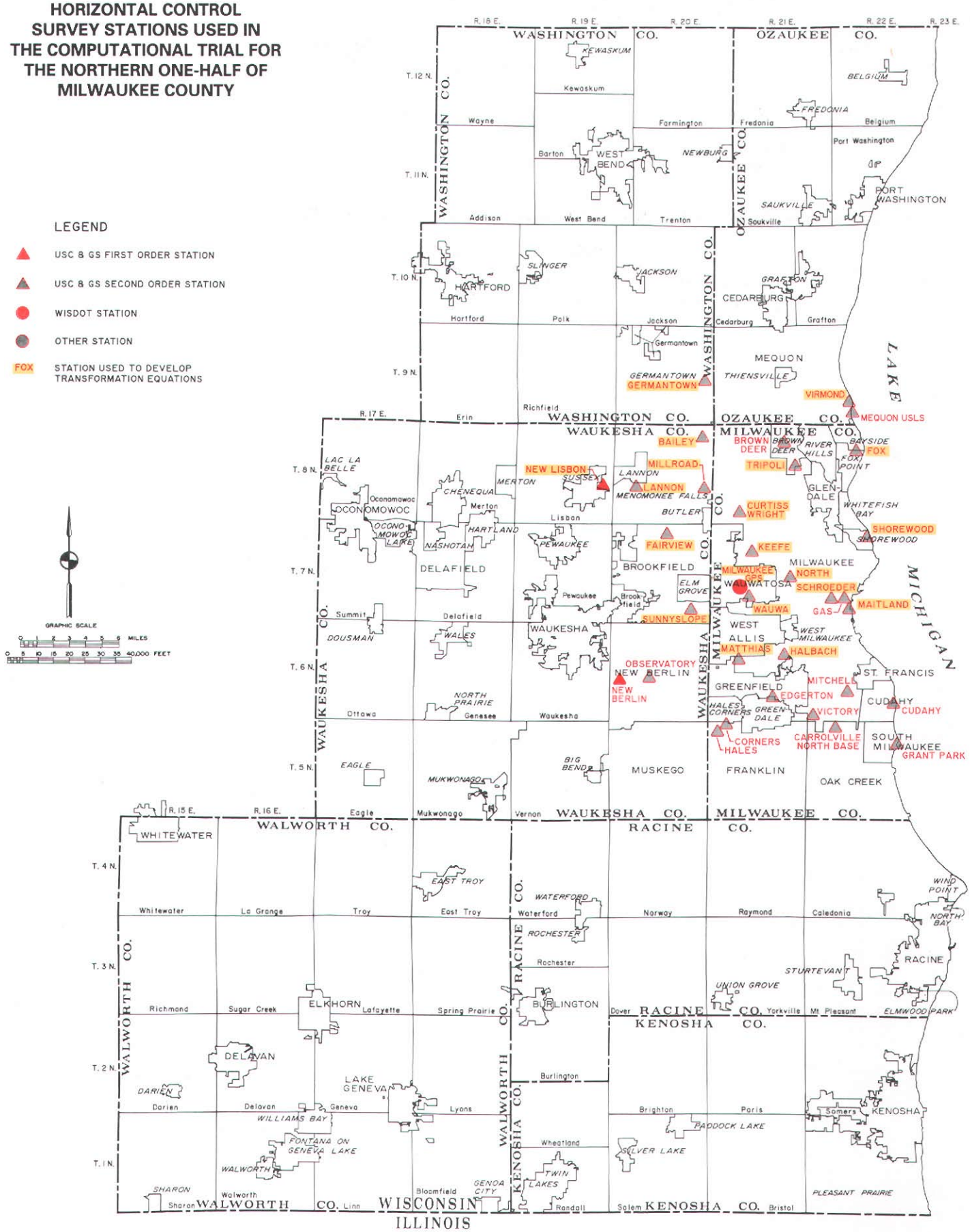
X/EAST DIRECTION: .393 FEET
Y/NORTH DIRECTION: .493 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	0.09 FT	0.12 FT
Y/NORTH DIRECTION:	-0.08 FT	0.25 FT

Map D-9

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE NORTHERN ONE-HALF OF MILWAUKEE COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: MILN-SD1.395
RESULTS: MILW-NOR.B09

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) WITH SD - NORTH PORTION OF MILWAUKEE CO.

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
304	X =	2560313.886	.053	E =	770772.0860	.0200	VIRMOND
	Y =	448430.934	.053	N =	136684.7430	.0200	
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4406	X =	2557875.330	.053	E =	770029.4550	.0200	CARROLVILLE NB
	Y =	345504.360	.053	N =	105313.2660	.0200	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4429	X =	2538918.420	.132	E =	764250.9750	.1000	BROWN DEER
	Y =	435628.950	.132	N =	132782.6890	.1000	
4432	X =	2564093.180	.053	E =	771924.0360	.0200	FOX
	Y =	432631.950	.053	N =	131869.4250	.0200	
4474	X =	2523450.530	.132	E =	759536.7380	.1000	CORNERS
	Y =	344502.850	.132	N =	105007.8540	.1000	
4475	X =	2576732.680	.053	E =	775777.1010	.0200	CUDAHY
	Y =	352803.850	.053	N =	107538.2870	.0200	
4477	X =	2525113.200	.132	E =	760043.2360	.1000	CURTIS WRIGHT
	Y =	412870.970	.132	N =	125846.2350	.1000	
4491	X =	2537715.630	.132	E =	763884.6910	.1000	EDGERTON
	Y =	353578.050	.132	N =	107774.0360	.1000	
4495	X =	2500294.520	.053	E =	752478.5420	.0200	FAIRVIEW
	Y =	403199.530	.053	N =	122898.2420	.0200	
4501	X =	2560536.810	.132	E =	770840.3680	.1000	GAS
	Y =	385819.730	.132	N =	117601.3510	.1000	
4503	X =	2578536.990	.132	E =	776327.1300	.1000	GRANT PARK
	Y =	340375.100	.132	N =	103750.0290	.1000	
4504	X =	2540652.260	.053	E =	764779.6940	.0200	HALBACH
	Y =	367523.760	.053	N =	112024.6890	.0200	
4505	X =	2519676.420	.053	E =	758386.4440	.0200	HALES
	Y =	342172.580	.053	N =	104297.5860	.0200	
4516	X =	2529746.890	.053	E =	761455.6360	.0200	KEEFE
	Y =	400880.440	.053	N =	122191.5690	.0200	
4530	X =	2561455.230	.132	E =	771120.2960	.1000	MAITLAND
	Y =	382858.510	.132	N =	116698.8210	.1000	
4531	X =	2527249.510	.053	E =	760694.5640	.0200	MATTHIAS
	Y =	366063.370	.053	N =	111579.4940	.0200	
4533	X =	2560686.630	.053	E =	770885.7000	.0200	MEQUON USLS
	Y =	447920.170	.053	N =	136529.0880	.0200	
4536	X =	2513320.190	.132	E =	756448.6910	.1000	MILLROAD
	Y =	419802.580	.132	N =	127958.9510	.1000	
4537	X =	2561841.970	.132	E =	771238.3980	.1000	MITCHELL
	Y =	356460.760	.132	N =	108652.7940	.1000	
4539	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4541	X =	2541685.610	.053	E =	765094.5380	.0200	NORTH
	Y =	393567.120	.053	N =	119962.7010	.0200	
4545	X =	2495538.290	.132	E =	751028.9960	.0200	OBSERVATORY
	Y =	358581.020	.132	N =	109298.8140	.0200	
4565	X =	2556635.800	.053	E =	769651.3750	.0200	SCHROEDER
	Y =	385466.540	.053	N =	117493.7080	.0200	
4567	X =	2565273.710	.053	E =	772284.0250	.0200	SHOREWOOD
	Y =	404703.670	.053	N =	123357.0380	.0200	
4574	X =	2510599.280	.132	E =	755619.4340	.0200	SUNNYSLOPE
	Y =	379356.060	.132	N =	115631.0630	.0200	
4577	X =	2550620.710	.132	E =	767818.1660	.1000	VICTORY
	Y =	348088.590	.132	N =	106100.9540	.1000	
4585	X =	2526967.310	.132	E =	760608.4470	.1000	WAUWA
	Y =	384787.130	.132	N =	117286.4820	.1000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

1004	GERMANTOWN	304	VIRMOND
4424	BAILEY	4432	FOX
4540	NEW LIBSON RESET	4536	MILLROAD
1008	TRIPOLI	4477	CURTIS WRIGHT
4495	FAIRVIEW	305	LANNON
4516	KEEFE	4567	SHOREWOOD
4412	MILWAUKEE GPS	4541	NORTH
4565	SCHROEDER	4574	SUNNYSLOPE
4585	WAUWA	4531	MATTHIAS
4504	HALBACH	4530	MAITLAND

NORTHING TRANSLATION: NT = -8.2138 METERS
EASTING TRANSLATION: ET = -9598.9337 METERS
SCALE: S = .304795950476
ROTATION: THETA = -.000016931103 RADIANS
0 0 -3.492291 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
1004	E =	756662.381	756662.247	DELTA E =	.1342	.440	GERMANTOWN
	N =	138211.078	138211.189	DELTA N =	-.1107	-.363	
304	E =	770772.086	770772.056	DELTA E =	.0296	.097	VIRMOND
	N =	136684.743	136684.931	DELTA N =	-.1884	-.618	
4424	E =	756461.978	756461.906	DELTA E =	.0724	.237	BAILEY
	N =	132571.880	132571.982	DELTA N =	-.1018	-.334	
4432	E =	771924.036	771924.051	DELTA E =	-.0155	-.051	FOX **
	N =	131869.425	131869.485	DELTA N =	-.0597	-.196	
4540	E =	746491.568	746491.614	DELTA E =	-.0457	-.150	NEW LIBSON RESET
	N =	128003.250	128003.251	DELTA N =	-.0009	-.003	
4536	E =	756448.691	756448.716	DELTA E =	-.0250	-.082	MILLROAD
	N =	127958.951	127958.883	DELTA N =	.0683	.224	
1008	E =	765434.573	765434.515	DELTA E =	.0581	.191	TRIPOLI **
	N =	130076.373	130076.436	DELTA N =	-.0635	-.208	
4477	E =	760043.236	760043.213	DELTA E =	.0226	.074	CURTIS WRIGHT **
	N =	125846.235	125846.217	DELTA N =	.0181	.059	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4495	E =	752478.542	752478.630	DELTA E =	-.0882	-.289	FAIRVIEW
	N =	122898.242	122898.273	DELTA N =	-.0310	-.102	
305	E =	749912.023	749912.062	DELTA E =	-.0389	-.127	LANNON
	N =	127598.398	127598.453	DELTA N =	-.0554	-.182	
4516	E =	761455.636	761455.605	DELTA E =	.0308	.101	KEEFE **
	N =	122191.569	122191.576	DELTA N =	-.0068	-.022	
4567	E =	772284.025	772284.016	DELTA E =	.0086	.028	SHOREWOOD **
	N =	123357.038	123357.064	DELTA N =	-.0262	-.086	
4412	E =	760211.603	760211.478	DELTA E =	.1246	.409	MILWAUKEE GPS **
	N =	117621.111	117621.050	DELTA N =	.0608	.200	
4541	E =	765094.538	765094.516	DELTA E =	.0215	.071	NORTH **
	N =	119962.701	119962.567	DELTA N =	.1339	.439	
4565	E =	769651.375	769651.316	DELTA E =	.0593	.195	SCHROEDER **
	N =	117493.708	117493.620	DELTA N =	.0877	.288	
4574	E =	755619.434	755619.602	DELTA E =	-.1683	-.552	SUNNYSLOPE
	N =	115631.063	115630.933	DELTA N =	.1299	.426	
4585	E =	760608.447	760608.484	DELTA E =	-.0366	-.120	WAUWA **
	N =	117286.482	117286.386	DELTA N =	.0963	.316	
4531	E =	760694.564	760694.594	DELTA E =	-.0296	-.097	MATTHIAS
	N =	111579.494	111579.461	DELTA N =	.0330	.108	
4504	E =	764779.694	764779.690	DELTA E =	.0040	.013	HALBACH
	N =	112024.689	112024.651	DELTA N =	.0379	.124	
4530	E =	771120.296	771120.272	DELTA E =	.0241	.079	MAITLAND **
	N =	116698.821	116698.728	DELTA N =	.0929	.305	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4405	E =	748257.816	748258.044	DELTA E =	-.2280	-.748	NEW BERLIN
	N =	109600.685	109600.552	DELTA N =	.1333	.437	
4406	E =	770029.455	770029.326	DELTA E =	.1294	.424	CARROLVILLE NB
	N =	105313.266	105313.316	DELTA N =	-.0500	-.164	
4429	E =	764250.975	764250.871	DELTA E =	.1039	.341	BROWN DEER **
	N =	132782.689	132782.828	DELTA N =	-.1393	-.457	
4474	E =	759536.738	759536.791	DELTA E =	-.0532	-.174	CORNERS
	N =	105007.854	105007.882	DELTA N =	-.0282	-.092	
4475	E =	775777.101	775776.932	DELTA E =	.1691	.555	CUDAHY
	N =	107538.287	107538.268	DELTA N =	.0187	.061	
4491	E =	763884.691	763884.689	DELTA E =	.0020	.006	EDGERTON
	N =	107774.036	107774.040	DELTA N =	-.0040	-.013	
4501	E =	770840.368	770840.326	DELTA E =	.0421	.138	GAS **
	N =	117601.351	117601.291	DELTA N =	.0597	.196	
4503	E =	776327.130	776326.942	DELTA E =	.1876	.616	GRANT PARK
	N =	103750.029	103750.045	DELTA N =	-.0160	-.052	
4505	E =	758386.444	758386.470	DELTA E =	-.0257	-.084	HALES
	N =	104297.586	104297.606	DELTA N =	-.0198	-.065	
4533	E =	770885.700	770885.670	DELTA E =	.0300	.099	MEQUON USLS
	N =	136529.088	136529.255	DELTA N =	-.1667	-.547	
4537	E =	771238.398	771238.285	DELTA E =	.1131	.371	MITCHELL
	N =	108652.794	108652.803	DELTA N =	-.0088	-.029	
4539	E =	748257.816	748258.044	DELTA E =	-.2280	-.748	NEW BERLIN
	N =	109600.685	109600.552	DELTA N =	.1333	.437	
4545	E =	751028.996	751029.181	DELTA E =	-.1848	-.606	OBSERVATORY
	N =	109298.814	109298.707	DELTA N =	.1067	.350	
4577	E =	767818.166	767818.133	DELTA E =	.0325	.107	VICTORY
	N =	106100.954	106100.941	DELTA N =	.0126	.041	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

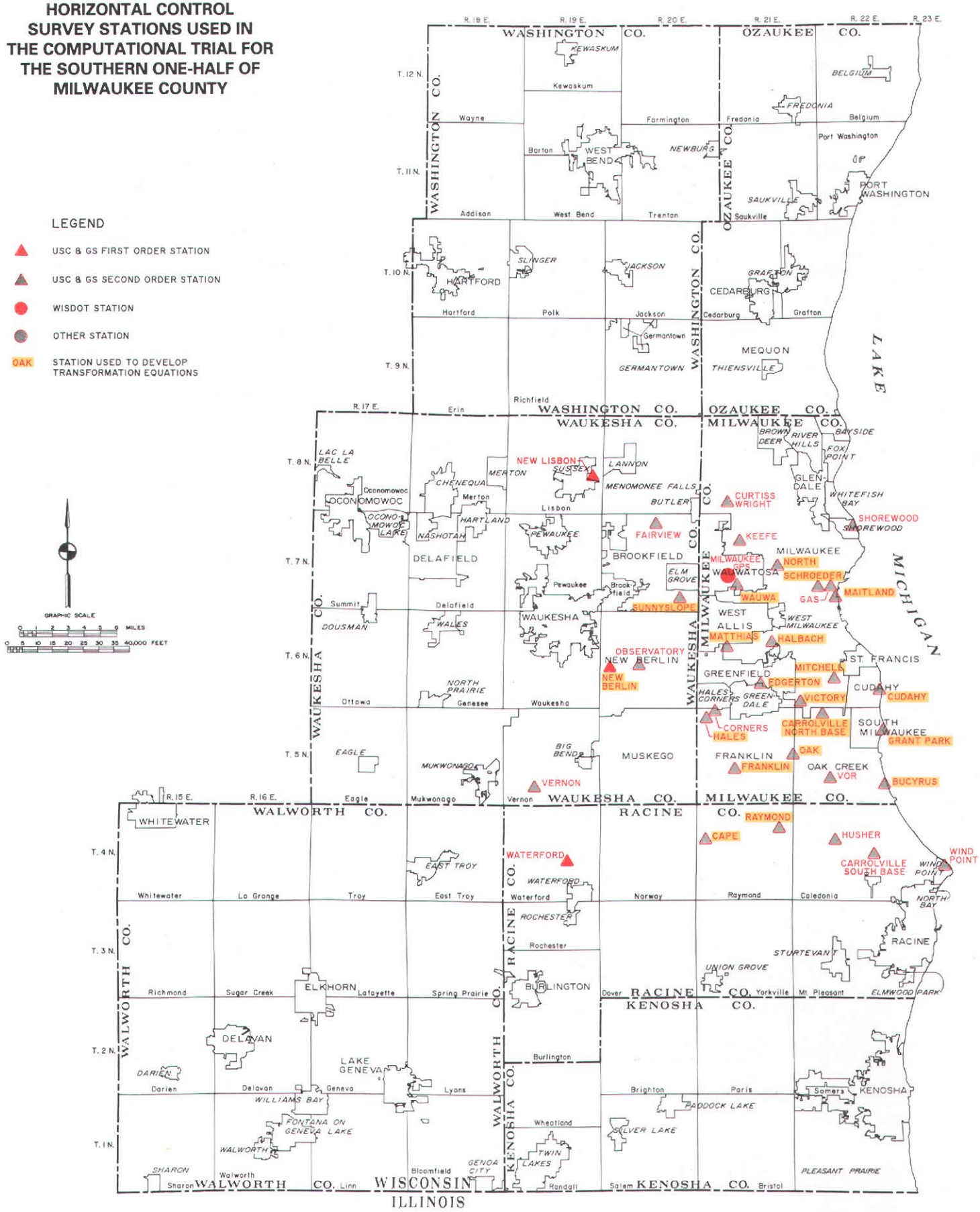
X/EAST DIRECTION: .333 FEET
Y/NORTH DIRECTION: .282 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	0.12 FT	0.15 FT
Y/NORTH DIRECTION:	0.07 FT	0.27 FT

Map D-10

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE SOUTHERN ONE-HALF OF MILWAUKEE COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: MILS-SD1.395
RESULTS: MILW-SOU.B10

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) WITH SD - S. PART OF MILWAUKEE CO.

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4406	X =	2557875.330	.053	E =	770029.4550	.0200	CARROLVILLE NB
	Y =	345504.360	.053	N =	105313.2660	.0200	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4466	X =	2579157.880	.053	E =	776516.5670	.0200	BUCYRUS
	Y =	321418.380	.053	N =	97972.0140	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4471	X =	2576343.080	.053	E =	775658.7720	.0200	CARROLVILLE SB
	Y =	297856.700	.053	N =	90790.3400	.0200	
4474	X =	2523450.530	.132	E =	759536.7380	.1000	CORNERS
	Y =	344502.850	.132	N =	105007.8540	.1000	
4475	X =	2576732.680	.053	E =	775777.1010	.0200	CUDAHY
	Y =	352803.850	.053	N =	107538.2870	.0200	
4477	X =	2525113.200	.132	E =	760043.2360	.1000	CURTIS WRIGHT
	Y =	412870.970	.132	N =	125846.2350	.1000	
4491	X =	2537715.630	.132	E =	763884.6910	.1000	EDGERTON
	Y =	353578.050	.132	N =	107774.0360	.1000	
4495	X =	2500294.520	.053	E =	752478.5420	.0200	FAIRVIEW
	Y =	403199.530	.053	N =	122898.2420	.0200	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4501	X =	2560536.810	.132	E =	770840.3680	.1000	GAS
	Y =	385819.730	.132	N =	117601.3510	.1000	
4503	X =	2578536.990	.132	E =	776327.1300	.1000	GRANT PARK
	Y =	340375.100	.132	N =	103750.0290	.1000	
4504	X =	2540652.260	.053	E =	764779.6940	.0200	HALBACH
	Y =	367523.760	.053	N =	112024.6890	.0200	
4505	X =	2519676.420	.053	E =	758386.4440	.0200	HALES
	Y =	342172.580	.053	N =	104297.5860	.0200	
4510	X =	2563997.420	.132	E =	771895.6890	.1000	HUSHER
	Y =	303942.940	.132	N =	92645.4130	.1000	
4516	X =	2529746.890	.053	E =	761455.6360	.0200	KEEFE
	Y =	400880.440	.053	N =	122191.5690	.0200	
4530	X =	2561455.230	.132	E =	771120.2960	.1000	MAITLAND
	Y =	382858.510	.132	N =	116698.8210	.1000	
4531	X =	2527249.510	.053	E =	760694.5640	.1000	MATTHIAS
	Y =	366063.370	.053	N =	111579.4940	.1000	
4537	X =	2561841.970	.132	E =	771238.3980	.1000	MITCHELL
	Y =	356460.760	.132	N =	108652.7940	.1000	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4541	X =	2541685.610	.053	E =	765094.5380	.0200	NORTH
	Y =	393567.120	.053	N =	119962.7010	.0200	
4542	X =	2549168.320	.132	E =	767375.6590	.1000	OAK RESET
	Y =	331559.880	.132	N =	101062.9490	.1000	
4545	X =	2495538.290	.132	E =	751028.9960	.0200	OBSERVATORY
	Y =	358581.020	.132	N =	109298.8140	.0200	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4565	X =	2556635.800	.053	E =	769651.3750	.0200	SCHROEDER
	Y =	385466.540	.053	N =	117493.7080	.0200	
4567	X =	2565273.710	.053	E =	772284.0250	.0200	SHOREWOOD
	Y =	404703.670	.053	N =	123357.0380	.0200	
4574	X =	2510599.280	.132	E =	755619.4340	.0200	SUNNYSLOPE
	Y =	379356.060	.132	N =	115631.0630	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4577	X =	2550620.710	.132	E =	767818.1660	.1000	VICTORY
	Y =	348088.590	.132	N =	106100.9540	.1000	
4579	X =	2560384.200	.132	E =	770794.3020	.1000	VOR
	Y =	323532.200	.132	N =	98616.1510	.1000	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4585	X =	2526967.310	.132	E =	760608.4470	.1000	WAUWA
	Y =	384787.130	.132	N =	117286.4820	.1000	
4589	X =	2598850.570	.053	E =	782519.1810	.0200	WIND POINT
	Y =	295780.660	.053	N =	90157.6530	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4469	CAPE	4558	RAYMOND
4466	BUCYRUS	4505	HALES
4406	CARROLVILLE NB	4475	CUDAHY
4405	NEW BERLIN	4531	MATTHIAS
4504	HALBACH	4574	SUNNYSLOPE
4541	NORTH	4565	SCHROEDER
4542	OAK RESET	4577	VICTORY
4537	MITCHELL	4585	WAUWA
4530	MAITLAND	4500	FRANKLIN
4491	EDGERTON	4503	GRANT PARK

NORTHING TRANSLATION: NT = -9.3310 METERS
EASTING TRANSLATION: ET = -9609.5155 METERS
SCALE: S = .304800108763
ROTATION: THETA = -.000016498990 RADIANS
0 0 -3.403161 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4469	E =	758609.708	758609.751	DELTA E =	-.0429	-.141	CAPE
	N =	92408.799	92408.764	DELTA N =	.0352	.115	
4558	E =	765727.014	765726.961	DELTA E =	.0533	.175	RAYMOND
	N =	93377.719	93377.707	DELTA N =	.0123	.040	
4466	E =	776516.567	776516.470	DELTA E =	.0966	.317	BUCYRUS **
	N =	97972.014	97971.997	DELTA N =	.0175	.057	
4505	E =	758386.444	758386.411	DELTA E =	.0335	.110	HALES **
	N =	104297.586	104297.580	DELTA N =	.0062	.020	
4406	E =	770029.455	770029.426	DELTA E =	.0293	.096	CARROLVILLE NB **
	N =	105313.266	105313.299	DELTA N =	-.0328	-.108	
4475	E =	775777.101	775777.111	DELTA E =	-.0103	-.034	CUDAHY **
	N =	107538.287	107538.279	DELTA N =	.0080	.026	
4405	E =	748257.816	748257.849	DELTA E =	-.0330	-.108	NEW BERLIN
	N =	109600.685	109600.602	DELTA N =	.0826	.271	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4531	E =	760694.564	760694.569	DELTA E = -.0050	-.017	MATTHIAS **
	N =	111579.494	111579.533	DELTA N = -.0393	-.129	
4504	E =	764779.694	764779.721	DELTA E = -.0274	-.090	HALBACH **
	N =	112024.689	112024.728	DELTA N = -.0387	-.127	
4574	E =	755619.434	755619.510	DELTA E = -.0763	-.250	SUNNYSLOPE
	N =	115631.063	115631.063	DELTA N = .0001	.000	
4541	E =	765094.538	765094.556	DELTA E = -.0176	-.058	NORTH
	N =	119962.701	119962.752	DELTA N = -.0509	-.167	
4565	E =	769651.375	769651.416	DELTA E = -.0409	-.134	SCHROEDER
	N =	117493.708	117493.769	DELTA N = -.0614	-.201	
4542	E =	767375.659	767375.598	DELTA E = .0608	.199	OAK RESET **
	N =	101062.949	101062.976	DELTA N = -.0270	-.089	
4577	E =	767818.166	767818.204	DELTA E = -.0377	-.124	VICTORY **
	N =	106100.954	106100.936	DELTA N = .0181	.059	
4537	E =	771238.398	771238.403	DELTA E = -.0049	-.016	MITCHELL **
	N =	108652.794	108652.831	DELTA N = -.0367	-.120	
4585	E =	760608.447	760608.460	DELTA E = -.0133	-.044	WAUWA
	N =	117286.482	117286.536	DELTA N = -.0539	-.177	
4530	E =	771120.296	771120.392	DELTA E = -.0958	-.314	MAITLAND
	N =	116698.821	116698.866	DELTA N = -.0448	-.147	
4500	E =	761243.347	761243.267	DELTA E = .0799	.262	FRANKLIN **
	N =	99208.427	99208.477	DELTA N = -.0501	-.164	
4491	E =	763884.691	763884.706	DELTA E = -.0153	-.050	EDGERTON **
	N =	107774.036	107774.059	DELTA N = -.0230	-.076	
4503	E =	776327.130	776327.128	DELTA E = .0023	.008	GRANT PARK **
	N =	103750.029	103750.004	DELTA N = .0253	.083	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4412	E =	760211.603	760211.450	DELTA E = .1531	.502	MILWAUKEE GPS
	N =	117621.111	117621.205	DELTA N = -.0941	-.309	
4471	E =	775658.772	775658.638	DELTA E = .1345	.441	CARROLVILLE SB
	N =	90790.340	90790.380	DELTA N = -.0397	-.130	
4474	E =	759536.738	759536.748	DELTA E = -.0100	-.033	CORNERS **
	N =	105007.854	105007.865	DELTA N = -.0113	-.037	
4477	E =	760043.236	760043.186	DELTA E = .0499	.164	CURTIS WRIGHT
	N =	125846.235	125846.484	DELTA N = -.2491	-.817	
4495	E =	752478.542	752478.498	DELTA E = .0436	.143	FAIRVIEW
	N =	122898.242	122898.503	DELTA N = -.2613	-.857	
4501	E =	770840.368	770840.442	DELTA E = -.0744	-.244	GAS
	N =	117601.351	117601.441	DELTA N = -.0904	-.296	
4510	E =	771895.689	771895.648	DELTA E = .0406	.133	HUSHER
	N =	92645.413	92645.404	DELTA N = .0087	.029	
4516	E =	761455.636	761455.596	DELTA E = .0403	.132	KEEFE
	N =	122191.569	122191.793	DELTA N = -.2236	-.733	
4540	E =	746491.568	746491.402	DELTA E = .1656	.543	NEW LIBSON RESET
	N =	128003.250	128003.553	DELTA N = -.3034	-.995	
4545	E =	751028.996	751029.023	DELTA E = -.0274	-.090	OBSERVATORY
	N =	109298.814	109298.753	DELTA N = .0613	.201	
4567	E =	772284.025	772284.155	DELTA E = -.1300	-.427	SHOREWOOD
	N =	123357.038	123357.292	DELTA N = -.2541	-.834	
4576	E =	741622.796	741622.903	DELTA E = -.1065	-.349	VERNON
	N =	96654.129	96653.971	DELTA N = .1579	.518	
4579	E =	770794.302	770794.240	DELTA E = .0620	.203	VOR **
	N =	98616.151	98616.195	DELTA N = -.0437	-.143	
4583	E =	744746.022	744746.159	DELTA E = -.1368	-.449	WATERFORD
	N =	89633.012	89632.946	DELTA N = .0660	.216	
4589	E =	782519.181	782518.933	DELTA E = .2476	.812	WIND POINT
	N =	90157.653	90157.716	DELTA N = -.0627	-.206	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

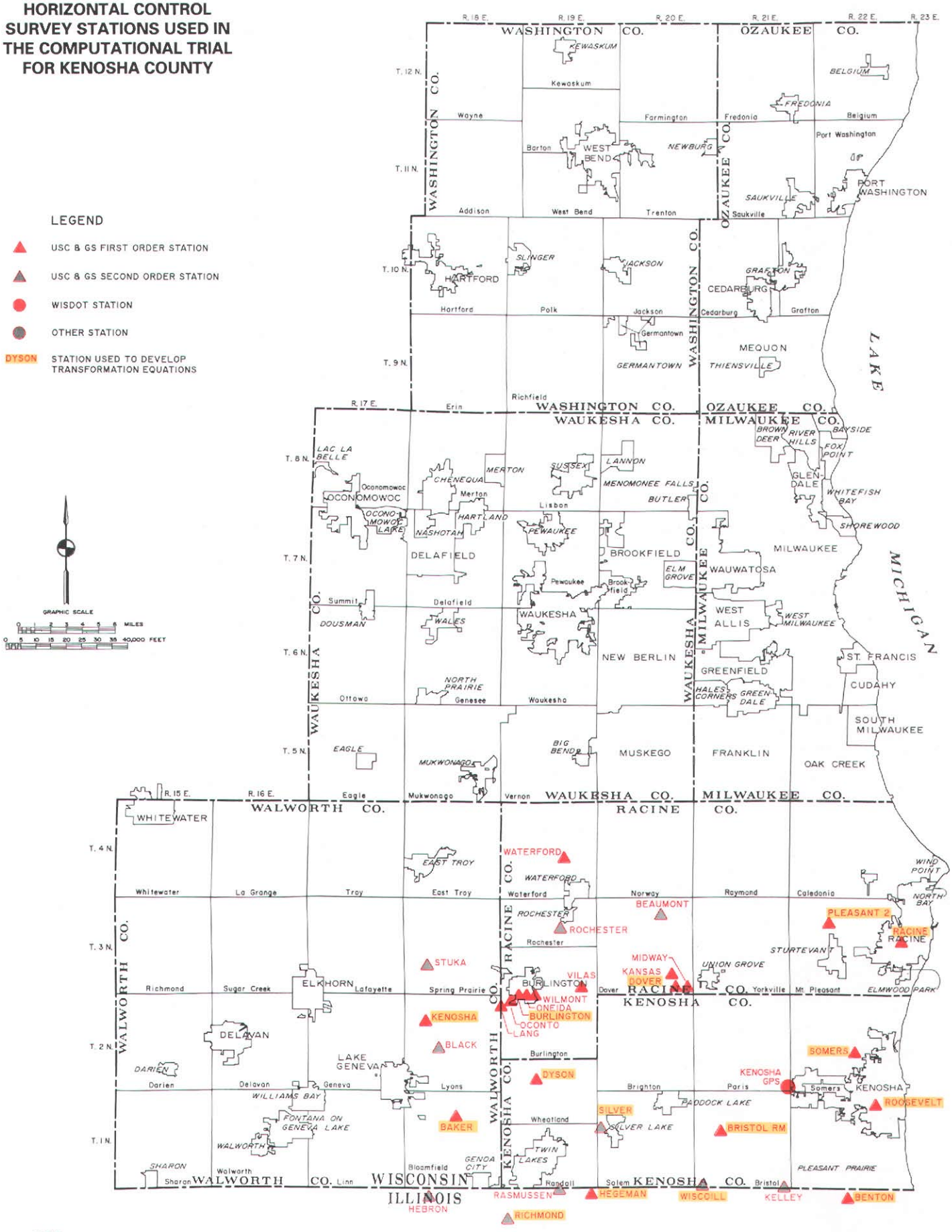
X/EAST DIRECTION: .274 FEET
Y/NORTH DIRECTION: .334 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	0.06 FT	0.14 FT
Y/NORTH DIRECTION:	-0.05 FT	0.09 FT

Map D-11

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR KENOSHA COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: KENO-SD1.395
RESULTS: KENOSHA.B11

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - KENOSHA COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4415	X =	2550478.433	.053	E =	767775.3090	.0010	KENOSHA GPS
	Y =	222012.587	.053	N =	67672.7160	.0010	
4416	X =	2571723.950	.026	E =	774251.0300	.0010	SOMERS RESET
	Y =	233048.660	.026	N =	71036.6060	.0010	
4458	X =	2441249.950	.026	E =	734481.7570	.0100	BAKER
	Y =	207140.680	.026	N =	63139.3800	.0100	
4460	X =	2508227.690	.132	E =	754896.8990	.1000	BEAUMONT
	Y =	276268.340	.132	N =	84209.8940	.1000	
4461	X =	2572193.230	.026	E =	774394.0630	.0100	BENTON
	Y =	183720.500	.026	N =	56001.0210	.0100	
4463	X =	2436327.170	.132	E =	732981.4510	.1000	BLACK
	Y =	229135.950	.132	N =	69843.4650	.1000	
4464	X =	2529345.040	.026	E =	761333.6460	.0100	BRISTOL
	Y =	205835.410	.026	N =	62741.7290	.0100	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4486	X =	2515200.170	.026	E =	757022.1180	.0100	DOVER RESET
	Y =	251454.970	.026	N =	76646.7620	.0100	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4506	X =	2433266.170	.132	E =	732048.3510	.1000	HEBRON (ILL)
	Y =	181595.160	.132	N =	55352.8910	.1000	
4508	X =	2487325.560	.026	E =	748525.8400	.0100	HEGEMAN
	Y =	185239.840	.026	N =	56463.9770	.0100	
4512	X =	2514682.480	.026	E =	756864.3420	.0200	KANSAS
	Y =	255477.050	.026	N =	77872.6910	.0200	
4517	X =	2550594.840	.132	E =	767810.7240	.1000	KELLEY
	Y =	187083.730	.132	N =	57026.1160	.1000	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4534	X =	2516101.410	.026	E =	757296.8450	.0200	MIDWAY RESET
	Y =	252222.320	.026	N =	76880.6550	.0200	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4553	X =	2562969.770	.026	E =	771582.6920	.0100	PLEASANT
	Y =	275128.360	.026	N =	83862.6310	.0100	
4555	X =	2587083.540	.026	E =	778932.5690	.0100	RACINE
	Y =	269538.570	.026	N =	82158.8750	.0100	
4557	X =	2476856.570	.053	E =	745334.8300	.0200	RASMUSSEN
	Y =	185464.090	.053	N =	56532.2480	.0200	
4559	X =	2462492.000	.053	E =	740956.4240	.0200	RICHMOND (ILL)
	Y =	174424.070	.053	N =	53167.1660	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4563	X =	2579267.260	.026	E =	776550.2920	.0100	ROOSEVELT
	Y =	215555.580	.026	N =	65704.6750	.0100	
4568	X =	2488304.690	.026	E =	748824.2910	.0100	SILVER
	Y =	206176.260	.026	N =	62845.5490	.0100	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	
4590	X =	2525653.530	.053	E =	760208.4660	.0100	WISCOLL
	Y =	186760.160	.053	N =	56927.3880	.0100	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4458	BAKER	4488	DYSON
4559	RICHMOND (ILL)	4508	HEGEMAN
4590	WISCOLL	4408	BRISTOL RM
4461	BENTON	4563	ROOSEVELT
4416	SOMERS RESET	4555	RACINE
4486	DOVER RESET	4518	KENOSHA
4467	BURLINGTON	4568	SILVER
4553	PLEASANT		

NORTHING TRANSLATION: NT = -2.3158 METERS
EASTING TRANSLATION: ET = -9625.5851 METERS
SCALE: S = .304806024072
ROTATION: THETA = -.000005392964 RADIANS
0 0 -1.112379 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4458	E =	734481.757	734481.765	DELTA E =	-.0084	-.028	BAKER **
	N =	63139.380	63139.424	DELTA N =	-.0442	-.145	
4488	E =	742356.324	742356.339	DELTA E =	-.0149	-.049	DYSON **
	N =	67983.088	67983.103	DELTA N =	-.0146	-.048	
4559	E =	740956.424	740956.524	DELTA E =	-.1000	-.328	RICHMOND (ILL)
	N =	53167.166	53167.239	DELTA N =	-.0733	-.241	
4508	E =	748525.840	748525.925	DELTA E =	-.0849	-.279	HEGEMAN **
	N =	56463.977	56463.992	DELTA N =	-.0150	-.049	
4590	E =	760208.466	760208.519	DELTA E =	-.0526	-.172	WISCOLL **
	N =	56927.388	56927.458	DELTA N =	-.0697	-.229	
4408	E =	761342.007	761342.073	DELTA E =	-.0659	-.216	BRISTOL RM **
	N =	62757.608	62757.623	DELTA N =	-.0148	-.048	
4461	E =	774394.063	774394.104	DELTA E =	-.0415	-.136	BENTON **
	N =	56001.021	56001.028	DELTA N =	-.0065	-.021	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4563	E =	776550.292	776550.259	DELTA E =	.0329	.108	ROOSEVELT **
	N =	65704.675	65704.563	DELTA N =	.1117	.366	
4416	E =	774251.030	774250.984	DELTA E =	.0460	.151	SOMERS RESET **
	N =	71036.606	71036.547	DELTA N =	.0589	.193	
4555	E =	778932.569	778932.620	DELTA E =	-.0506	-.166	RACINE **
	N =	82158.875	82158.917	DELTA N =	-.0417	-.137	
4486	E =	757022.118	757022.165	DELTA E =	-.0471	-.155	DOVER RESET **
	N =	76646.762	76646.808	DELTA N =	-.0463	-.152	
4518	E =	731224.961	731224.638	DELTA E =	.3234	1.061	KENOSHA
	N =	72952.590	72952.618	DELTA N =	-.0283	-.093	
4467	E =	740864.834	740864.726	DELTA E =	.1079	.354	BURLINGTON
	N =	75681.515	75681.458	DELTA N =	.0566	.186	
4568	E =	748824.291	748824.335	DELTA E =	-.0442	-.145	SILVER **
	N =	62845.549	62845.541	DELTA N =	.0084	.028	
4553	E =	771582.692	771582.588	DELTA E =	.1040	.341	PLEASANT
	N =	83862.631	83862.679	DELTA N =	-.0477	-.157	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4415	E =	767775.309	767775.241	DELTA E =	.0684	.224	KENOSHA GPS **
	N =	67672.716	67672.651	DELTA N =	.0654	.214	
4460	E =	754896.899	754896.870	DELTA E =	.0286	.094	BEAUMONT
	N =	84209.894	84210.062	DELTA N =	-.1675	-.550	
4463	E =	732981.451	732981.236	DELTA E =	.2147	.705	BLACK
	N =	69843.465	69843.707	DELTA N =	-.2419	-.794	
4464	E =	761333.646	761333.682	DELTA E =	-.0357	-.117	BRISTOL **
	N =	62741.729	62741.715	DELTA N =	.0141	.046	
4506	E =	732048.351	732048.303	DELTA E =	.0478	.157	HEBRON (ILL)
	N =	55352.891	55352.983	DELTA N =	-.0917	-.301	
4512	E =	756864.342	756864.363	DELTA E =	-.0215	-.070	KANSAS **
	N =	77872.691	77872.762	DELTA N =	-.0707	-.232	
4517	E =	767810.724	767810.780	DELTA E =	-.0556	-.182	KELLEY **
	N =	57026.116	57026.125	DELTA N =	-.0088	-.029	
4523	E =	738965.732	738965.601	DELTA E =	.1312	.430	LANG
	N =	74704.797	74704.697	DELTA N =	.0997	.327	
4534	E =	757296.845	757296.867	DELTA E =	-.0222	-.073	MIDWAY RESET **
	N =	76880.655	76880.703	DELTA N =	-.0477	-.157	
4547	E =	739879.449	739879.331	DELTA E =	.1179	.387	OCONTO
	N =	75081.660	75081.583	DELTA N =	.0773	.254	
4548	E =	741414.301	741414.191	DELTA E =	.1103	.362	ONEIDA
	N =	75690.667	75690.621	DELTA N =	.0462	.152	
4557	E =	745334.830	745334.913	DELTA E =	-.0833	-.273	RASMUSSEN **
	N =	56532.248	56532.328	DELTA N =	-.0795	-.261	
4561	E =	744687.945	744687.623	DELTA E =	.3218	1.056	ROCHESTER
	N =	82717.738	82718.124	DELTA N =	-.3862	-1.267	
4573	E =	731500.802	731500.534	DELTA E =	.2675	.878	STUKA
	N =	78858.538	78858.861	DELTA N =	-.3234	-1.061	
4578	E =	747510.744	747510.670	DELTA E =	.0744	.244	VILAS **
	N =	76483.563	76483.555	DELTA N =	.0083	.027	
4583	E =	744746.022	744745.725	DELTA E =	.2974	.976	WATERFORD
	N =	89633.012	89633.323	DELTA N =	-.3108	-1.020	
4588	E =	742065.195	742065.083	DELTA E =	.1124	.369	WILMONT
	N =	75689.117	75689.061	DELTA N =	.0563	.185	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

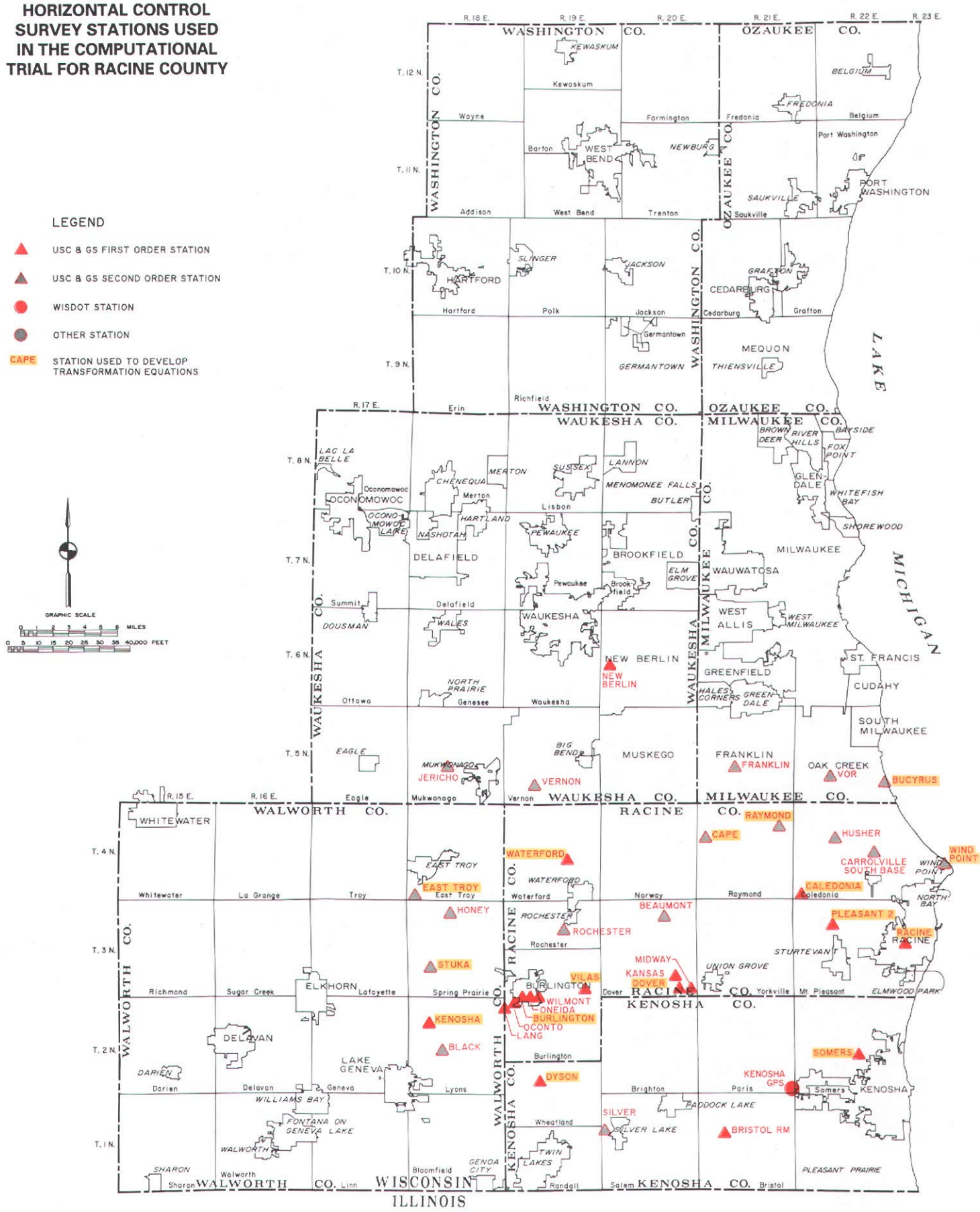
X/EAST DIRECTION: .402 FEET
Y/NORTH DIRECTION: .396 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	-0.07 FT	0.16 FT
Y/NORTH DIRECTION:	-0.04 FT	0.17 FT

Map D-12

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR RACINE COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: RACN-SD1.395
RESULTS: RACINE.B12

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - RACINE COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4415	X =	2550478.433	.053	E =	767775.3090	.0010	KENOSHA GPS
	Y =	222012.587	.053	N =	67672.7160	.0010	
4416	X =	2571723.950	.026	E =	774251.0300	.0010	SOMERS RESET
	Y =	233048.660	.026	N =	71036.6060	.0010	
4460	X =	2508227.690	.132	E =	754896.8990	.1000	BEAUMONT
	Y =	276268.340	.132	N =	84209.8940	.1000	
4463	X =	2436327.170	.132	E =	732981.4510	.1000	BLACK
	Y =	229135.950	.132	N =	69843.4650	.1000	
4464	X =	2529345.040	.026	E =	761333.6460	.0100	BRISTOL
	Y =	205835.410	.026	N =	62741.7290	.0100	
4466	X =	2579157.880	.053	E =	776516.5670	.0200	BUCYRUS
	Y =	321418.380	.053	N =	97972.0140	.0200	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4468	X =	2551538.560	.053	E =	768098.3020	.0200	CALEDONIA
	Y =	284218.350	.053	N =	86633.2920	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4471	X =	2576343.080	.053	E =	775658.7720	.0200	CARROLVILLE SB
	Y =	297856.700	.053	N =	90790.3400	.0200	
4486	X =	2515200.170	.026	E =	757022.1180	.0100	DOVER RESET
	Y =	251454.970	.026	N =	76646.7620	.0100	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4490	X =	2425814.000	.053	E =	729776.9940	.0200	EAST TROY
	Y =	281006.370	.053	N =	85653.6490	.0200	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4509	X =	2437484.360	.132	E =	733334.1290	.1000	HONEY
	Y =	274604.430	.132	N =	83702.3620	.1000	
4510	X =	2563997.420	.132	E =	771895.6890	.1000	HUSHER
	Y =	303942.940	.132	N =	92645.4130	.1000	
4512	X =	2514682.480	.026	E =	756864.3420	.0200	KANSAS
	Y =	255477.050	.026	N =	77872.6910	.0200	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4534	X =	2516101.410	.026	E =	757296.8450	.0200	MIDWAY RESET
	Y =	252222.320	.026	N =	76880.6550	.0200	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4553	X =	2562969.770	.026	E =	771582.6920	.0100	PLEASANT
	Y =	275128.360	.026	N =	83862.6310	.0100	
4555	X =	2587083.540	.026	E =	778932.5690	.0100	RACINE
	Y =	269538.570	.026	N =	82158.8750	.0100	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	
4568	X =	2488304.690	.026	E =	748824.2910	.0100	SILVER
	Y =	206176.260	.026	N =	62845.5490	.0100	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4579	X =	2560384.200	.132	E =	770794.3020	.1000	VOR
	Y =	323532.200	.132	N =	98616.1510	.1000	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	
4589	X =	2598850.570	.053	E =	782519.1810	.0200	WIND POINT
	Y =	295780.660	.053	N =	90157.6530	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4488	DYSON	4416	SOMERS RESET
4573	STUKA	4518	KENOSHA
4467	BURLINGTON	4578	VILAS
4486	DOVER RESET	4490	EAST TROY
4583	WATERFORD	4469	CAPE
4558	RAYMOND	4468	CALEDONIA
4553	PLEASANT	4555	RACINE
4589	WIND POINT	4466	BUCYRUS

NORTHING TRANSLATION: NT = -3.8764 METERS
EASTING TRANSLATION: ET = -9621.4027 METERS
SCALE: S = .304804469229
ROTATION: THETA = -.000007870880 RADIANS
0 0 -1.623485 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4488	E =	742356.324	742356.517	DELTA E =	-.1929	-.633	DYSON
	N =	67983.088	67983.059	DELTA N =	.0294	.096	
4416	E =	774251.030	774250.992	DELTA E =	.0382	.125	SOMERS RESET
	N =	71036.606	71036.567	DELTA N =	.0395	.130	
4573	E =	731500.802	731500.741	DELTA E =	.0611	.200	STUKA
	N =	78858.538	78858.735	DELTA N =	-.1970	-.646	
4518	E =	731224.961	731224.860	DELTA E =	.1009	.331	KENOSHA
	N =	72952.590	72952.521	DELTA N =	.0686	.225	
4467	E =	740864.834	740864.893	DELTA E =	-.0586	-.192	BURLINGTON
	N =	75681.515	75681.371	DELTA N =	.1436	.471	
4578	E =	747510.744	747510.800	DELTA E =	-.0563	-.185	VILAS
	N =	76483.563	76483.480	DELTA N =	.0829	.272	
4486	E =	757022.118	757022.247	DELTA E =	-.1289	-.423	DOVER RESET
	N =	76646.762	76646.756	DELTA N =	.0055	.018	
4490	E =	729776.994	729776.872	DELTA E =	.1221	.401	EAST TROY
	N =	85653.649	85653.941	DELTA N =	-.2918	-.957	
4583	E =	744746.022	744745.837	DELTA E =	.1852	.608	WATERFORD
	N =	89633.012	89633.174	DELTA N =	-.1623	-.532	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4469	E =	758609.708	758609.651	DELTA E = .0568	.187	CAPE
	N =	92408.799	92408.912	DELTA N = -.1132	-.371	
4558	E =	765727.014	765726.971	DELTA E = .0429	.141	RAYMOND
	N =	93377.719	93377.807	DELTA N = -.0885	-.290	
4468	E =	768098.302	768098.272	DELTA E = .0301	.099	CALEDONIA
	N =	86633.292	86633.268	DELTA N = .0237	.078	
4553	E =	771582.692	771582.578	DELTA E = .1144	.375	PLEASANT
	N =	83862.631	83862.626	DELTA N = .0049	.016	
4555	E =	778932.569	778932.576	DELTA E = -.0069	-.023	RACINE
	N =	82158.875	82158.891	DELTA N = -.0160	-.053	
4589	E =	782519.181	782519.156	DELTA E = .0247	.081	WIND POINT
	N =	90157.653	90157.626	DELTA N = .0274	.090	
4466	E =	776516.567	776516.675	DELTA E = -.1079	-.354	BUCYRUS
	N =	97972.014	97972.070	DELTA N = -.0559	-.184	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

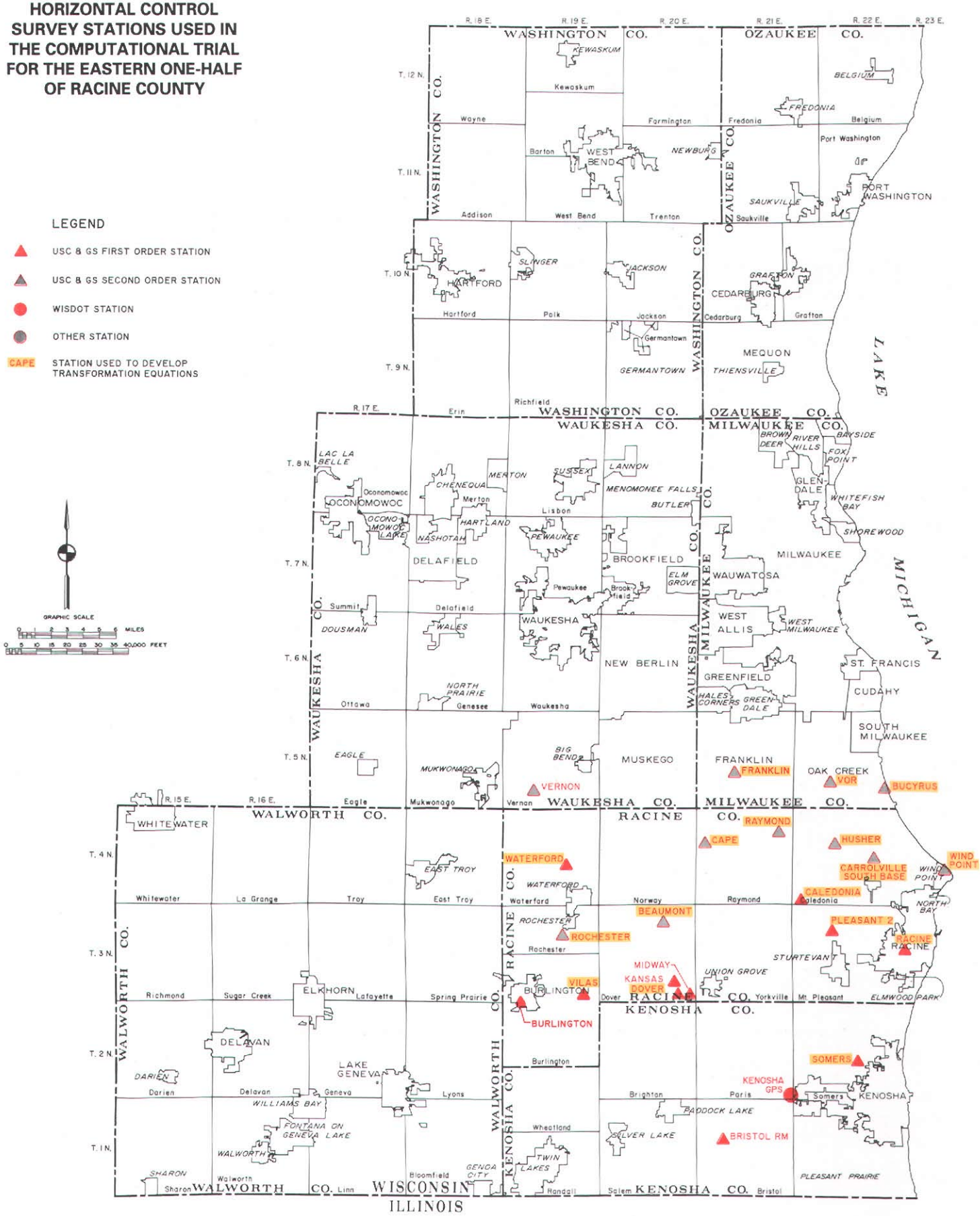
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4408	E =	761342.007	761342.167	DELTA E = -.1600	-.525	BRISTOL RM
	N =	62757.608	62757.652	DELTA N = -.0444	-.146	
4415	E =	767775.309	767775.290	DELTA E = .0193	.063	KENOSHA GPS
	N =	67672.716	67672.671	DELTA N = .0448	.147	
4460	E =	754896.899	754896.944	DELTA E = -.0453	-.149	BEAUMONT
	N =	84209.894	84209.966	DELTA N = -.0718	-.236	
4463	E =	732981.451	732981.458	DELTA E = -.0065	-.021	BLACK
	N =	69843.465	69843.630	DELTA N = -.1652	-.542	
4464	E =	761333.646	761333.776	DELTA E = -.1299	-.426	BRISTOL
	N =	62741.729	62741.745	DELTA N = -.0156	-.051	
4471	E =	775658.772	775658.768	DELTA E = .0042	.014	CARROLVILLE SB
	N =	90790.340	90790.358	DELTA N = -.0178	-.058	
4500	E =	761243.347	761243.264	DELTA E = .0833	.273	FRANKLIN
	N =	99208.427	99208.700	DELTA N = -.2730	-.896	
4509	E =	733334.129	733334.065	DELTA E = .0639	.210	HONEY
	N =	83702.362	83702.629	DELTA N = -.2669	-.876	
4510	E =	771895.689	771895.741	DELTA E = -.0518	-.170	HUSHER
	N =	92645.413	92645.441	DELTA N = -.0284	-.093	
4512	E =	756864.342	756864.443	DELTA E = -.1010	-.331	KANSAS
	N =	77872.691	77872.703	DELTA N = -.0122	-.040	
4514	E =	732399.554	732399.397	DELTA E = .1574	.516	JERICHO
	N =	98521.960	98522.093	DELTA N = -.1329	-.436	
4523	E =	738965.732	738965.780	DELTA E = -.0475	-.156	LANG
	N =	74704.797	74704.611	DELTA N = .1864	.612	
4534	E =	757296.845	757296.947	DELTA E = -.1020	-.335	MIDWAY RESET
	N =	76880.655	76880.650	DELTA N = .0047	.015	
4405	E =	748257.816	748257.749	DELTA E = .0665	.218	NEW BERLIN
	N =	109600.685	109601.086	DELTA N = -.4010	-1.316	
4547	E =	739879.449	739879.504	DELTA E = -.0551	-.181	OCONTO
	N =	75081.660	75081.496	DELTA N = .1637	.537	
4548	E =	741414.301	741414.354	DELTA E = -.0534	-.175	ONEIDA
	N =	75690.667	75690.535	DELTA N = .1319	.433	
4561	E =	744687.945	744687.753	DELTA E = .1922	.631	ROCHESTER
	N =	82717.738	82718.011	DELTA N = -.2728	-.895	
4568	E =	748824.291	748824.493	DELTA E = -.2020	-.663	SILVER
	N =	62845.549	62845.539	DELTA N = .0102	.034	
4576	E =	741622.796	741622.596	DELTA E = .1996	.655	VERNON
	N =	96654.129	96654.327	DELTA N = -.1978	-.649	
4579	E =	770794.302	770794.368	DELTA E = -.0662	-.217	VOR
	N =	98616.151	98616.327	DELTA N = -.1757	-.576	
4588	E =	742065.195	742065.243	DELTA E = -.0481	-.158	WILMONT
	N =	75689.117	75688.977	DELTA N = .1404	.461	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .345 FEET
Y/NORTH DIRECTION: .464 FEET

Map D-13

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE EASTERN ONE-HALF OF RACINE COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
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KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: RACN-SD2.395
RESULTS: RACINE-E.B13

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - EAST HALF, RACINE COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4415	X =	2550478.433	.053	E =	767775.3090	.0010	KENOSHA GPS
	Y =	222012.587	.053	N =	67672.7160	.0010	
4416	X =	2571723.950	.026	E =	774251.0300	.0010	SOMERS RESET
	Y =	233048.660	.026	N =	71036.6060	.0010	
4460	X =	2508227.690	.132	E =	754896.8990	.1000	BEAUMONT
	Y =	276268.340	.132	N =	84209.8940	.1000	
4464	X =	2529345.040	.026	E =	761333.6460	.0100	BRISTOL
	Y =	205835.410	.026	N =	62741.7290	.0100	
4466	X =	2579157.880	.053	E =	776516.5670	.0200	BUCYRUS
	Y =	321418.380	.053	N =	97972.0140	.0200	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4468	X =	2551538.560	.053	E =	768098.3020	.0200	CALEDONIA
	Y =	284218.350	.053	N =	86633.2920	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4471	X =	2576343.080	.053	E =	775658.7720	.0200	CARROLVILLE SB
	Y =	297856.700	.053	N =	90790.3400	.0200	
4486	X =	2515200.170	.026	E =	757022.1180	.0100	DOVER RESET
	Y =	251454.970	.026	N =	76646.7620	.0100	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4510	X =	2563997.420	.132	E =	771895.6890	.1000	HUSHER
	Y =	303942.940	.132	N =	92645.4130	.1000	
4512	X =	2514682.480	.026	E =	756864.3420	.0200	KANSAS
	Y =	255477.050	.026	N =	77872.6910	.0200	
4534	X =	2516101.410	.026	E =	757296.8450	.0200	MIDWAY RESET
	Y =	252222.320	.026	N =	76880.6550	.0200	
4553	X =	2562969.770	.026	E =	771582.6920	.0100	PLEASANT
	Y =	275128.360	.026	N =	83862.6310	.0100	
4555	X =	2587083.540	.026	E =	778932.5690	.0100	RACINE
	Y =	269538.570	.026	N =	82158.8750	.0100	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4579	X =	2560384.200	.132	E =	770794.3020	.1000	VOR
	Y =	323532.200	.132	N =	98616.1510	.1000	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4589	X =	2598850.570	.053	E =	782519.1810	.0200	WIND POINT
	Y =	295780.660	.053	N =	90157.6530	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4466	BUCYRUS	4589	WIND POINT
4555	RACINE	4553	PLEASANT
4468	CALEDONIA	4471	CARROLVILLE SB
4510	HUSHER	4579	VOR
4500	FRANKLIN	4558	RAYMOND
4469	CAPE	4460	BEAUMONT
4486	DOVER RESET	4416	SOMERS RESET
4578	VILAS	4561	ROCHESTER
4583	WATERFORD		

NORTHING TRANSLATION: NT = -4.2907 METERS
EASTING TRANSLATION: ET = -9620.2620 METERS
SCALE: S = .304804050643
ROTATION: THETA = -.000008544191 RADIANS
0 0 -1.762366 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4466	E =	776516.567	776516.670	DELTA E =	-.1029	-.338	BUCYRUS
	N =	97972.014	97972.050	DELTA N =	-.0364	-.119	
4589	E =	782519.181	782519.148	DELTA E =	.0326	.107	WIND POINT **
	N =	90157.653	90157.621	DELTA N =	.0322	.106	
4555	E =	778932.569	778932.578	DELTA E =	-.0093	-.031	RACINE **
	N =	82158.875	82158.895	DELTA N =	-.0198	-.065	
4553	E =	771582.692	771582.589	DELTA E =	.1030	.338	PLEASANT **
	N =	83862.631	83862.623	DELTA N =	.0084	.027	
4468	E =	768098.302	768098.286	DELTA E =	.0158	.052	CALEDONIA **
	N =	86633.292	86633.259	DELTA N =	.0334	.109	
4471	E =	775658.772	775658.769	DELTA E =	.0032	.010	CARROLVILLE SB **
	N =	90790.340	90790.348	DELTA N =	-.0076	-.025	
4510	E =	771895.689	771895.746	DELTA E =	-.0568	-.186	HUSHER **
	N =	92645.413	92645.426	DELTA N =	-.0130	-.043	
4579	E =	770794.302	770794.371	DELTA E =	-.0687	-.225	VOR
	N =	98616.151	98616.302	DELTA N =	-.1514	-.497	
4500	E =	761243.347	761243.279	DELTA E =	.0681	.223	FRANKLIN
	N =	99208.427	99208.668	DELTA N =	-.2414	-.792	
4558	E =	765727.014	765726.984	DELTA E =	.0299	.098	RAYMOND **
	N =	93377.719	93377.787	DELTA N =	-.0680	-.223	
4469	E =	758609.708	758609.675	DELTA E =	.0334	.110	CAPE **
	N =	92408.799	92408.888	DELTA N =	-.0892	-.293	
4460	E =	754896.899	754896.978	DELTA E =	-.0793	-.260	BEAUMONT **
	N =	84209.894	84209.951	DELTA N =	-.0566	-.186	
4486	E =	757022.118	757022.283	DELTA E =	-.1651	-.542	DOVER RESET
	N =	76646.762	76646.753	DELTA N =	.0089	.029	
4416	E =	774251.030	774251.008	DELTA E =	.0219	.072	SOMERS RESET **
	N =	71036.606	71036.582	DELTA N =	.0236	.077	
4578	E =	747510.744	747510.850	DELTA E =	-.1057	-.347	VILAS
	N =	76483.563	76483.471	DELTA N =	.0924	.303	
4561	E =	744687.945	744687.802	DELTA E =	.1431	.470	ROCHESTER
	N =	82717.738	82717.991	DELTA N =	-.2528	-.829	
4583	E =	744746.022	744745.881	DELTA E =	.1409	.462	WATERFORD
	N =	89633.012	89633.145	DELTA N =	-.1328	-.436	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4408	E =	761342.007	761342.207	DELTA E =	-.1997	-.655	BRISTOL RM
	N =	62757.608	62757.671	DELTA N =	-.0630	-.207	
4415	E =	767775.309	767775.317	DELTA E =	-.0082	-.027	KENOSHA GPS
	N =	67672.716	67672.687	DELTA N =	.0287	.094	
4464	E =	761333.646	761333.816	DELTA E =	-.1695	-.556	BRISTOL
	N =	62741.729	62741.763	DELTA N =	-.0342	-.112	
4467	E =	740864.834	740864.952	DELTA E =	-.1177	-.386	BURLINGTON
	N =	75681.515	75681.359	DELTA N =	.1565	.513	
4512	E =	756864.342	756864.479	DELTA E =	-.1366	-.448	KANSAS
	N =	77872.691	77872.698	DELTA N =	-.0070	-.023	
4534	E =	757296.845	757296.983	DELTA E =	-.1377	-.452	MIDWAY RESET **
	N =	76880.655	76880.647	DELTA N =	.0082	.027	
4576	E =	741622.796	741622.640	DELTA E =	.1557	.511	VERNON
	N =	96654.129	96654.286	DELTA N =	-.1565	-.514	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

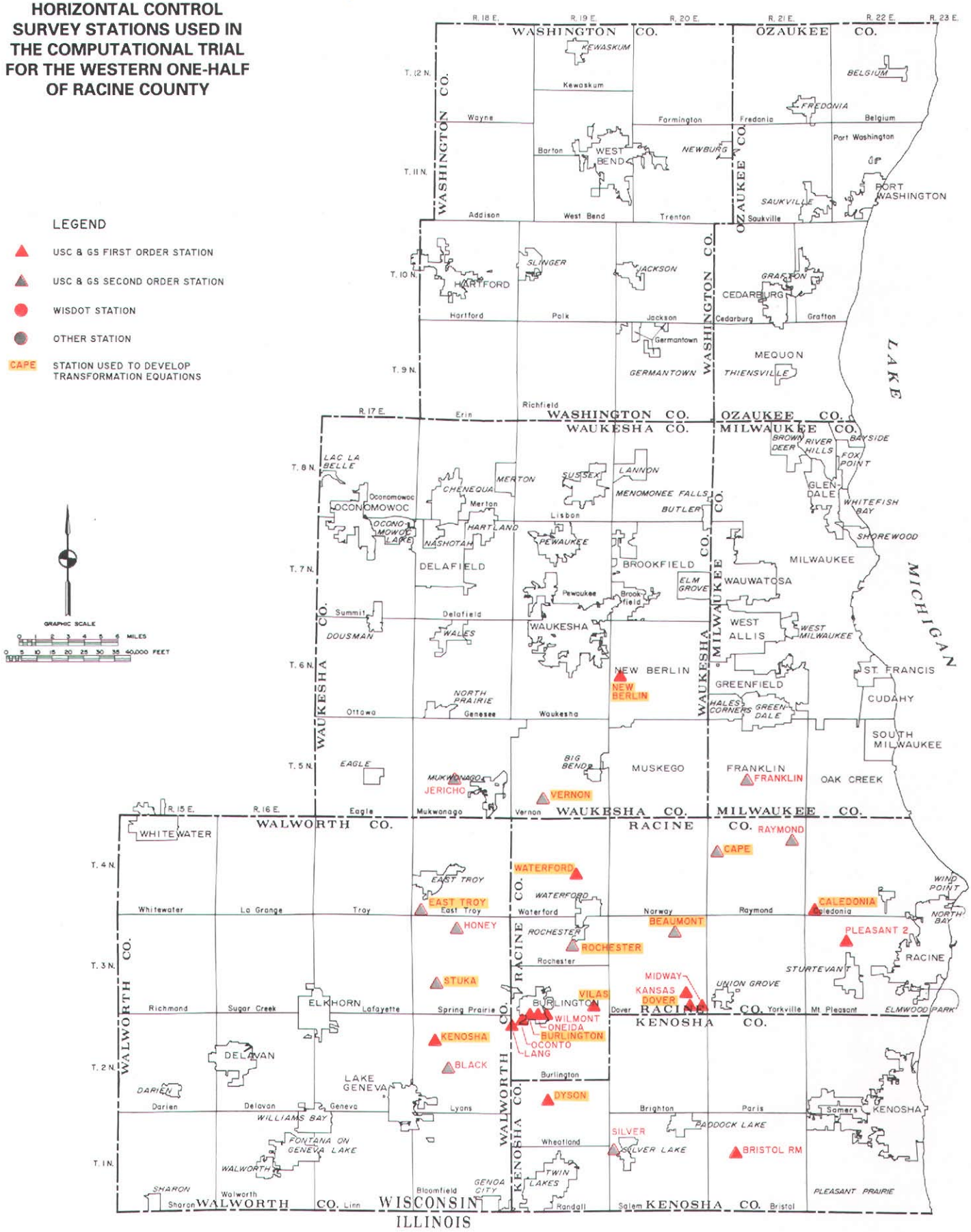
X/EAST DIRECTION:	.343 FEET
Y/NORTH DIRECTION:	.314 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	-0.01 FT	0.21 FT
Y/NORTH DIRECTION:	-0.04 FT	0.14 FT

Map D-14

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE WESTERN ONE-HALF OF RACINE COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 8, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: RACN-SD3.395
RESULTS: RACINE-W.B14

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - WEST HALF, RACINE COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4408	X =	2529372.570	.026	E =	761342.0070	.0100	BRISTOL RM
	Y =	205887.600	.026	N =	62757.6080	.0100	
4460	X =	2508227.690	.132	E =	754896.8990	.1000	BEAUMONT
	Y =	276268.340	.132	N =	84209.8940	.1000	
4463	X =	2436327.170	.132	E =	732981.4510	.1000	BLACK
	Y =	229135.950	.132	N =	69843.4650	.1000	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4468	X =	2551538.560	.053	E =	768098.3020	.0200	CALEDONIA
	Y =	284218.350	.053	N =	86633.2920	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4486	X =	2515200.170	.026	E =	757022.1180	.0100	DOVER RESET
	Y =	251454.970	.026	N =	76646.7620	.0100	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4490	X =	2425814.000	.053	E =	729776.9940	.0200	EAST TROY
	Y =	281006.370	.053	N =	85653.6490	.0200	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4509	X =	2437484.360	.132	E =	733334.1290	.1000	HONEY
	Y =	274604.430	.132	N =	83702.3620	.1000	
4512	X =	2514682.480	.026	E =	756864.3420	.0200	KANSAS
	Y =	255477.050	.026	N =	77872.6910	.0200	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4534	X =	2516101.410	.026	E =	757296.8450	.0200	MIDWAY RESET
	Y =	252222.320	.026	N =	76880.6550	.0200	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4553	X =	2562969.770	.026	E =	771582.6920	.0100	PLEASANT
	Y =	275128.360	.026	N =	83862.6310	.0100	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	
4568	X =	2488304.690	.026	E =	748824.2910	.0100	SILVER
	Y =	206176.260	.026	N =	62845.5490	.0100	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4488	DYSON	4518	KENOSHA
4467	BURLINGTON	4573	STUKA
4578	VILAS	4486	DOVER RESET
4490	EAST TROY	4583	WATERFORD
4469	CAPE	4468	CALEDONIA
4405	NEW BERLIN	4561	ROCHESTER
4460	BEAUMONT	4576	VERNON

NORTHING TRANSLATION:	NT =	-.9132 METERS
EASTING TRANSLATION:	ET =	-9616.2390 METERS
SCALE:	S =	.304802270072
ROTATION:	THETA =	-.000004656034 RADIANS
		0 0 -.960376 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4488	E =	742356.324	742356.474	DELTA E =	-.1496	-.491	DYSON
	N =	67983.088	67983.114	DELTA N =	-.0258	-.085	
4518	E =	731224.961	731224.913	DELTA E =	.0479	.157	KENOSHA
	N =	72952.590	72952.576	DELTA N =	.0135	.044	
4467	E =	740864.834	740864.885	DELTA E =	-.0508	-.167	BURLINGTON **
	N =	75681.515	75681.376	DELTA N =	.1391	.456	
4573	E =	731500.802	731500.811	DELTA E =	-.0089	-.029	STUKA
	N =	78858.538	78858.747	DELTA N =	-.2086	-.684	
4578	E =	747510.744	747510.747	DELTA E =	-.0031	-.010	VILAS **
	N =	76483.563	76483.457	DELTA N =	.1056	.346	
4486	E =	757022.118	757022.126	DELTA E =	-.0076	-.025	DOVER RESET **
	N =	76646.762	76646.702	DELTA N =	.0600	.197	
4490	E =	729776.994	729776.976	DELTA E =	.0179	.059	EAST TROY
	N =	85653.649	85653.909	DELTA N =	-.2599	-.853	
4583	E =	744746.022	744745.846	DELTA E =	.1761	.578	WATERFORD **
	N =	89633.012	89633.066	DELTA N =	-.0536	-.176	
4469	E =	758609.708	758609.569	DELTA E =	.1389	.456	CAPE **
	N =	92408.799	92408.739	DELTA N =	.0602	.197	
4468	E =	768098.302	768098.103	DELTA E =	.1991	.653	CALEDONIA
	N =	86633.292	86633.106	DELTA N =	.1859	.610	
4405	E =	748257.816	748257.797	DELTA E =	.0186	.061	NEW BERLIN
	N =	109600.685	109600.822	DELTA N =	-.1369	-.449	
4561	E =	744687.945	744687.740	DELTA E =	.2049	.672	ROCHESTER **
	N =	82717.738	82717.952	DELTA N =	-.2142	-.703	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4460	E =	754896.899	754896.863	DELTA E = .0363	.119	BEAUMONT **
	N =	84209.894	84209.864	DELTA N = .0304	.100	
4576	E =	741622.796	741622.651	DELTA E = .1454	.477	VERNON **
	N =	96654.129	96654.177	DELTA N = -.0484	-.159	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4408	E =	761342.007	761341.970	DELTA E = .0370	.122	BRISTOL RM
	N =	62757.608	62757.684	DELTA N = -.0763	-.250	
4463	E =	732981.451	732981.488	DELTA E = -.0368	-.121	BLACK
	N =	69843.465	69843.702	DELTA N = -.2371	-.778	
4500	E =	761243.347	761243.185	DELTA E = .1625	.533	FRANKLIN
	N =	99208.427	99208.469	DELTA N = -.0421	-.138	
4509	E =	733334.129	733334.137	DELTA E = -.0084	-.028	HONEY
	N =	83702.362	83702.600	DELTA N = -.2376	-.780	
4512	E =	756864.342	756864.327	DELTA E = .0152	.050	KANSAS **
	N =	77872.691	77872.640	DELTA N = .0506	.166	
4514	E =	732399.554	732399.523	DELTA E = .0307	.101	JERICHO **
	N =	98521.960	98521.960	DELTA N = .0003	.001	
4523	E =	738965.732	738965.782	DELTA E = -.0503	-.165	LANG **
	N =	74704.797	74704.628	DELTA N = .1688	.554	
4534	E =	757296.845	757296.825	DELTA E = .0205	.067	MIDWAY RESET **
	N =	76880.655	76880.593	DELTA N = .0617	.202	
4547	E =	739879.449	739879.502	DELTA E = -.0525	-.172	OCONTO **
	N =	75081.660	75081.508	DELTA N = .1518	.498	
4548	E =	741414.301	741414.343	DELTA E = -.0417	-.137	ONEIDA **
	N =	75690.667	75690.538	DELTA N = .1293	.424	
4553	E =	771582.692	771582.375	DELTA E = .3175	1.042	PLEASANT
	N =	83862.631	83862.473	DELTA N = .1582	.519	
4558	E =	765727.014	765726.841	DELTA E = .1731	.568	RAYMOND
	N =	93377.719	93377.604	DELTA N = .1147	.376	
4568	E =	748824.291	748824.386	DELTA E = -.0955	-.313	SILVER
	N =	62845.549	62845.610	DELTA N = -.0612	-.201	
4588	E =	742065.195	742065.227	DELTA E = -.0316	-.104	WILMONT **
	N =	75689.117	75688.977	DELTA N = .1399	.459	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

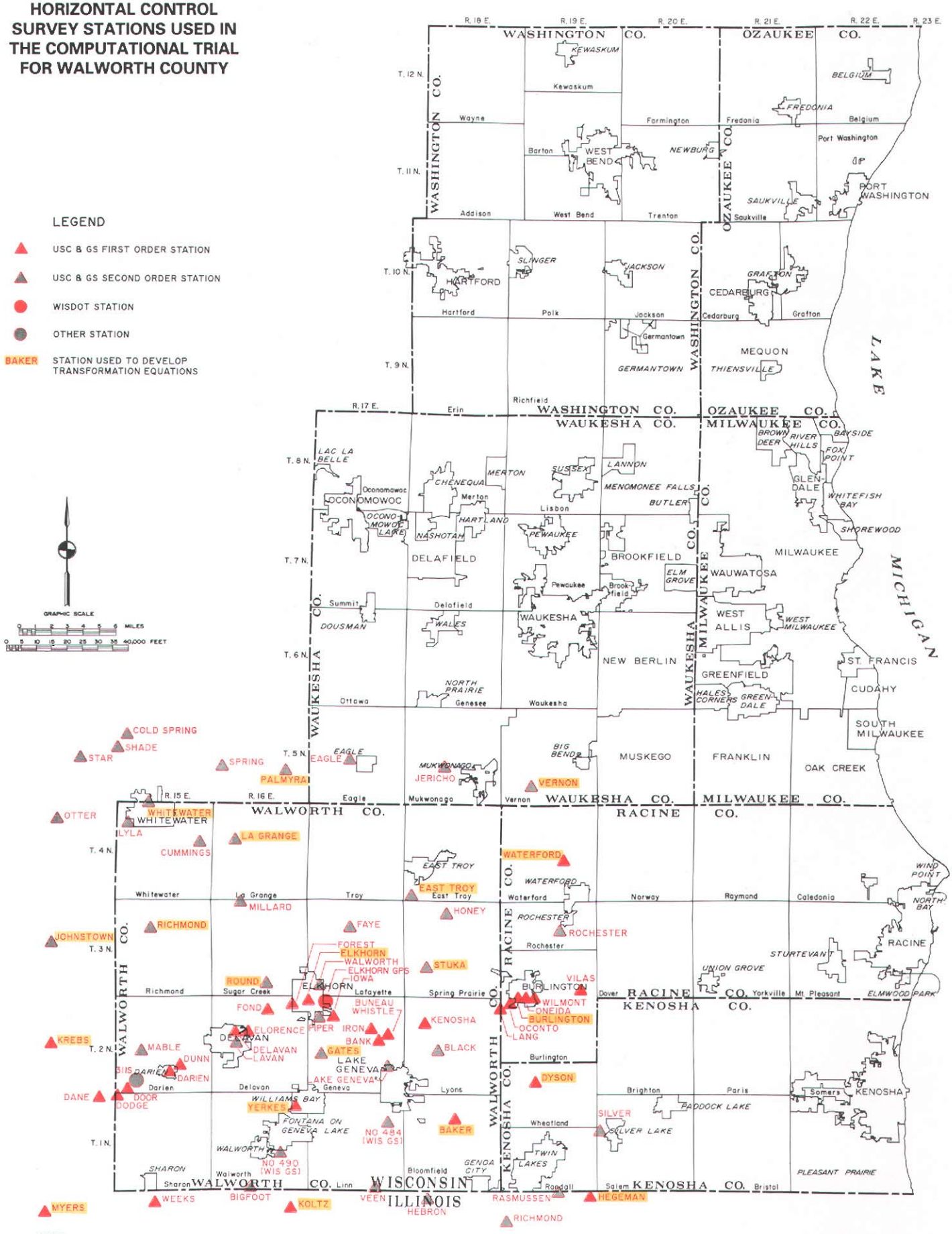
X/EAST DIRECTION:	.351 FEET
Y/NORTH DIRECTION:	.451 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	0.12 FT	0.29 FT
Y/NORTH DIRECTION:	0.17 FT	0.33 FT

Map D-15

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR WALWORTH COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WALW-SD.395
RESULTS: WALWORTH.B15

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - WALWORTH COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4404	X =	2328463.920	.132	E =	700104.6080	.1000	COLD SPRING
	Y =	325928.150	.132	N =	99345.4340	.1000	
4407	X =	2344993.210	.026	E =	705142.7980	.0100	WEEKS
	Y =	177691.150	.026	N =	54162.9040	.0100	
4413	X =	2335430.946	.053	E =	702228.3310	.0010	311S
	Y =	216819.675	.053	N =	66089.3330	.0010	
4414	X =	2399199.486	.053	E =	721664.9810	.0010	ELKHORN GPS
	Y =	245976.732	.053	N =	74976.4350	.0010	
4456	X =	2419453.290	.053	E =	727838.1480	.0200	484 RESET
	Y =	207188.720	.053	N =	63154.0100	.0200	
4457	X =	2384794.750	.053	E =	717274.2200	.0200	490
	Y =	196817.740	.053	N =	59992.6920	.0200	
4458	X =	2441249.950	.026	E =	734481.7570	.0100	BAKER
	Y =	207140.680	.026	N =	63139.3800	.0100	
4459	X =	2416224.140	.026	E =	726854.1040	.0200	BANK
	Y =	236539.250	.026	N =	72100.1550	.0200	
4462	X =	2375925.620	.132	E =	714571.0390	.1000	BIGFOOT
	Y =	183617.690	.132	N =	55969.2830	.1000	
4463	X =	2436327.170	.132	E =	732981.4510	.1000	BLACK
	Y =	229135.950	.132	N =	69843.4650	.1000	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4479	X =	2325217.660	.026	E =	699115.1910	.0200	DANE
	Y =	212885.550	.026	N =	64890.0500	.0200	
4480	X =	2347774.840	.026	E =	705990.5270	.0200	DARIEN
	Y =	222034.620	.026	N =	67678.7820	.0200	
4481	X =	2369863.480	.026	E =	712723.1330	.0200	DELAVAN
	Y =	234600.360	.026	N =	71508.8730	.0200	
4483	X =	2330572.530	.026	E =	700747.3350	.0200	DODGE
	Y =	214167.180	.026	N =	65280.7250	.0200	
4484	X =	2333391.270	.026	E =	701606.4770	.0200	DOOR
	Y =	214954.040	.026	N =	65520.5640	.0200	
4487	X =	2350106.820	.026	E =	706701.2860	.0200	DUNN-2
	Y =	223765.300	.026	N =	68206.2760	.0200	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4490	X =	2425814.000	.053	E =	729776.9940	.0200	EAST TROY
	Y =	281006.370	.053	N =	85653.6490	.0200	
4492	X =	2391941.540	.026	E =	719452.5900	.0200	ELKHORN
	Y =	246201.820	.026	N =	75045.0420	.0200	
4493	X =	2372488.550	.026	E =	713523.2700	.0200	ELORENCE
	Y =	236484.540	.026	N =	72083.1840	.0200	
4494	X =	2380547.630	.026	E =	715979.7160	.0200	FOND
	Y =	242185.230	.026	N =	73820.7640	.0200	
4497	X =	2407247.280	.132	E =	724117.7730	.1000	FAYE
	Y =	271324.780	.132	N =	82702.7090	.1000	
4498	X =	2387871.210	.026	E =	718211.9590	.0200	FOREST
	Y =	244590.290	.026	N =	74553.8440	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4499	X =	2401585.920	.026	E =	722392.2500	.0200	IOWA
	Y =	242625.450	.026	N =	73955.0540	.0200	
4502	X =	2395248.360	.026	E =	720460.5270	.0100	GATES
	Y =	228622.700	.026	N =	69686.9730	.0100	
4506	X =	2433266.170	.132	E =	732048.3510	.1000	HEBRON (ILL)
	Y =	181595.160	.132	N =	55352.8910	.1000	
4508	X =	2487325.560	.026	E =	748525.8400	.0100	HEGEMAN
	Y =	185239.840	.026	N =	56463.9770	.0100	
4509	X =	2437484.360	.132	E =	733334.1290	.1000	HONEY
	Y =	274604.430	.132	N =	83702.3620	.1000	
4511	X =	2414841.960	.026	E =	726432.7900	.0200	IRON
	Y =	237823.700	.026	N =	72491.6380	.0200	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4515	X =	2306936.640	.053	E =	693542.9840	.0200	JOHNSTOWN
	Y =	263130.510	.053	N =	80204.6770	.0200	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4519	X =	2389236.530	.026	E =	718628.0810	.0100	KOLTZ
	Y =	174721.190	.026	N =	53257.7300	.0100	
4520	X =	2306848.330	.026	E =	693516.1230	.0100	KREBS
	Y =	229641.230	.026	N =	69997.1260	.0100	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4522	X =	2419897.140	.132	E =	727973.5650	.1000	LAKE GENEVA
	Y =	226071.750	.132	N =	68909.4580	.1000	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4526	X =	2368186.670	.132	E =	712212.1090	.1000	LAVAN
	Y =	231849.520	.132	N =	70670.4460	.1000	
4528	X =	2332741.970	.132	E =	701408.5840	.1000	LYLA
	Y =	303993.410	.132	N =	92659.7460	.1000	
4529	X =	2338566.700	.132	E =	703183.8480	.1000	MABLE
	Y =	228727.130	.132	N =	69718.5980	.1000	
4535	X =	2369895.270	.132	E =	712732.7910	.1000	MILLARD
	Y =	278429.300	.132	N =	84867.8910	.1000	
4538	X =	2302299.420	.026	E =	692129.8280	.0100	MYERS
	Y =	175017.600	.026	N =	53347.8640	.0100	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4549	X =	2306773.690	.132	E =	693493.3820	.1000	OTTER-2
	Y =	305066.310	.132	N =	92986.6610	.1000	
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4552	X =	2397396.810	.132	E =	721115.3250	.1000	PIPER
	Y =	240585.950	.132	N =	73333.3210	.1000	
4557	X =	2476856.570	.053	E =	745334.8300	.0200	RASMUSSEN
	Y =	185464.090	.053	N =	56532.2480	.0200	
4559	X =	2462492.000	.053	E =	740956.4240	.0200	RICHMOND (ILL)
	Y =	174424.070	.053	N =	53167.1660	.0200	
4560	X =	2338683.070	.053	E =	703219.3160	.0200	RICHMOND (WIS)
	Y =	268341.930	.053	N =	81793.1900	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	
4564	X =	2379121.760	.053	E =	715545.0610	.0200	ROUND
	Y =	250925.710	.053	N =	76484.8630	.0200	
4566	X =	2327656.870	.132	E =	699858.6190	.1000	SHADE
	Y =	323208.210	.132	N =	98516.4130	.1000	
4568	X =	2488304.690	.026	E =	748824.2910	.0100	SILVER
	Y =	206176.260	.026	N =	62845.5490	.0100	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4571	X =	2317307.690	.132	E =	696704.1500	.1000	STAR
	Y =	321003.830	.132	N =	97844.4720	.1000	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4575	X =	2416417.080	.053	E =	726913.0190	.0200	VEEN
	Y =	184161.710	.053	N =	56135.2570	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4582	X =	2394755.710	.132	E =	720310.3090	.1000	WALWORTH
	Y =	251048.000	.132	N =	76522.1990	.1000	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4586	X =	2417660.900	.026	E =	727292.0360	.0200	WHISTLE
	Y =	236147.060	.026	N =	71980.6150	.0200	
4587	X =	2338046.620	.053	E =	703025.4200	.0200	WHITEWATER
	Y =	309303.170	.053	N =	94278.1480	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	
4591	X =	2389084.960	.026	E =	718581.8830	.0100	YERKES
	Y =	211590.900	.026	N =	64495.5620	.0100	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4587	WHITEWATER	4550	PALMYRA
4576	VERNON	4521	LAGRANGE
4490	EAST TROY	4583	WATERFORD
4515	JOHNSTOWN	4560	RICHMOND (WIS)
4564	ROUND	4492	ELKHORN
4573	STUKA	4520	KREBS
4502	GATES	4467	BURLINGTON
4591	YERKES	4458	BAKER
4488	DYSON	4538	MYERS
4519	KOLTZ	4508	HEGEMAN

NORTHING TRANSLATION: NT = -3.0798 METERS
EASTING TRANSLATION: ET = -9612.5613 METERS
SCALE: S = .304800809604
ROTATION: THETA = -.000007754354 RADIANS
0 0 -1.599450 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4587	E =	703025.420	703025.210	DELTA E =	.2097	.688	WHITEWATER
	N =	94278.148	94278.303	DELTA N =	-.1549	-.508	
4550	E =	717503.939	717503.726	DELTA E =	.2128	.698	PALMYRA
	N =	97563.457	97563.528	DELTA N =	-.0708	-.232	
4576	E =	741622.796	741622.429	DELTA E =	.3667	1.203	VERNON
	N =	96654.129	96653.875	DELTA N =	.2537	.832	
4521	E =	711953.843	711953.744	DELTA E =	.0994	.326	LAGRANGE
	N =	91110.021	91110.160	DELTA N =	-.1388	-.455	
4490	E =	729776.994	729776.846	DELTA E =	.1484	.487	EAST TROY
	N =	85653.649	85653.623	DELTA N =	.0262	.086	
4583	E =	744746.022	744745.631	DELTA E =	.3907	1.282	WATERFORD
	N =	89633.012	89632.807	DELTA N =	.2052	.673	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4515	E =	693542.984	693542.972	DELTA E = .0117	.038	JOHNSTOWN
	N =	80204.677	80204.765	DELTA N = -.0882	-.290	
4560	E =	703219.316	703219.298	DELTA E = .0184	.060	RICHMOND (WIS)
	N =	81793.190	81793.285	DELTA N = -.0953	-.313	
4564	E =	715545.061	715545.084	DELTA E = -.0232	-.076	ROUND
	N =	76484.863	76484.903	DELTA N = -.0399	-.131	
4492	E =	719452.590	719452.575	DELTA E = .0153	.050	ELKHORN
	N =	75045.042	75045.088	DELTA N = -.0457	-.150	
4573	E =	731500.802	731500.693	DELTA E = .1088	.357	STUKA
	N =	78858.538	78858.498	DELTA N = .0396	.130	
4520	E =	693516.123	693516.135	DELTA E = -.0115	-.038	KREBS
	N =	69997.126	69997.205	DELTA N = -.0794	-.260	
4502	E =	720460.527	720460.538	DELTA E = -.0106	-.035	GATES
	N =	69686.973	69686.966	DELTA N = .0075	.024	
4467	E =	740864.834	740864.732	DELTA E = .1019	.334	BURLINGTON
	N =	75681.515	75681.172	DELTA N = .3431	1.126	
4591	E =	718581.883	718581.969	DELTA E = -.0856	-.281	YERKES
	N =	64495.562	64495.645	DELTA N = -.0825	-.271	
4458	E =	734481.757	734481.910	DELTA E = -.1533	-.503	BAKER
	N =	63139.380	63139.337	DELTA N = .0428	.140	
4488	E =	742356.324	742356.338	DELTA E = -.0136	-.045	DYSON
	N =	67983.088	67982.951	DELTA N = .1367	.448	
4538	E =	692129.828	692129.752	DELTA E = .0758	.249	MYERS
	N =	53347.864	53347.868	DELTA N = -.0040	-.013	
4519	E =	718628.081	718628.254	DELTA E = -.1734	-.569	KOLTZ
	N =	53257.730	53257.727	DELTA N = .0026	.008	
4508	E =	748525.840	748525.845	DELTA E = -.0053	-.017	HEGEMAN
	N =	56463.977	56464.052	DELTA N = -.0753	-.247	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4404	E =	700104.608	700104.356	DELTA E = .2517	.826	COLD SPRING
	N =	99345.434	99345.588	DELTA N = -.1536	-.504	
4407	E =	705142.798	705142.848	DELTA E = -.0496	-.163	WEEKS
	N =	54162.904	54162.869	DELTA N = .0349	.115	
4413	E =	702228.331	702228.169	DELTA E = .1617	.530	311S
	N =	66089.333	66089.253	DELTA N = .0804	.264	
4414	E =	721664.981	721664.803	DELTA E = .1780	.584	ELKHORN GPS
	N =	74976.435	74976.498	DELTA N = -.0629	-.206	
4456	E =	727838.148	727838.271	DELTA E = -.1225	-.402	484 RESET
	N =	63154.010	63153.928	DELTA N = .0817	.268	
4457	E =	717274.220	717274.344	DELTA E = -.1240	-.407	490
	N =	59992.692	59992.763	DELTA N = -.0713	-.234	
4459	E =	726854.104	726853.954	DELTA E = .1504	.493	BANK
	N =	72100.155	72099.986	DELTA N = .1690	.555	
4462	E =	714571.039	714571.057	DELTA E = -.0182	-.060	BIGFOOT
	N =	55969.283	55969.356	DELTA N = -.0734	-.241	
4463	E =	732981.451	732981.391	DELTA E = .0600	.197	BLACK
	N =	69843.465	69843.502	DELTA N = -.0367	-.120	
4479	E =	699115.191	699115.161	DELTA E = .0302	.099	DANE
	N =	64890.050	64890.104	DELTA N = -.0540	-.177	
4480	E =	705990.527	705990.586	DELTA E = -.0589	-.193	DARIEN
	N =	67678.782	67678.801	DELTA N = -.0192	-.063	
4481	E =	712723.133	712723.192	DELTA E = -.0585	-.192	DELAVAN
	N =	71508.873	71508.901	DELTA N = -.0282	-.092	
4483	E =	700747.335	700747.326	DELTA E = .0086	.028	DODGE
	N =	65280.725	65280.758	DELTA N = -.0335	-.110	
4484	E =	701606.477	701606.479	DELTA E = -.0018	-.006	DOOR
	N =	65520.564	65520.601	DELTA N = -.0367	-.120	
4487	E =	706701.286	706701.371	DELTA E = -.0852	-.279	DUNN-2
	N =	68206.276	68206.319	DELTA N = -.0434	-.142	
4489	E =	723714.090	723713.919	DELTA E = .1708	.560	EAGLE
	N =	98945.102	98945.180	DELTA N = -.0782	-.256	
4493	E =	713523.270	713523.311	DELTA E = -.0405	-.133	ELORENCE
	N =	72083.184	72083.207	DELTA N = -.0229	-.075	

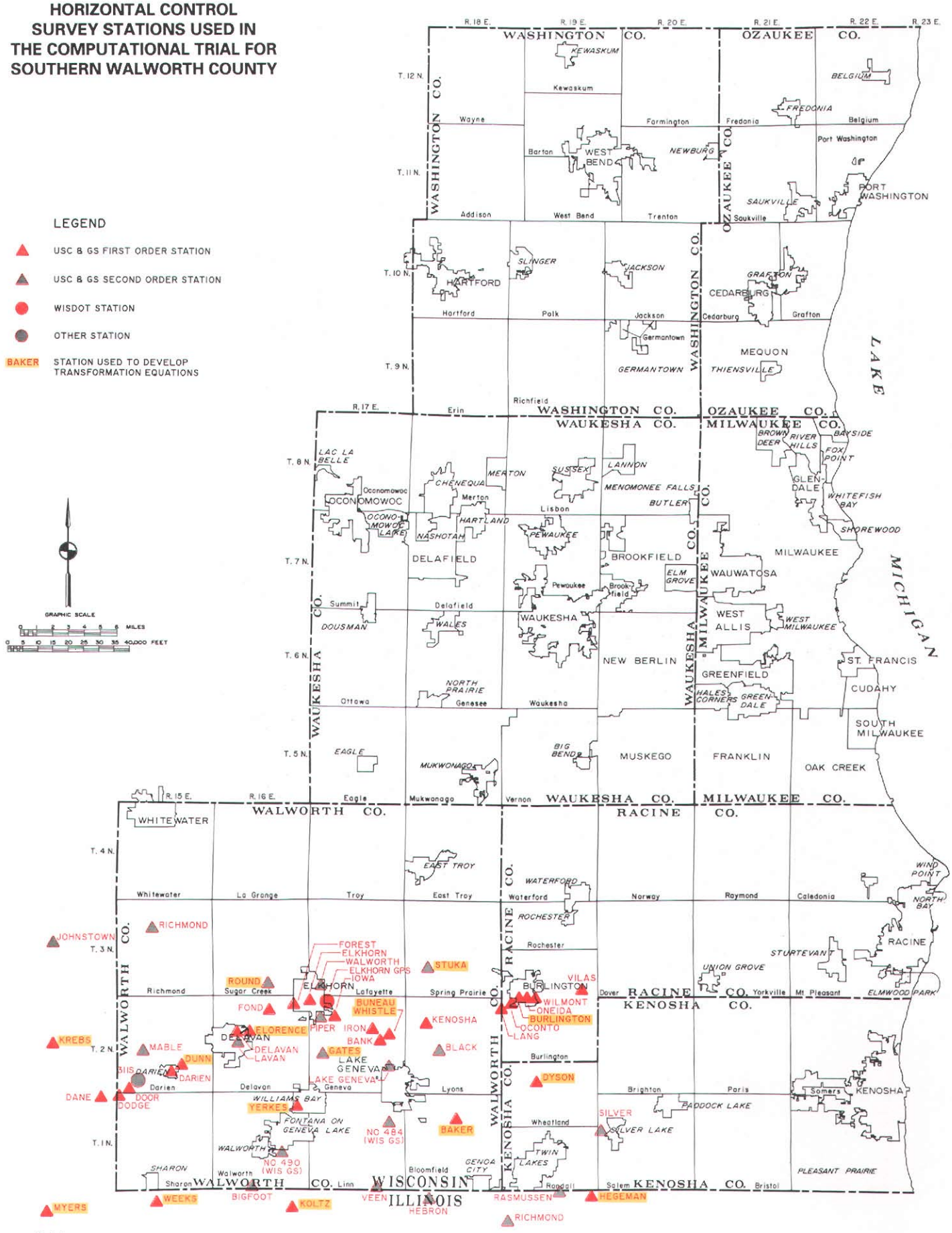
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4494	E =	715979.716	715979.711	DELTA E = .0048	.016	FOND
	N =	73820.764	73820.801	DELTA N = -.0369	-.121	
4497	E =	724117.773	724117.717	DELTA E = .0558	.183	FAYE
	N =	82702.709	82702.622	DELTA N = .0865	.284	
4498	E =	718211.959	718211.939	DELTA E = .0204	.067	FOREST
	N =	74553.844	74553.882	DELTA N = -.0385	-.126	
4499	E =	722392.250	722392.198	DELTA E = .0520	.171	IOWA
	N =	73955.054	73955.030	DELTA N = .0239	.079	
4506	E =	732048.351	732048.508	DELTA E = -.1570	-.515	HEBRON (ILL)
	N =	55352.891	55353.023	DELTA N = -.1321	-.434	
4509	E =	733334.129	733333.996	DELTA E = .1331	.437	HONEY
	N =	83702.362	83702.334	DELTA N = .0281	.092	
4511	E =	726432.790	726432.661	DELTA E = .1290	.423	IRON
	N =	72491.638	72491.484	DELTA N = .1539	.505	
4514	E =	732399.554	732399.340	DELTA E = .2136	.701	JERICHO
	N =	98521.960	98521.620	DELTA N = .3399	1.115	
4518	E =	731224.961	731224.815	DELTA E = .1460	.479	KENOSHA
	N =	72952.590	72952.356	DELTA N = .2343	.769	
4522	E =	727973.565	727973.512	DELTA E = .0532	.175	LAKE GENEVA
	N =	68909.458	68909.492	DELTA N = -.0342	-.112	
4523	E =	738965.732	738965.642	DELTA E = .0903	.296	LANG
	N =	74704.797	74704.423	DELTA N = .3740	1.227	
4526	E =	712212.109	712212.105	DELTA E = .0040	.013	LAVAN
	N =	70670.446	70670.439	DELTA N = .0071	.023	
4528	E =	701408.584	701408.361	DELTA E = .2228	.731	LYLA
	N =	92659.746	92659.871	DELTA N = -.1252	-.411	
4529	E =	703183.848	703183.922	DELTA E = -.0735	-.241	MABLE
	N =	69718.598	69718.662	DELTA N = -.0639	-.210	
4535	E =	712732.791	712732.778	DELTA E = .0134	.044	MILLARD
	N =	84867.891	84867.998	DELTA N = -.1066	-.350	
4547	E =	739879.449	739879.355	DELTA E = .0936	.307	OCONTO
	N =	75081.660	75081.304	DELTA N = .3559	1.168	
4548	E =	741414.301	741414.187	DELTA E = .1137	.373	ONEIDA
	N =	75690.667	75690.335	DELTA N = .3316	1.088	
4549	E =	693493.382	693493.206	DELTA E = .1761	.578	OTTER-2
	N =	92986.661	92986.831	DELTA N = -.1696	-.557	
4552	E =	721115.325	721115.359	DELTA E = -.0337	-.110	PIPER
	N =	73333.321	73333.379	DELTA N = -.0579	-.190	
4557	E =	745334.830	745334.888	DELTA E = -.0581	-.191	RASMUSSEN
	N =	56532.248	56532.379	DELTA N = -.1312	-.430	
4559	E =	740956.424	740956.582	DELTA E = -.1576	-.517	RICHMOND (ILL)
	N =	53167.166	53167.338	DELTA N = -.1722	-.565	
4561	E =	744687.945	744687.547	DELTA E = .3978	1.305	ROCHESTER
	N =	82717.738	82717.726	DELTA N = .0117	.038	
4566	E =	699858.619	699858.373	DELTA E = .2458	.806	SHADE
	N =	98516.413	98516.546	DELTA N = -.1328	-.436	
4568	E =	748824.291	748824.235	DELTA E = .0556	.182	SILVER
	N =	62845.549	62845.492	DELTA N = .0566	.186	
4570	E =	710608.107	710608.014	DELTA E = .0926	.304	SPRING-2
	N =	97409.453	97409.523	DELTA N = -.0695	-.228	
4571	E =	696704.150	696703.940	DELTA E = .2100	.689	STAR
	N =	97844.472	97844.625	DELTA N = -.1525	-.500	
4575	E =	726913.019	726912.886	DELTA E = .1333	.437	VEEN
	N =	56135.257	56135.270	DELTA N = -.0128	-.042	
4578	E =	747510.744	747510.560	DELTA E = .1839	.603	VILAS
	N =	76483.563	76483.270	DELTA N = .2928	.961	
4582	E =	720310.309	720310.325	DELTA E = -.0155	-.051	WALWORTH
	N =	76522.199	76522.214	DELTA N = -.0150	-.049	
4586	E =	727292.036	727291.880	DELTA E = .1558	.511	WHISTLE
	N =	71980.615	71980.450	DELTA N = .1655	.543	
4588	E =	742065.195	742065.068	DELTA E = .1269	.416	WILMONT
	N =	75689.117	75688.777	DELTA N = .3402	1.116	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .419 FEET
Y/NORTH DIRECTION: .474 FEET

Map D-16

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR SOUTHERN WALWORTH COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WALW-SD1.395
RESULTS: WALWOR-S.B16

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - S. HALF, WALWORTH COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4407	X =	2344993.210	.026	E =	705142.7980	.0100	WEEKS
	Y =	177691.150	.026	N =	54162.9040	.0100	
4413	X =	2335430.946	.053	E =	702228.3310	.0010	311S
	Y =	216819.675	.053	N =	66089.3330	.0010	
4414	X =	2399199.486	.053	E =	721664.9810	.0010	ELKHORN GPS
	Y =	245976.732	.053	N =	74976.4350	.0010	
4456	X =	2419453.290	.053	E =	727838.1480	.0200	484 RESET
	Y =	207188.720	.053	N =	63154.0100	.0200	
4457	X =	2384794.750	.053	E =	717274.2200	.0200	490
	Y =	196817.740	.053	N =	59992.6920	.0200	
4458	X =	2441249.950	.026	E =	734481.7570	.0100	BAKER
	Y =	207140.680	.026	N =	63139.3800	.0100	
4459	X =	2416224.140	.026	E =	726854.1040	.0200	BANK
	Y =	236539.250	.026	N =	72100.1550	.0200	
4462	X =	2375925.620	.132	E =	714571.0390	.1000	BIGFOOT
	Y =	183617.690	.132	N =	55969.2830	.1000	
4463	X =	2436327.170	.132	E =	732981.4510	.1000	BLACK
	Y =	229135.950	.132	N =	69843.4650	.1000	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4479	X =	2325217.660	.026	E =	699115.1910	.0200	DANE
	Y =	212885.550	.026	N =	64890.0500	.0200	
4480	X =	2347774.840	.026	E =	705990.5270	.0200	DARIEN
	Y =	222034.620	.026	N =	67678.7820	.0200	
4481	X =	2369863.480	.026	E =	712723.1330	.0200	DELAVAN
	Y =	234600.360	.026	N =	71508.8730	.0200	
4483	X =	2330572.530	.026	E =	700747.3350	.0200	DODGE
	Y =	214167.180	.026	N =	65280.7250	.0200	
4484	X =	2333391.270	.026	E =	701606.4770	.0200	DOOR
	Y =	214954.040	.026	N =	65520.5640	.0200	
4487	X =	2350106.820	.026	E =	706701.2860	.0200	DUNN-2
	Y =	223765.300	.026	N =	68206.2760	.0200	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4492	X =	2391941.540	.026	E =	719452.5900	.0200	ELKHORN
	Y =	246201.820	.026	N =	75045.0420	.0200	
4493	X =	2372488.550	.026	E =	713523.2700	.0200	ELORENCE
	Y =	236484.540	.026	N =	72083.1840	.0200	
4494	X =	2380547.630	.026	E =	715979.7160	.0200	FOND
	Y =	242185.230	.026	N =	73820.7640	.0200	
4498	X =	2387871.210	.026	E =	718211.9590	.0200	FOREST
	Y =	244590.290	.026	N =	74553.8440	.0200	
4499	X =	2401585.920	.026	E =	722392.2500	.0200	IOWA
	Y =	242625.450	.026	N =	73955.0540	.0200	
4502	X =	2395248.360	.026	E =	720460.5270	.0100	GATES
	Y =	228622.700	.026	N =	69686.9730	.0100	
4506	X =	2433266.170	.132	E =	732048.3510	.1000	HEBRON (ILL)
	Y =	181595.160	.132	N =	55352.8910	.1000	
4508	X =	2487325.560	.026	E =	748525.8400	.0100	HEGEMAN
	Y =	185239.840	.026	N =	56463.9770	.0100	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4511	X =	2414841.960	.026	E =	726432.7900	.0200	IRON
	Y =	237823.700	.026	N =	72491.6380	.0200	
4515	X =	2306936.640	.053	E =	693542.9840	.0200	JOHNSTOWN
	Y =	263130.510	.053	N =	80204.6770	.0200	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4519	X =	2389236.530	.026	E =	718628.0810	.0100	KOLTZ
	Y =	174721.190	.026	N =	53257.7300	.0100	
4520	X =	2306848.330	.026	E =	693516.1230	.0100	KREBS
	Y =	229641.230	.026	N =	69997.1260	.0100	
4522	X =	2419897.140	.132	E =	727973.5650	.1000	LAKE GENEVA
	Y =	226071.750	.132	N =	68909.4580	.1000	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4526	X =	2368186.670	.132	E =	712212.1090	.1000	LAVAN
	Y =	231849.520	.132	N =	70670.4460	.1000	
4529	X =	2338566.700	.132	E =	703183.8480	.1000	MABLE
	Y =	228727.130	.132	N =	69718.5980	.1000	
4538	X =	2302299.420	.026	E =	692129.8280	.0100	MYERS
	Y =	175017.600	.026	N =	53347.8640	.0100	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4552	X =	2397396.810	.132	E =	721115.3250	.1000	PIPER
	Y =	240585.950	.132	N =	73333.3210	.1000	
4557	X =	2476856.570	.053	E =	745334.8300	.0200	RASMUSSEN
	Y =	185464.090	.053	N =	56532.2480	.0200	
4559	X =	2462492.000	.053	E =	740956.4240	.0200	RICHMOND (ILL)
	Y =	174424.070	.053	N =	53167.1660	.0200	
4560	X =	2338683.070	.053	E =	703219.3160	.0200	RICHMOND (WIS)
	Y =	268341.930	.053	N =	81793.1900	.0200	
4564	X =	2379121.760	.053	E =	715545.0610	.0200	ROUND
	Y =	250925.710	.053	N =	76484.8630	.0200	
4568	X =	2488304.690	.026	E =	748824.2910	.0100	SILVER
	Y =	206176.260	.026	N =	62845.5490	.0100	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	
4575	X =	2416417.080	.053	E =	726913.0190	.0200	VEEN
	Y =	184161.710	.053	N =	56135.2570	.0200	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4582	X =	2394755.710	.132	E =	720310.3090	.1000	WALWORTH
	Y =	251048.000	.132	N =	76522.1990	.1000	
4586	X =	2417660.900	.026	E =	727292.0360	.0200	WHISTLE
	Y =	236147.060	.026	N =	71980.6150	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	
4591	X =	2389084.960	.026	E =	718581.8830	.0100	YERKES
	Y =	211590.900	.026	N =	64495.5620	.0100	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO COMBINATION OF COMMON POINTS LISTED BELOW:

4564	ROUND	4573	STUKA
4520	KREBS	4502	GATES
4467	BURLINGTON	4591	YERKES
4458	BAKER	4488	DYSON
4538	MYERS	4519	KOLTZ
4508	HEGEMAN	4487	DUNN-2
4407	WEEKS	4586	WHISTLE
4493	ELORENCE		

NORTHING TRANSLATION:	NT =	-3.8575 METERS
EASTING TRANSLATION:	ET =	-9612.6382 METERS
SCALE:	S =	.304800856344
ROTATION:	THETA =	-.000008824677 RADIANS
		0 0 -1.820220 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4564	E =	715545.061	715545.037	DELTA E =	.0244	.080	ROUND
	N =	76484.863	76484.913	DELTA N =	-.0500	-.164	
4573	E =	731500.802	731500.646	DELTA E =	.1564	.513	STUKA
	N =	78858.538	78858.526	DELTA N =	.0121	.040	
4520	E =	693516.123	693516.091	DELTA E =	.0325	.107	KREBS
	N =	69997.126	69997.191	DELTA N =	-.0649	-.213	
4502	E =	720460.527	720460.498	DELTA E =	.0289	.095	GATES **
	N =	69686.973	69686.980	DELTA N =	-.0069	-.022	
4467	E =	740864.834	740864.689	DELTA E =	.1447	.475	BURLINGTON
	N =	75681.515	75681.209	DELTA N =	.3060	1.004	
4591	E =	718581.883	718581.934	DELTA E =	-.0513	-.168	YERKES **
	N =	64495.562	64495.656	DELTA N =	-.0941	-.309	
4458	E =	734481.757	734481.880	DELTA E =	-.1229	-.403	BAKER **
	N =	63139.380	63139.365	DELTA N =	.0145	.048	
4488	E =	742356.324	742356.303	DELTA E =	.0207	.068	DYSON
	N =	67983.088	67982.989	DELTA N =	.0992	.325	
4538	E =	692129.828	692129.726	DELTA E =	.1022	.335	MYERS
	N =	53347.864	53347.849	DELTA N =	.0145	.048	
4519	E =	718628.081	718628.232	DELTA E =	-.1512	-.496	KOLTZ
	N =	53257.730	53257.737	DELTA N =	-.0073	-.024	
4508	E =	748525.840	748525.824	DELTA E =	.0158	.052	HEGEMAN
	N =	56463.977	56464.095	DELTA N =	-.1176	-.386	
4487	E =	706701.286	706701.331	DELTA E =	-.0451	-.148	DUNN-2 **
	N =	68206.276	68206.319	DELTA N =	-.0428	-.140	
4407	E =	705142.798	705142.822	DELTA E =	-.0244	-.080	WEEKS
	N =	54162.904	54162.865	DELTA N =	.0394	.129	
4586	E =	727292.036	727291.839	DELTA E =	.1967	.645	WHISTLE **
	N =	71980.615	71980.472	DELTA N =	.1435	.471	
4493	E =	713523.270	713523.267	DELTA E =	.0026	.009	ELORENCE **
	N =	72083.184	72083.214	DELTA N =	-.0302	-.099	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4413	E =	702228.331	702228.131	DELTA E =	.2002	.657	311S **
	N =	66089.333	66089.247	DELTA N =	.0862	.283	
4414	E =	721664.981	721664.758	DELTA E =	.2230	.732	ELKHORN GPS **
	N =	74976.435	74976.514	DELTA N =	-.0793	-.260	
4456	E =	727838.148	727838.239	DELTA E =	-.0912	-.299	484 RESET **
	N =	63154.010	63153.950	DELTA N =	.0605	.198	
4457	E =	717274.220	717274.314	DELTA E =	-.0944	-.310	490 **
	N =	59992.692	59992.773	DELTA N =	-.0807	-.265	
4459	E =	726854.104	726853.913	DELTA E =	.1915	.628	BANK **
	N =	72100.155	72100.007	DELTA N =	.1475	.484	
4462	E =	714571.039	714571.031	DELTA E =	.0075	.025	BIGFOOT **
	N =	55969.283	55969.362	DELTA N =	-.0793	-.260	
4463	E =	732981.451	732981.353	DELTA E =	.0978	.321	BLACK **
	N =	69843.465	69843.529	DELTA N =	-.0644	-.211	
4479	E =	699115.191	699115.123	DELTA E =	.0679	.223	DANE
	N =	64890.050	64890.095	DELTA N =	-.0447	-.147	
4480	E =	705990.527	705990.546	DELTA E =	-.0193	-.063	DARIEN **
	N =	67678.782	67678.800	DELTA N =	-.0177	-.058	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4481	E =	712723.133	712723.149	DELTA E = -.0159	-.052	DELAVAN **
	N =	71508.873	71508.907	DELTA N = -.0345	-.113	
4483	E =	700747.335	700747.289	DELTA E = .0464	.152	DODGE **
	N =	65280.725	65280.751	DELTA N = -.0260	-.085	
4484	E =	701606.477	701606.441	DELTA E = .0361	.119	DOOR **
	N =	65520.564	65520.594	DELTA N = -.0302	-.099	
4492	E =	719452.590	719452.529	DELTA E = .0607	.199	ELKHORN **
	N =	75045.042	75045.102	DELTA N = -.0598	-.196	
4494	E =	715979.716	715979.667	DELTA E = .0495	.162	FOND **
	N =	73820.764	73820.811	DELTA N = -.0471	-.154	
4498	E =	718211.959	718211.894	DELTA E = .0655	.215	FOREST **
	N =	74553.844	74553.895	DELTA N = -.0511	-.168	
4499	E =	722392.250	722392.154	DELTA E = .0958	.314	IOWA **
	N =	73955.054	73955.047	DELTA N = .0069	.023	
4506	E =	732048.351	732048.486	DELTA E = -.1346	-.442	HEBRON (ILL)
	N =	55352.891	55353.048	DELTA N = -.1567	-.514	
4511	E =	726432.790	726432.619	DELTA E = .1706	.560	IRON **
	N =	72491.638	72491.505	DELTA N = .1328	.436	
4515	E =	693542.984	693542.917	DELTA E = .0666	.218	JOHNSTOWN
	N =	80204.677	80204.752	DELTA N = -.0754	-.247	
4518	E =	731224.961	731224.774	DELTA E = .1873	.615	KENOSHA **
	N =	72952.590	72952.382	DELTA N = .2080	.682	
4522	E =	727973.565	727973.474	DELTA E = .0908	.298	LAKE GENEVA **
	N =	68909.458	68909.514	DELTA N = -.0564	-.185	
4523	E =	738965.732	738965.600	DELTA E = .1324	.434	LANG **
	N =	74704.797	74704.458	DELTA N = .3391	1.113	
4526	E =	712212.109	712212.063	DELTA E = .0459	.150	LAVAN **
	N =	70670.446	70670.445	DELTA N = .0014	.005	
4529	E =	703183.848	703183.879	DELTA E = -.0313	-.103	MABLE **
	N =	69718.598	69718.658	DELTA N = -.0597	-.196	
4547	E =	739879.449	739879.313	DELTA E = .1359	.446	OCONTO
	N =	75081.660	75081.340	DELTA N = .3200	1.050	
4548	E =	741414.301	741414.145	DELTA E = .1564	.513	ONEIDA
	N =	75690.667	75690.373	DELTA N = .2939	.964	
4552	E =	721115.325	721115.315	DELTA E = .0097	.032	PIPER **
	N =	73333.321	73333.394	DELTA N = -.0735	-.241	
4557	E =	745334.830	745334.866	DELTA E = -.0365	-.120	RASMUSSEN
	N =	56532.248	56532.418	DELTA N = -.1701	-.558	
4559	E =	740956.424	740956.563	DELTA E = -.1389	-.456	RICHMOND (ILL)
	N =	53167.166	53167.372	DELTA N = -.2059	-.675	
4560	E =	703219.316	703219.242	DELTA E = .0736	.241	RICHMOND (WIS)
	N =	81793.190	81793.283	DELTA N = -.0930	-.305	
4568	E =	748824.291	748824.208	DELTA E = .0834	.274	SILVER
	N =	62845.549	62845.536	DELTA N = .0130	.043	
4575	E =	726913.019	726912.862	DELTA E = .1573	.516	VEEN **
	N =	56135.257	56135.289	DELTA N = -.0320	-.105	
4578	E =	747510.744	747510.517	DELTA E = .2266	.743	VILAS
	N =	76483.563	76483.314	DELTA N = .2485	.815	
4582	E =	720310.309	720310.278	DELTA E = .0313	.103	WALWORTH
	N =	76522.199	76522.229	DELTA N = -.0302	-.099	
4588	E =	742065.195	742065.026	DELTA E = .1695	.556	WILMONT
	N =	75689.117	75688.815	DELTA N = .3018	.990	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

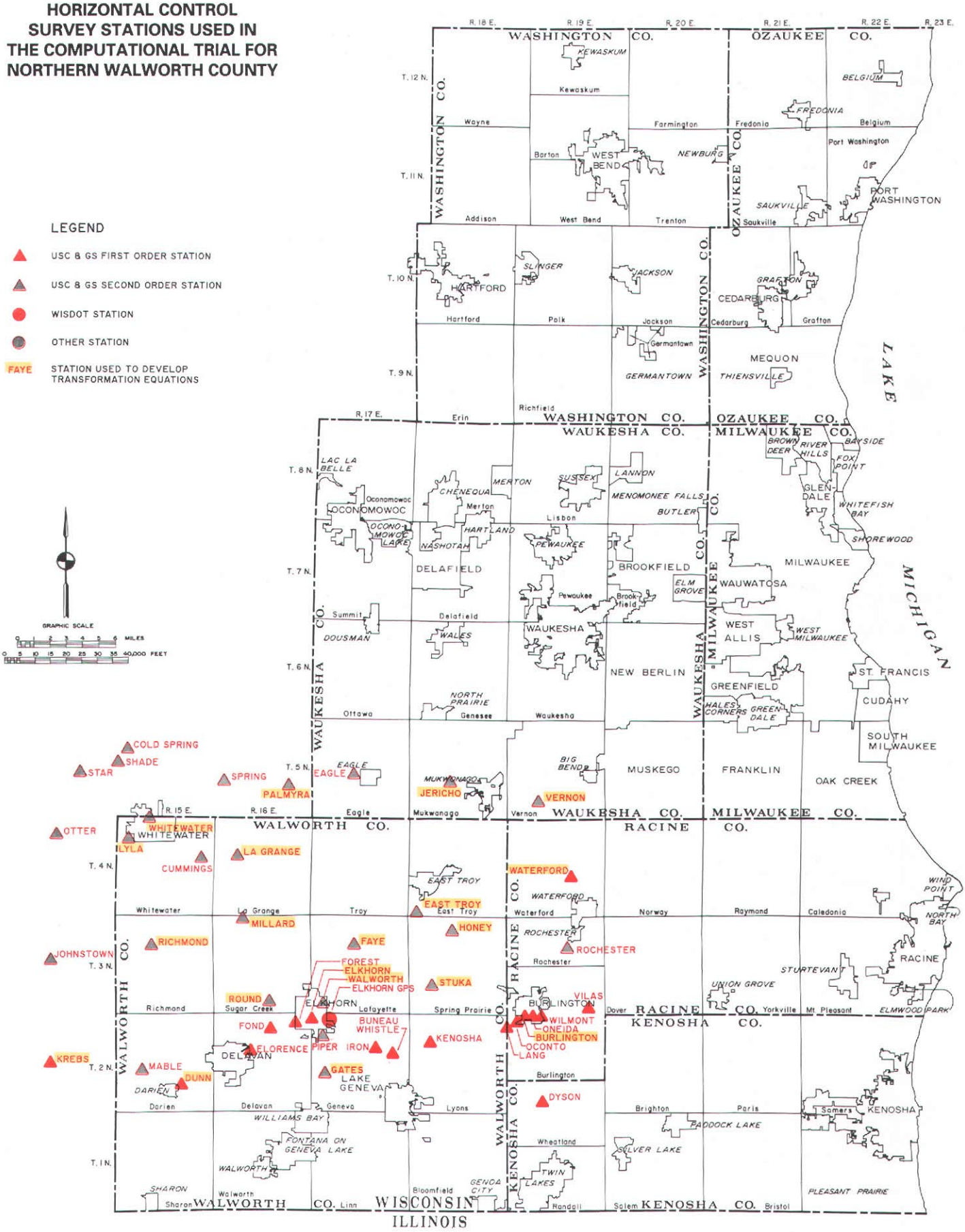
X/EAST DIRECTION: .325 FEET
Y/NORTH DIRECTION: .434 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	0.18 FT	0.32 FT
Y/NORTH DIRECTION:	0.03 FT	0.33 FT

Map D-17

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR NORTHERN WALWORTH COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WALW-SD2.395
RESULTS: WALWOR-N.B17

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - N. HALF, WALWORTH COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4404	X =	2328463.920	.132	E =	700104.6080	.1000	COLD SPRING
	Y =	325928.150	.132	N =	99345.4340	.1000	
4414	X =	2399199.486	.053	E =	721664.9810	.0010	ELKHORN GPS
	Y =	245976.732	.053	N =	74976.4350	.0010	
4467	X =	2462191.230	.026	E =	740864.8340	.0200	BURLINGTON
	Y =	248288.160	.026	N =	75681.5150	.0200	
4487	X =	2350106.820	.026	E =	706701.2860	.0200	DUNN-2
	Y =	223765.300	.026	N =	68206.2760	.0200	
4488	X =	2467084.740	.026	E =	742356.3240	.0100	DYSON
	Y =	223031.560	.026	N =	67983.0880	.0100	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4490	X =	2425814.000	.053	E =	729776.9940	.0200	EAST TROY
	Y =	281006.370	.053	N =	85653.6490	.0200	
4492	X =	2391941.540	.026	E =	719452.5900	.0200	ELKHORN
	Y =	246201.820	.026	N =	75045.0420	.0200	
4493	X =	2372488.550	.026	E =	713523.2700	.0200	ELORENCE
	Y =	236484.540	.026	N =	72083.1840	.0200	
4494	X =	2380547.630	.026	E =	715979.7160	.0200	FOND
	Y =	242185.230	.026	N =	73820.7640	.0200	
4497	X =	2407247.280	.132	E =	724117.7730	.1000	FAYE
	Y =	271324.780	.132	N =	82702.7090	.1000	
4498	X =	2387871.210	.026	E =	718211.9590	.0200	FOREST
	Y =	244590.290	.026	N =	74553.8440	.0200	
4502	X =	2395248.360	.026	E =	720460.5270	.0100	GATES
	Y =	228622.700	.026	N =	69686.9730	.0100	
4509	X =	2437484.360	.132	E =	733334.1290	.1000	HONEY
	Y =	274604.430	.132	N =	83702.3620	.1000	
4511	X =	2414841.960	.026	E =	726432.7900	.0200	IRON
	Y =	237823.700	.026	N =	72491.6380	.0200	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4515	X =	2306936.640	.053	E =	693542.9840	.0200	JOHNSTOWN
	Y =	263130.510	.053	N =	80204.6770	.0200	
4518	X =	2430564.220	.026	E =	731224.9610	.0200	KENOSHA
	Y =	239335.620	.026	N =	72952.5900	.0200	
4520	X =	2306848.330	.026	E =	693516.1230	.0100	KREBS
	Y =	229641.230	.026	N =	69997.1260	.0100	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4523	X =	2455960.610	.026	E =	738965.7320	.0200	LANG
	Y =	245083.660	.026	N =	74704.7970	.0200	
4528	X =	2332741.970	.132	E =	701408.5840	.1000	LYLA
	Y =	303993.410	.132	N =	92659.7460	.1000	
4529	X =	2338566.700	.132	E =	703183.8480	.1000	MABLE
	Y =	228727.130	.132	N =	69718.5980	.1000	
4535	X =	2369895.270	.132	E =	712732.7910	.1000	MILLARD
	Y =	278429.300	.132	N =	84867.8910	.1000	
4547	X =	2458958.360	.026	E =	739879.4490	.0200	OCONTO
	Y =	246320.120	.026	N =	75081.6600	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4548	X =	2463993.900	.026	E =	741414.3010	.0200	ONEIDA
	Y =	248318.210	.026	N =	75690.6670	.0200	
4549	X =	2306773.690	.132	E =	693493.3820	.1000	OTTER-2
	Y =	305066.310	.132	N =	92986.6610	.1000	
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4552	X =	2397396.810	.132	E =	721115.3250	.1000	PIPER
	Y =	240585.950	.132	N =	73333.3210	.1000	
4560	X =	2338683.070	.053	E =	703219.3160	.0200	RICHMOND (WIS)
	Y =	268341.930	.053	N =	81793.1900	.0200	
4561	X =	2474733.420	.132	E =	744687.9450	.1000	ROCHESTER
	Y =	271373.810	.132	N =	82717.7380	.1000	
4564	X =	2379121.760	.053	E =	715545.0610	.0200	ROUND
	Y =	250925.710	.053	N =	76484.8630	.0200	
4566	X =	2327656.870	.132	E =	699858.6190	.1000	SHADE
	Y =	323208.210	.132	N =	98516.4130	.1000	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4571	X =	2317307.690	.132	E =	696704.1500	.1000	STAR
	Y =	321003.830	.132	N =	97844.4720	.1000	
4573	X =	2431469.480	.053	E =	731500.8020	.0200	STUKA
	Y =	258712.670	.053	N =	78858.5380	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4578	X =	2483995.090	.026	E =	747510.7440	.0200	VILAS
	Y =	250919.540	.026	N =	76483.5630	.0200	
4582	X =	2394755.710	.132	E =	720310.3090	.1000	WALWORTH
	Y =	251048.000	.132	N =	76522.1990	.1000	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4586	X =	2417660.900	.026	E =	727292.0360	.0200	WHISTLE
	Y =	236147.060	.026	N =	71980.6150	.0200	
4587	X =	2338046.620	.053	E =	703025.4200	.0200	WHITEWATER
	Y =	309303.170	.053	N =	94278.1480	.0200	
4588	X =	2466129.330	.026	E =	742065.1950	.0200	WILMONT
	Y =	248313.080	.026	N =	75689.1170	.0200	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4520	KREBS	4487	DUNN-2
4502	GATES	4467	BURLINGTON
4564	ROUND	4492	ELKHORN
4573	STUKA	4560	RICHMOND (WIS)
4490	EAST TROY	4583	WATERFORD
4521	LAGRANGE	4587	WHITEWATER
4550	PALMYRA	4576	VERNON
4528	LYLA	4514	JERICHO
4535	MILLARD	4497	FAYE
4509	HONEY	4582	WALWORTH

NORTHING TRANSLATION: NT = -4.8108 METERS
EASTING TRANSLATION: ET = -9614.7439 METERS
SCALE: S = .304801819276
ROTATION: THETA = -.000009782857 RADIANS
0 0 -2.017859 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4520	E =	693516.123	693516.139	DELTA E =	-.0161	-.053	KREBS
	N =	69997.126	69997.132	DELTA N =	-.0065	-.021	
4487	E =	706701.286	706701.423	DELTA E =	-.1371	-.450	DUNN-2
	N =	68206.276	68206.267	DELTA N =	.0087	.028	
4502	E =	720460.527	720460.632	DELTA E =	-.1051	-.345	GATES
	N =	69686.973	69686.946	DELTA N =	.0267	.088	
4467	E =	740864.834	740864.882	DELTA E =	-.0480	-.158	BURLINGTON
	N =	75681.515	75681.214	DELTA N =	.3011	.988	
4564	E =	715545.061	715545.149	DELTA E =	-.0876	-.287	ROUND **
	N =	76484.863	76484.896	DELTA N =	-.0332	-.109	
4492	E =	719452.590	719452.655	DELTA E =	-.0649	-.213	ELKHORN **
	N =	75045.042	75045.084	DELTA N =	-.0422	-.138	
4573	E =	731500.802	731500.806	DELTA E =	-.0036	-.012	STUKA **
	N =	78858.538	78858.532	DELTA N =	.0061	.020	
4560	E =	703219.316	703219.310	DELTA E =	.0056	.018	RICHMOND (WIS) **
	N =	81793.190	81793.271	DELTA N =	-.0812	-.266	
4490	E =	729776.994	729776.939	DELTA E =	.0554	.182	EAST TROY **
	N =	85653.649	85653.675	DELTA N =	-.0263	-.086	
4583	E =	744746.022	744745.766	DELTA E =	.2562	.841	WATERFORD
	N =	89633.012	89632.903	DELTA N =	.1092	.358	
4521	E =	711953.843	711953.766	DELTA E =	.0765	.251	LAGRANGE **
	N =	91110.021	91110.194	DELTA N =	-.1732	-.568	
4587	E =	703025.420	703025.197	DELTA E =	.2229	.731	WHITEWATER **
	N =	94278.148	94278.330	DELTA N =	-.1817	-.596	
4550	E =	717503.939	717503.754	DELTA E =	.1847	.606	PALMYRA
	N =	97563.457	97563.595	DELTA N =	-.1379	-.452	
4576	E =	741622.796	741622.539	DELTA E =	.2569	.843	VERNON
	N =	96654.129	96653.988	DELTA N =	.1407	.462	
4528	E =	701408.584	701408.346	DELTA E =	.2380	.781	LYLA **
	N =	92659.746	92659.889	DELTA N =	-.1434	-.471	
4514	E =	732399.554	732399.416	DELTA E =	.1381	.453	JERICHO
	N =	98521.960	98521.721	DELTA N =	.2394	.786	
4535	E =	712732.791	712732.816	DELTA E =	-.0246	-.081	MILLARD **
	N =	84867.891	84868.013	DELTA N =	-.1220	-.400	
4497	E =	724117.773	724117.797	DELTA E =	-.0244	-.080	FAYE **
	N =	82702.709	82702.654	DELTA N =	.0553	.181	
4509	E =	733334.129	733334.105	DELTA E =	.0244	.080	HONEY **
	N =	83702.362	83702.387	DELTA N =	-.0252	-.083	
4582	E =	720310.309	720310.405	DELTA E =	-.0956	-.314	WALWORTH **
	N =	76522.199	76522.217	DELTA N =	-.0180	-.059	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4404	E =	700104.608	700104.323	DELTA E =	.2849	.935	COLD SPRING
	N =	99345.434	99345.625	DELTA N =	-.1913	-.628	
4414	E =	721664.981	721664.891	DELTA E =	.0903	.296	ELKHORN GPS **
	N =	74976.435	74976.499	DELTA N =	-.0636	-.209	
4488	E =	742356.324	742356.508	DELTA E =	-.1841	-.604	DYSON
	N =	67983.088	67982.971	DELTA N =	.1172	.384	
4489	E =	723714.090	723713.965	DELTA E =	.1249	.410	EAGLE
	N =	98945.102	98945.264	DELTA N =	-.1624	-.533	
4493	E =	713523.270	713523.377	DELTA E =	-.1072	-.352	ELORENCE
	N =	72083.184	72083.182	DELTA N =	.0025	.008	
4494	E =	715979.716	715979.782	DELTA E =	-.0664	-.218	FOND
	N =	73820.764	73820.786	DELTA N =	-.0223	-.073	
4498	E =	718211.959	718212.016	DELTA E =	-.0567	-.186	FOREST
	N =	74553.844	74553.875	DELTA N =	-.0308	-.101	
4511	E =	726432.790	726432.770	DELTA E =	.0204	.067	IRON
	N =	72491.638	72491.486	DELTA N =	.1518	.498	
4515	E =	693542.984	693542.956	DELTA E =	.0277	.091	JOHNSTOWN
	N =	80204.677	80204.726	DELTA N =	-.0492	-.161	
4518	E =	731224.961	731224.939	DELTA E =	.0225	.074	KENOSHA
	N =	72952.590	72952.369	DELTA N =	.2209	.725	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4523	E =	738965.732	738965.787	DELTA E = -.0553	-.181	LANG
	N =	74704.797	74704.458	DELTA N = .3391	1.113	
4529	E =	703183.848	703183.959	DELTA E = -.1107	-.363	MABLE
	N =	69718.598	69718.608	DELTA N = -.0097	-.032	
4547	E =	739879.449	739879.503	DELTA E = -.0542	-.178	OCONTO
	N =	75081.660	75081.342	DELTA N = .3179	1.043	
4548	E =	741414.301	741414.339	DELTA E = -.0380	-.125	ONEIDA
	N =	75690.667	75690.379	DELTA N = .2885	.946	
4549	E =	693493.382	693493.164	DELTA E = .2182	.716	OTTER-2
	N =	92986.661	92986.834	DELTA N = -.1729	-.567	
4552	E =	721115.325	721115.448	DELTA E = -.1229	-.403	PIPER
	N =	73333.321	73333.373	DELTA N = -.0521	-.171	
4561	E =	744687.945	744687.696	DELTA E = .2495	.819	ROCHESTER
	N =	82717.738	82717.799	DELTA N = -.0614	-.201	
4566	E =	699858.619	699858.341	DELTA E = .2781	.912	SHADE
	N =	98516.413	98516.580	DELTA N = -.1673	-.549	
4570	E =	710608.107	710608.020	DELTA E = .0870	.285	SPRING-2
	N =	97409.453	97409.575	DELTA N = -.1221	-.401	
4571	E =	696704.150	696703.899	DELTA E = .2514	.825	STAR
	N =	97844.472	97844.650	DELTA N = -.1784	-.585	
4578	E =	747510.744	747510.730	DELTA E = .0136	.045	VILAS
	N =	76483.563	76483.328	DELTA N = .2347	.770	
4586	E =	727292.036	727291.993	DELTA E = .0434	.142	WHISTLE
	N =	71980.615	71980.452	DELTA N = .1633	.536	
4588	E =	742065.195	742065.222	DELTA E = -.0270	-.089	WILMONT
	N =	75689.117	75688.821	DELTA N = .2957	.970	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

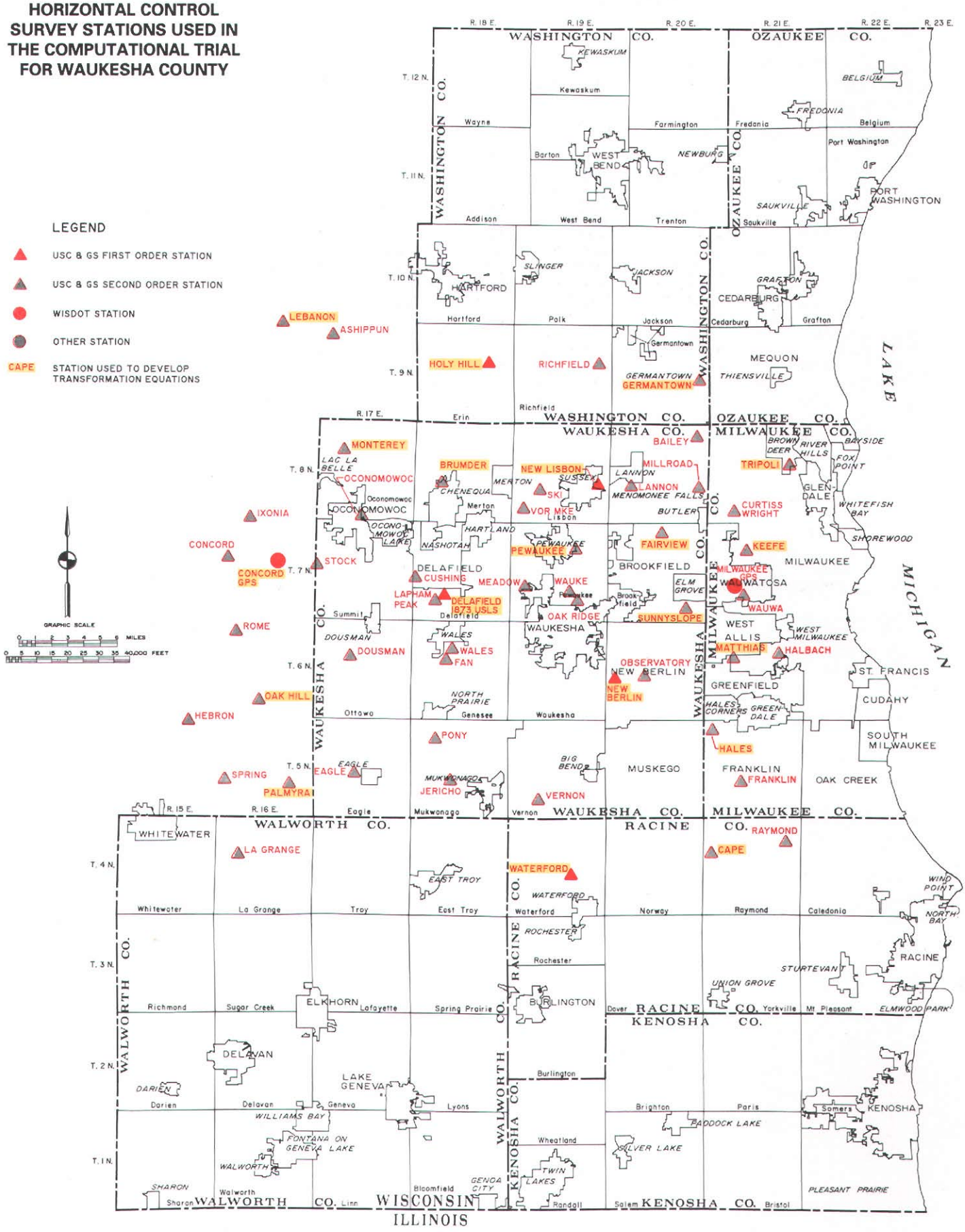
X/EAST DIRECTION: .435 FEET
Y/NORTH DIRECTION: .515 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	0.11 FT	0.36 FT
Y/NORTH DIRECTION:	0.23 FT	0.23 FT

Map D-18

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR WAUKESHA COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WAUK-SD.395
RESULTS: WAUKESHA.B18

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - WAUKESHA COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4423	X =	2392112.960	.132	E =	719505.3190	.1000	ASHIPPUN
	Y =	465719.370	.132	N =	141953.5560	.1000	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4442	X =	2400548.808	.053	E =	722076.1330	.0200	MONTEREY
	Y =	428960.967	.053	N =	130749.9490	.0200	
4444	X =	2481761.850	.053	E =	746829.8130	.0200	RICHFIELD
	Y =	459998.280	.053	N =	140210.1830	.0200	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4473	X =	2363539.730	.053	E =	710795.7840	.0200	CONCORD
	Y =	392609.860	.053	N =	119669.6990	.0200	
4477	X =	2525113.200	.132	E =	760043.2360	.1000	CURTIS WRIGHT
	Y =	412870.970	.132	N =	125846.2350	.1000	
4478	X =	2422692.370	.132	E =	728825.8990	.1000	CUSHING
	Y =	388318.970	.132	N =	118361.9260	.1000	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	
4485	X =	2401868.580	.132	E =	722478.2130	.1000	DOUSMAN
	Y =	364061.140	.132	N =	110968.5080	.1000	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4495	X =	2500294.520	.053	E =	752478.5420	.0200	FAIRVIEW
	Y =	403199.530	.053	N =	122898.2420	.0200	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4504	X =	2540652.260	.053	E =	764779.6940	.0200	HALBACH
	Y =	367523.760	.053	N =	112024.6890	.0200	
4505	X =	2519676.420	.053	E =	758386.4440	.0200	HALES
	Y =	342172.580	.053	N =	104297.5860	.0200	
4507	X =	2350417.840	.132	E =	706795.9510	.1000	HEBRON (WIS)
	Y =	337135.190	.132	N =	102761.5710	.1000	
4513	X =	2366580.838	.132	E =	711722.9320	.1000	IXONIA
	Y =	408317.936	.132	N =	124458.0010	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4516	X =	2529746.890	.053	E =	761455.6360	.0200	KEEFE
	Y =	400880.440	.053	N =	122191.5690	.0200	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4527	X =	2374744.440	.053	E =	714211.2320	.0100	LEBANON RESET
	Y =	468368.970	.053	N =	142760.8110	.0100	
4531	X =	2527249.510	.053	E =	760694.5640	.0200	MATTHIAS
	Y =	366063.370	.053	N =	111579.4940	.0200	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4536	X =	2513320.190	.132	E =	756448.6910	.1000	MILLROAD
	Y =	419802.580	.132	N =	127958.9510	.1000	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4543	X =	2373526.700	.053	E =	713839.7410	.0200	OAK HILL
	Y =	348327.870	.053	N =	106172.9670	.0200	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4545	X =	2495538.290	.132	E =	751028.9960	.0200	OBSERVATORY
	Y =	358581.020	.132	N =	109298.8140	.0200	
4546	X =	2405080.555	.132	E =	723457.4080	.0200	OCONOMOWOC
	Y =	407746.396	.132	N =	124283.8070	.0200	
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4554	X =	2428672.940	.053	E =	730648.4240	.0200	PONY
	Y =	337627.040	.053	N =	102911.6720	.0200	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4562	X =	2368134.700	.132	E =	712196.2280	.1000	ROME
	Y =	368969.790	.132	N =	112464.5050	.1000	
4569	X =	2462533.570	.053	E =	740969.0500	.0200	SKI
	Y =	417368.330	.053	N =	127216.7540	.0200	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4572	X =	2390732.575	.132	E =	719084.1300	.1000	STOCK
	Y =	390553.641	.132	N =	119043.3700	.1000	
4574	X =	2510599.280	.132	E =	755619.4340	.0200	SUNNYSLOPE
	Y =	379356.060	.132	N =	115631.0630	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4580	X =	2458029.980	.132	E =	739596.3470	.1000	VOR MKE -2
	Y =	411816.710	.132	N =	125524.5790	.1000	
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	
4585	X =	2526967.310	.132	E =	760608.4470	.1000	WAUWA
	Y =	384787.130	.132	N =	117286.4820	.1000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO COMBINATION OF COMMON POINTS LISTED BELOW:

4527	LEBANON RESET	4437	HOLY HILL
1004	GERMANTOWN	4442	MONTEREY
4465	BRUMDER	4540	NEW LIBSON RESET
1008	TRIPOLI	4411	CONCORD GPS
4482	DELAFIELD	4551	PEWAUKEE
4495	FAIRVIEW	4516	KEEFE
4574	SUNNYSLOPE	4531	MATTHIAS
4543	OAK HILL	4405	NEW BERLIN
4505	HALES	4550	PALMYRA
4583	WATERFORD	4469	CAPE

```
    NORTHING TRANSLATION:     NT =      -4.6131 METERS
    EASTING TRANSLATION:      ET =   -9603.4183 METERS
    SCALE:                     S =    .304797440512
    ROTATION:              THETA =  -.000011344085 RADIANS
                                    0  0 -2.339885 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

  N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

  E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

  X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

  Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #        PUBLISHED       COMPUTED        DIFFERENCE (M)    (FEET)   STATION
            (NAD83-HPGN)    (NAD83-HPGN)

4527  E =   714211.232      714210.989    DELTA E =   .2426     .796   LEBANON RESET
      N =   142760.811      142761.261    DELTA N =  -.4502   -1.477
4437  E =   735720.585      735720.262    DELTA E =   .3229    1.059   HOLY HILL
      N =   140003.362      140003.460    DELTA N =  -.0982    -.322
1004  E =   756662.381      756662.280    DELTA E =   .1006     .330   GERMANTOWN
      N =   138211.078      138211.184    DELTA N =  -.1059    -.348
4442  E =   722076.133      722076.231    DELTA E =  -.0980    -.321   MONTEREY
      N =   130749.949      130749.892    DELTA N =   .0570     .187
4465  E =   731301.820      731301.646    DELTA E =   .1737     .570   BRUMDER
      N =   127186.236      127186.623    DELTA N =  -.3869   -1.269
4540  E =   746491.568      746491.541    DELTA E =   .0275     .090   NEW LIBSON RESET
      N =   128003.250      128003.253    DELTA N =  -.0031    -.010
1008  E =   765434.573      765434.546    DELTA E =   .0271     .089   TRIPOLI
      N =   130076.373      130076.343    DELTA N =   .0300     .099
4411  E =   714902.335      714902.588    DELTA E =  -.2527    -.829   CONCORD GPS
      N =   120346.789      120346.805    DELTA N =  -.0164    -.054
4482  E =   730976.818      730976.738    DELTA E =   .0804     .264   DELAFIELD
      N =   115961.492      115961.374    DELTA N =   .1175     .386
4551  E =   744529.284      744529.288    DELTA E =  -.0037    -.012   PEWAUKEE
      N =   121596.192      121596.133    DELTA N =   .0594     .195
4495  E =   752478.542      752478.558    DELTA E =  -.0158    -.052   FAIRVIEW
      N =   122898.242      122898.217    DELTA N =   .0252     .083
4516  E =   761455.636      761455.573    DELTA E =   .0632     .207   KEEFE
      N =   122191.569      122191.466    DELTA N =   .1030     .338
4574  E =   755619.434      755619.505    DELTA E =  -.0707    -.232   SUNNYSLOPE
      N =   115631.063      115630.824    DELTA N =   .2392     .785
4531  E =   760694.564      760694.498    DELTA E =   .0659     .216   MATTHIAS
      N =   111579.494      111579.304    DELTA N =   .1905     .625
4543  E =   713839.741      713840.240    DELTA E =  -.4994   -1.639   OAK HILL
      N =   106172.967      106173.037    DELTA N =  -.0700    -.230
4405  E =   748257.816      748257.877    DELTA E =  -.0607    -.199   NEW BERLIN
      N =   109600.685      109600.454    DELTA N =   .2310     .758
4505  E =   758386.444      758386.322    DELTA E =   .1217     .399   HALES
      N =   104297.586      104297.426    DELTA N =   .1603     .526
4550  E =   717503.939      717504.482    DELTA E =  -.5429   -1.781   PALMYRA
      N =    97563.457       97563.526    DELTA N =  -.0692    -.227
4583  E =   744746.022      744746.114    DELTA E =  -.0923    -.303   WATERFORD
      N =    89633.012       89632.991    DELTA N =   .0214     .070
4469  E =   758609.708      758609.599    DELTA E =   .1086     .356   CAPE
      N =    92408.799       92408.713    DELTA N =   .0864     .283

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #        PUBLISHED       COMPUTED        DIFFERENCE (M)    (FEET)   STATION
            (NAD83-HPGN)    (NAD83-HPGN)

 305  E =   749912.023      749912.003    DELTA E =   .0198     .065   LANNON
      N =   127598.398      127598.434    DELTA N =  -.0364    -.120
4412  E =   760211.603      760211.414    DELTA E =   .1886     .619   MILWAUKEE GPS
      N =   117621.111      117620.925    DELTA N =   .1861     .610
```

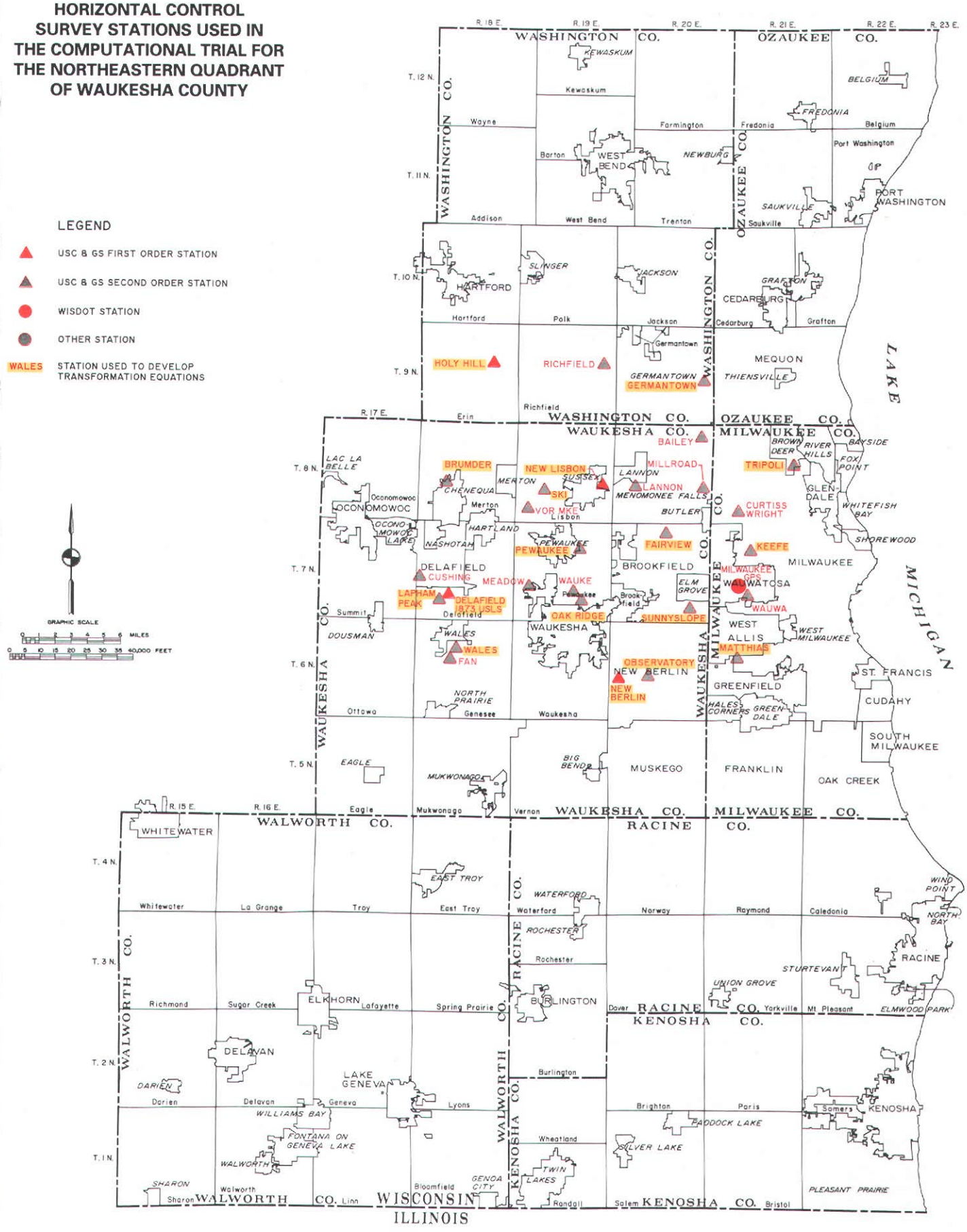
PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4423	E =	719505.319	719504.879	DELTA E = .4400	1.444	ASHIPPUN
	N =	141953.556	141953.730	DELTA N = -.1740	-.571	
4424	E =	756461.978	756461.907	DELTA E = .0713	.234	BAILEY
	N =	132571.880	132571.951	DELTA N = -.0706	-.232	
4444	E =	746829.813	746829.651	DELTA E = .1620	.531	RICHFIELD
	N =	140210.183	140210.266	DELTA N = -.0834	-.274	
4473	E =	710795.784	710796.084	DELTA E = -.3004	-.986	CONCORD
	N =	119669.699	119670.040	DELTA N = -.3407	-1.118	
4477	E =	760043.236	760043.194	DELTA E = .0415	.136	CURTIS WRIGHT
	N =	125846.235	125846.133	DELTA N = .1022	.335	
4478	E =	728825.899	728825.673	DELTA E = .2265	.743	CUSHING
	N =	118361.926	118362.392	DELTA N = -.4659	-1.529	
4485	E =	722478.213	722478.719	DELTA E = -.5055	-1.659	DOUSMAN
	N =	110968.508	110968.595	DELTA N = -.0874	-.287	
4489	E =	723714.090	723714.601	DELTA E = -.5113	-1.677	EAGLE
	N =	98945.102	98945.186	DELTA N = -.0835	-.274	
4496	E =	732083.694	732083.934	DELTA E = -.2402	-.788	FAN
	N =	110987.757	110987.526	DELTA N = .2314	.759	
4500	E =	761243.347	761243.128	DELTA E = .2194	.720	FRANKLIN
	N =	99208.427	99208.353	DELTA N = .0742	.244	
4504	E =	764779.694	764779.617	DELTA E = .0770	.253	HALBACH
	N =	112024.689	112024.473	DELTA N = .2160	.709	
4507	E =	706795.951	706796.758	DELTA E = -.8067	-2.647	HEBRON (WIS)
	N =	102761.571	102761.457	DELTA N = .1141	.374	
4513	E =	711722.932	711722.952	DELTA E = -.0200	-.066	IXONIA
	N =	124458.001	124457.832	DELTA N = .1695	.556	
4514	E =	732399.554	732399.928	DELTA E = -.3740	-1.227	JERICHO
	N =	98521.960	98521.661	DELTA N = .2987	.980	
4521	E =	711953.843	711954.584	DELTA E = -.7408	-2.431	LAGRANGE
	N =	91110.021	91110.210	DELTA N = -.1885	-.619	
4525	E =	730966.931	730967.112	DELTA E = -.1813	-.595	LAPHAM PEAK
	N =	115944.626	115944.614	DELTA N = .0125	.041	
4532	E =	739842.408	739842.352	DELTA E = .0557	.183	MEADOW
	N =	117665.311	117665.238	DELTA N = .0731	.240	
4536	E =	756448.691	756448.691	DELTA E = -.0002	-.001	MILLROAD
	N =	127958.951	127958.829	DELTA N = .1220	.400	
4544	E =	744865.572	744865.598	DELTA E = -.0264	-.087	OAK RIDGE
	N =	116734.940	116734.876	DELTA N = .0637	.209	
4545	E =	751028.996	751029.025	DELTA E = -.0293	-.096	OBSERVATORY
	N =	109298.814	109298.593	DELTA N = .2213	.726	
4546	E =	723457.408	723457.569	DELTA E = -.1612	-.529	OCONOMOWOC
	N =	124283.807	124283.761	DELTA N = .0463	.152	
4554	E =	730648.424	730648.710	DELTA E = -.2862	-.939	PONY
	N =	102911.672	102911.642	DELTA N = .0299	.098	
4558	E =	765727.014	765726.752	DELTA E = .2621	.860	RAYMOND
	N =	93377.719	93377.610	DELTA N = .1087	.357	
4562	E =	712196.228	712196.701	DELTA E = -.4733	-1.553	ROME
	N =	112464.505	112464.623	DELTA N = -.1177	-.386	
4569	E =	740969.050	740969.068	DELTA E = -.0179	-.059	SKI
	N =	127216.754	127216.700	DELTA N = .0538	.176	
4570	E =	710608.107	710608.847	DELTA E = -.7399	-2.427	SPRING-2
	N =	97409.453	97409.498	DELTA N = -.0448	-.147	
4572	E =	719084.130	719084.401	DELTA E = -.2711	-.889	STOCK
	N =	119043.370	119043.403	DELTA N = -.0334	-.110	
4576	E =	741622.796	741622.922	DELTA E = -.1256	-.412	VERNON
	N =	96654.129	96653.970	DELTA N = .1587	.521	
4580	E =	739596.347	739596.404	DELTA E = -.0574	-.188	VOR MKE -2
	N =	125524.579	125524.565	DELTA N = .0139	.046	
4581	E =	732535.766	732536.013	DELTA E = -.2470	-.810	WALES
	N =	111237.975	111237.748	DELTA N = .2269	.744	
4584	E =	744432.284	744432.317	DELTA E = -.0328	-.108	WAUKE
	N =	117255.258	117255.185	DELTA N = .0730	.240	
4585	E =	760608.447	760608.420	DELTA E = .0274	.090	WAUWA
	N =	117286.482	117286.257	DELTA N = .2253	.739	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .901 FEET
Y/NORTH DIRECTION: .555 FEET

Map D-19

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE NORTHEASTERN QUADRANT OF WAUKESHA COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WAUK-SD1.395
RESULTS: WAUKESH1.B19

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - NE 1/4, WAUKESHA COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
305	X =	2491874.170	.132	E =	749912.0230	.1000	LANNON
	Y =	418620.417	.132	N =	127598.3980	.1000	
1004	X =	2514021.329	.053	E =	756662.3810	.0200	GERMANTOWN
	Y =	453439.190	.053	N =	138211.0780	.0200	
1008	X =	2542801.667	.053	E =	765434.5730	.0200	TRIPOLI
	Y =	426749.528	.053	N =	130076.3730	.0200	
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4424	X =	2513363.720	.132	E =	756461.9780	.1000	BAILEY
	Y =	434937.620	.132	N =	132571.8800	.1000	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4444	X =	2481761.850	.053	E =	746829.8130	.0200	RICHFIELD
	Y =	459998.280	.053	N =	140210.1830	.0200	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
4477	X =	2525113.200	.132	E =	760043.2360	.1000	CURTIS WRIGHT
	Y =	412870.970	.132	N =	125846.2350	.1000	
4478	X =	2422692.370	.132	E =	728825.8990	.1000	CUSHING
	Y =	388318.970	.132	N =	118361.9260	.1000	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	
4495	X =	2500294.520	.053	E =	752478.5420	.0200	FAIRVIEW
	Y =	403199.530	.053	N =	122898.2420	.0200	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4516	X =	2529746.890	.053	E =	761455.6360	.0200	KEEFE
	Y =	400880.440	.053	N =	122191.5690	.0200	
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4531	X =	2527249.510	.053	E =	760694.5640	.0200	MATTHIAS
	Y =	366063.370	.053	N =	111579.4940	.0200	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4536	X =	2513320.190	.132	E =	756448.6910	.1000	MILLROAD
	Y =	419802.580	.132	N =	127958.9510	.1000	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4545	X =	2495538.290	.132	E =	751028.9960	.0200	OBSERVATORY
	Y =	358581.020	.132	N =	109298.8140	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4569	X =	2462533.570	.053	E =	740969.0500	.0200	SKI
	Y =	417368.330	.053	N =	127216.7540	.0200	
4574	X =	2510599.280	.132	E =	755619.4340	.0200	SUNNYSLOPE
	Y =	379356.060	.132	N =	115631.0630	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4580	X =	2458029.980	.132	E =	739596.3470	.1000	VOR MKE -2
	Y =	411816.710	.132	N =	125524.5790	.1000	
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	
4585	X =	2526967.310	.132	E =	760608.4470	.1000	WAUWA
	Y =	384787.130	.132	N =	117286.4820	.1000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4437	HOLY HILL	1004	GERMANTOWN
4465	BRUMDER	4540	NEW LIBSON RESET
1008	TRIPOLI	4569	SKI
4482	DELAFIELD	4551	PEWAUKEE
4495	FAIRVIEW	4516	KEEFE
4525	LAPHAM PEAK	4544	OAK RIDGE
4574	SUNNYSLOPE	4581	WALES
4405	NEW BERLIN	4545	OBSERVATORY
4531	MATTHIAS		

NORTHING TRANSLATION: NT = -2.5590 METERS
EASTING TRANSLATION: ET = -9600.1957 METERS
SCALE: S = .304796052668
ROTATION: THETA = -.000009415427 RADIANS
0 0 -1.942071 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4437	E =	735720.585	735720.361	DELTA E =	.2240	.735	HOLY HILL
	N =	140003.362	140003.439	DELTA N =	-.0774	-.254	
1004	E =	756662.381	756662.280	DELTA E =	.1005	.330	GERMANTOWN
	N =	138211.078	138211.131	DELTA N =	-.0528	-.173	
4465	E =	731301.820	731301.741	DELTA E =	.0795	.261	BRUMDER
	N =	127186.236	127186.669	DELTA N =	-.4329	-1.420	
4540	E =	746491.568	746491.567	DELTA E =	.0008	.003	NEW LIBSON RESET **
	N =	128003.250	128003.266	DELTA N =	-.0160	-.053	
1008	E =	765434.573	765434.490	DELTA E =	.0827	.271	TRIPOLI
	N =	130076.373	130076.310	DELTA N =	.0630	.207	
4569	E =	740969.050	740969.118	DELTA E =	-.0682	-.224	SKI **
	N =	127216.754	127216.727	DELTA N =	.0266	.087	
4482	E =	730976.818	730976.812	DELTA E =	.0063	.021	DELAFIELD
	N =	115961.492	115961.472	DELTA N =	.0198	.065	
4551	E =	744529.284	744529.311	DELTA E =	-.0269	-.088	PEWAUKEE **
	N =	121596.192	121596.179	DELTA N =	.0135	.044	
4495	E =	752478.542	752478.547	DELTA E =	-.0053	-.018	FAIRVIEW **
	N =	122898.242	122898.242	DELTA N =	.0005	.002	
4516	E =	761455.636	761455.520	DELTA E =	.1159	.380	KEEFE
	N =	122191.569	122191.477	DELTA N =	.0925	.303	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4525	E =	730966.931	730967.186	DELTA E =	-.2554	-.838	LAPHAM PEAK
	N =	115944.626	115944.711	DELTA N =	-.0854	-.280	
4544	E =	744865.572	744865.611	DELTA E =	-.0387	-.127	OAK RIDGE **
	N =	116734.940	116734.944	DELTA N =	-.0037	-.012	
4574	E =	755619.434	755619.466	DELTA E =	-.0319	-.105	SUNNYSLOPE **
	N =	115631.063	115630.876	DELTA N =	.1875	.615	
4581	E =	732535.766	732536.071	DELTA E =	-.3048	-1.000	WALES
	N =	111237.975	111237.864	DELTA N =	.1107	.363	
4405	E =	748257.816	748257.860	DELTA E =	-.0438	-.144	NEW BERLIN
	N =	109600.685	109600.547	DELTA N =	.1376	.451	
4545	E =	751028.996	751028.995	DELTA E =	.0007	.002	OBSERVATORY
	N =	109298.814	109298.682	DELTA N =	.1319	.433	
4531	E =	760694.564	760694.428	DELTA E =	.1355	.445	MATTHIAS
	N =	111579.494	111579.364	DELTA N =	.1301	.427	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
305	E =	749912.023	749912.013	DELTA E =	.0095	.031	LANNON **
	N =	127598.398	127598.443	DELTA N =	-.0447	-.147	
4412	E =	760211.603	760211.359	DELTA E =	.2445	.802	MILWAUKEE GPS
	N =	117621.111	117620.959	DELTA N =	.1523	.500	
4424	E =	756461.978	756461.897	DELTA E =	.0812	.266	BAILEY **
	N =	132571.880	132571.924	DELTA N =	-.0436	-.143	
4444	E =	746829.813	746829.700	DELTA E =	.1133	.372	RICHFIELD
	N =	140210.183	140210.223	DELTA N =	-.0401	-.132	
4477	E =	760043.236	760043.155	DELTA E =	.0807	.265	CURTIS WRIGHT
	N =	125846.235	125846.129	DELTA N =	.1055	.346	
4478	E =	728825.899	728825.761	DELTA E =	.1380	.453	CUSHING
	N =	118361.926	118362.483	DELTA N =	-.5569	-1.827	
4496	E =	732083.694	732083.994	DELTA E =	-.2996	-.983	FAN
	N =	110987.757	110987.644	DELTA N =	.1131	.371	
4532	E =	739842.408	739842.389	DELTA E =	.0187	.061	MEADOW **
	N =	117665.311	117665.311	DELTA N =	.0003	.001	
4536	E =	756448.691	756448.672	DELTA E =	.0185	.061	MILLROAD **
	N =	127958.951	127958.823	DELTA N =	.1280	.420	
4580	E =	739596.347	739596.458	DELTA E =	-.1106	-.363	VOR MKE -2 **
	N =	125524.579	125524.603	DELTA N =	-.0237	-.078	
4584	E =	744432.284	744432.332	DELTA E =	-.0481	-.158	WAUKE **
	N =	117255.258	117255.251	DELTA N =	.0071	.023	
4585	E =	760608.447	760608.361	DELTA E =	.0857	.281	WAUWA
	N =	117286.482	117286.291	DELTA N =	.1908	.626	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

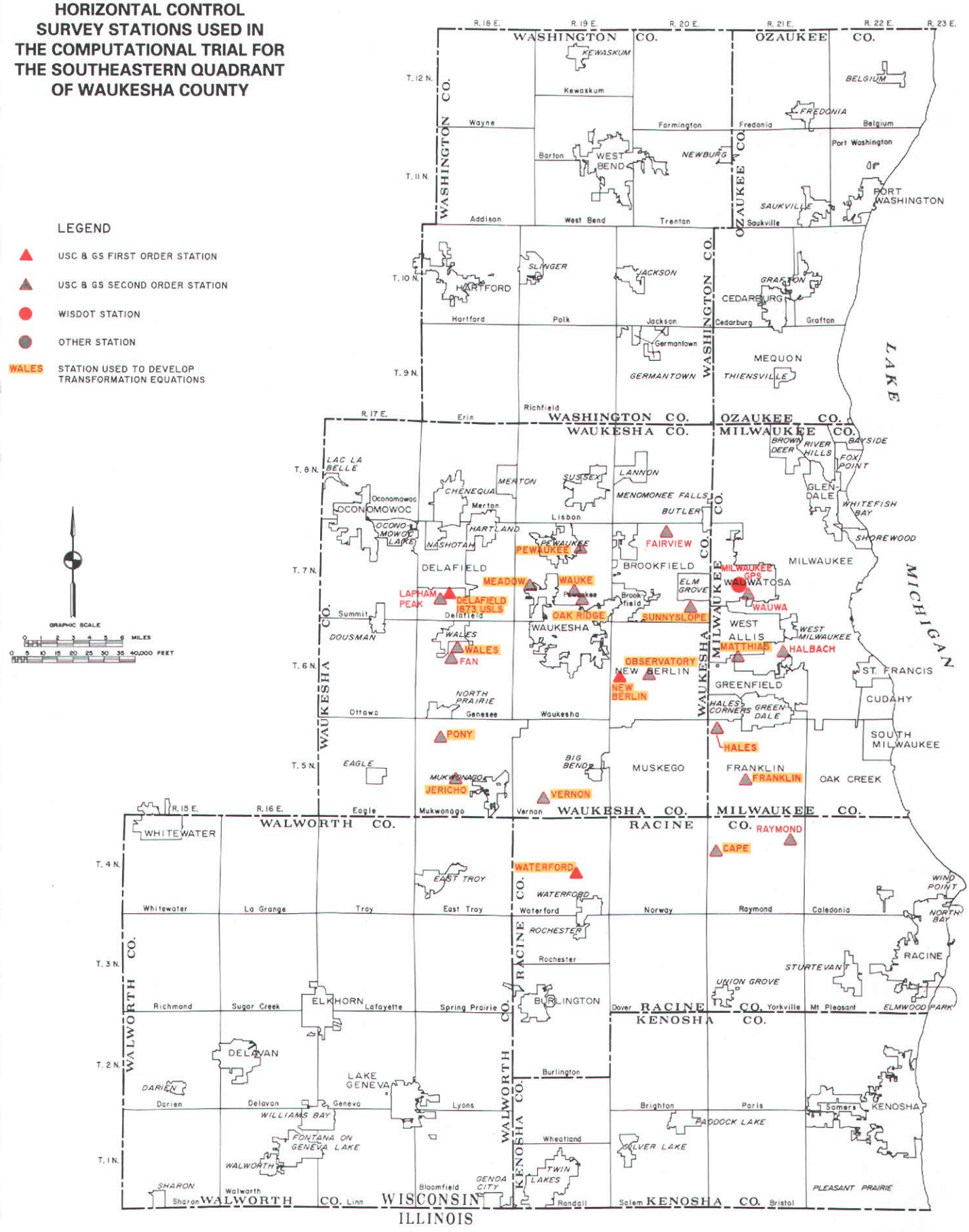
X/EAST DIRECTION:	.433 FEET
Y/NORTH DIRECTION:	.531 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	-0.06 FT	0.16 FT
Y/NORTH DIRECTION:	0.06 FT	0.23 FT

Map D-20

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE SOUTHEASTERN QUADRANT OF WAUKESHA COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: MARCH 7, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WAUK-SD2.395
RESULTS: WAUKESH2.B20

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - SE 1/4, WAUKESHA COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4412	X =	2525664.801	.053	E =	760211.6030	.0010	MILWAUKEE GPS
	Y =	385885.147	.053	N =	117621.1110	.0010	
4469	X =	2520408.520	.053	E =	758609.7080	.0200	CAPE
	Y =	303167.280	.053	N =	92408.7990	.0200	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	
4495	X =	2500294.520	.053	E =	752478.5420	.0200	FAIRVIEW
	Y =	403199.530	.053	N =	122898.2420	.0200	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4500	X =	2529049.030	.132	E =	761243.3470	.1000	FRANKLIN
	Y =	325475.900	.132	N =	99208.4270	.1000	
4504	X =	2540652.260	.053	E =	764779.6940	.0200	HALBACH
	Y =	367523.760	.053	N =	112024.6890	.0200	
4505	X =	2519676.420	.053	E =	758386.4440	.0200	HALES
	Y =	342172.580	.053	N =	104297.5860	.0200	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4531	X =	2527249.510	.053	E =	760694.5640	.0200	MATTHIAS
	Y =	366063.370	.053	N =	111579.4940	.0200	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4545	X =	2495538.290	.132	E =	751028.9960	.0200	OBSERVATORY
	Y =	358581.020	.132	N =	109298.8140	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4554	X =	2428672.940	.053	E =	730648.4240	.0200	PONY
	Y =	337627.040	.053	N =	102911.6720	.0200	
4558	X =	2543758.990	.053	E =	765727.0140	.0200	RAYMOND
	Y =	306345.840	.053	N =	93377.7190	.0200	
4574	X =	2510599.280	.132	E =	755619.4340	.0200	SUNNYSLOPE
	Y =	379356.060	.132	N =	115631.0630	.0200	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	
4585	X =	2526967.310	.132	E =	760608.4470	.1000	WAUWA
	Y =	384787.130	.132	N =	117286.4820	.1000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4482	DELAFIELD	4551	PEWAUKEE
4574	SUNNYSLOPE	4581	WALES
4405	NEW BERLIN	4545	OBSERVATORY
4531	MATTHIAS	4554	PONY
4514	JERICHO	4576	VERNON
4583	WATERFORD	4469	CAPE
4505	HALES	4544	OAK RIDGE
4584	WAUKE	4532	MEADOW
4500	FRANKLIN		

NORTHING TRANSLATION: NT = -4.5463 METERS
EASTING TRANSLATION: ET = -9605.6902 METERS
SCALE: S = .304798339692
ROTATION: THETA = -.000010992850 RADIANS
0 0 -2.267438 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4482	E =	730976.818	730976.691	DELTA E = .1268	.416	DELAFIELD
	N =	115961.492	115961.523	DELTA N = -.0312	-.102	
4551	E =	744529.284	744529.283	DELTA E = .0008	.003	PEWAUKEE
	N =	121596.192	121596.293	DELTA N = -.1011	-.332	
4574	E =	755619.434	755619.531	DELTA E = -.0968	-.318	SUNNYSLOPE **
	N =	115631.063	115630.963	DELTA N = .1001	.328	
4581	E =	732535.766	732535.969	DELTA E = -.2035	-.668	WALES **
	N =	111237.975	111237.882	DELTA N = .0927	.304	
4405	E =	748257.816	748257.879	DELTA E = -.0630	-.207	NEW BERLIN **
	N =	109600.685	109600.578	DELTA N = .1071	.351	
4545	E =	751028.996	751029.036	DELTA E = -.0397	-.130	OBSERVATORY **
	N =	109298.814	109298.715	DELTA N = .0992	.326	
4531	E =	760694.564	760694.538	DELTA E = .0262	.086	MATTHIAS
	N =	111579.494	111579.429	DELTA N = .0651	.214	
4554	E =	730648.424	730648.658	DELTA E = -.2342	-.768	PONY
	N =	102911.672	102911.752	DELTA N = -.0804	-.264	
4514	E =	732399.554	732399.880	DELTA E = -.3256	-1.068	JERICHO
	N =	98521.960	98521.758	DELTA N = .2019	.662	
4576	E =	741622.796	741622.900	DELTA E = -.1038	-.341	VERNON **
	N =	96654.129	96654.058	DELTA N = .0707	.232	
4583	E =	744746.022	744746.099	DELTA E = -.0773	-.254	WATERFORD
	N =	89633.012	89633.057	DELTA N = -.0448	-.147	
4469	E =	758609.708	758609.626	DELTA E = .0818	.268	CAPE **
	N =	92408.799	92408.782	DELTA N = .0169	.055	
4505	E =	758386.444	758386.353	DELTA E = .0914	.300	HALES **
	N =	104297.586	104297.530	DELTA N = .0556	.183	
4544	E =	744865.572	744865.593	DELTA E = -.0212	-.070	OAK RIDGE **
	N =	116734.940	116735.022	DELTA N = -.0824	-.270	
4584	E =	744432.284	744432.311	DELTA E = -.0265	-.087	WAUKE
	N =	117255.258	117255.333	DELTA N = -.0748	-.245	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4532	E =	739842.408	739842.333	DELTA E = .0754	.247	MEADOW
	N =	117665.311	117665.388	DELTA N = -.0775	-.254	
4500	E =	761243.347	761243.165	DELTA E = .1825	.599	FRANKLIN
	N =	99208.427	99208.441	DELTA N = -.0144	-.047	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4412	E =	760211.603	760211.455	DELTA E = .1483	.486	MILWAUKEE GPS
	N =	117621.111	117621.068	DELTA N = .0427	.140	
4495	E =	752478.542	752478.577	DELTA E = -.0352	-.115	FAIRVIEW
	N =	122898.242	122898.378	DELTA N = -.1365	-.448	
4496	E =	732083.694	732083.889	DELTA E = -.1952	-.640	FAN
	N =	110987.757	110987.659	DELTA N = .0977	.321	
4504	E =	764779.694	764779.669	DELTA E = .0251	.082	HALBACH
	N =	112024.689	112024.598	DELTA N = .0908	.298	
4525	E =	730966.931	730967.066	DELTA E = -.1348	-.442	LAPHAM PEAK
	N =	115944.626	115944.762	DELTA N = -.1362	-.447	
4558	E =	765727.014	765726.800	DELTA E = .2140	.702	RAYMOND
	N =	93377.719	93377.680	DELTA N = .0388	.127	
4585	E =	760608.447	760608.461	DELTA E = -.0140	-.046	WAUWA
	N =	117286.482	117286.399	DELTA N = .0831	.273	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

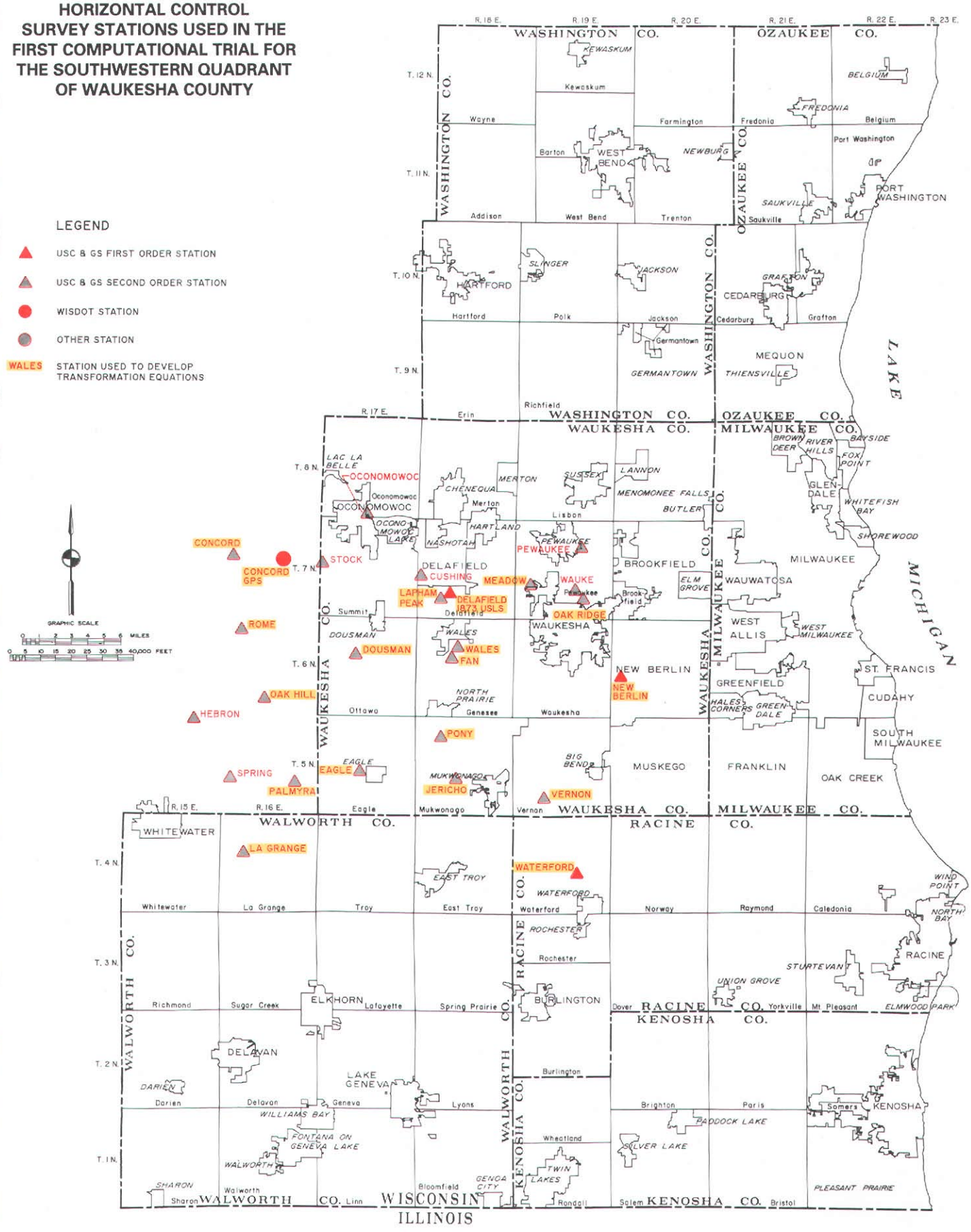
X/EAST DIRECTION: .442 FEET
Y/NORTH DIRECTION: .299 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	-0.15 FT	0.32 FT
Y/NORTH DIRECTION:	0.19 FT	0.21 FT

Map D-21

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE FIRST COMPUTATIONAL TRIAL FOR THE SOUTHWESTERN QUADRANT OF WAUKESHA COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 22, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WAUK-SD3.295
RESULTS: WAUKESH3.B21

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - SW 1/4, WAUKESHA COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4473	X =	2363539.730	.053	E =	710795.7840	.0200	CONCORD
	Y =	392609.860	.053	N =	119669.6990	.0200	
4478	X =	2422692.370	.132	E =	728825.8990	.1000	CUSHING
	Y =	388318.970	.132	N =	118361.9260	.1000	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	
4485	X =	2401868.580	.132	E =	722478.2130	.1000	DOUSMAN
	Y =	364061.140	.132	N =	110968.5080	.1000	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4507	X =	2350417.840	.132	E =	706795.9510	.1000	HEBRON (WIS)
	Y =	337135.190	.132	N =	102761.5710	.1000	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4543	X =	2373526.700	.053	E =	713839.7410	.0200	OAK HILL
	Y =	348327.870	.053	N =	106172.9670	.0200	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4546	X =	2405080.555	.132	E =	723457.4080	.0200	OCONOMOWOC
	Y =	407746.396	.132	N =	124283.8070	.0200	
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4554	X =	2428672.940	.053	E =	730648.4240	.0200	PONY
	Y =	337627.040	.053	N =	102911.6720	.0200	
4562	X =	2368134.700	.132	E =	712196.2280	.1000	ROME
	Y =	368969.790	.132	N =	112464.5050	.1000	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4572	X =	2390732.575	.132	E =	719084.1300	.1000	STOCK
	Y =	390553.641	.132	N =	119043.3700	.1000	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4411	CONCORD GPS	4473	CONCORD
4482	DELAFIELD	4525	LAPHAM PEAK
4532	MEADOW	4562	ROME
4543	OAK HILL	4581	WALES
4405	NEW BERLIN	4521	LAGRANGE
4550	PALMYRA	4554	PONY
4514	JERICHO	4576	VERNON
4583	WATERFORD	4485	DOUSMAN
4489	EAGLE	4496	FAN
4544	OAK RIDGE		

NORTHING TRANSLATION:	NT =	-6.0469 METERS
EASTING TRANSLATION:	ET =	-9609.5556 METERS
SCALE:	S =	.304799930427
ROTATION:	THETA =	-.000012106290 RADIANS
		0 0 -2.497101 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4411	E =	714902.335	714902.277	DELTA E =	.0578	.190	CONCORD GPS
	N =	120346.789	120346.907	DELTA N =	-.1180	-.387	
4473	E =	710795.784	710795.741	DELTA E =	.0431	.141	CONCORD
	N =	119669.699	119670.133	DELTA N =	-.4335	-1.422	
4482	E =	730976.818	730976.562	DELTA E =	.2562	.841	DELAFIELD
	N =	115961.492	115961.452	DELTA N =	.0396	.130	
4525	E =	730966.931	730966.936	DELTA E =	-.0054	-.018	LAPHAM PEAK **
	N =	115944.626	115944.691	DELTA N =	-.0654	-.214	
4532	E =	739842.408	739842.248	DELTA E =	.1604	.526	MEADOW
	N =	117665.311	117665.336	DELTA N =	-.0255	-.084	
4562	E =	712196.228	712196.375	DELTA E =	-.1467	-.481	ROME
	N =	112464.505	112464.658	DELTA N =	-.1528	-.501	
4543	E =	713839.741	713839.932	DELTA E =	-.1911	-.627	OAK HILL
	N =	106172.967	106173.022	DELTA N =	-.0549	-.180	
4581	E =	732535.766	732535.853	DELTA E =	-.0875	-.287	WALES **
	N =	111237.975	111237.789	DELTA N =	.1863	.611	
4405	E =	748257.816	748257.847	DELTA E =	-.0309	-.101	NEW BERLIN
	N =	109600.685	109600.493	DELTA N =	.1918	.629	
4521	E =	711953.843	711954.272	DELTA E =	-.4285	-1.406	LAGRANGE
	N =	91110.021	91110.070	DELTA N =	-.0490	-.161	
4550	E =	717503.939	717504.210	DELTA E =	-.2710	-.889	PALMYRA
	N =	97563.457	97563.444	DELTA N =	.0134	.044	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4554	E =	730648.424	730648.542	DELTA E =	-.1177	-.386	PONY **
	N =	102911.672	102911.613	DELTA N =	.0588	.193	
4514	E =	732399.554	732399.777	DELTA E =	-.2231	-.732	JERICHO **
	N =	98521.960	98521.598	DELTA N =	.3621	1.188	
4576	E =	741622.796	741622.847	DELTA E =	-.0515	-.169	VERNON
	N =	96654.129	96653.899	DELTA N =	.2304	.756	
4583	E =	744746.022	744746.071	DELTA E =	-.0491	-.161	WATERFORD
	N =	89633.012	89632.864	DELTA N =	.1480	.486	
4485	E =	722478.213	722478.477	DELTA E =	-.2641	-.866	DOUSMAN **
	N =	110968.508	110968.626	DELTA N =	-.1181	-.387	
4489	E =	723714.090	723714.379	DELTA E =	-.2891	-.948	EAGLE **
	N =	98945.102	98945.119	DELTA N =	-.0169	-.056	
4496	E =	732083.694	732083.771	DELTA E =	-.0771	-.253	FAN **
	N =	110987.757	110987.564	DELTA N =	.1932	.634	
4544	E =	744865.572	744865.535	DELTA E =	.0366	.120	OAK RIDGE
	N =	116734.940	116734.971	DELTA N =	-.0311	-.102	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4478	E =	728825.899	728825.477	DELTA E =	.4217	1.384	CUSHING
	N =	118361.926	118362.488	DELTA N =	-.5618	-1.843	
4507	E =	706795.951	706796.394	DELTA E =	-.4434	-1.455	HEBRON (WIS)
	N =	102761.571	102761.409	DELTA N =	.1624	.533	
4546	E =	723457.408	723457.326	DELTA E =	.0824	.270	OCONOMOWOC
	N =	124283.807	124283.901	DELTA N =	-.0939	-.308	
4551	E =	744529.284	744529.218	DELTA E =	.0658	.216	PEWAUKEE
	N =	121596.192	121596.267	DELTA N =	-.0749	-.246	
4570	E =	710608.107	710608.519	DELTA E =	-.4118	-1.351	SPRING-2
	N =	97409.453	97409.409	DELTA N =	.0443	.145	
4572	E =	719084.130	719084.126	DELTA E =	.0043	.014	STOCK
	N =	119043.370	119043.497	DELTA N =	-.1275	-.418	
4584	E =	744432.284	744432.250	DELTA E =	.0341	.112	WAUKE
	N =	117255.258	117255.284	DELTA N =	-.0258	-.084	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

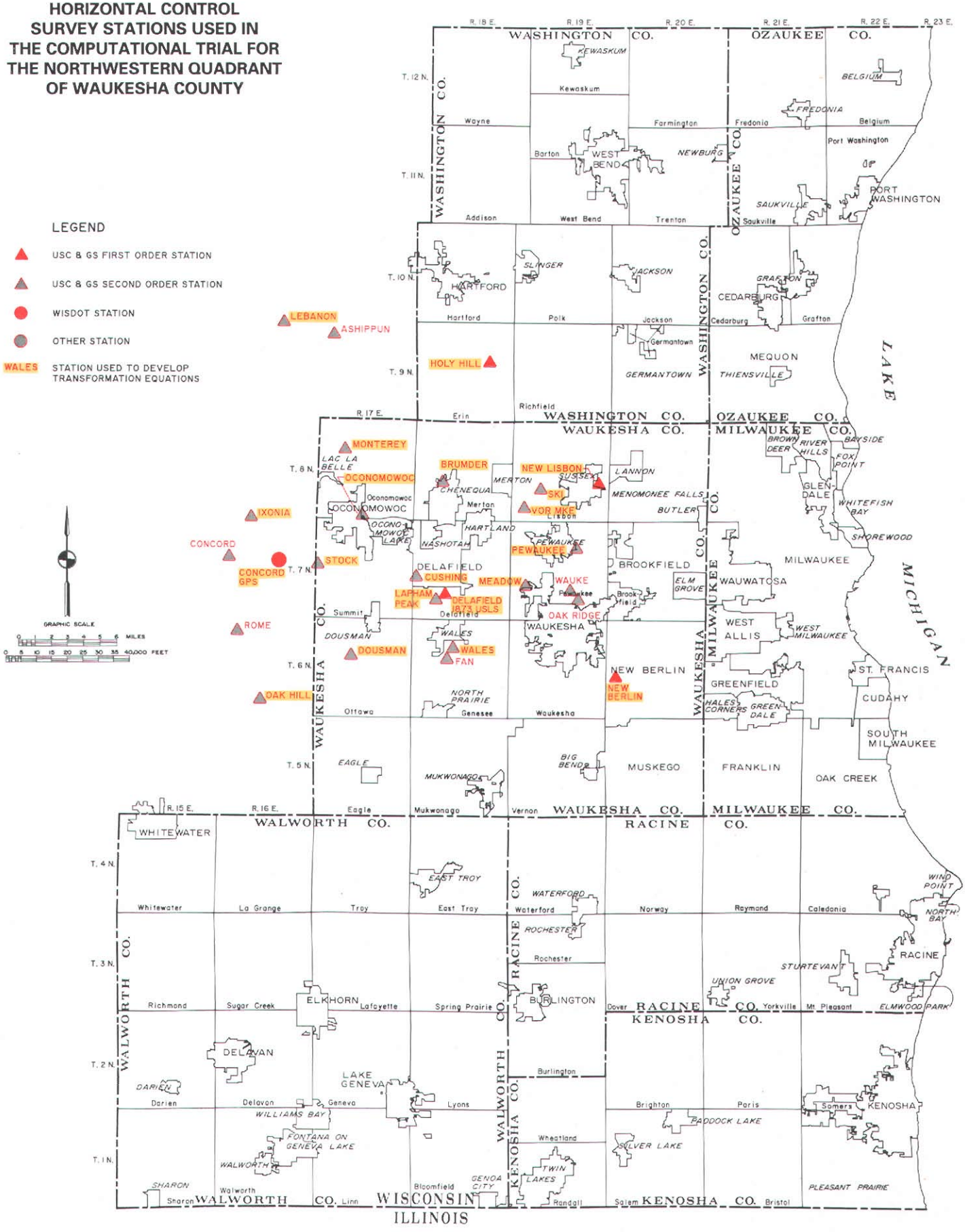
X/EAST DIRECTION: .677 FEET
Y/NORTH DIRECTION: .637 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	-0.50 FT	0.35 FT
Y/NORTH DIRECTION:	0.28 FT	0.56 FT

Map D-22

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE COMPUTATIONAL TRIAL FOR THE NORTHWESTERN QUADRANT OF WAUKESHA COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 22, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WAUK-SD4.295
RESULTS: WAUKESH4.B22

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - NW 1/4, WAUKESHA COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4423	X =	2392112.960	.132	E =	719505.3190	.1000	ASHIPPUN
	Y =	465719.370	.132	N =	141953.5560	.1000	
4437	X =	2445313.410	.053	E =	735720.5850	.0200	HOLY HILL
	Y =	459320.190	.053	N =	140003.3620	.0200	
4442	X =	2400548.808	.053	E =	722076.1330	.0200	MONTEREY
	Y =	428960.967	.053	N =	130749.9490	.0200	
4465	X =	2430816.040	.053	E =	731301.8200	.0200	BRUMDER
	Y =	417270.010	.053	N =	127186.2360	.0200	
4473	X =	2363539.730	.053	E =	710795.7840	.0200	CONCORD
	Y =	392609.860	.053	N =	119669.6990	.0200	
4478	X =	2422692.370	.132	E =	728825.8990	.1000	CUSHING
	Y =	388318.970	.132	N =	118361.9260	.1000	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	
4485	X =	2401868.580	.132	E =	722478.2130	.1000	DOUSMAN
	Y =	364061.140	.132	N =	110968.5080	.1000	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4513	X =	2366580.838	.132	E =	711722.9320	.1000	IXONIA
	Y =	408317.936	.132	N =	124458.0010	.1000	
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4527	X =	2374744.440	.053	E =	714211.2320	.0100	LEBANON RESET
	Y =	468368.970	.053	N =	142760.8110	.0100	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4540	X =	2480652.100	.026	E =	746491.5680	.0010	NEW LIBSON RESET
	Y =	419948.700	.026	N =	128003.2500	.0010	
4543	X =	2373526.700	.053	E =	713839.7410	.0200	OAK HILL
	Y =	348327.870	.053	N =	106172.9670	.0200	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4546	X =	2405080.555	.132	E =	723457.4080	.0200	OCONOMOWOC
	Y =	407746.396	.132	N =	124283.8070	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4562	X =	2368134.700	.132	E =	712196.2280	.1000	ROME
	Y =	368969.790	.132	N =	112464.5050	.1000	
4569	X =	2462533.570	.053	E =	740969.0500	.0200	SKI
	Y =	417368.330	.053	N =	127216.7540	.0200	
4572	X =	2390732.575	.132	E =	719084.1300	.1000	STOCK
	Y =	390553.641	.132	N =	119043.3700	.1000	
4580	X =	2458029.980	.132	E =	739596.3470	.1000	VOR MKE -2
	Y =	411816.710	.132	N =	125524.5790	.1000	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4527	LEBANON RESET	4437	HOLY HILL
4442	MONTEREY	4465	BRUMDER
4540	NEW LIBSON RESET	4411	CONCORD GPS
4482	DELAFIELD	4551	PEWAUKEE
4581	WALES	4532	MEADOW
4543	OAK HILL	4405	NEW BERLIN
4546	OCONOMOWOC	4572	STOCK
4478	CUSHING	4485	DOUSMAN
4525	LAPHAM PEAK	4513	IXONIA
4569	SKI	4580	VOR MKE -2

NORTHING TRANSLATION: NT = -3.6594 METERS
EASTING TRANSLATION: ET = -9602.4633 METERS
SCALE: S = .304796992107
ROTATION: THETA = -.000010297091 RADIANS
0 0 -2.123928 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4527	E =	714211.232	714211.029	DELTA E =	.2030	.666	LEBANON RESET
	N =	142760.811	142761.247	DELTA N =	-.4360	-1.431	
4437	E =	735720.585	735720.267	DELTA E =	.3178	1.043	HOLY HILL
	N =	140003.362	140003.428	DELTA N =	-.0656	-.215	
4442	E =	722076.133	722076.246	DELTA E =	-.1134	-.372	MONTEREY **
	N =	130749.949	130749.887	DELTA N =	.0618	.203	
4465	E =	731301.820	731301.644	DELTA E =	.1756	.576	BRUMDER **
	N =	127186.236	127186.614	DELTA N =	-.3777	-1.239	
4540	E =	746491.568	746491.517	DELTA E =	.0508	.167	NEW LIBSON RESET
	N =	128003.250	128003.227	DELTA N =	.0232	.076	
4411	E =	714902.335	714902.603	DELTA E =	-.2678	-.878	CONCORD GPS
	N =	120346.789	120346.824	DELTA N =	-.0345	-.113	
4482	E =	730976.818	730976.724	DELTA E =	.0935	.307	DELAFIELD
	N =	115961.492	115961.382	DELTA N =	.1099	.360	
4551	E =	744529.284	744529.260	DELTA E =	.0235	.077	PEWAUKEE
	N =	121596.192	121596.118	DELTA N =	.0742	.244	
4581	E =	732535.766	732535.993	DELTA E =	-.2266	-.743	WALES
	N =	111237.975	111237.761	DELTA N =	.2139	.702	
4532	E =	739842.408	739842.328	DELTA E =	.0801	.263	MEADOW **
	N =	117665.311	117665.234	DELTA N =	.0772	.253	
4543	E =	713839.741	713840.242	DELTA E =	-.5012	-1.645	OAK HILL
	N =	106172.967	106173.077	DELTA N =	-.1100	-.361	
4405	E =	748257.816	748257.831	DELTA E =	-.0155	-.051	NEW BERLIN
	N =	109600.685	109600.453	DELTA N =	.2320	.761	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4546	E =	723457.408	723457.576	DELTA E = -.1679	-.551	OCONOMOWOC **
	N =	124283.807	124283.764	DELTA N = .0430	.141	
4572	E =	719084.130	719084.409	DELTA E = -.2787	-.914	STOCK **
	N =	119043.370	119043.419	DELTA N = -.0490	-.161	
4478	E =	728825.899	728825.665	DELTA E = .2339	.768	CUSHING **
	N =	118361.926	118362.398	DELTA N = -.4723	-1.550	
4485	E =	722478.213	722478.713	DELTA E = -.4996	-1.639	DOUSMAN
	N =	110968.508	110968.619	DELTA N = -.1113	-.365	
4525	E =	730966.931	730967.099	DELTA E = -.1681	-.552	LAPHAM PEAK **
	N =	115944.626	115944.621	DELTA N = .0047	.016	
4513	E =	711722.932	711722.976	DELTA E = -.0441	-.145	IXONIA
	N =	124458.001	124457.847	DELTA N = .1541	.506	
4569	E =	740969.050	740969.052	DELTA E = -.0018	-.006	SKI
	N =	127216.754	127216.681	DELTA N = .0731	.240	
4580	E =	739596.347	739596.389	DELTA E = -.0416	-.136	VOR MKE -2 **
	N =	125524.579	125524.550	DELTA N = .0293	.096	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4423	E =	719505.319	719504.910	DELTA E = .4090	1.342	ASHIPPUN
	N =	141953.556	141953.711	DELTA N = -.1554	-.510	
4473	E =	710795.784	710796.105	DELTA E = -.3209	-1.053	CONCORD
	N =	119669.699	119670.063	DELTA N = -.3640	-1.194	
4496	E =	732083.694	732083.914	DELTA E = -.2202	-.722	FAN
	N =	110987.757	110987.539	DELTA N = .2176	.714	
4544	E =	744865.572	744865.566	DELTA E = .0064	.021	OAK RIDGE
	N =	116734.940	116734.868	DELTA N = .0717	.235	
4562	E =	712196.228	712196.712	DELTA E = -.4841	-1.588	ROME
	N =	112464.505	112464.655	DELTA N = -.1502	-.493	
4584	E =	744432.284	744432.285	DELTA E = -.0012	-.004	WAUKE
	N =	117255.258	117255.177	DELTA N = .0813	.267	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

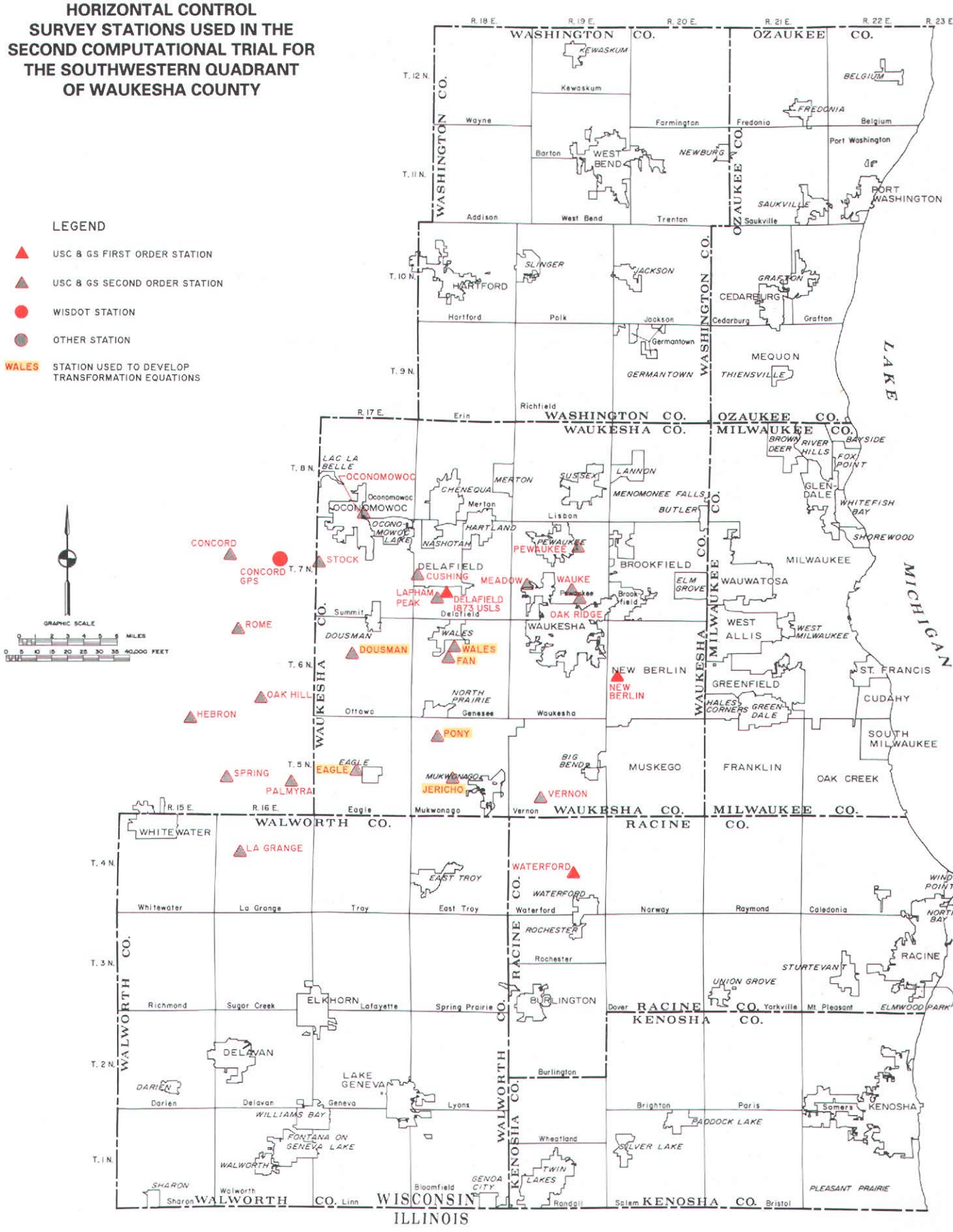
X/EAST DIRECTION:	.792 FEET
Y/NORTH DIRECTION:	.642 FEET

** MEAN AND STANDARD DEVIATION OF DIFFERENCES FOR POINTS WITHIN/NEAR TARGETED AREA:

	MEAN	SIGMA
X/EAST DIRECTION:	-0.11 FT	0.60 FT
Y/NORTH DIRECTION:	-0.28 FT	0.70 FT

Map D-23

HORIZONTAL CONTROL SURVEY STATIONS USED IN THE SECOND COMPUTATIONAL TRIAL FOR THE SOUTHWESTERN QUADRANT OF WAUKESHA COUNTY



TRANSFORMATION PARAMETERS FOR CONVERSION NAD27 TO NAD83 (HPGN)

ALGORITHM AND PROGRAM DESIGN BY: EARL F.BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 22, 1995

PROGRAM: GEOTRAN5 - VER. 3.05, EFB:08/94
INPUT FILE: WAUK-SD3.295
RESULTS: WAUKESH5.B23

AGENCY: SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
PROJECT: PUB NAD27 & NAD83(91) - SW 1/4, WAUKESHA COUNTY: SCENARIO B WITH SD

COMMON POINTS IN PROJECT AREA:

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4405	X =	2486446.530	.026	E =	748257.8160	.0200	NEW BERLIN
	Y =	359571.490	.026	N =	109600.6850	.0200	
4411	X =	2377012.648	.053	E =	714902.3350	.0010	CONCORD GPS
	Y =	394830.086	.053	N =	120346.7890	.0010	
4473	X =	2363539.730	.053	E =	710795.7840	.0200	CONCORD
	Y =	392609.860	.053	N =	119669.6990	.0200	
4478	X =	2422692.370	.132	E =	728825.8990	.1000	CUSHING
	Y =	388318.970	.132	N =	118361.9260	.1000	
4482	X =	2429749.640	.026	E =	730976.8180	.0100	DELAFIELD
	Y =	380441.470	.026	N =	115961.4920	.0100	
4485	X =	2401868.580	.132	E =	722478.2130	.1000	DOUSMAN
	Y =	364061.140	.132	N =	110968.5080	.1000	
4489	X =	2405922.900	.132	E =	723714.0900	.1000	EAGLE
	Y =	324613.880	.132	N =	98945.1020	.1000	
4496	X =	2433382.020	.132	E =	732083.6940	.1000	FAN
	Y =	364122.890	.132	N =	110987.7570	.1000	
4507	X =	2350417.840	.132	E =	706795.9510	.1000	HEBRON (WIS)
	Y =	337135.190	.132	N =	102761.5710	.1000	
4514	X =	2434418.290	.132	E =	732399.5540	.1000	JERICHO
	Y =	323224.030	.132	N =	98521.9600	.1000	
4521	X =	2367339.550	.053	E =	711953.8430	.0200	LAGRANGE
	Y =	298908.800	.053	N =	91110.0210	.0200	
4525	X =	2429718.060	.053	E =	730966.9310	.0200	LAPHAM PEAK
	Y =	380386.480	.053	N =	115944.6260	.0200	
4532	X =	2458836.610	.132	E =	739842.4080	.1000	MEADOW
	Y =	386031.290	.132	N =	117665.3110	.1000	
4543	X =	2373526.700	.053	E =	713839.7410	.0200	OAK HILL
	Y =	348327.870	.053	N =	106172.9670	.0200	
4544	X =	2475317.180	.053	E =	744865.5720	.0200	OAK RIDGE
	Y =	382978.710	.053	N =	116734.9400	.0200	
4546	X =	2405080.555	.132	E =	723457.4080	.0200	OCONOMOWOC
	Y =	407746.396	.132	N =	124283.8070	.0200	
4550	X =	2385548.270	.053	E =	717503.9390	.0200	PALMYRA
	Y =	320081.070	.053	N =	97563.4570	.0200	
4551	X =	2474213.970	.053	E =	744529.2840	.0200	PEWAUKEE
	Y =	398927.860	.053	N =	121596.1920	.0200	
4554	X =	2428672.940	.053	E =	730648.4240	.0200	PONY
	Y =	337627.040	.053	N =	102911.6720	.0200	
4562	X =	2368134.700	.132	E =	712196.2280	.1000	ROME
	Y =	368969.790	.132	N =	112464.5050	.1000	
4570	X =	2362924.600	.132	E =	710608.1070	.1000	SPRING-2
	Y =	319575.980	.132	N =	97409.4530	.1000	
4572	X =	2390732.575	.132	E =	719084.1300	.1000	STOCK
	Y =	390553.641	.132	N =	119043.3700	.1000	
4576	X =	2464677.640	.132	E =	741622.7960	.1000	VERNON
	Y =	317096.040	.132	N =	96654.1290	.1000	
4581	X =	2434865.240	.053	E =	732535.7660	.0200	WALES
	Y =	364943.820	.053	N =	111237.9750	.0200	

PT #		NAD 27 (FEET)	STD DEV		NAD 83 (HPGN) (METERS)	STD DEV	STATION NAME
4583	X =	2474924.160	.026	E =	744746.0220	.0200	WATERFORD
	Y =	294061.020	.026	N =	89633.0120	.0200	
4584	X =	2473895.660	.132	E =	744432.2840	.1000	WAUKE
	Y =	384685.790	.132	N =	117255.2580	.1000	

TRANSFORMATION PARAMETERS DERIVED FROM LEAST SQUARES FIT TO
COMBINATION OF COMMON POINTS LISTED BELOW:

4514	JERICHO	4489	EAGLE
4554	PONY	4485	DOUSMAN
4496	FAN	4581	WALES

NORTHING TRANSLATION: NT = -8.3145 METERS
EASTING TRANSLATION: ET = -9618.0351 METERS
SCALE: S = .304803441118
ROTATION: THETA = -.000013668893 RADIANS
0 0 -2.819412 D M S

TRANSFORMATION EQUATIONS, NAD27 TO NAD83 (HPGN) ARE:

N(I) = S*[-X(I) SIN(THETA) + Y(I) COS(THETA)] + NT

E(I) = S*[X(I) COS(THETA) + Y(I) SIN(THETA)] + ET

TRANSFORMATION EQUATIONS, NAD83 (HPGN) TO NAD27 ARE:

X(I) = [(E(I) - ET) * COS(THETA)]/S - [(N(I) - NT) * SIN(THETA)]/S

Y(I) = [(E(I) - ET) * SIN(THETA)]/S + [(N(I) - NT) * COS(THETA)]/S

DIFFERENCES ASSOCIATED WITH COMMON POINTS USED:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4514	E =	732399.554	732399.690	DELTA E =	-.1361	-.447	JERICHO
	N =	98521.960	98521.625	DELTA N =	.3353	1.100	
4489	E =	723714.090	723714.191	DELTA E =	-.1014	-.333	EAGLE
	N =	98945.102	98945.137	DELTA N =	-.0350	-.115	
4554	E =	730648.424	730648.428	DELTA E =	-.0037	-.012	PONY
	N =	102911.672	102911.688	DELTA N =	-.0158	-.052	
4485	E =	722478.213	722478.256	DELTA E =	-.0434	-.142	DOUSMAN
	N =	110968.508	110968.781	DELTA N =	-.2727	-.895	
4496	E =	732083.694	732083.661	DELTA E =	.0329	.108	FAN
	N =	110987.757	110987.734	DELTA N =	.0234	.077	
4581	E =	732535.766	732535.748	DELTA E =	.0178	.058	WALES
	N =	111237.975	111237.962	DELTA N =	.0129	.042	

CONVERTED POINTS COMPARED TO KNOWN POINTS IN A BLIND TEST:

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)		(FEET)	STATION
4405	E =	748257.816	748257.925	DELTA E =	-.1093	-.359	NEW BERLIN
	N =	109600.685	109600.672	DELTA N =	.0126	.041	
4411	E =	714902.335	714901.955	DELTA E =	.3804	1.248	CONCORD GPS
	N =	120346.789	120347.158	DELTA N =	-.3688	-1.210	
4473	E =	710795.784	710795.372	DELTA E =	.4119	1.351	CONCORD
	N =	119669.699	119670.369	DELTA N =	-.6701	-2.199	
4478	E =	728825.899	728825.318	DELTA E =	.5808	1.906	CUSHING
	N =	118361.926	118362.738	DELTA N =	-.8116	-2.663	
4482	E =	730976.818	730976.431	DELTA E =	.3868	1.269	DELAFIELD
	N =	115961.492	115961.678	DELTA N =	-.1859	-.610	
4507	E =	706795.951	706796.006	DELTA E =	-.0550	-.180	HEBRON (WIS)
	N =	102761.571	102761.444	DELTA N =	.1268	.416	

PT #		PUBLISHED (NAD83-HPGN)	COMPUTED (NAD83-HPGN)	DIFFERENCE (M)	(FEET)	STATION
4521	E =	711953.843	711953.961	DELTA E = -.1177	-.386	LAGRANGE
	N =	91110.021	91109.979	DELTA N = .0415	.136	
4525	E =	730966.931	730966.806	DELTA E = .1253	.411	LAPHAM PEAK
	N =	115944.626	115944.917	DELTA N = -.2906	-.953	
4532	E =	739842.408	739842.216	DELTA E = .1916	.629	MEADOW
	N =	117665.311	117665.595	DELTA N = -.2844	-.933	
4543	E =	713839.741	713839.619	DELTA E = .1216	.399	OAK HILL
	N =	106172.967	106173.108	DELTA N = -.1408	-.462	
4544	E =	744865.572	744865.564	DELTA E = .0084	.028	OAK RIDGE
	N =	116734.940	116735.227	DELTA N = -.2872	-.942	
4546	E =	723457.408	723457.095	DELTA E = .3126	1.026	OCONOMOWOC
	N =	124283.807	124284.210	DELTA N = -.4035	-1.324	
4550	E =	717503.939	717503.953	DELTA E = -.0140	-.046	PALMYRA
	N =	97563.457	97563.436	DELTA N = .0209	.069	
4551	E =	744529.284	744529.235	DELTA E = .0491	.161	PEWAUKEE
	N =	121596.192	121596.578	DELTA N = -.3864	-1.268	
4562	E =	712196.228	712196.033	DELTA E = .1948	.639	ROME
	N =	112464.505	112464.814	DELTA N = -.3086	-1.012	
4570	E =	710608.107	710608.183	DELTA E = -.0756	-.248	SPRING-2
	N =	97409.453	97409.389	DELTA N = .0644	.211	
4572	E =	719084.130	719083.853	DELTA E = .2766	.908	STOCK
	N =	119043.370	119043.740	DELTA N = -.3698	-1.213	
4576	E =	741622.796	741622.870	DELTA E = -.0737	-.242	VERNON
	N =	96654.129	96653.918	DELTA N = .2107	.691	
4583	E =	744746.022	744746.140	DELTA E = -.1182	-.388	WATERFORD
	N =	89633.012	89632.808	DELTA N = .2043	.670	
4584	E =	744432.284	744432.272	DELTA E = .0117	.038	WAUKE
	N =	117255.258	117255.545	DELTA N = -.2871	-.942	

STANDARD DEVIATION OF DIFFERENCES BASED UPON ALL COMMON POINTS ABOVE.

X/EAST DIRECTION: .648 FEET
Y/NORTH DIRECTION: .889 FEET

Appendix E

POINT PAIR DISTANCE COMPARISONS

This appendix contains the following materials:

- A map of the SEWRPC area which shows the approximate location of 17 pairs of intervisible points scattered throughout the Region. The distances between these points were used to compare the field measured distance—reduced for elevation and state plane coordinate system scale factor—with the distances obtained by inversing various combinations of coordinates computed during the study.

- Specific comparisons of each measured distance with the published NAD27 inverse distance, the NAD83 (91) distance obtained from NADCON and several NAD83 (91) distances obtained by using several sets of transformation parameters in adjacent areas. The NAD83 (91) azimuths were also compared to the NAD27 azimuth for each line.

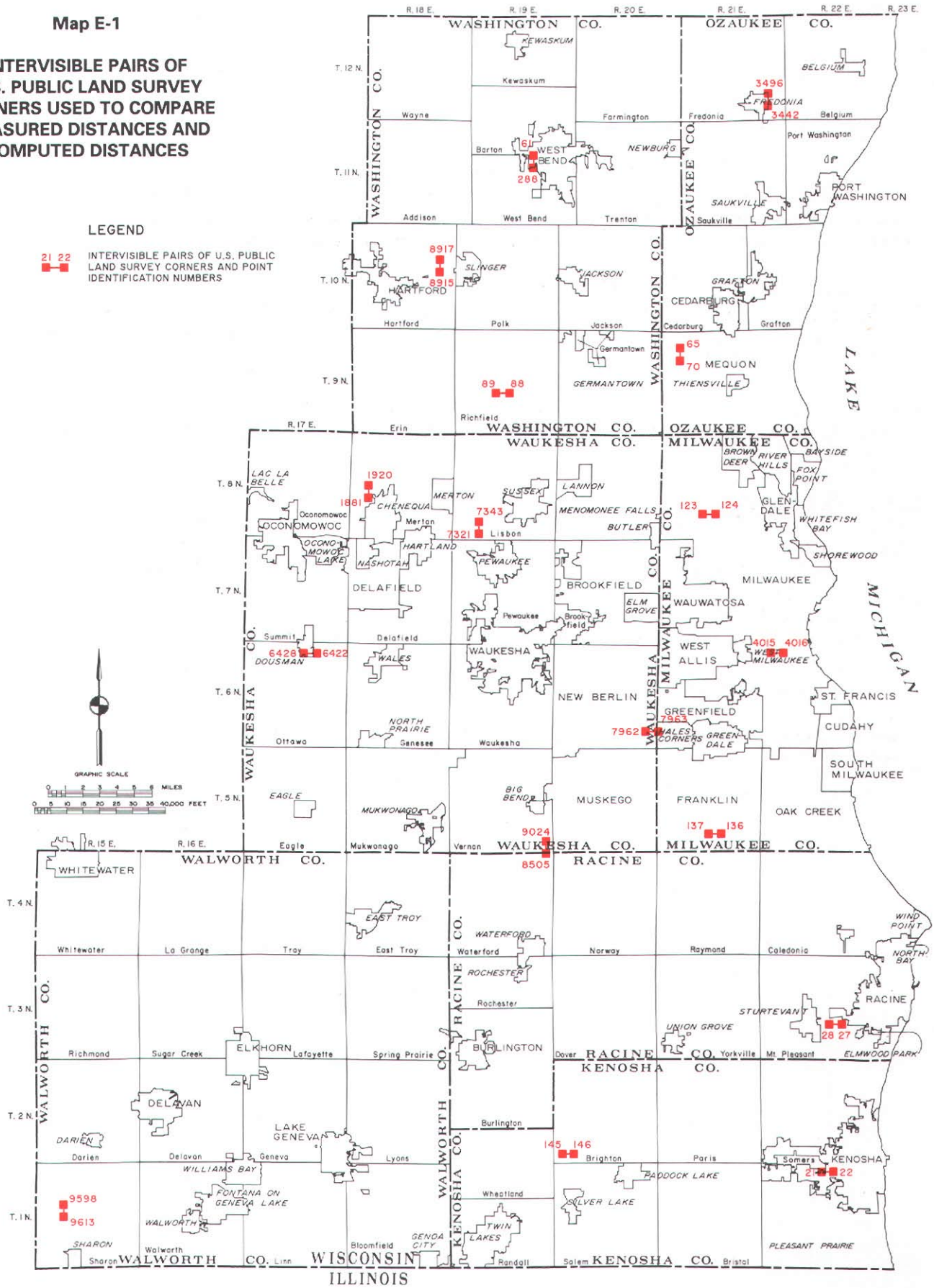
- Inversed distances as determined by each set of transformation parameters were also compared to the measured distance of each line. The various parameter sets are identified by the Scenario B sequence number as follows:

Code	Area Covered	Code	Area Covered
B01	Entire SEWRPC area	B14	W 1/2 Racine County
B05	Ozaukee County	B16	S 1/2 Walworth County
B06	N 1/2 Washington County	B17	N 1/2 Walworth County
B08	S 1/2 Washington County	B19	NE 1/4 Waukesha County
B09	N 1/2 Milwaukee County	B20	SE 1/4 Waukesha County
B10	S 1/2 Milwaukee County	B21	SW 1/4 Waukesha County
B11	Kenosha County	B22	NW 1/4 Waukesha County
B13	E 1/2 Racine County		

- NADCON derived distances compared to the field measured distance for each of the 17 intervisible point-pairs.

Map E-1

INTERVISIBLE PAIRS OF U.S. PUBLIC LAND SURVEY CORNERS USED TO COMPARE MEASURED DISTANCES AND COMPUTED DISTANCES



COMPARISON OF RESULTS ON INTERVISIBLE POINT PAIRS

SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
MEASURED	145	146	2,649.090	-	-	-	-
NAD27	220300.140	220367.350					
PUBLISHED	2490552.440	2493200.650	2,649.063	0.027	97,170	88 32 46.2	-
NAD83 (91)	220309.414	220376.653					
FROM NADCON	2459015.630	2461663.871	2,649.095	-0.005	582,752	88 32 44.1	2.1
NAD83 (91)	220309.888	220377.113					
KENOSHA CO	2459015.553	2461663.810	2,649.110	-0.020	132,400	88 32 45.2	1.0
NAD83 (91)	220309.940	220377.163					
W 1/2 RACINE	2459015.705	2461663.929	2,649.077	0.013	204,609	88 32 45.3	0.9
MEASURED	21	22	2,672.170	-	-	-	-
NAD27	216408.500	216373.760					
PUBLISHED	2569730.390	2572402.350	2,672.186	-0.016	168,806	90 44 41.6	-
NAD83 (91)	216418.480	216383.764					
FROM NADCON	2538194.951	2540866.978	2,672.253	-0.083	32,344	90 44 39.8	1.9
NAD83 (91)	216418.605	216383.879					
KENOSHA CO	2538194.931	2540866.939	2,672.233	-0.063	42,316	90 44 40.5	1.1
NAD83 (91)	216418.823	216384.105					
E 1/2 RACINE	2538195.076	2540867.066	2,672.216	-0.046	58,170	90 44 39.9	1.7
MEASURED	9598	9613	2,646.950	-	-	-	-
NAD27	200541.690	197894.760					
PUBLISHED	2337692.160	2337706.620	2,646.969	-0.019	135,764	179 41 13.2	-
NAD83 (91)	200549.887	197902.969					
FROM NADCON	2306154.815	2306169.285	2,646.957	-0.007	370,180	179 41 12.4	0.8
NAD83 (91)	200549.826	197902.894					
S 1/2 WALWORTH	2306154.819	2306169.302	2,646.972	-0.022	122,411	179 41 11.4	1.8
NAD83 (91)	200549.572	197902.631					
N 1/2 WALWORTH	2306155.104	2306169.589	2,646.980	-0.030	87,546	179 41 11.2	2.0
MEASURED	28	27	2,647.590	-	-	-	-
NAD27	261548.180	261566.290					
PUBLISHED	2571203.630	2573851.100	2,647.532	0.058	45,601	89 36 29.1	-
NAD83 (91)	261558.958	261577.095					
FROM NADCON	2539668.071	2542315.603	2,647.594	-0.004	674,717	89 36 27.0	2.1
NAD83 (91)	261559.025	261577.158					
E 1/2 RACINE	2539667.947	2542315.446	2,647.562	0.028	93,539	89 36 27.3	1.8
NAD83 (91)	261559.095	261577.220					
KENOSHA	2539667.954	2542315.471	2,647.579	0.011	241,541	89 36 28.0	1.1

SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
MEASURED	137	136	2,630.100	-	-	-	-
NAD27	319093.050	319160.350					
PUBLISHED	2533422.170	2536051.410	2,630.101	-0.001	2,210,888	88 32 1.4	-
NAD83 (91)	319103.615	319170.960					
FROM NADCON	2501885.269	2504514.512	2,630.106	-0.006	458,791	88 31 57.9	3.5
NAD83 (91)	319103.711	319171.054					
S 1/2 MILWUAKEE	2501885.523	2504514.758	2,630.097	0.003	848,341	88 31 58.0	3.4
NAD83 (91)	319104.222	319171.545					
E 1/2 RACINE	2501885.568	2504514.837	2,630.131	-0.031	85,480	88 31 59.7	1.7
NAD83 (91)	319103.607	319170.936					
SE 1/4 WAUKESHA	2501885.127	2504514.346	2,630.081	0.020	133,094	88 31 59.2	2.3
MEASURED	9024	8505	2,627.860	-	-	-	-
NAD27	314982.940	312357.420					
PUBLISHED	2483195.430	2483306.960	2,627.888	-0.028	94,578	177 34 3.3	-
NAD83 (91)	314992.644	312367.135					
FROM NADCON	2451658.463	2451770.013	2,627.878	-0.018	149,786	177 34 1.7	1.6
NAD83 (91)	314992.976	312367.477					
SE 1/4 WAUKESHA	2451658.806	2451770.364	2,627.868	-0.008	325,070	177 34 1.1	2.2
NAD83 (91)	314993.222	312367.688					
W 1/2 RACINE	2451658.214	2451769.757	2,627.902	-0.042	62,396	177 34 2.3	1.0
NAD83 (91)	314992.779	312367.265					
S 1/2 MILWAUKEE	2451658.934	2451770.507	2,627.883	-0.023	112,644	177 33 59.9	3.4
MEASURED	7962	7963	2,681.510	-	-	-	-
NAD27	350128.260	350228.780					
PUBLISHED	2514241.770	2516921.320	2,681.435	0.075	35,648	87 51 5.9	-
NAD83 (91)	350138.390	350238.955					
FROM NADCON	2482704.513	2485384.060	2,681.433	0.077	34,772	87 51 2.4	3.5
NAD83 (91)	350138.375	350238.924					
SE 1/4 WAUKESHA	2482704.528	2485384.057	2,681.415	0.095	28,132	87 51 3.6	2.3
NAD83 (91)	350138.302	350238.846					
NE 1/4 WAUKESHA	2482704.242	2485383.751	2,681.395	0.115	23,277	87 51 3.9	1.9
NAD83 (91)	350138.554	350239.118					
S 1/2 MILWAUKEE	2482704.643	2485384.187	2,681.430	0.080	33,661	87 51 2.5	3.4
MEASURED	4015	4016	2,639.780	-	-	-	-
NAD27	375024.180	375028.220					
PUBLISHED	2551484.100	2554123.900	2,639.803	-0.023	114,319	89 54 44.3	-
NAD83 (91)	375034.631	375038.693					
FROM NADCON	2519946.567	2522586.372	2,639.809	-0.029	92,542	89 54 42.6	1.7
NAD83 (91)	375034.698	375038.783					
N 1/2 MILWAUKEE	2519946.247	2522586.007	2,639.763	0.017	155,832	89 54 40.8	3.5
NAD83 (91)	375035.047	375039.131					
S 1/2 MILWAUKEE	2519946.501	2522586.296	2,639.799	-0.019	140,728	89 54 40.9	3.4

SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
MEASURED	123	124	2,621.830	-	-	-	-
NAD27	416992.020	417064.310					
PUBLISHED	2529689.790	2532310.720	2,621.927	-0.097	27,098	88 25 12.3	-
NAD83 (91)	417001.336	417073.660					
FROM NADCON	2498151.858	2500772.769	2,621.908	-0.078	33,407	88 25 9.6	2.7
NAD83 (91)	417001.528	417073.861					
N 1/2 MILWUAKEE	2498151.560	2500772.448	2,621.887	-0.057	46,271	88 25 8.8	3.5
NAD83 (91)	417001.208	417073.522					
NE 1/4 WAUKESHA	2498151.402	2500772.292	2,621.888	-0.058	45,576	88 25 10.3	2.0
NAD83 (91)	417001.209	417073.517					
OZAUKEE	2498151.568	2500772.451	2,621.879	0.047	55,455	88 25 10.7	1.5
MEASURED	7343	7321	2,654.370	-	-	-	-
NAD27	412827.760	410173.410					
PUBLISHED	2460779.540	2460772.870	2,654.358	0.012	228,438	180 8 38.3	-
NAD83 (91)	412836.237	410181.929					
FROM NADCON	2429242.084	2429235.424	2,654.317	0.053	50,042	180 8 37.6	0.7
NAD83 (91)	412836.361	410182.051					
NE 1/4 WAUKESHA	2429242.221	2429235.576	2,654.319	0.051	51,659	180 8 36.4	1.9
NAD83 (91)	412836.193	410181.875					
NW 1/4 WAUKESHA	2429242.002	2429235.359	2,654.327	0.043	61,459	180 8 36.2	2.1
NAD83 (91)	412836.457	410182.162					
S1/2 WASHINGTON	2429242.371	2429235.713	2,654.303	0.067	39,755	180 8 37.4	0.9
MEASURED	1920	1881	2,672.130	-	-	-	-
NAD27	423129.280	420457.210					
PUBLISHED	2426789.560	2426802.630	2,672.102	0.028	95,313	179 43 11.1	-
NAD83 (91)	423137.140	420465.110					
FROM NADCON	2395252.167	2395265.242	2,672.062	0.068	39,290	179 43 10.7	0.4
NAD83 (91)	423137.241	420465.203					
NW 1/4 WAUKESHA	2395252.319	2395265.417	2,672.070	0.060	44,609	179 43 9.0	2.1
NAD83 (91)	423137.407	420465.377					
NE 1/4 WAUKESHA	2395252.652	2395265.747	2,672.062	0.068	39,405	179 43 9.1	2.0
NAD83 (91)	423137.607	420465.592					
S1/2 WASHINGTON	2395253.048	2395266.130	2,672.046	0.084	31,950	179 43 10.2	0.9
MEASURED	6428	6422	2,684.030	-	-	-	-
NAD27	372032.350	372031.490					
PUBLISHED	2405772.620	2408456.610	2,683.990	0.040	67,333	90 1 6.1	-
NAD83 (91)	372040.652	372039.831					
FROM NADCON	2374235.338	2376919.327	2,683.989	0.041	65,826	90 1 3.1	3.0
NAD83 (91)	372040.807	372039.980					
SW 1/4 WAUKESHA	2374235.405	2376919.389	2,683.984	0.046	58,681	90 1 3.6	2.5
NAD83 (91)	372040.701	372039.869					
NW 1/4 WAUKESHA	2374236.155	2376920.113	2,683.958	0.072	37,449	90 1 4.0	2.1

SOURCE	FROM	TO	DISTANCE IN FEET	DIFFERENCE: MEASURED MINUS COMPUTED	RATIO OF PRECISION: ONE PART IN	AZIMUTH	DIFFERENCE: NAD27 MINUS NAD83 (91)
MEASURED	89	88	2,655.570	-	-	-	-
NAD27	453000.130	453030.440					
PUBLISHED	2465903.220	2468558.600	2,655.553	0.017	156,045	89 20 45.7	-
NAD83 (91)	453008.019	453038.354					
FROM NADCON	2434365.608	2437020.964	2,655.530	0.040	66,182	89 20 43.7	2.0
NAD83 (91)	453008.018	453038.339					
S1/2 WASHINGTON	2434365.760	2437021.085	2,655.498	0.072	36,810	89 20 44.7	0.9
NAD83 (91)	453008.179	453038.514					
NE 1/4 WAUKESHA	2434365.446	2437020.786	2,655.513	0.057	46,724	89 20 43.7	1.9
MEASURED	8917	8915	2,640.680	-	-	-	-
NAD27	492557.720	489917.000					
PUBLISHED	2447214.620	2447217.310	2,640.721	-0.041	63,831	179 56 29.9	-
NAD83 (91)	492564.662	489923.991					
FROM NADCON	2415676.857	2415679.565	2,640.672	0.008	342,403	179 56 28.5	1.4
NAD83 (91)	492564.702	489924.037					
S1/2 WASHINGTON	2415677.365	2415680.067	2,640.667	0.013	198,619	179 56 28.9	0.9
NAD83 (91)	492564.207	489923.522					
N1/2 WASHINGTON	2415677.124	2415679.847	2,640.686	-0.006	432,635	179 56 27.3	2.6
MEASURED	61	288	2,655.540	-	-	-	-
NAD27	525267.690	522612.590					
PUBLISHED	2475217.000	2475272.080	2,655.671	-0.131	20,232	178 48 41.7	-
NAD83 (91)	525274.372	522619.321					
FROM NADCON	2443678.743	2443733.844	2,655.623	-0.083	32,070	178 48 39.9	1.7
NAD83 (91)	525274.089	522619.025					
N1/2 WASHINGTON	2443678.727	2443733.839	2,655.636	-0.096	27,682	178 48 39.1	2.6
NAD83 (91)	525274.123	522619.078					
S1/2 WASHINGTON	2443679.014	2443734.105	2,655.616	-0.076	34,766	178 48 40.7	1.0
MEASURED	3496	3442	2,662.050	-	-	-	-
NAD27	545231.110	542569.850					
PUBLISHED	2546557.500	2546622.120	2,662.044	0.006	477,680	178 36 32.5	-
NAD83 (91)	545238.063	542576.852					
FROM NADCON	2515018.236	2515082.882	2,661.996	0.054	49,173	178 36 30.4	2.1
NAD83 (91)	545238.117	542576.906					
OZAUKEE	2515018.031	2515082.669	2,661.996	0.054	49,661	178 36 31.0	1.5
NAD83 (91)	545238.126	542576.903					
N1/2 WASHINGTON	2515018.031	2515082.683	2,662.009	0.041	64,798	178 36 30.0	2.6
MEASURED	65	70	2,642.930	-	-	-	-
NAD27	467118.840	464477.610					
PUBLISHED	2521104.400	2521201.760	2,643.024	-0.094	28,172	177 53 20.2	-
NAD83 (91)	467126.990	464485.807					
FROM NADCON	2489566.104	2489663.488	2,642.978	-0.048	54,895	177 53 18.2	2.0
NAD83 (91)	467127.064	464485.883					
OZAUKEE	2489565.963	2489663.341	2,642.976	-0.046	57,203	177 53 18.7	1.5
NAD83 (91)	467126.689	464485.514					
S1/2 WASHINGTON	2489565.731	2489663.101	2,642.969	-0.039	67,657	177 53 19.2	1.0

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B01

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

CMPTD NAD83/91 B01 - POINT PAIRS THROUGHOUT REGION

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
145	220309.4573	2459016.3080	C-31-2-20
146	220376.6892	2461664.5114	E-31-2-20
21	216418.4845	2538194.1031	C-3-1-22
22	216383.7667	2540866.0570	E-3-1-22
9598	200549.7843	2306156.5540	C-17-1-15
9613	197902.8604	2306171.0363	S-17-1-15
137	319102.4897	2501885.1160	SW-27-5-21
136	319169.8115	2504514.3492	S-27-5-21
4015	375033.6374	2519946.5385	C-6-6-22
4016	375037.6994	2522586.3321	E-6-6-22
123	417001.1968	2498151.9315	C-28-8-21
124	417073.5084	2500772.8544	E-28-8-21
65	467127.8269	2489566.1452	NE-7-9-21
70	464486.6038	2489663.5269	E-7-9-21
3496	545240.1234	2515018.5359	E-26-12-21
3442	542578.8702	2515083.1778	SE-26-12-21
61	525276.1581	2443678.3708	N-15-11-19
288	522621.0647	2443733.4728	C-15-11-19
8917	492566.0329	2415676.3287	NW-13-10-18
8915	489925.3190	2415679.0407	W-13-10-18
89	453008.6917	2434365.2133	C-21-9-19
88	453039.0237	2437020.5866	E-21-9-19
1920	423137.5875	2395251.8939	NW-20-8-18
1881	420465.5239	2395264.9860	W-20-8-18
7343	412836.3741	2429241.8790	N-32-8-19
7321	410182.0304	2429235.2311	C-32-8-19
6428	372040.6037	2374235.4284	W-3-6-17
6422	372039.7661	2376919.4118	C-3-6-17
28	261558.0697	2539666.9646	NW-26-3-22
27	261576.2016	2542314.4282	N-26-3-22
9024	314991.9720	2451658.5288	C-36-5-19
8505	312366.4593	2451770.0804	S-36-5-19
7962	350137.4667	2482704.5034	S-25-6-20
7963	350238.0088	2485384.0463	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
145 - 146	88 32 44.5	2649.057	2649.090	79452.32
21 - 22	90 44 39.9	2672.180	2672.170	280832.34
9598 - 9613	179 41 11.5	2646.963	2646.950	196676.46
137 - 136	88 31 59.7	2630.095	2630.100	526668.37
4015 - 4016	89 54 42.6	2639.797	2639.780	157786.99
123 - 124	88 25 10.6	2621.920	2621.830	29048.73
65 - 70	177 53 18.5	2643.018	2642.930	30143.16
3496 - 3442	178 36 30.8	2662.038	2662.050	225010.19
61 - 288	178 48 39.9	2655.665	2655.540	21219.07
8917 - 8915	179 56 28.2	2640.715	2640.680	74868.87
89 - 88	89 20 44.0	2655.547	2655.570	113153.17
7962 - 7963	87 51 4.1	2681.428	2681.510	32893.87
1920 - 1881	179 43 9.4	2672.096	2672.130	77737.75
7343 - 7321	180 8 36.6	2654.352	2654.370	148269.09
6428 - 6422	90 1 4.4	2683.984	2684.030	57854.28
28 - 27	89 36 27.4	2647.526	2647.590	41127.73
9024 - 8505	177 34 1.6	2627.882	2627.860	122212.07

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B05

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR OZAUKEE COUNTY

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
123	417001.2090	2498151.5683	C-28-8-21
124	417073.5172	2500772.4505	E-28-8-21
65	467127.0644	2489565.9634	NE-7-9-21
70	464485.8827	2489663.3412	E-7-9-21
3496	545238.1172	2515018.0306	E-26-12-21
3442	542576.9057	2515082.6693	SE-26-12-21
61	525274.5311	2443678.9607	N-15-11-19
288	522619.4794	2443734.0590	C-15-11-19
8917	492564.9430	2415677.3248	NW-13-10-18
8915	489924.2705	2415680.0344	W-13-10-18
89	453008.2019	2434365.8803	C-21-9-19
88	453038.5309	2437021.2122	E-21-9-19
7343	412836.5165	2429242.5880	N-32-8-19
7321	410182.2144	2429235.9378	C-32-8-19

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
123 - 124	88 25 10.7	2621.880	2621.830	52965.09
65 - 70	177 53 18.7	2642.976	2642.930	57174.24
89 - 88	89 20 44.2	2655.505	2655.570	40955.92
288 - 61	358 48 40.2	2655.623	2655.540	31833.56
3496 - 3442	178 36 31.0	2661.996	2662.050	49696.83
8917 - 8915	179 56 28.3	2640.674	2640.680	435063.47

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B06

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR NORTH HALF OF WASHINGTON COUNTY - B06

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
123	417000.5328	2498152.1330	C-28-8-21
124	417072.8542	2500773.0270	E-28-8-21
65	467126.5799	2489566.2364	NE-7-9-21
70	464485.3863	2489663.6279	E-7-9-21
3496	545238.1264	2515018.0310	E-26-12-21
3442	542576.9027	2515082.6831	SE-26-12-21
61	525274.0886	2443678.7268	N-15-11-19
288	522619.0246	2443733.8389	C-15-11-19
8917	492564.2068	2415677.1240	NW-13-10-18
8915	489923.5221	2415679.8468	W-13-10-18
89	453007.3742	2434365.9652	C-21-9-19
88	453037.7166	2437021.3097	E-21-9-19
1920	423136.4372	2395253.1950	NW-20-8-18
1881	420464.4028	2395266.2980	W-20-8-18
7343	412835.4749	2429242.8505	N-32-8-19
7321	410181.1603	2429236.2137	C-32-8-19

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
123 - 124	88 25 9.7	2621.892	2621.830	42514.53
65 - 70	177 53 17.6	2642.989	2642.930	45150.43
3496 - 3442	178 36 30.0	2662.009	2662.050	64765.06
61 - 288	178 48 39.1	2655.636	2655.540	27707.74
8917 - 8915	179 56 27.3	2640.686	2640.680	434112.99
89 - 88	89 20 43.1	2655.518	2655.570	50854.34
1920 - 1881	179 43 8.5	2672.066	2672.130	42067.07
7343 - 7321	180 8 35.7	2654.323	2654.370	56319.77

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B08

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR SOUTH HALF OF WASHINGTON COUNTY B08

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
123	417000.9475	2498151.1733	C-28-8-21
124	417073.2482	2500772.0486	E-28-8-21
65	467126.6891	2489565.7305	NE-7-9-21
70	464485.5143	2489663.1007	E-7-9-21
3496	545237.4571	2515017.9434	E-26-12-21
3442	542576.2524	2515082.5745	SE-26-12-21
61	525274.1227	2443679.0142	N-15-11-19
288	522619.0778	2443734.1053	C-15-11-19
8917	492564.7019	2415677.3652	NW-13-10-18
8915	489924.0366	2415680.0673	W-13-10-18
89	453008.0179	2434365.7599	C-21-9-19
88	453038.3393	2437021.0846	E-21-9-19
1920	423137.6068	2395253.0481	NW-20-8-18
1881	420465.5925	2395266.1301	W-20-8-18
7343	412836.4568	2429242.3708	N-32-8-19
7321	410182.1619	2429235.7130	C-32-8-19

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
123 - 124	88 25 11.3	2621.872	2621.830	61826.70
70 - 65	357 53 19.2	2642.969	2642.930	67658.09
3496 - 3442	178 36 31.6	2661.989	2662.050	43901.39
288 - 61	358 48 40.7	2655.616	2655.540	34766.60
8917 - 8915	179 56 28.9	2640.667	2640.680	198618.19
89 - 88	89 20 44.7	2655.498	2655.570	36809.49
1920 - 1881	179 43 10.2	2672.046	2672.130	31948.93
7343 - 7321	180 8 37.4	2654.303	2654.370	39757.78

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOM2.B09

USER: EARL F. BURKHOLDER
DATE: MARCH 9, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR NORTH HALF OF MILWAUKEE COUNTY B09

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
137	319104.1174	2501885.5402	SW-27-5-21
136	319171.4607	2504514.7387	S-27-5-21
4015	375034.6981	2519946.2468	C-6-6-22
4016	375038.7827	2522586.0067	E-6-6-22
123	417001.5275	2498151.5595	C-28-8-21
124	417073.8607	2500772.4482	E-28-8-21
65	467127.4358	2489565.4523	NE-7-9-21
70	464486.2479	2489662.8553	E-7-9-21
89	453008.0070	2434365.3550	C-21-9-19
88	453038.3616	2437020.6939	E-21-9-19
7343	412836.1645	2429242.4335	N-32-8-19
7321	410181.8548	2429235.8085	C-32-8-19
9024	314993.2197	2451659.6374	C-36-5-19
8505	312367.7417	2451771.2103	S-36-5-19
7962	350138.5281	2482704.9079	S-25-6-20
7963	350239.0918	2485384.4150	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
137 - 136	88 31 58.0	2630.061	2630.100	67084.97
8505 - 9024	357 33 59.8	2627.848	2627.860	212996.70
7962 - 7963	87 51 2.4	2681.394	2681.510	23027.82
4015 - 4016	89 54 40.8	2639.763	2639.780	155029.55
123 - 124	88 25 8.8	2621.887	2621.830	46201.48
65 - 70	177 53 16.7	2642.983	2642.930	49506.19
89 - 88	89 20 42.2	2655.512	2655.570	46057.52
7343 - 7321	180 8 34.8	2654.318	2654.370	50965.93

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B10

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR SOUTH HALF MILWAUKEE COUNTY B10

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
137	319103.7109	2501885.5234	SW-27-5-21
136	319171.0542	2504514.7580	S-27-5-21
4015	375035.0472	2519946.5008	C-6-6-22
4016	375039.1305	2522586.2964	E-6-6-22
123	417002.4586	2498151.5342	C-28-8-21
124	417074.7918	2500772.4587	E-28-8-21
65	467129.0546	2489565.3312	NE-7-9-21
70	464487.8305	2489662.7346	E-7-9-21
89	453009.4568	2434364.4751	C-21-9-19
88	453039.8108	2437019.8500	E-21-9-19
7343	412837.0684	2429241.4663	N-32-8-19
7321	410182.7226	2429234.8400	C-32-8-19
28	261559.5589	2539667.8708	NW-26-3-22
27	261577.7127	2542315.3360	N-26-3-22
9024	314992.7791	2451658.9336	C-36-5-19
8505	312367.2654	2451770.5069	S-36-5-19
7962	350138.5537	2482704.6428	S-25-6-20
7963	350239.1178	2485384.1867	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
137 - 136	88 31 58.0	2630.097	2630.100	840935.18
4015 - 4016	89 54 40.9	2639.799	2639.780	140928.11
123 - 124	88 25 8.9	2621.922	2621.830	28346.20
65 - 70	177 53 16.8	2643.019	2642.930	29542.93
89 - 88	89 20 42.3	2655.548	2655.570	123072.41
7343 - 7321	180 8 34.9	2654.354	2654.370	166022.56
7963 - 7962	267 51 2.4	2681.430	2681.510	33639.95
9024 - 8505	177 33 59.9	2627.883	2627.860	112277.46
28 - 27	89 36 25.7	2647.527	2647.590	42304.77

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B11

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR KENOSHA COUNTY B11

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
145	220309.8875	2459015.5534	C-31-2-20
146	220377.1127	2461663.8103	E-31-2-20
21	216418.6052	2538194.9311	C-3-1-22
22	216383.8789	2540866.9386	E-3-1-22
28	261559.0950	2539667.9538	NW-26-3-22
27	261577.2196	2542315.4708	N-26-3-22

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
145 - 146	88 32 45.1	2649.110	2649.090	132771.66
21 - 22	90 44 40.5	2672.233	2672.170	42349.77
28 - 27	89 36 28.0	2647.579	2647.590	241868.84

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B13

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR E HALF OF RACINE COUNTY B13

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
145	220309.8300	2459016.1984	C-31-2-20
146	220377.0635	2461664.4379	E-31-2-20
21	216418.8227	2538195.0755	C-3-1-22
22	216384.1050	2540867.0659	E-3-1-22
137	319104.2217	2501885.5684	SW-27-5-21
136	319171.5447	2504514.8374	S-27-5-21
28	261559.0248	2539667.9466	NW-26-3-22
27	261577.1576	2542315.4462	N-26-3-22
9024	314993.6361	2451658.2965	C-36-5-19
8505	312368.0872	2451769.8501	S-36-5-19
7962	350139.6180	2482704.6865	S-25-6-20
7963	350240.1621	2485384.2661	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
21 - 22	90 44 39.9	2672.216	2672.170	58180.96
145 - 146	88 32 44.5	2649.093	2649.090	953695.92
28 - 27	89 36 27.3	2647.562	2647.590	93625.58
137 - 136	88 31 59.7	2630.131	2630.100	85424.03
9024 - 8505	177 34 1.5	2627.918	2627.860	45589.67

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B14

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR WEST HALF OF RACINE COUNTY B14

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
145	220309.9403	2459015.7047	C-31-2-20
146	220377.1629	2461663.9287	E-31-2-20
21	216418.6475	2538194.1040	C-3-1-22
22	216383.9199	2540866.0787	E-3-1-22
137	319103.5882	2501885.2082	SW-27-5-21
136	319170.9007	2504514.4621	S-27-5-21
28	261558.5806	2539667.1421	NW-26-3-22
27	261576.7029	2542314.6263	N-26-3-22
9024	314993.2217	2451658.2138	C-36-5-19
8505	312367.6879	2451769.7566	S-36-5-19
7962	350138.8778	2482704.5592	S-25-6-20
7963	350239.4107	2485384.1234	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
145 - 146	88 32 45.3	2649.077	2649.090	205164.01
21 - 22	90 44 40.7	2672.200	2672.170	88160.55
28 - 27	89 36 28.1	2647.546	2647.590	60488.21
137 - 136	88 32 .5	2630.115	2630.100	170415.78
9024 - 8505	177 34 2.3	2627.902	2627.860	62413.01

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B16

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR SOUTH HALF WALWORTH COUNTY B16

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
145	220309.6407	2459015.0482	C-31-2-20
146	220376.8742	2461663.2597	E-31-2-20
9598	200549.8259	2306154.8188	C-17-1-15
9613	197902.8939	2306169.3020	S-17-1-15
9024	314992.4527	2451657.1967	C-36-5-19
8505	312366.9314	2451768.7500	S-36-5-19

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
145 - 146	88 32 44.4	2649.065	2649.090	105538.80
9598 - 9613	179 41 11.4	2646.972	2646.950	122172.74
9024 - 8505	177 34 1.5	2627.890	2627.860	87320.56

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B17

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR NORTH HALF OF WALWORTH COUNTY B17

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
145	220309.5958	2459015.7969	C-31-2-20
146	220376.8319	2461664.0166	E-31-2-20
9598	200549.5720	2306155.1036	C-17-1-15
9613	197902.6314	2306169.5894	S-17-1-15
6428	372041.5784	2374234.1560	W-3-6-17
6422	372040.7448	2376918.1566	C-3-6-17
9024	314992.6994	2451657.8313	C-36-5-19
8505	312367.1702	2451769.3875	S-36-5-19

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
145 - 146	88 32 44.2	2649.073	2649.090	157361.35
9598 - 9613	179 41 11.2	2646.980	2646.950	87618.72
9024 - 8505	177 34 1.3	2627.898	2627.860	68997.25
6428 - 6422	90 1 4.1	2684.001	2684.030	91500.96

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B19

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR NE QUADRANT WAUKESHA COUNTY B19

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
137	319103.7365	2501884.6475	SW-27-5-21
136	319171.0605	2504513.8476	S-27-5-21
4015	375034.2004	2519945.7810	C-6-6-22
4016	375038.2653	2522585.5414	E-6-6-22
123	417001.2077	2498151.4017	C-28-8-21
124	417073.5215	2500772.2918	E-28-8-21
65	467127.1976	2489565.6678	NE-7-9-21
70	464486.0080	2489663.0512	E-7-9-21
89	453008.1790	2434365.4462	C-21-9-19
88	453038.5135	2437020.7861	E-21-9-19
1920	423137.4073	2395252.6521	NW-20-8-18
1881	420465.3772	2395265.7472	W-20-8-18
7343	412836.3613	2429242.2209	N-32-8-19
7321	410182.0510	2429235.5759	C-32-8-19
6428	372041.0433	2374236.5074	W-3-6-17
6422	372040.2087	2376920.4574	C-3-6-17
9024	314993.2152	2451658.6971	C-36-5-19
8505	312367.7355	2451770.2500	S-36-5-19
7962	350138.3020	2482704.2419	S-25-6-20
7963	350238.8458	2485383.7510	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
9024 - 8505	177 34 1.4	2627.848	2627.860	227554.73
137 - 136	88 31 59.5	2630.062	2630.095	79552.74
7962 - 7963	87 51 3.9	2681.395	2681.510	23270.97
4015 - 4016	89 54 42.4	2639.764	2639.780	160944.48
123 - 124	88 25 10.3	2621.888	2621.830	45576.76
65 - 70	177 53 18.3	2642.984	2642.930	48672.98
89 - 88	89 20 43.7	2655.513	2655.570	46669.06
1920 - 1881	179 43 9.1	2672.062	2672.130	39397.68
7343 - 7321	180 8 36.4	2654.319	2654.370	51666.52
6428 - 6422	90 1 4.1	2683.950	2684.030	33609.22

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B20

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR SOUTHEAST QUADRANT WAUKESHA COUNTY B20

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
137	319103.6072	2501885.1268	SW-27-5-21
136	319170.9358	2504514.3463	S-27-5-21
4015	375034.5193	2519946.3072	C-6-6-22
4016	375038.5882	2522586.0877	E-6-6-22
123	417001.8071	2498151.6982	C-28-8-21
124	417074.1255	2500772.6080	E-28-8-21
65	467128.1596	2489565.8211	NE-7-9-21
70	464486.9503	2489663.2096	E-7-9-21
89	453008.9480	2434365.2074	C-21-9-19
88	453039.2868	2437020.5672	E-21-9-19
1920	423137.8903	2395252.1672	NW-20-8-18
1881	420465.8405	2395265.2665	W-20-8-18
7343	412836.8207	2429242.0073	N-32-8-19
7321	410182.4903	2429235.3666	C-32-8-19
6428	372041.1099	2374235.9454	W-3-6-17
6422	372040.2792	2376919.9154	C-3-6-17
9024	314992.9757	2451658.8060	C-36-5-19
8505	312367.4766	2451770.3638	S-36-5-19
7962	350138.3752	2482704.5283	S-25-6-20
7963	350238.9242	2485384.0571	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
9024 - 8505	177 34 1.0	2627.868	2627.860	328476.29
137 - 136	88 31 59.2	2630.081	2630.100	141459.60
7962 - 7963	87 51 3.6	2681.415	2681.510	28119.78
4015 - 4016	89 54 42.1	2639.784	2639.780	729741.64
123 - 124	88 25 10.0	2621.907	2621.830	33904.97
65 - 70	177 53 17.9	2643.004	2642.930	35636.38
89 - 88	89 20 43.4	2655.533	2655.570	72082.03
7343 - 7321	180 8 36.0	2654.339	2654.370	84609.32
1920 - 1881	179 43 8.8	2672.082	2672.130	55532.82
6428 - 6422	90 1 3.8	2683.970	2684.030	44848.17

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B21

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR SOUTHWEST QUADRANT WAUKESHA COUNTY B21

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
137	319103.1705	2501885.3115	SW-27-5-21
136	319170.5021	2504514.5448	S-27-5-21
4015	375034.3943	2519946.5241	C-6-6-22
4016	375038.4665	2522586.3180	E-6-6-22
123	417001.8770	2498151.7543	C-28-8-21
124	417074.1987	2500772.6779	E-28-8-21
65	467128.4814	2489565.7768	NE-7-9-21
70	464487.2584	2489663.1686	E-7-9-21
89	453009.1347	2434364.8908	C-21-9-19
88	453039.4768	2437020.2644	E-21-9-19
1920	423137.8775	2395251.6796	NW-20-8-18
1881	420465.8136	2395264.7816	W-20-8-18
7343	412836.7921	2429241.7084	N-32-8-19
7321	410182.4480	2429235.0707	C-32-8-19
6428	372040.8071	2374235.4047	W-3-6-17
6422	372039.9797	2376919.3889	C-3-6-17
9024	314992.4615	2451658.7332	C-36-5-19
8505	312366.9488	2451770.2946	S-36-5-19
7962	350138.0789	2482704.5782	S-25-6-20
7963	350238.6312	2485384.1211	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
9024 - 8505	177 34 .8	2627.882	2627.860	119882.61
137 - 136	88 31 59.0	2630.095	2630.100	554652.28
7962 - 7963	87 51 3.4	2681.429	2681.510	33048.49
4015 - 4016	89 54 41.8	2639.797	2639.780	154610.24
123 - 124	88 25 9.8	2621.921	2621.830	28750.46
65 - 70	177 53 17.7	2643.018	2642.930	30014.88
89 - 88	89 20 43.2	2655.547	2655.570	115336.47
1920 - 1881	179 43 8.6	2672.096	2672.130	78598.26
7343 - 7321	180 8 35.8	2654.352	2654.370	150818.63
6428 - 6422	90 1 3.6	2683.984	2684.030	58680.27

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOMP.B22

USER: EARL F. BURKHOLDER
DATE: FEBRUARY 23, 1995

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

POINT PAIRS FOR NORTHWEST QUADRANT WAUKESHA COUNTY B22

THE INPUT COORDINATES ARE:

PT NUM	N/Y	E/X	STATION NAME
137	319103.3434	2501884.7347	SW-27-5-21
136	319170.6697	2504513.9431	S-27-5-21
4015	375033.9957	2519945.8745	C-6-6-22
4016	375038.0629	2522585.6431	E-6-6-22
123	417001.1132	2498151.3912	C-28-8-21
124	417073.4293	2500772.2891	E-28-8-21
65	467127.2498	2489565.5868	NE-7-9-21
70	464486.0523	2489662.9728	E-7-9-21
89	453008.1389	2434365.2074	C-21-9-19
88	453038.4761	2437020.5554	E-21-9-19
1920	423137.2407	2395252.3191	NW-20-8-18
1881	420465.2027	2395265.4165	W-20-8-18
7343	412836.1930	2429242.0017	N-32-8-19
7321	410181.8745	2429235.3594	C-32-8-19
6428	372040.7008	2374236.1547	W-3-6-17
6422	372039.8685	2376920.1129	C-3-6-17
9024	314992.7650	2451658.6334	C-36-5-19
8505	312367.2775	2451770.1890	S-36-5-19
7962	350137.9877	2482704.2429	S-25-6-20
7963	350238.5341	2485383.7602	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
9024 - 8505	177 34 1.2	2627.856	2627.860	668214.00
137 - 136	88 31 59.3	2630.070	2630.100	88250.21
7962 - 7963	87 51 3.7	2681.403	2681.510	25076.21
4015 - 4016	89 54 42.2	2639.772	2639.780	322076.90
123 - 124	88 25 10.2	2621.895	2621.830	40052.66
65 - 70	177 53 18.1	2642.992	2642.930	42446.65
89 - 88	89 20 43.5	2655.521	2655.570	54562.44
1920 - 1881	179 43 9.0	2672.070	2672.130	44580.81
7343 - 7321	180 8 36.2	2654.327	2654.370	61473.26
6428 - 6422	90 1 4.0	2683.958	2684.030	37456.06

COORDINATE INVERSES WITH OPTIONAL DISTANCE COMPARISONS

ALGORITHM AND PROGRAM DESIGN BY: EARL F. BURKHOLDER, PLS, PE
CONSULTING GEODETIC ENGINEER
KLAMATH FALLS, OREGON 97601-0050

PROGRAM: INVERSE - VER. 1.02, EFB:08/94 FILE: DISTCOM.CON

USER: EARL F. BURKHOLDER
DATE: AUGUST 30, 1994

AGENCY OR PERSON RESPONSIBLE FOR THE COORDINATES:

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

DESCRIPTION OF UNIQUE CHARACTERISTICS OR IDENTIFICATION OF COORDINATES:

NAD83 (91) POINT PAIR COORDINATES - OBTAINED FROM NADCON

THE INPUT COORDINATES ARE EXPRESSED IN U.S. SURVEY FEET

PT NUM	N/Y	E/X	STATION NAME
145	220309.4144	2459015.6299	C-31-2-20
146	220376.6527	2461663.8710	E-31-2-20
21	216418.4802	2538194.9505	C-3-1-22
22	216383.7638	2540866.9776	E-3-1-22
9598	200549.8866	2306154.8152	C-17-1-15
9613	197902.9690	2306169.2850	S-17-1-15
137	319103.6151	2501885.2689	SW-27-5-21
136	319170.9598	2504514.5123	S-27-5-21
4015	375034.6305	2519946.5667	C-6-6-22
4016	375038.6925	2522586.3721	E-6-6-22
123	417001.3363	2498151.8583	C-28-8-21
124	417073.6596	2500772.7691	E-28-8-21
65	467126.9903	2489566.1035	NE-7-9-21
70	464485.8069	2489663.4879	E-7-9-21
3496	545238.0627	2515018.2360	E-26-12-21
3442	542576.8519	2515082.8816	SE-26-12-21
61	525274.3723	2443678.7429	N-15-11-19
288	522619.3212	2443733.8441	C-15-11-19
8917	492564.6615	2415676.8573	NW-13-10-18
8915	489923.9906	2415679.5646	W-13-10-18
89	453008.0189	2434365.6076	C-21-9-19
88	453038.3544	2437020.9642	E-21-9-19
1920	423137.1399	2395252.1672	NW-20-8-18
1881	420465.1099	2395265.2423	W-20-8-18
7343	412836.2373	2429242.0844	N-32-8-19
7321	410181.9287	2429235.4237	C-32-8-19
6428	372040.6519	2374235.3378	W-3-6-17
6422	372039.8311	2376919.3269	C-3-6-17
28	261558.9579	2539668.0712	NW-26-3-22
27	261577.0950	2542315.6030	N-26-3-22
9024	314992.6440	2451658.4631	C-36-5-19
8505	312367.1351	2451770.0131	S-36-5-19
7962	350138.3896	2482704.5133	S-25-6-20
7963	350238.9550	2485384.0597	SE-25-6-20

POINT - POINT	AZIMUTH	INV. DIST	MEAS. DIST	RATIO 1:
145 - 146	88 32 44.1	2649.095	2649.090	583179.18
21 - 22	90 44 39.8	2672.253	2672.170	32330.37
9598 - 9613	179 41 12.4	2646.957	2646.950	369852.35
137 - 136	88 31 57.9	2630.106	2630.100	456507.57
4015 - 4016	89 54 42.6	2639.809	2639.780	92491.43
123 - 124	88 25 9.6	2621.908	2621.830	33421.11
65 - 70	177 53 18.2	2642.978	2642.930	54938.70
3496 - 3442	178 36 30.4	2661.996	2662.050	49247.54
61 - 288	178 48 39.9	2655.623	2655.540	32062.14
8917 - 8915	179 56 28.5	2640.672	2640.680	342393.05
89 - 88	89 20 43.7	2655.530	2655.570	66126.17
7962 - 7963	87 51 2.4	2681.433	2681.510	34806.78
1920 - 1881	179 43 10.7	2672.062	2672.130	39340.83
7343 - 7321	180 8 37.6	2654.317	2654.390	36372.97
6428 - 6422	90 1 3.1	2683.989	2684.030	65751.99
28 - 27	89 36 27.0	2647.594	2647.590	678446.18
9024 - 8505	177 34 1.7	2627.877	2627.860	150168.29