# AIRBORNE TOPOGRAPHIC LIDAR REPORT

# GARRETT COUNTY, MD QL2 LIDAR

Contract No. G10PC00026 Requisition No. 0040186553 Task Order No. G15PD00051

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### 1. SUMMARY/SCOPE

# 1.1. SUMMARY

This report contains a summary of the Garrett County, MD LiDAR acquisition task order, issued by the USGS National Geospatial Technical Operations Center, under their Geospatial Product and Services Contract on December 23, 2014. The combined task orders yielded one study area covering the Garrett County, MD. The intent of this document is to only provide specific validation information for the LiDAR data acquisition/collection work completed for the USGS NGTOC project.

# **1.2. SCOPE**

The scope of the Garrett County, MD LiDAR task order included the acquisition of aerial topographic LiDAR using state of the art technology, along with necessary surveyed ground control points (GCPs) and airborne GPS and inertial navigation systems, for Garrett County, MD. The aerial data collection was designed with the following specifications listed in Table 1 below.

#### Table 1. Originally Planned LiDAR Specifications

Average Point Density	Flight Altitude (AGL)	Field of View	Minimum Side Overlap	RMSEz
2.52 pts / m^2	1445 – 2200 m	40.0 degrees	11.79%	≤ 10 cm

# 1.3. LOCATION / COVERAGE

The Garrett County, MD LiDAR project boundary covers the entire county and totals approximately 739 square miles, as shown in Figure 1 on the following page.





#### Figure 1. Garrett County, MD LiDAR Project Boundary



# 1.4. **DURATION**

The first mission was flown on April 24, 2014 and it took eight total lifts to complete coverage of the area. See Section 2.4 for more details.

### 1.5. ISSUES

Persistent snow coverage followed by rapid leaf-out conditions caused multiple mobilizations to the project site for both the ground and aerial acquisition teams, thus causing the rescheduling of the pilot delivery date.

# 2. PLANNING / EQUIPMENT

The entire target area was comprised of 76 planned flight lines and approximately 1,732.082 flight line miles. Please refer to Figure 2 on the following pages.



# Figure 2. Originally Planned Flight Lines





Detailed project flight planning calculations were performed for the Garrett County, MD project using Leica Mission Pro planning software. Flight planning was based on the unique project requirements and characteristics of the project site. The basis of planning included: required accuracies, type of development, amount / type of vegetation within project area, required data posting, and potential altitude restrictions for flights in project vicinity. Please note that certain values in the table below are listed as "Variable" due to the various flight plans used, as described in Section 1.5 of this document. A brief summary of the aerial acquisition parameters for the project are shown in the LiDAR System Specification Table 2 below:

Torrain and Aircraft	Flying Height AGL	1445 – 2200 m
Recommended Ground Speed (GS)		120 kts
Scoppor	Field of View (FOV)	40°
Scanner	Scan Rate Setting used (SR)	33.3 Hz
Lacor	Laser Pulse Rate used	249,200 Hz
Lasei	Multi Pulse in Air Mode	Enabled
Coverage	Full Swath Width	1,601.47 meters
Coverage	Line Spacing	927.89 meters
	Maximum Point Spacing Across Track	0.93 m
Point Spacing and Density	Maximum Point Spacing Along Track	0.93 m
	Average Point Density	2.52 pts / m^2

#### Table 2. LiDAR System Specifications

### 2.1. EQUIPMENT: AIRCRAFT

All flights for the Garrett County, MD project were accomplished through the use of two customized Piper Navajo (twin-piston) planes (Tail Number: N262AS and 1827H) and a VULCANAIR Observer (twin-piston) (Tail Number: 1827H). This aircraft provided an ideal, stable aerial base for LiDAR acquisition. This aerial platform has relatively fast cruise speeds which are beneficial for project mobilization / demobilization while maintaining relatively slow stall speeds which proved ideal for collection of high-density, consistent data posting using a state-of-the-art Leica LiDAR system.



# 2.2. LIDAR SENSOR

Quantum Spatial utilized a Leica LiDAR sensor (see Figure 3), serial numbers 7122, 7178, and 7225, during the project. The system is capable of collecting data at a maximum frequency of 500 kHz, which affords elevation data collection of up to 500,000 points per second. The system utilizes a Multi-Pulse in the Air option (MPIA). The sensor is also equipped with the ability to measure up to 4 returns per outgoing pulse from the laser and these come in the form of 1st, 2nd, 3rd and last returns. The intensity of the returns is also captured during aerial acquisition.

Figure 3. Leica ALS70 LiDAR System





### 2.3. BASE STATION INFORMATION

GPS base stations were utilized during all phases of flight (see Table 3 below). The base station locations were verified using NGS OPUS service and subsequent surveys. Base Station locations are depicted in Figure 4. Data sheets, graphical depiction of base station locations or log sheets used during station occupation are available in Appendix A.

Base Station	Latitude	Longitude	Ellipsoid Height (m)
LOYS	39° 38' 46.39061"	78° 43' 47.89729"	169.354
WVTA	39° 26' 16.64399"	79° 30' 52.95281"	726.044

#### Table 3. Base Station Locations



### Figure 3. Base Station Locations





#### TIME PERIOD 2.4.

Project specific flights were conducted over several months. Seven sorties, or aircraft lifts were completed. Accomplished sorties are listed below:

- 20150412A\_7123
- 20150502A 7225 20150503A\_7225
- 20150504B 7225

- 20150424\_7225 20150429A\_7225
- - 20150504A 7225

#### 3. PROCESSING SUMMARY

Applanix + POSPac Mobile Mapping Suite software was used for post-processing of airborne GPS and inertial data (IMU), which is critical to the positioning and orientation of the LiDAR sensor during all flights. POSPac combines aircraft raw trajectory data with stationary GPS base station data yielding a "Smoothed Best Estimate Trajectory (SBET) necessary for additional post processing software to develop the resulting geo-referenced point cloud from the LiDAR missions.

During the sensor trajectory processing (combining GPS & IMU datasets) certain statistical graphs and tables are generated within the Applanix POSPac processing environment which are commonly used as indicators of processing stability and accuracy. This data for analysis include: Max horizontal / vertical GPS variance, separation plot, altitude plot, PDOP plot, base station baseline length, processing mode, number of satellite vehicles, and mission trajectory. All relevant graphs produced in the POSPac processing environment for each sortie during the Quantum Spatial project mobilization are available in Appendix A.

The generated point cloud is the mathematical three dimensional composite of all returns from all laser pulses as determined from the aerial mission. Laser point data are imported into TerraScan and a manual calibration is performed to assess the system offsets for pitch, roll, heading and scale. At this point this data is ready for analysis, classification, and filtering to generate a bare earth surface model in which the above-ground features are removed from the data set. Point clouds were created using the Leica ALS Post Processor. GeoCue distributive processing software was used in the creation of some files needed in downstream processing, as well as in the tiling of the dataset into more manageable file sizes. TerraScan and TerraModeler software packages were then used for the automated data classification, manual cleanup, and bare earth generation. Project specific macros were developed to classify the ground and remove side overlap between parallel flight lines.

All data will manually be reviewed and any remaining artifacts removed using functionality provided by TerraScan and TerraModeler. Global Mapper will be used as a final check of the bare earth dataset. GeoCue was used to create the deliverable industry-standard LAS files for the All Point Cloud Data. In-house software will then be used to perform final statistical analysis of the classes in the LAS files.

Metadata was generated for the project on a deliverable level.



# 3.1. FLIGHT LOGS

Flight logs were completed by LIDAR sensor technicians for each mission during acquisition. These logs depict a variety of information, including:

- Job / Project #
- Flight Date / Lift Number
- FOV (Field of View)
- Scan Rate (HZ)
- Pulse Rate Frequency (Hz)
- Ground Speed
- Altitude
- Base Station
- PDOP avoidance times
- Flight Line #
- Flight Line Start and Stop Times
- Flight Line Altitude (AMSL)
- Heading
- Speed
- Returns
- Crab

Notes: (Visibility, winds, ride, weather, temperature, dew point, pressure, etc). Project specific flight logs for each sortie are available in Appendix A.

# 3.2. LAS CLASSIFICATION SCHEME

The classification classes are determined by the USGS Version 1.2 specifications and are an industry standard for the classification of LIDAR point clouds. All data starts the process as Class 1 (Unclassified), and then through automated classification routines, the classifications are determined using TerraScan macro processing. Overlap points are identified using the overlap bit as specified in the USGS Version 1.2 Specifications.

The classes used in the dataset are as follows and have the following descriptions:

- Class 1 Processed, but Unclassified These points would be the catch all for points that do not fit any of the other deliverable classes. This would cover features such as vegetation, cars, etc.
- Class 2 Bare earth ground This is the bare earth surface
- Class 7 Low Noise Low points, manually identified above or below the surface that could be noise points in point cloud.
- Code 8 Model Key Point
- Class 9 In-land Water Points found inside of inland lake/ponds
- Class 10 Ignored Ground Points found to be close to breakline features. Points are moved to this class from the Class 2 dataset. This class is ignored during the DEM creation process in order to provide smooth transition between the ground surface and hydro flattened surface.
- Class 17 Bridge Decks Points that fall on bridge decks.
- Class 18 High Noise High points, manually identified above or below the surface that could be noise points in point cloud.



### 3.3. CLASSIFIED LAS PROCESSING

The bare earth surface is then manually reviewed to ensure correct classification on the Class 2 (Ground) points. After the bareearth surface is finalized; it is then used to generate all hydro-breaklines through heads-up digitization.

All ground (ASPRS Class 2) LiDAR data inside of the Lake Pond and Double Line Drain hydro flattening breaklines were then classified to water (ASPRS Class 9) using TerraScan macro functionality. A buffer of 1 meter was also used around each hydro flattened feature to classify these ground (ASPRS Class 2) points to Ignored ground (ASPRS Class 10). All Lake Pond Island and Double Line Drain Island features were checked to ensure that the ground (ASPRS Class 2) points were reclassified to the correct classification after the automated classification was completed.

All overlap data was processed through automated functionality provided by TerraScan to classify the overlapping flight line data to approved classes by USGS. The overlap points were identified using the overlap bit as specified in the USGS Version 1.2 Specifications.

All data was manually reviewed and any remaining artifacts removed using functionality provided by TerraScan and TerraModeler. Global Mapper is used as a final check of the bare earth dataset. GeoCue was then used to create the deliverable industry-standard LAS files for all point cloud data. Quantum Spatial proprietary software was used to perform final statistical analysis of the classes in the LAS files, on a per tile level to verify final classification metrics and full LAS header information.

### 3.4. HYDRO FLATTENING BREAKLINE PROCESS

Class 2 LiDAR was used to create a bare earth surface model. The surface model was then used to heads-up digitize 2D breaklines of Inland Streams and Rivers with a 30 meter nominal width and Inland Ponds and Lakes of 2 acres or greater surface area.

Elevation values were assigned to all Inland Ponds and Lakes, Inland Pond and Lake Islands, Inland Streams and Rivers and Inland Stream and River Islands using TerraModeler functionality.

Elevation values were assigned to all Inland streams and rivers using Quantum Spatial proprietary software.

All ground (ASPRS Class 2) LiDAR data inside of the collected inland breaklines were then classified to water (ASPRS Class 9) using TerraScan macro functionality. A buffer of 1 meter was also used around each hydro flattened feature. These points were moved from ground (ASPRS Class 2) to Ignored Ground (ASPRS Class 10).

The breakline files were then translated to ESRI Shapefile format using ESRI conversion tools.

### 3.5. HYDRO FLATTENING RASTER DEM PROCESS

Class 2 LiDAR in conjunction with the hydro breaklines were used to create a 1 meter Raster DEM. Using automated scripting routines within ArcMap, an ERDAS Imagine IMG file was created for each tile. Each surface is reviewed using Global Mapper to check for any surface anomalies or incorrect elevations found within the surface.



### 4. **DELIVERABLES**

- Uncalibrated, unclassified raw point cloud swath LAS in version 1.4 format
- Classified point cloud tiled LAS in version 1.4 format
- Hydro flattened raster DEM in ERDAS .IMG format
- Hydro flattened breaklines in shape file format
- Ground control points in shape file format
- Intensity image, tiled, in GeoTIFF format
- Project and deliverable level metadata in XML format
- Project report

### 5. **PROJECT COVERAGE VERIFICATION**

The Garrett County, MD project area coverage verification was performed by comparing coverage of processed .LAS files captured during project collection to generate project shape files depicting boundaries of specified project areas. Please refer to Figure 5.



Figure 5. Flightline Swath LAS File Coverage



### 6. GROUND CONTROL AND CHECK POINT COLLECTION

Quantum Spatial completed a field survey of 20 ground control (calibration) points along with 87 blind QA points (total of 107 points) as an independent test of the accuracy of this project. A combination of precise GPS surveying methods, including static



and RTK observations were used to establish the 3D position of ground calibration points and QA points for the point classes above. GPS was not an appropriate methodology for surveying in the forested areas during the leaf-on conditions for the actual field survey (which was accomplished after the LiDAR acquisition). Therefore the 3D positions for the forested points were acquired using a GPS-derived offset point located out in the open near the forested area, and using precise offset surveying techniques to derive the 3D position of the forested point from the open control point. The explicit goal for these surveys was to develop 3D positions that were three times greater than the accuracy requirement for the elevation surface. In this case of the blind QA points the goal was a positional accuracy of 5 cm in terms of the RMSE.

Figure 6 shows the location of each bare earth calibration point for the project area. Table 4 depicts the Control Report for the LiDAR bare earth calibration points shown in Figure 6, as computed in TerraScan as a quality assurance check. Note that these results of the surface calibration are not an independent assessment of the accuracy of these project deliverables, but the statistical results do provide additional feedback as to the overall quality of the elevation surface.

The project was delivered using the following horizontal projection(s): NAD83 UTM Zone 17, meters; NAVD88 Geoid 12A, meters. In this document, horizontal coordinates for ground control and QA points for all LiDAR classes are reported in UTM Zone 17, meters.

The required accuracy testing was performed on the LiDAR dataset (both the LiDAR point cloud and derived DEM's) according to the USGS LiDAR Base Specification Version 1.0 (2012). The locations for all tested blind QA points are shown in Figure 7. The summary below provides the results of this testing:

# Point Cloud Testing

 Raw Non-Vegetated Vertical Accuracy (Raw NVA): The tested Raw NVA for the dataset was found to be 0.036 meters in terms of the RMSEz. The resulting NVA stated as the 95% confidence level (RMSEz x 1.96) is 0.070 meters. This dataset *meets* the required NVA of 19.6 cm at the 95% confidence level (according to the National Standard for Spatial Database Accuracy (NSSDA)), based on TINs derived from the final calibrated and controlled LiDAR swath data. This is summarized in Table 5.

### **Digital Elevation Model (DEM) Testing**

- Non-Vegetated Vertical Accuracy (NVA): The tested NVA for the dataset captured from the DEM using bi-linear interpolation to derive the DEM elevations was found to be 0.033 meters in terms of the RMSEz. The resulting accuracy stated as the 95% confidence level (RMSEz x 1.96) is 0.064 meters. This dataset *meets* the required NVA of ≤19.6 cm at the 95% confidence level (based on NSSDA). This is summarized in Table 6.
- Vegetated Vertical Accuracy (VVA): The tested VVA for the dataset captured from the DEM using bi-linear interpolation for all classes (including the bare earth class) was found to be 0.143, which is stated in terms of the 95<sup>th</sup> percentile error. Therefore the data *meets* the required VVA of ≤29.4 cm. This test was based on the 95<sup>th</sup> percentile error (based on ASPRS guidelines) across <u>all</u> land cover categories. This is also summarized in Table 6.





Figure 6. LiDAR Ground Control Points Used in Calibration



#### Figure 7. All Final LiDAR QA Point Locations





# Table 4. LiDAR Calibration Point Report (Units = Meters)

Number	Easting	Northing	Known Z	Laser Z	Dz
CP1	630705.00	4394463.99	706.60	706.61	0.01
CP2	645117.27	4396082.70	780.28	780.30	0.02
CP3	658055.10	4396190.15	717.91	717.90	0.00
CP4	663264.53	4397000.25	814.27	814.29	0.02
CP5	673591.16	4395165.66	793.26	793.26	0.00
CP6	630898.93	4367962.29	763.40	763.42	0.02
CP7	631034.22	4387854.93	709.12	709.11	-0.01
CP8	664611.82	4384981.44	538.46	538.41	-0.05
CP9	659929.40	4378854.40	451.65	451.67	0.02
CP10	665395.71	4374415.47	627.96	627.97	0.01
CP11	643401.75	4373974.73	790.98	790.98	0.00
CP12	640551.13	4368790.37	784.59	784.57	-0.02
CP13	652387.27	4369943.03	747.35	747.36	0.01
CP14	665756.75	4371336.77	317.62	317.64	0.02
CP15	640660.48	4362450.42	743.61	743.63	0.02
CP16	633586.86	4343715.20	856.42	856.41	0.00
CP17	631151.37	4340712.82	825.23	825.24	0.01
CP18	632884.63	4346973.49	940.72	940.69	-0.03
CP19	634835.69	4353494.61	752.56	752.48	-0.08
CP20	647390.33	4382367.69	823.39	823.35	-0.04
Average dz	0.00 m				

0.00 m
-0.077 m
0.025 m
0.028 m
0.028 m



# Table 5. Raw NVA – QA Points (Units = Meters)

	1	-			
Number	Easting	Northing	Known Z	Lidar Z	Dz
BE01	631490.33	4396132.81	688.53	688.49	-0.04
BE02	645140.94	4396257.91	781.63	781.65	0.03
BE03	649248.76	4395791.77	812.25	812.30	0.05
BE04	657672.47	4396296.26	735.95	736.00	0.05
BE05	663315.79	4397057.17	813.32	813.40	0.08
BE06	666064.88	4391821.34	795.94	795.89	-0.05
BE07	631139.56	4387703.82	711.41	711.39	-0.02
BE08	636930.87	4397017.32	564.61	564.58	-0.03
BE09	644328.35	4387067.20	719.77	719.75	-0.02
BE10	653008.24	4386003.49	797.27	797.26	-0.01
BE11	667272.55	4381388.67	798.16	798.16	0.00
BE12	633222.44	4375486.96	834.67	834.60	-0.07
BE13	651544.26	4377631.96	809.26	809.33	0.07
BE14	659894.19	4378827.03	451.37	451.39	0.02
BE15	665044.02	4374796.10	645.77	645.76	-0.01
BE16	643525.77	4374004.80	779.95	779.98	0.03
BE17	640551.54	4368866.77	786.33	786.31	-0.02
BE18	637465.99	4370097.96	772.94	772.96	0.02
BE19	652409.05	4370100.99	754.45	754.43	-0.02
BE20	640628.04	4362418.53	741.94	741.94	0.00
BE21	631018.34	4340747.36	825.30	825.28	-0.02
BE22	632490.74	4346429.18	981.82	981.82	0.00
BE23	634061.26	4347831.33	859.86	859.81	-0.05
BE24	641853.99	4350505.66	801.46	801.47	0.01
BE25	635004.44	4353346.51	744.72	744.67	-0.05
BE26	644536.81	4355625.98	853.23	853.23	0.01
BE27	647455.35	4382343.51	824.23	824.22	-0.01
BE28	654292.90	4394429.21	776.80	776.85	0.05
BE29	642192.82	4394988.96	722.60	722.57	-0.03
BE30	651569.31	4366221.71	903.00	903.05	0.05
BE31	660984.31	4391490.46	829.12	829.11	-0.01
BE32	639668.50	4385342.24	774.62	774.60	-0.02
BE33	660993.55	4389061.95	799.60	799.57	-0.03
BE34	649710.51	4361839.99	830.74	830.77	0.03
BE35	636971.30	4347962.30	821.20	821.15	-0.05
BE36	657479.68	4367056.28	799.34	799.39	0.05
BE37	661491.32	4369455.09	585.22	585.21	-0.01
BE38	657827.30	4371165.56	845.08	845.04	-0.037
BE39	632081.91	4358555.67	738.92	738.89	-0.029
BE40	670939.38	4390108.82	792.84	792.89	0.046
BE41	658814.46	4384727.98	759.65	759.64	-0.007
BE42	654990.45	4362547.50	690.68	690.64	-0.041
UA01	636858.75	4391743.31	455.98	455.93	-0.05
UA02	641955.81	4380139.18	783.60	783.60	0.00
UA03	657971.94	4396166.90	722.45	722.47	0.03
UA04	638368.76	4364614.08	784.17	784.14	-0.03
UA05	652132.69	4369257.65	705.77	705.80	0.03
UA06	670537.33	4394863.55	793.91	793.97	0.06

Post Flight Aerial Acquisition and Calibrated Report for USGS



UA07	665835.23	4371349.04	315.98	316.00	0.02
UA08	633144.13	4351983.40	780.34	780.34	0.00
Average dz	0.00 m				
Minimum dz	-0.073 m				
Maximum dz	0.078 m				
Root Mean Square	0.036 m				
95% Confidence	0.070 m				



### Table 6. NVA/VVA – QA Points – Derived DEMs Classified (Units = Meters)

Number	Easting	Northing	Known Z	Lidar Z	Dz
BE01	631490.331	4396132.807	688.527	688.509	-0.018
BE02	645140.941	4396257.912	781.625	781.660	0.035
BE03	649248.755	4395791.768	812.254	812.277	0.023
BE04	657672.465	4396296.255	735.948	735.993	0.045
BE05	663315.785	4397057.165	813.322	813.368	0.046
BE06	666064.878	4391821.336	795.938	795.900	-0.038
BE07	631139.562	4387703.815	711.408	711.407	-0.001
BE08	636930.873	4397017.315	564.609	564.598	-0.011
BE09	644328.346	4387067.198	719.774	719.751	-0.023
BE10	653008.235	4386003.491	797.274	797.282	0.008
BE11	667272.546	4381388.669	798.161	798.152	-0.009
BE12	633222.438	4375486.964	834.673	834.611	-0.062
BE13	651544.263	4377631.958	809.258	809.324	0.066
BE14	659894.190	4378827.027	451.373	451.385	0.012
BE15	665044.023	4374796.098	645.766	645.745	-0.021
BE16	643525.774	4374004.797	779.949	779.966	0.017
BE17	640551.535	4368866.766	786.328	786.264	-0.064
BE18	637465.985	4370097.964	772.943	772.958	0.015
BE19	652409.047	4370100.989	754.454	754.439	-0.015
BE20	640628.041	4362418.532	741.939	741.942	0.003
BE21	631018.343	4340747.358	825.301	825.313	0.012
BE22	632490.738	4346429.182	981.816	981.821	0.005
BE23	634061.255	4347831.328	859.860	859.819	-0.041
BE24	641853.988	4350505.657	801.461	801.464	0.003
BE25	635004.437	4353346.505	744.718	744.662	-0.056
BE26	644536.814	4355625.978	853.225	853.226	0.001
BE27	647455.354	4382343.511	824.228	824.246	0.018
BE28	654292.899	4394429.213	776.798	776.846	0.048
BE29	642192.824	4394988.956	722.596	722.575	-0.021
BE30	651569.307	4366221.709	903.000	903.050	0.050
BE31	660984.307	4391490.455	829.116	829.115	-0.001
BE32	639668.502	4385342.242	774.622	774.578	-0.044
BE33	660993.551	4389061.953	799.604	799.592	-0.012
BE34	649710.512	4361839.990	830.742	830.756	0.014
BE35	636971.295	4347962.296	821.201	821.166	-0.035
BE36	657479.676	4367056.280	799.342	799.388	0.046
BE37	661491.318	4369455.090	585.218	585.231	0.013
BE38	657827.297	4371165.561	845.077	845.039	-0.038
BE39	632081.911	4358555.666	738.919	738.882	-0.037
BE40	670939.378	4390108.824	792.844	792.901	0.057
BE41	658814.460	4384727.981	759.647	759.664	0.017
BE42	654990.453	4362547.497	690.681	690.663	-0.018
FO01	631513.657	4396138.164	688.580	688.621	0.041
FO02	644986.343	4396081.227	775.559	775.635	0.076
FO03	673635.821	4395295.328	799.843	799.906	0.063
F004	631147.855	4387674.170	710.649	710.616	-0.033
FO05	644390.262	4387056.087	717.482	717.605	0.123
FO06	652984.287	4385742.669	793.585	793.587	0.002

Post Flight Aerial Acquisition and Calibrated Report for USGS



FO07     664635.539     438499.228     536.993     536.998     0.005       FO08     665105.866     4377684185     807.997     808.133     0.196       FO10     64300.576     4378980.268     451.795     451.816     0.021       FO11     640015.030     436780.702     782.825     782.868     0.043       FO12     630904.447     4367921.396     762.079     762.909     0.011       FO14     66232.144     4395019.24     805.827     809.881     0.035       FO16     64322.544     4395619.324     805.827     809.881     0.054       FO16     64322.544     4395619.242     857.231     857.257     0.026       FO17     640735.188     438270.528     746.185     743.742     0.047       FO18     63356.62.39     4343704.928     857.231     857.257     0.026       FO19     633168.087     433270.528     746.185     -0.010     FO22     652140.355     436500.336     874.535     874.805     0.170       FO22     6						
FO08     651509.566     4377658.185     807.997     808.193     0.196       FO10     643400.576     4378880.288     451.1956     451.816     0.021       FO11     640619.030     4367870.702     782.825     782.866     0.043       FO12     630904.447     4367921.396     762.079     762.090     0.011       FO14     652374.072     4370155.634     764.065     764.100     0.035       FO15     663323.144     4397097.001     811.393     811.529     0.136       FO16     649232.544     4392097.001     811.393     811.529     0.047       FO18     633366.239     434.3704.428     857.231     857.257     0.026       FO19     635168.067     4332270.528     746.195     746.185     -0.010       FO21     64242.013     4393940.711     723.131     723.185     0.047       FO22     652140.365     436300.366     874.855     748.050     0.170       FO23     660951.733     4391483.836     828.537     828.600     0.068	F007	664635.539	4384999.228	536.993	536.998	0.005
FO09     659920.976     4378880.288     451795     45116     0.021       FO10     643600.576     4373989.734     793.215     793.165     -0.050       FO11     640619.030     436780.702     782.625     782.868     0.043       FO14     652374.072     4370165.634     764.065     764.100     0.035       FO15     663323.144     4397097.061     811.393     811.529     0.136       FO16     640232.544     4396819.324     809.827     809.881     0.054       FO17     640735.188     4362370.447     743.695     743.742     0.047       FO18     633565.239     4343704.928     887.231     857.237     0.026       FO19     635168.087     4352070.528     746.195     746.185     -0.010       FO20     647404.720     4332293.249     822.750     822.779     0.029       FO21     64224.013     4396007.111     773.131     723.131     723.145     0.054       FO22     652140.365     4366300.36     874.635     874.805	F008	651509.566	4377658.185	807.997	808.193	0.196
FO10     643400.576     4373989.734     793.215     793.165     -0.050       FO11     640619.030     4366780.702     782.825     782.868     0.043       FO12     630904.447     4367921.336     762.079     762.090     0.011       FO15     663323.144     4367921.336     764.065     764.100     0.035       FO16     64223.244     4397097.001     811.393     811.529     0.136       FO16     64223.244     439207.041     743.695     743.742     0.047       FO18     633565.239     4343704.928     867.231     857.257     0.026       FO19     635168.087     4352270.528     746.195     748.185     -0.010       FO21     642242.013     4396300.4711     723.131     723.185     0.064       FO22     65214.0.365     4366300.336     874.635     874.405     0.170       FO23     660951.733     4391483.836     828.537     828.600     0.063       FO24     66719.9.450     4335427.822     841.597     0.033     0.024	F009	659920.976	4378880.268	451.795	451.816	0.021
FO11     640619.030     436720.702     722.825     782.868     0.043       FO12     630904.447     4367921.396     762.079     762.090     0.011       FO14     652374.072     4307065.634     764.065     764.100     0.035       FO16     663323.144     43970165.634     764.065     764.100     0.035       FO16     64232.544     4395819.324     809.827     809.881     0.054       FO17     640735.188     436207.047     73.895     743.742     0.047       FO18     633566.239     4343704.928     857.231     857.257     0.026       FO19     635168.067     4353207.0282     746.195     746.165     -0.010       FO20     647404.720     4335207.0282     746.195     746.165     -0.010       FO22     652140.365     436300.336     874.635     874.405     0.170       FO23     6607169.450     4361427.980     804.140     804.252     0.112       FO24     667169.450     436140.096     828.479     828.600     0.063	FO10	643400.576	4373989.734	793.215	793.165	-0.050
FO12     63309(4.4/7     4367921.396     762.079     762.090     0.011       FO14     653274.072     4370165.634     764.065     764.100     0.035       FO15     663322.144     4397097.061     811.393     811.529     0.136       FO16     64922.544     4395819.324     809.827     809.81     0.047       FO18     633556.239     4343704.928     857.231     857.257     0.026       FO19     635166.087     4352270.528     746.195     746.185     -0.010       FO21     64224.013     4395004.711     723.181     723.185     0.054       FO22     652140.365     4365300.336     824.835     874.805     0.170       FO23     660951.733     439143.836     828.537     828.600     0.063       FO24     667169.450     4381427.980     804.140     804.222     0.112       FO25     633278.921     4375068.852     741.98     774.287     0.089       FO26     63965.034     438337.665     774.198     774.287     0.065 <td>F011</td> <td>640619.030</td> <td>4368780.702</td> <td>782.825</td> <td>782.868</td> <td>0.043</td>	F011	640619.030	4368780.702	782.825	782.868	0.043
FO14     662374.072     4370165.634     764.065     764.100     0.035       FO15     663323.144     4397097.061     811.393     811.529     0.136       FO16     649232.544     4395819.324     809.827     809.821     0.054       FO17     640735.188     4362370.447     743.695     743.742     0.047       FO18     633566.239     4343704.928     857.231     857.257     0.026       FO19     635168.087     4353270.528     746.195     746.185     -0.010       FO20     647404.720     4382293.249     822.750     822.779     0.029       FO21     642424.013     439504.711     723.131     723.185     0.054       FO22     652140.365     4366300.336     874.635     874.805     0.170       FO23     660951.733     4391483.386     828.537     826.00     0.063       FO24     667.169.450     4375508.52     841.630     841.597     -0.033       FO25     633278.921     4375508.7265     774.188     774.287     0.069	F012	630904.447	4367921.396	762.079	762.090	0.011
FO15     663323.144     4397097.061     811.393     811.529     0.136       FO16     649232.544     4396819.324     809.827     809.881     0.054       FO17     640735.188     4362370.447     743.695     743.742     0.047       FO18     633556.239     4343704.928     857.231     857.257     0.026       FO19     653568.087     4352270.282     746.195     746.195     -0.010       FO20     647404.720     4382293.249     822.750     822.779     0.029       FO21     642242.013     4396004.711     723.185     0.054     0.170       FO22     652140.355     439483.356     828.537     828.600     0.063       FO24     667159.450     438427.980     804.140     804.222     0.112       FO25     633278.921     4375508.852     874.163     4033     0.025       FO26     633625.931     4361800.096     828.479     828.503     0.024       FO26     633625.931     4361800.096     828.479     828.503     0.025 <td>FO14</td> <td>652374.072</td> <td>4370165.634</td> <td>764.065</td> <td>764.100</td> <td>0.035</td>	FO14	652374.072	4370165.634	764.065	764.100	0.035
FO16     649232.544     4395819.324     809.827     809.881     0.054       FO17     640735.188     4362370.447     743.695     743.742     0.047       FO18     633566.239     4333270.528     746.195     746.185     -0.010       FO20     647404.720     4382293.249     822.750     822.779     0.029       FO21     642242.013     439600.711     723.181     723.185     0.054       FO22     652140.365     4366300.336     874.635     874.805     0.170       FO23     660951.733     4391483.86     828.537     828.600     0.063       FO24     667169.450     4381427.980     804.140     804.252     0.112       FO25     633278.921     4375508.652     841.630     841.597     -0.033       FO26     633965.034     438557.865     774.198     774.287     0.089       FO27     66100.0420     439501.81     687.655     0.065       FW01     631440.371     4396205.788     720.457     797.393     0.055 <td< td=""><td>F015</td><td>663323.144</td><td>4397097.061</td><td>811.393</td><td>811.529</td><td>0.136</td></td<>	F015	663323.144	4397097.061	811.393	811.529	0.136
F017     640735 188     4362370.447     743.695     743.742     0.047       F018     633365 239     4435704.428     867.231     867.257     0.026       F019     633168 087     4435205.288     746.195     746.185     -0.010       F020     647404 720     4382293.249     822.750     822.779     0.029       F021     642242 013     4395004.711     723.131     723.185     0.054       F022     652140.365     4366300.336     874.635     874.805     0.170       F023     660951.733     4391483.836     828.537     828.600     0.063       F024     667169.450     4381427.980     804.140     804.252     0.112       F025     633265.034     438537.865     774.198     774.287     0.099       F027     661000.420     4386100.096     828.473     828.503     0.024       TW01     631440.371     4396091.181     687.655     0.069     779.339     0.053       TW02     67328.941     4395623.101     797.340     797.393	FO16	649232.544	4395819.324	809.827	809.881	0.054
FO18     633556 239     4343704.928     857 231     857 257     0.026       FO19     635166.087     435270.528     746.195     746.185     -0.010       FO20     647404.720     43822730.328     746.195     746.185     -0.010       FO21     642242013     4395004.711     723.185     0.029       FO23     660951.733     4391483.836     828.537     822.600     0.063       FO24     667169.450     4381427.980     804.140     804.252     0.112       FO25     633278.921     4375608.852     841.630     841.597     -0.033       FO26     633665.034     438537.665     774.198     774.287     0.089       FO27     661000.420     4398016.106     791.134     791.160     0.026       FO28     64362.591     436180.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     720.511     0.056       TW02     673628.941     4395223.101     797.340     797.333     0.055       <	F017	640735,188	4362370.447	743.695	743,742	0.047
FO19     635168.087     4353270.528     746.195     746.185     -0.010       FO20     647404.720     4382293.249     822.750     822.779     0.029       FO21     642242.013     4395004.711     723.131     723.185     0.054       FO22     652140.365     4366300.336     874.635     874.805     0.170       FO23     660951.733     4391483.836     828.537     828.600     0.063       FO24     667769.450     4381427.980     804.140     804.252     0.112       FO25     633278.921     4375508.852     841.630     841.597     -0.033       FO26     639655.034     438507.865     774.198     714.287     0.089       FO27     661000.420     4396016.106     791.134     791.160     0.026       FO28     649882.591     436100.096     828.479     828.503     0.024       TW01     631440.371     4396021.181     687.586     687.655     0.069       TW02     673628.941     439502.075     593.459     793.30     0.63 <	FO18	633556,239	4343704.928	857,231	857,257	0.026
FO20     647404.720     4382293.249     822.750     822.779     0.029       FO21     64224.013     4395004.711     723.131     723.185     0.054       FO22     662140.365     436630.336     874.635     874.805     0.170       FO23     660951.733     4391483.836     828.537     828.600     0.063       FO24     667169.450     4381427.980     804.140     804.252     0.112       FO25     633278.921     437508.852     841.630     841.597     -0.033       FO26     639655.034     438507.865     774.198     774.287     0.089       FO27     661000.420     4389016.106     791.134     791.160     0.026       FO28     649882.591     4361800.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     687.655     0.069       TW02     673628.941     4385002.073     539.594     539.656     0.062       TW03     644362.868     4387055.908     641.497     641.598     0.011 <	F019	635168.087	4353270.528	746,195	746,185	-0.010
FO21     642242.013     4395004.711     723.131     723.185     0.085       FO22     652140.365     4366300.336     874.635     874.805     0.170       FO23     660951.733     4391483.836     828.537     828.600     0.063       FO24     667169.450     4381427.980     804.140     804.252     0.112       FO25     633278.921     4375508.852     841.630     841.597     0.033       FO26     639655.034     438537.865     774.198     774.287     0.089       FO27     661000.420     4389016.106     791.134     791.160     0.026       FO28     649882.591     431600.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     687.655     0.069       TW02     673528.941     43950253.101     797.340     797.393     0.053       TW04     65239.352     438775.242     795.440     795.495     0.055       TW04     665458.120.404     4374755.908     641.497     641.598     0.101	FO20	647404 720	4382293 249	822 750	822 779	0.029
FO22     652140.365     4366300.336     874.635     874.805     0.170       FO23     660951.733     4391483.836     828.537     828.600     0.063       FO24     667169.450     4381427.980     804.140     804.252     0.112       FO25     633278.921     4375508.852     841.630     841.597     -0.033       FO26     633655.034     438537.865     774.198     774.287     0.089       FO27     661000.420     4389016.106     791.134     791.160     0.026       FO28     649682.591     4361800.096     624.479     622.603     0.024       TW01     631440.371     4396091.181     687.655     0.069       TW02     673628.941     4395253.101     797.340     797.393     0.053       TW03     644362.888     4387057.898     720.455     720.511     0.056       TW04     652939.352     438775.908     641.497     641.598     0.062       TW05     6645481.29     438002.073     539.594     539.656     0.062 <t< td=""><td>F021</td><td>642242 013</td><td>4395004 711</td><td>723 131</td><td>723 185</td><td>0.054</td></t<>	F021	642242 013	4395004 711	723 131	723 185	0.054
FO23     660951.733     4391483.836     826.537     826.600     0.063       FO24     667169.450     4331427.980     804.140     804.252     0.112       FO26     633278.921     4375508.852     841.630     841.597     -0.033       FO26     633655.034     438537.865     774.198     774.287     0.089       FO27     661000.420     4389016.106     791.134     791.160     0.026       FO28     649682.591     4361800.096     828.479     828.503     0.024       TW01     631440.371     4396253.101     797.340     797.393     0.053       TW02     673628.941     4395253.101     797.340     797.393     0.055       TW03     644362.858     4387057.898     720.455     720.511     0.056       TW04     652393.932     4385775.242     795.440     795.495     0.055       TW05     664548.129     438502.0273     539.594     539.656     0.062       TW06     665120.640     4374726.3908     641.497     641.598     0.101	F022	652140.365	4366300.336	874.635	874,805	0.170
FO24     667169.450     4381427.980     804.140     804.252     0.112       FO25     633278.921     4375508.852     841.630     841.597     -0.033       FO26     639655.034     438537.865     774.198     774.287     0.089       FO27     661000.420     4389016.106     791.134     791.160     0.026       FO28     649682.591     4361800.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     687.655     0.069       TW02     673628.941     439523.101     797.340     797.393     0.053       TW03     644382.858     4387057.898     720.455     720.511     0.066       TW04     65293.352     436577.242     795.440     795.495     0.055       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4386339.206     767.456     767.538     0.082       UA01     636588.750     4391743.310     455.978     455.928     -0.050	F023	660951,733	4391483,836	828.537	828.600	0.063
F025     633278.921     4375508.852     841.630     841.597     -0.033       F026     639655.034     438537.865     774.198     774.287     0.089       F027     661000.420     4389016.106     791.134     791.160     0.026       F028     649682.591     4361800.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     687.655     0.069       TW02     673628.941     439523.101     797.340     797.393     0.053       TW04     652939.352     4387057.898     720.455     720.511     0.056       TW05     664548.129     4385002.073     539.594     539.656     0.062       TW05     6645120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639836.647     4383339.06     767.456     767.538     0.062	F024	667169.450	4381427.980	804,140	804,252	0.112
FO26     633655.034     438337.865     774.198     774.287     0.089       FO27     661000.420     4389016.106     791.134     791.160     0.026       FO28     649682.591     4361800.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     687.655     0.069       TW02     673628.941     4395057.898     720.455     720.511     0.056       TW03     644362.858     4387075.242     795.440     797.393     0.053       TW04     652939.352     4385072.073     539.594     539.554     0.055       TW05     664548.129     4385302.073     539.594     539.554     0.055       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     43825392.020     767.456     767.538     0.082       UA01     638687.50     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008	F025	633278 921	4375508 852	841 630	841 597	-0.033
FO27     661000.420     4389016.106     791.134     791.160     0.026       FO28     649682.591     4361800.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     687.655     0.069       TW02     673628.941     4395253.101     797.340     797.393     0.053       TW03     644362.858     4387057.898     720.455     720.511     0.056       TW04     652939.352     4385775.242     795.440     795.495     0.055       TW05     664548.129     4385002.073     539.594     539.656     0.0662       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     438539.206     767.456     767.538     0.082       UA01     636868.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     65771.944     43964614.079     784.171     784.158     -0.013	F026	639655.034	4385357.865	774,198	774,287	0.089
FO28     649682.591     4361800.096     828.479     828.503     0.024       TW01     631440.371     4396091.181     687.586     687.655     0.069       TW02     673628.941     4395253.101     797.393     0.053       TW03     644362.858     4387057.898     720.455     720.511     0.056       TW04     652339.352     4385775.242     795.440     795.495     0.055       TW05     664548.129     4385002.073     539.594     539.656     0.062       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     884.561     -0.013        TW09     639536.647     438539.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4396166.898     722.445     722.468     0.023       UA	F027	661000 420	4389016 106	791 134	791 160	0.026
TW01     631420.371     4396091.181     687.585     687.655     0.069       TW02     673628.941     4395253.101     797.340     797.393     0.053       TW03     644362.858     4387057.898     720.455     720.511     0.056       TW04     652939.352     4385775.242     795.440     795.495     0.055       TW05     664548.129     4385002.073     539.594     539.656     0.062       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     438539.206     767.4566     767.538     0.082       UA01     63868.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.446     0.023	F028	649682 591	4361800.096	828 479	828 503	0.024
TW02     673628.941     4395253.101     797.340     797.393     0.053       TW03     644362.858     4387057.898     720.455     720.511     0.056       TW04     652933.352     4385775.242     795.440     795.495     0.055       TW05     664548.129     4385002.073     539.594     539.656     0.062       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     63858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     439616.898     722.445     722.468     0.023       UA04     633868.763     4364614.079     784.171     784.158     -0.013	TW01	631440 371	4396091 181	687 586	687 655	0.069
TW03     644362.858     4380357.898     720.455     720.511     0.056       TW04     652939.352     4385775.242     795.440     795.495     0.055       TW05     664548.129     4385002.073     539.594     539.666     0.062       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034 <td>TW02</td> <td>673628.941</td> <td>4395253 101</td> <td>797 340</td> <td>797 393</td> <td>0.053</td>	TW02	673628.941	4395253 101	797 340	797 393	0.053
TW04     652939.352     4385775.242     795.440     795.495     0.035       TW05     664548.129     4385002.073     539.594     539.656     0.062       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     438539.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062	TW03	644362 858	4387057 898	720 455	720 511	0.056
TW05     664548.129     4385002.073     539.594     539.556     0.052       TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     438539.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638388.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     666835.233     4371349.042     315.980     315.996     0.016	TW04	652939.352	4385775.242	795,440	795,495	0.055
TW06     665120.640     4374755.908     641.497     641.598     0.101       TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     438539.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633619.504     4343726.368     854.564     854.551     -0.013 <td>TW05</td> <td>664548,129</td> <td>4385002.073</td> <td>539,594</td> <td>539,656</td> <td>0.062</td>	TW05	664548,129	4385002.073	539,594	539,656	0.062
TW07     640697.407     4362397.245     742.736     742.825     0.089       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.023       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633144.132     4351983.403     780.344     780.334     -0.010       TW09     639536.647     4385339.206     767.456     767.538     0.082 <td>TW06</td> <td>665120.640</td> <td>4374755.908</td> <td>641,497</td> <td>641.598</td> <td>0.101</td>	TW06	665120.640	4374755.908	641,497	641.598	0.101
TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633144.132     4351983.403     780.344     780.334     -0.010       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082 </td <td>TW07</td> <td>640697.407</td> <td>4362397.245</td> <td>742.736</td> <td>742.825</td> <td>0.089</td>	TW07	640697.407	4362397.245	742.736	742.825	0.089
TW09639536.6474385339.206767.456767.5380.082UA01636858.7504391743.310455.978455.928-0.050UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.016UA08633144.1324351983.403780.344780.334-0.010TW08633619.5044343726.368854.564854.551-0.013TW09639536.64743891743.310455.978455.928-0.050UA01636858.7504391743.310455.978455.928-0.050UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546733.912739.9740.062 <td>TW08</td> <td>633619.504</td> <td>4343726.368</td> <td>854.564</td> <td>854.551</td> <td>-0.013</td>	TW08	633619.504	4343726.368	854.564	854.551	-0.013
UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633144.132     4351983.403     780.344     780.334     -0.010       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008<	TW09	639536.647	4385339.206	767.456	767.538	0.082
UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.016UA08633144.1324351983.403780.344780.334-0.010TW08633619.5044343726.368854.564854.551-0.013TW09639536.6474385339.206767.456767.5380.082UA01636858.7504391743.310455.978455.928-0.050UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA0365797.1.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062	UA01	636858,750	4391743.310	455.978	455.928	-0.050
UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.016UA08633144.1324351983.403780.344780.334-0.010TW08633619.5044343726.368854.564854.551-0.013TW09639536.6474385339.206767.456767.5380.082UA01636858.7504391743.310455.978455.928-0.050UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA06670537.3304394863.546793.912793.9740.062UA07665835.233437149.042315.980315.9960.016UA07665835.233437149.042315.980315.9960.016	UA02	641955.813	4380139.178	783.603	783.595	-0.008
UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.016UA08633144.1324351983.403780.344780.334-0.010TW08633619.5044343726.368854.564854.551-0.013TW09639536.6474385339.206767.456767.5380.082UA01636858.7504391743.310455.978455.928-0.050UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.016	UA03	657971.944	4396166.898	722.445	722.468	0.023
UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633144.132     4351983.403     780.344     780.334     -0.010       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062 <td>UA04</td> <td>638368.763</td> <td>4364614.079</td> <td>784.171</td> <td>784.158</td> <td>-0.013</td>	UA04	638368.763	4364614.079	784.171	784.158	-0.013
UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.016UA08633144.1324351983.403780.344780.334-0.010TW08633619.5044343726.368854.564854.551-0.013TW09639536.6474385339.206767.456767.5380.082UA01636858.7504391743.310455.978455.928-0.050UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.016	UA05	652132.685	4369257.646	705.772	705.806	0.034
UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633144.132     4351983.403     780.344     780.334     -0.010       TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016	UA06	670537.330	4394863.546	793.912	793.974	0.062
UA08633144.1324351983.403780.344780.334-0.010TW08633619.5044343726.368854.564854.551-0.013TW09639536.6474385339.206767.456767.5380.082UA01636858.7504391743.310455.978455.928-0.050UA02641955.8134380139.178783.603783.595-0.008UA03657971.9444396166.898722.445722.4680.023UA04638368.7634364614.079784.171784.158-0.013UA05652132.6854369257.646705.772705.8060.034UA06670537.3304394863.546793.912793.9740.062UA07665835.2334371349.042315.980315.9960.010	UA07	665835.233	4371349.042	315.980	315.996	0.016
TW08     633619.504     4343726.368     854.564     854.551     -0.013       TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.010	UA08	633144.132	4351983.403	780.344	780.334	-0.010
TW09     639536.647     4385339.206     767.456     767.538     0.082       UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.023       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.010	TW08	633619.504	4343726.368	854.564	854.551	-0.013
UA01     636858.750     4391743.310     455.978     455.928     -0.050       UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.024       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.010	TW09	639536.647	4385339.206	767.456	767.538	0.082
UA02     641955.813     4380139.178     783.603     783.595     -0.008       UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016	UA01	636858.750	4391743.310	455.978	455.928	-0.050
UA03     657971.944     4396166.898     722.445     722.468     0.023       UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.024       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.010	UA02	641955.813	4380139.178	783.603	783.595	-0.008
UA04     638368.763     4364614.079     784.171     784.158     -0.013       UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016	UA03	657971.944	4396166.898	722.445	722.468	0.023
UA05     652132.685     4369257.646     705.772     705.806     0.034       UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633144.132     4351983.403     780.344     780.334     0.010	UA04	638368.763	4364614.079	784.171	784.158	-0.013
UA06     670537.330     4394863.546     793.912     793.974     0.062       UA07     665835.233     4371349.042     315.980     315.996     0.016       UA08     633144.132     4351983.403     780.344     780.334     0.010	UA05	652132.685	4369257.646	705.772	705.806	0.034
UA07 665835.233 4371349.042 315.980 315.996 0.016	UA06	670537.330	4394863.546	793.912	793.974	0.062
	UA07	665835.233	4371349.042	315.980	315.996	0.016
0.010 0.0144.102 4.01900.400 7.00.044 7.00.004 -0.010	UA08	633144.132	4351983.403	780.344	780.334	-0.010



N	/A	V	/A
Average dz	0.00 m	Average dz	0.05 m
Minimum dz	-0.064 m	Minimum dz	-0.050 m
Maximum dz	0.066 m	Maximum dz	0.196 m
Root Mean Square		Root Mean Square	0.143 m
95% Confidence		95% Confidence	