

**Countywide GPS Survey
In Support of GIS**

Dickinson County, Iowa

Submitted by Patrick Engineering Inc.

October 16, 2002

Carol,

The reports are ready to bind with the following exceptions.

~~1~~ The Table of Contents needs to be revised. Monumentation & Baseline Maps is to be section 3, not Monumentation of Baseline Maps.

~~2~~ Section 2 and Section 3 needs to be in order, i.e. Page 1. then Page 2. For Section 2 I want the Northing and Eastings first, then the Latitudes and Longitudes.

~~3~~ We need a coverpage. I made a handwritten one of what I think should be on there.

4. We are going to use floppy disks as opposed to CDs. ~~The contents are in Projects\Sidwell\9373.A0\DoesTheData.~~ *Carol had labels*

Most of everything is punched.

I'll be in the office around 11 to noon.

Thanks,

Scott

Project Report

Tabular Summary of Data

Monumentation & Baseline Map

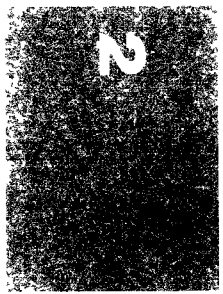
Survey Mark Descriptions

Published Coordinate Information

Smart GPS Output

Control Position Closures & Adjustment

Electronic Data



8

7

6

5

4

3

2

PROJECT REPORT

PROJECT INFORMATION

Location: Dickinson County, Iowa
Description: Countywide GPS Survey in Support of Geographical Information System

SUBMITTED TO

The Sidwell Company
675 Sidwell Court
St. Charles, IL 60174-3492

ATTENTION

Gary Lobdell

DATE

October 16, 2002

SUBMITTED BY

Patrick Engineering Inc.
GIS, Surveying, & Mapping Services Division
1970 University Drive
Lisle, IL 60532

Phone: (630) 795-7200
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INTRODUCTION

Dickinson County chose to embark on a county wide high accuracy geographical information system (GIS) survey. Patrick Engineering Inc. (Patrick) performed the high accuracy survey for aerial control and 3D monumentation.

The purpose of this survey was to provide the County with an accurate base map for their GIS. The base map would be acquired using photogrammetry that would need photo control. The photo control was implemented on approximately a three-mile grid. At each photo control location a permanent monument was installed. The permanent monuments can be used to locate features and load them accurately into the GIS.

PROJECT REQUIREMENTS

The basis of horizontal coordinates would be relative to the Iowa High Accuracy Reference Network (HARN) that is in NAD83 (1996). State Plane coordinates would be used in the Iowa North Zone in units of US Survey feet. The accuracy of the survey network would meet 1st Order horizontal accuracy as specified by the Federal Geodetic Control Committee (FGCC). Due to the size of the project and the accuracy requirements, surveying utilizing GPS would be required.

According to the GEOMETRIC GEODETIC ACCURACY STANDARDS AND SPECIFICATIONS FOR USING GPS RELATIVE POSITIONING TECHNIQUES by the FGCC, 1st Order horizontal accuracy is defined by a base error and a line-length dependent error. The base error is defined as 1 centimeter regardless of how far or close the distance is between two points. The line-length dependent error or relative error is defined as 1 part in 100,000.

Elevations were also required for the County. Elevations would be based on the North American Vertical Datum of 1988 (NAVD88). An elevation accuracy tolerance of 0.1 feet was specified.

CHRONOLOGY

Aerial Targets were installed on March 25 through March 29 and April 1 through April 5, 2002.

Monuments were installed on May 13 through May 16 and May 28 through May 31, 2002.

The fieldwork for the GPS survey was performed on August 26 through August 30, 2002. The data was then post processed and adjusted on September 3 through September 6 and September 9, 2002.

The survey report was started on September 10 and was completed on October 16.

RECONNAISSANCE

Reconnaissance was performed at various stages throughout this project. The first phase of the reconnaissance was to locate suitable locations for the permanent monuments that would also serve as photo control. One requirement was that there could be no overhead obstructions since the monument location had to be visible from the sky for photogrammetry and had to be suitable for GPS. Another requirement was to look for evidence of underground utilities and Right-of-Way. The locations were to avoid utilities and to remain on highway Right-of-Way.

The second phase of reconnaissance was to search for the NGS monuments. A sufficient number of horizontal and vertical control monuments would be needed in order to obtain the required positions.

MONUMENTATION

Fifty-four monuments were installed for the County and an additional six monuments were installed for cities inside the County. The monuments consisted of a Berrtsen Rod monument composed of a point, a 3-ft aluminum rod section, a 3-ft top security rod section, an aluminum disk, a 6-inch PVC pipe, a 6-inch aluminum access cover, and sand for backfill.

The Dickinson County Engineers Office coordinated the marking of underground utilities at each monument location to ensure that there were no utility conflicts.

INSTRUMENTATION

Leica dual frequency GPS receivers were utilized for this project to collect and store GPS observation data. The following GPS receivers were used on this project:

<u>GPS Receiver</u>	<u>Firmware Version</u>	<u>Serial Number</u>
Leica SR399	V 3.65-EN	60129/149315
Leica SR399	V 3.65-EN	60158/149674
Leica SR530	V 3.00	0033402/3964
Leica SR530	V 3.00	0033689/3904
Leica SR530	V 3.00	0033781/10213

Two-meter fixed-height tripods were used to observe over the stations.

SOFTWARE

The software used to post-process, analyze and adjust the GPS observation data for this project were as follows:

<u>Post-Processing Data:</u>	Leica Geosystems AG, SKI-PRO ver. 2.1.0.0
<u>Analyzing Data:</u>	Shanlong Kuang, Ph.D, SMARTGPS ver. 6.03
<u>Adjusting Data:</u>	Star Plus Software, STAR*NET-PRO V6.0.24

PROJECT DIAGRAM

The project diagram illustrating the location of stations (known and unknown) are provided under Section 3 in this report.

HORIZONTAL CONTROL STATIONS

The horizontal control consisting of three (3) Iowa HARN stations, two (2) Minnesota HARN stations, and nine (9) Clay County Monuments are provided under Section 5 of the project report.

VERTICAL CONTROL STATIONS

The vertical control orthometric heights consisting of five (5) NGS benchmarks and eight (8) Clay County Monuments are provided under Section 5 of the project report. One NGS monument was P 21. It was not observed using GPS; instead a level loop was performed from P 21 to the County monument 8048.

All vertical information is provided under Section 5.

FINAL STATION COORDINATE LIST

Final station coordinate list is enclosed in Section 2 of the project report.

DATA PROCESSING RESULTS

The GPS observation data was post-processed in the Lisle office of Patrick Engineering Inc. All site information (i.e. station name, session number and height of instrument) has been checked and any errors were corrected. Antenna configurations were edited to correspond to those provided on the National Geodetic Survey (NGS) website to ensure that the two different antennas used for this project would be compatible.

LOOP CLOSURES

SMARTGPS software was used to analyze the post-processed baseline vectors for loop closures. The NGS relative accuracy for 1st-Order was chosen for loop closure analysis. Fifty-four (54) loops were computed and were analyzed. These loops satisfied the specifications for B-Order Class III since the highest precision misclosure was 2.70-ppm for a particular component. This is well under the 10-ppm specification. The loop closure output is enclosed in Section 6 of the project report.

REPEAT BASELINE CLOSURES

SMARTGPS software was used to analyze the post-processed baseline vectors for baseline closures (i.e., repeat baselines). Sixteen (16) repeat baselines were analyzed. The largest misclosure for the repeat baselines was 12.09-ppm in one component, which is more than the required 10-ppm specification. However, this does not take into account the 1cm + 10-ppm specification for 1st Order Accuracy. The baseline length that had a closure of 12.09-ppm was 620 meters long. Therefore the equivalent line accuracy allowable taking into account the base error of 1-cm would be 18.98-ppm. Since 12.09-ppm is less than 18.98-ppm, the repeat baseline closure met specification. The next largest closure for a repeat baseline was 7.81-ppm in one component. Therefore all repeat baselines met 1st Order horizontal accuracy.

Repeat baseline closures are under Section 6 of the project report.

MINIMALLY CONSTRAINED ADJUSTMENT

Star*Net was used to perform the minimally constrained adjustment. The position for the HARN station WHYNOT was held fixed in horizontal and A 20 was held fixed in vertical. All non-trivial baselines were used.

Output from Star*Net is not enclosed but the published position closures have been included in Section 7 of the project report.

CONSTRAINED ADJUSTMENT

Star*Net was used to perform the constrained adjustment by holding horizontal and vertical components of the control stations. All non-trivial baselines were used.

The adjustment was done in iterations to ensure that the published control did indeed agree with the observations that were recorded. The first points that were constrained were the HARN monuments in the horizontal component and then the

NGS benchmarks in the vertical component. These constrained monuments fit into the adjustment and the remaining free monuments were compared to their published values. It was found that horizontally all of the monuments of Clay County were within accuracy tolerances. Vertically, it was found that only four of the Clay County Monuments (7019, 7055, 7072, and 7073) were within 0.10 feet of their published values.

A second constrained adjustment was performed in which all NGS monuments were fixed in their horizontal and vertical components and all of the Clay County monuments were fixed in horizontal. In addition, four Clay County monuments (7019, 7055, 7072, and 7073) were fixed vertically. The remaining free monuments were then compared to their published values. It was then found that an additional two Clay County Monuments (7037 and 7054) were within 0.10 feet of their published values.

A third constrained adjustment was performed in which all known constraints were fixed with the exception of the vertical components of the three Clay County monuments 7001, 7018, and 7036. This adjustment showed that these monuments differed from their published elevations by the following:

7001: -0.16 feet
7018: -0.11 feet
7036: -0.20 feet

Since 7018 essentially was within a tenth of its published elevation, it was decided that its published elevation was valid and would be held fixed in the next adjustment. By fixing the elevation of 7018, the difference in elevation of 7001 from its published value would be reduced from -0.16 feet to about -0.05 feet. Therefore its elevation would be valid and would be held fixed in the next adjustment. The elevation of 7036 would not be fixed in the next adjustment since its deviation was more than a tenth of a foot.

The final adjustment then held fixed all published coordinates in horizontal and elevation with the exception of the elevation of 7036. It was found that the free elevation of 7036 was -0.13 feet from its published value. It was decided that the elevation of 7036 is not valid and could not be held fixed.

Output from the adjustment is enclosed in Section 5 of the project report.

CONTROL POINT CLOSURES

Control point closures were computed in spreadsheet format and analyzed the accuracy of the published coordinates with respect to the recorded observations. All points were calculated based on their position from the minimally constrained adjustment relative to WHYNOT, the point held fixed horizontally in the minimally constrained adjustment. All control points satisfied the accuracy requirements for this project indicating that the published monument's horizontal information were correct

and that there appears to be no disturbed monuments based on the 1st Order Horizontal Accuracy criteria.

Output from the control point closures is enclosed in Section 7 of the project report

FINAL RESULTS

Final results including Iowa North Zone State Plane Coordinates in US survey feet and meters, combined scale factor, convergence angle, latitude, longitude, ellipsoid height, and orthometric height of stations surveyed are provided under Section 2 of the project report.

Monument Sketches for all monuments except for the Clay County monuments have been provided in Section 4 of the project report. The monument sketches from Clay County have been enclosed in Section 5.

SUMMARY

It is our professional opinion that this report represents a survey that will satisfy the stated accuracy requirements and specifications.

DICKINSON COUNTY, IOWA GPS PROJECT

ADJUSTMENT DATE: SEPTEMBER 9, 2002

HORIZONTAL DATUM: IOWA HARN, NAD 83 (1996), IOWA NORTH ZONE
 VERTICAL DATUM: NAD 83 (ELEVATIONS GPS DERIVED USING GEOID 99)

Number	Name	Northing US Feet	Eastng US Feet	Elevation US Feet	Northing Meters	Eastng Meters	Elevation Meters	CONVERGENCE	SCALE
7001	973806 4	3926074.61	4418323.32	1416.89	1196669.934	1346707.641	431.869	-1°16'46.33"	0.999935
7018	973804 1	3925783.01	4433624.31	1383.25	1196581.055	1351371.392	421.615	-1°14'26.17"	0.999936
7019	973706 4	3925469.86	4449963.79	1375.26	11966485.606	1356351.676	419.180	-1°11'56.5"	0.999937
7036	973704 1	3925114.66	4465753.23	1391.81	1196377.341	1361164.307	424.225	-1°09'31.86"	0.999936
7037	973606 4	3924840.12	4481927.18	1428.54	1196293.661	1366094.137	435.420	-1°07'03.72"	0.999934
7054	973604 1	3924571.94	4497043.42	1461.77	1196211.920	1370701.576	445.548	-1°04'45.26"	0.999933
7055	973506 4	3923744.92	4512924.94	1402.99	1195959.844	1375542.273	427.632	-1°02'19.69"	0.999935
7072	973503 4	3923864.76	4528789.05	1367.48	1195996.371	1380377.663	416.809	0°59'54.45"	0.999937
7073	973501 1	3923604.03	4541989.73	1418.75	1195916.900	1384401.239	432.436	0°57'53.53"	0.999935
8001	1013835 3	4015444.33	4420376.28	1529.83	1223909.880	1347333.385	466.293	-1°16'45.81"	0.999982
8002	1003819 4	4005831.00	4420216.63	1492.58	1222079.731	1347284.723	454.939	-1°16'45.3"	0.999977
8003	1003833 3	3990060.18	4419891.21	1526.93	1216172.775	1347185.535	465.409	-1°16'45.06"	0.999965
8004	993818 3	3973721.30	4419517.04	1512.77	1211192.675	1347071.488	461.093	-1°16'45.14"	0.999956
8005	993818 3	3973721.30	4419517.04	1512.77	1211192.675	1347071.488	461.093	-1°16'45.14"	0.999956
8006	983806 4	3957781.31	4419164.34	1433.20	1206334.156	1346963.985	436.840	-1°16'45.11"	0.999950
8007	1013731 3	4015160.92	4435960.02	1485.41	1223823.496	1346972.041	438.764	-1°16'41.62"	0.999942
8008	1003821 1	4002817.38	4435676.78	1479.74	1222061.178	1352083.318	452.754	-1°14'22.5"	0.999984
8009	1003833 2	3989765.52	4435403.18	1467.55	1216082.963	1351996.987	451.026	-1°14'22.64"	0.999976
8010	993816 2	3973512.82	4434444.84	1480.79	1211129.130	1351621.490	447.310	-1°14'22.56"	0.999968
8011	983804 1	3957481.03	4434716.89	1512.93	1206242.630	1351704.411	451.346	-1°14'28.13"	0.999958
8012	983822 4	3941513.85	4434509.51	1400.16	1201375.824	1351641.202	461.142	-1°14'22.45"	0.999947
8014	1003707 4	4014796.98	4451889.23	1469.30	1223712.567	1351641.202	426.770	-1°14'21.18"	0.999943
8015	1003719 3	4002403.97	4451620.98	1431.86	1219935.170	1356938.551	447.844	-1°14'21.18"	0.999985
8016	993813 2	3973116.25	4450910.77	1477.91	1215963.197	1356856.788	436.432	-1°14'21.18"	0.999979
8017	983706 4	3957005.59	4450622.65	1472.40	1206097.716	1356540.316	445.122	-1°14'55.77"	0.999969
8018	983813 2	3941360.03	4450236.13	1436.34	1201328.940	1356552.497	450.468	-1°14'56.97"	0.999958
8019	1013731 3	4014668.61	4467190.30	1407.58	1223673.440	1356434.685	437.797	-1°14'56.52"	0.999949
8020	1003722 3	4001852.59	4467094.51	1408.03	1219767.109	1361602.327	429.031	-1°11'57.06"	0.999942
8021	993703 4	3988885.99	4466973.02	1481.97	1215814.881	1361573.130	429.168	-1°09'33.8"	0.999980
8022	993721 1	3972731.19	4466581.30	1462.21	1210890.888	1361536.100	451.705	-1°09'32.51"	0.999968
8023	993734 3	3957040.15	4466561.44	1432.38	1206108.250	1361416.703	445.682	-1°09'33.1"	0.999958
8024	983721 1	3940940.37	4466176.77	1450.43	1201201.027	1361410.650	436.590	-1°09'30.37"	0.999951
8025	1013633 3	4014494.26	4478925.45	1436.35	1223620.298	1361293.402	442.092	-1°09'30.92"	0.999941
8026	1003724 2	4001838.20	4480553.84	1459.76	1219762.723	1365179.208	437.800	-1°07'47.39"	0.999987
8027	993701 1	3987746.40	4483408.48	1437.31	1215315.133	1365675.542	444.936	-1°07'30.14"	0.999977
8028	993618 3	3971063.96	4485451.44	1417.87	1210382.716	1366545.638	438.093	-1°07'01.29"	0.999969
8029	983701 1	3955674.63	4482184.67	1426.65	1205692.039	1367168.333	432.168	-1°06'39.65"	0.999960
8030	983713 2	3940808.14	4481978.37	1428.92	1201160.723	1366172.620	434.844	-1°07'6.87"	0.999950
8031	1013531 3	4014169.04	4498355.05	1415.15	1223521.170	1366109.739	435.536	-1°07'6.1"	0.999942
8032	1003620 3	4001664.41	4489883.99	1443.98	1219709.752	1366109.739	434.844	-1°07'6.87"	0.999950
8033	993604 1	3986577.09	4498041.53	1401.20	1215111.127	1366109.739	434.844	-1°07'6.87"	0.999950
8034	993615 3	3972631.48	4496790.31	1413.99	1210860.497	1370624.428	427.087	-1°04'46.82"	0.999970
8035	993634 3	3956288.07	4497812.13	1454.11	1205879.015	1370935.879	443.214	-1°04'55.89"	0.999961
8036	983616 2	3940456.19	4497313.10	1452.32	1201053.449	1370935.879	443.214	-1°04'43.69"	0.999950
8037	1013638 2	4013776.56	4514599.72	1411.42	1223401.542	1370783.774	442.668	-1°04'45.53"	0.999941
8038	1003519 3	4001241.13	4514367.67	1450.80	1219580.736	1376052.747	430.202	-1°02'19.31"	0.999988
8039	1003636 2	3988134.84	4514148.48	1529.82	1215585.930	1375982.018	442.205	-1°02'19.35"	0.999978
8040	993613 2	3972486.14	4513784.08	1509.64	1210816.197	1375915.209	466.290	-1°02'19.18"	0.999965
8041	983506 4	3955850.61	4513577.30	1464.96	1205745.677	1375804.139	460.139	-1°02'19.92"	0.999957
8042	983613 2	3940076.76	4513150.98	1448.05	1200937.798	1375741.113	446.521	-1°02'19.05"	0.999949
8043	1003510 4	4013450.59	4530066.24	1421.91	1223302.186	1375611.170	441.367	-1°02'20.34"	0.999941
						1380766.951	433.399	0°59'57.06"	0.999988

DICKINSON COUNTY, IOWA GPS PROJECT

ADJUSTMENT DATE SEPTEMBER 9, 2002

HORIZONTAL DATUM: IOWA HARN, NAD 83 (1996), IOWA NORTH ZONE
 VERTICAL DATUM: NAD 83 (ELEVATIONS GPS DERIVED USING GEOID 99)

Number	Name	Northing US Feet	Easting US Feet	Elevation US Feet	Northing Meters	Easting Meters	Elevation Meters	CONVERGENCE	SCALE
8044	1003522 3	4001008.38	4529863.84	1453.91	1219509.793	1380705.260	443.153	0°59'56.93"	0.999978
8045	993504 1	3987696.42	4529660.13	1476.33	1215452.300	1380643.169	449.986	0°59'56.67"	0.999968
8046	993521 1	3971250.77	4529439.97	1454.68	1210439.656	1380576.064	443.387	0°59'56.05"	0.999959
8047	983503 4	3955538.11	4529336.85	1424.66	1205550.427	1380544.633	434.237	0°59'54.49"	0.999951
8048	983522 3	3939699.03	4529616.95	1422.18	1200822.666	1380630.008	433.481	0°59'49.39"	0.999942
8049	1003407 4	4013187.26	4545969.25	1386.37	1223221.923	1385614.199	422.566	0°57'30.82"	0.999989
8050	1003524 2	3999479.07	4545599.26	1421.79	1219043.659	1385501.425	433.362	0°57'32.11"	0.999978
8051	993406 4	3987464.77	4545571.56	1517.87	1215381.693	1385492.982	462.648	0°57'30.52"	0.999966
8052	993419 4	3970877.45	4545349.24	1446.58	1210325.867	1385425.219	440.918	0°57'30.01"	0.999959
8053	983501 1	3955141.17	45443674.42	1437.96	1205529.440	1384914.733	438.291	0°57'42.95"	0.999950
8054	983513 2	3939456.03	4544752.39	1431.13	1200748.599	1385243.299	436.209	0°57'30.66"	0.999942
A 20	1003628 2	3993960.41	4497794.43	1413.40	1217361.568	1370930.484	430.805	-1°04'50.36"	0.999974
JACPORT		4066784.27	4528891.11	1444.25	1239558.325	1380408.771	440.208	-1°00'16.46"	1.000027
LAKE PARK	1003832 4	3994584.09	4425016.19	1530.27	1217551.666	1348747.632	466.427	-1°15'58.92"	0.999968
MILLPORT	983701 2	3953742.96	4481545.55	1435.19	1205103.264	1365977.816	437.447	-1°07'12.39"	0.999949
M 20	1003830 2	3997194.07	4424670.84	1494.52	1218347.189	1348642.369	455.531	-1°16'2.62"	0.999972
ORLEANS	1003622 2	3994564.74	4498776.28	1418.60	1217545.768	1371229.753	432.390	-1°04'41.45"	0.999975
S 388		4064697.51	4459263.79	1427.25	1238922.279	1359186.322	435.027	-1°10'57.67"	1.000025
SPIRIT LAKE 1	993604 2	3984041.54	4494307.40	1471.46	1214338.290	1369867.635	448.502	-1°05'20.66"	0.999955
SPIRIT LAKE 2	993609 1	3982560.12	4496763.99	1463.30	1213886.752	1370616.405	446.015	-1°04'57.85"	0.999965
SUPERIOR	1003535 2	3989037.28	4537607.84	1503.17	1215860.995	1383065.636	458.167	0°58'43.89"	0.999967
WHARFETON 1	993726 4	3967116.76	4474208.07	1436.63	1209179.607	1363741.347	437.886	-1°08'22.1"	0.999956
WHARFETON 2	993726 2	3962347.38	4474508.87	1422.92	1207725.897	1363833.031	433.707	-1°08'18.47"	0.999954
WHYNOT	983636 1	3927988.01	4512917.88	1463.60	1197253.140	1375540.121	446.106	-1°02'20.46"	0.999934

DICKINSON COUNTY, IOWA GPS PROJECT

ADJUSTMENT DATE SEPTEMBER 9, 2002

HORIZONTAL DATUM: IOWA HARN, NAD 83 (1996), IOWA NORTH ZONE

VERTICAL DATUM: NAV 83 (ELEVATIONS GPS DERIVED USING GEOID99)

Number	Name	Latitude	Longitude	Ellipsoidal Height	
				Feet	Meters
7001	973806 4	43°15'18.398408"	95°23'16.556808"	1325.56	404.030
7018	973804 1	43°15'18.842421"	95°19'49.759423"	1291.48	393.644
7019	973706 4	43°15'19.185660"	95°16'08.925140"	1283.05	391.073
7036	973704 1	43°15'18.886856"	95°12'35.510094"	1299.22	396.004
7037	973606 4	43°15'19.349249"	95°08'56.921944"	1335.61	407.094
7054	973604 1	43°15'19.563144"	95°05'32.624988"	1368.60	417.151
7055	973506 4	43°15'14.295357"	95°01'57.851377"	1309.63	399.175
7072	973503 4	43°15'18.264337"	94°58'23.546165"	1274.00	388.315
7073	973501 1	43°15'17.923215"	94°55'25.132832"	1325.19	403.920
8001	1013835 3	43°30'01.272585"	95°23'15.786342"	1440.50	439.066
8002	1003819 4	43°28'26.321191"	95°23'15.040012"	1403.10	427.666
8003	1003831 3	43°25'50.535599"	95°23'14.677468"	1437.14	438.043
8004	993818 3	43°23'09.127553"	95°23'14.803825"	1422.62	433.614
8005	983806 4	43°20'31.660095"	95°23'14.759875"	1342.65	409.241
8006	983819 4	43°17'54.896380"	95°23'09.609744"	1348.55	411.039
8007	1013731 3	43°30'01.857179"	95°19'44.332049"	1395.66	425.398
8008	1003821 1	43°27'59.921940"	95°19'44.550934"	1389.80	423.610
8009	1003833 2	43°25'50.993267"	95°19'44.431428"	1377.35	419.816
8010	993816 2	43°23'10.311417"	95°19'52.644505"	1390.23	423.742
8011	983804 1	43°20'32.071089"	95°19'44.265047"	1421.98	433.420
8012	983822 4	43°17'54.363594"	95°19'42.397838"	1308.79	398.919
8013	1003707 4	43°30'01.611066"	95°16'08.168096"	1379.17	420.372
8014	1003719 3	43°27'59.190637"	95°16'08.288694"	1341.53	408.900
8015	1003731 3	43°25'50.471306"	95°16'07.836515"	1369.77	417.507
8016	993813 2	43°23'09.858607"	95°16'09.605662"	1386.93	422.737
8017	983706 4	43°20'30.719297"	95°16'08.941246"	1381.04	420.941
8018	983813 2	43°17'56.149684"	95°16'09.739659"	1344.57	409.825
8019	1013731 3	43°30'03.453726"	95°12'40.589493"	1317.20	401.483
8020	1003722 3	43°27'56.891151"	95°12'38.370636"	1317.41	401.547
8021	993703 4	43°25'48.834739"	95°12'36.461274"	1391.06	423.996
8022	993721 1	43°23'09.241392"	95°12'37.339732"	1370.88	417.844
8023	993734 3	43°20'34.298929"	95°12'33.312789"	1340.62	408.621
8024	983721 1	43°17'55.244899"	95°12'34.112048"	1358.24	413.993
8025	1013633 3	43°30'04.047752"	95°10'01.364461"	1345.78	410.196
8026	1003724 2	43°27'59.398750"	95°09'35.905325"	1368.91	417.244
8027	993701 1	43°25'35.868919"	95°08'53.348723"	1346.05	410.277
8028	993618 3	43°22'56.470552"	95°08'21.419064"	1326.11	404.198
8029	983701 1	43°20'23.880961"	95°09'01.577229"	1334.51	406.758
8030	983713 2	43°17'57.039983"	95°09'00.441943"	1336.38	407.331
8031	1013531 3	43°30'04.537011"	95°05'37.728630"	1324.26	403.634

DICKINSON COUNTY, IOWA GPS PROJECT

ADJUSTMENT DATE SEPTEMBER 9, 2002

HORIZONTAL DATUM: IOWA HARN, NAD 83 (1996), IOWA NORTH ZONE

VERTICAL DATUM: NAV 83 (ELEVATIONS GPS DERIVED USING GEOID99)

Number	Name	Latitude	Longitude	Ellipsoidal Height	
				Feet	Meters
8032	1003620 3	43°27'59.4722776"	95°07'29.373324"	1352.96	412.382
8033	993604 1	43°25'32.030142"	95°05'34.927823"	1309.67	399.187
8034	993615 3	43°23'14.092094"	95°05'48.310166"	1322.09	402.973
8035	993634 3	43°20'32.897897"	95°05'30.308435"	1361.73	415.055
8036	983616 2	43°17'56.469066"	95°05'33.024641"	1359.53	414.384
8037	1013638 2	43°30'03.627923"	95°01'57.277861"	1320.25	402.414
8038	1003519 3	43°27'59.808475"	95°01'57.342667"	1359.37	414.336
8039	1003636 2	43°25'50.352561"	95°01'57.092746"	1438.07	438.325
8040	993613 2	43°23'15.763360"	95°01'58.185343"	1417.47	432.046
8041	983506 4	43°20'31.455007"	95°01'56.901556"	1372.34	418.290
8042	983613 2	43°17'55.613637"	95°01'58.799120"	1355.04	413.017
8043	1003510 4	43°30'03.125434"	94°58'27.400187"	1330.50	405.538
8044	1003522 3	43°28'00.231622"	94°58'27.202246"	1362.24	415.211
8045	993504 1	43°25'48.747370"	94°58'26.816710"	1384.33	421.943
8046	993521 1	43°23'06.313965"	94°58'25.914595"	1362.27	415.221
8047	983503 4	43°20'31.136002"	94°58'23.603011"	1331.86	405.953
8048	983522 3	43°17'54.772901"	94°58'16.083776"	1329.01	405.084
8049	1003407 4	43°30'03.208299"	94°54'51.616916"	1294.72	394.633
8050	1003524 2	43°27'47.785674"	94°54'53.523396"	1329.85	405.338
8051	993406 4	43°25'49.144277"	94°54'51.174008"	1425.65	434.538
8052	993419 4	43°23'05.310997"	94°54'50.426797"	1353.98	412.693
8053	983501 1	43°20'29.638614"	94°55'09.525473"	1345.02	409.964
8054	983513 2	43°17'54.924206"	94°54'51.389939"	1337.86	407.780
A 20	1003628 2	43°26'44.889460"	95°05'40.162395"	1322.06	402.963
JACPORT		43°38'49.537560"	94°58'56.026310"	1353.85	412.655
LAKE PARK	1003832 4	43°26'36.327280"	95°22'06.598700"	1440.45	439.049
MILPORT	983701 2	43°20'04.683270"	95°09'09.712800"	1343.01	409.351
M 20	1003830 2	43°27'02.021774"	95°22'12.060951"	1404.76	428.170
ORLEANS	1003627 2	43°26'51.039385"	95°05'27.010173"	1327.25	404.547
S 388		43°38'15.810820"	95°14'42.113790"	1337.67	407.722
SPIRIT LAKE 1	993604 2	43°25'06.295339"	95°06'24.864126"	1379.92	420.601
SPIRIT LAKE 2	993609 1	43°24'52.127011"	95°05'51.207159"	1371.68	418.088
SUPERIOR	1003535 2	43°26'03.342603"	94°56'39.441186"	1411.10	430.103
WHAPETON 1	993726 4	43°22'15.313653"	95°10'52.569890"	1344.98	409.950
WHAPETON 2	993726 2	43°21'28.277918"	95°10'47.215588"	1331.13	405.728
WHYNOT	983636 1	43°15'56.195080"	95°01'58.986470"	1370.32	417.675

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1013835 3 GPS NO. 8001 COUNTY JACKSON STATE MN
 LOCATED IN SECTION 35 TWP 101 N RANGE 38 W USGS QUAD MAP SIOUXVALLEY
 THE STATION IS
 DUE NORTH OF THE INTERSECTION BETWEEN 100TH STREET AND 100TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY Patrick Engineering Inc. DATE August, 2002
 MARK SET VALUES ESTABLISHED BY

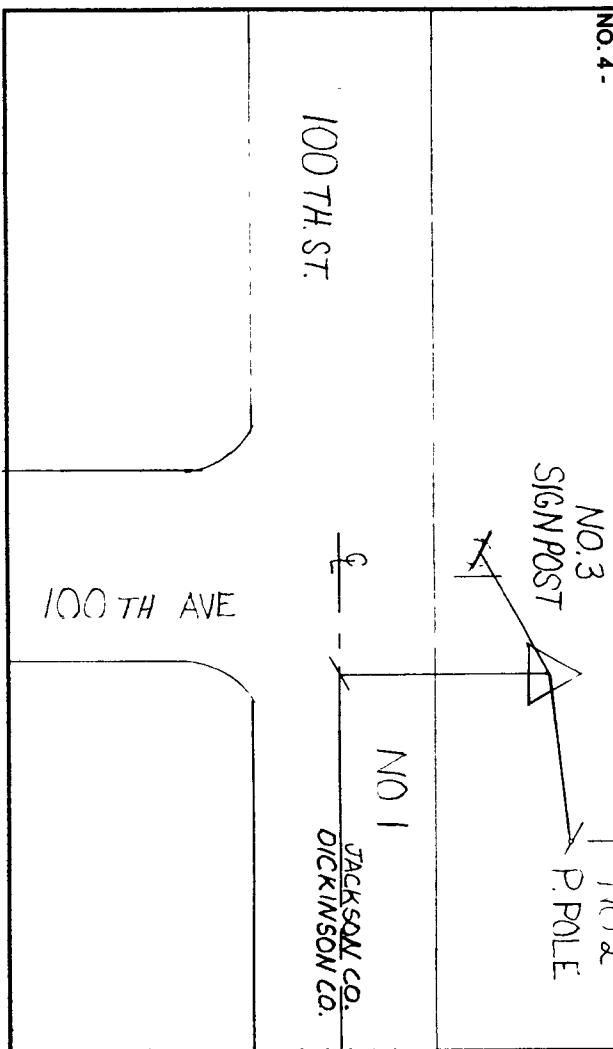
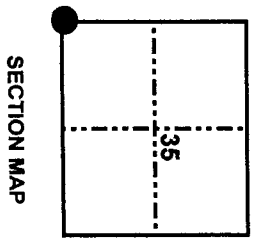
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 30' 01.272585" CONVERGENCE ANGLE -1° 16' 45.81"
 LONGITUDE WEST 95° 23' 15.786342" SCALE FACTOR 0.999982
 ELLIPSOID HEIGHT (meter) 439.066 * (Based on GEOID99 Model)
 IOWA COORDINATE SYSTEM, NORTH ZONE
 COORDINATES (US FEET) 4015444.33 COORDINATES (METERS) 1223909.880
 NORTHING (Y) 4420376.28 EASTING (X) 1347333.385

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1529.83 ELEVATION (METERS) 466.293

TIES
 NO. 1 - 52.0'
 NO. 2 - 15.0'
 NO. 3 - 13.0'
 NO. 4 -



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 1003819 4 **GPS NO.** 8002 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 19 **TWP** 100 N **RANGE** 38 W **USGS QUAD MAP** HARRIS
THE STATION IS _____
SOUTHEASTERLY FROM THE INTERSECTION OF 120TH STREET AND 100TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING **VALUES AS PUBLISHED BY** Patrick Engineering Inc. **DATE** August, 2002
 MARK SET **VALUES ESTABLISHED BY** _____

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 28' 26.321191"
LONGITUDE WEST 95° 23' 15.040012"
ELLIPSOID HEIGHT (meter) 427.666 * (Based on GEOID99 Model)

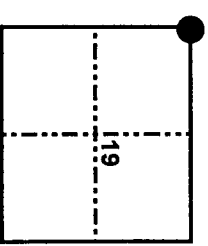
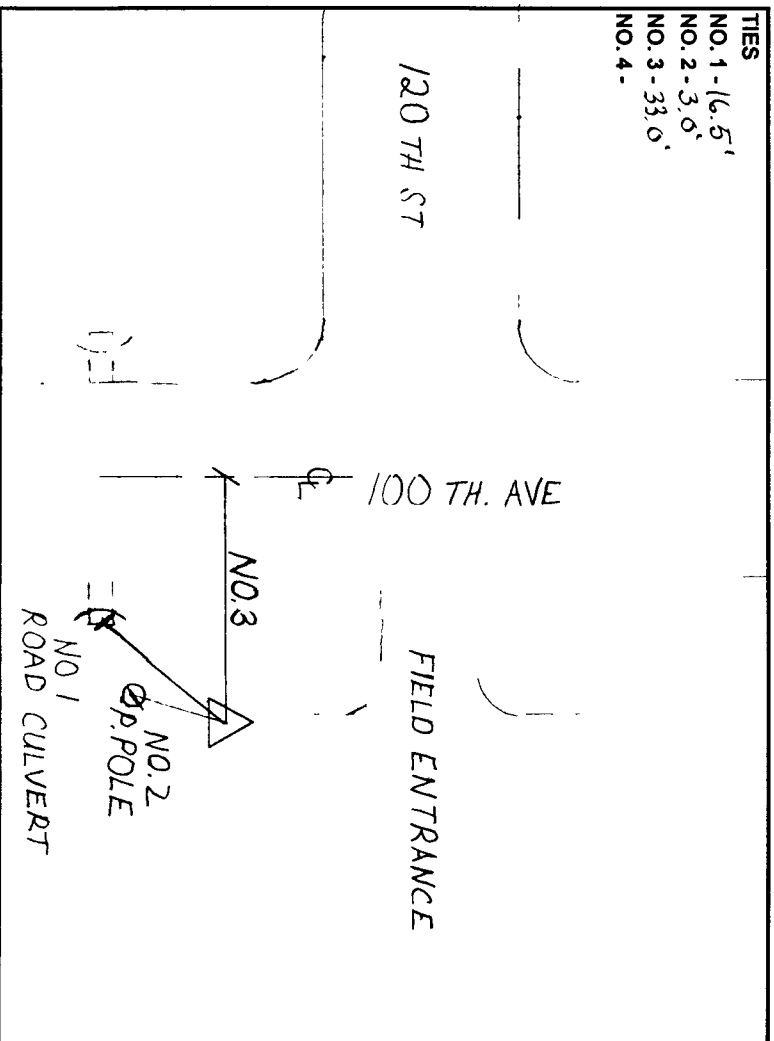
IOWA COORDINATE SYSTEM, NORTH ZONE

COORDINATES (US FEET)	CONVERGENCE ANGLE	<u>-1° 16' 45.3"</u>
NORTHING (Y)	SCALE FACTOR	<u>0.999977</u>
EASTING (X)	COORDINATES (METERS)	NORTHING (Y)
<u>4005631.00</u>	EASTING (X)	<u>1220979.731</u>
<u>4420216.63</u>		<u>1347284.723</u>

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1492.58 **ELEVATION (METERS)** 454.939

TIES
 NO. 1 - 16.5'
 NO. 2 - 3.0'
 NO. 3 - 33.0'
 NO. 4 - _____



SECTION MAP

SKETCH
BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003831 3 GPS NO. 8003 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 31 TWP 100 N RANGE 38 W USGS QUAD MAP HARRIS
 THE STATION IS _____
 AT THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN HIGHWAY 9 AND 100TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

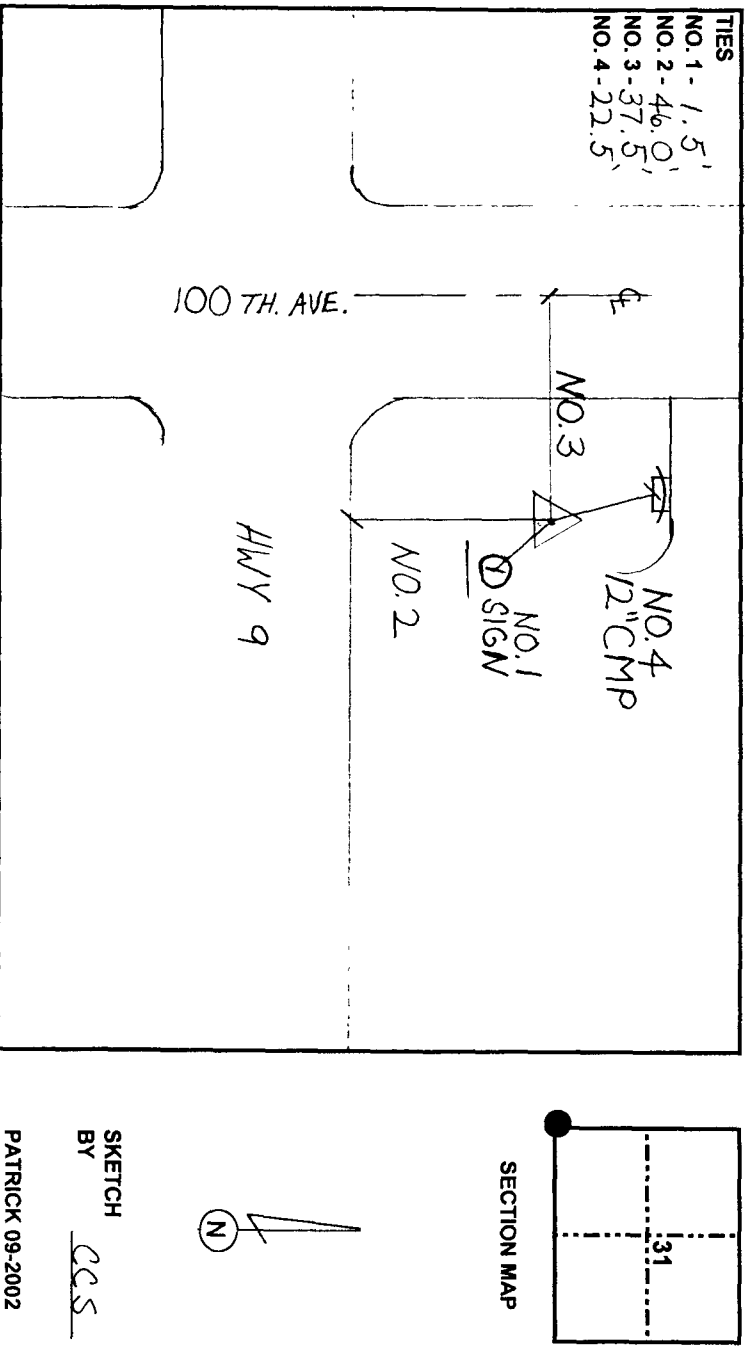
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 25' 50.535599"
 LONGITUDE WEST 95° 23' 14.677468"
 ELLIPSOID HEIGHT (meter) 438.043 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 16' 45.06"
 SCALE FACTOR 0.999965
 COORDINATES (US FEET)
 NORTHING (Y) 3990060.18 COORDINATES (METERS) 1216172.775
 EASTING (X) 4419891.21 EASTING (X) 1347185.535

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1526.93 ELEVATION (METERS) 465.409



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993818 3 GPS NO. 8004 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 18 TWP 99 N RANGE 38 W USGS QUAD MAP HARRIS
 THE STATION IS _____
 AT THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN 180TH STREET AND 100TH AVENUE. _____

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

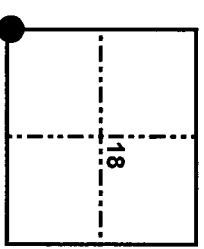
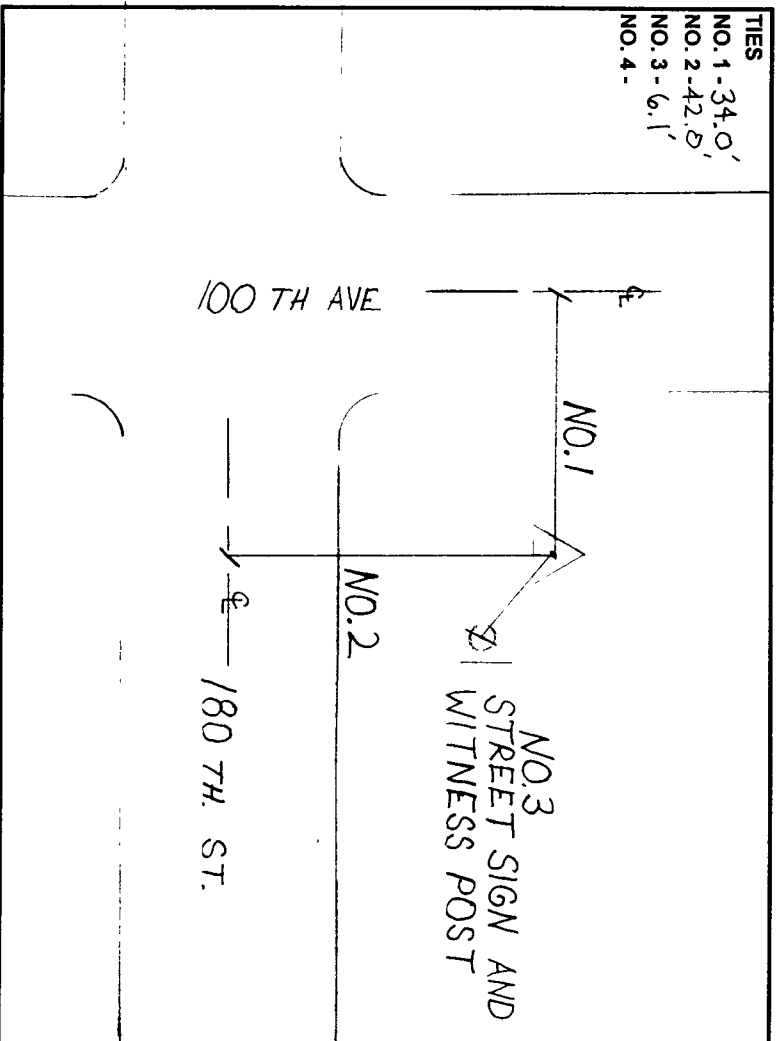
LATITUDE NORTH 43° 23' 09.127553"
 LONGITUDE WEST 95° 23' 14.803825"
 ELLIPSOID HEIGHT (meter) 433.614 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE	CONVERGENCE ANGLE	<u>-1° 16' 45.14"</u>
COORDINATES (US FEET)	SCALE FACTOR	<u>0.999956</u>
NORTHING (Y)	COORDINATES (METERS)	<u>1211192.675</u>
EASTING (X)	NORTHING (Y)	<u>1347071.488</u>
	EASTING (X)	<u>4419517.04</u>

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1512.77 ELEVATION (METERS) 461.093

TIES
 NO. 1 - 34.0'
 NO. 2 - 42.0'
 NO. 3 - 6.1'
 NO. 4 - _____



SECTION MAP

SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 983819 4 GPS NO. 8006 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 19 TWP 98 N RANGE 38 W USGS QUAD MAP MAY CITY
 TO REACH THE STATION FROM THE INTERSECTION BETWEEN 240TH STREET AND 100TH AVENUE: HEAD EAST ON 240TH STREET FOR 0.1 MILE TO THE STATION ON THE RIGHT.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY Patrick Engineering Inc. DATE August, 2002
 MARK SET VALUES ESTABLISHED BY

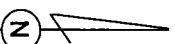
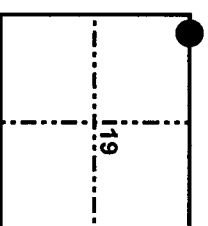
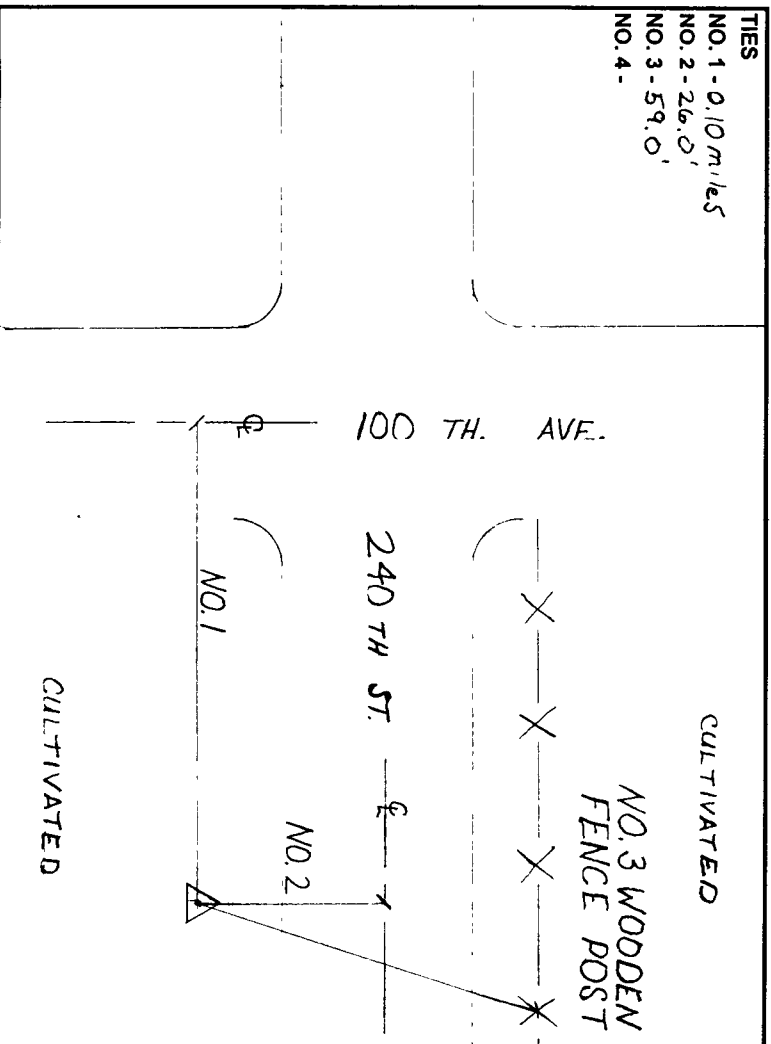
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 17' 54.896380"
 LONGITUDE WEST 95° 23' 09.609744"
 ELLIPSOID HEIGHT (meter) 411.039 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 16' 41.62"
 SCALE FACTOR 0.999942
 COORDINATES (US FEET)
 NORTHING (Y) 3941904.40 NORTHING (Y) 1201494.864
 EASTING (X) 4419190.77 EASTING (X) 1346972.041

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1439.51 ELEVATION (METERS) 438.764



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1013731 3 GPS NO. 8007 COUNTY JACKSON STATE IA
 LOCATED IN SECTION 31 TWP 101 N RANGE 37 W USGS QUAD MAP Lake Park
 THE STATION IS
 NORTHEASTERLY OF THE INTERSECTION BETWEEN 100TH STREET AND 130TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 30' 01.857179"
 LONGITUDE WEST 95° 19' 44.332049"
 ELLIPSOID HEIGHT (meter) 425.398 * (Based on GEOID99 Model)

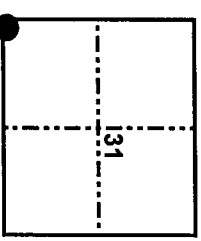
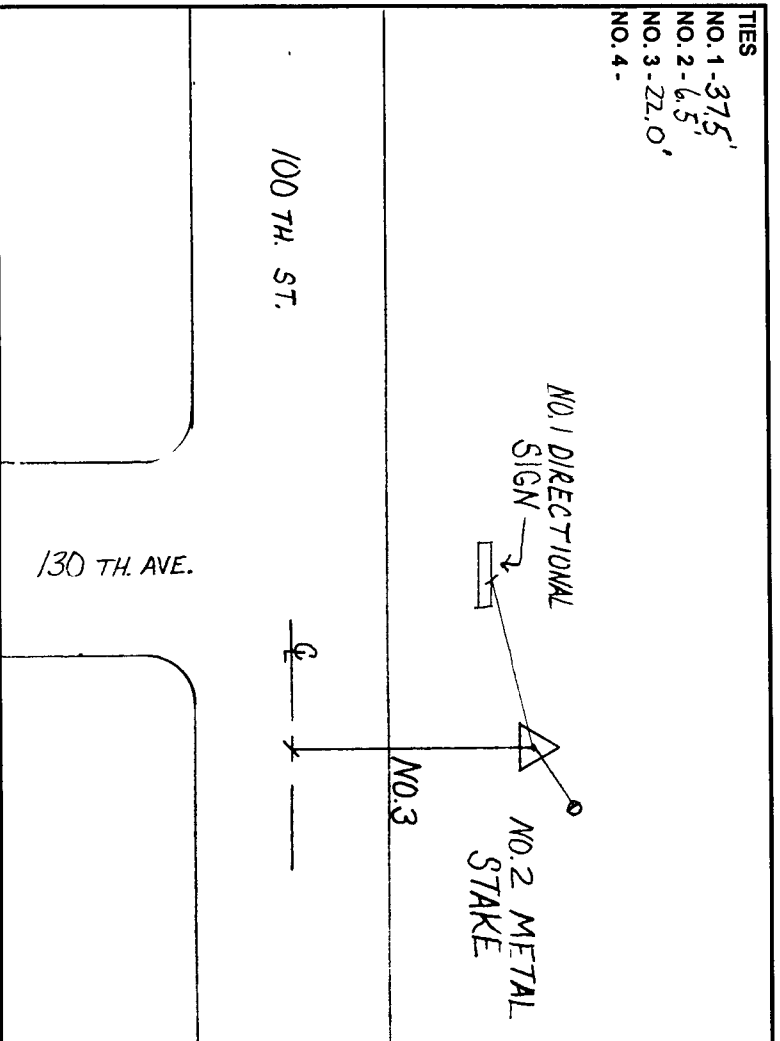
IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 14' 22.5"
 SCALE FACTOR 0.999984

COORDINATES (US FEET)
 NORTHING (Y) 4015160.92 COORDINATES (METERS)
 EASTING (X) 4435960.02 NORTHING (Y) 1223823.496
 EASTING (X) 1352083.318

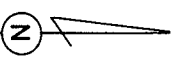
VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1485.41 ELEVATION (METERS) 452.754

TIES
 NO. 1 - 37.5'
 NO. 2 - 6.5'
 NO. 3 - 22.0'
 NO. 4 -



SECTION MAP



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 1003821 1 **GPS NO.** 8008 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 21 **TWP** 100 N **RANGE** 38 W **USGS QUAD MAP** LAKE PARK
TO REACH THE STATION
FROM THE INTERSECTION BETWEEN 130TH AVENUE AND 120TH STREET; HEAD SOUTH ON 130TH AVENUE TO THE
STATION ON THE RIGHT.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. **DATE** August, 2002

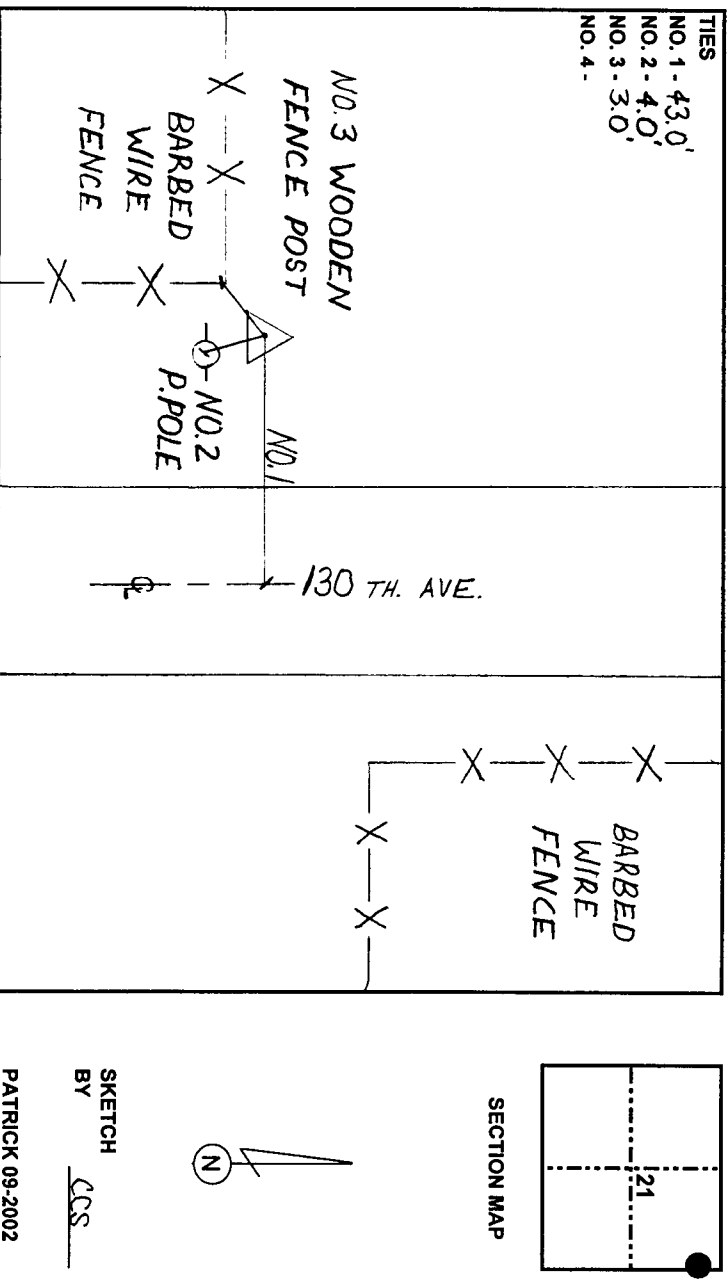
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARM) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 27' 59.921940"
LONGITUDE WEST 95° 19' 44.550934"
ELLIPSOID HEIGHT (meter) 423.610 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 14' 22.64"
COORDINATES (US FEET) **SCALE FACTOR** 0.999976
NORTHING (Y) 4002817.38 **NORTHING (Y)** 1220061.178
EASTING (X) 4435676.78 **EASTING (X)** 1351996.987

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1479.74 **ELEVATION (METERS)** 451.026



GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 1003833 2 **GPS NO.** 8009 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 33 **TWP** 100 N **RANGE** 38 W **USGS QUAD MAP** LAKE PARK
TO REACH FROM _____
THE INTERSECTION OF HIGHWAY 9 AND 130TH AVENUE. HEAD WEST ON HIGHWAY 9 0.2 MILE TO THE STATION

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____ **DATE** August, 2002
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

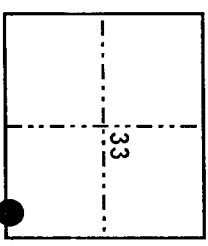
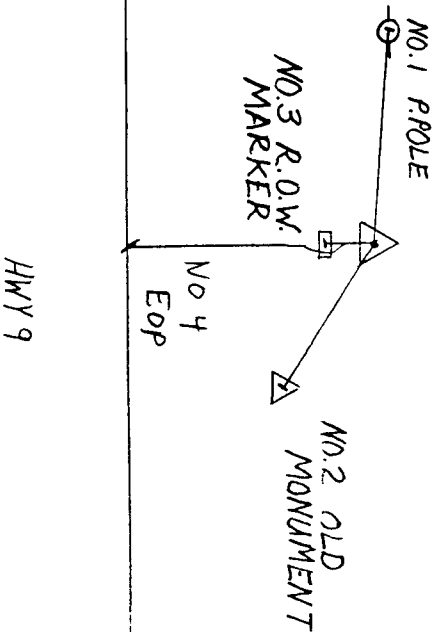
LATITUDE NORTH 43° 25' 50.993267"
LONGITUDE WEST 95° 19' 44.431428"
ELLIPSOID HEIGHT (meter) 419.816 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE	CONVERGENCE ANGLE <u>-1° 14' 22.56"</u>
COORDINATES (US FEET)	SCALE FACTOR <u>0.999968</u>
NORTHING (Y) <u>3989765.52</u>	COORDINATES (METERS)
EASTING (X) <u>4435403.18</u>	NORTHING (Y) <u>1216082.963</u>
	EASTING (X) <u>1351913.593</u>

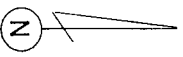
VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1467.55 **ELEVATION (METERS)** 447.310

TIES
NO. 1 - 26.5'
NO. 2 - 10.0'
NO. 3 - 3.6'
NO. 4 - 117



SECTION MAP



SKETCH BY PQS

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993816 2 GPS NO. 8010 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 16 TWP 99 N RANGE 38 W USGS QUAD MAP LAKE PARK
 TO REACH THE STATION
 FROM THE INTERSECTION OF 180TH STREET AND 130TH AVENUE; HEAD WEST ON 180TH STREET FOR 0.1 MILE TO THE
 STATION ON THE RIGHT.

MARK

BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY

Patrick Engineering Inc.

DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 23' 10.311417"
 LONGITUDE WEST 95° 19' 52.644505"
 ELLIPSOID HEIGHT (meter) 423.742 * (Based on GEOID99 Model)

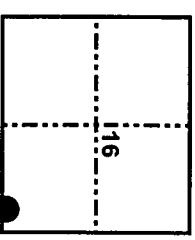
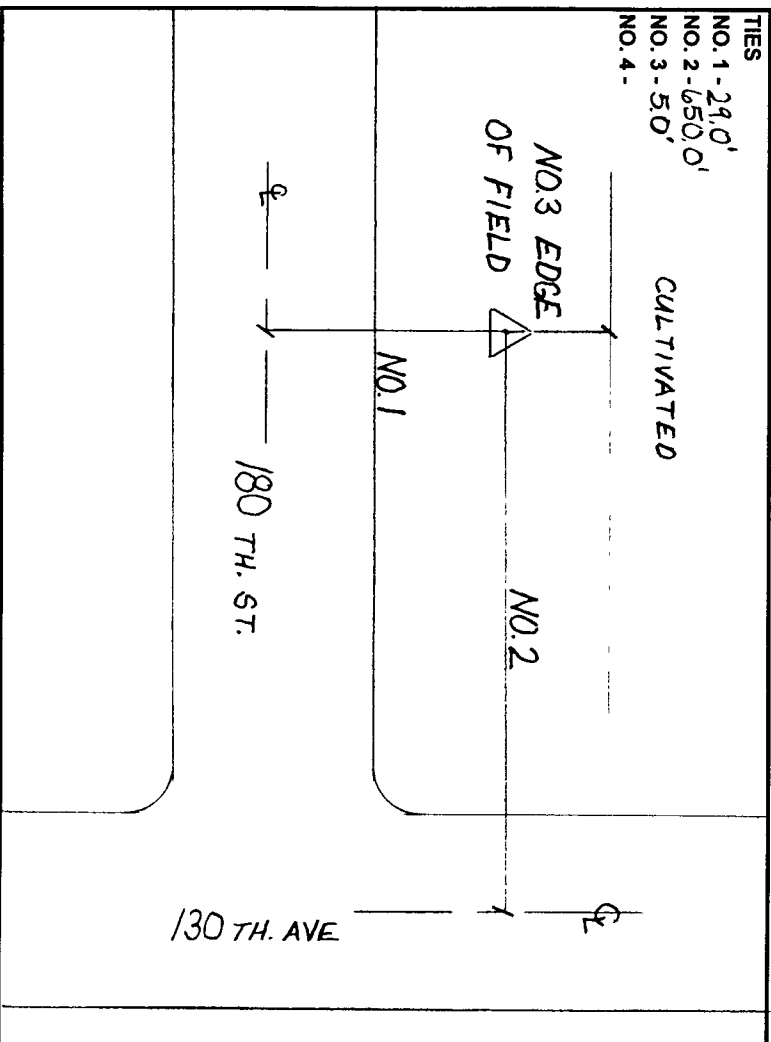
IOWA COORDINATE SYSTEM, NORTH ZONE

COORDINATES (US FEET)		CONVERGENCE ANGLE	<u>-1° 14' 28.13"</u>
NORTHING (Y)	<u>3973512.82</u>	SCALE FACTOR	<u>0.999958</u>
EASTING (X)	<u>4434444.84</u>	COORDINATES (METERS)	
		NORTHING (Y)	<u>1211129.130</u>
		EASTING (X)	<u>1351621.490</u>

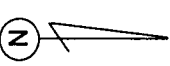
VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET)	<u>1480.79</u>	ELEVATION (METERS)	<u>451.346</u>
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TIES
 NO. 1 - 24.0'
 NO. 2 - 650.0'
 NO. 3 - 5.0'
 NO. 4 -



SECTION MAP



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 983804 1 GPS NO. 8011 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 4 TWP 98 N RANGE 38 W USGS QUAD MAP LAKE PARK SE
 THE STATION IS _____
 AT THE SOUTHWEST CORNER OF THE INTERSECTION BETWEEN 210TH STREET AND 130TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

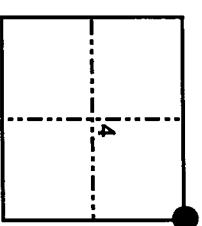
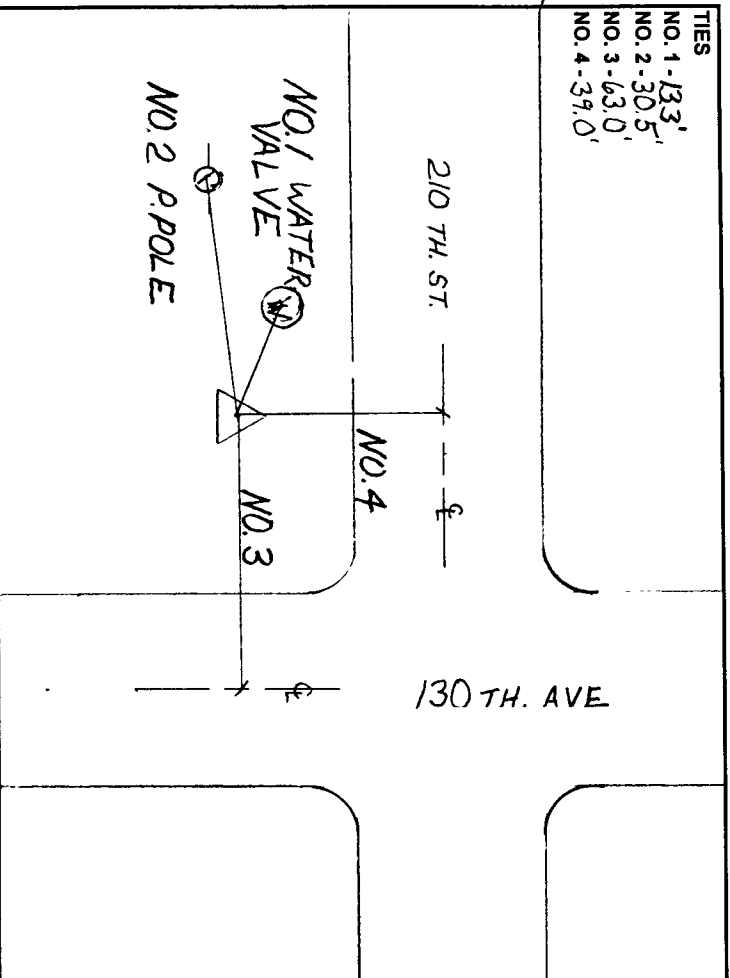
LATITUDE NORTH 43° 20' 32.071089"
 LONGITUDE WEST 95° 19' 44.265047"
 ELLIPSOID HEIGHT (meter) 433.420 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 14' 22.45"
 SCALE FACTOR 0.999947
 COORDINATES (US FEET)
 NORTHING (Y) 3957481.03 COORDINATES (METERS) 1206242.630
 EASTING (X) 4434716.89 EASTING (X) 1351704.411

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1512.93 ELEVATION (METERS) 461.142

TIES
 NO. 1 - 133'
 NO. 2 - 30.5'
 NO. 3 - 63.0'
 NO. 4 - 39.0'



SECTION MAP

SKETCH
 BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 983822 4 GPS NO. 8012 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 22 TWP 98 N RANGE 38 W USGS QUAD MAP LAKE PARK SE
 THE STATION IS
 AT THE SOUTHEAST CORNER OF THE INTERSECTION BETWEEN 240TH STREET AND 130 (M27) AVENUE

MARK

BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY

Patrick Engineering Inc DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

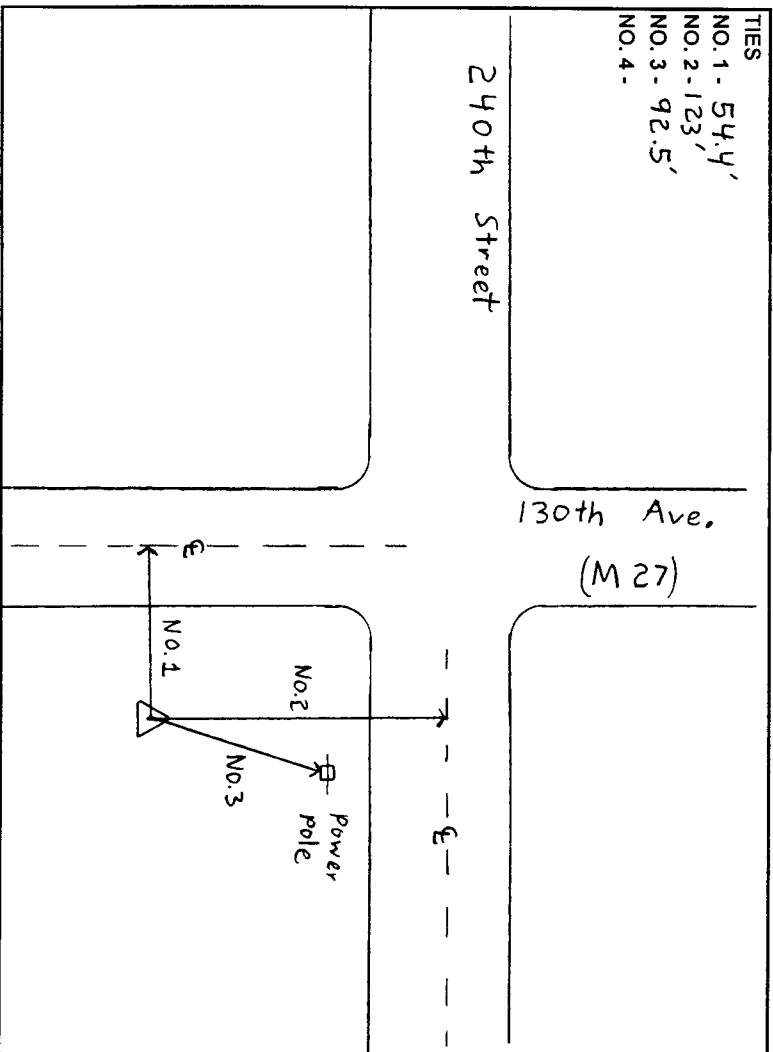
LATITUDE NORTH 43° 17' 54.363594"
 LONGITUDE WEST 95° 19' 42.397838"
 ELLIPSOID HEIGHT (meter) 398 919 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE

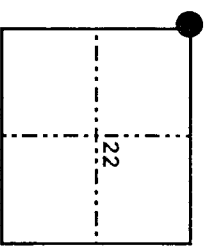
COORDINATES (US FEET)		CONVERGENCE ANGLE	<u>-1° 14' 21 18"</u>
NORTHING (Y)	<u>3941513.85</u>	SCALE FACTOR	<u>0.999943</u>
EASTING (X)	<u>4434509.51</u>	COORDINATES (METERS)	
		NORTHING (Y)	<u>1201375.824</u>
		EASTING (X)	<u>1351641.202</u>

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1400 16 ELEVATION (METERS) 426 770



TIES
 NO. 1 - 54.4'
 NO. 2 - 123'
 NO. 3 - 92.5'
 NO. 4 -



SECTION MAP

SKETCH BY SL

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003707 4 GPS NO. 8013 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 7 TWP 100 N RANGE 37 W USGS QUAD MAP LAKE PARK
 TO REACH THE STATION FROM THE INTERSECTION OF 100TH STREET AND 140TH AVENUE: HEAD EAST ON 100TH STREET FOR 2.0 MILES TO THE STATION ON THE RIGHT.

MARK

BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY

Patrick Engineering Inc.

DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 30' 01.611066"
 LONGITUDE WEST 95° 16' 08.168096"
 ELLIPSOID HEIGHT (meter) 420.372 * (Based on GEOID99 Model)

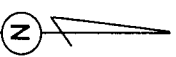
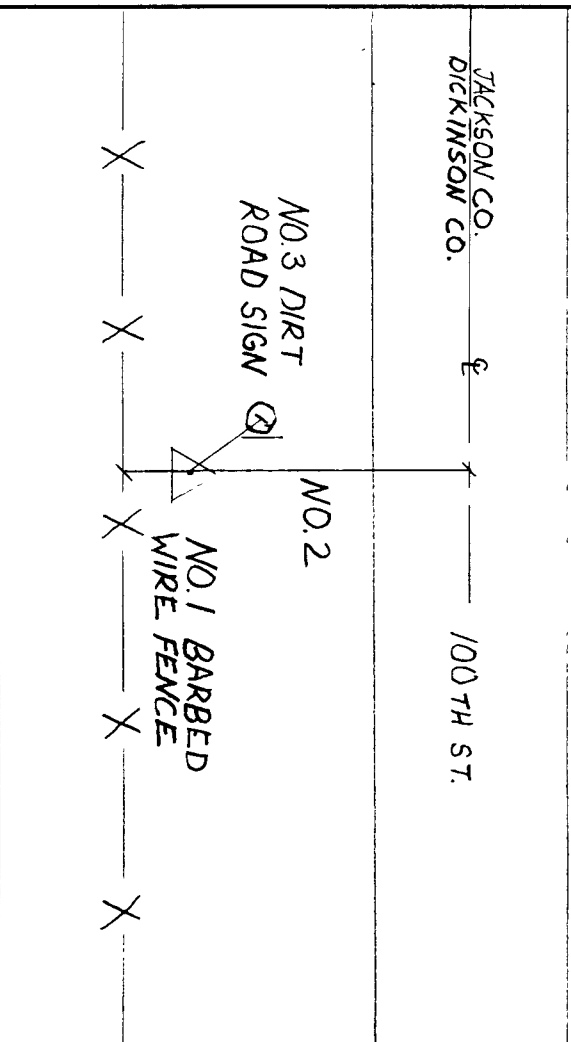
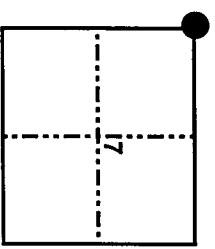
IOWA COORDINATE SYSTEM, NORTH ZONE

COORDINATES (US FEET)		CONVERGENCE ANGLE	<u>-1° 11' 55.99"</u>
NORTHING (Y)	<u>4014796.98</u>	SCALE FACTOR	<u>0.999985</u>
EASTING (X)	<u>4451889.23</u>	COORDINATES (METERS)	
		NORTHING (Y)	<u>1223712.567</u>
		EASTING (X)	<u>1356938.551</u>

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1469.30 ELEVATION (METERS) 447.844

TIES
 NO. 1 - 1.3'
 NO. 2 - 31.0'
 NO. 3 - 10.0'
 NO. 4 -



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003719 3 GPS NO. 8014 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 19 TWP 100 N RANGE 37 W USGS QUAD MAP LAKE PARK
 THE STATION IS
 LOCATED SOUTHEASTERLY OF THE INTERSECTION BETWEEN 125TH STREET AND 160TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 27' 59.190637"
 LONGITUDE WEST 95° 16' 08.288694"
 ELLIPSOID HEIGHT (meter) 408.900 * (Based on GEOID99 Model)

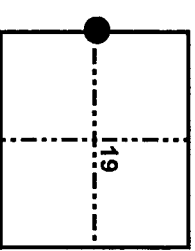
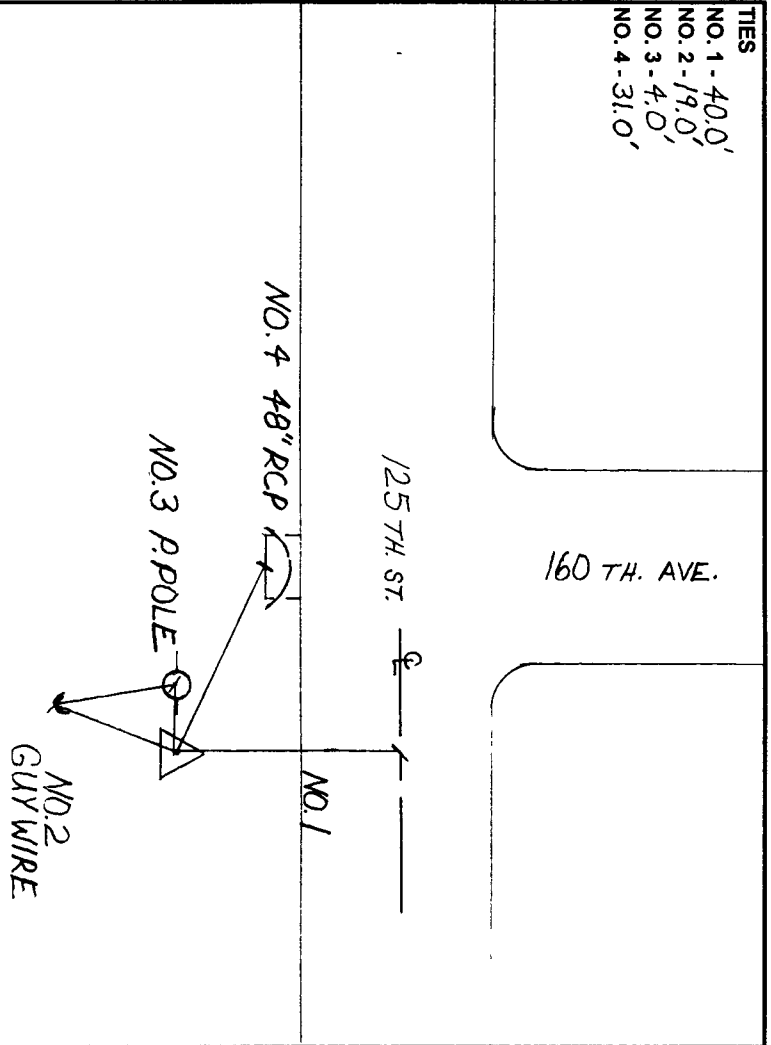
IOWA COORDINATE SYSTEM, NORTH ZONE

COORDINATES (US FEET)		CONVERGENCE ANGLE	<u>-1° 11' 56.07"</u>
NORTHING (Y)	<u>4002403.97</u>	SCALE FACTOR	<u>0.999979</u>
EASTING (X)	<u>4451620.98</u>	COORDINATES (METERS)	
		NORTHING (Y)	<u>1219935.170</u>
		EASTING (X)	<u>1356856.788</u>

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1431.86 ELEVATION (METERS) 436.432

TIES
 NO. 1 - 40.0'
 NO. 2 - 19.0'
 NO. 3 - 4.0'
 NO. 4 - 31.0'



SECTION MAP

SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003731 3 GPS NO. 8015 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 31 TWP 100 N RANGE 37 W USGS QUAD MAP LAKE PARK
 THE STATION IS
 AT THE SOUTHWEST CORNER OF THE INTERSECTION BETWEEN HIGHWAY 9 AND 160TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY Patrick Engineering Inc. DATE August, 2002
 MARK SET VALUES ESTABLISHED BY

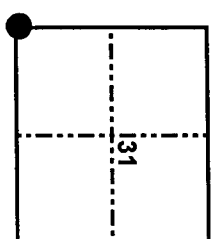
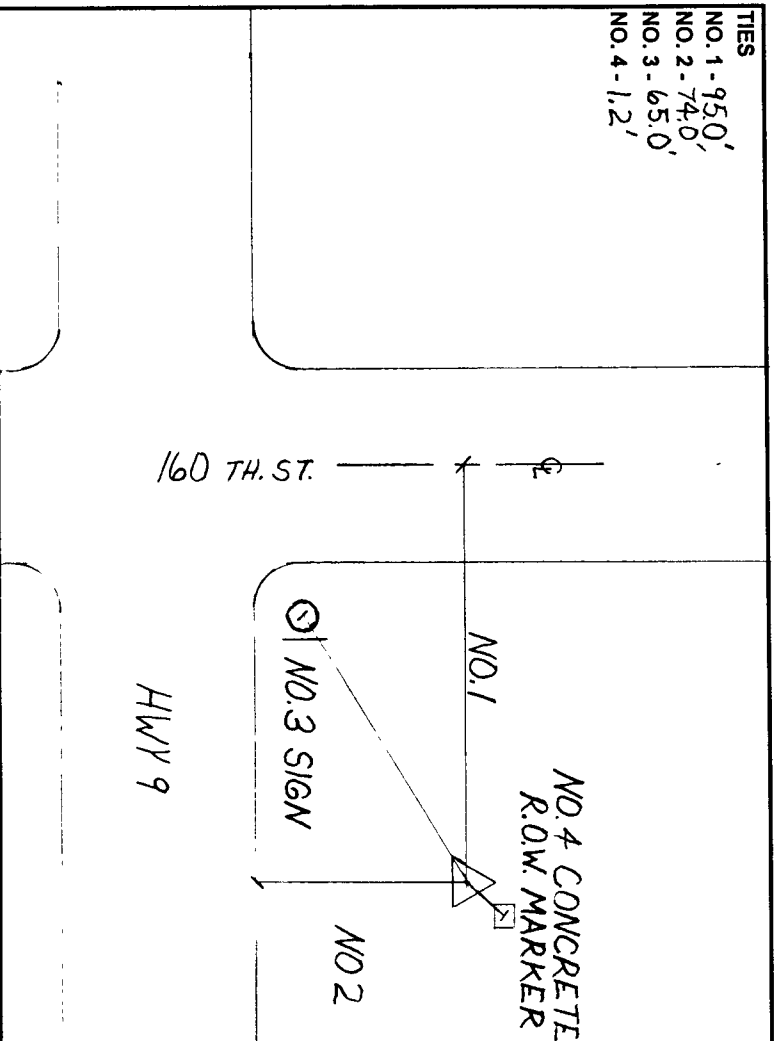
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 25' 50.471306"
 LONGITUDE WEST 95° 16' 07.836515"
 ELLIPSOID HEIGHT (meter) 417.507 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 11' 55.77"
 SCALE FACTOR 0.999969
 COORDINATES (US FEET) COORDINATES (METERS)
 NORTHING (Y) 3989372.59 NORTHING (Y) 1215963.197
 EASTING (X) 4451381.63 EASTING (X) 1356783.834

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1460.37 ELEVATION (METERS) 445.122



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993813.2 **GPS NO.** 8016 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 13 **TWP** 99 N **RANGE** 38 W **USGS QUAD MAP** LAKE PARK
THE STATION IS _____
AT THE NORTHWEST CORNER OF THE INTERSECTION BETWEEN 180TH STREET AND 160TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY _____ **DATE** August, 2002
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc.

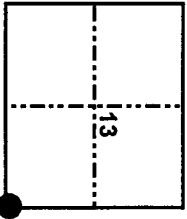
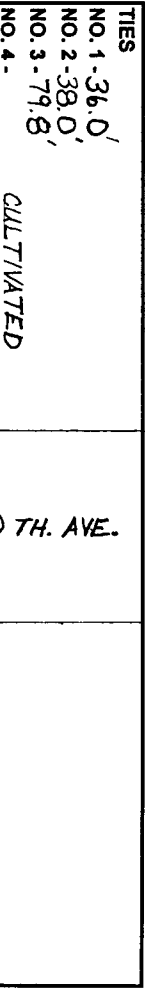
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 23' 09.858607"
LONGITUDE WEST 95° 16' 09.605662"
ELLIPSOID HEIGHT (meter) 422.737 * (Based on GEOID99 Model)

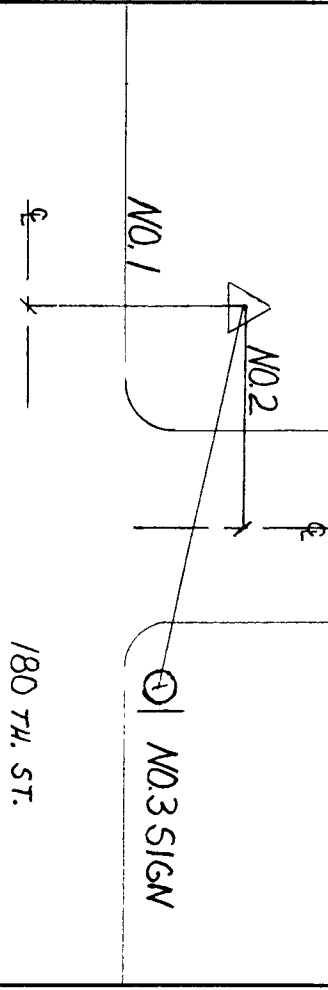
IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 11' 56.97"
COORDINATES (US FEET) **SCALE FACTOR** 0.999968
NORTHING (Y) 3973116.25 **COORDINATES (METERS)** **NORTHING (Y)** 1211008.255
EASTING (X) 4450910.77 **EASTING (X)** 1356640.316

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1477.91 **ELEVATION (METERS)** 450.468



SECTION MAP



SKETCH
 BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 983706 4 GPS NO. 8017 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 6 TWP 98 N RANGE 37 W USGS QUAD MAP LAKE PARK SE
 THE STATION IS EAST OF THE CENTERLINE OF 160TH AVENUE AND APPROXIMATELY 195.0 FEET SOUTH OF THE CENTERLINE OF 210TH STREET.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY Patrick Engineering Inc. DATE August, 2002
 MARK SET VALUES ESTABLISHED BY

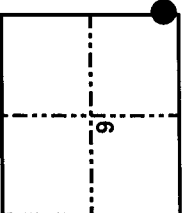
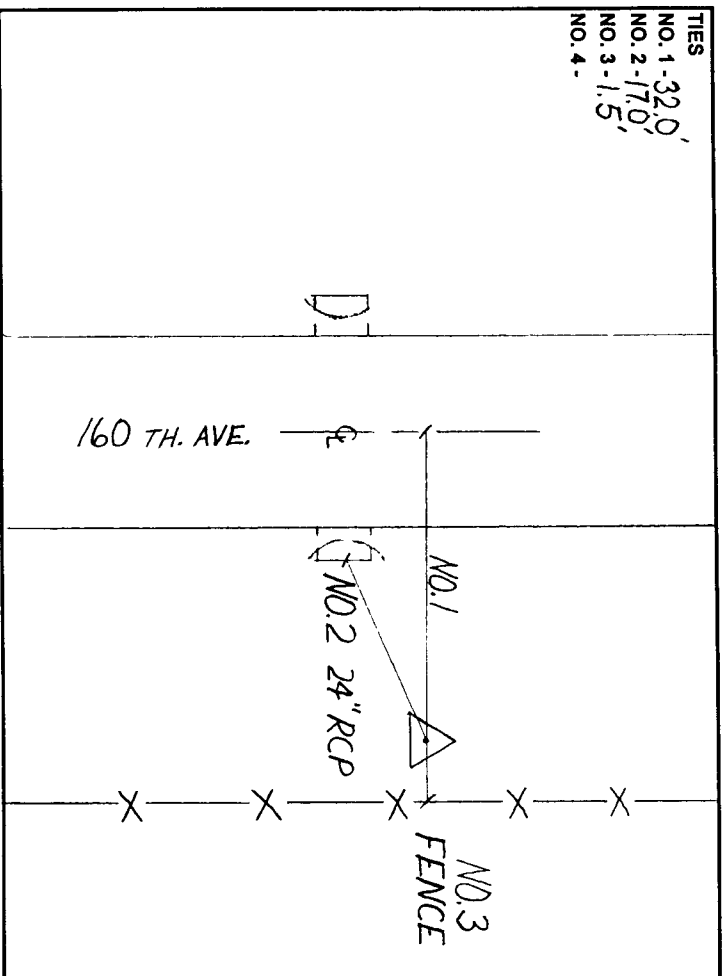
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 20' 30.719297"
 LONGITUDE WEST 95° 16' 08.941246"
 ELLIPSOID HEIGHT (meter) 420.941 * (Based on GEOID99 Model)

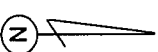
IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 11' 56.52"
 SCALE FACTOR 0.999949
 COORDINATES (METERS)
 NORTHING (Y) 1206097.716
 EASTING (X) 1356552.497

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1472.40 ELEVATION (METERS) 448.788



SECTION MAP



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 983813 2 **GPS NO.** 8018 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 13 **TWP** 98 N **RANGE** 38 W **USGS QUAD MAP** LAKE PARK SE
THE STATION IS _____
AT THE NORTHWEST CORNER OF THE INTERSECTION BETWEEN 240TH STREET AND 160TH AVENUE.

MARK BERTINSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. **DATE** August, 2002

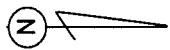
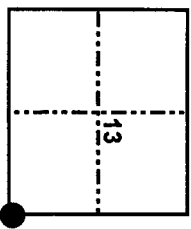
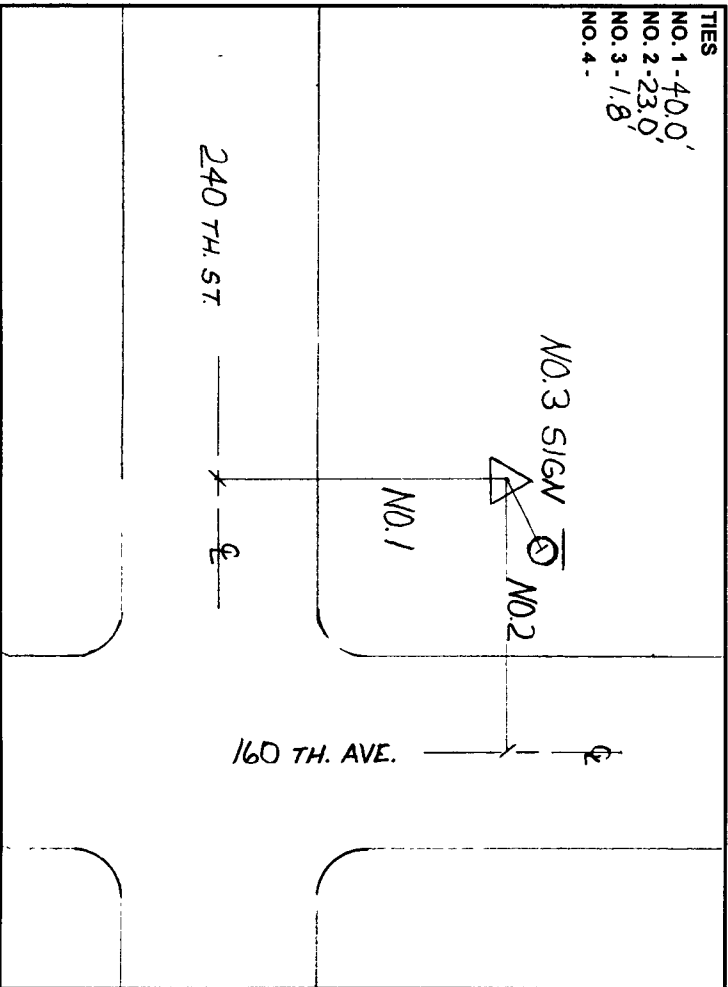
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 17' 56.149684"
LONGITUDE WEST 95° 16' 09.739659"
ELLIPSOID HEIGHT (meter) 409.825 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 11' 57.06"
COORDINATES (US FEET) **SCALE FACTOR** 0.999942
NORTHING (Y) 3941360.03 **COORDINATES (METERS)**
EASTING (X) 4450236.13 **NORTHING (Y)** 1201328.940
EASTING (X) 1356434.685

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1436.34 **ELEVATION (METERS)** 437.797



SKETCH
BY CCS
PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1013731 3 GPS NO. 8019 COUNTY JACKSON STATE MN
 LOCATED IN SECTION 31 TWP 101 N RANGE 37 W USGS QUAD MAP LAKEFIELD SW
 THE STATION IS _____
 DUE NORTH OF THE INTERSECTION BETWEEN 100TH STREET AND 190TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____ DATE August, 2002
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc.

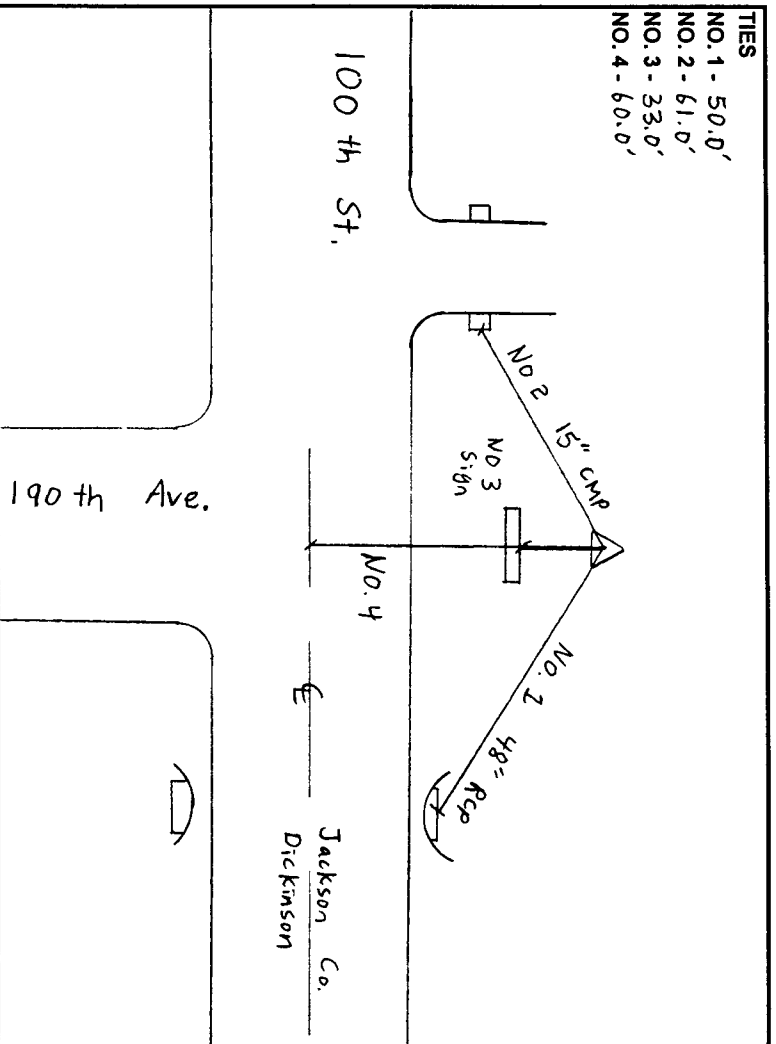
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 30' 03.453726"
 LONGITUDE WEST 95° 12' 40.589493"
 ELLIPSOID HEIGHT (meter) 401.483 * (Based on GEOID99 Model)

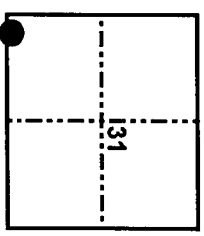
IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 09' 35.31"
 SCALE FACTOR 0.999988
 COORDINATES (US FEET)
 NORTHING (Y) 4014688.61 COORDINATES (METERS)
 EASTING (X) 4467190.30 NORTHING (Y) 1223673.440
 EASTING (X) 1361602.327

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

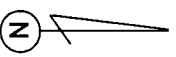
ELEVATION (US FEET) 1407.58 ELEVATION (METERS) 429.031



TIES
 NO. 1 - 50.0'
 NO. 2 - 61.0'
 NO. 3 - 33.0'
 NO. 4 - 60.0'



SECTION MAP



SKETCH BY SL

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003722 3 GPS NO. 8020 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 22 TWP 100 N RANGE 37 W USGS QUAD MAP OKOBOJI
 TO REACH THE STATION FROM THE INTERSECTION BETWEEN 190TH AVENUE AND 120TH STREET: HEAD SOUTH ON 190TH AVENUE 0.6 MILE TO THE STATION ON THE LEFT.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXSTING VALUES AS PUBLISHED BY Patrick Engineering Inc. DATE August, 2002
 MARK SET VALUES ESTABLISHED BY

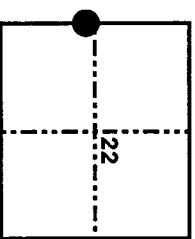
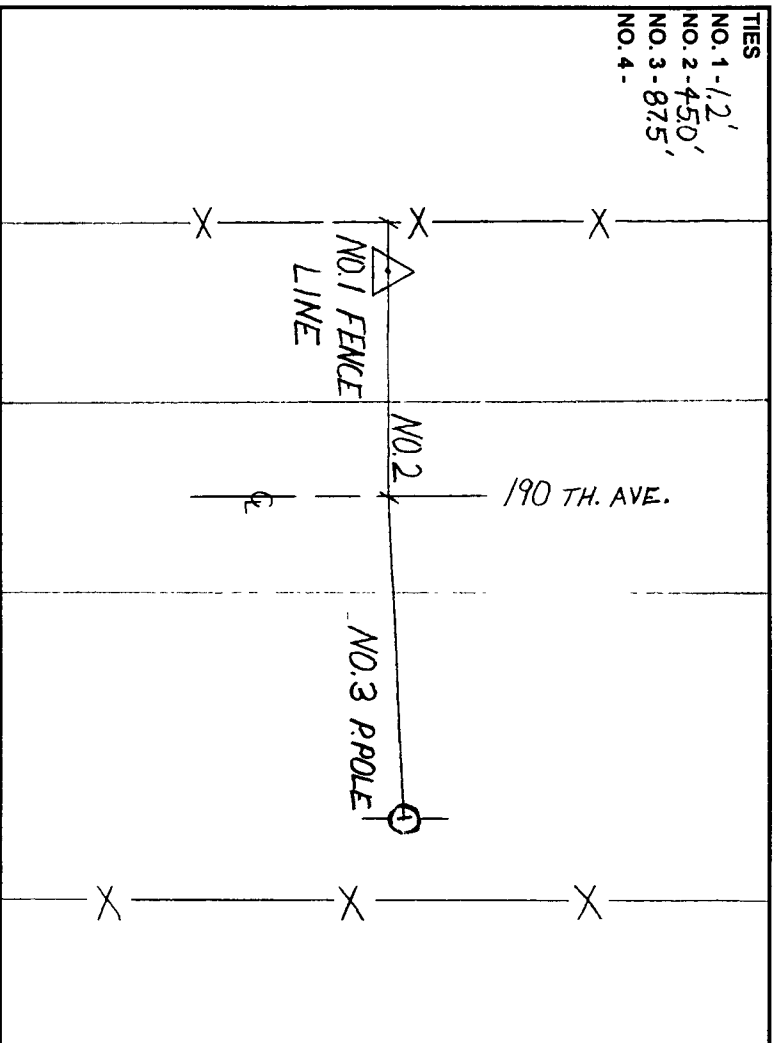
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 27' 56.891151"
 LONGITUDE WEST 95° 12' 38.370636"
 ELLIPSOID HEIGHT (meter) 401.547 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 09' 33.8"
 SCALE FACTOR 0.9999980
 COORDINATES (US FEET)
 NORTHING (Y) 4001852.59 COORDINATES (METERS)
 EASTING (X) 4467094.51 NORTHING (Y) 1219767.109
 EASTING (X) 1361573.130

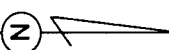
VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1408.03 ELEVATION (METERS) 429.168



SECTION MAP

TIES
 NO. 1 - 1/2'
 NO. 2 - 450'
 NO. 3 - 87.5'
 NO. 4 -



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993703 4 GPS NO. 8021 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 3 TWP 99 N RANGE 37 W USGS QUAD MAP OKOBOJI
 THE STATION IS
 AT THE SOUTHEAST CORNER OF THE INTERSECTION BETWEEN 190TH AVENUE AND HIGHWAY 9.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

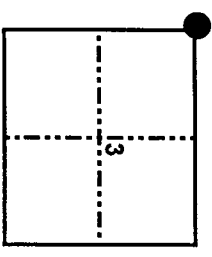
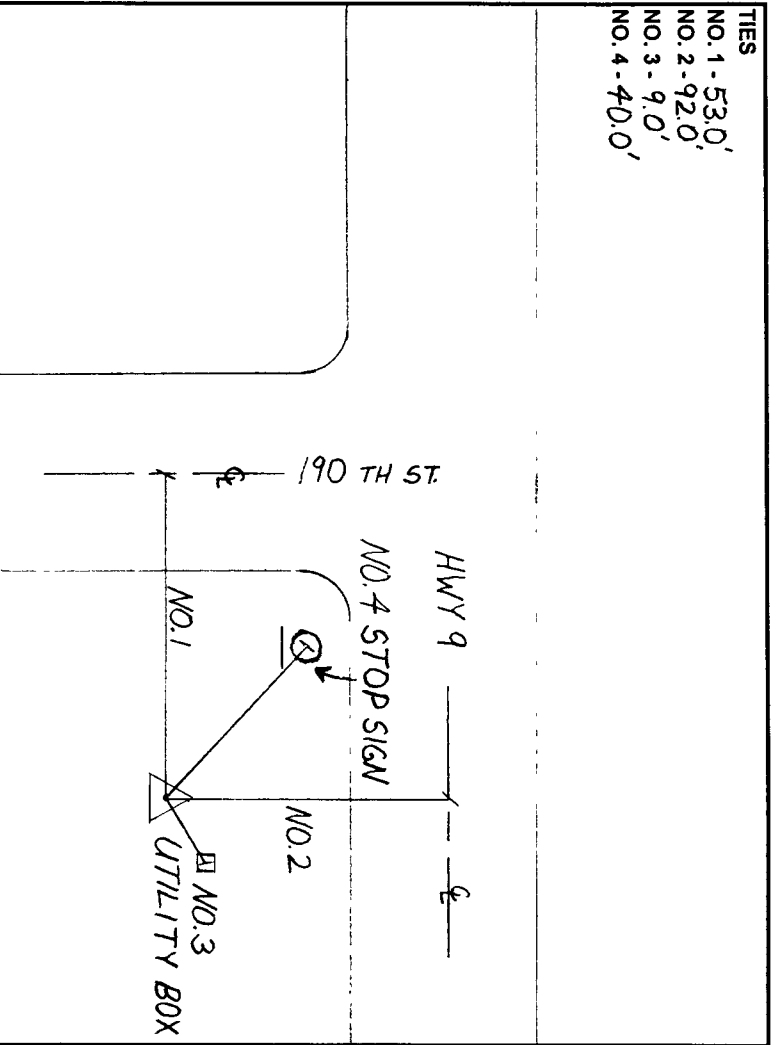
LATITUDE NORTH 43° 25' 48.834739"
 LONGITUDE WEST 95° 12' 36.461274"
 ELLIPSOID HEIGHT (meter) 423.996 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 09' 32.51"
 SCALE FACTOR 0.999968
 COORDINATES (US FEET)
 NORTHING (Y) 3988885.99 COORDINATES (METERS)
 EASTING (X) 4466973.02 NORTHING (Y) 1215814.881
 EASTING (X) 1361536.100

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1481.97 ELEVATION (METERS) 451.705

TIES
 NO. 1 - 53.0'
 NO. 2 - 92.0'
 NO. 3 - 9.0'
 NO. 4 - 40.0'



SECTION MAP

SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993721 1 GPS NO. 8022 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 21 TWP 99 N RANGE 37 W USGS QUAD MAP OKOBOJI
 THE STATION IS _____
 AT THE SOUTHWEST CORNER OF THE INTERSECTION OF 180TH STREET AND 190TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____ DATE August, 2002
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc.

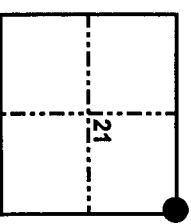
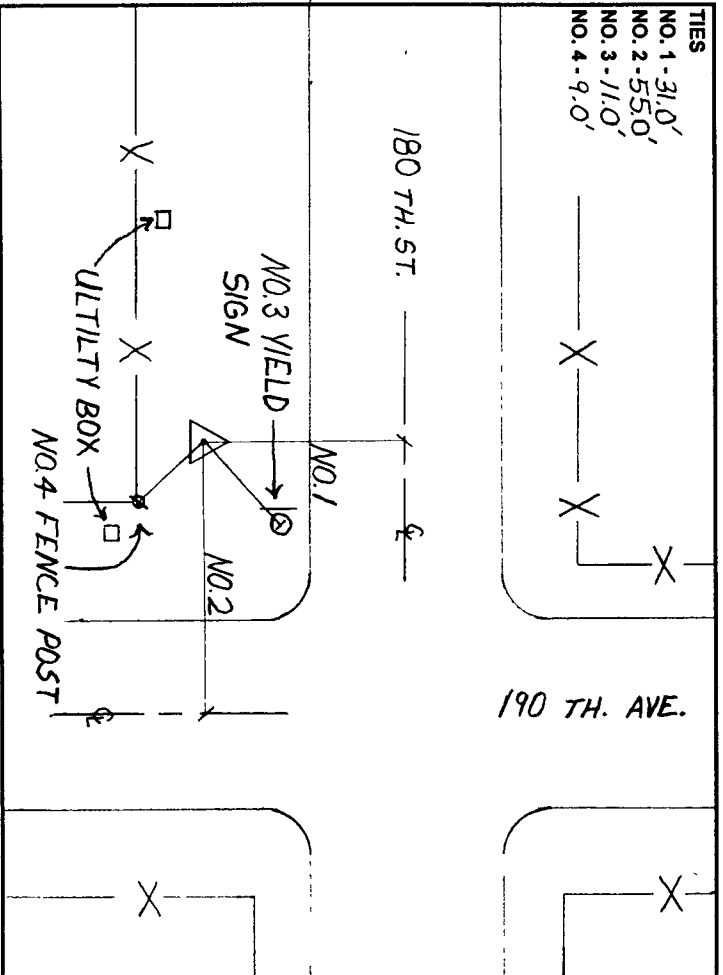
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 23' 09.241392"
 LONGITUDE WEST 95° 12' 37.339732"
 ELLIPSOID HEIGHT (meter) 417.844 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 09' 33.1"
 SCALE FACTOR 0.999956
 COORDINATES (US FEET)
 NORTHING (Y) 3972731.19 NORTHING (METERS) 1210890.888
 EASTING (X) 4466581.30 EASTING (METERS) 1361416.703

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1462.21 ELEVATION (METERS) 445.682



SECTION MAP

SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993734 3 GPS NO. 8023 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 34 TWP 99 N RANGE 37 W USGS QUAD MAP MILFORD
 TO REACH THE STATION FROM _____
 THE INTERSECTION BETWEEN 190TH AVENUE AND 210TH STREET. HEAD NORTH ON 190TH AVENUE APPROXIMATELY
 260.0 FEET TO THE STATION ON THE RIGHT.

MARK _____ BERTNSEN MONUMENT WITH 2-1/2" ALUMINIUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____ DATE August, 2002
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc.

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

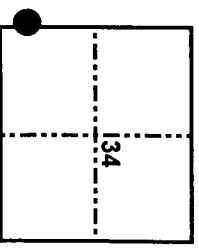
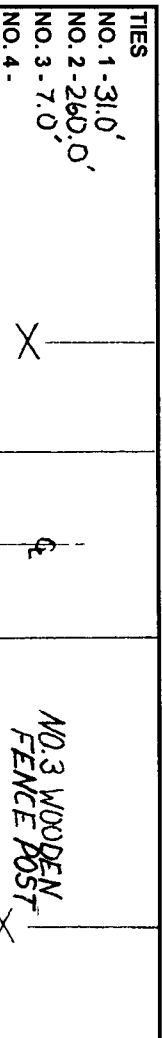
LATITUDE NORTH 43° 20' 34.298929"
 LONGITUDE WEST 95° 12' 33.312789"
 ELLIPSOID HEIGHT (meter) 408.621 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE CONVERGENCE ANGLE -1° 09' 30.37"

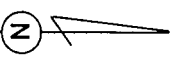
COORDINATES (US FEET) SCALE FACTOR 0.999951
 NORTHING (Y) 3957040.15 COORDINATES (METERS) 1206108.250
 EASTING (X) 4466561.44 EASTING (X) 1361410.650

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1432.38 ELEVATION (METERS) 436.590



SECTION MAP



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 983721 1 **GPS NO.** 8024 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 21 **TWP** 98 N **RANGE** 37 W **USGS QUAD MAP** MILFORD
THE STATION IS _____
AT THE SOUTHWEST CORNER OF THE INTERSECTION BETWEEN 240TH STREET AND 190TH AVENUE.

MARK MARK EXISTING VALUES AS PUBLISHED BY BERTITSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. **DATE** August, 2002

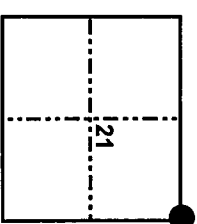
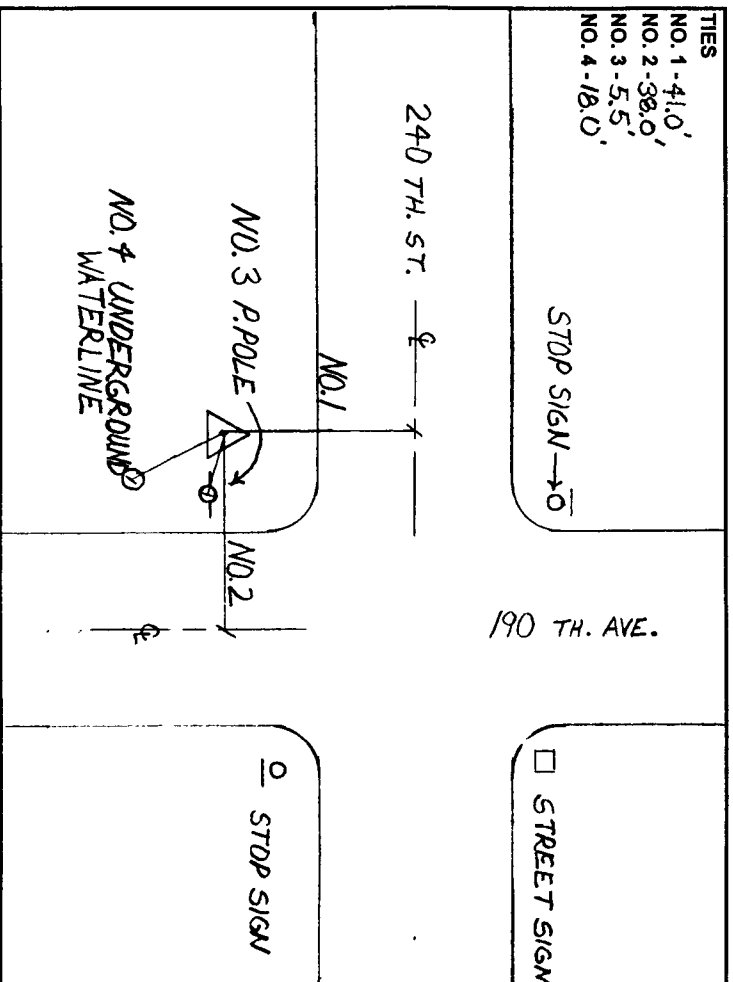
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 17' 55.244899"
LONGITUDE WEST 95° 12' 34.112048"
ELLIPSOID HEIGHT (meter) 413.993 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 09' 30.92"
COORDINATES (US FEET) **SCALE FACTOR** 0.999941
NORTHING (Y) 3940940.37 **COORDINATES (METERS)** **NORTHING (Y)** 1201201.027
EASTING (X) 4466176.77 **EASTING (X)** 1361293.402

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1450.43 **ELEVATION (METERS)** 442.092



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 1013633 3 **GPS NO.** 8025 **COUNTY** JACKSON **STATE** MINNESOTA
LOCATED IN SECTION 33 **TWP** 101 N **RANGE** 36 W **USGS QUAD MAP** LAKEFIELD SW
TO REACH THE STATION FROM _____
THE INTERSECTION OF 100TH STREET AND 190TH AVENUE: HEAD EAST ON 100TH STREET FOR APPROXIMATELY
2.3 MILES TO A SOUTHERLY BEND IN THE ROAD. GO STRAIGHT ON A GRASS PATH TO THE STATION ON THE LEFT..

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. **DATE** August, 2002

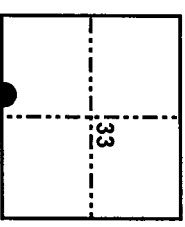
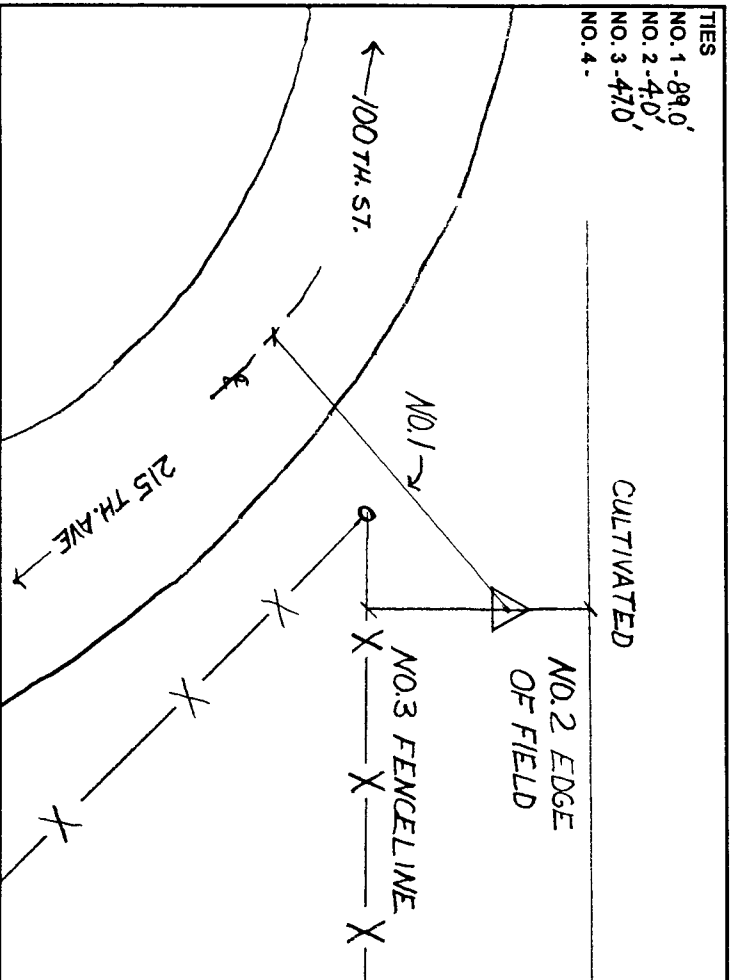
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATTITUDE NORTH 43° 30' 04.047752"
LONGITUDE WEST 95° 10' 01.364461"
ELLIPSOID HEIGHT (meter) 410.196 * (Based on GEOID99 Model)

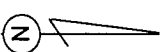
IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 07' 47.39"
COORDINATES (US FEET) **SCALE FACTOR** 0.999987
NORTHING (Y) 4014494.26 **COORDINATES (METERS)** 1223620.298
EASTING (X) 4478925.45 **EASTING (X)** 1365179.208

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1436.35 **ELEVATION (METERS)** 437.800



SECTION MAP



SKETCH
BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003724 2 GPS NO. 8026 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 24 TWP 100 N RANGE 37 W USGS QUAD MAP OKOBOJI
 TO REACH THE STATION FROM _____
 THE INTERSECTION OF 215TH AVENUE AND 125TH STREET. HEAD EAST ON 125TH STREET FOR APPROXIMATELY
225.0 FEET TO THE STATION ON THE RIGHT.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

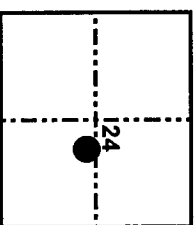
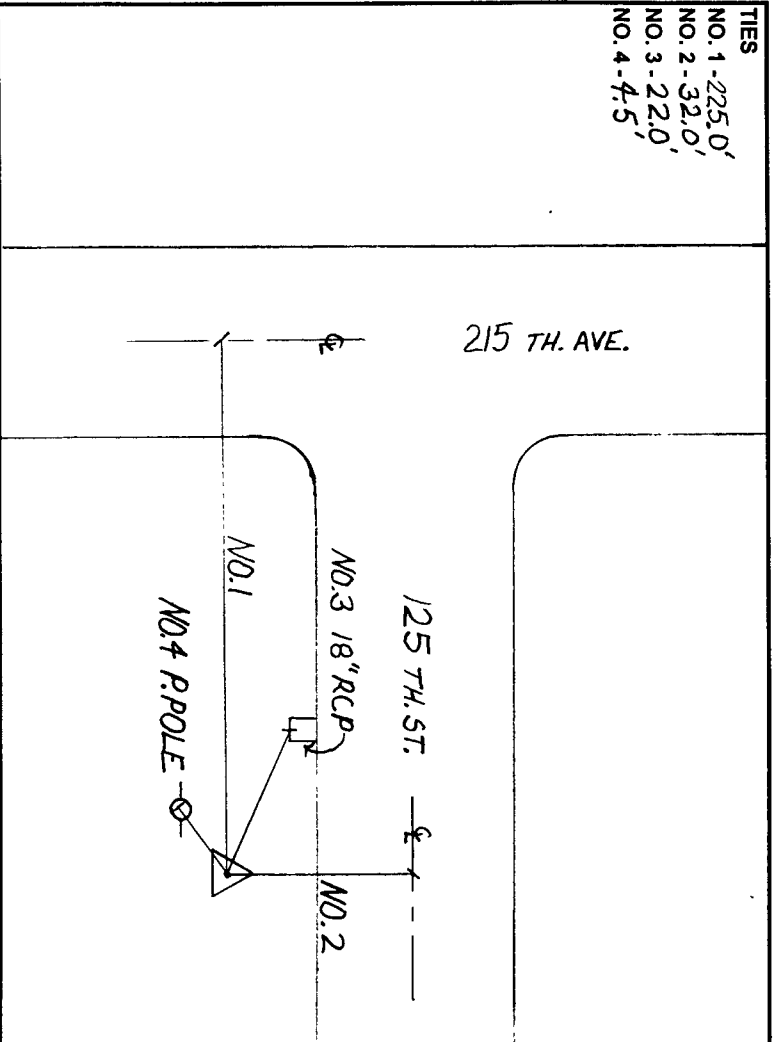
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 27' 59.398750"
 LONGITUDE WEST 95° 09' 35.905325"
 ELLIPSOID HEIGHT (meter) 417.244 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 07' 30.14"
 SCALE FACTOR 0.999977
 COORDINATES (US FEET)
 NORTHING (Y) 4001838.20 COORDINATES (METERS)
 NORTHING (Y) 1219762.723
 EASTING (X) 4480553.84 EASTING (X) 1365675.542

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
 ELEVATION (US FEET) 1459.76 ELEVATION (METERS) 444.936

TIES
 NO. 1-225.0'
 NO. 2-32.0'
 NO. 3-22.0'
 NO. 4-4.5'



SECTION MAP



SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993701 1 GPS NO. 8027 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 1 TWP 99 N RANGE 37 W USGS QUAD MAP OKOBOJI
 TO REACH THE STATION FROM _____
 THE INTERSECTION BETWEEN HIGHWAY 9 AND 153RD STREET, HEAD WEST ON HIGHWAY 9 FOR 0.2 MILE TO THE
 STATION ON THE LEFT LOCATED IN THE CENTER OF THE MEDIAN.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____ DATE August, 2002
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc.

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 25' 35.868919"
 LONGITUDE WEST 95° 08' 53.348723"
 ELLIPSOID HEIGHT (meter) 410.277 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE CONVERGENCE ANGLE -1° 07' 01.29"
 SCALE FACTOR 0.999969

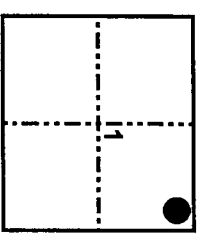
COORDINATES (US FEET) COORDINATES (METERS)
 NORTHING (Y) 3987246.40 NORTHING (Y) 1215315.133
 EASTING (X) 4483408.48 EASTING (X) 1366545.638

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

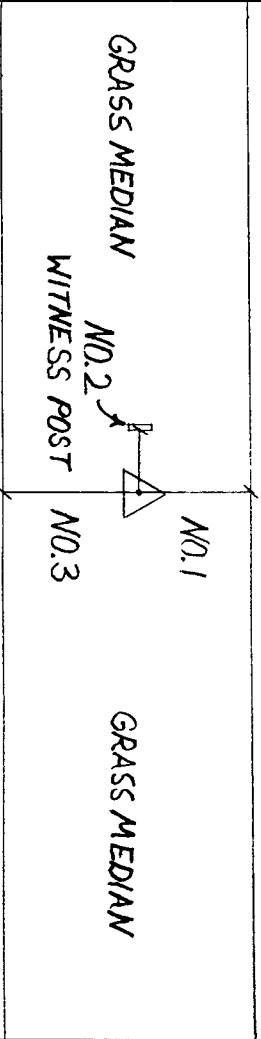
ELEVATION (US FEET) 1437.31 ELEVATION (METERS) 438.093

TIES
 NO. 1 - 29.4'
 NO. 2 - 14.0'
 NO. 3 - 41.0'
 NO. 4 - _____

WESTBOUND HWY 9



SECTION MAP



EASTBOUND HWY 9

SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 993618 3 **GPS NO.** 8028 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 18 **TWP** 99 N **RANGE** 36 W **USGS QUAD MAP** OKOBUJ
THE STATION IS AT
THE INTERSECTION OF SANBORN AVENUE AND FURLAM STREET. THE STATION IS ON THE NORTH SIDE OF SANBORN
ROAD AND IN THE CENTER MEDIAN OF THE ENTRANCE TO SPIRIT LAKE AIRPORT.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING **VALUES AS PUBLISHED BY** Patrick Engineering Inc. **DATE** August, 2002
 MARK SET **VALUES ESTABLISHED BY**

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

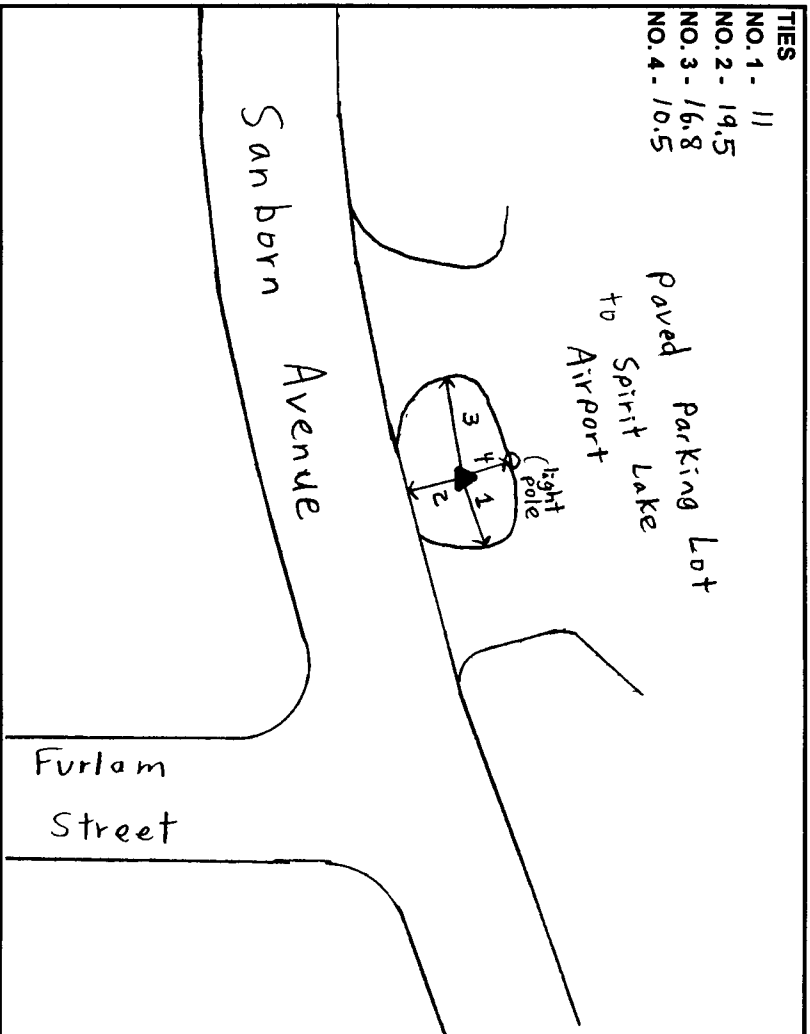
LATITUDE NORTH 43° 22' 56.470552"
LONGITUDE WEST 95° 08' 21.419064"
ELLIPSOID HEIGHT (meter) 404.198 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 06' 39.65"
COORDINATES (US FEET) **SCALE FACTOR** 0.9999960
NORTHING (Y) 3971063.96 **COORDINATES (METERS)**
EASTING (X) 4485451.44 **NORTHING (Y)** 1210382.716
EASTING (X) 1367168.333

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1417.87 **ELEVATION (METERS)** 432.168

TIES
NO. 1 - 11
NO. 2 - 19,5
NO. 3 - 16,8
NO. 4 - 10,5



SECTION MAP

SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 983701 1 **GPS NO.** 8029 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 1 **TWP** 98 N **RANGE** 37 W **USGS QUAD MAP** MILFORD
THE STATION IS
AT THE SOUTHWEST CORNER OF THE INTERSECTION BETWEEN HIGHWAY 86 AND U.S. HIGHWAY 71.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING **VALUES AS PUBLISHED BY** Patrick Engineering Inc. **DATE** August, 2002
 MARK SET **VALUES ESTABLISHED BY**

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

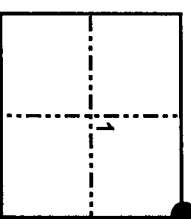
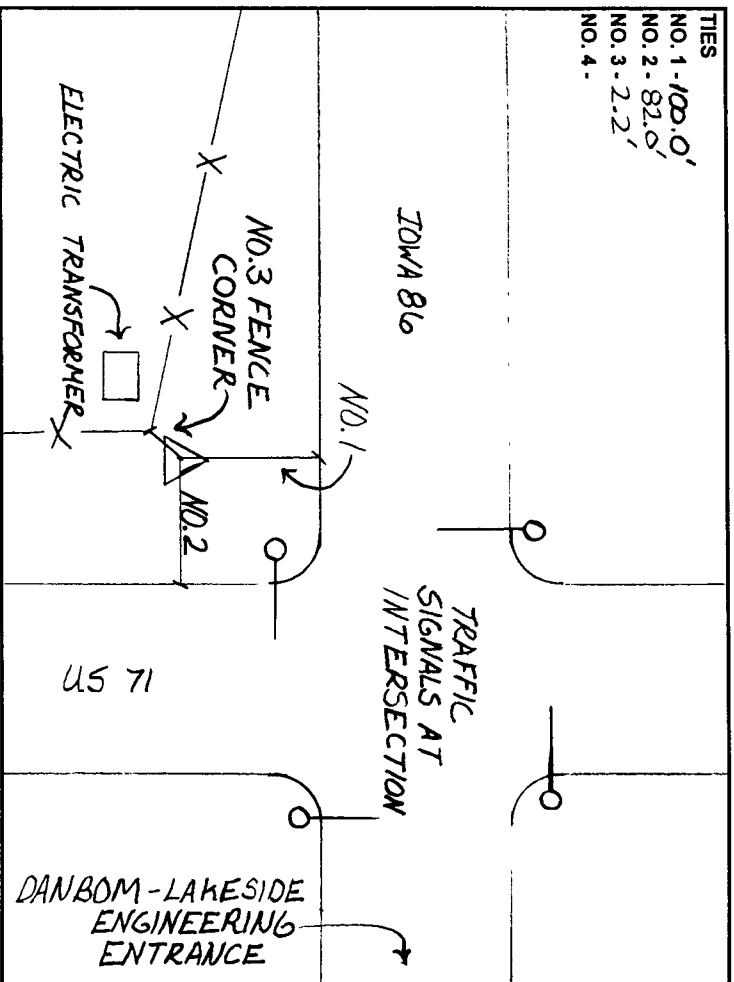
LATITUDE NORTH 43° 20' 23.880961"
LONGITUDE WEST 95° 09' 01.577229"
ELLIPSOID HEIGHT (meter) 406.758 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE -1° 07' 06.87"
CONVERGENCE ANGLE 0.999950
SCALE FACTOR
COORDINATES (US FEET) **COORDINATES (METERS)**
NORTHING (Y) 3955674.63 **NORTHING (Y)** 1205692.039
EASTING (X) 4482184.67 **EASTING (X)** 1366172.620

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1426.65 **ELEVATION (METERS)** 434.844

TIES
NO. 1 - 100.0'
NO. 2 - 82.0'
NO. 3 - 2.2'
NO. 4 -



SECTION MAP

SKETCH BY CCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 983713 2 GPS NO. 8030 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 13 TWP 98 N RANGE 37 W USGS QUAD MAP MILFORD
 THE STATION IS _____
 DUE NORTH OF THE INTERSECTION BETWEEN 240TH STREET AND U.S. HIGHWAY 71 IN THE CENTER MEDIAN.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

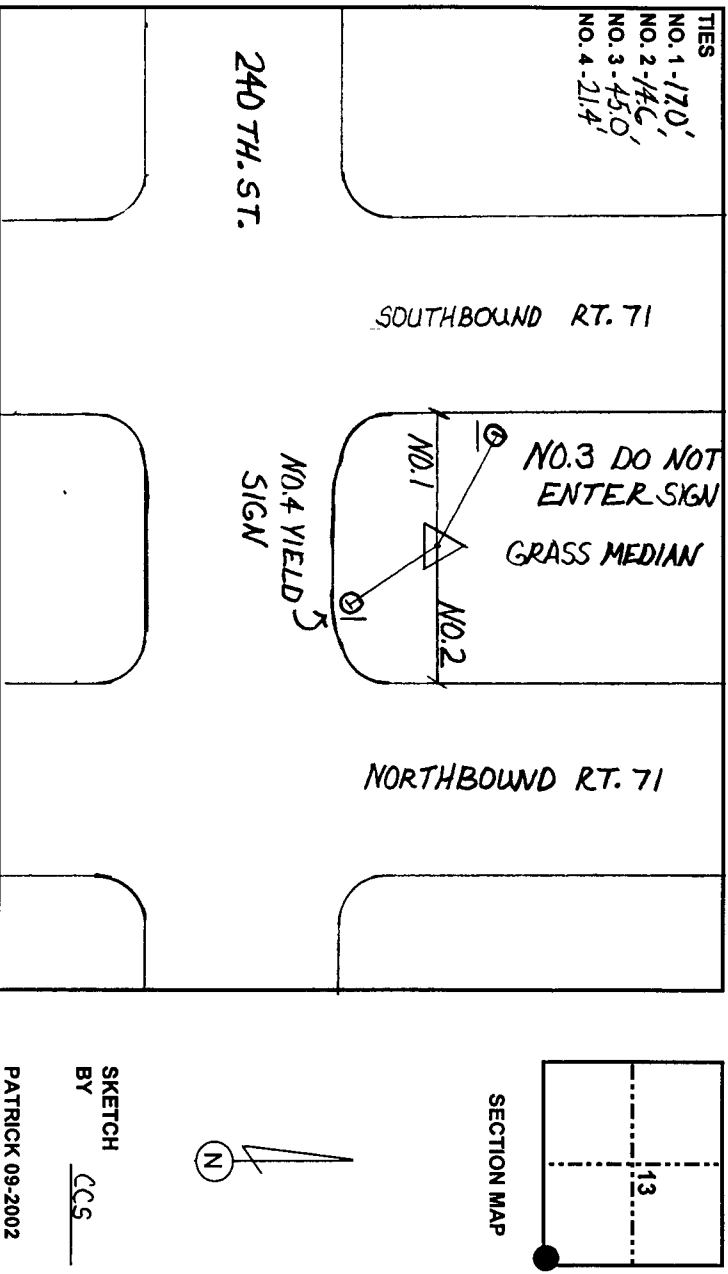
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 17' 57.039983"
 LONGITUDE WEST 95° 09' 00.441943"
 ELLIPSOID HEIGHT (meter) 407.331 *(Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 07' 06.1"
 SCALE FACTOR 0.999942
 COORDINATES (US FEET)
 NORTHING (Y) 3940808.14 COORDINATES (METERS)
 EASTING (X) 4481978.37 NORTHING (Y) 1201160.723
 EASTING (X) 1366109.739

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1428.92 ELEVATION (METERS) 435.536



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1013531 3 GPS NO. 8031 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 31 TWP 101 N RANGE 35 W USGS QUAD MAP LAKEFIELD SE
 THE STATION IS
 AT THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN 100TH STREET AND JACKSON COUNTY ROAD 75

MARK

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY

Patrick Engineering Inc.

DATE Augusl, 2002

BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

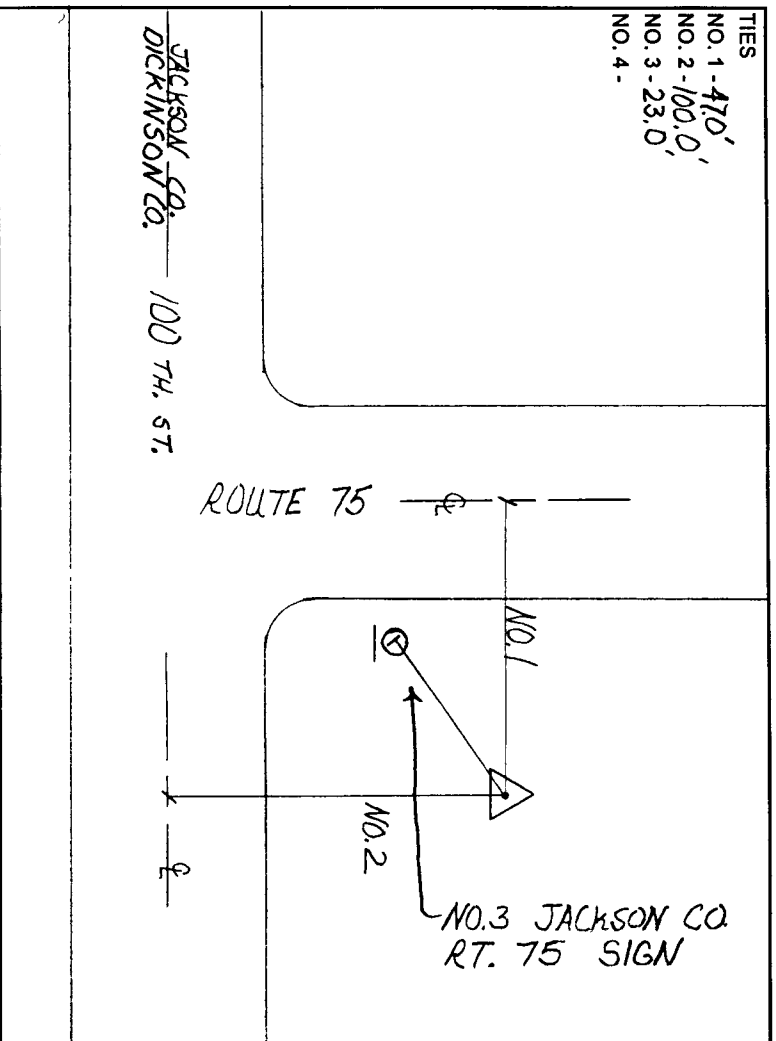
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 30' 04.537011"
 LONGITUDE WEST 95° 05' 37.728630"
 ELLIPSOID HEIGHT (meter) 403.634 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 04' 48.71"
 SCALE FACTOR 0.999988
 COORDINATES (US FEET)
 NORTHING (Y) 4014169.04 COORDINATES (METERS)
 EASTING (X) 4498355.05 NORTHING (Y) 1223521.170
 EASTING (X) 1371101.361

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1415.15 ELEVATION (METERS) 431.339



SKETCH BY ps

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003620 3 GPS NO. 8032 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 20 TWP 100 N RANGE 36 W USGS QUAD MAP OKOBOJI
 THE STATION IS AT _____
 THE INTERSECTION OF HIGHWAY 276 AND 125TH STREET. THE STATION IS AT THE SOUTHWEST CORNER.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY Patrick Engineering Inc. DATE August, 2002
 MARK SET VALUES ESTABLISHED BY _____

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 27' 59.472776"
 LONGITUDE WEST 95° 07' 29.373324"
 ELLIPSOID HEIGHT (meter) 412.382 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE

CONVERGENCE ANGLE

SCALE FACTOR

COORDINATES (US FEET)

COORDINATES (METERS)

NORTHING (Y) 4001664.41
 EASTING (X) 4489883.99

NORTHING (Y) 1219709.752
 EASTING (X) 1368519.377

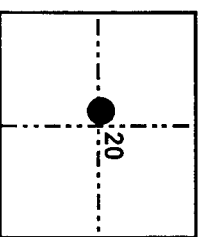
VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1443.98

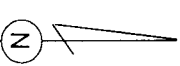
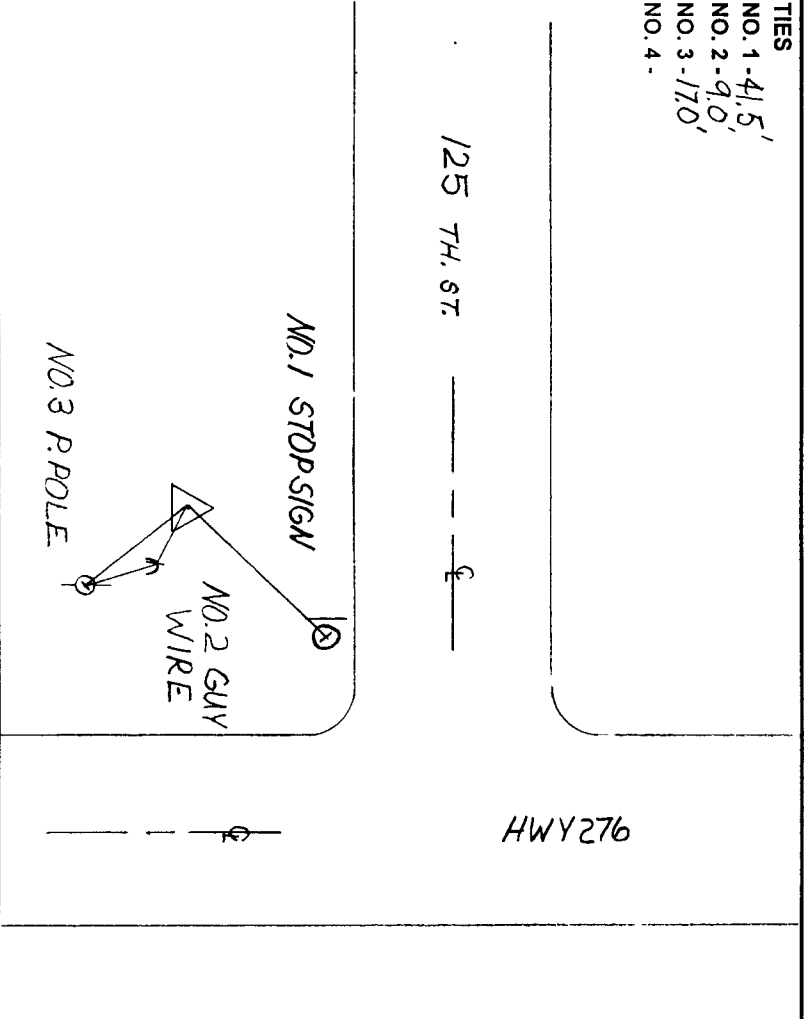
ELEVATION (METERS)

440.126

TIES
 NO. 1 - 41.5'
 NO. 2 - 90'
 NO. 3 - 170'
 NO. 4 - _____



SECTION MAP



SKETCH BY PCS

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993604 1 GPS NO. 8033 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 4 TWP 99 N RANGE 36 W USGS QUAD MAP SPIRIT LAKE
 TO REACH THE STATION FROM _____
 THE INTERSECTION OF HIGHWAY 9 AND 250TH AVENUE. HEAD SOUTH ON HIGHWAY 9 APPROXIMATELY 275 FEET TO THE
 STATION ON THE LEFT.

MARK

BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY

Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL
 ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996
 ADJUSTMENT.

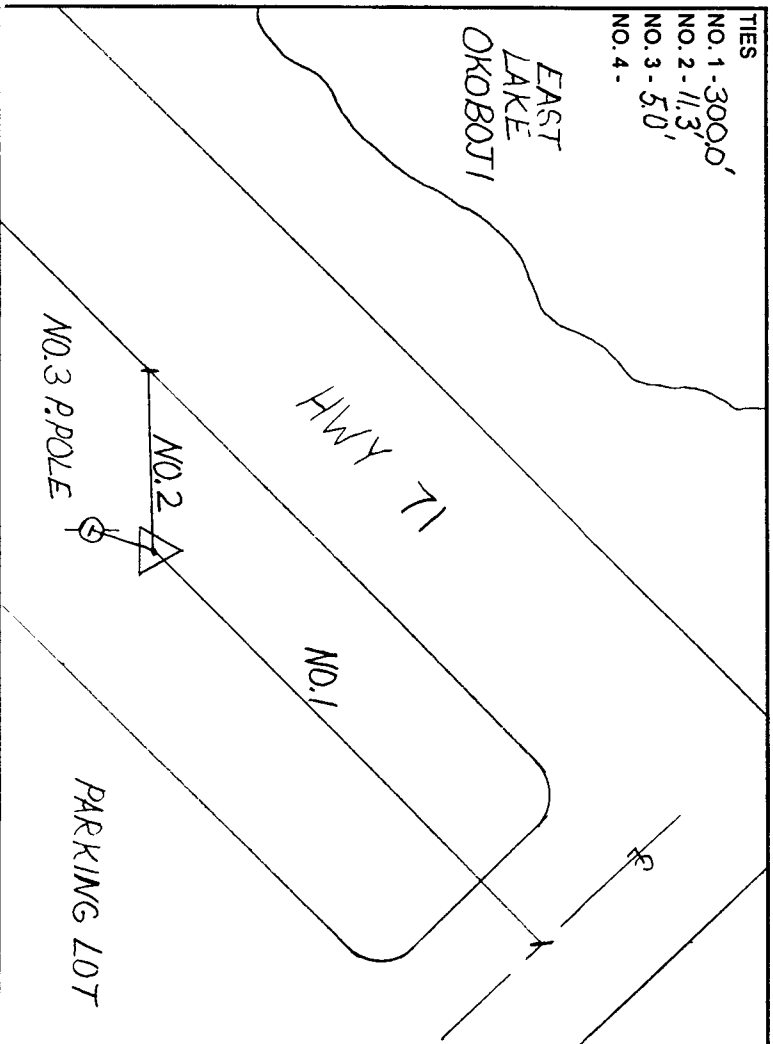
LATITUDE NORTH 43° 25' 32.030142"
 LONGITUDE WEST 95° 05' 34.927823"
 ELLIPSOID HEIGHT (meter) 399.187 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE

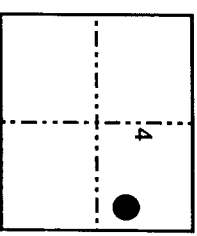
COORDINATES (US FEET)	CONVERGENCE ANGLE
NORTHING (Y) <u>3986577.09</u>	<u>-1° 04' 46.82"</u>
EASTING (X) <u>4498041.53</u>	SCALE FACTOR <u>0.999970</u>
	COORDINATES (METERS)
	NORTHING (Y) <u>1215111.127</u>
	EASTING (X) <u>1371005.800</u>

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE
 U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET)	<u>1401.20</u>	ELEVATION (METERS)	<u>427.087</u>
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TIES
 NO. 1 - 3000.0'
 NO. 2 - 113.3'
 NO. 3 - 50.0'
 NO. 4 -



SECTION MAP



SKETCH
 BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 993615 3 GPS NO. 8034 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 15 TWP 99 N RANGE 36 W USGS QUAD MAP SPIRIT LAKE
 TO REACH THE STATION FROM _____
 THE INTERSECTION OF 182ND STREET AND 242 AVENUE, HEAD NORTHWEST ON 182ND STREET TO THE STATION
 STATION ON THE RIGHT _____

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 23' 14.092094"
 LONGITUDE WEST 95° 05' 48.310166"
 ELLIPSOID HEIGHT (meter) 402.973 * (Based on GEOID99 Model)

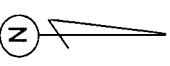
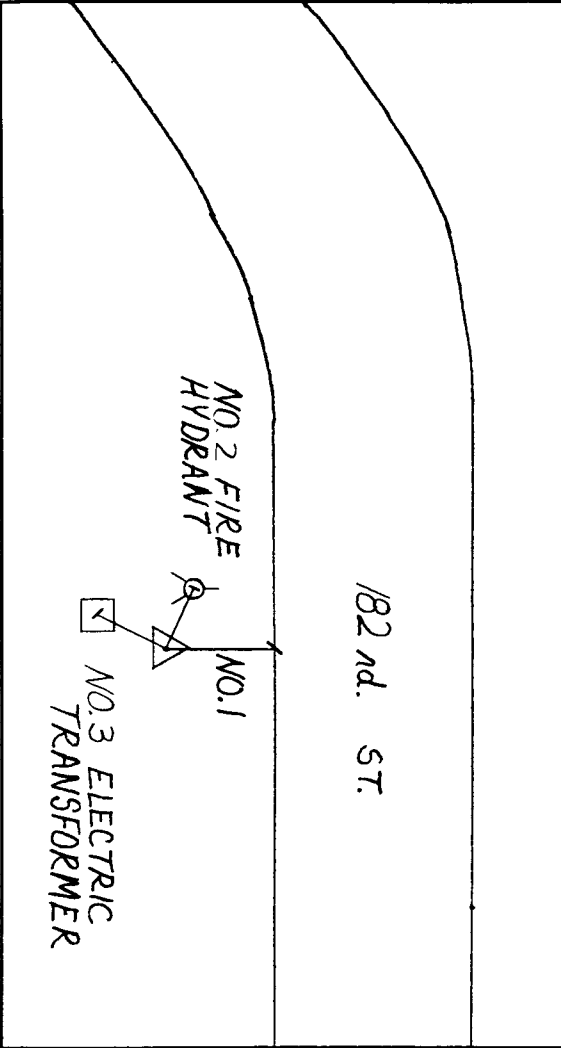
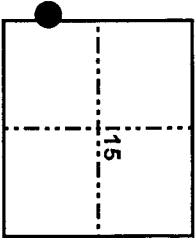
IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 04' 55.89"
 SCALE FACTOR 0.999961
 COORDINATES (US FEET)
 NORTHING (Y) 3972631.48 NORTHING (Y) 1210860.497
 EASTING (X) 4496790.31 EASTING (X) 1370624.428

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1413.99 ELEVATION (METERS) 430.985

TIES
 NO. 1-29.0'
 NO. 2-4.5'
 NO. 3-22.0'
 NO. 4- _____

HOUSE # 24766



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 993634 3 **GPS NO.** 8035 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 34 **TWP** 99 N **RANGE** 36 W **USGS QUAD MAP** SPIRIT LAKE SE
THE STATION IS
AT THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN 210TH STREET AND 250TH AVENUE.

MARK MARK EXISTING VALUES AS PUBLISHED BY BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. **DATE** August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 20' 32.897897"
LONGITUDE WEST 95° 05' 30.308435"
ELLIPSOID HEIGHT (meter) 415.055 * (Based on GEOID99 Model)

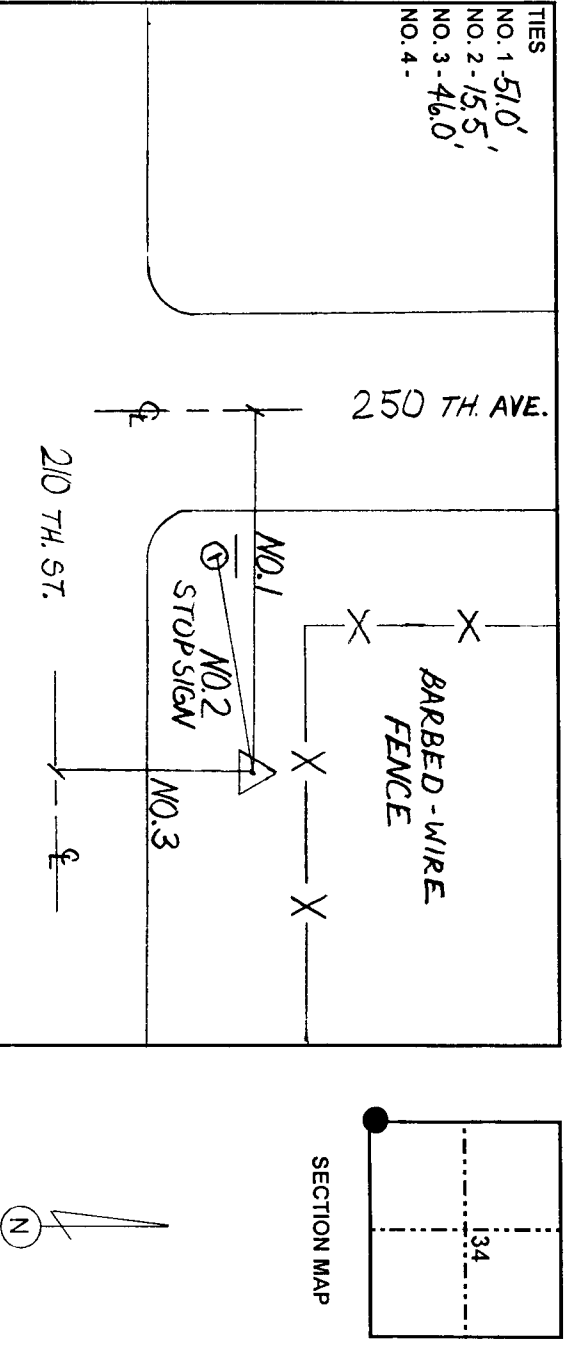
IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 04' 43.69"
SCALE FACTOR 0.999950

COORDINATES (US FEET) **COORDINATES (METERS)**
NORTHING (Y) 3956288.07 **NORTHING (Y)** 1205879.015
EASTING (X) 4497812.13 **EASTING (X)** 1370935.879

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1454.11 **ELEVATION (METERS)** 443.214

TIES
NO. 1 - 51.0'
NO. 2 - 15.5'
NO. 3 - 46.0'
NO. 4 -



SKETCH
BY CCS
PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 983616 2 **GPS NO.** 8036 **COUNTY** DICKINSON **STATE** IOWA
LOCATED IN SECTION 16 **TWP** 98 N **RANGE** 36 W **USGS QUAD MAP** SPIRIT LAKE SE
THE STATION IS
 AT THE NORTHWEST CORNER OF THE INTERSECTION BETWEEN 240TH STREET AND 250TH AVENUE

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY Patrick Engineering Inc. **DATE** August, 2002
 MARK SET VALUES ESTABLISHED BY

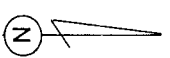
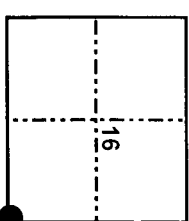
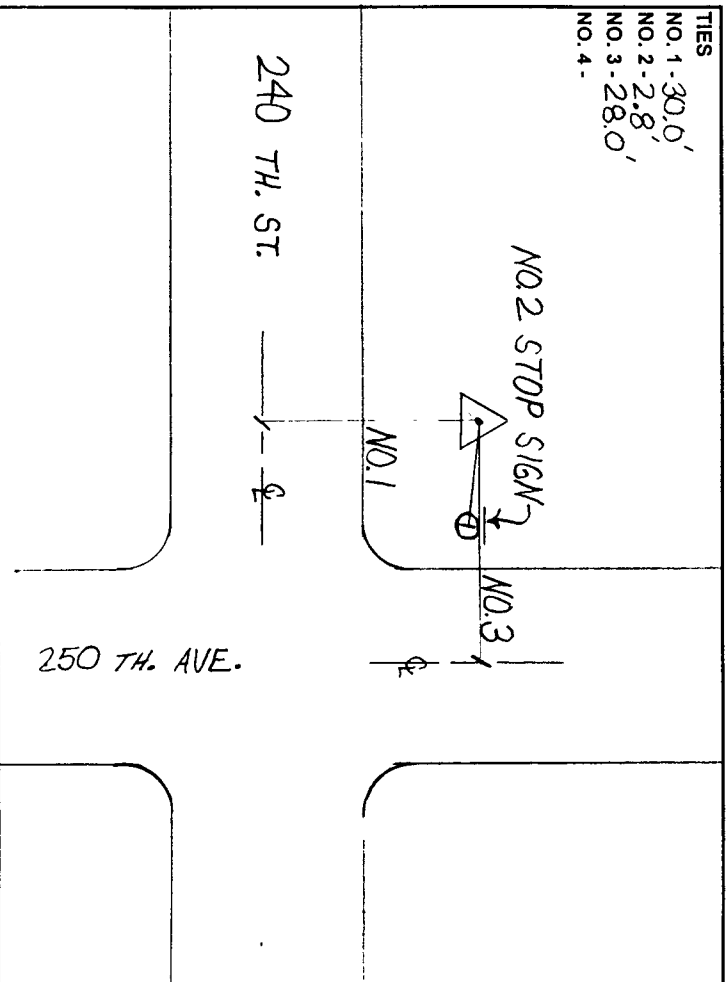
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 17' 56.469066"
LONGITUDE WEST 95° 05' 33.024641"
ELLIPSOID HEIGHT (meter) 414.384 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE **CONVERGENCE ANGLE** -1° 04' 45.53"
COORDINATES (US FEET) **SCALE FACTOR** 0.999941
NORTHING (Y) 3940456.19 **COORDINATES (METERS)** **NORTHING (Y)** 1201053.449
EASTING (X) 4497313.10 **EASTING (X)** 1370783.774

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1452.32 **ELEVATION (METERS)** 442.668



SKETCH
 BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1013638 2 GPS NO. 8037 COUNTY JACKSON STATE MN
 LOCATED IN SECTION 38 TWP 101 N RANGE 36 W USGS QUAD MAP _____
 THE STATION IS _____
 DUE NORTH OF THE INTERSECTION BETWEEN 100TH STREET AND 280TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER
 MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

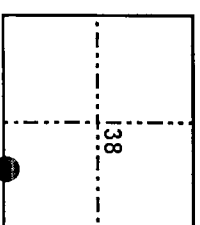
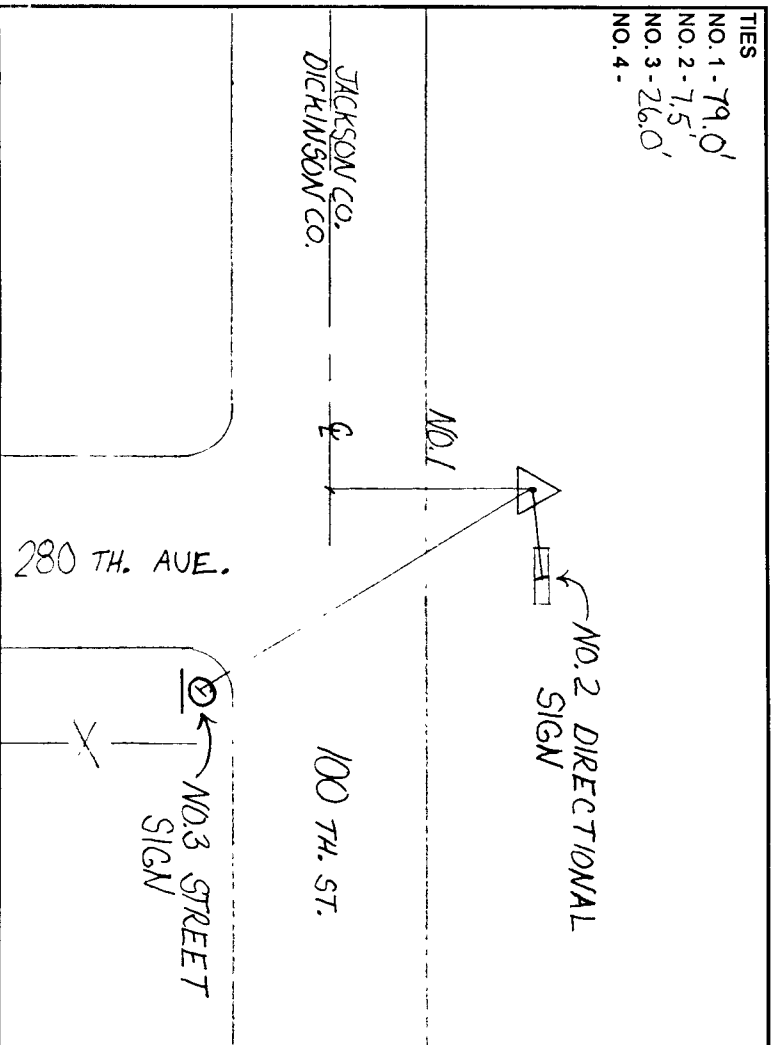
LATITUDE NORTH 43° 30' 03.627923"
 LONGITUDE WEST 95° 01' 57.277961"
 ELLIPSOID HEIGHT (meter) 402.414 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 02' 19.31"
 SCALE FACTOR 0.999988
 COORDINATES (US FEET)
 NORTHING (Y) 4013776.56 COORDINATES (METERS)
 EASTING (X) 4514599.72 NORTHING (Y) 1223401.542
 EASTING (X) 1376052.747

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1411.42 ELEVATION (METERS) 430.202

TIES
 NO. 1 - 79.0'
 NO. 2 - 7.5'
 NO. 3 - 26.0'
 NO. 4 - _____



SECTION MAP



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003519 3 GPS NO. 8038 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 19 TWP 100 N RANGE 35 W USGS QUAD MAP SPIRIT LAKE
 TO REACH THE STATION FROM _____
 THE INTERSECTION BETWEEN 280TH AVENUE AND 120TH (A15) STREET; HEAD SOUTH ON 280TH AVENUE FOR 0.5 MILE
 TO THE STATION ON THE LEFT.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

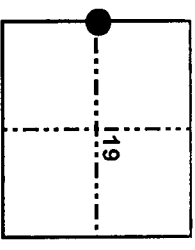
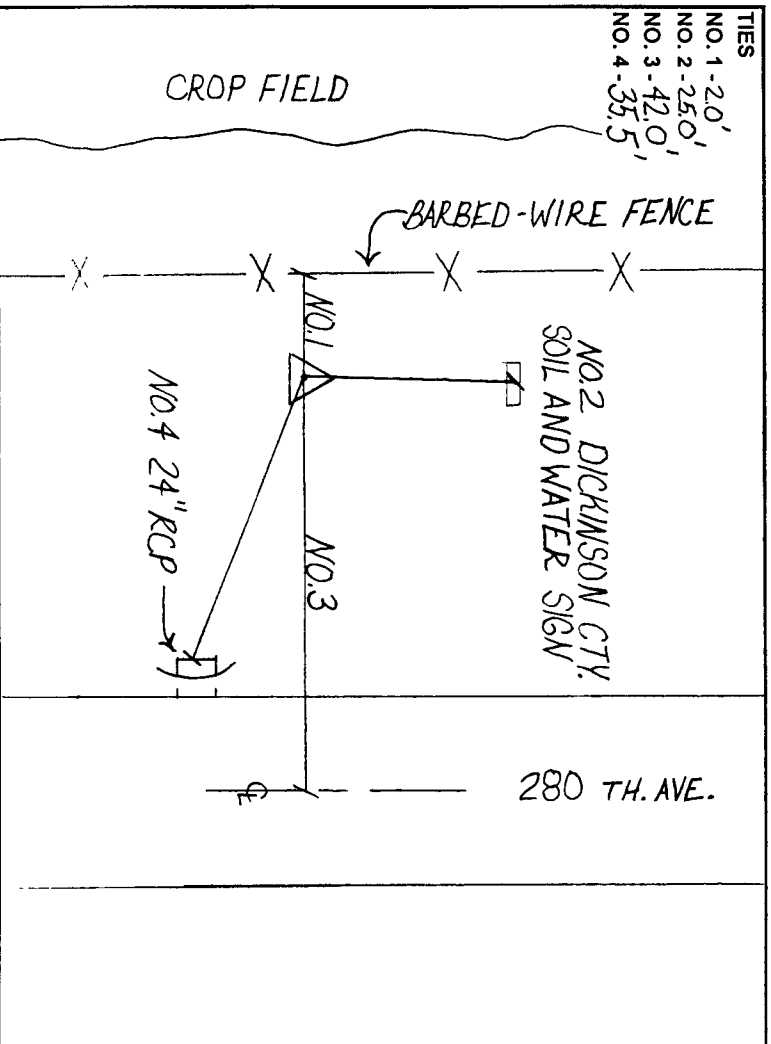
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 27' 59.808475"
 LONGITUDE WEST 95° 01' 57.342667"
 ELLIPSOID HEIGHT (meter) 414.336 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 02' 19.35"
 SCALE FACTOR 0.999978
 COORDINATES (US FEET)
 NORTHING (Y) 4001241.13 COORDINATES (METERS)
 NORTHING (Y) 1219580.736
 EASTING (X) 4514367.67 EASTING (X) 1375982.018

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1450.80 ELEVATION (METERS) 442.205



SECTION MAP



SKETCH BY CCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 1003636 2 GPS NO. 8039 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 36 TWP 100 N RANGE 36 W USGS QUAD MAP SPIRIT LAKE
 THE STATION IS
 AT THE NORTHWEST CORNER OF THE INTERSECTION BETWEEN HIGHWAY 9 (ALSO HIGHWAY 71) AND 280TH AVENUE.

MARK BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY Patrick Engineering Inc DATE August, 2002
 MARK SET VALUES ESTABLISHED BY

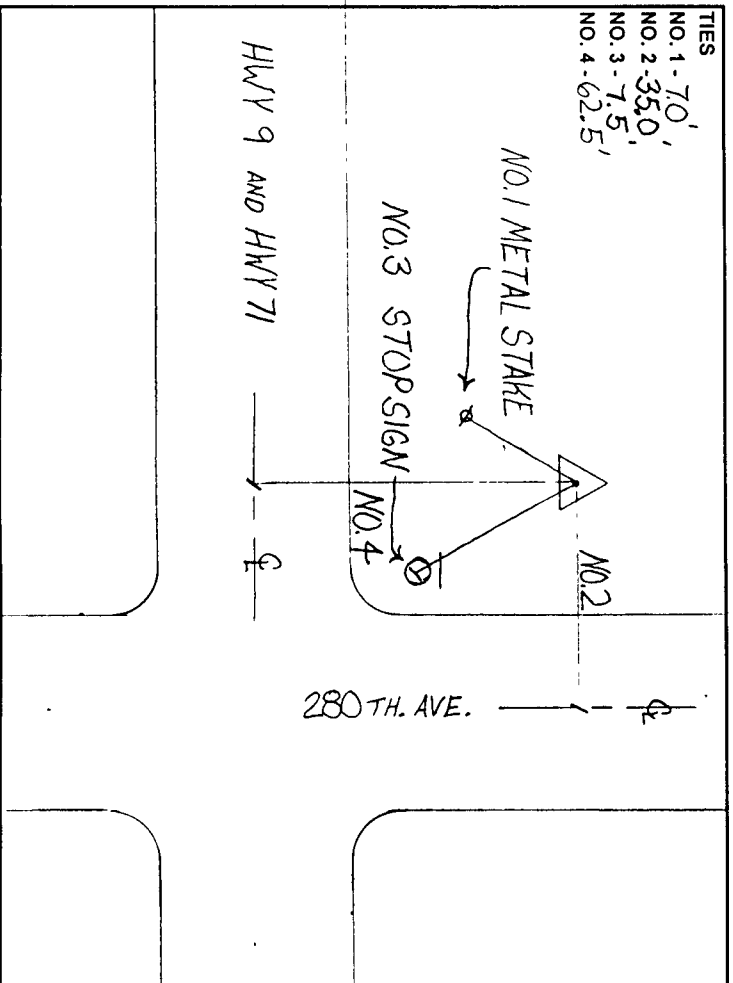
HORIZONTAL VALUES ORIGINATED ON "K" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 25' 50.352561"
 LONGITUDE WEST 95° 01' 57.092746"
 ELLIPSOID HEIGHT (meter) 438.325 * (Based on GEOID99 Model)

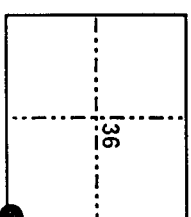
IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 02' 19.18"
 SCALE FACTOR 0.999965
 COORDINATES (US FEET)
 NORTHING (Y) 3988134.84 COORDINATES (METERS)
 EASTING (X) 4514148.48 NORTHING (Y) 1215585.930
 EASTING (X) 1375915.209

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1529.82 ELEVATION (METERS) 466.290



TIES
 NO. 1 - 70'
 NO. 2 - 35.0'
 NO. 3 - 7.5'
 NO. 4 - 62.5'



SECTION MAP

SKETCH BY PCCS
 PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
THE SIDWELL COMPANY
WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
COUNTY ENGINEER
DICKINSON COUNTY, IOWA

DESIGNATION 993613 2 GPS NO. 8040 COUNTY DICKINSON STATE IOWA
LOCATED IN SECTION 13 TWP 99 N RANGE 36 W USGS QUAD MAP SPIRIT LAKE
TO REACH THE STATION FROM _____
THE INTERSECTION OF 280TH AVENUE AND 190TH STREET, HEAD NORTH ON 280TH AVENUE FOR 1.1 MILE TO
THE STATION ON THE LEFT, LOCATED IN A GRAVEL PARKING AREA.

MARK

BERNTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY

Patrick Engineering Inc.

DATE August 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 23' 15.763360"
LONGITUDE WEST 95° 01' 58.185343"
ELLIPSOID HEIGHT (meter) 432.046 * (Based on GEOID99 Model)

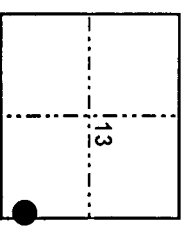
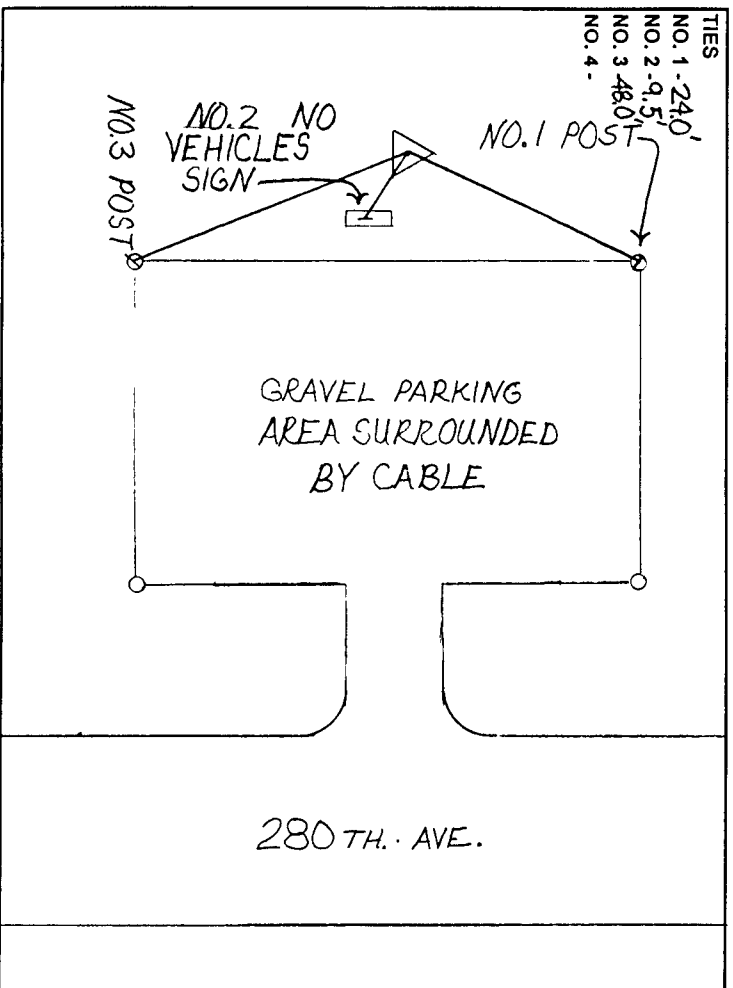
IOWA COORDINATE SYSTEM, NORTH ZONE

CONVERGENCE ANGLE -1° 02' 19.92"

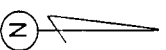
COORDINATES (US FEET)		SCALE FACTOR	<u>0.999957</u>
NORTHING (Y)	<u>3972486.14</u>	COORDINATES (METERS)	
EASTING (X)	<u>4513784.08</u>	NORTHING (Y)	<u>1210816.197</u>
		EASTING (X)	<u>1375804.139</u>

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1509.64 ELEVATION (METERS) 460.139



SECTION MAP



SKETCH BY CCS
PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DEJURISDICTION 983506 4 GPS NO. 8041 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 6 TWP 98 N RANGE 35 W USGS QUAD MAP SPRIT LAKE SE
 THE STATION IS
 AT THE SOUTHEAST CORNER OF THE INTERSECTION BETWEEN 280TH AVENUE AND 210TH STREET.

MARK

BERTSEN MONUMENT WITH 2-1/2" ALUMINUM DISK ON ROD WITH 6" ACCESS COVER

MARK EXISTING VALUES AS PUBLISHED BY
 MARK SET VALUES ESTABLISHED BY

Patrick Engineering Inc.

DATE August, 2002

HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 20' 31.455007"
 LONGITUDE WEST 95° 01' 56.901556"
 ELLIPSOID HEIGHT (meter) 418.290 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 02' 19.05"
 SCALE FACTOR 0.999949
 COORDINATES (US FEET)
 NORTHING (Y) 3955850.61 COORDINATES (METERS)
 EASTING (X) 4513577.30 NORTHING (Y) 1205745.677
 EASTING (X) 1375741.113

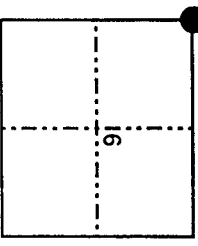
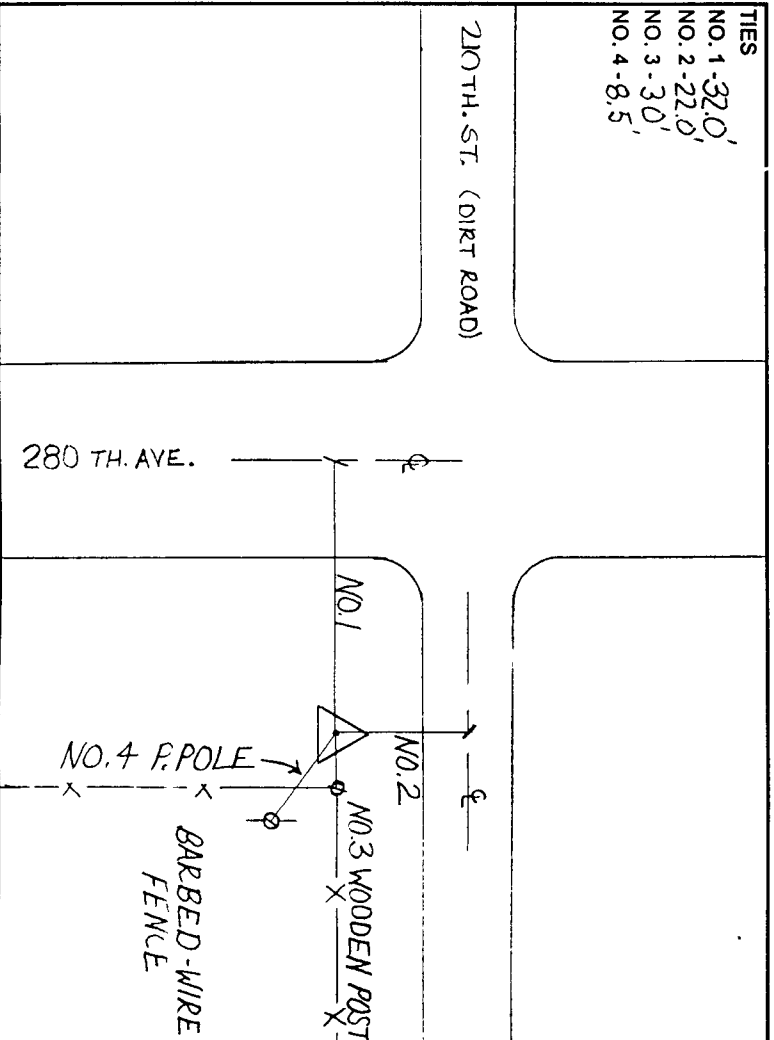
VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1464.96 ELEVATION (METERS) 446.521

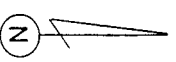
TIES
 NO. 1 - 32.0'
 NO. 2 - 22.0'
 NO. 3 - 30'
 NO. 4 - 8.5'

210 TH. ST. (DIRT ROAD)

280 TH. AVE.



SECTION MAP



SKETCH BY C.C.S.

PATRICK 09-2002

GPS SURVEY MARK DESCRIPTION

GIS MAPPING BY:
 THE SIDWELL COMPANY
 WEST CHICAGO, ILLINOIS

THE OFFICE OF THE
 COUNTY ENGINEER
 DICKINSON COUNTY, IOWA

DESIGNATION 983613 2 GPS NO. 8042 COUNTY DICKINSON STATE IOWA
 LOCATED IN SECTION 13 TWP 98 N RANGE 36 W USGS QUAD MAP SPIRIT LAKE SE
 THE STATION IS _____
 AT THE NORTHWEST INTERSECTION OF 240TH STREET AND 280TH AVENUE

MARK _____
 MARK EXISTING VALUES AS PUBLISHED BY _____
 MARK SET VALUES ESTABLISHED BY Patrick Engineering Inc. DATE August, 2002

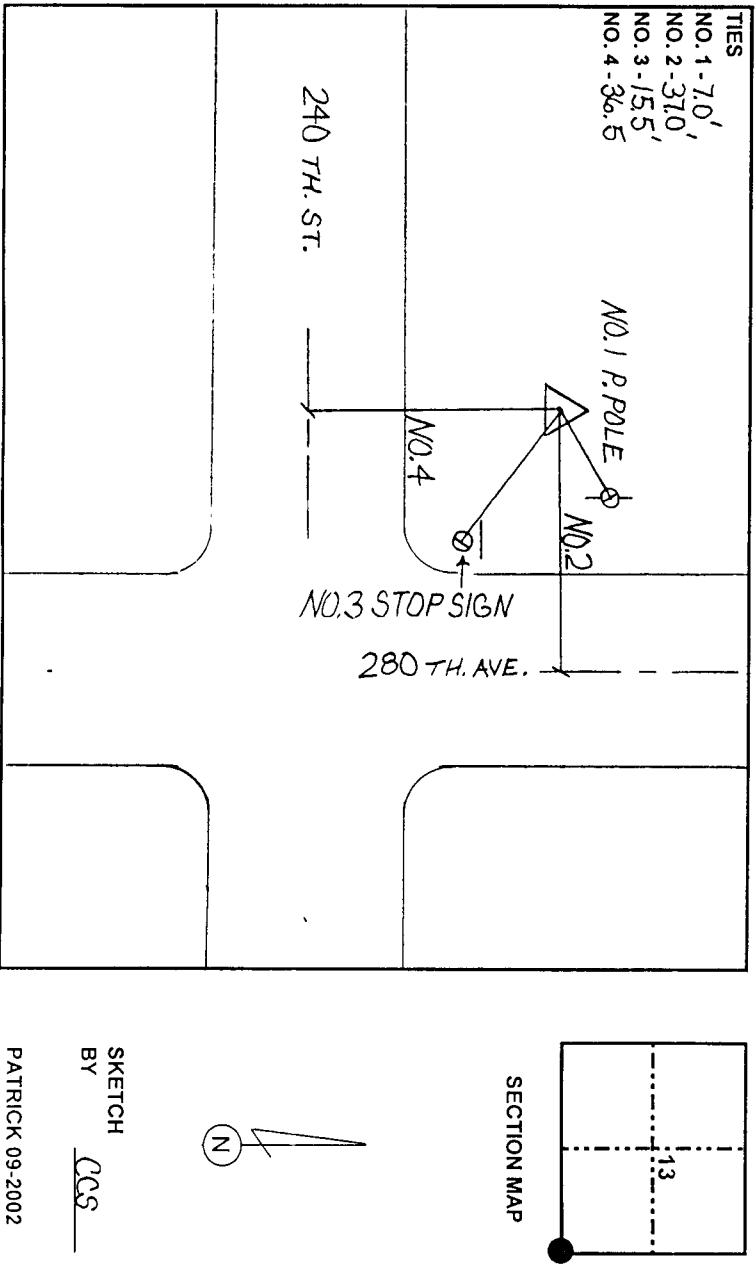
HORIZONTAL VALUES ORIGINATED ON ORDER "B" IOWA HIGH ACCURACY REFERENCE NETWORK (HARN) CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND BASED ON THE NORTH AMERICAN DATUM OF 1983, 1996 ADJUSTMENT.

LATITUDE NORTH 43° 17' 55.613637"
 LONGITUDE WEST 95° 01' 58.799120"
 ELLIPSOID HEIGHT (meter) 413.017 * (Based on GEOID99 Model)

IOWA COORDINATE SYSTEM, NORTH ZONE
 CONVERGENCE ANGLE -1° 02' 20.34"
 SCALE FACTOR 0.999941
 COORDINATES (US FEET)
 NORTHING (Y) 3940076.76
 EASTING (X) 4513150.98
 COORDINATES (METERS)
 NORTHING (Y) 1200937.798
 EASTING (X) 1375611.170

VERTICAL VALUES ORIGINATED ON VERTICAL CONTROL ESTABLISHED BY THE NATIONAL GEODETIC SURVEY AND/OR THE U.S. GEOLOGICAL SURVEY AND BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.

ELEVATION (US FEET) 1448.05 ELEVATION (METERS) 441.367



SKETCH BY CCS
 PATRICK 09-2002