Field Notes - Critical to the Success of Cadastral Surveys - the 'Eyes and Ears' of the Project Survey

The emphasis on preparing good field notes of survey cannot be over emphasized. We all rely on the notes of the current and previous generation of surveyors to help us in our work. The future generations will need to rely on ours.

Field notes are the ***primary*** documentation of the survey from which a plan is prepared. The fact that we now put more information on our survey plans, including the evidence held for the boundaries, is not a substitute or a rational for not making good field notes.

The need and requirement to prepare field notes has not substantially changed with the introduction of electronic data collection. The angles, distances and coordinates may now be electronically collected but they continue to form part of and must be preserved with the field note records.

- Field notes are the best way to communicate to the office staff who prepare the final plan, exactly what was done and found in the field. Verbal communications or trying to decipher the method of survey from the raw data file are poor substitutes and far more prone to error.
- Field notes should contain a level of detail that will not be illustrated on the plan. The plan is primarily a communication to the client and others, to illustrate the subject property, its dimensions, the man-made and natural features, the evidence held to determine the boundaries, etc. In addition to what the plan illustrates, the field notes may contain more subtle aspects of the site occupation, the conflicting evidence, the age and condition of monuments, etc. Additionally, the notes can contain useful information to assist the company with future surveys such as sidewalk ties to monuments, their relation to grade or ties to monuments that are buried and difficult to locate.
- Field notes done with skill and care become an asset to a survey company.
- Good field notes are of vital importance to time sensitive surveys such as building stake-outs. The supervising surveyor may need to review the field survey the same day because the foundation construction is proceeding on the next day after the stake-out. Notes that clearly illustrate how the survey was done and what check measurements were made, allow the supervising surveyor to quickly evaluate the work and if there is any doubt, get the crew back onto the site or call the client and have them hold off their construction.
- Good field notes are an essential aid in resolving boundary conflicts and are of great value as supporting evidence in a court case. Clear notes as to what was found and relied upon; how measurements were made or whether check measurements were made greatly assist in resolving these disputes.
- Field notes tend to set the 'tone' - the standard for the rest of the work. Where you find good quality field survey notes, you usually also find good quality surveys.

One of the most important functions of a survey is to relate the physical occupation to the theoretical boundaries. The field notes should always include the location of physical occupation in the immediate vicinity of the boundaries being surveyed. Waterways, natural or manmade should be tied in where they cross boundaries. The width, water depth and general characteristics of streams, rivers, lakes, etc. that are close to, cross over or form the limit of a boundary under survey should always be tied in and noted.

Field Notes – Branches of Surveying

As noted further in this Guideline, Section 15 of O. Reg. 216/10 under the Surveyors Act requires field notes to be prepared for 'each survey' but the term 'survey' is not defined in the regulation except with regard to the use of the word on 'plans'.

O. Reg. 216/10, s. 16

Plans

Use of word "survey"

16. *The word "survey" and its equivalent in any other language shall not be used in the title of any plan unless the plan has been prepared from a survey of land made for the purpose of establishing, locating, defining or describing any line, boundary, or corner of a parcel of land, or land covered with water.*

The terms "cadastral survey", "geodetic surveying", "hydrographic surveying" and "photogrammetric surveying" are all defined in the regulation and the term 'survey' is used or implied with regard to these branches of surveying.

From both a historical and current regulatory perspective, it is **necessary** for Ontario Land Surveyors to prepare and keep field notes for all cadastral surveys and it is the recommendation of this Guideline that Ontario Land Surveyors prepare and keep appropriate field notes when undertaking ALL types of surveys.

This Guideline focuses on the field notes that must be prepared for cadastral survey including the use of newer measurement technologies such as total stations, GNSS, Drones, land based and aerial LiDAR, photogrammetry, etc. The field notes for non-cadastral surveys may be patterned on these requirements, modified to suit the purposes of those surveys.

Field Notes – Statutory Requirements

Section 4 of the Surveys Act

Duty to keep field notes, etc.

4 (2) Every surveyor shall make and preserve exact and regular survey records and shall index all such survey records and shall exhibit or give copies of the same to any surveyor for a reasonable charge.

AOLS By-Law 2012-04

Exchange of Survey Records

WHEREAS Section 4 (1) of the Surveys Act requires "Every surveyor shall make and preserve exact and regular field notes of all his or her surveys and shall keep a proper record and index of all such field notes and shall exhibit or give copies of the same to any surveyor for a reasonable charge."; and

WHEREAS Bulletin 2007-01 outlines the AOLS Policy Regarding the Exchange of Cadastral Survey Records; and

WHEREAS it is in the public interest to ensure proper research is conducted by all members prior to making a boundary determination;

BE IT RESOLVED that:

1. A member shall ensure that proper indices are maintained for all of the records in the member's possession or for which the member is responsible in order to facilitate prompt retrieval.
2. Survey Records are to be made available for pick up or delivery to another member requesting same within five working days of such a request.
3. Records may be made available in a number of ways – Personal viewing, internet, email, fax, mail or pick up.
4. The member supplying the survey records shall ensure that the necessary research is performed by a competent person.
5. The requesting member shall indicate the specific location for which information is required.
6. The member supplying records shall ensure that the information supplied is drawn from all of the member's records, however only records owned by the member shall be distributed unless an agreement to the contrary exists.
7. The information supplied shall be complete and reflect the final decisions made during the survey. Field notes shall be provided when requested. Plans and Reports should be made available.
8. All copies of survey records supplied shall be of good quality.
9. A reasonable charge based on a member's cost for storage, maintenance, searching, retrieval, reproductions and transmittal of information may be assessed. The policy for such charges shall be available and reciprocal agreements between firms may be negotiated.
10. The acquisition and consideration of existing survey records is an integral part of every survey and the costs of acquiring such information should be considered part of any project. In situations where a project was not completed and / or the contract was not paid for, the charge for those survey records should be negotiated between members.

Field Notes – Statutory Requirements cont.

Section 6 of O. Reg. 216/10 under the Surveyors Act

Records

6 (1) A professional member shall retain properly indexed records of all professional services provided to the public, including projects, and of all pertinent information necessary to reconstruct the details of the projects.

(2) The professional member shall retain and maintain the records in a secure manner and in accordance with,

(a) the Surveys Act for records prepared for cadastral surveys; and

(b) the Limitations Act, 2002 for all other records.

(3) In the records, the professional member shall provide sufficient evidence that the work conducted for a project meets the specified requirements and end results.

Note: The requirements of Section 6 of O. Reg. 216/10 also apply to Geodetic Surveying, Hydrographic Surveying, Photogrammetric Surveying and Geographic Information Management by Ontario Land Surveyors.

Section 8 of O. Reg. 216/10 under the Surveyors Act

Evidence used

8. When undertaking a survey, a licensed member shall,

(a) refer to the documentary evidence related to the land under survey and the land adjoining the land under survey;

(b) carry out a thorough field investigation for the best available evidence of all lines, boundaries, and corners of the land under survey; and

(c) give priority to the evidence in accordance with common law and statute law.

AOLS Interpretive Guide and Supplement to The Performance Standards for the Practice of Cadastral Surveying (Ontario Regulation 216/10) with regard to Section 8 of O. Reg. 216/10

Evidence Used

8. 3) With respect to priority of evidence referred to in O. Reg. 216/10, subsections 8 (b) & (c):

Where a monument is placed on an existing boundary, such monument will normally be placed on the boundary at a point established from existing evidence of the boundary on both sides of the monument so placed, if so intended.

Section 15 of O. Reg. 216/10 under the Surveyors Act

Field Notes

15 For each survey, field notes shall be prepared in the field and shall contain a clear and detailed account of everything found, observed and done in the field in the course of and relevant to the survey.

Field Note Preparation

Field survey data capture should not be performed without a sound knowledge of the equipment being used – particularly the newer technologies such as GNSS, LIDAR and Drone equipment. GNSS survey and to some extent, LIDAR and Drone technologies are the 'reverse' of traditional technology in that coordinates are the direct result of measurement, and it is the vectors (azimuth or angles and distance) between stations that are derived. Techniques and knowledge needed to detect blunders and minimize error differ between technologies.

Field notes must be recorded for all measurement technologies and may be created manually or electronically but must be capable of paper reproduction and must contain and illustrate:

(1) the location and identity of the property being surveyed including,

- (a) the geographic designation of the land being surveyed and the land adjacent to the land being surveyed, (Lot, Plan, PIN) and
- (b) the names of adjoining streets;

(2) information related to the interpretation and use of the field notes such as,

- (a) a north arrow on each page,
- (b) the date and the file number of the survey on each page,
- (c) the page number and the total number of pages used on each page,
- (d) the type and identification of all measuring equipment used e.g., electronic distance measuring (EDM) equipment, Global Navigation Satellite Systems (GNSS), steel tape etc.,
- (e) the identification of the party chief and assistants,
- (f) the weather conditions,
- (g) units of measurement - distance (metres, feet, etc.) and angle (degrees: decimal, DMS, etc., grads (gons), etc.),
- (h) dimension arrows for distances and angle measurements where required to make the information clear,
- (i) reference to records of field calculations, electronic data collector files and
- (j) the co-ordinate system used, if any, the control points and the sources of co-ordinates;

Field Note Preparation cont.

(3) illustrates the field procedures and the method of survey including,

(a) offset lines and traverse lines identified as such,

(b) the annotation of instrument and site stations, interline and intersection points, etc.,

(c) all observations or measurements, including slope, tension, temperature and tape correction, set-up heights and rod heights as required (metric and imperial measurements help provide independent, redundant measurements),

(d) whether angles and distances have been set or measured and if they are based on historical information (deeds, plans, etc.), direct measurement (measurements derived by 'remote' total station techniques should be noted as such) or calculated,

(e) physical evidence of boundaries must be shown including fences, lines of vegetation, retaining walls, driveways, and any other physical feature on or near the boundary,

(f) features such as overhanging eaves, encroaching structures, planters, walks, utility pedestals and lines, poles and anchors, etc.,

(g) where no occupational evidence exists a note to same must be shown, ("no fence" or "no evidence of occupation"),

(h) where applicable, the reasons why monuments are not set when required by regulation,

(i) an adequate description of all evidence including the surveyor's identification marking, or if none this fact should be indicated, the condition of found monuments, all monuments set or restored and every permanent structure referencing monuments, and

(j) a specific notation of evidence looked for but not found;

(4) in addition:

(a) when voice and/or video recordings are used, the data should be verified and transcribed onto a permanent visually readable format attached to the field notes. A log listing the origin of the voice and video recording data, the repository name, the software used and the names of the persons manipulating and reviewing that data must be maintained,

(b) field notes should be recorded at the time of observation,

(c) where it is deemed necessary to redraw field notes, the original field notes should be retained and attached to the copies,

(d) major additions to field notes should be recorded on a separate page,

(e) minor additions to field notes on a date other than that recorded on the page should be so identified, and

(f) after the field survey has been completed, incorrect measurements on field notes should not be erased but stroked out in such a manner that they remain legible but are obviously discarded;

Field Note Preparation cont.

(5) a field note report should include:

(a) a record of all oral evidence obtained,

(b) an explanation of any discrepancy, and

(c) an assessment of any conflicting evidence;

(6) a field note data recording:

(a) spatial data obtained by ground-based surveys (traditional, total station, GNSS, LIDAR, and other techniques) and captured electronically must be referenced to the manual / digital field notes produced at the time of observation so that the electronic data files can be analyzed for accuracy, consistency and integrity with the manually recorded observations of the site,

(b) all measurements to survey monuments, structures or other features that will be dimensioned on a plan of survey, whether recorded manually or electronically, must be verified by mathematical closure or independent measurement such as the observation of points from a minimum of two known points or duplicate GNSS coordinates for a point. Field notes must clearly indicate how both the initial and redundant measurements are made and recorded,

(c) observations or measurement may be expressed directly on a sketch or in tabular form and where electronic data capture is used, a table indicating a range of point numbers and descriptors for each point or range of points to cross reference to the printed raw data file, and

(d) where an automated or semi-automated data-logging device is used to record field data, this data should be verified and transcribed onto a permanent visually readable format attached to the field notes. A data "log form" indicating the origin of the electronic data, the repository file name, the software employed and the parties manipulating and reviewing it must be maintained.

Data recorded electronically as part of the field survey are 'field notes' and constitute part of the records that are to be maintained by survey firms and should be provided to other survey firms as part of a field note request. Proprietary total station, GNSS or other electronic data files must be translated to readable, transferable formats. For example:

i) Original Total Station Data Files should be converted to a readable (ASCII) format that contains the setup location, backsight location, foresight location, angle, distance (horizontal or slope) and the vertical angle if necessary. The file should preferably contain the setup height and rod height as well. The data should be in a consistent and organized file that can be readily interpreted by other users.

See SAMPLE FIELD NOTE PAGE: Preservation of Electronic Data Recorder Files

ii) Original Global Network Satellite System (GNSS) electronic data files vary considerably between manufacturers and with the method of survey. The original data from the satellite transmissions is useful and important data for the survey firm to retain for their own purposes but it is not useful data for future users. GNSS data needs to be processed and the computed values retained as part of the field note record.

Precise Point Positioning (PPP) data:

Survey quality 'absolute' (network) positions can be computed from single receiver GNSS satellite data (usually with at least a few hours observation time) by a number of commercial software applications and by using NRCan's PPP on-line application. The reports should be preserved as part of the field note record. The report should contain the location identifier, date and time of observation, the datum and projection specifications, the coordinates and height above the ellipsoid and an estimate of quality.

See SAMPLE FIELD NOTE PAGE: Precise Point Positioning Output Files

Kinematic, 'Stop and Go', Real Time Network (RTN) etc. Positioning data:

Survey quality 'relative' positions can be computed from dual receiver GNSS satellite data with short (a few minutes) observation times. With this method, the 'base station' generally has known coordinates of survey quality and coordinates for the 'unknown point' are generated by the GNSS receiver. Because the positions are relative – including RTN – the data preserved as part of the field note record must contain the location and coordinates of the base station used for the observation. The accuracy of the coordinates of the 'unknown' points is dependant on a number of factors such as distance from the base station, length of observation, satellite geometry, atmospheric conditions, etc. The field note record should contain sufficient information to estimate the accuracy of the derived locations. The horizontal and / or vertical Dilution of Precision (DOP) should be recorded for each point or each group of points as necessary. Because this is a 'radial' survey method (every located point is independent of other located points), the field notes must contain information that provides redundant measurement to the same locations.

See SAMPLE FIELD NOTE PAGE: Real Time Network Output Files

Static and Rapid Static Positioning data:

Survey quality 'relative' positions can be computed from dual receiver GNSS satellite data with medium length (usually several minutes to a few hours) observation times. With this method, vectors between the GNSS receivers are generally computed for adjustment using appropriate software. The accuracy of the vectors is dependant on a number of factors such as distance from the base station, length of observation, satellite geometry, atmospheric conditions, etc. The field note record should contain sufficient information to estimate the accuracy of the derived vectors. The horizontal and / or vertical Dilution of Precision (DOP) should be recorded for each point or each group of points as necessary.

See SAMPLE FIELD NOTE PAGE: Rapid Static Vector Files

iii) LiDAR, Drone Mapping, Aerial Photography, etc.
While not extensively used for cadastral survey, these technologies have and may be increasingly used for cadastral survey. They are frequently used for non-cadastral survey. The data maintained and provided as part of any required field note record should be patterned on the records for total stations and GNSS.

SAMPLE FIELD NOTE PAGE: Blank Page - Lined

Field Survey Records – Please Return to 999 Dumfries Avenue, Kitchener, Ontario N2H 1Z7 *Tel. (519) 576 – 9999*

Thomas C. Esquire Limited, Ontario Land Surveyors

Date	Field Crew	Notes By	File Number

All Distances and Elevations are in METRES unless otherwise noted.

Temperature	Air Pressure	Weather	Equipment	Page ..... of .....
..... °C	..... kPa			

SAMPLE FIELD NOTE PAGE: Blank Page - Unlined

Field Survey Records – Please Return to 999 Dumfries Avenue, Kitchener, Ontario N2H 1Z7 *Tel. (519) 576 – 9999*

Thomas C. Esquire Limited, Ontario Land Surveyors

.....	.....	.....	.....
Date	Field Crew	Notes By	File Number

All Distances and Elevations are in METRES unless otherwise noted.

..... °C	..... kPa	.....	.....	Page ..... of .....
Temperature	Air Pressure	Weather	Equipment	

SAMPLE FIELD NOTE PAGE: Blank Page - Elevations Using Level

Field Survey Records – Please Return to 999 Dumfries Avenue, Kitchener, Ontario N2H 1Z7 *Tel. (519) 576 – 9999*

Thomas C. Esquire Limited, Ontario Land Surveyors

Date	Field Crew	Notes By	File Number

All Distances and Elevations are in METRES unless otherwise noted.

B. S.	H. I.	F. S.	Elev.	Remarks

Temperature	Air Pressure	Weather	Equipment	
°C	kPa			Page ..... of .....

SAMPLE FIELD NOTE PAGE: Blank Page – GNSS Static / Rapid Static Measurements

Field Survey Records – Please Return to 999 Dumfries Avenue, Kitchener, Ontario N2H 1Z7 Tel. (519) 576 – 9999

Thomas C. Esquire Limited, Ontario Land Surveyors

Date	Field Crew	Notes By	File Number

All Distances and Elevations are in METRES unless otherwise noted.

Inst. Stat.			**Inst. Height**	Metric Start	Metric End
Monument Type			GPS Value m	Imperial Start	Imperial End
Monument Identifier					
Start Time	Hrs.	Min.			
End Time	Hrs.	Min.			
G.P.S. Model & Ser. No.					
Ant. Model & Ser. No.					
Epoch & Horz. Cutoff	Sec.	Deg.			
Remarks			Mon. & Obstruction Sketch		

Inst. Stat.			**Inst. Height**	Metric Start	Metric End
Monument Type			GPS Value m	Imperial Start	Imperial End
Monument Identifier					
Start Time	Hrs.	Min.			
End Time	Hrs.	Min.			
G.P.S. Model & Ser. No.					
Ant. Model & Ser. No.					
Epoch & Horz. Cutoff	Sec.	Deg.			
Remarks			Mon. & Obstruction Sketch		

Temperature	Air Pressure	Weather	Equipment	
°C	kPa			Page ..... of .....

SAMPLE FIELD NOTE PAGE: Blank Page - Index

Field Survey Records – Please Return to 999 Dumfries Avenue, Kitchener, Ontario N2H 1Z7 *Tel. (519) 576 – 9999*

Thomas C. Esquire Limited, Ontario Land Surveyors

.....	.....	.....	.....
Date	Field Crew	Notes By	File Number

All Distances and Elevations are in METRES unless otherwise noted.

File 2022-001 Index Page:

Project: single family new construction

Pages: 1, 2 – initial field survey and building layout

Page 3: initial calculation sketch

Page 4: SRPR field survey

Page 5: final calculation sketch

Equipment Used:

Total Station:

Level:

GNSS:

..... °C	..... kPa	.....	.....	Page ..... of .....
Temperature	Air Pressure	Weather	Equipment	

SAMPLE FIELD NOTE PAGE: Rapid Static GNSS Measurement

Field Survey Records – Please Return to 999 Dumfries Avenue, Kitchener, Ontario N2H 1Z7 *Tel. (519) 576 – 9999*

Thomas C. Esquire Limited, Ontario Land Surveyors

Date	Field Crew	Notes By	File Number
April 06, 2022	PCW / JAM	PCW	2022-001

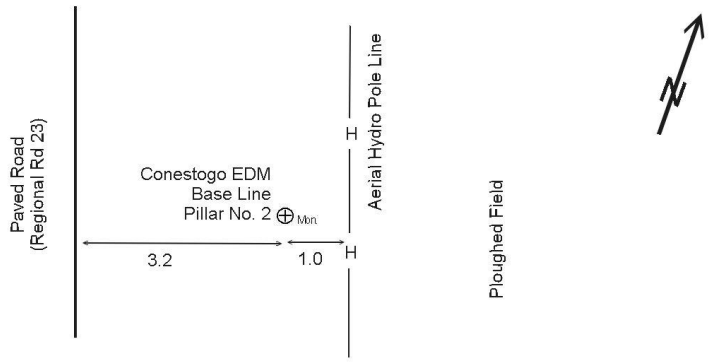
All Distances and Elevations are in METRES unless otherwise noted.

Inst. Stat. 1004

Monument Type	Conc. Pillar & Threaded Plate	
Monument Identifier	00119843025	
Start Time	13 Hrs.	12 Min.
End Time	13 Hrs.	59 Min.
G.P.S. Model & Ser. No.	Thales Z-Max	800979
Ant. Model & Ser. No.	Thales	800900
Epoch & Horz. Cutoff	2 Sec.	20 Deg.

Remarks
- Rapid Static Obsevation
- Set on Forced Centre Plate on Concrete Pillar
- open to sky, possible multipath from traffic
- GNSS Data File 800964_2022_04.asc

Inst. Height			
Metric Start	0.452	Metric End	0.453
GPS Value	0.452 m	Imperial Start	1.48 ft.
		Imperial End	1.48 ft.



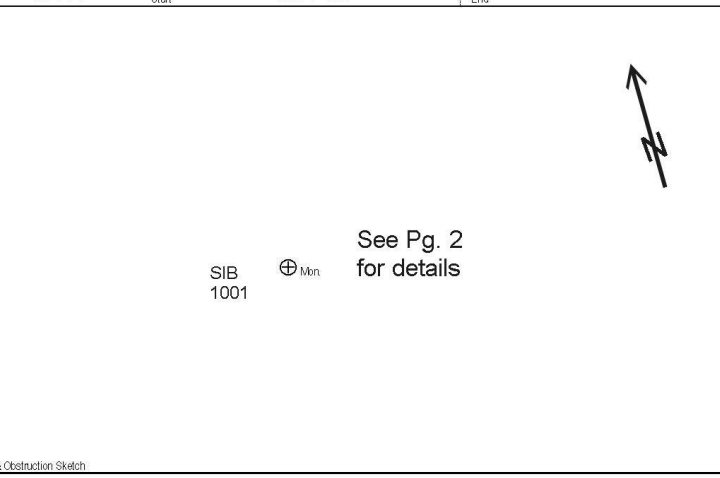
Mon. & Obstruction Sketch

Inst. Stat. 1001

Monument Type	SIB	
Monument Identifier	SW Corner Lot 10 Con. 5, Wilmot	
Start Time	12 Hrs.	47 Min.
End Time	17 Hrs.	24 Min.
G.P.S. Model & Ser. No.	Thales Z-Max	800248
Ant. Model & Ser. No.	Thales	800900
Epoch & Horz. Cutoff	2 Sec.	20 Deg.

Remarks
- Rapid Static
- Tripod Setup
- see Pg. 2 for First Obser.
- GNSS Data File 800248_2022_04.asc

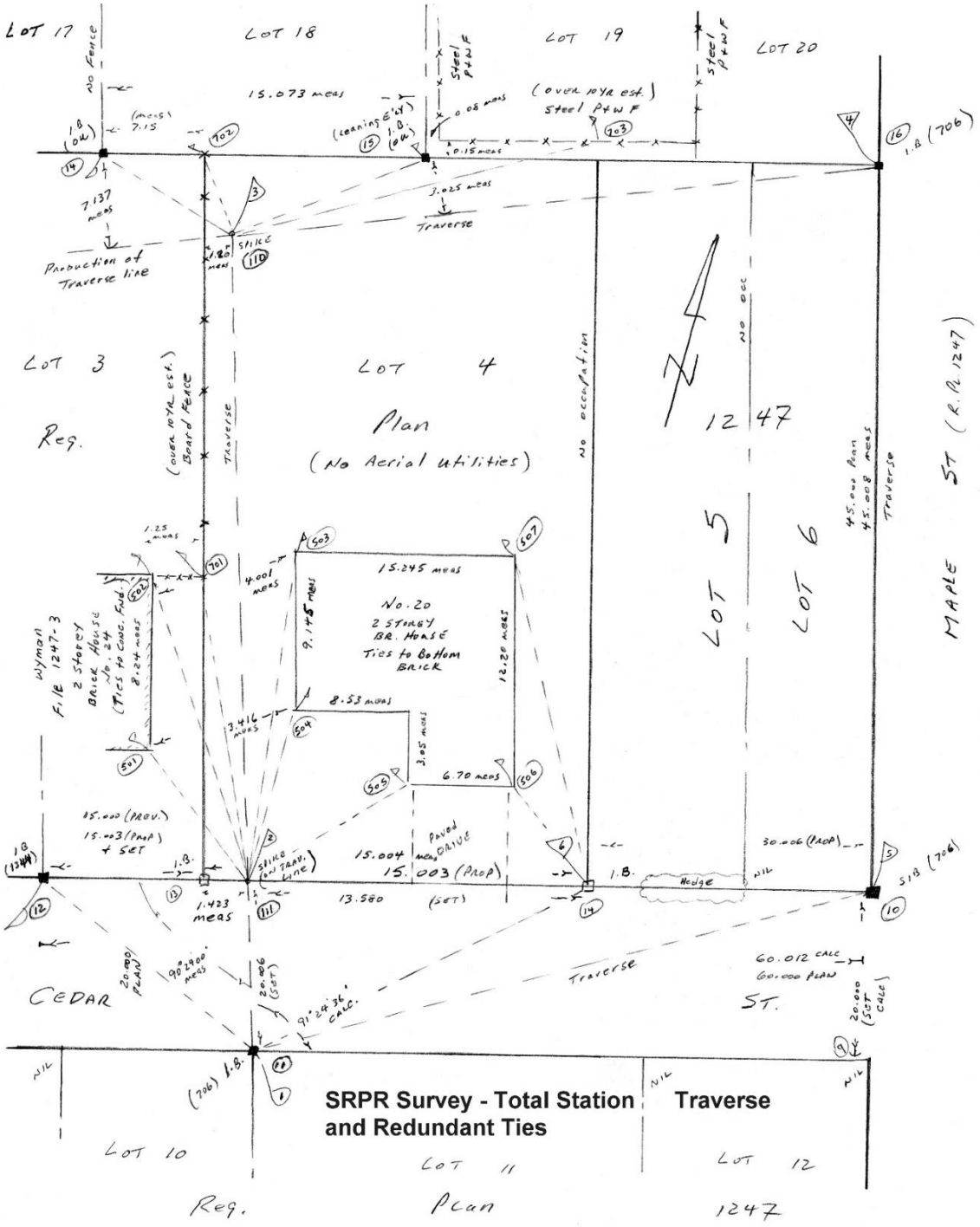
Inst. Height			
Metric Start	1.245	Metric End	1.249
GPS Value	1.247 m	Imperial Start	4.08 ft.
		Imperial End	4.09 ft.



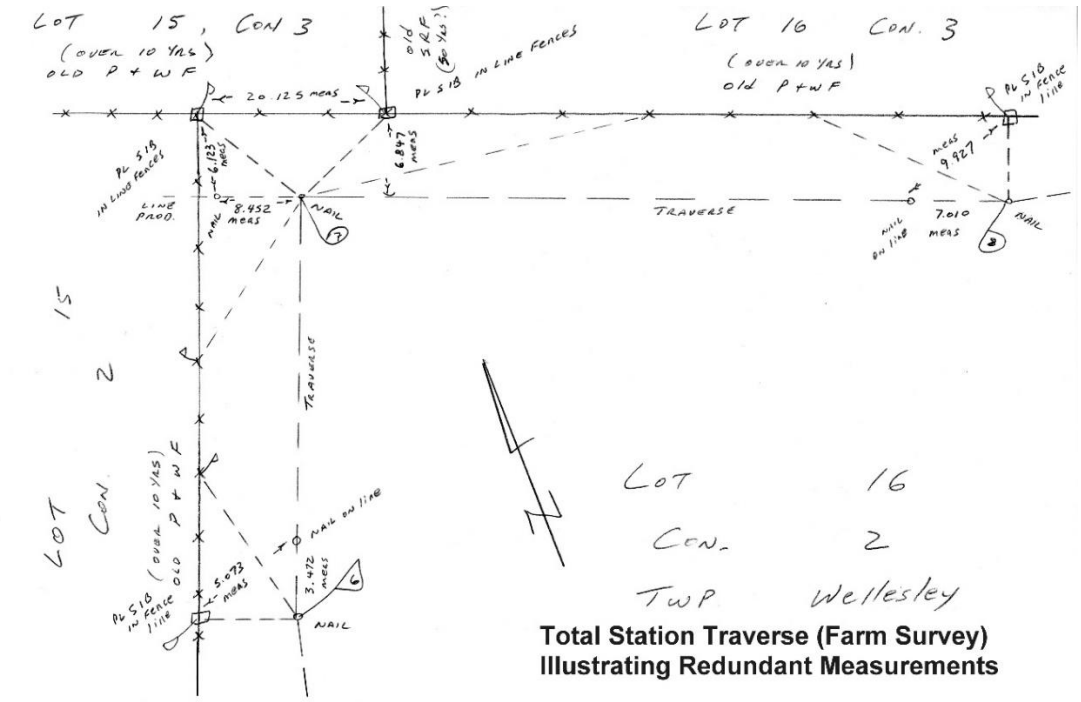
Mon. & Obstruction Sketch

Temperature	Air Pressure	Weather	Equipment	
14 °C	103 kPa	Cloudy	as noted	Page 4 of 12

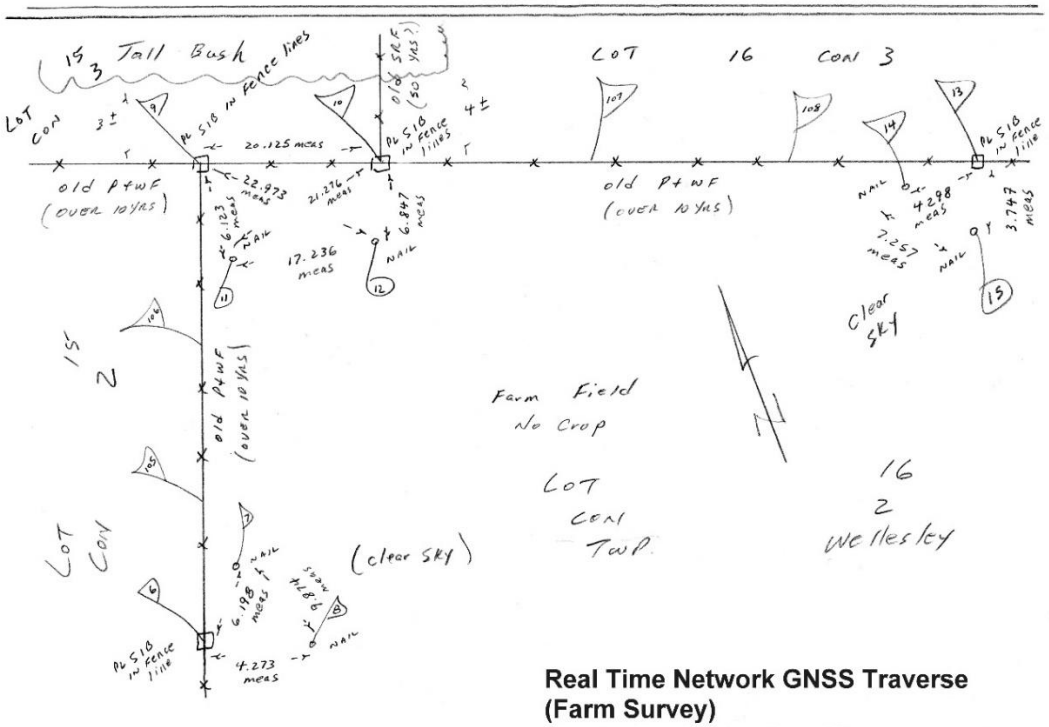
SAMPLE FIELD NOTE PAGE: Typical Details for SRPR Measurements



SAMPLE FIELD NOTE PAGE: Typical Details for Farm Survey Measurements



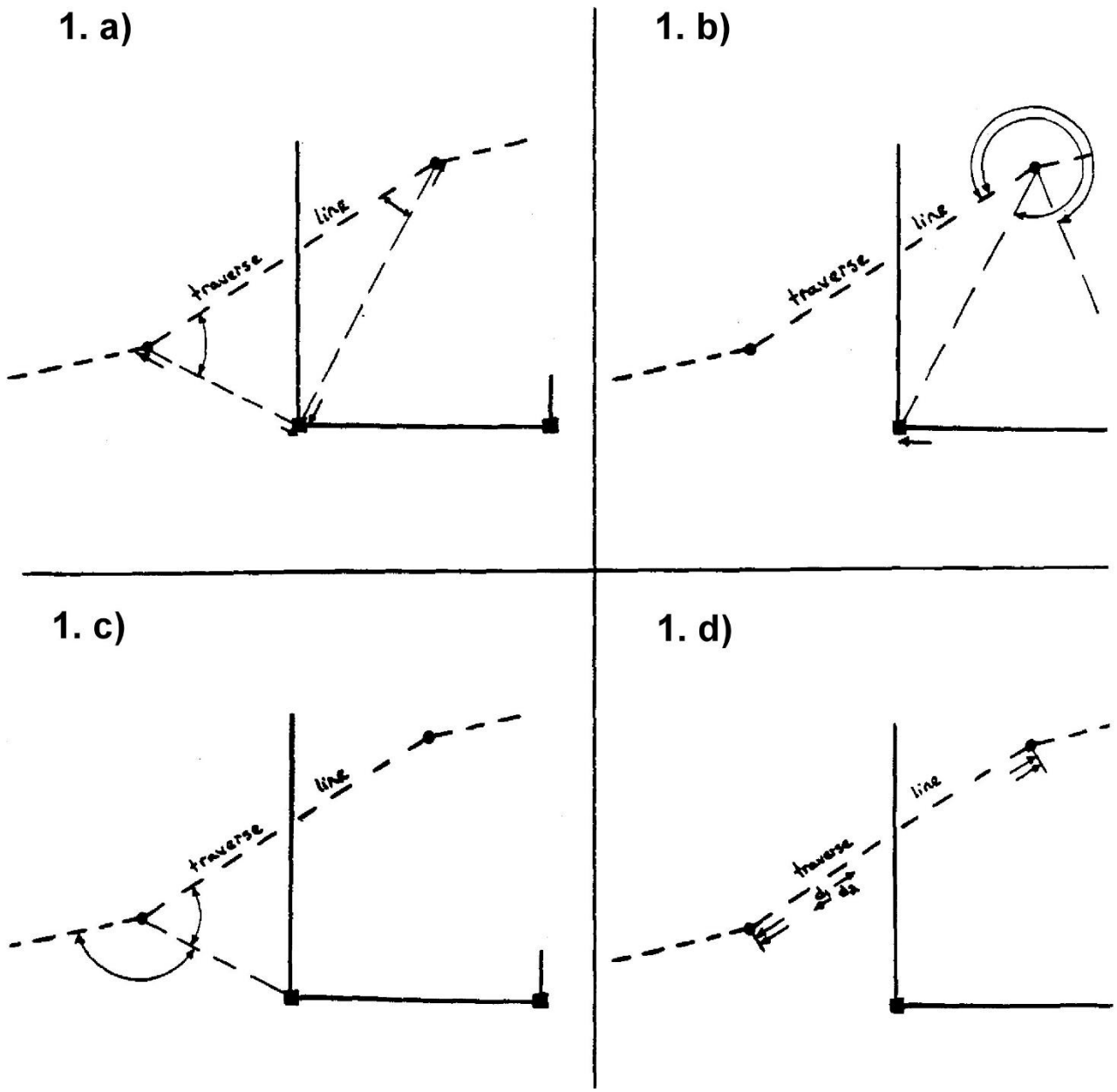
Total Station Traverse (Farm Survey)
Illustrating Redundant Measurements



Real Time Network GNSS Traverse
(Farm Survey)
Illustrating Redundant Measurements

SAMPLE FIELD NOTE PAGE:

EXAMPLE - INDEPENDENT MEASUREMENTS



SAMPLE FIELD NOTE PAGE:

EXAMPLE 3 - CORRECTIVE INSTRUCTIONS

LOT/BLOCK: PT. LOT 70 PLAN/CON.: 593 YORK TWP/CITY: ETOBICOKE COUNTY/REGION: METRO TORON

NOTES

(1) PT. (18) SET ON LINE BETW'N (3) AND (4)

(2) PT. (15) ADD 0.30 TO DIST. FROM (3) (PT. INACCESSIBLE (FENCE ROW

(3) PT. (15) I.B.(BLT) LEANS N.W. — / TIE IN TOP

(4) DELETE PT. 999 — SHOULD BE PT. (9)

DATE: SEPT. 1/20

PARTY: J. DOE
X A. SMITH

FILE: 20-285

SAMPLE FIELD NOTE PAGE: Preservation of Electronic Recorder Data

EXAMPLE – UNEDITED ABSTRACT OF RAW FIELD DATA

```
50=900925\80=1\51=25-09-2020\54=1\53=1230\56=17\74=760\
80=2\2=2\4=411\62=1\21=0\7=.0002\11=122.043\4=411\
80=3\7=.0024\11=122.046\
80=4\5=100\7=3.0624\11=50.596\4=309\
80=5\7=3.0622\11=50.595\
80=6\5=101\7=32.2518\11=40.034\4=309\
80=7\7=32.2504\11=40.028\
80=8\5=102\7=52.4548\11=43.788\4=309\
80=9\7=52.4536\11=43.788\
80=10\5=103\7=15.492\11=9.481\4=309\
80=11\7=15.4906\11=9.482\
```

EXAMPLE - EDITED ABSTRACT OF RAW FIELD DATA

SET TV 0001 No of Obs 023

At	To	Direction	Hor. Dist.	Code
0001	0002	000-00-00	106.208	FD SSIB
0001	0003	346-58-35	153.667	FD IB
0001	0004	028-38-34	202.440	FD WS PL IB
0001	0005	044-41-12	188.443	FD WS
0001	0006	044-44-31	188.534	FD SIB
0001	0007	090-44-57	128.593	TOP PM M-1641
0001	0008	087-09-59	115.725	BTM 7TH BRK M-1641

SAMPLE FIELD NOTE PAGE: Precise Point Positioning Output Files (NRCan File)

CSRS-PPP (V 1.05 34613) **Point 103**

Data Start	**Data End**	**Duration of Observations**
2015-07-21 13:06:30.000	2015-07-21 15:28:00.000	2h 21m 30.00s
Apri / Aposteriori Phase Std		**Apri / Aposteriori Code Std**
0.015m / 0.014m		2.0m / 2.131m
Observations	**Frequency**	**Mode**
Phase and Code	L1 and L2	Static
Elevation Cut-Off	**Rejected Epochs**	**Observation & Estimation Steps**
10.000 degrees	0.00 %	15.00 sec / 30.00 sec
Antenna Model	**APC to ARP**	**ARP to Marker**
TRMR10 NONE	L1= 0.128 m L2= 0.120 m	1.727 m

(APC = antenna phase center; ARP = antenna reference point)

Estimated Position for AdjSem_2015_07_21_AM_Point_103.txt

	Latitude (+n)	**Longitude (+e)**	**Ell. Height**
NAD83(CSRS) (1997)	43º 26’ 39.3865’’	-80º 28’ 01.6148’’	287.843 m
Sigmas(95%)	0.014 m	0.022 m	0.048 m
Apriori	43º 26’ 39.439’’	-80º 28’ 01.664’’	289.840 m
Estimated - Apriori	-1.620 m	1.097 m	-1.998 m

Orthometric Height CGVD (HTv2.0)	**95% Error Ellipse (cm)**	**UTM (North) Zone 17**
323.550	semi-major: 2.867 cm	4810290.485 (N)
	semi-minor: 1.601 cm	543120.347 (E)
	semi-major azimuth: 69° 51’ 38.13”	

SAMPLE FIELD NOTE PAGE: Real Time Network Output Files (Leica File)

Field book Report 05/09/2018 09:58:19

Job Information

Job name:	4778GEO
Created:	05/09/2018 09:25:17
Time zone:	-4h 00'
Coordinate system name:	UTM17-NAD83-CSRS
Application software:	LEICA Geo Office 8.4
Firmware version:	7.80
Code list name:	TABSURV
Average limit (Position):	0.0500 m
Average limit (Height):	0.0750 m

Coordinate System Information

Coordinate system name:	UTM17-NAD83- CSRS
Created:	05/09/2018 09:23:35
Transformation name:	-
Transformation type:	-
Height mode:	-
Residuals:	-
Local Ellipsoid:	GRS 1980
Projection:	UTM17
Geoid model:	SW-ONT80
CSCS model:	-

GPS Coordinates

Baseline	Reference: RTCM-Ref 3659	Rover: 50000
Local Coordinates:		
Easting:	633976.2700 m	627528.1064 m
Northing:	4990206.8227 m	4975326.8260 m
Ellip. Hgt:	250.1351 m	192.2224 m

Quality:	Sd. E: 0.0076 m	Sd. N: 0.0103 m	Sd. Hgt: 0.0282 m
Posn. Qlty:	0.0128 m	Sd. Slope: 0.0095 m	

Baseline vector:	dLat: -0° 07' 57.73808"	dLon: -0° 05' 08.23934"	dHgt: -57.9128 m

Slope: 16220.8021 m

SAMPLE FIELD NOTE PAGE: Processed Rapid Static Vector Files

Files

Name	Start Time	Sampling	Epochs	Size (Kb)	Type
B5005211.224	11/08/12 06:08:00	20	149	111	L1/L2 GPS
B9236311.224	11/08/12 05:30:20	20	415	291	L1/L2 GPS
B1100B11.224	11/08/12 05:47:40	20	319	234	L1/L2 GPS
B5006B11.224	11/08/12 06:13:20	20	112	80	L1/L2 GPS

Occupations

Site	Start Time	Timespan	Type	File
5005	August 12 2011 06:08:00.00	00:49:20.00	Static	B5005211.224
9236	August 12 2011 05:30:20.00	02:18:00.00	Static	B9236311.224
1100	August 12 2011 05:47:40.00	01:46:00.00	Static	B1100B11.224
5006	August 12 2011 06:13:20.00	00:37:00.00	Static	B5006B11.224

Processed

Reference	Reference File	Rover	Rover File	Mode	Num
9236	B9236311.224	5005	B5005211.224	Static	1
9236	B9236311.224	1100	B1100B11.224	Static	2
1100	B1100B11.224	5005	B5005211.224	Static	3
9236	B9236311.224	5006	B5006B11.224	Static	4
1100	B1100B11.224	5006	B5006B11.224	Static	5
5005	B5005211.224	5006	B5006B11.224	Static	6

Processed Vectors

Vector Identifier	Vector Length	95% Error	Vector Components		95% Error	SV	PDOP	QA Solution
5005 - 5006	58.373	0.001	X	-15.891	0.001	7	2.5	Fixed
11/08/12 06:13:20.00			Y	-43.203	0.001			
+00:37:00.00			Z	-35.894	0.000			
9236 - 5006	8020.590	0.040	X	5460.623	0.016	8	2.0	Fixed
11/08/12 06:13:20.00			Y	-3780.555	0.016			
+00:37:00.00			Z	-4496.538	0.016			
9236 - 1100	6980.802	0.034	X	-1648.738	0.014	8	1.9	Fixed
11/08/12 05:47:40.00			Y	-5052.423	0.014			
+01:46:00.00			Z	-4526.176	0.014			
9236 - 5005	7991.081	0.040	X	5476.516	0.016	8	1.9	Fixed
11/08/12 06:08:00.00			Y	-3737.346	0.016			
+00:49:20.00			Z	-4460.649	0.016			
1100 - 5006	7222.303	0.037	X	7109.368	0.015	8	2.0	Fixed
11/08/12 06:13:20.00			Y	1271.877	0.015			
+00:37:00.00			Z	29.626	0.015			
1100 - 5005	7245.896	0.035	X	7125.257	0.014	8	1.9	Fixed
11/08/12 06:08:00.00			Y	1315.074	0.015			
+00:49:20.00			Z	65.527	0.014			