



Electronic Spatial and Positional Data Standards
Updated November 3, 2014

Overview

The criteria and specifications contained within this document shall govern electronic spatial and positional data provided to the City of Manhattan for the purposes of planning, designing, constructing, or archiving projects or developments.

The City of Manhattan, Kansas is subject to all State of Kansas and Federal laws and regulations. This document is meant to augment existing City, State, and Federal laws and regulations.

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ED 0000 – General Conditions

Sec. 1 - This document shall be known, cited and referred to as the "Electronic Spatial and Positional Data Standards" for the City of Manhattan, Kansas and that portion of the Manhattan Urban Area Comprehensive Plan area located in Riley County, Kansas and also in Pottawatomie County, Kansas. All projects conducted within the Manhattan Urban Area Comprehensive Plan area shall conform to the Kansas Minimum Standards for Boundary Surveys and Mortgage Title Inspections Standards of Practice, and all other applicable State of Kansas and Federal statutes.

Sec. 2 – Application

From, and after, their issuance by the City Engineer, these Standards shall apply to electronic data utilized to plan, design, construct, and archive projects, designs and plats submitted to the City of Manhattan, located within the Manhattan Urban Area Comprehensive Plan area.

Sec. 3 - Construction

Unless a contrary intention clearly appears, the following words and phrases shall have, for the purpose of these Regulations, the meanings given in the following clauses. Any word or term not defined herein shall be used in a meaning of standard usage.

- (A) Words used in the present tense shall include the future.
- (B) The singular shall include the plural.
- (C) The word "shall" is mandatory.
- (D) The word "may" is permissive.
- (E) The phrase "used for" shall include the phrases "arranged for", "designed for", "maintained for", and "occupied for".
- (F) The word "City" shall mean the City of Manhattan, Kansas.
- (G) The phrase "Riley County" shall mean the County of Riley, Kansas.
- (H) The phrase "Pottawatomie County" shall mean the County of Pottawatomie, Kansas.
- (I) The word "ordinance" shall include the words "resolution" or "regulations".

Sec. 4 – Exceptions

The City Engineer or his designee shall have the power to determine the appropriateness of the application of the standards to individual projects and make exceptions, based upon his professional opinion, if necessary.

Sec. 5 - Definitions

As-built - A set of drawings, which depicts the actual as-built conditions of the completed construction

Base line - An accurately surveyed line from which other lines or the angles between them are measured.

Benchmark - A survey mark made on a monument having a known elevation, serving as a reference point for surveying.

Combined Scale Factor - average grid scale factor for the project multiplied by the average orthometric height scale factor for the project.

Manhattan Urban Area Comprehensive Plan - The plan as adopted pursuant to K.S.A. 12-747, by Manhattan Urban Area Planning Board and the Riley County Planning Board for the development of the City of Manhattan and any unincorporated territory lying outside of the city but which in the opinion of said planning boards, forms the total community of which the City of Manhattan is a part.

Computer aided drafting (CAD) - The use of a computer and sophisticated graphics software to design products or systems

Datum - The reference specifications of a measurement system, usually a system of coordinate positions on a surface (a horizontal datum) or heights above or below a surface (a vertical datum).

Esri (Environmental Systems Research Inc) - A developer of GIS software.

Foot, US Survey - Linear unit of the US prior to 1959 and defined such that one foot equals exactly 1200 / 3937 meter. Longer than the international foot by 2 parts per million (ppm).

Geodetic datum - Reference frame for computing geodetic coordinates (latitude, longitude, and ellipsoid height) of a point. A datum always refers to a particular ellipsoid and a specific adjustment.

Geographic “projection” - This is not a true map projection in the sense that it does not transform geodetic coordinates (latitude and longitude) into linear units. However, it is a projection in the sense that it represents geodetic coordinates on a regular flat grid, such that the difference in angular units (e.g., decimal degrees) is equal in all directions. Because of meridian convergence, this results in an extremely distorted coordinate system, especially at high latitudes, and the distortion varies greatly with direction.

Geoid - Surface of constant gravitational equipotential (a level surface) that best corresponds to global mean sea level. Often used as a reference surface for vertical datums.

Georeference - Aligning geographic data to a known coordinate system so it can be viewed, queried, and analyzed with other geographic data.

GIS (Geographic Information System) - An integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes.

GPS (Global Positioning System) - A constellation of satellites used for navigation, mapping, surveying, and timing. Microwave signals transmitted by the satellites are observed by GPS receivers to determine a three-dimensional position. Accuracy varies greatly depending on the type of receiver and methods used.

Grid distance - The horizontal distance between two points on a flat plane. This type of distance can be obtained from map projections.

Grid Scale Factor - a measure of the distortion at a given point on a projected map.

Manhattan Control Network - Comprised of the survey benchmarks and monuments maintained by the City.

Map projection - A functional mathematical relationship between geodetic coordinates on the curved ellipsoid surface, and grid coordinates on a planar map surface. All projections are distorted, in that the relationship between projected coordinates differs from that between their respective geodetic coordinates.

Metadata - Information that describes the content, quality, condition, origin, and other characteristics of data or other pieces of information.

Monument - A physical object that marks a position on the ground.

NAD 83 (North American Datum of 1983) - Current official geodetic datum of the US. Replaced NAD 27 in 1986, This is the datum of SPCS 83 and UTM 83.

NAVD 88 (North American Vertical Datum of 1988) - Current official vertical datum of the US. Replaced NGVD 29 in 1991.

Orthometric Height Scale Factor - represents a factor of elevation that can be used to calculate geodetic distances above or below the ellipsoid.

Plat - A map as a formal document representing a tract of land, showing the boundaries and location of individual properties and streets; a map and a legal description of a subdivision or a site plan.

Positional Network - A collection of monumented or unmonumented surveyed reference points providing known vertical (benchmarks) and horizontal (control points) locations.

Project Control Monuments - Monuments that have been created or designated for use in a specific project.

Spatial Data - Information about the locations and shapes of geographic features and the relationships between them, usually stored as coordinates and topology.

SPCS (State Plane Coordinate System) - A system of standardized map projections covering each state with one or more zones such that a specific distortion criterion is met (usually 1:10,000). Projection parameters (including units of length) are independently established by the legislature of each state. Kansas coordinate system of 1983, North Zone is an example of a SPCS.

Stable (in reference to monuments) - A monument that has not shifted or settled and has remained in the same horizontal and vertical position as when it was first constructed

Subdivision - The division of a lot, tract or parcel of land into two or more lots, tracts, parcels of land for sale, development, lease or other similar purpose. Such division may also include, as an integral part of such division, the dedicating, vacating or reserving of streets, alleys, parks, and easements intended for public use.

Vertical datum - A reference system for determining "elevations", usually through optical differential leveling. Modern vertical datums typically use the geoid as a reference surface and allow elevation determination using GPS when combined with a geoid model.

ED 1000 – General electronic positional data

Sec. 1 - General

Electronic drawings and designs that are submitted to the City – including, but not limited to, plats, as-builts, and engineering plans – shall be delivered in a format that is compatible with current City of Manhattan software, and as determined by the receiving department.

Sec. 2 – Metadata

Metadata should meet Federal Geographic Data Committee (FGDC) standards (<http://www.fgdc.gov/metadata>).

Electronic drawings and designs that are submitted to the City shall include the following metadata:

- (1) Projection
- (2) Scale factor
- (3) Convergence angle
- (4) Vertical and horizontal datum
- (5) Title, to include distinction between pre-bid and final bid
- (6) Consultant contact
- (7) Attribute definitions

ED 2000 – Datum and Documentation

Sec. 1 - Datum for City Monument Network

Horizontal positioning - The basis of bearings for City projects shall be Kansas coordinate system of 1983, North Zone. Project distances and coordinates shall be State Plane grid distances modified to an average project elevation above sea level and an average grid scale factor for the project. Only one combined scale factor shall be used for the entire survey. All of the line distances shown on the project shall be dimensioned using the above mentioned combined scale factor. Distances shall be in US Survey Feet to the hundredth of a foot.

Vertical positioning/ elevation - City of Manhattan projects shall be vertically localized utilizing North American Vertical Datum 1988, Geoid 12.

Sec. 2 - Project Monumentation Requirements

Each City project shall contain the following:

Horizontal location - Each project shall contain a minimum of three horizontal project control monuments that shall be contained within the project boundary. The project control monuments shall be placed in such a manner as to be stable throughout the lifespan of the project for which they were designated.

Vertical positioning /elevation - shall utilize a minimum of one established vertical benchmark from the Manhattan Control Network (see appendix A). The city benchmark shall be within a reasonable distance of the geographical center of the proposed project. Each project shall also contain a minimum of two vertical project control monuments that shall be contained within the project boundary -this may include the required City benchmark.

All project monument descriptions shall include the following:

- (1) Physical description of the monument

- (2) Coordinates of the monument
- (3) Station and offset to the base line if applicable to the project

Sec. 3 - Referencing / Recovery of Government Public Land Survey System corners

Contractors working within the comprehensive planning area that are required to file reports under KSA 58-2011 shall furnish a copy of said reference report to the City Engineer or his designee.

Appendix A

City of Manhattan Monumentation

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
001M	Disk at East end of North headwall on box culvert along Marlatt Ave. East of the Swine, Dairy and Poultry Teaching and Research entrance rd. 600'A West of Denison Ave. NW of the KSU 580 low frequency transmitter tower.	1049.626	1050.03	Denison	Marlatt	325549	1712300
002M	Destroyed(2003) Headwall Conc. Box 1/2 mile south of Marlatt	1066.539	1066.94	College	Marlatt	322818	1709521
003M	Disk at West end of North headwall of concrete box on Marlatt Ave. 550'A East of intersection of Marlatt and College Ave., 105'A SE to P.P., 15' N of centerline of Marlatt	1067.691	1068.10	College	Marlatt	325507	1710310
004M	Disk in center of South headwall of concrete box culvert on Marlatt 250'A East of Browning centerline, 16' South of Marlatt centerline, 76' E.S.E to power pole.	1115.053	1115.46	Browning	Marlatt	325408	1707091
005M	Disk 8' North of the South end of the West headwall of the concrete box culvert on Browning Ave. 35.4' North of centerline of Lawrence Rd. 28' West of Browning centerline.	1093.298	1093.70	Browning	Lawrence	322644	1706862
006M	Disk on East end of north headwall of concrete box culvert on Kimball Ave. 87'A West of the centerline of the southbound off ramp for K-113. 44.5'A North of Kimball Ave. centerline. At the SE corner of Candlewood Shopping Center.	1113.981	1114.39	K-113(Seth Childs)	Kimball	319992	1704084
007M	Destroyed(unknown) Disk in North end of concrete retaining wall at the SE corner of the Kimball Ave and Hudson Ave intersection. 69' South of Kimball centerline and 16' East of Hudson centerline.	1213.961	1214.37	Hudson	Kimball	-	-
008M	Disk in center of North headwall of concrete box culvert on Kimball Ave. over Little Kitten Creek. 225'A East of Westbank Way, 43.9' North of Kimball centerline	1122.973	1123.38	Westbank Way	Kimball	319919	1699760
009M	Disk in North end of concrete box culvert on Kimball Ave. 47' East of Kimball centerline 106.5'A North of Grand Mere Pky centerline.	1189.679	1190.08	Grand Mere Pky	Kimball	319246	1698409

Bold - Adjusted Elevation - Looped Differential Leveling
Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
010M	Disk in concrete bank lining at South end of concrete retaining wall on Hudson Ave. 110' North of Dickens Ave. centerline, 18.5' East of Hudson centerline, and 0.5' South of end of retaining wall.	1160.716	1161.12	Hudson	Dickens	317384	1701735
011M	Disk at NW corner concrete street inlet 29' North of Anderson Ave centerline, 56' East of Meadowbrook In., 6' East of Fire Hydrant.	<i>1053.215</i>	<i>1053.62</i>	Meadowbrook	Anderson	314680	1703639
012M	Disk in center of North headwall of double box culvert on Anderson Ave. at Little Kitten Creek crossing. 141.5' West of Windsong Ln., and 47' North of Anderson Ave. centerline.	<i>1063.879</i>	<i>1064.28</i>	Windsong	Anderson	314631	1701286
013M	Disk in entrance to Twin Oaks Softball Complex, Anneberg Park. 41' East of chain link fence, 1' East of the edge of the concrete service road, and 30.5' South of Twin Oaks entrance walkway centerline. 60' North of pay phone.	<i>1060.499</i>	<i>1060.90</i>	Anneberg	Twin Oaks	313893	1699937
014M	Disk in South headwall of concrete box culvert on Anderson Ave. 3.5' East of West edge of South headwall, 20' South of Anderson centerline, and 92' West of Pebblebrook Cir(Cumberland Rd).	1075.953	1076.36	Pebblebrook	Anderson	314678	1698637
015M	Disk in NW corner of street inlet box at the North West corner of the intersection of Candlewood Dr. and North Candlecrest Cir. 20' North of Candlewood drive centerline and 38' West of Candlecrest Cir centerline.	<i>1146.25</i>	<i>1146.65</i>	Candlewood	North Candlecrest	323316	1703452
016M	Disk at West side of West of two flag pole bases. At West side of Manhattan Fire Dept. Headquarters, 110' east of Denison Ave. centerline, and 214.7' North of North curb of Kimball Ave.	1105.119	1105.52	Denison	Kimball	320545	1713257
017M	Destroyed(1996) - Disk NE corner area inlet at SE corner of Kimball and College	-	-	College	Kimball	-	-
018M	Disk at Northwest corner of storm sewer junction box at Northeast corner of Kimball Ave. and Browning Ave. 39.5' East of Browning centerline and 57' North of Kimball centerline	1104.591	1105.00	Browning	Kimball	320076	1706960

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Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
019M	Disk at Northwest corner of street inlet box on North side of Gary St. South of residence of 3412 Gary. 19.4' North of Gary centerline and 77' West of Effingham centerline.	1160.806	1161.21	Effingham	Gary	322610	1702793
020M	Disk on center of South end of street inlet box on the east side of Little Kitten Ave. 17.6' East to Little Kitten Ave. centerline and 410' South to Stephen Ct. centerline.	1134.348	1134.75	Little Kitten	Stephen	321029	1699769
021M	Disk at Northeast corner of street inlet box at East end of Cul-De-Sac of Erin Cir. 26' North of Erin Cir. Centerline. 19.2' WNW of telephone pedestal #1317			Sharingbrook	Erin	316425	1699779
022M	Disk at Southeast corner of street inlet box on East side of Westbank Way, 17.7' East of Westbank Way centerline and 53.5' North of Deandra Ln. extended centerline.		<i>1135.54</i>	Westbank Way	Deandra	318488	1699676
023M	Disk at Southeast corner of street inlet box South of Blue Hills Rd. 51.1' East of N. Manhattan Ave. centerline and 17.3' South of Blue Hills Rd. centerline.	<i>1141.244</i>	<i>1141.65</i>	N. Manhattan	Blue Hills Rd.	320809	1715852
024M	Disk at West end of North end of headwall 7'X5' box 65' West of southbound Tuttle Creek Blvd centerline and 147' North of westbound Kimball Ave. centerline.	1049.958	1050.36	Tuttle Creek Blvd	Kimball	321791	1716994
025M	Disk at center of headwall at the East end of 14" concrete pipe. 30' East of northbound Tuttle Creek Blvd centerline and +_95' South of Walters Dr. centerline	1041.966	1042.37	Tuttle Creek Blvd	Walters	324645	1715440
026O	Destroyed(Unknown) Disk NE corner traffic signal SW corner of Claflin and College.	-	-	College	Claflin	-	-
027O	Disk at Southwest corner of street inlet box on the West side of College Ave. 27.3' West of College centerline and +_120' North of Hobbs St. centerline.	1113.062	1113.47	College	Hobbs	318326	1709568
028O	Disk at Northeast corner of concrete base of traffic signal at the Southeast corner of the intersection of Browning Ave. and Hobbs Dr. at the Northwest corner of Marlatt Elementary School. 27.2' East of Browning centerline and 22.1' South of Hobbs centerline.	1094.558	1094.96	Browning	Hobbs	318002	1706985
029O	Disk in limestone rock outcropping on the East side of Browning Ave. +_32' East of Browning centerline and +_100' North of Claflin centerline	1110.424	1110.83	Browning	Claflin	316189	1707025

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Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
030O	Disk at Southeast corner of street inlet box on Anderson Ave. 25.2' North of Anderson centerline and 37.4' West of Woodland Dr. centerline.		<i>1073.33</i>	Woodland	Anderson	315276	1708495
031O	Disk at South end of a concrete retaining wall on the west side of concrete steps on the north side of Anderson Ave. and on the South side of Lee Elementary School. 33'+_ North of Anderson Ave. centerline and 123'+_ East of Westview Dr. centerline			Westview Dr.	Anderson	313759	1710909
032S	Disk at Southeast corner of a concrete flag pole base near the main entrance to Manhattan High School West Campus. 59'+_ North of Poyntz Ave. centerline and 75'+_ West of Pine Dr. centerline	1142.733	1143.05	Pine	Poyntz	311298	1711900
033S	Disk at the Southwest corner of a concrete sign base of the Sunset Zoo main entrance. 17.6' North of Oak St. centerline and 215'+_ West of Summit Dr. centerline.			Summit	Oak	310761	1710994
034R	Void(Out of ROW) Disk at center of the North edge of a 4' X 9' Boulder. 41'+_ North of Juniper Dr. and 59'+_ East of Stagg Hill Rd. centerline.	-	-	Stagg Hill	Juniper	305292	1708010
035R	Disk at Northeast corner of street inlet box 26'A East of Davis Dr. centerline and 73'A North of Stagg Hill Rd. centerline.			Davis	Stagg Hill	304210	1706117
036R	Disk at Southwest corner of the concrete base of a telephone pedestal near the intersection of Fort Riley Blvd and Warner Park Road. A69' West of the Warner Park Rd centerline and A60' North of the centerline of the West bound lane of Fort Riley Blvd.			Warner Park	Fort Riley Blvd		
037R	Disk in exposed rock layer A 0.2 miles from the entrance of Warner Park Rd entrance to Warner Park and Southeast of the intersection of the West spur of the park road and an entrance to a parking area. A34' South of spur centerline and A54.7' East of the parking area entrance centerline. 14.6' SSE to a shiner in a 42" Cedar tree and 21.5' West to a split 60" Cedar tree.			Warner Park			
038M	Disk at Northwest corner of concrete base of a telephone pedestal #8041. 46.7' East of Denison Ave centerline, and 0.45 miles South of Marlatt Ave.	1083.444	1083.85	Denison	Marlatt	323008	1713123

Bold - Adjusted Elevation - Looped Differential Leveling
Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
039C	Disk at Northeast corner of concrete base of a telephone pedestal #R8084. +_38' South of Anderson Ave centerline and +_76' East of entrance to Blueville Nursery at 4539 Anderson Ave. and +_0.1 miles West of Kimball Rd centerline		<i>1105.69</i>	Kimball	Anderson	316363	1696467
040R	Disk at Southeast corner of street inlet box Northeast of the West Dartmouth Rd and Amherst Ave intersections. A23' East of Dartmouth centerline and A35' North of Amherst centerline.		<i>1126.97</i>	Dartmouth	Amherst	310256	1705413
041R	Disk at center of West retaining wall behind and North of a stone street sign at the North side of Bethany Dr. and Bethany Cir. A16' North of Bethany Dr. centerline and A30' West of Bethany Cir. Centerline.			Bethany Cir.	Bethany Dr.	312187	1704759
042S	Disk at Northwest corner of a concrete storm sewer junction box manhole. A31' South of Fort Riley Blvd centerline, A 40' North of Frontage Rd. and A38' West of Delaware Ave. centerline.			Delaware	Fort Riley Blvd		
043S	Disk at the Southwest corner of a street inlet box A18' West of Manhattan Ave. centerline and A65' South of Fort Riley Blvd. Centerline.	1018.623	1018.94	Manhattan	Fort Riley Blvd	309376	1715785
044I	Disk at the Southwest corner of concrete traffic signal base at the Southeast corner of Fort Riley Blvd and Juliette Ave. 35.4' South of Fort Riley Blvd. centerline and 39.8' East of Juliette centerline.	1018.98	1019.45	Juliette	Fort Riley Blvd	309415	1718647
045I	Disk at West end of a concrete retaining wall 1.5' North of Manhattan Train Depot. A250' East of 2nd St. centerline and A95' South of Yuma St.	1014.894	1015.36	2nd St	Yuma	309756	1721126
046I	Disk at the center of the North headwall of a box culvert running under U.S. Highway 24 and at the South side of Jon Murdock Auto Dealership(600 McCall Rd). A23' North of Frontage Rd. centerline and A411' West of McCall Rd and U.S 24 intersection.		<i>1004.98</i>	Enoch	Frontage	314834	1724495

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BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
047I	Disk at the Southwest corner of a concrete traffic signal base at the Southeast corner of Tuttle Creek Blvd. And U.S. Highway 24. +_34' South of East bound U.S. 24 centerline and +_46' East of South bound Tuttle Creek Blvd.	1013.281	1013.75	Tuttle Creek Blvd	U.S HWY 24	311498	1721686
048T	Disk at Northeast corner of concrete light pole base. Second light pole East of entrance to the Manhattan Waste Water Treatment plant on the South side of the entrance drive and North of the chain link fence. 48' South and 5' West of the Southwest corner of the main office of the treatment plant.		<i>1017.98</i>	Sewage Treatment Plant Rd.		313617	1726573
049M	Disk at Southeast corner of street inlet box South of Harvey Dr. +_22' Southeast of Harvey Dr. centerline and +_45' Northeast of Columbine Ct. centerline.	<i>1012.257</i>	<i>1012.66</i>	Columbine Ct.	Harvey	319034	1722610
050M	Disk at Northwest corner of storm sewer junction box at Southwest corner of Casement Rd. and Allen Rd. +_26.5' West of Casement centerline and +_24.4' South of Allen centerline. Northeast corner of 2031 Casement Rd (School District Shop).	1020.652	1021.06	Casement	Allen	320362	1721102
051M	Destroyed(2003) Disk on West wing wall of the North side of the west side of a twin Concrete box under Casement RD. A16' West of Casement centerline and A75' North of Brookmont Dr.	1019.027	1019.43	Casement	Brookmont	323293	1721016
052M	A disk at the Northwest corner of a street inlet box South of Butterfield. A17.7' South of Butterfield Rd. centerline and A42.6' West of Buttonwood Dr.	1019.26	1019.66	Buttonwood	Butterfield	322845	1719627
053M	Disk 12' South of the North edge the hubguard of a concrete triple box under Butterfield Rd. 15.6' East of Butterfield Rd. centerline and A30' South of Mission Ave centerline.	1027.428	1027.83	Butterfield	Mission	323260	1717503
054M	Disk at Southeast corner of a street inlet box at the Southwest corner of Spain Dr. and Blueberry Dr. 19.3' South of Spain centerline and A35' West of Blueberry centerline.	1011.912	1012.32	Blueberry	Spain	321517	1723222

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BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
055R	Disk at Southwest corner of a concrete storm sewer junction box. 21.7' East of Ridgewood centerline and + .590' South of Allison Ave. Between the addresses of 720 and 722 Ridgewood.			Ridgewood	Allison	306248	1707633
056F	Disk at Northwest corner of a concrete traffic signal base at the Northwest corner of 17th St. and Poyntz Ave. 25.5' North of Poyntz centerline and 39.0' West of 17th centerline.	1043.141	1043.46	17th	Poyntz	311368	1713909
057J	Destroyed(1999) Disk at Northeast corner of a street inlet box along the North side of Anderson Ave. 25.7' North of Anderson centerline and 62.9' East of Denison Ave. centerline.	DEST	DEST	Denison	Anderson	-	-
058K	Disk at Northeast corner of a street inlet box at the Northwest corner of the intersection of Juliette Ave. and Fremont St. 24.3' West of Juliette centerline and 24.0' North of Fremont centerline.	1014.801	1015.27	Juliette	Fremont	312904	1718581
059K	Disk at Southeast corner of a street inlet box on the East side of Juliette Ave. 15.2' East of Juliette centerline and A164' North of Ratone St. centerline.			Juliette	Ratone	316085	1718617
060M	Disk at Southeast corner of a street inlet box on the East side of Tuttle Creek Blvd. 30.5' East of the centerline of the North bound lane of Tuttle Creek Blvd. and A225' South of Casement Rd. centerline			Tuttle Creek Blvd	Casement	317838	1719774
061M	Destroyed(1995) Disk at Southwest corner of a street inlet box on the South side of Allen Rd. 18.0' South of Allen and A301' West of Sloan St. centerline. At the residence of 705 Allen.	-	-	Sloan	Allen	-	-
062K	Destroyed(1995) Disk at West end of the North headwall of a twin box culvert under Bluemont Ave. A43' North of Bluemont centerline and A62' West of Frontage Rd.	-	-	Frontage	Bluemont	314102	1720811

Bold - Adjusted Elevation - Looped Differential Leveling
Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
063K	Disk at Northwest corner of a concrete landing at the bottom of a concrete stairway. Located on the East side of the old low level pumping station building at the water treatment plant. A106' West of the centerline of the Southbound lanes of Tuttle Creek Blvd, and A29' South of the North water treatment plant entrance road centerline.		<i>1016.31</i>	Tuttle Creek Blvd	Thurston	315902	1720165
064M	Destroyed() Disk in a rock outcropping on the West side of N. Manhattan Ave. A30' West of Manhattan Ave. centerline and A193' South of Baker's Way centerline and directly West of the American Institute of Baking.	-	-	Manhattan	Baker's Way	318665	1715769
065S	Disk at the Southwest corner of a concrete telephone pedestal base, #417G. A27' South of Collins Lane centerline and A31' East of the centerline of the 1st street of Northcrest #2 Mobile Home Park			S. Manhattan	Collins	304195	1714463
066M	Disk set in concrete with rebar 0.5' below ground surface. 2.6' East of the back of curb, 18.2' East of Londondery St. centerline, 9.7' Southwest of center of sanitary sewer manhole, and A398' North of Plymouth Dr.			Londondery	Plymouth	321505	1700737
067M	Destroyed() Disk set in concrete with rebar 0.4' below ground surface. A55' East of Kimball Ave centerline, 6.8' West Southwest of the Northwest corner of Lot 1, 69.1' North Northwest of the PI of Lot 1, Paragon Point Subdivision, and 0.2 miles North of Anderson Ave centerline.	1178.831	1179.24	Kimball	Anderson	-	-
068M	Disk set in concrete with rebar 0.5' below ground surface. 52.1' East of Kimball Ave. centerline, 10.3' West of North-South barb wire fence, and 68.1' South of the PI on the West line of lot 70, Paragon Pointe, Phase III subdivision. A0.6 miles North of Anderson Ave. A78' South of centerline of Berkshire Rd.	1213.476	1213.88	Kimball	Berkshire Cir	318302	1698360

Bold - Adjusted Elevation - Looped Differential Leveling
Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
069T	Disk set in concrete with rebar, 0.5' below ground surface. East of Shop Quick at address of 473 U.S. Highway 24, in the median of Hwy 24, 22.8' South of the Westbound lanes of Hwy 24, and 46.3' East of Frontage Rd. centerline.		<i>1006.92</i>	Frontage	U.S HWY 24	313543	1723427
070T	Destroyed() Disk set in concrete with rebar, 0.6' below ground surface. Southeast corner of Kretchmer and Levee Dr. 21.0' South of Levee centerline and 56.0' East of Kretchmer.	-	-	Kretchmer	Levee	-	-
071T	Disk set in concrete with rebar, 0.7' below ground surface. Southeast of Levee Dr. and Hayes Dr. 22.0' South of Levee Dr. centerline and 63.5' East of Hayes Dr. centerline.			Hayes	Levee	315997	1721932
072S	Disk set in concrete with rebar, 0.6' below ground surface. 46.5' South of S. Manhattan Ave. centerline, 781' South of the South end of the bridge over Wildcat Creek, 26.0' North Northwest of the North side of a power pole, 1.0' East of a North-South barbwire fence, and 0.35 miles South of Fort Riley Blvd.	1009.426	1009.74	S. Manhattan	Pottawatomie	307757	1715695
073S	Disk set in concrete with rebar, 0.5' below ground surface. 27.3' East of S. Manhattan centerline, 5.2' North of a telephone/cable TV pole, 42.8' South of a drive entrance to the East, East of 942 S. Manhattan Ave. and A0.2 miles North of Collins Rd. centerline.			S. Manhattan	Collins	305370	1715802
074M	Disk set in sidewalk. A39' East of College centerline and A65' South of Kimball centerline.	1099.256	1099.66	College	Kimball	320070	1709603
075M	Disk at Southwest corner of street inlet box on Walters Dr. 18.55' East of Walters Dr. centerline and 48.3' South of Butterfield Rd.	1024.41	1024.81	Walters	Butterfield	324586	1717379
076M	Disk at Southwest corner of street inlet box +_15' East of the Wyndham Heights Rd. centerline, Southeast of the entrance of Wyndham Heights subdivision.	1183.075	1183.48	Wyndham Heights Kimball	Anderson	316797	1698104
077M	Disk at center of street inlet box on Pinewood Dr. A17.4' East of Pinewood centerline and A52.3' North of Meadowood Dr. centerline.		<i>1131.65</i>	Pinewood	Meadowood	323486	1704907

Bold - Adjusted Elevation - Looped Differential Leveling
Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
078M	Disk in Southeast corner of concrete street inlet box between 2501 and 2511 Tiana Ter. 38.5' from the center of the cul-de-sac, 74.0 to sanitary sewer manhole between 2510 and 2501 Tiana Ter., 55.7' to water meter of 2511 Tiana Ter., and A240' East of Tamarron Ter.	1086.825	1087.23	Tamarron Ter	Tianna Ter	322430	1708282
079M	Disk in Northeast corner of concrete inlet box between 2608 and 2600 Snowbird Dr. 37.6' to center of cul-de-sac, 58.8' to water valve in street, 44.8' to Water meter of 2600 Snowbird, and A303' East of Hillview centerline.	1097.754	1098.16	Hillview	Snowbird	321129	1708274
080M	Disk at East end of concrete wingwall at Southeast corner of concrete box under St. Matthews Dr. A24.2' Northeast of St. Matthews centerline and A167' Northwest of Hillview centerline.	1073.835	1074.24	St. Matthew	Hillview	322061	1708609
081M	Disk in Northeast corner of concrete street inlet box on Corporate Dr. 25.7' West of Corporate Dr. centerline, 28.7' to sanitary sewer manhole on South side of Corporate Dr. and 70.9' to a Fire Hydrant on the North side of Corporate Dr.			Wildcat Creek	Corporate		
082M	Disk at Southwest corner of a Triple concrete storm box under Vinewood Drive. A39' West of Vinewood centerline and A105.2' South of Willow Grove Rd. centerline.	1082.245	1082.65	Vinewood	Willow Grove	323240	1708136
083M	Disk at East end of South concrete bridge buttress. A26.2' East of College Ave. centerline and A0.16 miles North of Hillview Dr. centerline.	1070.424	1070.83	College	Hillview	322788	1709554
084M	Disk on West end of North concrete wingwall on the East side of a triple concrete box under Casement Rd. A15.6' East of Casement centerline and A64.5' North of Brookmont Dr. centerline.	1018.761	1019.17	Casement	Brookmont	323286	1721048
085M	Disk at center of South headwall of a concrete box under Anderson Ave. A59.0' South of Anderson centerline and A280' West of Scenic Dr.	1077.437	1077.84	Scenic Dr. Kimball Ave	Anderson	315673	1697155

Bold - Adjusted Elevation - Looped Differential Leveling
Italics - GPS Survey Elevations

BM# City	Benchmark Location	Elevation		Street		Coordinates(NAD 83)	
		(ft)NGVD 29	(ft) NAVD 88	North-South	East-West	Northing	Easting
086M	Disk in concrete retaining wall A1' East of the Northeast corner of a concrete golf cart tunnel under Grandmere Pky. A37.6' North of Grandmere Pky. centerline and A381.5' East of Heartland Dr.	1245.446	1245.85	Heartland Dr.	Grandmere Pky	320133	1696626

Bold - Adjusted Elevation - Looped Differential Leveling
Italics - GPS Survey Elevations

Non City BM		Elevation		Street		Coordinates(NAD 83)	
BM #	Location	(ft)NGVD 29	(ft) NAVD 88	N-S Street	E-W Street	Northing	Easting
USGS							
Y-111	3" Brass disk in concrete monument. 30' North of Marlatt Rd CL and +_660' East of Potomac Rd. (Destroyed 2005)	1030.346	1030.75	Tuttle Creek Blvd	Marlatt	325650	1716200
FF-115	3" Brass disk in concrete retaining wall on the West side of the North doors to the Federal Building at 4th and Houston.	1018.413	1018.88	4th	Houston	310923	1719940
C-370	Steel rod under protective cap. Intersection of Yuma and 16th street. 89' west of 16th street centerline and 44' North of Yuma centerline.	1025.323	1025.64	N. Manhattan	Yuma	309863	1714312
D-115	Disk in concrete monument. 13' South of South curb of Vattier street and 33' West of West curb of N. Manhattan Ave.	1026.865	1027.36	N. Manhattan	Vattier	314385	1715759
K-263	3" brass disk in rail bridge abutment +_100' Southeast of Fort Riley Blvd. In the top of the Southeast end of the Southwest Abutment.	1027.252	1027.64	Poliska	Fort Riley Blvd	307745	1710998
R-114	Disk in wall of Riley county court house. .5' east of the south entrance to the court house set vertically in the wall.	1020.36	1020.82	5th	Poyntz	311292	1719655
P-370	Steel rod under protective cap. +_25 miles west of the intersection of K-18/K-113 and +_75' north of the center of the west bound lanes of K-18.	1120.37	1121.12	K-113	K-18	307455	1706841
Q-370	.55 mile east of train station and 57.1' SE of near rail and 3.3 ft SW od fence corner.	1008.48	1009.15	K-177	Fort Riley Blvd	312348	1722473
N-370	127' South of the E bound lane of Ft Riley Blvd, 53.8' West of Stagg Hill Rd centerline, and 30.7' N of a paved road.	1027.27	1027.95	W. end of Stagg Hill	Fort Riley Blvd	303218	1701890
B-338	Destroyed	1020.88	1021.24				
MMA-2	Disk at the Manhattan Airport 18.6' North of the West corner of the old rock hanger.	1042.65	1043.13	Airport Rd	K-18	296632	1691082
M-370	Steel Rod under protective cap. .1 mile southeast of K-18 on Wildcat Creek Rd. 45' East of railroad track		1041.33	Wildcat Creek Rd	K-18	293416	1688816
G-370	3" Brass disk on the north end of the west abutment of the railroad bridge across the Big Blue River just south of the US-24 bridge		<i>1008.01</i>	Levee Dr.	US-24	315829	1726941

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Italics - GPS Survey Elevations

Non City BM		Elevation		Street		Coordinates(NAD 83)	
BM #	Location	(ft)NGVD 29	(ft) NAVD 88	N-S Street	E-W Street	Northing	Easting
KSU							
D-338	Disk in concrete monument Northeast of Goodnow Hall. 118' South of Claflin centerline and 71' West of Denison centerline.	1084.11	1084.58	Denison	Claflin	316107	1713149
C-338	Disk in concrete monument North of Moore Hall. 156' South of Claflin and 79' East Northeast of the Northwest corner of the Hall and 21.5' North of the North side of the Hall.	1065.11	1065.58	N. Manhattan	Claflin	316890	1715182
KSU	South of Seaton Hall	1065.14	1065.61	17th	Mid Campus	314449	1714565
C-115	East of Fairchild Hall	1074.62	1075.09	Mid Campus	Vattier	314744	1714009
Reset							

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Italics - GPS Survey Elevations