FINAL SURVEY REPORT

FLIN FLON 3D

April 2007

Scout Inc. Hobo Explorations

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Flin Flon 3D

Program Information

Client:	Hudson Bay Mining and Smelting
Area:	Flin Flon , Manitoba
Program Name:	Flin Flon 3D
Geophysical Company:	Kinetex Geophysical
Front End Company:	Scout Inc.
Survey Company:	Hobo Exploration
Survey Date:	May 2007

Intervals:	Receiver= 25 Meter Source = 50 Meter
Source Type(s):	1) Drill mounted on Backhoe 2)Heliportable Drills 3) Hand Drills 4) Vibrosis Determined by terrain and access.
Survey System:	1) Leica 500 Series GPS Base 2) Leica 1200 Series GPS Rover Packs 2) Pacific Crest Radios
Survey Processing:	1) Leica Geo Office 2) GPSeismic Software 3) OziExplorer Mapping Software
Survey Datum:	1) UTM NAD83 Zone 14N 2) HT2_0.byn Geoid Transformation

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Survey Methodology

An initial scout of the program including mapping of access and exclusion zone estimations, listed are initial scout findings.

Type	Solid rock/Open	41 Kms
	Muskeg	5 Kms
	Treed areas	42 Kms
	Open water.	10 Kms
	Town	55 Kms

Estimates: Combined source and receiver.

Comments:

a) East and north areas of program mostly treed. Mixture of spruce and aspen.
b) West portion outcrop. Rolling . Little vegetation. Minesite.
c) South portion encompasses Townsite. Narrow streets. Buildings.
d) Muskeg areas. Creeks.
e) Definitely walking hazards. Slips and falls.
f) Snow deep in crevices. Melting daily.
g) Some cliffs and rock ledges.

In order to scout timbered areas in the northern portion of the program, preflagging was done using Garmin Handheld GPS units and compasses. Preflagers mapped areas for access and checked ground conditions for equipment .

Crews then began handcutting the lines for access.

Trimble GPS Equipment mounted on tripods collected Raw Static GPS Data. Placed on known control points as well as establishing unknown points to be used later.

A Leica 500 GPS Base Station and Leica 1200 Series Rover Packs were used to collect the Survey Data. In timbered areas, 7.5 meter survey rods were used to elevate the antennas above the canopy for good satellite and radio reception.

Base2 was use to survey the program. A repeater was utilize in northern portion.

Preplot files uploaded to Leica 1200 GPS and points were placed in stakeout mode by Rover Pack Operators who marked the point, orange for source and blue for receiver.

The Survey Data was then Processed for errors and survey quality.

When all Seismic Lines were surveyed and processed the final point information is output in Seg P1 format for Processing of the Seismic Data.

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Preplot Begin and End Point Summary

Line#	BOL	EOL	#Pts	#Kms
R-101	101137	101245	109	2.70
R-103	103137	103245	109	2.70
R-105	105137	105245	109	2.70
R-107	107137	107245	109	2.70
R-109	109137	109245	109	2.70
R-111	111101	111245	145	3.60
R-113	113101	113245	145	3.60
R-115	115101	115245	145	3.60
R-117	117101	117245	145	3.60
R-119	119101	119245	145	3.60
R-121	121101	121245	145	3.60
R-123	123101	123245	145	3.60
R-125	125101	125245	145	3.60
R-127	127101	127281	181	4.50
R-129	129101	129281	181	4.50
R-131	131101	131281	181	4.50
R-133	133101	133281	181	4.50
R-135	135101	135281	181	4.50
R-137	137101	137281	181	4.50
R-139	139101	139281	181	4.50
R-141	141101	141281	181	4.50
R-143	143101	143281	181	4.50
R-145	145101	145281	181	4.50
Totals			3515	87.85

Receiver	87.85 Km
Source	59.60 Km
	147.45 Km

Line#	BOL	EOL	#Pts	#Kms
S-102	102121	102189	69	3.40
S-104	104121	104189	69	3.40
S-106	106121	106189	69	3.40
S-108	108101	108189	89	4.40
S-110	110101	110189	89	4.40
S-112	112101	112189	89	4.40
S-114	114101	114189	89	4.40
S-116	116101	116189	89	4.40
S-118	118101	118189	89	4.40
S-120	120101	120189	89	4.40
S-122	122101	122189	89	4.40
S-124	124101	124189	89	4.40
S-126	126101	126189	89	4.40
S-128	128153	128189	37	1.80
S-130	130153	130189	37	1.80
S-132	132153	132189	37	1.80
Totals			1208	59.60

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Postplot Begin and End Point Summary

Line#	BOL	EOL	#Pts	#Kms
R-101	101137	101245	109	2.70
R-103	103137	103245	109	2.70
R-105	105137	105245	109	2.70
R-107	107137	107245	109	2.70
R-109	109137	109245	109	2.70
R-111	111114	111245	132	3.28
R-113	113113	113177	65	1.60
R-113	113183	113243	61	1.50
R-115	115101	115174	74	1.83
R-115	115184	115245	62	1.53
R-117	117101	117174	74	1.83
R-117	117181	117245	65	1.60
R-119	119101	119177	77	1.90
R-119	119182	119245	64	1.58
R-121	121101	121124	24	0.58
R-121	121140	121148	9	0.20
R-121	121152	121245	94	2.33
R-123	123101	123122	22	0.53
R-123	123142	123148	7	0.15
R-123	123154	123245	92	2.28
R-125	125101	125127	27	0.65
R-125	125139	125143	5	0.10
R-125	125163	125245	83	2.05
R-127	127099	127131	33	0.80
R-127	127143	127147	5	0.10
R-127	127168	127281	114	2.83
R-129	129101	129108	8	0.18
R-129	129113	129119	7	0.15
R-129	129143	129148	6	0.13
R-129	129165	129281	117	2.90
R-131	131101	131106	6	0.13
R-131	131111	131120	10	0.23
R-131	131142	131148	7	0.15
R-131	131185	131206	22	0.53
R-131	131210	131281	72	1.78
R-133	133101	133106	6	0.13
R-133	133111	133122	12	0.28
R-133	133148	133154	7	0.15
R-133	133185	133209	25	0.60
R-133	133223	133227	5	0.10
R-133	133243	133281	39	0.95
R-135	135101	135127	27	0.65
R-135	135226	135281	56	1.38
R-137	137101	137132	32	0.78
R-137	137233	137281	49	1.20
R-139	139101	139133	33	0.80
R-139	139236	139281	46	1.13
R-141	141101	141135	35	0.85
R-141	141235	141239	5	0.10
R-141	141245	141281	37	0.90
R-143	143101	143124	24	0.58
R-143	143131	143162	32	0.78
R-143	143232	143236	5	0.10
R-143	143243	143281	39	0.95
R-145	145101	145164	64	1.58
R-145	145239	145281	43	1.05
Totals			2610	63.85

Receiver	63.85 Km
Source	59.20 Km
	123.05 Km

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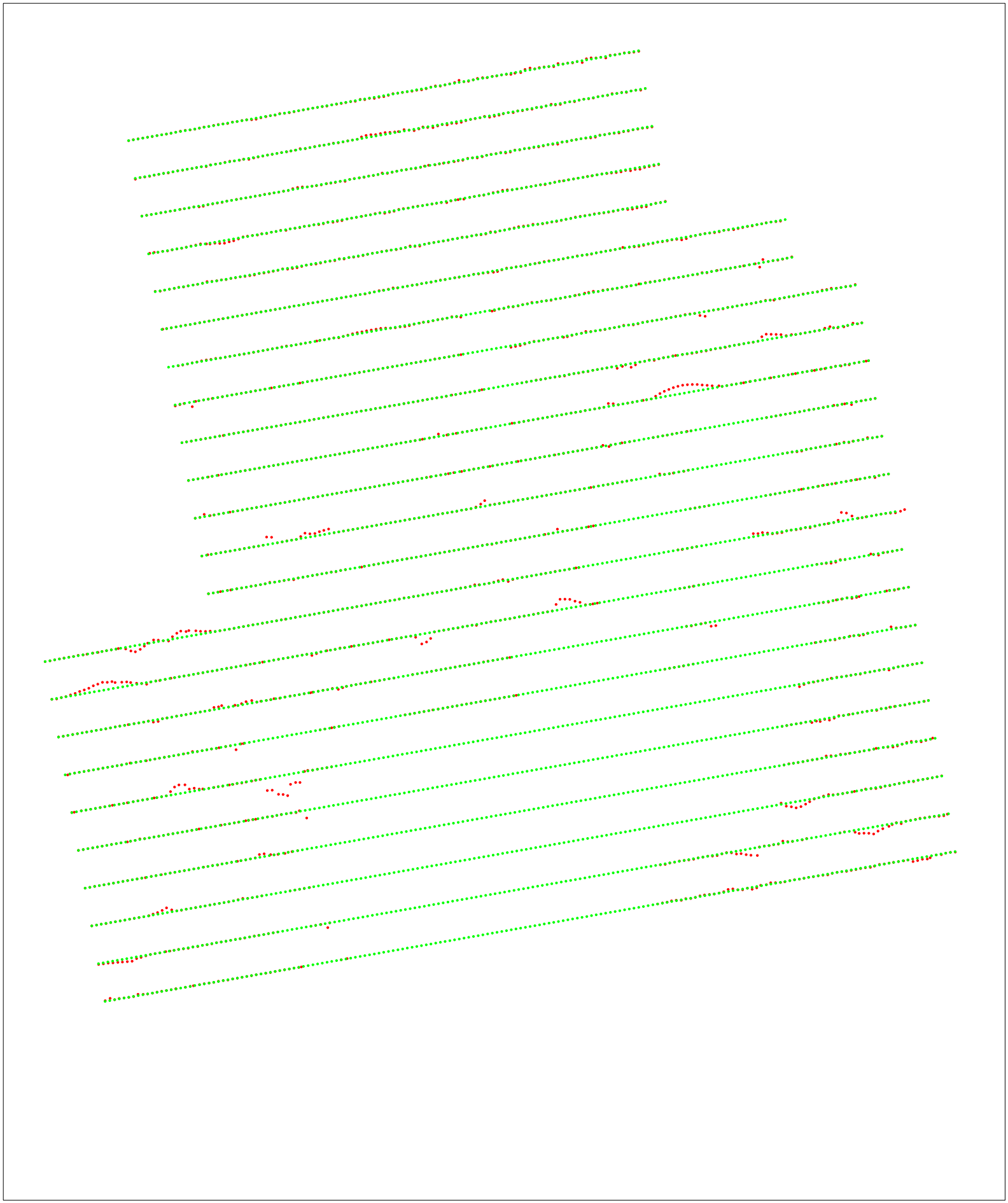
Postplot Begin and End Point Summary

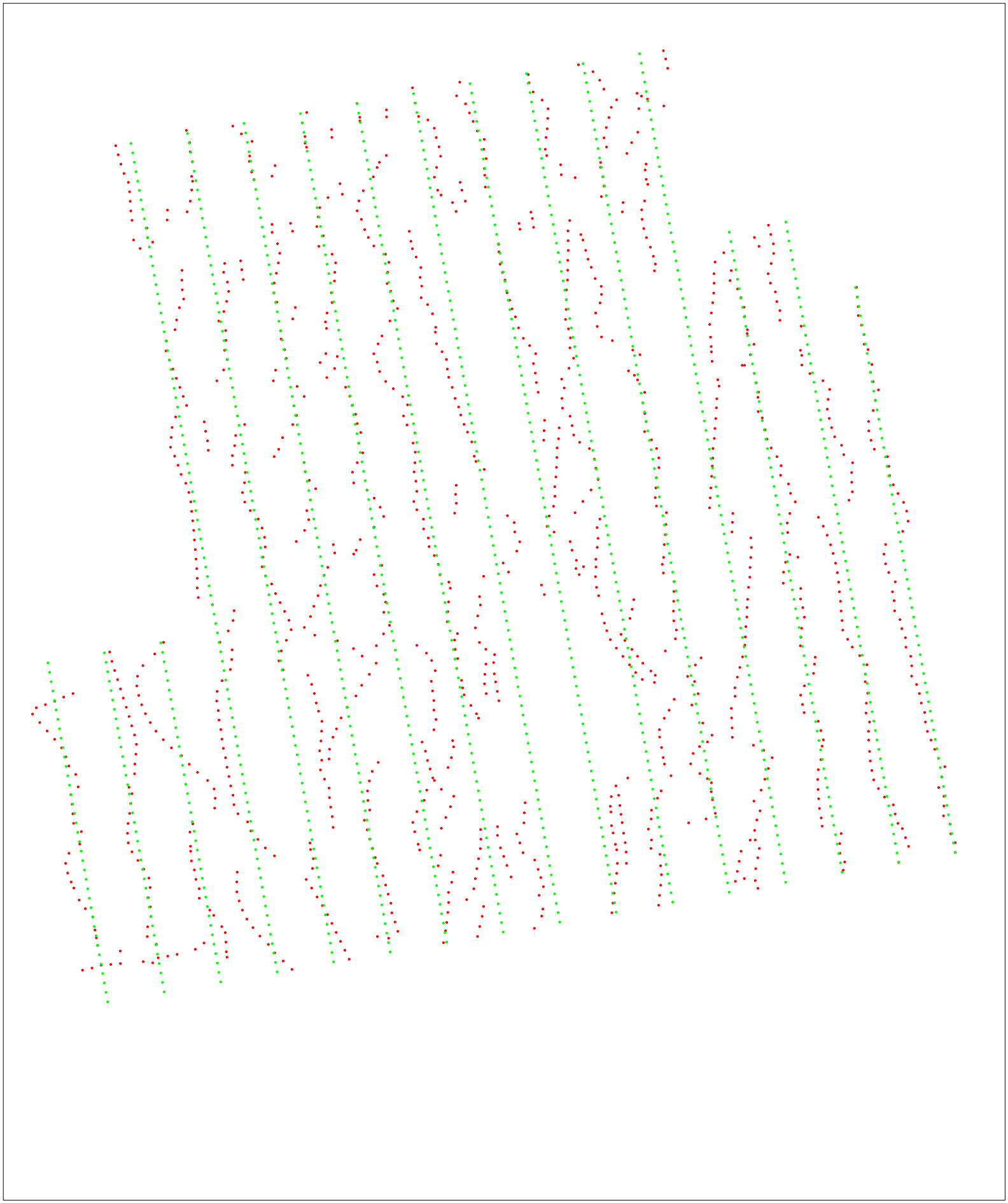
Line#	BOL	EOL	#Pts	#Kms
S-102	102129	102189	61	3.00
S-104	104121	104189	69	3.40
S-106	106121	106189	69	3.40
S-108	108101	108189	89	4.40
S-110	110101	110189	89	4.40
S-112	112101	112189	89	4.40
S-114	114101	114189	89	4.40
S-116	116101	116189	89	4.40
S-118	118101	118189	89	4.40
S-120	120101	120189	89	4.40
S-122	122101	122189	89	4.40
S-124	124101	124189	89	4.40
S-126	126101	126189	89	4.40
S-128	128153	128189	37	1.80
S-130	130153	130189	37	1.80
S-132	132153	132189	37	1.80
Totals			1200	59.20

Receiver Preplot vs Postplot



Green= Preplot Red=Postplot

Source Preplot vs Postplot



Green= Preplot Red= Postplot

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Control Results

Local survey monuments were occupied and base locations established using Trimble GPS equipment.

The following pages summarize the Control Results. Raw Data files are supplied on Compact Disc.

Any Control done using Leica was converted to Rinex and processed using Trimble Geomatics Office.

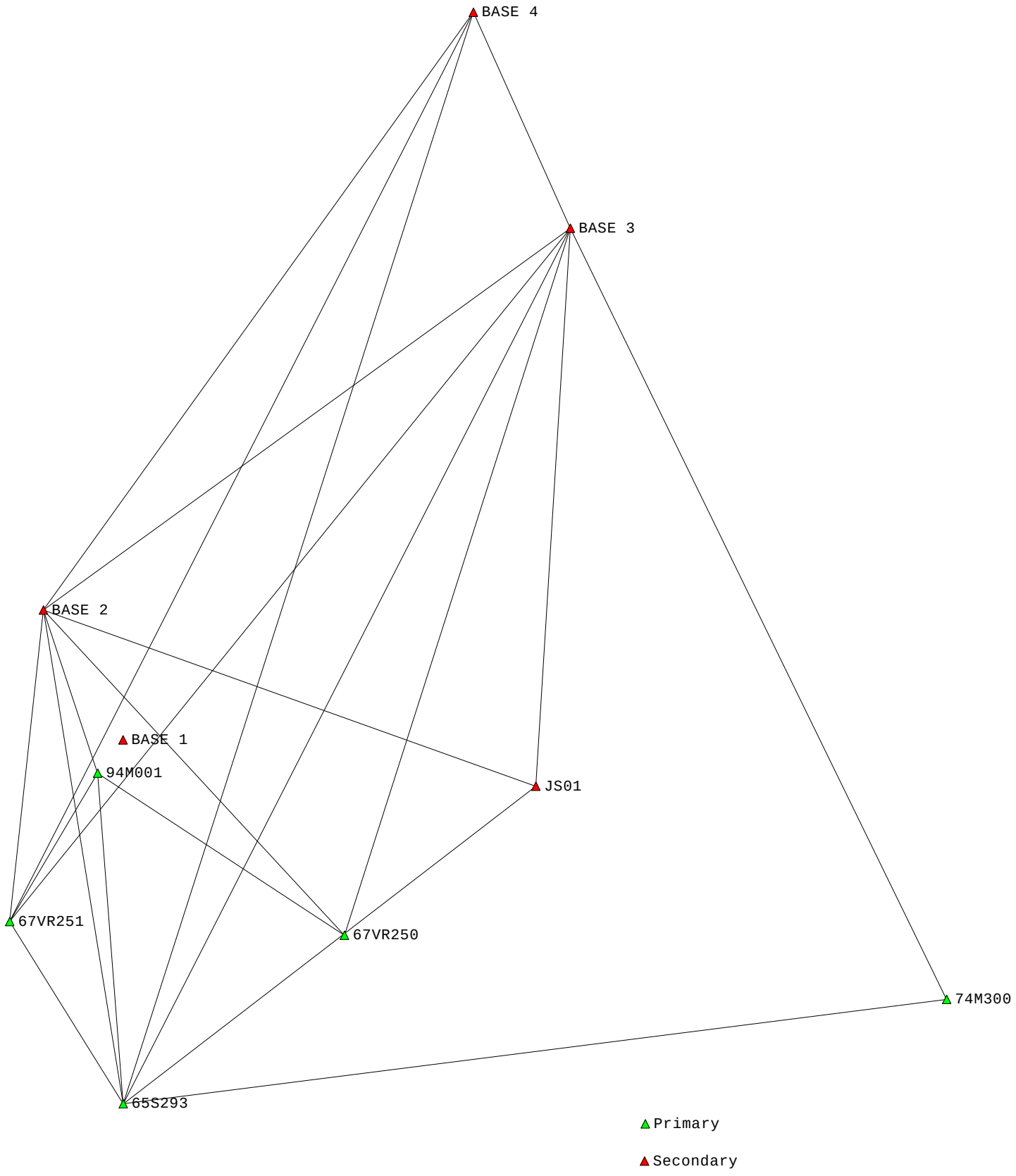
SUMMARY OF GPS OBSERVATIONS

Station	Northing (14N)	Easting (14N)	ortho.	Latiude (Nad83)	Longitude (Nad83)	Ellip. (HT_2)
65S293	6071302.692	314918.614	333.231	54°45'17.31480"N	101°52'34.36350"W	302.612
67VR250	6072122.319	315994.026	309.546	54°45'45.22032"N	101°51'36.15156"W	278.900
67VR251	6072189.274	314366.281	320.531	54°45'45.22811"N	101°53'07.25909"W	289.904
74M300	6071810.315	318922.207	321.522	54°45'38.96856"N	101°48'51.82517"W	290.845
94M001	6072984.941	314794.079	344.965	54°46'11.50566"N	101°52'45.18143"W	314.317
BASE1	6073022.610	314822.617	341.279	54°46'12.76070"N	101°52'43.67300"W	310.630
BASE2	6073703.807	314530.515	339.079	54°46'34.38309"N	101°53'01.56441"W	308.422
BASE3	6075559.525	317092.507	309.732	54°47'37.72879"N	101°50'42.56782"W	279.023
BASE4	6076610.031	316621.168	309.084	54°48'11.05356"N	101°51'11.31821"W	278.365
JS01	6072847.080	316924.562	312.101	54°46'09.86292"N	101°50'45.79906"W	281.432

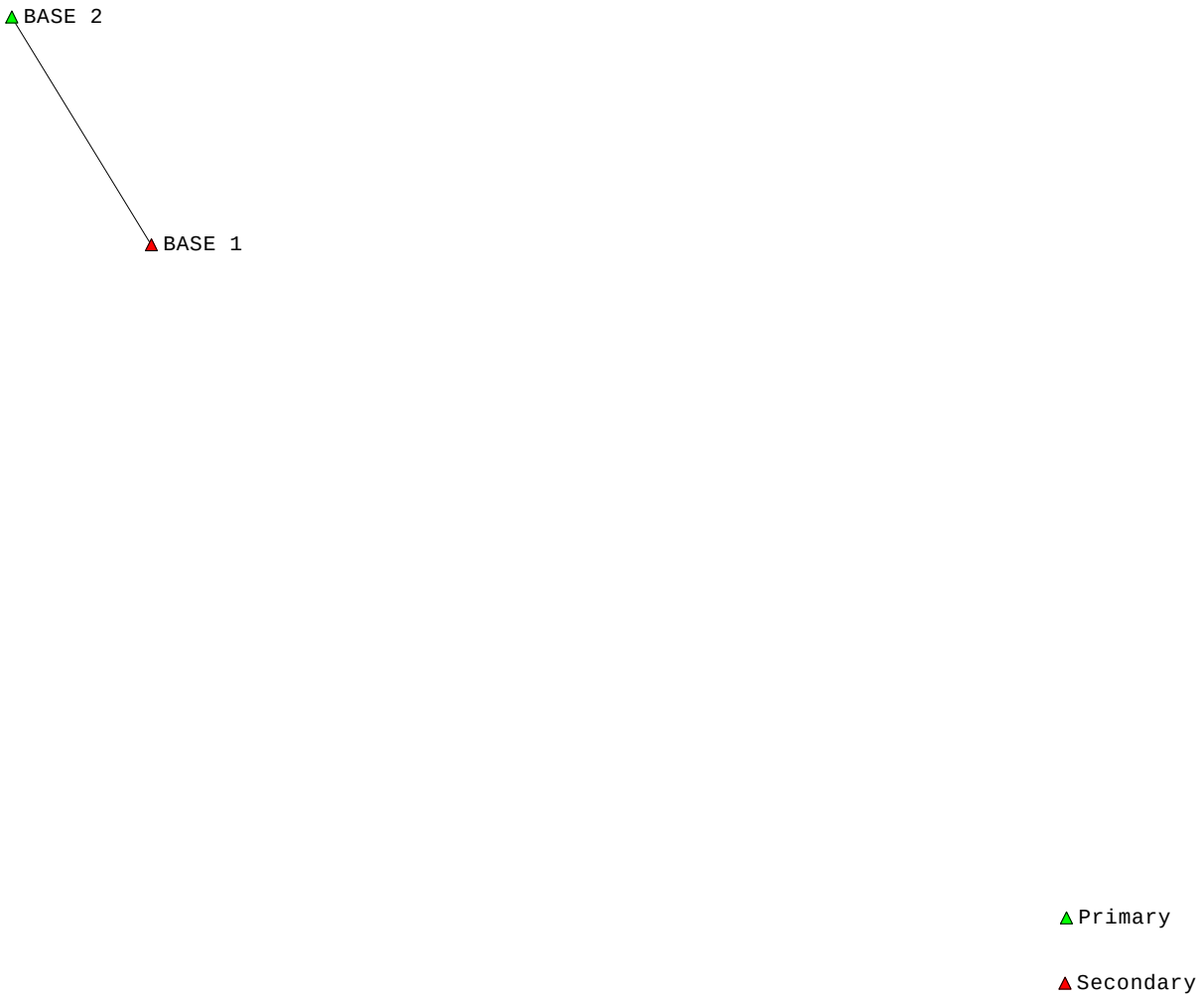
CLOSURE

	Station	Northing (14N)	Easting (14N)	ortho.	Latiude (Nad83)	Longitude (Nad83)	Ellip. (HT_2)	
	65S293	6071302.692	314918.614	333.231	54°45'17.31480"N	101°52'34.36350"W	302.612	T/O
observed	67VR250	6072122.319	315994.026	309.546	54°45'45.22032"N	101°51'36.15156"W	278.900	
published	67VR251	6072122.390	315994.220	304.800				
delta		-0.071	-0.194					
observed	67VR251	6072189.274	314366.281	320.531	54°45'45.22811"N	101°53'07.25909"W	289.904	
published	67VR252	6072189.350	314366.470	320.788				
delta		-0.076	-0.189	-0.257				
observed	74M300	6071810.315	318922.207	321.526	54°45'38.96856"N	101°48'51.82517"W	290.845	
published				321.522				
delta				0.004				
observed	94M001	6072984.941	314794.079	344.965	54°46'11.50566"N	101°52'45.18143"W	314.317	
published								

Flin Flon Control Loop Sketch



Flin Flon Control Loop Sketch



SITE IDENTIFICATION

Unique Number : 65S293
Name : 65S293
Established By : Geodetic Survey Division
Province : SK
Prov. Identifier : None
NTS Map No : 063K13

STATION COORDINATES

Horizontal Datum : NAD83CSRS
Method : Global Positioning System
Latitude : N54 45' 17.3148 0.001 m Std Dev. (68% confidence level)
Longitude : W101 52' 34.3635 0.001 m Std Dev. (68% confidence level)
Ellipsoidal Height : 302.61 m 0.008 m Std Dev. (68% confidence level)
Geoid Separation (HTv2.0) : -30.619 m
Agency : Geodetic Survey Division
Adjustment Net : M01707
Epoch : 1997
UTM : Zone = 14 N = 6071302.69 m E = 314918.61 m
XYZ Coords.: = X = -759207.69 m Y = -3610126.42 m Z = 5185927.16 m

VERTICAL DATA

Vertical Datum : CGVD28
Elevation : 333.231 m
Order : First Order
Method : Differential
Adjustment Line : VA330
Published Year : 1965

STATION MARKER INFORMATION AND LOCATION

Marker Type : Brass/Bronze Tablet Or Cap
Inspected in : 1994
Status : Good
Inspection Comments : No inspection text on file

Accessible by passenger car or light truck and a walk of less than 50 m

CREIGHTON

LARGE ROCK OUTCROP ON SOUTH SIDE OF HIGHWAY NO. 167 (MANITOBA HIGHWAY NO. 10) AT JUNCTION WITH PAVED ACCESS ROAD TO PHANTOM LAKE, 1.4 KM EAST OF JUNCTION WITH HIGHWAY NO. 106, TABLET IN TOP OF OUTCROP, 77 M FROM CENTRE LINE OF HIGHWAY, 27.1 M EAST OF CENTRE LINE OF ACCESS ROAD, 11.6 M EAST OF TELEPHONE POLE AND 9.1 M NORTH OF TELEPHONE LINE, 1 M ABOVE ACCESS ROAD LEVEL, 3 M ABOVE HIGHWAY LEVEL.

HISTORICAL COORDINATES NOTE: Coordinates listed below are no longer maintained by GSD and should be verified with your provincial agency before use.
Horizontal Datum : NAD83
Method : Gps - Low Accuracy (10 M)
Latitude : N54 45' 17.50000
Longitude : W101 52' 34.70000
UTM : Zone = 14 N = 6071308.661 m E = 314912.835 m

PROJECTS IDENTIFIERS:
54101 VA330 GPS

SITE IDENTIFICATION

Unique Number : 74M300
Name : 74M300
Established By : Geodetic Survey Division
Province : MB
Prov. Identifier : None
NTS Map No : 063K13

STATION COORDINATES

Horizontal Datum : NAD83
Method : Values should be checked with provincial agency
Latitude : N54 45' 39.10000
Longitude : W101 48' 52.10000
Agency : Geodetic Survey Division
Adjustment Net : PVC9483
UTM : Zone = 14 N = 6071814.573 m E = 318917.459 m

VERTICAL DATA

Vertical Datum : CGVD28
Elevation : 321.522 m
Order : First Order
Method : Differential
Adjustment Line : VA185
Published Year : 1974
Inspected in : 1994
Status : Good
Inspection Comments : No inspection text on file

Accessible by passenger car or light truck and a walk of less than 50 m

FLIN FLON

ROCK OUTCROP ON NORTHEAST SIDE OF HIGHWAY NO. 10, 1.7 KM SOUTHEAST OF JUNCTION WITH HIGHWAY NO. 10A, 0.9 KM NORTHWEST OF JUNCTION WITH HIGHWAY NO. 291, TABLET IN TOP OF OUTCROP, 66.9 M SOUTHEAST OF "CITY OF FLIN FLON" SIGN FOR WESTBOUND TRAFFIC, OPPOSITE POINT ON HIGHWAY 65 M NORTHWEST OF TWIN DEFLECTION POWER POLES, 26.1 M FROM CENTRE LINE OF HIGHWAY, 22.9 M SOUTHEAST OF PROJECTION OF CENTRE OF 1 M STEEL CULVERT, 21.1 M SOUTHWEST OF CENTRE LINE OF OLD HIGHWAY, 1 M ABOVE HIGHWAY LEVEL.

HISTORICAL COORDINATES NOTE: Coordinates listed below are no longer maintained by GSD and should be verified with your provincial agency before use.

Horizontal Datum : NAD83
Method : Gps - Low Accuracy (10 M)
Latitude : N54 45' 39.10000
Longitude : W101 48' 52.10000
UTM : Zone = 14 N = 6071814.573 m E = 318917.459 m

PROJECTS IDENTIFIERS:
54101 VA185

Station 3 of 3

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SITE IDENTIFICATION

Unique Number : 94M001
Name : 94M001
Established By : Geodetic Survey Division
Province : MB
Prov. Identifier : None
NTS Map No : 063K13

STATION COORDINATES

Horizontal Datum : NAD83
Method : Values should be checked with provincial agency
Latitude : N54 46' 11.50000
Longitude : W101 52' 45.10000
Agency : Geodetic Survey Division
Adjustment Net : PVC9483
UTM : Zone = 14 N = 6072984.706 m E = 314795.526 m

VERTICAL DATA

None
Inspected in : 1994
Status : Good
Inspection Comments : No inspection text on file

Accessible by passenger car or light truck and a walk of less than 50 m

FLIN FLON

ROCK OUTCROP ON WEST SIDE OF HIGHWAY NO. 10, 1.9 KM SOUTHWEST OF CNR OVERPASS, 0.2 KM NORTH OF JUNCTION WITH HIGHWAY NO. 10A (FIRST AVENUE), TABLET IN TOP OF OUTCROP, 22.3 M FROM CENTRE LINE OF HIGHWAY, 16.8 M NORTH AND 10.9 M WEST OF POWER POLE BEARING TRANSFORMER NO. 2072 AND TWIN GUY WIRES, 9.4 M NORTH OF CHAIN LINK FENCE, 1 M ABOVE HIGHWAY LEVEL.

HISTORICAL COORDINATES NOTE: Coordinates listed below are no longer maintained by GSD and should be verified with your provincial agency before use.

Horizontal Datum : NAD83
Method : Gps - Low Accuracy (10 M)
Latitude : N54 46' 11.50000
Longitude : W101 52' 45.10000
UTM : Zone = 14 N = 6072984.706 m E = 314795.526 m

PROJECTS IDENTIFIERS:

NAD83(CSRS) Datum

Name:	MON.D_67VR251	Monument Type:	pbo Setting: 01	Unique Number:	**91V130**
Latitude:	**54 45 45.23070**	Longitude:	**101 53 7.24869**	Accuracy:	0.180m
UTM Coordinates:	N 6072189.35	E 314366.47	Zone 14	Horizontal Datum:	NAD83(CSRS)
Orthometric Ht:	**320.788**	Vertical Datum:	CGVD29	Accuracy Class:	Y Method: 8
Geoid Sep:	**-30.627**	Geoid Model:	HT2_0	Based on:	CGG2000

Description:
Station is located southwest of the town of Creighton on large rock hill approximately 20 metres south of the centre line of road allowance. Monument is a Manitoba-Sask boundary marker approximately 5 m above road level

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Name:	MON.C	Monument Type:	pbo Setting: 00	Unique Number:	**67VR250**
Latitude:	**54 45 45.22295**	Longitude:	**101 51 36.14120**	Accuracy:	0.214m
UTM Coordinates:	N 6072122.39	E 315994.22	Zone 14	Horizontal Datum:	NAD83(CSRS)
Orthometric Ht:	**304.800**	Vertical Datum:	CGVD29	Accuracy Class:	Y Method: Y
Geoid Sep:	**-30.646**	Geoid Model:	HT2_0	Based on:	CGG2000

Description:
Manitoba Saskatchewan boundary monument number C.

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Statistics

	Total	Percentage
Total No.of points	4691	100%
RTK Surveyed	3810	81%
Interpolated	0	0%
Code	2	0.1%
Phase	3808	99.9%
Autonomous	0	0%
No. of Source points	1200	100%
Shotpoints	86	7%
No Holes	1114	93%
Skids	245	20%
Offsets	869	72%
No Recovery	0	0%

Flin Flon 3D

Re-Occupation Results

Used	Check	Tie North	Tie East	Tie Height
101150	101150	-0.01	0.12	0.01
101191	101191	2.18	-0.31	0.23
103164	103164	-0.22	1.63	-0.19
103181	103181	-1.07	-0.25	0.46
104157	104157	-1.70	-0.78	0.05
105149	105149	-0.71	-0.63	0.17
105167	105167	0.70	-0.26	0.10
105224	105224	0.40	-0.32	0.09
109158	109158	-0.09	0.53	-0.02
110117	110117	0.30	1.09	0.30
110140	110140	0.84	0.70	-0.02
111127	111127	-0.22	0.11	0.40
114105	114105	-2.63	4.77	0.06
115130	115130	-1.28	0.56	0.27
115152	115152	1.80	-0.38	0.21
115241	115241	-0.05	0.22	0.12
118109	118109	-1.24	-1.10	0.62
119182	119182	0.07	-0.05	0.01
119209	119209	0.03	0.10	-0.18
120102	120102	-0.61	0.08	0.09
121160	121160	0.14	-0.31	-0.21
121209	121209	-0.16	0.16	-0.15
121235	121235	0.77	0.30	-0.23
124119	124119	0.45	0.40	0.05
125179	125179	-0.24	-0.04	0.09
125207	125207	0.87	-0.18	0.05
125240	125240	-0.01	0.04	-0.49
126149	126149	0.17	1.37	0.49
127195	127195	0.11	-0.47	0.01
127209	127209	0.10	0.13	-0.03
127230	127230	0.21	0.62	0.15
127240	127240	-0.02	-0.77	-0.05
128163	128163	0.13	-0.67	0.40
129233	129233	0.06	0.07	0.00
141119	141119	-0.30	-0.39	-0.04
143247	143247	0.17	1.19	-0.01

Flin Flon 3D

Survey Tie Points

RTK Observation Ties From Base 2

Height Transformations HT2_0.byn

BASE03 Published	Nad83 UTM Zone 14N	RTK	BASE3	TIE	BASE3	TIE	BASE3	TIE	BASE3	TIE
Northing	6075559.53		6075559.6	0.075	6075559.5	-0.025	6075559.6	0.075	6075559.5	-0.025
Easting	317092.507		317092.5	-0.007	317092.5	-0.007	317092.5	-0.007	317092.6	0.093
Orthometric Height	309.73		309.7	-0.032	309.7	-0.032	309.7	-0.032	309.4	-0.332

BASE04 Published	Nad83 UTM Zone 14N	RTK	BASE4	TIE	BASE4	TIE	BASE4	TIE	BASE4	TIE
Northing	6076610.03		6076610.0	-0.031	6076610.0	-0.031	6076610.0	-0.031	6076610.0	-0.031
Easting	316621.168		316621.2	0.032	316621.1	-0.068	316621.2	0.032	316621.1	-0.068
Orthometric Height	309.08		309.1	0.016	309.0	-0.084	309.0	-0.084	309.1	0.016

94M001 Published	Nad83 UTM Zone 14N	RTK	94M001	TIE
Northing	6072984.71		6072985.0	0.294
Easting	314795.526		314794.0	-1.526
Orthometric Height	None		345.0	NA

Summary

Wet area around Ross Creek.

Ross Lake

Northern portion of Program.

Summary

Existing trail.

Outcrop.

Summary

Timbered areas.

Hudson Bay Mining and Smelting.
Smoke Stack

Tailings Dam

Summary

Town of Flin Flon
Line# 2

Overhead power lines.

Minesite Area.

Summary

Backhoe Drill