Static GPS Networks

LAB 5

Katie Chute | REMT 3010 | December 9th, 2016

Description of Project & Procedures

PLANNING

The planning process for this lab took a full afternoon to figure out what needed to be done and which day each team would go out and collect their data. As a group it was decided that one group would do their first collect that Friday morning and the second group would do their first collect in the afternoon. Then it was agreed upon that the group that went second on Friday would do their second collect on Monday and the group that went first on Friday would do their second collect on Wednesday.

The group that went second on Friday, could not complete their first session on Friday. So the group agreed that they would finish the first session on Monday also start the second session. The group could not finish their second session on Monday, for some unforeseen happenings, so the group first their second session on Wednesday. The days that the data were collected on are as follows: November 25th, 28th, and 30th, 2016. The Julian Days that these days' land on are Day 330 (Nov 25th), Day 333 (Nov 28th), and Day 335 (Nov 30th).

The next thing that had to be planned out was to figure out which monuments we wanted to collect and make sure that one box was not a he same monument for more than three collects. This will be talked about more in the next section.

The final thing that needed to be done before we headed out to collect the data needed in order to complete this static GPS network lab, was to make sure that the equipment that was needed was going to be free for the days we had decided upon.

SESSIONS

The image below shows how this was solved. The numbers that you see highlighted in the lighter gray colour are the last digits of the monument number. For example, one of the monument numbers is 227012, but in this table it shows as 12 (and in my GrafNet file it shows as 012); another example is the monument number 227002 and in the table it shows up as 2 (and in my GrafNet file it shows as 002).

Sessions		Box 1	Box 2	Box 3
E	A	100	12	7
F	B	100	4	12
G	C	7	5	100
H	D	5	2	4

"The network design provided with this lab will have the teams perform 4 sessions with the three receivers (i.e. set up all 3 to observe for a common period of time).

For each session take note of which receiver has been placed at which station (monument). As with previous labs, you are required to fill out a GPS Baseline Log for each station; taking note of the date & time, HI, monument identifier, nearby obstructions, PDOP, etc. as outlined in the form. You will be marked on the completeness and accuracy of these reports.

Once a session has been completed be sure to ***tear down all three systems entirely*** *- even if the same receiver will be used at the same monument for the next session. By setting the system up again you are providing additional redundancy to the network which will facilitate the network adjustment calculations during post-processing."* (This was taken from the lab5_static_network_2016 PDF that was given to use by our instructor; can be found under the Requirements section and GPS Session subsection).

FIELDWORK

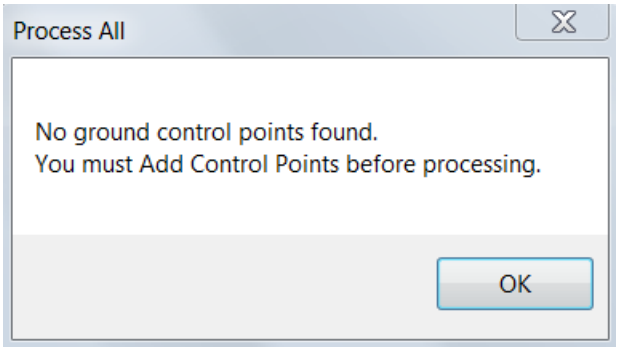
The field work consisted of setting up three stations just like you see here and then waiting half an hour. Once that half hour was done we would tear down the stations and move on to the next session. So, for example the first session for the group that I was involved in was 229100, 227012, and 227007. Box 1 would go out to monument 100, then box 2 would go to 012 and then the final box would go out to 007.

IMPORTING, ASSIGNING, BASELINES & ADJUSTMENTS

The importing process for this project consists of two steps. The first step is to convert the Raw GNSS data to GPB data. When the convert raw GNSS data to GPB window pops up the receiver type by default is set to Unknown/AutoDetect, as fair as the folder goes you may have to click the “Get Folder” button to navigate to the folder that contains the data that you are working with. The next step within the convert raw GNSS to GPB window is you need to find all of the .m00 files that come with the data that you have collected. Once you have located all of your .m00 files and added them to the convert files window to the right of the list, click on one .m00 file at a time and go into the options of each file and make sure that the Static/Kinematic Mode is set to Static. The reasoning behind that last step, making sure that every file is set to Static, is because if you don’t then and you bring in your data and you have an epoch error, then you have to go back and make sure that this setting is set. The second step in the importing process is Add/Remove Observations to your new project that you have created in GrafNet. The way to add the observations is you select the GPB in the top window and then click add and the GPBs will be added as observations to your project. Once all your GPBs have been added to your Observations in project window in the second window, then you can click close and your observations should be added to your project.

As far as assigning of the data anything, I assigned the LTWN observation (which was given to the class by our instructor Rob), observation of Monument 227012, and I also set the observation of monument 227002 as control points for this network assignment.

When it comes to the baselines and adjustments that went along with the baselines were very little. Before we can do any adjustments on the baselines we had to process them and the following steps will go through that process. *"Processing baselines is performed through the Process Sessions button or by right-clicking on a session from the Data Manager window and choosing Process from the context menu; similar to the static processing you performed in earlier labs. As before, each baseline requires one station as a "reference" and another as the "rover". You may have noticed that the Process Sessions button is greyed out. This is because we have yet to designate an observation as a Control Point. Similarly, if you attempt to process a single baseline via the context menu from the Data Manager window, you will receive the error below:*



Only stations that are known to be "good" (i.e. HPNs or AC points) should be used as control. Alternatively, depending on the situation, you can also use coordinates that have been estimated/derived from a previous baseline/adjustment. For our exercise which is contained to the COGS property, we know that the HPN monument 229100 and the COGS ACS 250002 are trusted positions. Thus we can have confidence in their published coordinates as Ground Control Points." (This information comes from the GrafNet Networking Processing Guide on Page 2 under the Processing Baselines section and under the subsection Reference/Rover). Once the baseline process is complete then you can go ahead with the adjustments. There was only one adjustment that was needed to be done and that would have been removing the baseline between monuments 227004 and 227007; which, as I stated above, came out as not enough time overlap of the sessions, there needs to be at least 30 minutes of an overlap.

Results & Discussion

PRELIMINARY ANALYSIS, LOOP MISCLOSURE, & ADJUSTMENT ANALYSIS

When looking preliminary analysis everything looked good but then I went looking into things a little bit more and that is when I had to make some adjustments to my data (as mentioned above). As far as the loop Misclosure I could not find any errors in the loop closures. When it comes to the adjustment analysis everything looked better once the baseline between 227004 and 227007 was removed from network.

ISSUES & SOLUTIONS

The first issue that came up when processing the baselines. When running through the process of processing through all of the baselines an error came up with the baseline that went between 004 to 007. There was only one thing that I could think of that would have caused this error and that was the HI's. Once I went through all the observations for the two stations in question I finally took a look at the overlapping time, it should be about 30 minutes or more, it was only reading 3 minutes and 25 seconds.

The solution that would work to fix this error would to completely remove this baseline from the network and that is what was done.

There was another issue, but this had nothing to do with the data for this report. The issue was there were two second year surveyors that were collecting something and they came along and moved one of our setups that we had ready to go for the next session. So, instead of being rude like they were, we waited until they were done collecting whatever they were collecting.

Appendices

RECEIVER CONFIGURATION PARAMETERS

The configuration parameters that were used for each receiver throughout this entire lab were set as the following. The static observations were set for every one second, the antenna type was set to K1203+GNSS tripod or K1203+GNSS pole (if you are collecting at 229100). The cut-off angle is set to ten degrees, this is set to collect all satellites above ten degrees and nothing below that. Then the auto store option is turned on for when the collect is stopped then the point is automatically stored. The “measured observations” is set to be included on the display of the controller. Then the final con figuration setting is to set the local time zone and date, the local time zone is -3:00h.

When creating the jobs in the controllers, we had to be sure to clearly identify each collect and monument, this is done to avoid any confusion when moving the receivers to other locations throughout the network. Another thing that was done to avoid any confusion was the boxes were labeled (1,2, and 4). When creating the jobs within the controller each job had a letter ranging from ‘A’ to ‘F’, attached to the end, this was done to identify which session and which monuments where collected at the same time.

TABLE SHOWING THE COORDINATES (GEOGRAPHIC & UTM)

	UTM		Geographic	
Station Name	Northing	Easting	Latitude	Longitude
2	4972226.710	328805.410	N 44° 52' 58.31799"	W 65° 10' 05.54086"
4	4972570.900	328737.120	N 44° 53' 09.54820"	W 65° 10' 07.26686"
5	4972697.120	328687.840	N 44° 53' 13.71065"	W 65° 10' 09.71097"
7	4972716.260	328523.870	N 44° 53' 13.97866"	W 65° 10' 17.37318"
12	4973164.582	328880.318	N 44° 53' 28.83592"	W 65° 10' 01.39251"
100	4973357.239	329399.404	N 44° 53' 34.65845"	W 65° 10' 23.53685"
LTWN (COGS)	4972470.154	328483.119	N 44° 53' 06.26325"	W 65° 10' 04.97542"

PROCESSING REPORTS (PARAMETERS, SUMMARIES, BASELINES, TRAVERSE, NETWORK, LOOPS, ETC.)

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  ***********************************************
             * GrafNet - GRAPHIC GNSS NETWORK PROCESSING    *
             *           SOFTWARE PACKAGE                   *
             *                                              *
             * TRAVERSE SOLUTION                            *
             *                                              *
             * Copyright NovAtel Inc. (2016)                *
             *                                              *
             * Version: 8.60.6717                           *
             *                                              *
             * PROJECT: Chute_StaticGPS_Network             *
             ***********************************************


DATE:   12/08/2016 (m/d/y)
TIME:   19:19:04

DATUM:  NAD83
GRID:   UTM, Zone 20
UNITS:  metres
GEOID:  D:\Geoids\GPS-H-Canada.wpg


*********************************
  STATIONS (STATUS):
*********************************

Station      Type        HgtStatus     Result  Coordinates derived from...
002          Control-3D  OK            Pub(3D) (-)
004          Loop Tie    OK            Good    002
005          Loop Tie    OK            Good    002
007          Loop Tie    OK            Good    LTWN
012          Control-3D  OK            Pub(3D) (-)
100          Loop Tie    OK            Good    012
LTWN         Control-3D  OK            Pub(3D) (-)


*********************************
  STATIONS (COORDINATES):
*********************************

Station         Latitude        Longitude       Grid-E       Grid-N    EllHgt  OrthoHgt
                (D M S)           (D M S)          (m)          (m)       (m)       (m)
002       44 52 58.59821  -65 10 03.45322   328810.194  4972232.742    13.052    34.331
004       44 53 09.66058  -65 10 07.18121   328737.532  4972576.279    15.408    36.683
005       44 53 13.81937  -65 10 09.63274   328687.185  4972706.045    16.272    37.546
007       44 53 14.08286  -65 10 17.24517   328520.415  4972718.642     9.422    30.698
012       44 53 28.83592  -65 10 01.39251   328880.318  4973164.582     7.564    28.830
100       44 53 34.65894  -65 10 23.53689   328399.403  4973357.255     7.578    28.845
LTWN      44 53 06.26325  -65 10 04.97542   328783.119  4972470.155    15.710    36.986
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****
LOOP, CHECK & DUPLICATE TIES:
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Name/Session	Type	Result	DEast (m)	DNorth (m)	DHeight (m)
002 to 004 (1)	Duplicate	Good	-0.0045	0.0023	0.0061
012 to 004 (2)	Duplicate	Good	-1.0873	0.1460	8.8162
012 to 004	LoopTie	Good	-1.0870	0.1565	8.8205
LTWN to 004 (4)	Duplicate	Good	-1.0891	0.1509	8.4459
LTWN to 004 (2)	Duplicate	Good	-1.0928	0.1549	8.4465
LTWN to 004 (3)	Duplicate	Good	-1.0922	0.1518	8.4517
LTWN to 004	LoopTie	Good	-1.0912	0.1636	8.4485
002 to 005 (2)	Duplicate	Good	-0.0004	0.0044	-0.0026
LTWN to 005 (3)	Duplicate	Good	-1.0897	0.1486	8.4499
LTWN to 005 (1)	Duplicate	Good	-1.0825	0.1489	8.4461
LTWN to 005	LoopTie	Good	-1.0868	0.1532	8.4498
004 to 005	LoopTie	Good	0.0056	0.0010	-0.0003
004 to 005 (2)	Duplicate	Good	-0.0001	-0.0009	-0.0036
LTWN to 007 (3)	Duplicate	Good	-0.0008	0.0058	-0.0135
LTWN to 007 (2)	Duplicate	Good	-0.0008	0.0097	-0.1188
LTWN to 007 (1)	Duplicate	Good	0.0043	0.0105	0.0087
012 to 007 (1)	Duplicate	Good	0.0068	0.0065	0.3642
012 to 007	LoopTie	Good	0.0082	-0.0057	0.3588
005 to 007	LoopTie	Good	1.0827	-0.1342	-8.5650
012 to 100 (2)	Duplicate	Good	0.0039	0.0062	-0.0083
012 to 100 (3)	Duplicate	Good	0.0028	0.0032	-0.0138
012 to 100 (4)	Duplicate	Good	0.0040	0.0039	0.0043
012 to 100 (5)	Duplicate	Good	-0.0026	0.0033	-0.0146
LTWN to 100	LoopTie	Good	-0.0045	0.0081	-0.3737
LTWN to 100 (2)	Duplicate	Good	-0.0014	0.0082	-0.3780
LTWN to 100 (3)	Duplicate	Good	-0.0067	0.0110	-0.3824
LTWN to 100 (4)	Duplicate	Good	-0.0043	0.0112	-0.3730
LTWN to 100 (5)	Duplicate	Good	-0.0048	0.0108	-0.3725
LTWN to 100 (6)	Duplicate	Good	-0.0040	0.0075	-0.3740
004 to 100 (3)	Duplicate	Good	1.0865	-0.1479	-8.8205
004 to 100	LoopTie	Good	1.0832	-0.1512	-8.8339
004 to 100 (1)	Duplicate	Good	1.0919	-0.1495	-8.8195
005 to 100	LoopTie	Good	1.0769	-0.1332	-8.8203
007 to 100 (1)	Duplicate	Good	-0.0112	-0.0055	-0.3770
007 to 100 (2)	Duplicate	Good	-0.0051	0.0026	-0.2528
007 to 100 (3)	Duplicate	Good	-0.0062	0.0017	-0.3671
007 to 100	LoopTie	Good	-0.0073	0.0024	-0.3640
RMS (tie points)			0.6687	0.0921	5.3056
RMS (check points)					

```
            ************************************************
            * NETWORK - WEIGHTED GNSS NETWORK ADJUSTMENT     *
            *                                                *
            * (c) Copyright NovAtel Inc., (2016)             *
            *                                                *
            * Version: 8.60.6717                             *
            *                                                *
            * FILE: D:\REMT3010\Lab5_Network_Lab\Chute_StaticGPS_Network.net
            ************************************************

DATE(m/d/y): Thur.  12/08/16   TIME: 19:14:47



************************************************************

  DATUM:            'NAD83'
  GRID:             UTM, Zone 20
  SCALE_FACTOR:     3720.8000
  CONFIDENCE LEVEL: 95.00 %   (Scale factor is 2.4479)


************************************************************
    INPUT CONTROL/CHECK POINTS
************************************************************

STA_ID     TYPE    -- LATITUDE --  -- LONGITUDE --  ELLHGT -   HZ-SD   V-SD
002        GCP-3D  44 52 58.59821  -65 10 03.45322     13.052 0.00500 0.00500
012        GCP-3D  44 53 28.83592  -65 10 01.39251      7.564 0.01150 0.01730
LTWN       GCP-3D  44 53 06.26325  -65 10 04.97542     15.710 0.00200 0.00300


****************************************************************
    INPUT VECTORS
****************************************************************

SESSION NAME           VECTOR(m)   ------ Covariance (m) [unscaled] ------
                        DX/DY/DZ          standard deviations in brackets
002 to 004 (1)         -174.7480  2.3773e-005 (0.0049)
                        182.8326  -1.3392e-005 5.6453e-005 (0.0075)
                        243.6116  7.4655e-006 -2.1567e-005 7.9504e-005 (0.0089)

002 to 004 (2)         -174.7510  3.8657e-005 (0.0062)
                        182.8283  -4.4960e-005 1.1379e-004 (0.0107)
                        243.6176  1.8246e-005 -3.1984e-005 4.6700e-005 (0.0068)

002 to 005 (1)         -261.3650  2.3778e-005 (0.0049)
                        241.9021  -1.3395e-005 5.6463e-005 (0.0075)
                        335.1848  7.4668e-006 -2.1571e-005 7.9519e-005 (0.0089)

002 to 005 (2)         -261.3626  3.8664e-005 (0.0062)
                        241.8978  -4.4968e-005 1.1381e-004 (0.0107)
                        335.1835  1.8249e-005 -3.1990e-005 4.6709e-005 (0.0068)

004 to 005 (1)          -86.6187  2.3507e-005 (0.0048)
                         59.0707  -1.2841e-005 5.5884e-005 (0.0075)
                         91.5668  2.6247e-006 -2.2391e-005 7.6019e-005 (0.0087)

004 to 005 (2)          -86.6131  3.8789e-005 (0.0062)
                         59.0722  -4.4693e-005 1.1318e-004 (0.0106)
                         91.5704  1.8513e-005 -3.2561e-005 4.8000e-005 (0.0069)

004 to 100 (1)         -555.1656  4.2077e-005 (0.0065)
                        342.5580  -4.7764e-005 1.1347e-004 (0.0107)
                        547.5191  1.8872e-005 -2.9634e-005 4.5272e-005 (0.0067)

004 to 100 (2)         -555.1539  3.0718e-005 (0.0055)
                        342.5535  -2.9539e-005 8.4627e-005 (0.0092)
                        547.5304  1.8224e-005 -1.8844e-005 8.7845e-005 (0.0094)

004 to 100 (3)         -555.1599  3.3548e-005 (0.0058)
                        342.5586  -3.0837e-005 9.5286e-005 (0.0098)
                        547.5187  3.3385e-005 -7.5544e-005 1.4022e-004 (0.0118)

005 to 007 (1)         -154.5369  2.5277e-005 (0.0050)
                         -66.4126  -2.5196e-005 7.1169e-005 (0.0084)
                           7.0683  1.7162e-005 -3.9936e-005 6.1371e-005 (0.0078)

005 to 100 (1)         -468.5328  2.5975e-005 (0.0051)
                        283.4795  -2.9240e-005 8.8865e-005 (0.0094)
                        455.9409  1.9268e-005 -4.6964e-005 6.3193e-005 (0.0079)

007 to 100 (1)         -313.9562  3.6421e-005 (0.0060)
                        349.8197  -3.7070e-005 1.1013e-004 (0.0105)
                        448.9625  4.1702e-005 -9.6083e-005 1.6835e-004 (0.0130)
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007 to 100 (2)         -313.9964  2.6962e-005 (0.0052)
                        349.8918  -3.0581e-005 9.7457e-005 (0.0099)
                        448.8692  2.0106e-005 -4.7814e-005 6.5942e-005 (0.0081)

007 to 100 (3)         -313.9616  3.2901e-005 (0.0057)
                        349.8193  -3.4643e-005 1.0766e-004 (0.0104)
                        448.9505  2.7518e-005 -5.8591e-005 1.0228e-004 (0.0101)

007 to 100 (4)         -313.9613  6.7237e-005 (0.0082)
                        349.8214  -1.3543e-004 4.5605e-004 (0.0214)
                        448.9478  8.5600e-005 -2.4675e-004 2.0106e-004 (0.0142)

012 to 007 (1)         -180.3006  2.9414e-005 (0.0054)
                       -438.7453  -2.9519e-005 1.0308e-004 (0.0102)
                       -321.6009  2.4493e-005 -5.6991e-005 1.0055e-004 (0.0100)

012 to 004 (1)           60.8971  3.4892e-005 (0.0059)
                       -431.4819  -3.5600e-005 8.9805e-005 (0.0095)
                       -420.1708  1.8926e-005 -2.3994e-005 5.5444e-005 (0.0074)

012 to 004 (2)           60.8955  3.7502e-005 (0.0061)
                       -431.4778  -3.4555e-005 9.7459e-005 (0.0099)
                       -420.1603  3.3439e-005 -6.7179e-005 1.2036e-004 (0.0110)

012 to 007 (2)         -180.3039  3.7877e-005 (0.0062)
                       -438.7415  -4.3552e-005 1.2004e-004 (0.0110)
                       -321.5885  3.2170e-005 -6.1599e-005 9.0407e-005 (0.0095)

012 to 100 (1)         -494.2650  3.5906e-005 (0.0060)
                        -88.9186  -3.3259e-005 9.6914e-005 (0.0098)
                        127.3533  3.2533e-005 -6.8585e-005 1.2426e-004 (0.0111)

012 to 100 (2)         -494.2642  3.3642e-005 (0.0058)
                        -88.9295  -3.2768e-005 9.6076e-005 (0.0098)
                        127.3548  3.7988e-005 -7.4928e-005 1.4017e-004 (0.0118)

012 to 100 (3)         -494.2625  4.5672e-005 (0.0068)
                        -88.9307  -6.6733e-005 2.1486e-004 (0.0147)
                        127.3608  4.2980e-005 -1.1129e-004 1.1112e-004 (0.0105)

012 to 100 (4)         -494.2687  4.4391e-005 (0.0067)
                        -88.9200  -5.0017e-005 1.1230e-004 (0.0106)
                        127.3475  1.9978e-005 -2.6739e-005 4.1924e-005 (0.0065)

012 to 100 (5)         -494.2573  3.0696e-005 (0.0055)
                        -88.9290  -2.9519e-005 8.4565e-005 (0.0092)
                        127.3612  1.8211e-005 -1.8830e-005 8.7782e-005 (0.0094)

LTWN to 004 (3)         -76.5777  2.3519e-005 (0.0048)
                         52.8291  -1.2873e-005 5.6022e-005 (0.0075)
                         68.0196  2.6925e-006 -2.2428e-005 7.6079e-005 (0.0087)

LTWN to 002 (1)          98.1708  2.3771e-005 (0.0049)
                       -130.0045  -1.3391e-005 5.6448e-005 (0.0075)
                       -175.5953  7.4646e-006 -2.1565e-005 7.9496e-005 (0.0089)
```

```
LTWN to 002 (2)          98.1711  3.8653e-005 (0.0062)
                       -130.0022  -4.4955e-005 1.1378e-004 (0.0107)
                       -175.5908  1.8245e-005 -3.1982e-005 4.6696e-005 (0.0068)

LTWN to 004 (1)          -76.5742  3.3963e-005 (0.0058)
                          52.8190  -3.5386e-005 9.3156e-005 (0.0097)
                          68.0135  1.7773e-005 -2.5189e-005 5.4062e-005 (0.0074)

LTWN to 004 (2)          -76.5747  3.8379e-005 (0.0062)
                          52.8240  -3.5478e-005 9.6522e-005 (0.0098)
                          68.0211  3.5639e-005 -6.7785e-005 1.2412e-004 (0.0111)

LTWN to 004 (4)          -76.5791  3.8789e-005 (0.0062)
                          52.8247  -4.4693e-005 1.1317e-004 (0.0106)
                          68.0243  1.8513e-005 -3.2561e-005 4.7999e-005 (0.0069)

LTWN to 005 (1)         -163.1997  2.5419e-005 (0.0050)
                         111.8970  -2.5555e-005 7.2629e-005 (0.0085)
                         159.5927  1.7058e-005 -3.9543e-005 6.1096e-005 (0.0078)

LTWN to 005 (2)         -163.1956  2.2702e-005 (0.0048)
                         111.8985  -1.3045e-005 5.5440e-005 (0.0074)
                         159.5870  4.7282e-006 -2.1477e-005 6.3969e-005 (0.0080)

LTWN to 005 (3)         -163.1943  3.3714e-005 (0.0058)
                         111.9027  -3.3475e-005 8.4832e-005 (0.0092)
                         159.5903  2.0477e-005 -3.5957e-005 7.0623e-005 (0.0084)

LTWN to 007 (1)         -317.7793  3.1249e-005 (0.0056)
                          45.5674  -2.8453e-005 9.4582e-005 (0.0097)
                         166.5739  3.2184e-005 -7.8782e-005 1.4707e-004 (0.0121)

LTWN to 007 (2)         -317.7370  2.3795e-005 (0.0049)
                          45.4882  -2.2596e-005 6.6926e-005 (0.0082)
                         166.6644  1.6996e-005 -3.8612e-005 6.1991e-005 (0.0079)

LTWN to 007 (3)         -317.7695  3.1022e-005 (0.0056)
                          45.5584  -3.3529e-005 1.0967e-004 (0.0105)
                         166.5929  2.0480e-005 -4.8482e-005 8.1567e-005 (0.0090)

LTWN to 007 (4)         -317.7759  3.7704e-005 (0.0061)
                          45.5704  -4.4794e-005 1.3104e-004 (0.0114)
                         166.5874  3.1498e-005 -6.2377e-005 8.7612e-005 (0.0094)

LTWN to 012 (1)         -137.4681  3.6664e-005 (0.0061)
                         484.2972  -3.4048e-005 9.8438e-005 (0.0099)
                         488.1880  3.1994e-005 -6.5511e-005 1.1760e-004 (0.0108)

LTWN to 012 (2)         -137.4714  2.7607e-005 (0.0053)
                         484.3082  -2.5572e-005 7.9748e-005 (0.0089)
                         488.1812  2.3010e-005 -5.0909e-005 1.0025e-004 (0.0100)

LTWN to 012 (3)         -137.4705  3.3763e-005 (0.0058)
                         484.3070  -4.4467e-005 1.5991e-004 (0.0126)
                         488.1757  2.6197e-005 -6.2004e-005 7.5189e-005 (0.0087)

LTWN to 012 (4)          -137.4713  3.4401e-005 (0.0059)
                          484.3020  -3.5226e-005 9.0245e-005 (0.0095)
                          488.1828  1.7842e-005 -2.2813e-005 5.3475e-005 (0.0073)

LTWN to 100 (1)          -631.7352  4.1487e-005 (0.0064)
                          395.3808  -4.1443e-005 1.0992e-004 (0.0105)
                          615.5381  3.8990e-005 -7.5496e-005 1.2783e-004 (0.0113)

LTWN to 100 (2)          -631.7367  3.5183e-005 (0.0059)
                          395.3767  -3.4268e-005 9.1467e-005 (0.0096)
                          615.5410  3.6566e-005 -6.7378e-005 1.3400e-004 (0.0116)

LTWN to 100 (3)          -631.7298  3.0729e-005 (0.0055)
                          395.3742  -2.9549e-005 8.4655e-005 (0.0092)
                          615.5422  1.8231e-005 -1.8850e-005 8.7874e-005 (0.0094)

LTWN to 100 (4)          -631.7347  4.5717e-005 (0.0068)
                          395.3792  -6.6810e-005 2.1525e-004 (0.0147)
                          615.5353  4.3019e-005 -1.1147e-004 1.1123e-004 (0.0105)

LTWN to 100 (5)          -631.7346  2.5993e-005 (0.0051)
                          395.3800  -2.9261e-005 8.8927e-005 (0.0094)
                          615.5353  1.9282e-005 -4.6997e-005 6.3236e-005 (0.0080)

LTWN to 100 (6)          -631.7357  3.6275e-005 (0.0060)
                          395.3808  -3.4506e-005 1.0099e-004 (0.0100)
                          615.5387  3.0585e-005 -6.2059e-005 1.1319e-004 (0.0106)
```

****
OUTPUT VECTOR RESIDUALS (East, North, Height - Local Level)
****

SESSION NAME	-- RE -- (m)	-- RN -- (m)	-- RH -- (m)	- PPM -	DIST (km)	STD - (m)
002 to 004 (1)	0.8953	-0.1170	-6.4038	$ 18416.599	0.4	0.7709
002 to 004 (2)	0.8998	-0.1194	-6.4099	$ 18435.619	0.4	0.8608
002 to 005 (1)	0.7818	-0.0828	-5.7984	$ 11964.850	0.5	0.7710
002 to 005 (2)	0.7815	-0.0784	-5.8011	$ 11970.043	0.5	0.8609
004 to 005 (1)	-0.1123	0.0375	0.6112	4472.268	0.1	0.7604
004 to 005 (2)	-0.1181	0.0356	0.6078	4455.692	0.1	0.8626
004 to 100 (1)	0.1356	-0.0159	-1.4883	1754.861	0.9	0.8644
004 to 100 (2)	0.1269	-0.0176	-1.5027	1770.813	0.9	0.8695
004 to 100 (3)	0.1302	-0.0143	-1.4893	1755.448	0.9	1.0006
005 to 007 (1)	0.2430	-0.0380	-2.2658	13538.055	0.2	0.7663
005 to 100 (1)	0.2385	-0.0361	-2.1006	2967.313	0.7	0.8139
007 to 100 (1)	-0.0102	-0.0038	0.0435	68.894	0.7	1.0825
007 to 100 (2)	-0.0040	0.0043	0.1676	258.055	0.7	0.8416
007 to 100 (3)	-0.0051	0.0034	0.0533	82.594	0.7	0.9506
007 to 100 (4)	-0.0062	0.0041	0.0564	87.554	0.7	1.6417
012 to 007 (1)	-0.0502	0.0175	0.8543	1493.574	0.6	0.9312
012 to 004 (1)	-0.1862	0.0346	2.4000	3977.090	0.6	0.8187
012 to 004 (2)	-0.1865	0.0241	2.3957	3969.940	0.6	0.9747
012 to 007 (2)	-0.0489	0.0054	0.8489	1483.831	0.6	0.9612
012 to 100 (1)	-0.0559	0.0127	0.9106	1761.064	0.5	0.9780
012 to 100 (2)	-0.0520	0.0189	0.9023	1744.793	0.5	1.0021
012 to 100 (3)	-0.0531	0.0159	0.8968	1734.221	0.5	1.1759
012 to 100 (4)	-0.0519	0.0166	0.9149	1769.063	0.5	0.8597
012 to 100 (5)	-0.0585	0.0161	0.8960	1733.383	0.5	0.8692
LTWN to 004 (3)	-0.1932	0.0312	2.0378	17763.482	0.1	0.7609
LTWN to 002 (1)	-1.0885	0.1515	8.4431	$ 35546.814	0.2	0.7709
LTWN to 002 (2)	-1.0898	0.1469	8.4414	$ 35540.452	0.2	0.8608
LTWN to 004 (1)	-0.1922	0.0430	2.0346	17738.449	0.1	0.8211
LTWN to 004 (2)	-0.1938	0.0344	2.0326	17719.847	0.1	0.9817
LTWN to 004 (4)	-0.1901	0.0303	2.0321	17710.934	0.1	0.8626
LTWN to 005 (1)	-0.3014	0.0650	2.6437	$ 10469.844	0.3	0.7695
LTWN to 005 (2)	-0.3058	0.0693	2.6474	$ 10486.989	0.3	0.7272
LTWN to 005 (3)	-0.3087	0.0647	2.6474	$ 10487.939	0.3	0.8390
LTWN to 007 (1)	-0.0544	0.0228	0.5054	1406.934	0.4	1.0077
LTWN to 007 (2)	-0.0596	0.0220	0.3779	1059.635	0.4	0.7538
LTWN to 007 (3)	-0.0596	0.0180	0.4833	1347.295	0.4	0.9094
LTWN to 007 (4)	-0.0588	0.0123	0.4968	1383.485	0.4	0.9766
LTWN to 012 (1)	-0.0073	0.0090	-0.3714	529.819	0.7	0.9697
LTWN to 012 (2)	-0.0089	0.0058	-0.3585	511.443	0.7	0.8789
LTWN to 012 (3)	-0.0093	0.0108	-0.3557	507.660	0.7	1.0002
LTWN to 012 (4)	-0.0064	0.0087	-0.3637	518.879	0.7	0.8141
LTWN to 100 (1)	-0.0622	0.0220	0.5435	566.421	1.0	1.0193
LTWN to 100 (2)	-0.0591	0.0222	0.5392	561.642	1.0	0.9848
LTWN to 100 (3)	-0.0644	0.0249	0.5348	557.845	1.0	0.8696
LTWN to 100 (4)	-0.0620	0.0252	0.5442	567.289	1.0	1.1768
LTWN to 100 (5)	-0.0625	0.0247	0.5448	567.852	1.0	0.8142
LTWN to 100 (6)	-0.0617	0.0215	0.5432	566.074	1.0	0.9654
RMS	0.3559	0.0502	2.7932			

$ - This session is flagged as a 3-sigma outlier

****
CONTROL POINT RESIDUALS (ADJUSTMENT MADE)
****

STA. NAME	-- RE -- (m)	-- RN -- (m)	-- RH -- (m)
002	0.0021	-0.0012	-0.0031
012	-0.0020	0.0014	0.0075
LTWN	-0.0003	0.0001	0.0009
RMS	0.0017	0.0010	0.0047

****
OUTPUT STATION COORDINATES (LAT/LONG/HT)
****

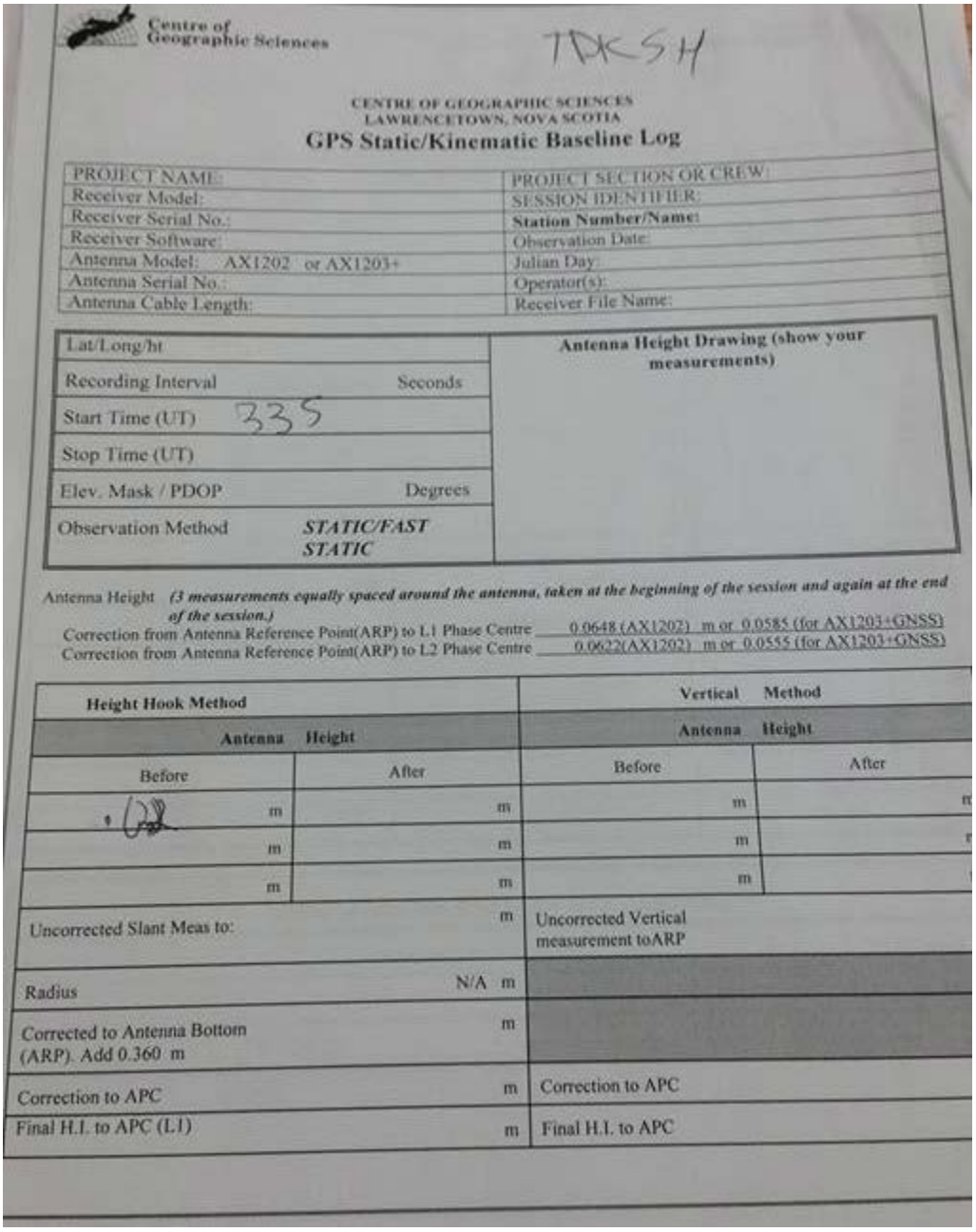
STA_ID	-- LATITUDE --	-- LONGITUDE --	- ELLHGT -	ORTHOHGT
002	44 52 58.59817	-65 10 03.45313	13.0489	34.3279
004	44 53 09.65668	-65 10 07.14012	8.9946	30.2700
005	44 53 13.81666	-65 10 09.59702	10.4704	31.7446
007	44 53 14.08327	-65 10 17.24786	9.9196	31.1954
012	44 53 28.83596	-65 10 01.39260	7.5715	28.8374
100	44 53 34.65940	-65 10 23.53953	8.4957	29.7632
LTWN	44 53 06.26325	-65 10 04.97543	15.7109	36.9872

****
OUTPUT STATION COORDINATES (GRID)
****

STA_ID	- EASTING - (m)	- NORTHING - (m)	- ELLHGT - (m)	ORTHOHGT (m)
002	328810.1961	4972232.7407	13.0489	34.3279
004	328738.4304	4972576.1350	8.9946	30.2700
005	328687.9659	4972705.9401	10.4704	31.7446
007	328520.3561	4972718.6557	9.9196	31.1954
012	328880.3159	4973164.5839	7.5715	28.8374
100	328399.3454	4973357.2702	8.4957	29.7632
LTWN	328783.1188	4972470.1548	15.7109	36.9872

```
*****************************************************************
    OUTPUT VARIANCE/COVARIANCE
*****************************************************************
                                                 2
STA_ID      SE/SN/SUP  --------- CX matrix (m )-----------
            (95.00 %)  (not scaled by confidence level)
               (m)          (ECEF, XYZ cartesian)
002           0.01223  2.4958e-005
              0.01223  -1.2149e-008 2.4983e-005
              0.01224  3.9021e-009 -4.4075e-009 2.4983e-005

004           0.18630  9.5993e-003
              0.28923  -8.5382e-003 2.4916e-002
              0.45628  5.0206e-003 -9.1084e-003 1.9982e-002

005           0.21097  1.1820e-002
              0.31634  -1.0371e-002 3.1742e-002
              0.52348  5.9479e-003 -1.3222e-002 2.6300e-002

007           0.20371  1.1659e-002
              0.29715  -1.2117e-002 3.7194e-002
              0.59974  9.3378e-003 -2.0613e-002 3.2839e-002

012           0.02789  1.4473e-004
              0.02803  -3.2375e-005 1.9999e-004
              0.04223  3.5132e-005 -7.5429e-005 2.1378e-004

100           0.16028  7.5351e-003
              0.24197  -7.5740e-003 2.1856e-002
              0.45124  5.5550e-003 -1.0755e-002 1.8650e-002

LTWN          0.00489  4.4398e-006
              0.00489  -9.5714e-007 6.0656e-006
              0.00734  1.0498e-006 -2.2683e-006 6.4878e-006



*****************************************************************
    VARIANCE FACTOR = 8.6898

    Note: Values < 1.0 indicate statistics are pessimistic, while
          values > 1.0 indicate optimistic statistics. Entering this
          value as the network adjustment scale factor will bring
          variance factor to one.
*****************************************************************
```

GPS BASELINE LOGS (ONE FOR EACH STATION AND OBSERVATION SESSION)



Centre of Geographic Sciences

TDKSH

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

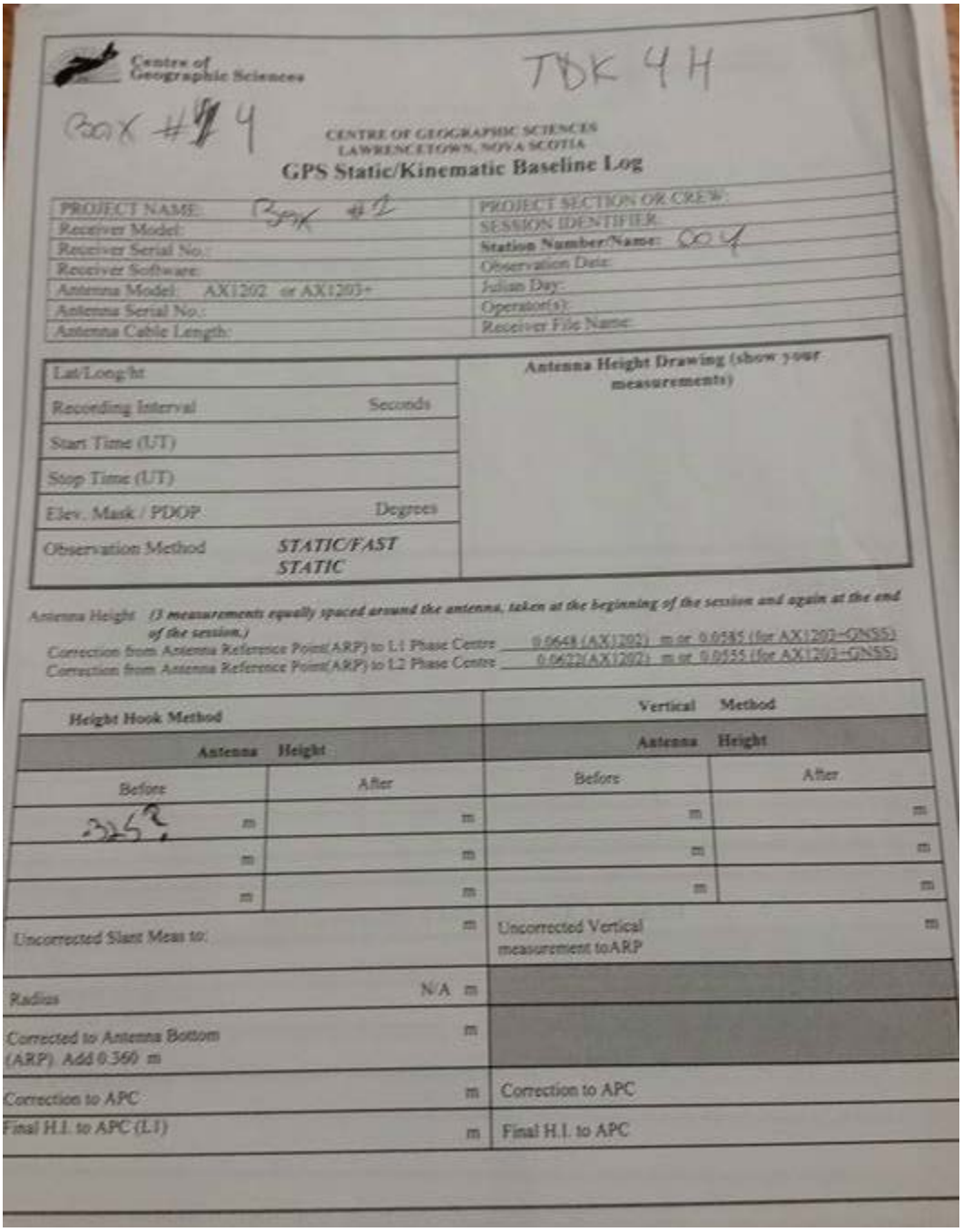
PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 335	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)
Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	



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TDK 4H

Box #4

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME: Box #4	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	Station Number/Name: 004
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	Antenna Height Drawing (show your measurements)
Recording Interval Seconds	
Start Time (UT)	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method STATIC/FAST STATIC	

Antenna Height (3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		Vertical Method	
Antenna Height		Antenna Height	
Before	After	Before	After
3.52 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Mean to: m		Uncorrected Vertical measurement to ARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP) Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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GPS Static/Kinematic Baseline Log

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 13:58	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***
Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)
Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
1.832 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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100 G

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LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT)	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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TDK 5 [illegible] 4Box 2

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 226	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***
Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)
Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.564 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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Box # 1 TNC76

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME: TNC 26	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	Station Number/Name: 003
Receiver Software:	Observation Date: 203
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval: Seconds	
Start Time (UT): 231	
Stop Time (UT):	
Elev. Mask / PDOP: Degrees	
Observation Method: *STATIC/FAST STATIC*	

Antenna Height: *(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)*
Correction from Antenna Reference Point(ARP) to L1 Phase Centre: 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)
Correction from Antenna Reference Point(ARP) to L2 Phase Centre: 0.0622(AX1202) m or 0.0333 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
a 1.71 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement to ARP: m	
Radius: NA m			
Corrected to Antenna Bottom (ARP). Add 0.360 m: m			
Correction to APC: m		Correction to APC	
Final H.I. to APC (L1): m		Final H.I. to APC	

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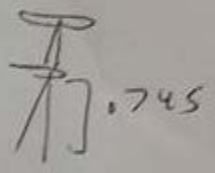
CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA
Remote Sensing
GPS Static Baseline Log

Project:	Operator(s): TDK012F
Receiver Model:	Session Identifier:
Receiver Serial #:	Station Identifier:
Antenna Model: AX1202 or AX1203+	Calendar Date:
Antenna Serial #:	Julian Day:
Data File Name:	

Lat/Long/Ht:	Antenna Height Drawing (show your measurements)
Start Time (UTC): 2114	
Stop Time (UTC):	
Elev. Mask / PDOP Degrees	
Recording Interval: Seconds	

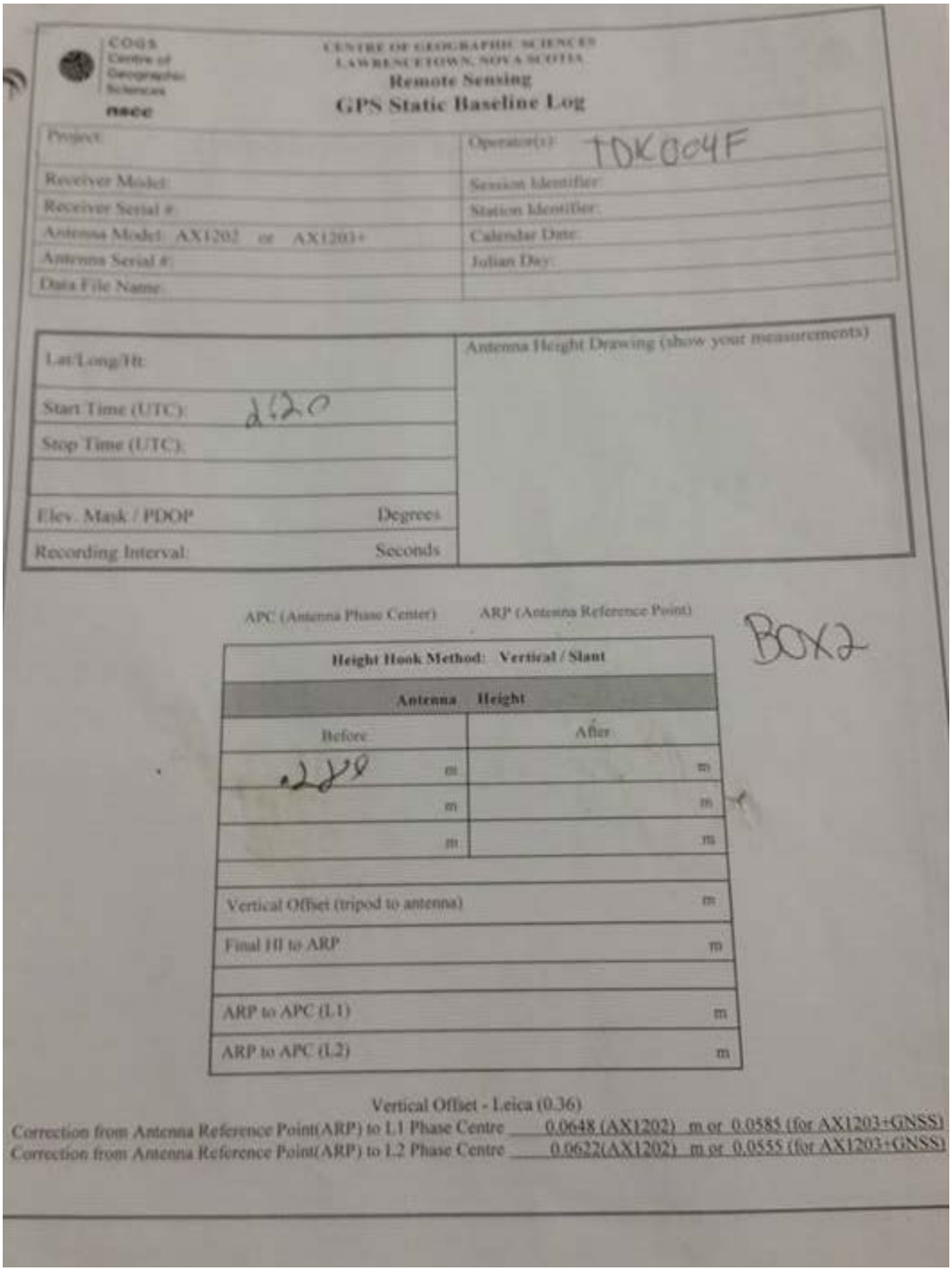
APC (Antenna Phase Center) ARP (Antenna Reference Point)

BOX 4

Height Hook Method: Vertical / Slant	
Antenna Height	
Before	After
.745 m	m
m	m
m	m
Vertical Offset (tripod to antenna)	m
Final HI to ARP	m
ARP to APC (L1)	m
ARP to APC (L2)	m

Vertical Offset - Leica (0.36)

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNS
Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNS



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LAWRENCETOWN, NOVA SCOTIA

Remote Sensing

GPS Static Baseline Log

Project:	Operation(s): TDK004F
Receiver Model:	Session Identifier:
Receiver Serial #:	Station Identifier:
Antenna Model: AX1202 or AX1203+	Calendar Date:
Antenna Serial #:	Julian Day:
Data File Name:	

Lat/Long/Ht:	Antenna Height Drawing (show your measurements)
Start Time (UTC): 2120	
Stop Time (UTC):	
Elev. Mask / PDOP Degrees	
Recording Interval: Seconds	

APC (Antenna Phase Center) ARP (Antenna Reference Point)

BOX2

Height Hook Method: Vertical / Slant	
Antenna Height	
Before:	After:
.228 m	m
m	m
m	m
Vertical Offset (tripod to antenna)	m
Final HI to ARP	m
ARP to APC (L1)	m
ARP to APC (L2)	m

Vertical Offset - Leica (0.36)

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

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LAWRENCETOWN, NOVA SCOTIA

Remote Sensing

GPS Static Baseline Log

Project:	Operator(s): TDK 100F2
Receiver Model:	Session Identifier:
Receiver Serial #:	Station Identifier:
Antenna Model: AX1202 or (AX1203+)	Calendar Date:
Antenna Serial #:	Julian Day: Nov 30
Data File Name:	

Lat/Long/Ht: 1:54	Antenna Height Drawing (show your measurements)
Start Time (UTC):	0.187
Stop Time (UTC):	
Elev. Mask / PDOP Degrees	
Recording Interval: Seconds	

APC (Antenna Phase Center) ARP (Antenna Reference Point) BOX1

Height Hook Method: Vertical / Slant	
Antenna Height	
Before	After
.187 m	m
m	m
m	m
Vertical Offset (tripod to antenna)	m
Final HI to ARP	m
ARP to APC (L1)	m
ARP to APC (L2)	m

Vertical Offset - Leica (0.36)

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

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TDK7E

BOX 4

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	Station Number/Name: 007E
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing** *(show your measurements)*
Recording Interval Seconds	
Start Time (UT) 11:24	
Stop Time (UT) 12:25	
Elev. Mask / PDOP Degrees	
Observation Method *STATIC/FAST STATIC*	

Antenna Height *(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)*

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0785 (for AX1203+/2050)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622 (AX1202) m or 0.0755 (for AX1203+/2050)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.674 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement to ARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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LAWRENCETOWN, NOVA SCOTIA

Box #2

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 11.41	
Stop Time (UT) 12.14	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m	m		
Correction to APC	m	Correction to APC	
Final H.I. to APC (L1)	m	Final H.I. to APC	

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7DC 5D

BOX 1

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 10.19	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
1.724 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP), Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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Box #2

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LAWRENCETOWN, NOVA SCOTIA

7DE002D

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER
Receiver Serial No.:	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 1029	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method *STATIC/FAST STATIC*	

Antenna Height *(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)*

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0625(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.782 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m	m		
Correction to APC	m	Correction to APC	
Final H.I. to APC (L1)	m	Final H.I. to APC	

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Box #4

TDK07
TDK7C

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GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.: Box #4	**Station Number/Name:** 007
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 0900	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.657 m	m	m	m
m	m	m	m
m	m	m	m

Uncorrected Slant Meas to:	m	Uncorrected Vertical measurement toARP	m
Radius	N/A m		
Corrected to Antenna Bottom (ARP). Add 0.360 m	m		
Correction to APC	m	Correction to APC	
Final H.I. to APC (L1)	m	Final H.I. to APC	

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TDIC 25 C

Box 2

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GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:** 003C
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT)	
Stop Time (UT) 2352	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0[illegible] (for AX1[illegible] GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.609 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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Box #4

7DK 100C

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LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME: 7DK 100C	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	**Station Number/Name:** 100C
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 9.21	
Stop Time (UT) 9.51	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

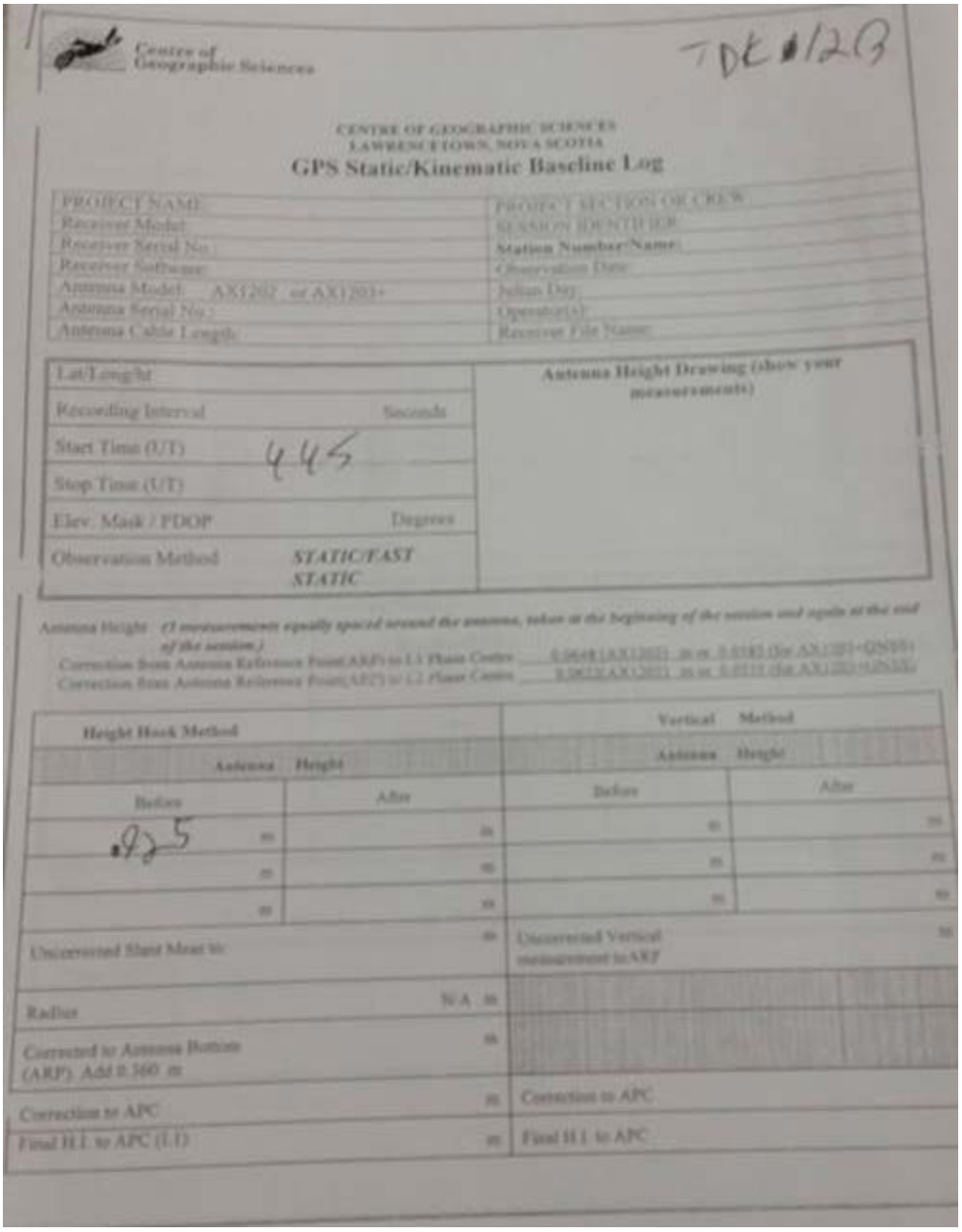
Antenna Height ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.127 m	m	m	m
m	m	m	m
m	m	m	m

Uncorrected Slant Meas to:	m	Uncorrected Vertical measurement toARP	
Radius	N/A m		
Corrected to Antenna Bottom (ARP). Add 0.360 m	m		
Correction to APC	m	Correction to APC	
Final H.I. to APC (L1)	m	Final H.I. to APC	



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TDK #123

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT LOCATION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.:	Station Number/Name:
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 445	
Stop Time (UT)	
Elev. Mask / PDOP Degrees	
Observation Method *STATIC/FAST STATIC*	

Antenna Height *(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)*
Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0583 (for AX1202+GNSS)
Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0672 (AX1203+) m or 0.0515 (for AX1202+GNSS)

Height Hook Method		Vertical Method	
Antenna Height		Antenna Height	
Before	After	Before	After
.925 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement to ARP: m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m m			
Correction to APC m		Correction to APC	
Final H.I. to APC (I.I) m		Final H.I. to APC	

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TOK4B

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No.: 8AX2	Station Number/Name: TOK4B
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht:	**Antenna Height Drawing (show your measurements)**
Recording Interval: Seconds	
Start Time (UT): 4:24	
Stop Time (UT):	
Elev. Mask / PDOP: Degrees	
Observation Method: *STATIC/FAST STATIC*	

Antenna Height: ***(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)***

Correction from Antenna Reference Point(ARP) to L1 Phase Centre: 0.0648 (AX1202) m or 0.0583 (for AX1201+GNSS)

Correction from Antenna Reference Point(ARP) to L2 Phase Centre: 0.0622(AX1202) m or 0.0557 (for AX1202+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.165 m	m	m	m
m	m	m	m
m	m	m	m

Uncorrected Slant Meas to:	m	Uncorrected Vertical measurement toARP	m
Radius	N/A m		
Corrected to Antenna Bottom (ARP). Add 0.360 m	m		
Correction to APC	m	Correction to APC	
Final H.I. to APC (L1)	m	Final H.I. to APC	

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GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER:
Receiver Serial No: 80	**Station Number/Name:**
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT) 4:54	
Stop Time (UT) 5:24	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height *(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)*
Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)
Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0637(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
1.27 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	

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TDK12A

CENTRE OF GEOGRAPHIC SCIENCES
LAWRENCETOWN, NOVA SCOTIA

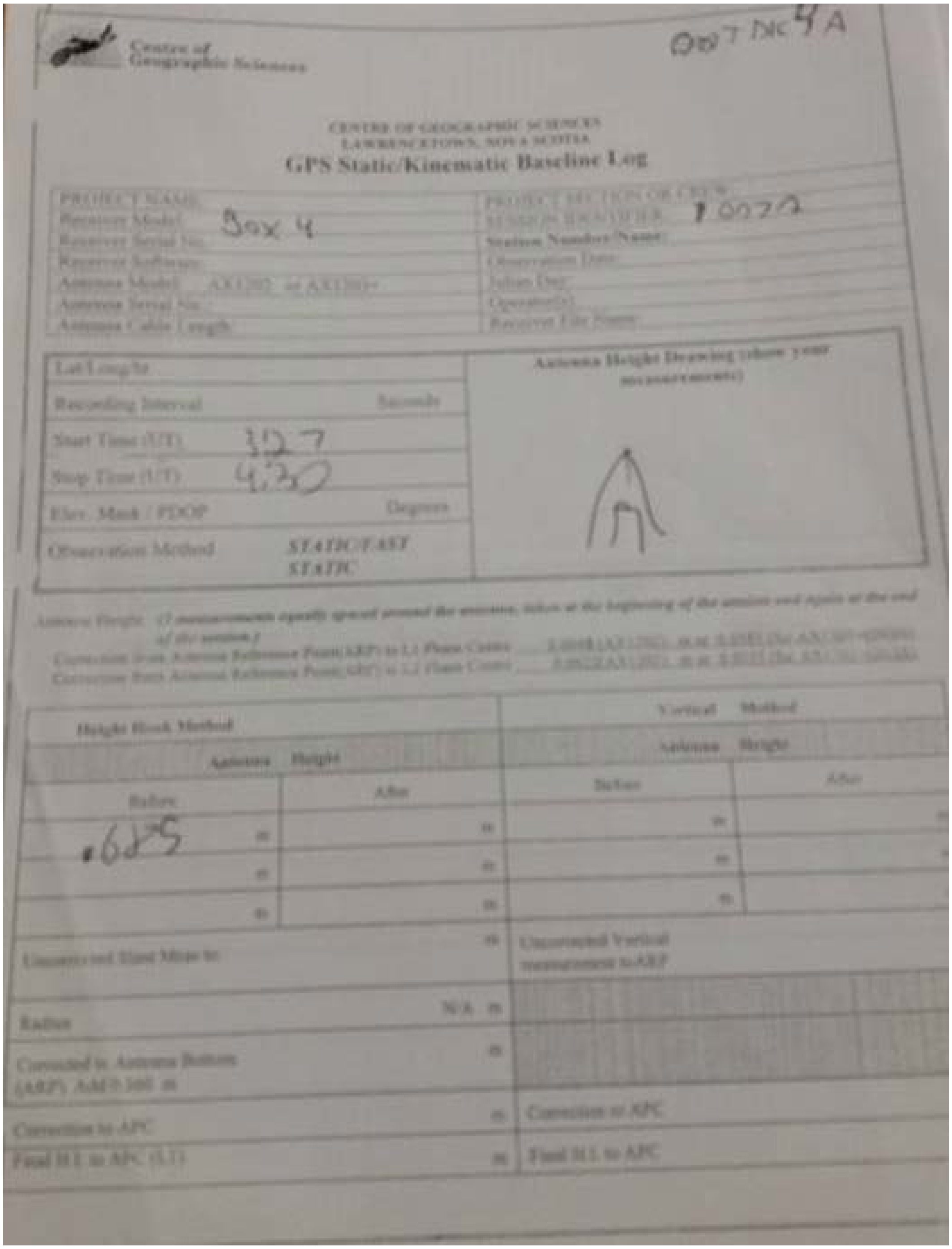
GPS Static/Kinematic Baseline Log

PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model:	SESSION IDENTIFIER: M
Receiver Serial No: 7808X2	**Station Number/Name:** 012A
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No:	Operator(s):
Antenna Cable Length:	Receiver File Name:

Lat/Long/ht	**Antenna Height Drawing (show your measurements)**
Recording Interval Seconds	
Start Time (UT)	
Stop Time (UT) 5:03	
Elev. Mask / PDOP Degrees	
Observation Method ***STATIC/FAST STATIC***	

Antenna Height *(3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)*
Correction from Antenna Reference Point(ARP) to L1 Phase Centre 0.0648 (AX1202) m or 0.0585 (for AX1203+GNSS)
Correction from Antenna Reference Point(ARP) to L2 Phase Centre 0.0622(AX1202) m or 0.0555 (for AX1203+GNSS)

Height Hook Method		**Vertical Method**	
Antenna Height		**Antenna Height**	
Before	After	Before	After
.723 m	m	m	m
m	m	m	m
m	m	m	m
Uncorrected Slant Meas to: m		Uncorrected Vertical measurement toARP m	
Radius N/A m			
Corrected to Antenna Bottom (ARP). Add 0.360 m m			
Correction to APC m		Correction to APC	
Final H.I. to APC (L1) m		Final H.I. to APC	



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LAWRENCETOWN, NOVA SCOTIA

GPS Static/Kinematic Baseline Log

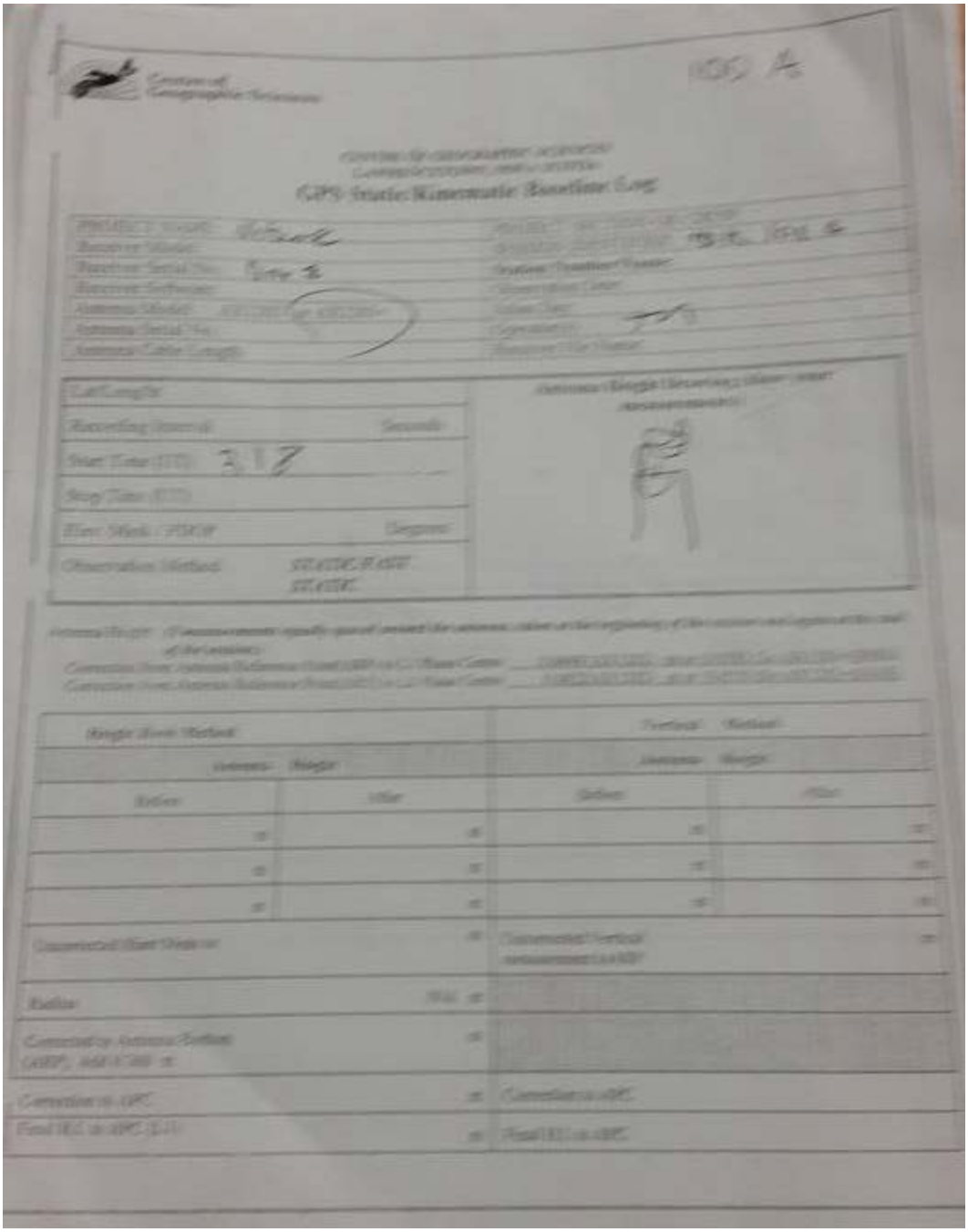
PROJECT NAME:	PROJECT SECTION OR CREW:
Receiver Model: Box 4	SESSION IDENTIFIER: 1007A
Receiver Serial No.:	Station Number/Name:
Receiver Software:	Observation Date:
Antenna Model: AX1202 or AX1203+	Julian Day:
Antenna Serial No.:	Operator(s):
Antenna Cable Length:	Receiver File Name:

		Antenna Height Drawing (show your measurements)
Lat/Long/ht		
Recording Interval	Seconds	
Start Time (UT)	3:27	
Stop Time (UT)	4:30	
Elev. Mask / PDOP	Degrees	
Observation Method	STATIC/FAST STATIC	

Antenna Height: (3 measurements equally spaced around the antenna, taken at the beginning of the session and again at the end of the session.)

Correction from Antenna Reference Point(ARP) to L1 Phase Centre
Correction from Antenna Reference Point(ARP) to L2 Phase Centre

Height Hook Method		Vertical Method	
Antenna Height		Antenna Height	
Before	After	Before	After
.625 m	m	m	
m	m	m	
m	m	m	
Uncorrected Slant Measure	m	Uncorrected Vertical measurement to ARP	
Radius	N/A m		
Corrected to Antenna Bottom (ARP)	m		
Correction to APC	m	Correction to APC	
Final H.I. to APC (L1)	m	Final H.I. to APC	



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