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WEST QUESNEL LAND STABILITY PROGRAM
ANNUAL MONITORING REPORT - 2010

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1.0 INTRODUCTION

AMEC Earth & Environmental, a division of AMEC Americas Limited, (AMEC) has carried out instrumentation monitoring in West Quesnel as part of the ongoing West Quesnel Land Stability Program. The purpose of the instrumentation monitoring was to track landslide related ground movements, groundwater conditions and precipitation.

Various sets of Global Positioning System (GPS) ground surface movement hubs have been established in the field between 1998 and 2008. Beginning in the year 2000, AMEC has installed several phases of slope inclinometers, piezometers, trial pumping wells and trial horizontal drains. Urban Systems, from Kamloops, BC, has also installed a weather station in West Quesnel, which measures precipitation and temperature data.

This report is intended to summarize the data collected during 2010 and provide an update on observed trends or interpretations that have developed or changed since the 2009 Monitoring Report, dated 1 February 2010. For detailed background information including geology and project history, the reader is referred to previous AMEC reports including: Trial Dewatering dated May 2008 and West Quesnel Land Stability Study Report dated May 2007.

2.0 GPS MOVEMENT HUBS

Beginning in September 1998, Terasen Gas (formerly BC Gas) installed and monitored a series of GPS surface movement hubs. Subsequently, in 2001, 2006, and 2008, the GPS hub network has been expanded and modified such that a current total of 47 hubs are monitored. The monitoring consists of comparing changes in the specific positions of the defined survey reference points versus time as measured periodically by survey contractors (most recently McElhanney Consultants Limited), retained by both Terasen and AMEC on behalf of the City of Quesnel. Surveys are typically conducted on a quarterly basis with the results forwarded to AMEC. During 2010, no further hubs were installed.

During 2010, quarterly GPS monitoring was carried out in March, July, September, and November. Significantly reduced rates of movement were observed during the spring of 2010, as compared to that experienced in 2008 and 2009. Some movement occurred during the winter of 2009-2010 and possibly the spring movement started earlier in 2010 than typical and this was reflected in the winter period readings rather than the spring. During 2010, there was also some acceleration between the July to September and September to November surveys for a large number of the hubs. However, the rates of movement and total movement recorded in 2010 were much less than that observed in 2008 and 2009.

An overall summary table and detailed individual plots of movements for all GPS hubs are provided in Appendix A. Please note that while both horizontal and vertical movement data is recorded, typically vertical GPS survey data has at least one order of magnitude less accuracy than the horizontal data. Accordingly, while there are some general trends that can be observed regarding vertical and/or the resultant of both horizontal and vertical movement, the following report discussions of movement refer primarily to horizontal movement information.

The GPS movement hubs can be broken into 4 general categories based upon their location and displacement. The first category represents benchmark hubs, which are used to provide reference control for the survey. These benchmarks are theoretically located outside the slide area on stable ground and have recorded little, if any, movement since installation. The exceptions to this are survey tolerance variations that may suggest minor movement (typically

less than 15 mm of total horizontal movement over the life of the survey). While there have been as many as seven hubs in this category, typically only two (GPS Water Tank: City concrete water tank and GPS 01-38: Terasen Pump Station, Red Bluff) are utilized to gauge the accuracy of the survey data.

The second category consists of 14 hubs that are at or near the eastern extremity of the slide area and are used to define the approximate toe area or likely eastern boundary of active landslide movement. Generally, total horizontal displacement less than 15-20 mm is interpreted to mean that the location is beyond the active movement toe area. Higher values suggest that the hub is on or very near the toe of the slide.

The third category consists of three hubs that are located at or near the upper west portion of the slide, in order to try and confirm the western extent or crest of the slide. Similar to the toe area, total horizontal displacement less than 15-20 mm typically represents areas outside the area of active movement.

The fourth category involves the remaining 33 GPS hubs that are interpreted to be within the main body of the landslide. These hubs have shown significant movements over the course of the 12 years that the 15 oldest hubs have been monitored. The total horizontal movement, measured since September 1998 for these 15 oldest hubs, ranged from 268 to 580 mm.

After observation of higher than average movements in 2008 and 2009, movement was relatively limited in 2010. Total horizontal displacement for the year ranged up to 19 mm, depending on the hub location. This was significantly less than the typical long term average of approximately 45 to 50 mm per year, and well below the rates observed in the previous two years. Lower total precipitation was observed during late 2009 and 2010 (see Section 7.0 for more details on precipitation data) and is likely the reason for this decrease in movement as compared to previous years. Table 1 presents typical cumulative, annual and peak horizontal movement data (from GPS Hub 98-17) from 1998 to 2010.

Table 1: Typical Horizontal Movement (from GPS Hub 98-17) from 1998 to 2010

Year	Cumulative Movement (mm)	Annual Movement Rate (mm/yr)	Peak Movement Rate (mm/yr)*
1998	16**	n/a**	66
1999	96	80	115
2000	163	67	110
2001	225	62	75
2002	279	54	83
2003	300	21	23
2004	322	22	22
2005	409	87	75
2006	423	14	75
2007	447	24	43
2008	506	59	160
2009	574	68	216
2010	580	6	56

*Note: Peak movement rate typically observed during the spring.
**Note: GPS Hub initialized in September 1998.

Figure 1 provides an updated vector movement map for GPS hubs monitored in the West Quesnel area. AMEC simplified the GPS vector plots, in Figure 1, to show relative magnitude and azimuth of latest total vector. Details for individual GPS movement hubs are located in Appendix A.

Figures 2 to 14 show contour plots of total and annual GPS hub movement data selected over different time periods (which also means that only hubs used during the entire time period are included in the contour process) and over different components (i.e. horizontal movement, vertical movement and resultant 3D movement). The ground movement contours were drawn using triangulation in Autodesk Civil 3D (2010).

Figure 2 shows total horizontal movement between September 1998 and November 2010, for the GPS hubs installed in September 1998. Movement of 580 mm has occurred at GPS 98-17 (which is at the corner of Bettcher St. and Lark Ave.). Significant movement has been observed at the GPS hubs within the slide mass since 1998. Figure 3 shows total horizontal movement between December 2001 and November 2010, for the GPS hubs installed in September 1998 and December 2001. Figure 4 shows total horizontal movement between November 2006 and November 2010, for the GPS hubs installed in September 1998, December 2001 and November 2006. All three figures show that the greatest movement occurred in the middle of the slide area.

Figure 5 shows total vertical movement between November 2006 and November 2010. This contour plots shows downwards movement at the top of the slide (mainly the northwest corner, although it should be noted that very few hubs exist along the rest of the slide crest) and some upwards movement (or bulging) near the toe of the slide. A significant bulge related to toe thrust movements of the slide has been detected on Lewis Drive, just east of Healy St.

Figure 6 shows total 3D movement between November 2006 and November 2010. As in Figure 4, the largest 3D slide movements have been observed in the middle of the slide area.

Figures 7 through 14 show annual horizontal movement and annual 3D movement for the years 2007, 2008, 2009 and 2010 (2 figures per year). During 2007, relatively little movement was recorded by the GPS hubs with total horizontal movement typically being between 10 to 30 mm (see Figure 7) and total 3D movement between 10 to 50 mm (see Figure 8). In 2008, significantly more horizontal movement occurred than in 2007 and 3D movement increased slightly as well. Up to 60 mm of horizontal (see Figure 9) and 60 mm of 3D movement (see Figure 10) was observed in 2008. Total horizontal (see Figure 11) and 3D movement (see Figure 12) increased again in 2009 with up to 70 mm observed in both categories. These figures suggest that the slide has accelerated in those two calendar years, even though reported precipitation levels have remained normal or slightly below normal (see Section 7.0 for more details on precipitation data). In 2010, the horizontal (see Figure 13) and 3D movement (see Figure 14) was significantly less than the previous two years, with up to 20 mm and 30 mm of displacement, respectively; similar to that observed in 2007. 2010 was drier than previous years and this could explain the much lower movements observed (see Section 7.0 for more details on precipitation data).

3.0 SLOPE INCLINOMETERS

A total of fifteen slope inclinometer (SI) casings were installed by AMEC in West Quesnel, between November 2000 and August 2006, to monitor depths and rates of subsurface lateral ground movements. Installation details and the results of previous SI monitoring are described in previous AMEC reporting. In mid-2009, the remaining, actively moving, slope inclinometers sheared off. Currently, there are only two remaining functional installations, however these installations have been judged to be too shallow to intersect the underlying slide surface and are not useful for monitoring overall slide movements. Consequently, SI surveys were discontinued in 2010, and will not be resumed until further SI's are installed. A summary table of the SI installations can be found in Appendix B. Figure 1 provides a vector movement map for the slope inclinometer monitoring from previous years.

4.0 PIEZOMETERS

Two general types of piezometers (alternately referred to as monitoring wells), using three different installation procedures, have been utilized in West Quesnel to monitor groundwater levels. The slotted screen of all the standpipe piezometers was surrounded by a sand pack and has a bentonite seal both below and above the sand pack. There are nine standpipe piezometers, which are read quarterly using a manual water level dip tape. There are four standpipes that have been retrofitted with vibrating wire piezometers (for automated electronic detection of standpipe water elevation) installed inside the standpipes. Another 48 vibrating wire piezometers were grouted directly in the ground at various depths and at 21 different locations. These vibrating wire piezometers measure water pressure at the specific depth of their tip (see Figure 15). With the exception of one standpipe piezometer (BH4A), all of the piezometers are serviceable and monitored, although some intermittently go dry. Standpipe piezometer BH4A, at Voyageur School was damaged in June 2010 by a vandal and filled up with soil and can no longer be monitored. A summary table of the piezometers, along with the water elevation/phreatic elevation plots, can be found in Appendix C.

All of the vibrating wire piezometers (VWP) are connected to Campbell Scientific dataloggers, with the exception of VWP 4B, which is connected to a Slope Indicator MiniLogger. Dataloggers are used to record readings at set intervals and can store large quantities of data, so that near real time data can be collected remotely. The Campbell Scientific dataloggers have been connected to cellular modems and are accessed remotely by AMEC staff.

In late June 2010, the casing protector at BH 4, at Voyageur School, was knocked over and needed to be replaced. The vibrating wire in the bore hole was not damaged but the minilogger was removed for approximately 1 month (between June 20 and July 21) while a new casing protector was installed. Standpipe BH 4A was destroyed when the casing protector was hit and has since been deactivated. A 1.2 m tall concrete ring was placed at the location. The setup at BH 14 was also vandalized, in July 2010, and lost about 1 month of data. In July 2009, VWP 16 was also vandalized and the station was re-established in August 2010. During the 13 months it was not active, AMEC attempted to record manual values quarterly.

Depending on the location of the various piezometers, they depict various short and long term groundwater levels or pressure conditions within the West Quesnel area. Some near surface installations are more sensitive to seasonal precipitation trends, short term weather events and potential water service line breaks. Deeper installations tend to show longer term background trends and subdued seasonal response indicative of larger scale more regional groundwater conditions. Meanwhile, some of the piezometers continue to show the effects of nearby trial

dewatering installations (pumping wells and horizontal drains), that have remained in operation beyond the initial trial periods.

Table 2 presents the overall trends and the observations from 2010 for piezometer locations that are judged to be unlikely to be affected by trial dewatering efforts, and are more reflective of general background subsurface groundwater patterns in West Quesnel. Depending on the local geology, depth of installation, etc., some of these other installations appear sensitive to seasonal snow melt trends and/or individual storm events while others do not. Generally, in 2010, the reaction to seasonal precipitation was subdued compared to previous years. At BH 10 (at the corner of Dawson St. and Abbott Dr.), a sharp increase, followed by a sharp decrease, was observed in August 2010 and this was correlated to a waterline break in the vicinity of the instruments.

Table 2: Background Piezometers – Overall Trend and 2010 Observations

Instrument	Background Groundwater Condition	2010 Observations
BH 2	Steady-state at 485 m elevation	Decreased by 1 m to 484 m between April and June 2010
BH 2A	Steady-state at 502 m elevation	No change
BH 2B	Steady-state at 506 m elevation	No change
BH 2C	Steady-state at 508 m elevation	Decrease of 1 m between April and June 2010 followed by recovery to previous elevation
BH 4A SP(Voyageur School)	Highly variable with some seasonal response	Decreasing water level until destroyed in June 2010
BH 4B VWP (Voyageur School)	Steady-state at 521 m elevation until sharp rise to 526 m elevation in April 2009	Steady-state at 526 m
BH 6A	Dry, sheared at 530 m elevation	No change
BH 6B	Steady-state at 557 m elevation	No change
BH 7A	Varies, 537 m to 538 m elevation, with seasonal precipitation response	Subdued seasonal groundwater response, decreasing to 537 m
BH 7B	Varies, 536 m to 537 m elevation, with seasonal precipitation response	Subdued seasonal groundwater response, decreasing to 535 m
BH 8A	Steady-state at 513 m elevation, intermittently dry	No change
BH 8B	Steady-state at 513 m elevation, intermittently dry	No change
BH 8C	Steady-state at 511 m elevation	No change
BH 8D	Generally decreasing (1.5 m difference to date from 508 to 506.5 m elevation), with slight seasonal precipitation response	No seasonal response, still decreasing
BH 9A	Varies, 529.5 m to 530.5 m elevation, with seasonal precipitation response	Subdued seasonal groundwater response,
BH 9B	Varies, 530 m to 531 m elevation, with seasonal precipitation variation	Subdued seasonal groundwater response
BH 9C	Generally decreasing (2 m difference to date from 531.5 to 529.5 m elevation), with seasonal precipitation response	Subdued seasonal groundwater response

Table 2: Background Piezometers – Overall Trend and 2010 Observations (cont.)

BH 10A	Varies, 541.5 m to 542.5 elevation, with seasonal precipitation response	Slightly subdued seasonal groundwater response, sharp increase in August 2010 due to waterline break on Dawson St,, now approx. 541 m
BH 10B	Varies, 541.5 m to 542.5 elevation with seasonal precipitation response	Slightly subdued seasonal groundwater response, sharp increase in August 2010 due to waterline break on Dawson St, now approx. 541 m
BH 10C	Generally decreasing (2.5 m difference to date from 538.5 to 536 m elevation), with seasonal precipitation response	Slightly subdued seasonal groundwater response, sharp increase in August 2010 due to waterline break on Dawson St, now below 536 m
BH 11A	Steady-state at 517 m elevation	No change
BH 11B	Steady-state at 515.5 m elevation	No change
BH 11C	Slight decline 515 m to 514.5 m elevation	No change
BH 13A	Generally decreasing (1.5 m difference to date from 481 to 479.5 m elevation)	Slight increase in water level in fall 2010
BH 13B	Generally decreasing (1 m difference to date from 482 to 481 m elevation)	Slight increase in water level in fall 2010
BH 14A	Varies. 566 m to 567.5 m elevation, with seasonal precipitation response	Subdued to no seasonal groundwater response,
BH 14B	Varies, 530 m to 531 m elevation, with minimal seasonal precipitation response	No change
BH 14C	Varies, 529 m to 530 elevation, with minimal seasonal precipitation response	No change
BH 15A	Varies, 561 m to 562.5 m elevation with strong seasonal and storm precipitation response	Subdued seasonal groundwater response, decreasing to 560 m
BH 15B	Gradual decrease (1.5 m difference to date from 540 to 538.5 m elevation) until mid-2009, steady state since then	No change
BH 15C	Gradual decrease (3 m difference to date from 538 to 535 m elevation) until mid-2009, steady state since then	No change
BH 16A	Steady-state at 646 m elevation	No change
BH 16B	Generally increasing (9 m difference to date from 580 to 589 m elevation) until August 2010, steady state since then	Leveled out at steady-state in August 2010
BH 16C	Steady-state at 550 m elevation	No change
BH 16D	Steady-state at 550 m elevation	No change (piezometer stopped working in August 2010)

Table 3 presents overall trends and observations for piezometers that are situated near the pumping wells. The piezometers nearest the pumping wells and closer to surface have experienced the greatest influence (draw-down of groundwater level) since pumping started and many have reached a new steady-state level (depending on how productive the pump has been with PW4 producing the most water and PW5 the least). Piezometers that are considered to be out of the radius of influence of the well or are too deep to be influenced have remained at

steady-state levels. Some of the piezometers react to seasonal precipitation. In 2010, the only change from the overall trends was the subdued reaction to seasonal precipitation.

Table 3: Piezometers Near Pumping Wells – Overall Trend and 2010 Observations

Instrument	Overall Groundwater Trend	2010 Observations
BH 3A (near PW1)	Decreased from start of pump trials in Nov. 2007 until mid-2009 (draw down of 3 m from 518.5 to 515.5 m elevation), steady-state since then	No change
BH 3B (near PW1)	Decreased from start of pump trials in Nov. 2007 until mid-2009 (draw down of 14.5 m from 518.5 to 504 m elevation), steady-state since then	No change
BH 3C (near PW1)	Decreasing from start of pump trials in Nov. 2007 until present (draw down of 12.5 m to date from 518.5 to 506 m elevation)	Slight decreasing trend (draw down effect) continued
BH 4A (near PW1)	Steady-state at 516 m elevation with spikes due to precipitation events, no apparent influence from pumping	No storm event or seasonal precipitation response
BH 4B (near PW1)	Steady-state at 516 m elevation with spikes due to precipitation events, no apparent influence from pumping	No storm event or seasonal precipitation response
BH 4C (near PW1)	Steady-state at 515 m elevation, no apparent influence from pumping	Was buried under a gravel pile for most of 2010 and was not accessible for monitoring
BH 3 (near PW2)	Groundwater level varies, 500 to 501 m elevation with seasonal precipitation response; level decreased to 499.5 m during trial dewatering (Oct 2007 – May 2009), recovering to 500 m thereafter	Remained at post-pumping steady-state level, near 500 m, no seasonal increase in groundwater level observed
BH 19A (near PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008 (draw down of 4 m from 545 to 541 m elevation), steady-state since then	No change
BH 19B (near PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008 (draw down of 7 m from 545 to 538 m elevation), steady-state since then	No change
BH 12A (near PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008 (draw down of 6 m from 543 to 537 m elevation), steady-state since then	No change
BH 12B (near PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008 (draw down of 8 m from 550 to 542 m elevation), steady-state since then	No change
BH 12C (near PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008 (draw down of 5 m from 535 to 530 m elevation), dry since then	No change
BH 12D (near PW4)	Steady-state at 525 m elevation, no apparent influence from pumping or seasonal precipitation response	No change

Table 3: Piezometers Near Pumping Wells – Overall Trend and 2010 Observations (cont.)

BH 20 (near PW4)	Gradual decrease from start of pump trials in Oct. 2007 until early 2008 (possible draw down of 2 m from 545 to 543 m elevation), steady-state since then	No change
BH 17A (near PW5)	Gradual decrease from start of pump trials in Oct. 2007 until present (possible draw down of 1 m to date from 484 to 483 m elevation) with seasonal precipitation response	Subdued seasonal groundwater increase
BH 17B (near PW5)	Gradual decrease from start of pump trials in Oct. 2007 until present (possible draw down of 2.5 m to date from 483 to 480.5 m elevation) with seasonal precipitation response	Subdued seasonal groundwater increase
BH 18A (near PW5)	Gradual decrease from start of pump trials in Oct. 2007 until present (possible draw down of 1 m from 481 to 480 m elevation)	No change
BH 18B (near PW5)	Increased since installation from 483.5 to 489.5 m in early 2009 when it was determined the instrument was not working	Not working

Table 4 presents the overall trends and observations from 2010 for piezometers situated above or near the horizontal drain installations. These piezometers have generally been at steady-state although a few showed initial draw-down when the drains were first installed. A couple of these instruments react to seasonal precipitation. In 2010, seasonal groundwater increases typical of previous years were either subdued or not evident. BH 25B stopped working in 2010.

Table 4: Piezometers Near Horizontal Drains – Overall Trend and 2010 Observations

Instrument	Overall Groundwater Trend	2010 Observations
BH 23A (near HD1)	Steady-state at 495 m elevation, no influence from horizontal drains	No change
BH 23B (near HD1)	Gradual decrease since installation of horizontal drain in Nov. 2007 until mid-2010 (draw down of 6 m from 495 to 489 m elevation), steady-state since then, no seasonal precipitation response	Steady-state groundwater level achieved, near 489 m
BH 24 (near HD1)	Decreased upon installation of horizontal drain in Nov. 2007 (draw down of 9 m from 501 to 492 m elevation), steady-state since then, intermittently dry	No change
BH 25A (near HD1)	Varies, 500 m to 501 m elevation, slight seasonal precipitation response, no apparent influence from horizontal drains	No seasonal groundwater response, near 500 m

Table 4: Piezometers Near Horizontal Drains – Overall Trend and 2010 Observations (cont.)

BH 25B (near HD1)	Varies, 498 m to 498.5 elevation, with slight seasonal precipitation response, no apparent influence from horizontal drains	Stopped working in early 2010
BH 21A (near HD4)	Groundwater level varies, 499 m to 501 m elevation, with seasonal precipitation response, no apparent influence from horizontal drains	Subdued seasonal groundwater increase, decline to 499 m
BH 21B (near HD4)	Varies, 500.5 m to 501.5 m elevation, with seasonal precipitation response, no apparent influence from horizontal drains	Subdued seasonal groundwater increase, decline to 500.5 m
BH 22 (near HD4)	Varies, 504.5 m to 505.5 m elevation, with seasonal precipitation response, no apparent influence from horizontal drains	Subdued seasonal groundwater increase, decline to 504.5 m

Groundwater levels within the West Quesnel area have been considered to be generally quite high and detrimental to slope stability. The overall trend observed in 2010 was that of a slight decline in overall levels and a generally more subdued to no noticeable seasonal (typically spring) spike in groundwater levels as has been observed in previous years. Groundwater levels adjacent to operating trial dewatering pumping wells and horizontal drains continued to decrease or remain at or near their steady state lowered levels.

5.0 PUMPING WELLS

During 2010, AMEC continued to monitor well levels and pump production for the three operating pumping wells that were left in operation after the 2007-2008 trial dewatering program (reported on by AMEC in May 2008).

Figure 13 shows the locations of the trial pumping wells. PW1 is on Flamingo Street and has a 75 mm by 0.75 horsepower (hp) pump restricted to 15 L/min. PW2, on Abbott Drive, had a 75 mm by 0.75 hp pump restricted to 15 L/min but it stopped working in May 2009 and the pump remains in the well. PW4, on Panagrot Ave., has a 75 mm 2 hp pump restricted to 75 L/min. PW5 is located on Adam Street, with a 100 mm 0.75 hp pump restricted to 15 L/min. PW1, PW2 and PW5 have electronic level controls to start and stop the pumps. PW4 is controlled by an ammeter that shuts off just prior to the pump cavitating (low head level) and restarts after a pre-set time period (20 min). The water pumped from PW1 enters the West Quesnel sanitary sewer while at PW2, PW4 and PW5, the water pumped enters the West Quesnel storm drainage system. A summary table of the well details along with charts of well levels and production since installation can be found in Appendix D.

Table 5 presents the total annual flow and daily average flow for all of the pumping wells from 2008 to 2010.

Table 5: Pumping Wells – Total Annual and Daily Average Flows

	PW1		PW2		PW4		PW5	
Year	Total Flow (L)	Daily Average Flow (L)	Total Flow (L)	Daily Average Flow (L)	Total Flow (L)	Daily Average Flow (L)	Total Flow (L)	Daily Average Flow (L)
2008	33,760	92	9,030	25	4,874,093	13,480	596	2
2009	17,256	47	3,975*	26*	4,985,579	13,649	711	2
2010	15,174	42	0	0	4,524,783	12,400	615	2

*Note: PW2 data from 2009 represents values collected prior to the pump failing in May 2009.

PW1 pumped at a rate of between 40 and 45 L/day during 2010, which is slightly lower than the rates observed in 2009. The total volume of water pumped, since installation to the end of 2010, was approximately 72,941 L. The water level in the well has mostly remained around 477 to 480 m elevation, as defined by the well level controls.

The pump at PW2 stopped working in May 2009 and has not been fixed or replaced since then. The water level in the well remained at approximately 500 m elevation during 2010, after stabilizing, post pumping, in July 2009.

PW4 has been the most productive well, with average pump rates between 11,000 and 14,000 L/day for 2010, which is slightly lower compared to average rates for 2009. To the end of 2010, approximately 16.6 million L of water has been pumped from this well. The water level in the well remained between approximately 528 to 535 m depth, as defined by the well level controls.

PW5 has been the least productive well, with rates averaging below 3 L/day. In 2010, production occurred at least once in each month except for February. To date, only 2015 L of water has been pumped. The water level in the well remained between 424 to 426 m depth, as defined by the well level controls.

6.0 HORIZONTAL DRAINS

During the fall of 2007, four test horizontal (gravity) drains were installed at two different locations into the slope underlying West Quesnel (see Figure 13). This was part of the 2007-2008 trial dewatering program, reported on by AMEC in May 2008. Two of the drains (HD1a and HD1b) are located adjacent to SI-13 on the utility corridor south of the Sikh Temple. Although thought to have initially encountered water during installation, they were observed to be dry (at the discharge end) shortly after installation was complete. The other two drains (HD4a and HD4b) were installed west of Adam Street, near PW5. These drains have been producing water since installation. A summary table of the drains can be found in Appendix E, along with a production table for HD4. The production table for HD4 data prior to January 2009 was based on intermittent manual readings. These readings were averaged to produce the plot and calculate assumed volumes. A magnetic flow meter was installed in mid-December 2008 and now provides real-time data. The magnetic flow meter replaced a previously installed paddle-wheel type flow meter that worked only intermittently. Table 6 presents the total daily average flow observed for each of the three previous years (2008 to 2010).

Table 6: Horizontal Drains – Total Annual and Daily Average Flows

	HD1		HD4	
Year	**Total Annual Flow (L)**	**Daily Average Flow (L)**	**Total Annual Flow (L)**	**Daily Average Flow (L)**
2008	Dry	Dry	1,049,757*	2,879
2009	Dry	Dry	536,501	1,489
2010	Dry	Dry	420,515	1,153

*Note: 2008 HD4 flow values based on intermittent manual readings.

HD4 produced a combined flow from the two drains ranging between approximately 260 and 1,600 L/day during 2010, with the maximum flow occurring between March and June. The flow rates observed during 2010 were similar to 2009 until October 2010, when the flow rate dropped significantly for the next two months. The rate recovered in December 2010 to about half the value of the rates observed in the summer. The observed decrease in flow may be the result of the reduced groundwater recharge, depletion of capture zone water levels or could be a simple instrument error. AMEC will monitor the data in early 2011 to see if a pattern develops. To date, approximately 2.2 million L of water has been removed through the drains.

7.0 PRECIPITATION DATA

Appendix F contains various historical precipitation data charts for the Quesnel area. The primary source of information was precipitation data collected from Environment Canada (EC), for stations Quesnel AWOS[1] (prior to June 2010) and Quesnel[1] (from June 2010 on), which are located approximately 6 km north of the project site at the Quesnel airport. Total monthly and daily precipitation records, including 30 year climate normals, were obtained for the EC station. A secondary source of precipitation data was from the custom-installed local weather station on the roof of an apartment building within the West Quesnel Land Stability Program area by Urban Systems Ltd. Daily total precipitation data has been available from the Urban Systems' station only on an intermittent basis since June 2006.

The intention of installing the custom local weather station was to try to discern if there were significant differences in total precipitation patterns between the EC station and the West Quesnel area. Unfortunately AMEC was unable to access the Urban System's station data at the time of this report (due to system malfunctions that have yet to be resolved) and accordingly cannot present the corresponding 2010 data. AMEC recommends that the Urban System station be fixed as soon as possible. From previous data, it appears that while generally both stations record the same significant precipitation events, the EC station recorded a higher level of total precipitation. While this discrepancy may suggest that the West Quesnel area is drier than the Quesnel Airport, a significant portion of this difference is due to equipment outages at the Urban Systems station. In addition, the discrepancy may also be due to a non-standard layout for the Urban Systems' equipment (being on an apartment roof, as compared to that used for the EC station), which could affect the capture of both rain and snowfall precipitation. Consequently, AMEC has decided to rely on the more complete EC total precipitation data for analysis of the West Quesnel area for the 2010 monitoring period.

[1] Environment Canada, 2010. Canadian Climate Data Search On-line - Canada's National Climate Archive. http://www.climate.weatheroffice.ec.gc.ca/climateData/canadae.html Last visited January 6, 2011.

Total precipitation recorded at the EC weather station for 2010 was 315 mm, which is roughly 40% lower than the historical normal[2] (1971 to 2000) which was 540 mm. Generally, 2010 was drier than previous years from January until July but was a bit wetter than normal through August and September and drier again through October to December. Overall, the calendar year of 2010 was much drier than previous years and appears to be similar to trends observed in the late 1980's. Table 7 presents the annual total precipitation from 1996 to 2010. Figure F1, in Appendix F, presents total monthly precipitation since June 2006. Figures F2 and F3 show cumulative total monthly precipitation and total monthly precipitation versus the historical normal since 1976, respectively. Figure F4 shows the cumulative difference between the actual recorded precipitation and the 30-year normal since 1976. Upward slopes in the cumulative difference graph represent wet trends, while downward slopes are drying trends. Normal precipitation is observed when the cumulative difference plot remains relatively constant.

Table 7: Annual Total Precipitation from 1996 to 2010

Year	Annual Total Precipitation (mm)	Difference from Historical Normal (mm)
1996	657	+117
1997	579	+39
1998	488	-52
1999	628	+88
2000	554	+14
2001	554	+14
2002	471	-69
2003	478	-62
2004	692	+152
2005	524	-16
2006	465	-75
2007	541	+1
2008	530	-10
2009	423	-117
2010	315	-225

8.0 TRENDS

Selected data from different types of instrumentation was plotted to determine if any general trends were apparent. While 2007-2010 still represents the early stages of availability of relatively comprehensive data sets across the study area, several trends were visible. Charts of these comparisons can be found in Appendix G.

[2] Environment Canada, 2010. Canadian Climate Normals and Averages 1971-2000 – Canada's National Climate Archive. http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html Last visited December 8, 2010.

The comparisons in different types of data, to be discussed below, are as follows:

- Total monthly precipitation vs. groundwater elevation (Figure G1)
- Cumulative total daily precipitation vs. groundwater elevation (Figure G2)
- Incremental ground movement rate vs. total monthly precipitation (Figure G3)
- Incremental ground movement rate vs. total seasonal precipitation (Figure G4)
- Cumulative ground movement vs. total monthly precipitation (Figure G5)
- Incremental ground movement rate vs. cumulative difference total monthly precipitation (Figure G6)
- Incremental ground movement rate vs. groundwater elevation (Figure G7)
- Cumulative ground movement vs. groundwater elevation (Figure G8)

8.1 PRECIPITATION EFFECT ON GROUNDWATER LEVELS

On Figure G1, when total monthly precipitation is compared to general groundwater elevation (as determined from selected vibrating wire piezometers unlikely to have been affected by trial dewatering); it is apparent that significant seasonal rises in groundwater level do occur just after winter each year, although the seasonal rises were more subdued in 2010. As discussed in Section 4.0, VWP 10C experienced a large increase in water level in August 2010, and this was subsequently attributed to a nearby broken water line. The same may have been true for the unexplained rise in VWP 4B in 2009.

When these same groundwater elevations are plotted against cumulative total daily precipitation (see Figure G2), a steep rise in the cumulative precipitation curve is often, but not always, followed by a rise in groundwater levels in some of the piezometers. In the other cases, observed rises in groundwater levels are not directly or immediately correlated to preceding rises in the cumulative precipitation plot. There is likely an over-riding and complicated time-lag effect of infiltration of previous rainfall or snow melt (during frozen/non-frozen and dry/saturated ground conditions) on groundwater levels. There may also be additional factors operating such as infiltration variability depending on surface moisture conditions and near surface groundwater conditions, lawn watering, variable losses from sewers and water systems and other unknown factors. In addition, in other slides, the degree of infiltration has been found to vary with slide movement closing and opening tension areas combined with surface water and shallow groundwater flow paths. Generally, however, for 2010 there was an observed gradual reduction in background groundwater levels that corresponded with reduced precipitation and reduced movement rates.

8.2 PRECIPITATION EFFECT ON GROUND MOVEMENT

Cumulative total ground movement and movement rates (as determined from selected representative SI and horizontal GPS movement data) were plotted against various precipitation data (see Figures G3 to G6). A general correlation between ground movement and seasonal precipitation patterns can be discerned, with more observed movement generally occurring or following wetter years or wetter seasons within a given year. The observed reduced rate and amount of movement in 2010 correlates with generally declining precipitation, starting around mid 2009 onwards.

8.3 GROUNDWATER LEVEL CORRELATION WITH GROUND MOVEMENT

Figure G7 plots groundwater elevation versus ground movement rates (velocity, as determined from selected SI and horizontal GPS movement data). Peaks in movement rates typically occurred in the late spring. There was a time lag observed between the increase in groundwater levels and the maximum movement rate and this time lag appears relatively consistent (approximately 1.5 to 2 months) within the four years of data plotted. It is important to note that this time lag is not absolute, as the GPS based movement data is collected only quarterly and thus provides only very coarse resolution. In the May 2007 report, AMEC observed that groundwater elevations correlated to slide movement rates. Similar correlations are present in the current data set.

The cumulative ground movement (horizontal movement only) was plotted against groundwater elevation (see Figure G8) using the same piezometer data as in Figure G7. The annual ground movement appears to begin around the same time as the groundwater levels rise (during spring), although the ground movement continues beyond the rise in groundwater levels. As with the previous chart, it is important to note that the time frames are not absolute, as the movement data is collected only quarterly and thus provides only very coarse resolution.

What is apparent from both Figures G7 and G8 is that increased ground movements are strongly correlated with seasonal increases in monitored groundwater levels. The reduced ground movement observed in 2010 (as opposed to 2008 and 2009) is generally correlated with gradually declining background groundwater levels observed over the same period. This in turn is correlated to the more recent general drying trend in terms of precipitation observed from approximately mid 2009 to present.

9.0 CLOSURE

This report presents the results of the annual monitoring carried out by AMEC for the 2010 calendar year. It is recommended and anticipated that monitoring will continue through 2011 and beyond. AMEC will be providing a work plan and estimate for the 2011 annual monitoring program under separate cover.

This report has been prepared for the exclusive use of the City of Quesnel and their representatives for specific application to West Quesnel Land Stability Program. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. AMEC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report was prepared in accordance with generally accepted geotechnical engineering principles and practice. No other warranty, expressed or implied, is made.

Please do not hesitate to contact the undersigned at (250) 564-3243 should you have any questions or require further information.

AMEC Earth & Environmental
A division of AMEC Americas Limited

PROFESSIONAL PROVINCE OF H. M. CHOTEAU # 35253 BRITISH COLUMBIA ENGINEER 04-02-2011

Reviewed by:

Hayley Robertson, P.Eng.
Geotechnical Engineer

D.S. Cavers, M.Eng., P.Eng., P.Geo.
Principal Engineer

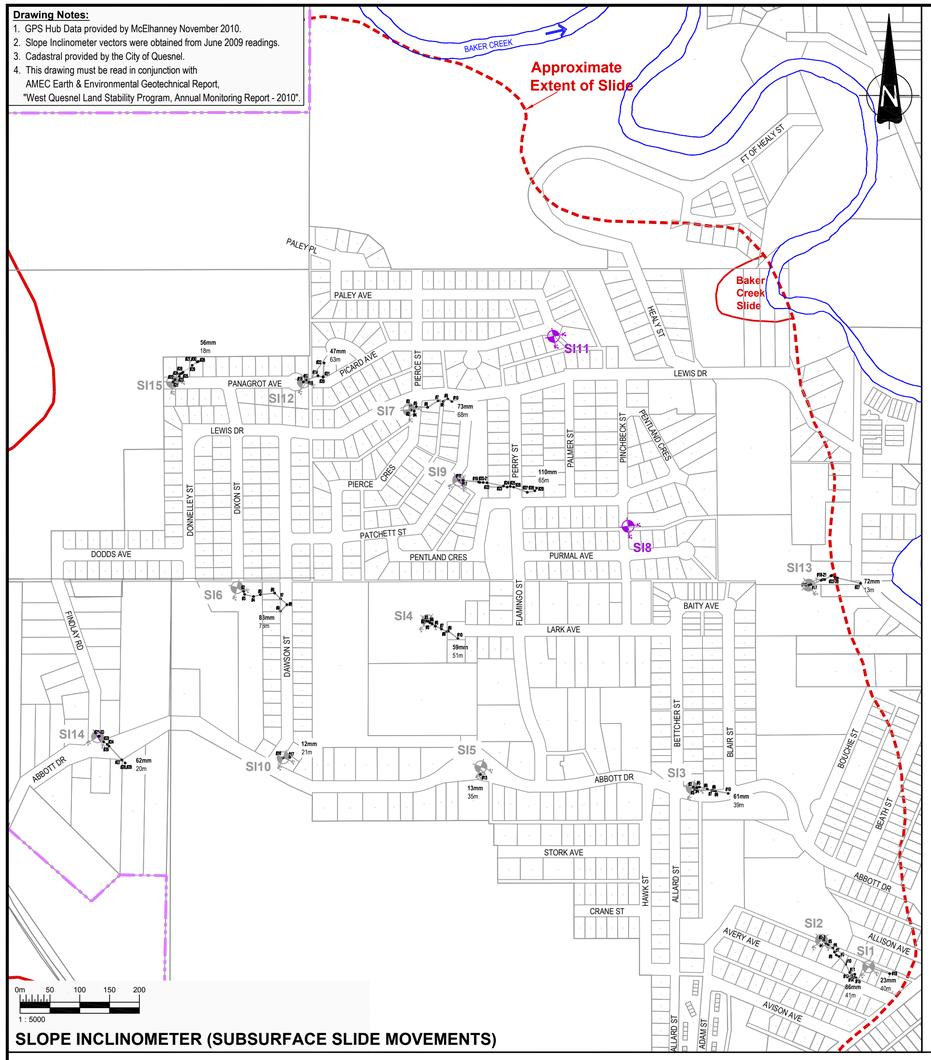
PROFESSIONAL PROVINCE OF N. C. POLYSOU BRITISH COLUMBIA ENGINEER Feb 4/2011

Nick C. Polysou, P.Eng.
Senior Associate, Geotechnical Engineer
Manager, BC Region

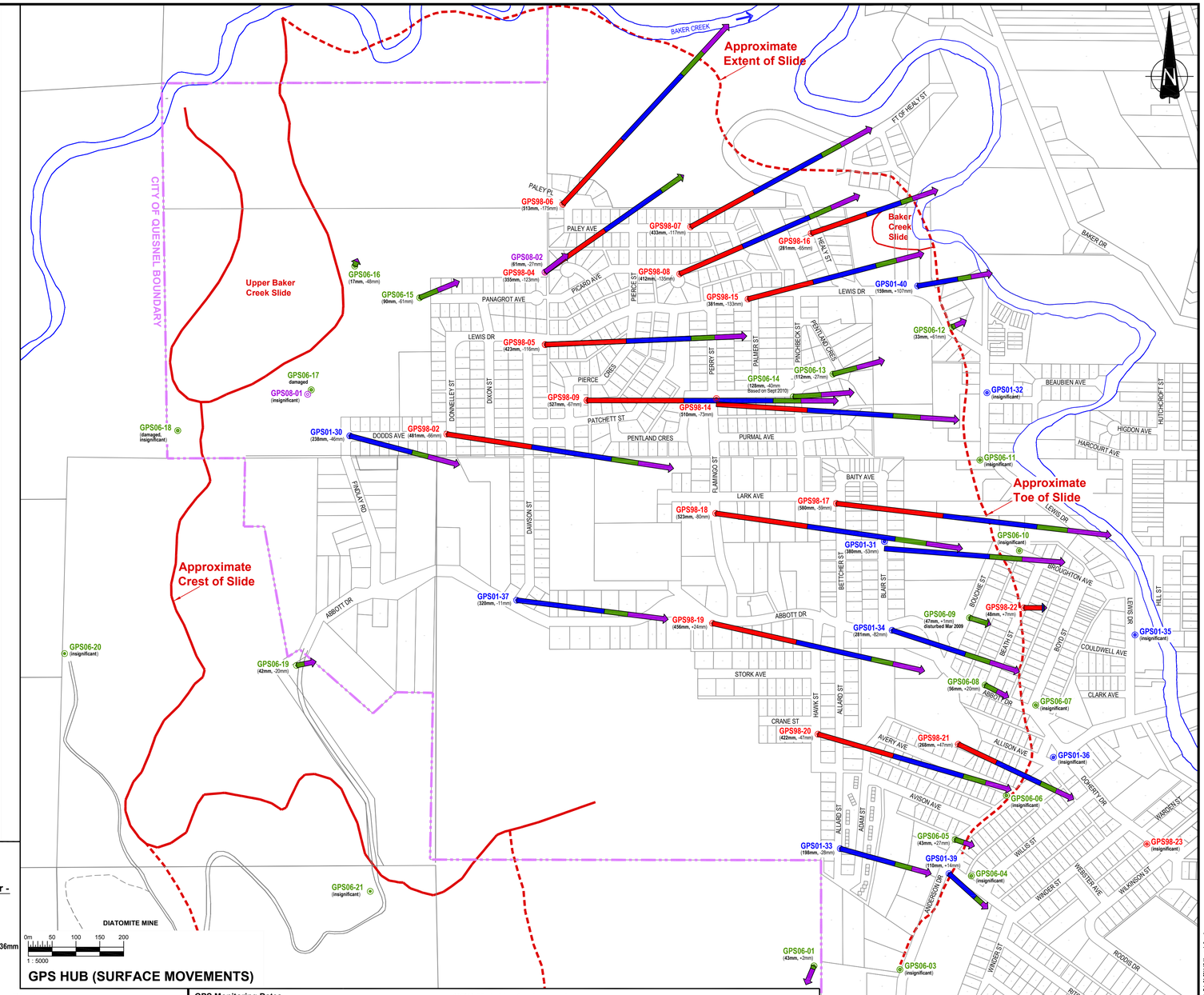
LIST OF FIGURES

Drawing Notes:

1. GPS Hub Data provided by McElhanney November 2010.
2. Slope Inclinometer vectors were obtained from June 2009 readings.
3. Cadastral provided by the City of Quesnel.
4. This drawing must be read in conjunction with AMEC Earth & Environmental Geotechnical Report, "West Quesnel Land Stability Program, Annual Monitoring Report - 2010".



SLOPE INCLINOMETER (SUBSURFACE SLIDE MOVEMENTS)

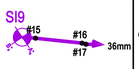


GPS HUB (SURFACE MOVEMENTS)

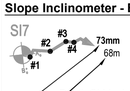
SI Monitoring Schedule

Dates	SI1	SI2	SI3	SI4	SI5	SI6	SI7	SI8	SI9	SI10	SI11	SI12	SI13	SI14	SI15
Depth	43.6m	74.6m	102.4m	158.0m	144.8m	154.5m	125.6m	71.3m	79.2m	79.9m	70.7m	73.2m	39.6m	99.4m	90.8m
Initial	21 Nov 2000	21 Nov 2000	21 Nov 2000	03 Nov 2000	28 Oct 2000	22 Nov 2000	22 Nov 2000	03 Jun 2005	27 Apr 2005	27 Apr 2005	31 May 2005	28 Apr 2005	28 Apr 2005	08 Nov 2006	09 Nov 2006
#1				24 Nov 2000	24 Nov 2000										
#2	07 Dec 2000	07 Dec 2000	06 Dec 2000	06 Dec 2000	06 Dec 2000	06 Dec 2000	07 Dec 2000								
#3	12 Jan 2001	11 Jan 2001	12 Jan 2001	11 Jan 2001	12 Jan 2001	11 Jan 2001	12 Jan 2001								
#4	05 Mar 2001	05 Mar 2001	06 Mar 2001	05 Mar 2001	06 Mar 2001	05 Mar 2001	06 Mar 2001								
#5	02 Apr 2001	02 Apr 2001	03 Apr 2001	02 Apr 2001	03 Apr 2001	02 Apr 2001	03 Apr 2001								
#6	28 Apr 2001	28 Apr 2001	28 Apr 2001	28 Apr 2001	29 Apr 2001	28 Apr 2001	29 Apr 2001								
#7	18 Jun 2001	13 Jun 2001	14 Jun 2001	14 Jun 2001	14 Jun 2001	13 Jun 2001	14 Jun 2001								
#8	04 Oct 2001	04 Oct 2001	04 Oct 2001	04 Oct 2001	04 Oct 2001	26 Sep 2001	04 Oct 2001								
#9	20 Nov 2001	19 Nov 2001	19 Nov 2001	19 Nov 2001	19 Nov 2001	19 Nov 2001	20 Nov 2001								
#10	06 May 2002	06 May 2002	06 May 2002	06 May 2002	06 May 2002	**blocked 78m**	06 May 2002								
#11	19 Nov 2002	19 Nov 2002	**blocked 39m**	**blocked 51m**	19 Nov 2002		**blocked 68m**								
#12	15 Aug 2003	15 Aug 2003			15 Aug 2003		15 Aug 2003								
#13	02 Dec 2003	02 Dec 2003			02 Dec 2003		02 Dec 2003								
#14	24 Jun 2004	24 Jun 2004			**blocked 35m**		24 Jun 2004								
#15	10 Nov 2004	10 Nov 2004					10 Nov 2004								
#16	27 Apr 2005	**blocked 41m**					27 Apr 2005								
#17									03 Jun 2005	03 Jun 2005		03 Jun 2005	03 Jun 2005		
#18										**blocked 21m**		09 Jun 2005			
#19	18 May 2006						18 May 2006	18 May 2006	18 May 2006		18 May 2006	19 May 2006	18 May 2006		
#20	29 Aug 2006						29 Aug 2006	29 Aug 2006	29 Aug 2006		29 Aug 2006	30 Aug 2006	29 Aug 2006		
#21	08 Nov 2006						09 Nov 2006	09/21 Nov 2006	08 Nov 2006		09 Nov 2006	21 Nov 2006	21 Nov 2006		
#22	08 Mar 2007						08 Mar 2007	30 Mar 2007	08 Mar 2007		08 Mar 2007	30 Mar 2007	12 Mar 2007	09 Mar 2007	09 Mar 2007
#23	29 May 2007						29 May 2007	29 May 2007	30 May 2007		30 May 2007	**blocked 63m**	29 May 2007	30 May 2007	30 May 2007
#24	30 Aug 2007						28 Aug 2007	30 Aug 2007	30 Aug 2007		30 Aug 2007		30 Aug 2007	30 Aug 2007	30 Aug 2007
#25	22 Nov 2007						**sheared 27m**	22 Nov 2007	22 Nov 2007		22 Nov 2007		22 Nov 2007		22 Nov 2007
#26	04 April 2008							03 April 2008	04 April 2008		04 April 2008		03 April 2008	03 April 2008	04 April 2008
#27	**blocked 40m**							24 June 2008	24 June 2008		25 June 2008		25 June 2008	24 June 2008	24 June 2008
#28								09 Sept 2008	09 Sept 2008		10 Sept 2008		**blocked 13m**	09 Sept 2008	10 Sept 2008
#29								11 Nov 2008	10 Nov 2008		11 Nov 2008			10 Nov 2008	10 Nov 2008
#30								16 April 2009	**blocked 65m**		16 April 2009			**blocked 20m**	16 April 2009
#31								30 June 2009			30 June 2009				**blocked 18m**

Slope Inclinometer - Operational



Slope Inclinometer - Blocked



Depth SI blocked below ground surface, in metres
Total shear displacement at shear surface, in millimetres

Note: Total shear displacement measured across shear surface, from initial reading to present or until blocked.

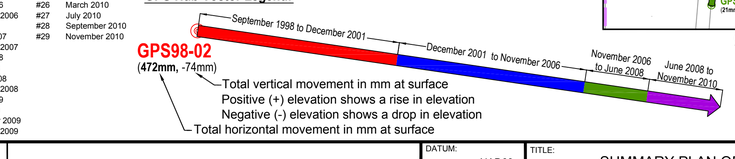
Movement Vector Scale:

0mm 50 100 150 200

GPS Monitoring Dates

Initial	September 1998	#13	March 2006	#26	March 2010
#1	December 1998	#14	November 2006	#27	July 2010
#2	April 1999	#15	April 2007	#28	September 2010
#3	December 1999	#16	August 2007	#29	November 2010
#4	February 2000	#17	December 2007		
#5	May 2000	#18	March 2008		
#6	December 2000	#19	June 2008		
#7	May 2001	#20	August 2008		
#8	December 2001	#21	November 2008		
#9	May 2002	#22	March 2009		
#10	October 2002	#23	June 2009		
#11	November 2003	#24	September 2009		
#12	January 2005	#25	November 2009		

GPS Hub Vector Legend:



GPS Hubs installed:

- GPS98-02 - September 1998
- GPS01-30 - December 2001
- GPS06-01 - November 2006
- GPS08-01 - June 2008

Movement Vector Scale:

0mm 50 100 150 200

REV	D	M	Y	ISSUE/REVISION DESCRIPTION	CAD	APPR.
G						
F						
E						
D	07	12	2010	UPDATED TO NOV 2010 DATA	SR	HC
C	08	12	2009	UPDATED TO NOV 2009 DATA	SR	HC
B	13	01	2009	UPDATED TO NOV 2008 DATA	JF	HC
A	04	05	2007	ISSUED DRAFT	SR	NP

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DATUM:	NAD83
PROJECTION:	UTM Zone 10
DRAWN BY:	S.Ruiz
REVIEWED BY:	H.Croteau
ORIGINAL SCALE:	1:5000

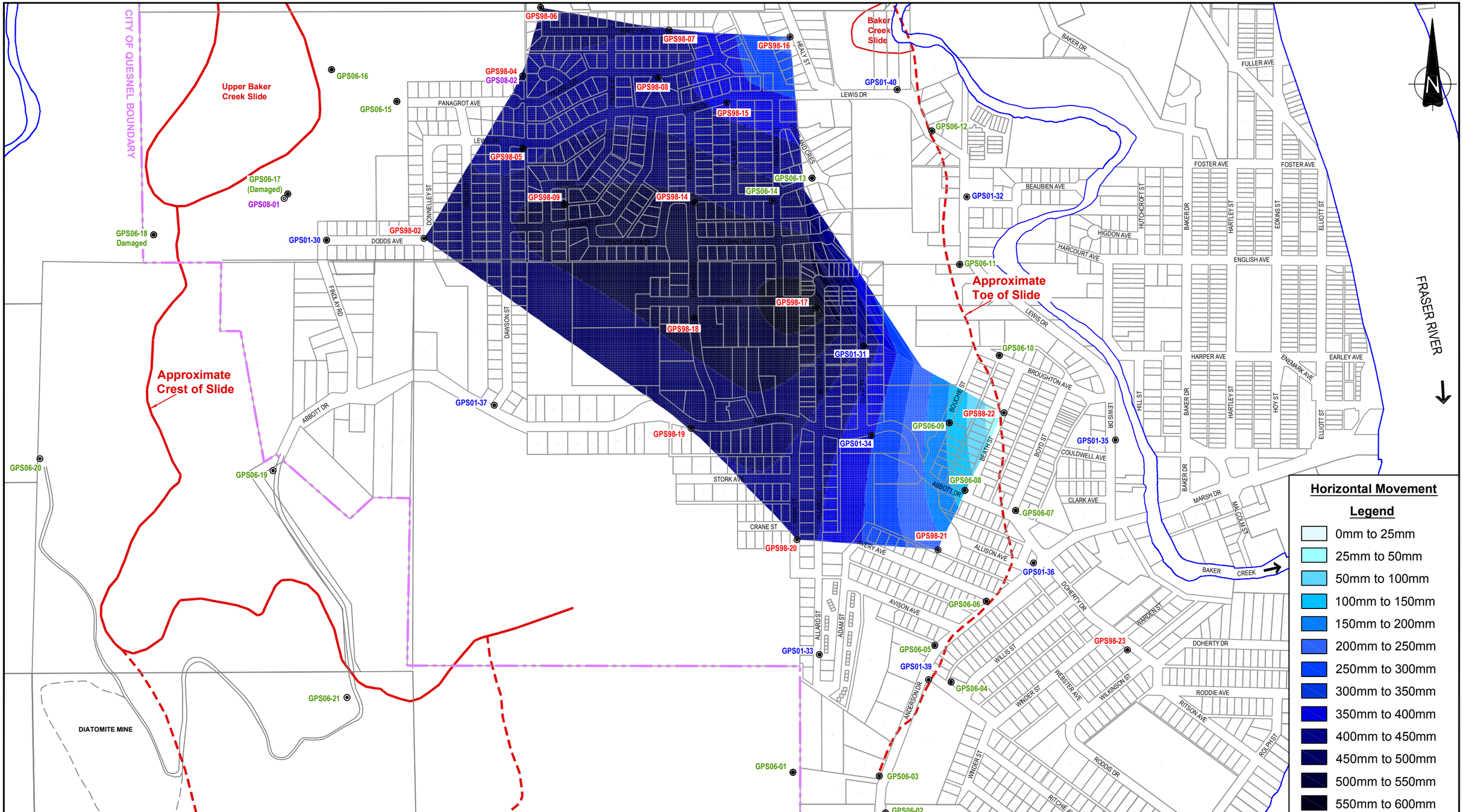
TITLE: SUMMARY PLAN OF GROUND MOVEMENT (GPS HUBS AND SLOPE INCLINOMETERS)

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

PROJECT NO.:	KX04397
REVISION NO.	D
DATE:	4 February 2011
FIGURE NO.:	FIGURE 1
SHEET NO.:	1 of 1

This drawing was originally produced in colour.

C:\JOB\Healy\KX04397\CAD\Annual Monitoring-ver2011\KX04397-fig1-GPS-SI-Nov2010.dwg - figure 1 - File: M, 2011 13:14pm - ewilkins.mt



GPS Hubs installed:

GPS98-02 ◉ - September 1998
GPS01-30 ◉ - December 2001
GPS06-01 ◉ - November 2006
GPS08-01 ◉ - June 2008

0m 50 100 150 200 250 300
1 : 7500

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DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

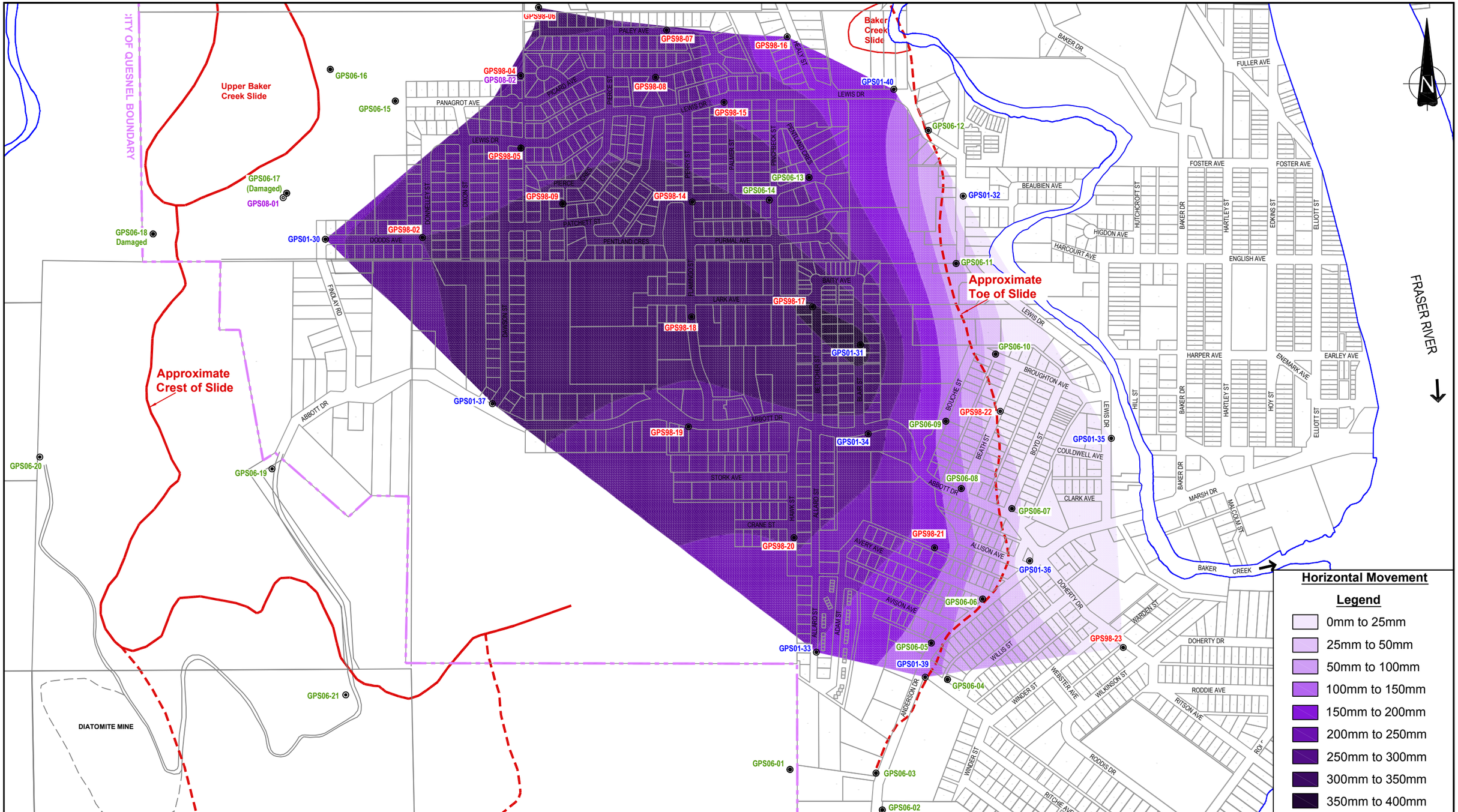
TITLE: TOTAL HORIZONTAL MOVEMENT SEPTEMBER 1998 TO NOVEMBER 2010 FOR THE 1998 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 2

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig02-H.MOVE-Sept98-Nov10-98hubs.dwg - Figure2 - Feb. 04, 2011 2:22pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◉ - September 1998
GPS01-30 ◉ - December 2001
GPS06-01 ◉ - November 2006
GPS08-01 ◉ - June 2008

0m 50 100 150 200 250 300
1 : 7500

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CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

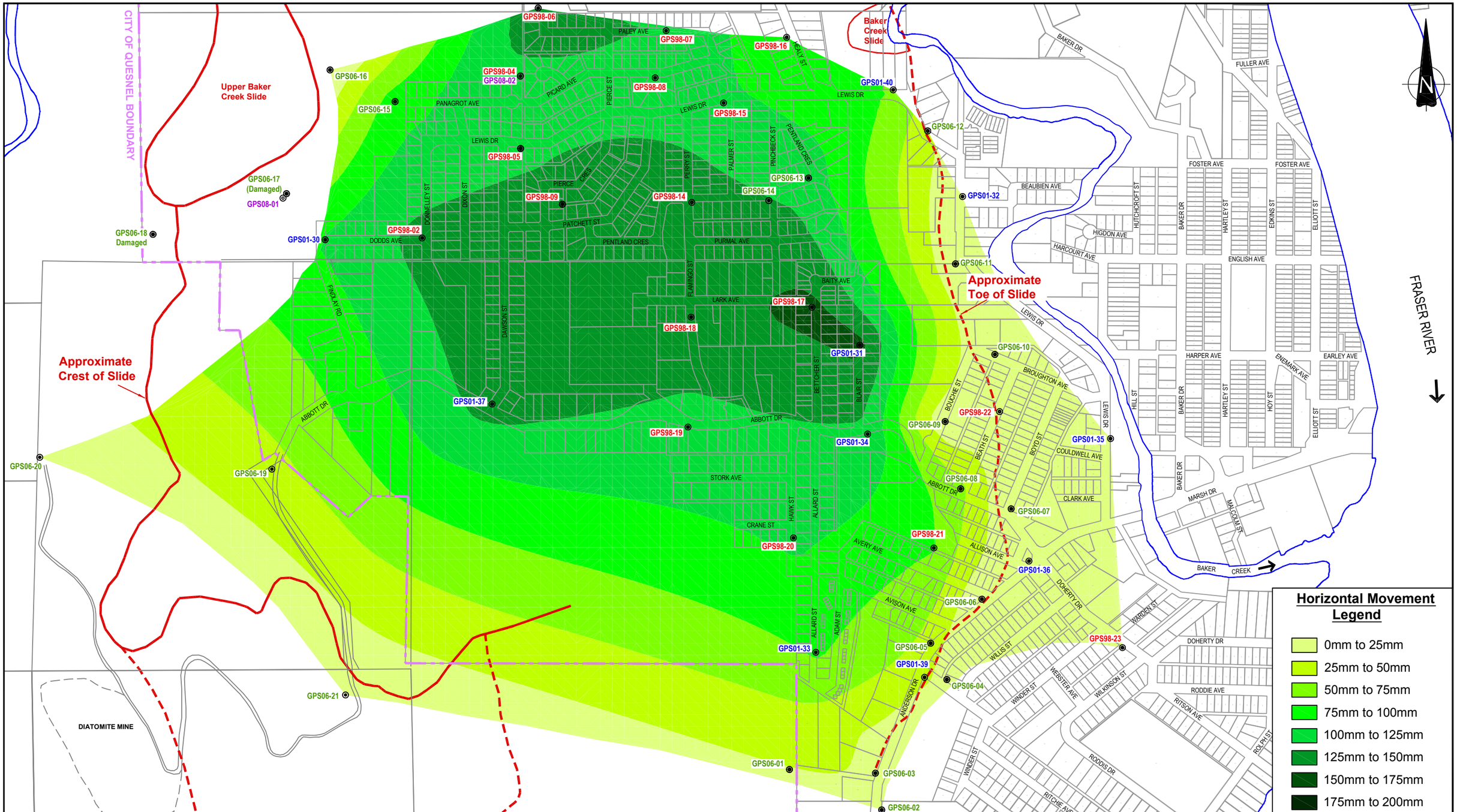
TITLE: TOTAL HORIZONTAL MOVEMENT DECEMBER 2001 TO NOVEMBER 2010 FOR THE 1998 AND 2001 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 3

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig03-H.MOVE-Dec01-Nov10-98.01hubs.dwg - FIGURE3 - Feb. 04, 2011 12:52pm - shelley.ruiz

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 25mm
- 25mm to 50mm
- 50mm to 75mm
- 75mm to 100mm
- 100mm to 125mm
- 125mm to 150mm
- 150mm to 175mm
- 175mm to 200mm

GPS Hubs installed:

GPS98-02 ◎ - September 1998
GPS01-30 ◎ - December 2001
GPS06-01 ◎ - November 2006
GPS08-01 ◎ - June 2008

0m 50 100 150 200 250 300
1 : 7500

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CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

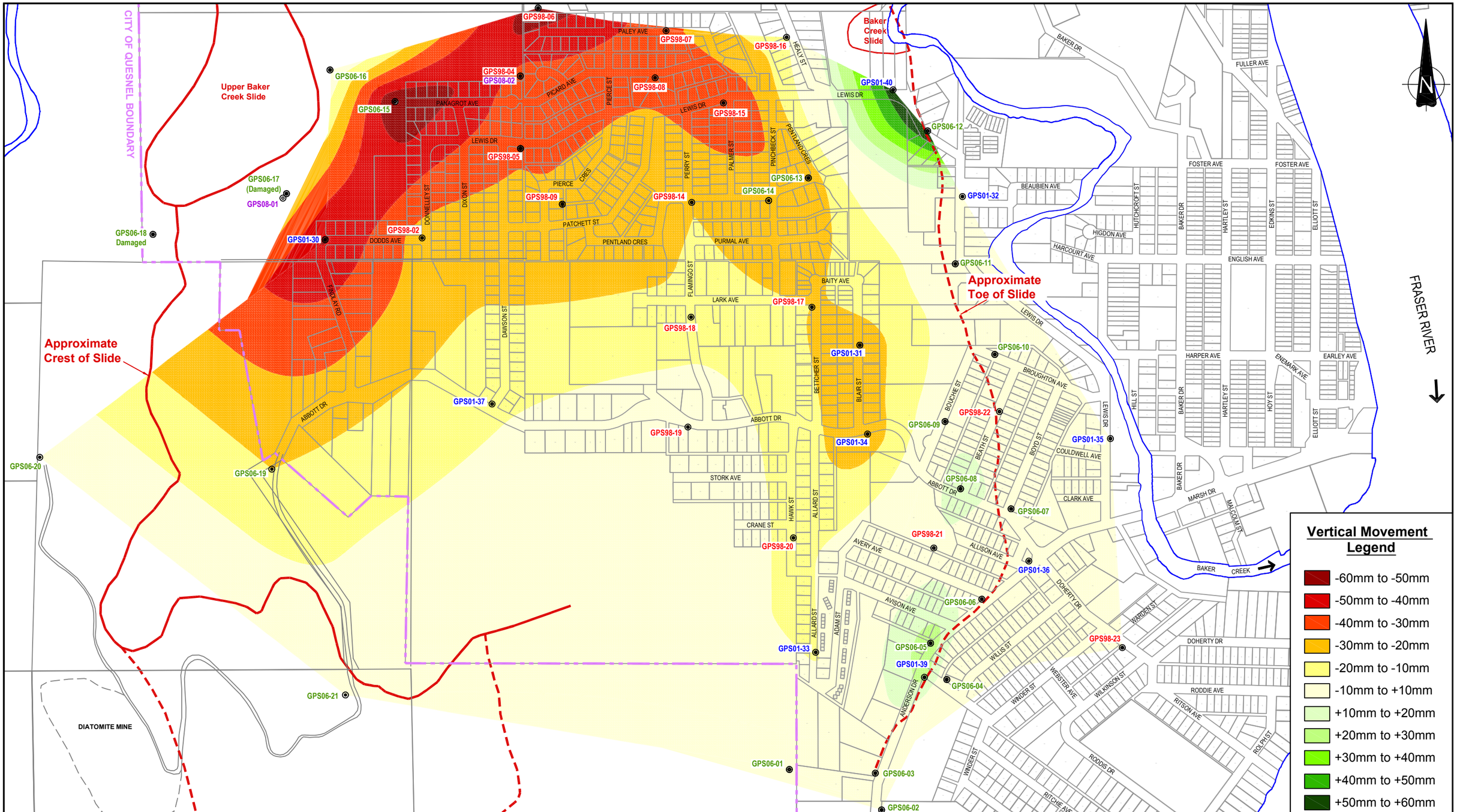
TITLE: TOTAL HORIZONTAL MOVEMENT NOVEMBER 2006 TO NOVEMBER 2010 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 4

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig04-H.MOVE-Nov06-Nov10-allhubs.dwg - fig 11x17 - Feb. 04, 2011 12:55pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◉ - September 1998
GPS01-30 ◉ - December 2001
GPS06-01 ◉ - November 2006
GPS08-01 ◉ - June 2008

0m 50 100 150 200 250 300
1 : 7500

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DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

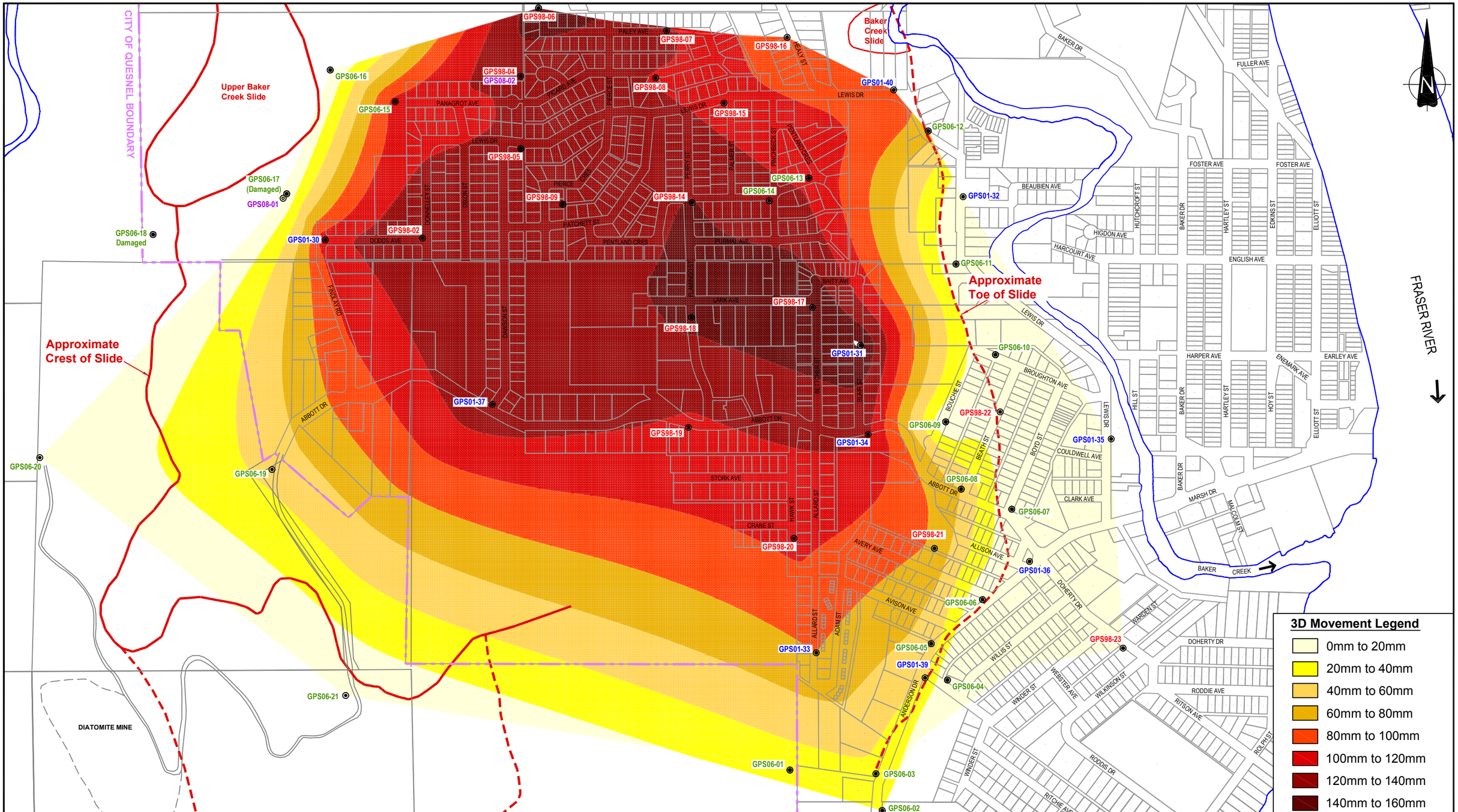
TITLE: TOTAL VERTICAL MOVEMENT NOVEMBER 2006 TO NOVEMBER 2010 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 5

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig05-V.MOVE-Nov06-Nov10-allhubs.dwg - FIGURE5 - Feb. 04, 2011 1:16pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◉ - September 1998
GPS01-30 ◉ - December 2001
GPS06-01 ◉ - November 2006
GPS08-01 ◉ - June 2008

0m 50 100 150 200 250 300
1 : 7500

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DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

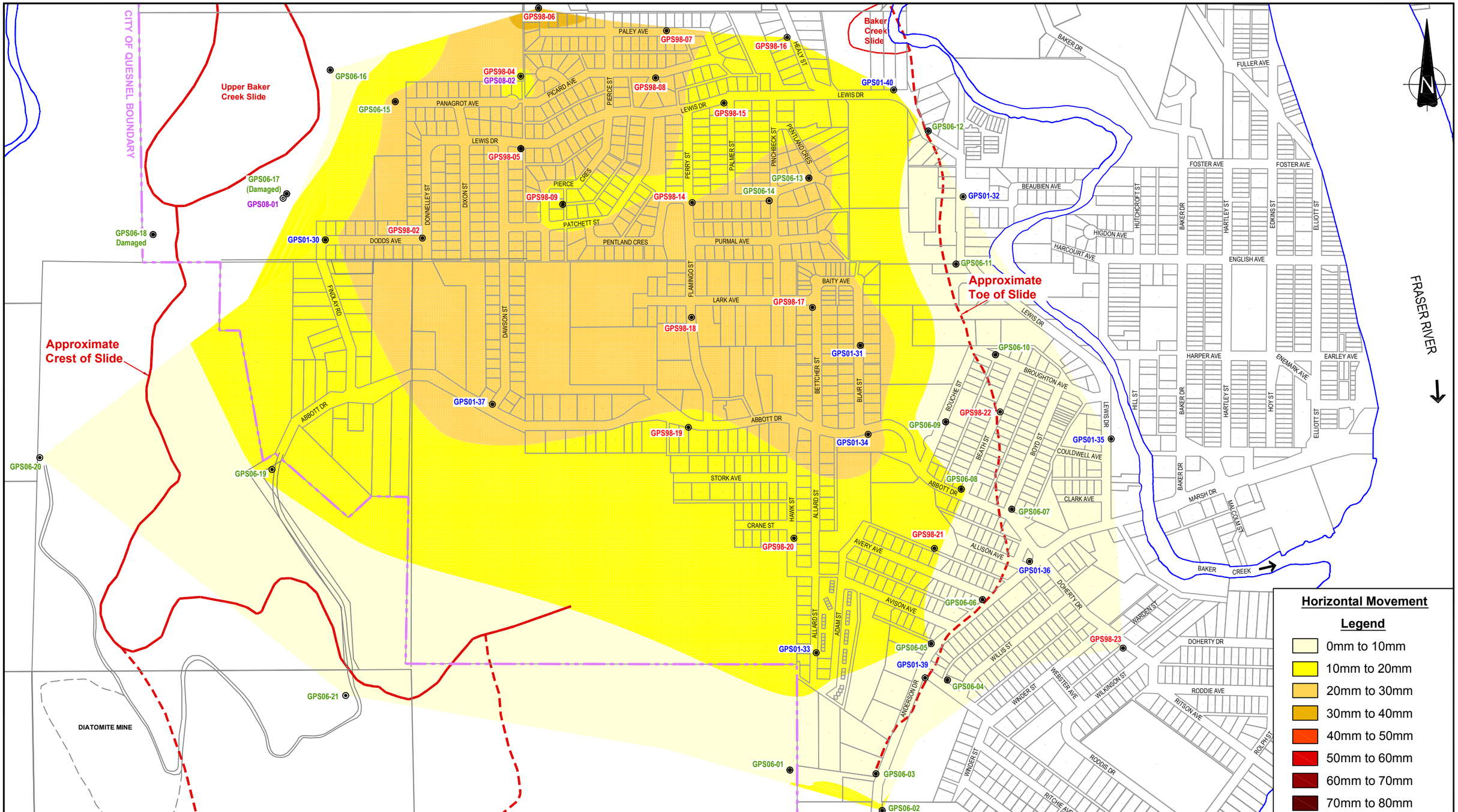
TITLE
TOTAL 3D MOVEMENT NOVEMBER 2006 TO NOVEMBER 2010 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT
WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 6

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig06-3D.MOVE-Nov06-Nov10-allhubs.dwg - FIGURE6 - Feb. 04, 2011 1:21pm - shelley.ruiz

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm

GPS Hubs installed:

GPS98-02 ◉ - September 1998
GPS01-30 ◉ - December 2001
GPS06-01 ◉ - November 2006
GPS08-01 ◉ - June 2008

0m 50 100 150 200 250 300
1 : 7500

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DWN BY: S.Ruiz
CHK'D BY: N.Polysou
DATUM: NAD83
PROJECTION: UTM Zone 10
SCALE: 1:7500

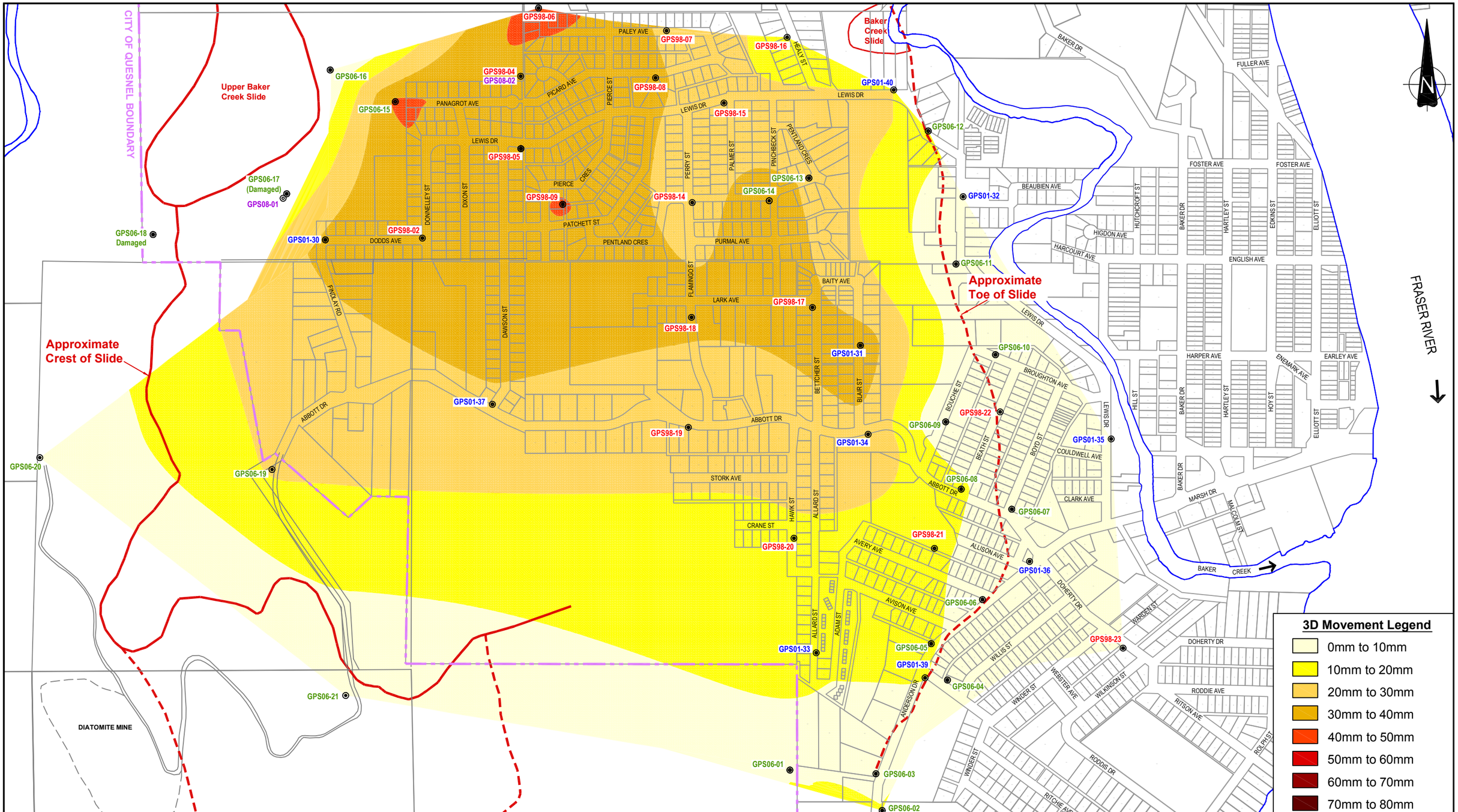
TITLE: ANNUAL HORIZONTAL MOVEMENT NOVEMBER 2006 TO DECEMBER 2007 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE: 4 February 2011
PROJECT NO: KX04397
REV. NO.: A
FIGURE No. FIGURE 7

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig07-H.MOVE-Nov06-Dec07-allhubs.dwg - FIGURE7 - Feb. 04, 2011 1:26pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◉ - September 1998
GPS01-30 ◉ - December 2001
GPS06-01 ◉ - November 2006
GPS08-01 ◉ - June 2008

0m 50 100 150 200 250 300
1 : 7500

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DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

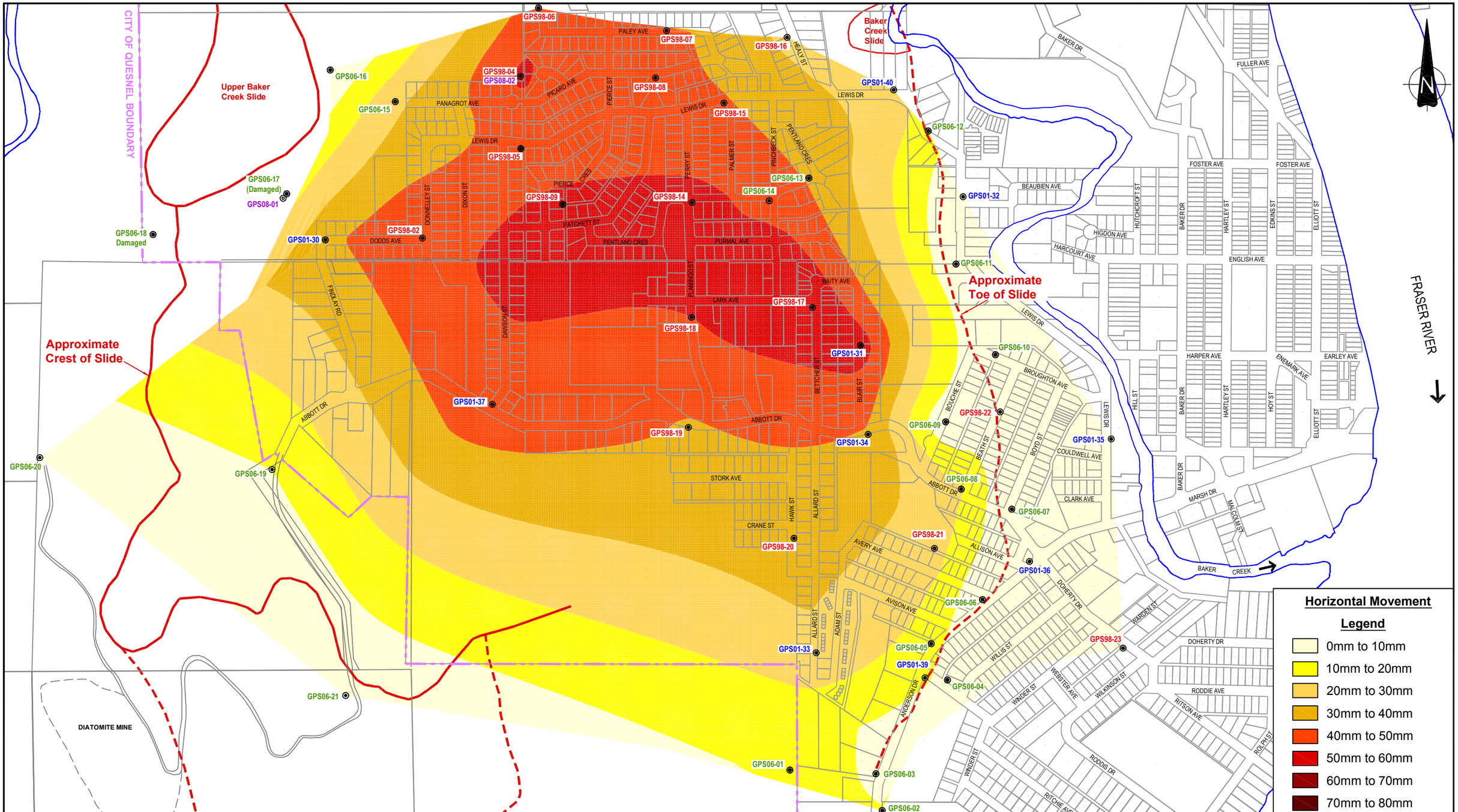
TITLE: ANNUAL 3D MOVEMENT NOVEMBER 2006 TO DECEMBER 2007 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 8

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig08-3D.MOVE-Nov06-Dec07-allhubs.dwg - FIGURE8 - Feb. 04, 2011 1:28pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◎ - September 1998
GPS01-30 ◎ - December 2001
GPS06-01 ◎ - November 2006
GPS08-01 ◎ - June 2008

0m 50 100 150 200 250 300
1 : 7500

CLIENT LOGO

West Quesnel Land Stability Program

CLIENT: CITY OF QUESNEL

AMEC Earth & Environmental
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel. (250) 564-3243
Fax (250) 562-7045

amec

DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

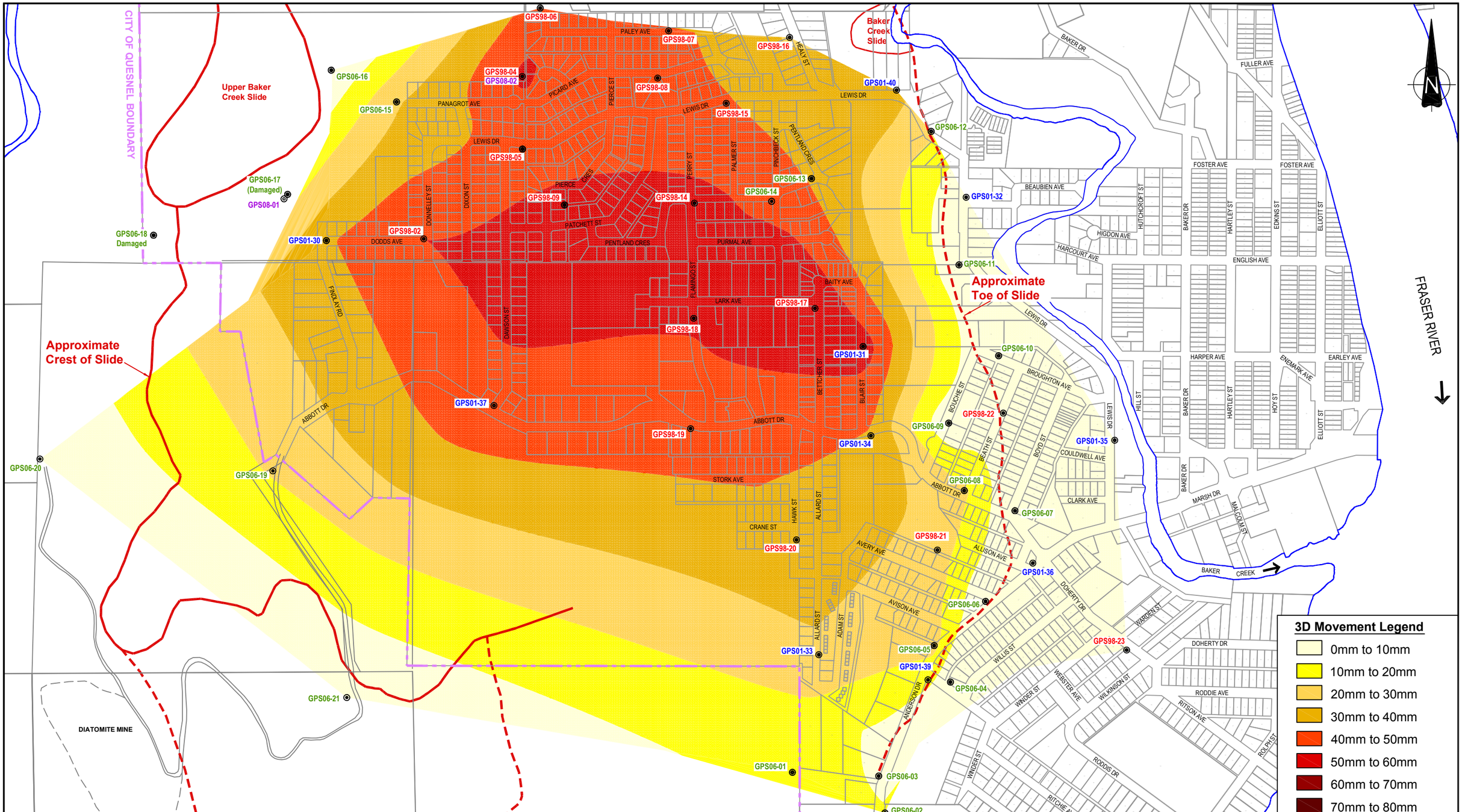
TITLE: ANNUAL HORIZONTAL MOVEMENT DECEMBER 2007 TO NOVEMBER 2008 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 9

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig09-H.MOVE-Dec07-Nov08-allhubs.dwg - FIGURE9 - Feb. 04, 2011 1:30pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◎ - September 1998
GPS01-30 ◎ - December 2001
GPS06-01 ◎ - November 2006
GPS08-01 ◎ - June 2008

0m 50 100 150 200 250 300
1 : 7500

CLIENT LOGO

West Quesnel Land Stability Program

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Fax (250) 562-7045

DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

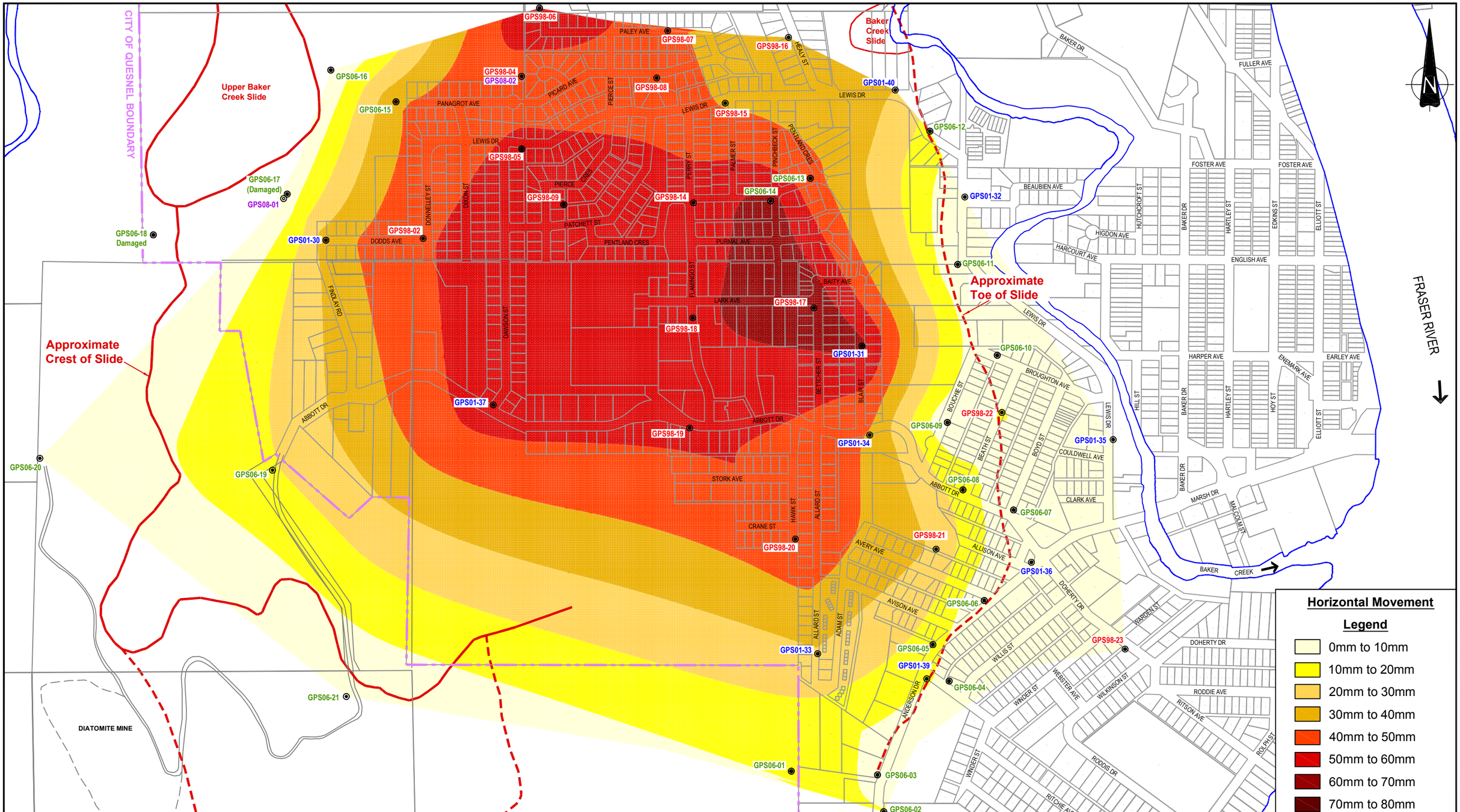
TITLE: ANNUAL 3D MOVEMENT DECEMBER 2007 TO NOVEMBER 2008 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 10

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig10-3D.MOVE-Dec07-Nov08-allhubs.dwg - FIGURE10 - Feb. 04, 2011 1:32pm - shelley.ruiz

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm

GPS Hubs installed:

- GPS98-02 ◎ - September 1998
- GPS01-30 ◎ - December 2001
- GPS06-01 ◎ - November 2006
- GPS08-01 ◎ - June 2008

0m 50 100 150 200 250 300

1 : 7500

CLIENT LOGO

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DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

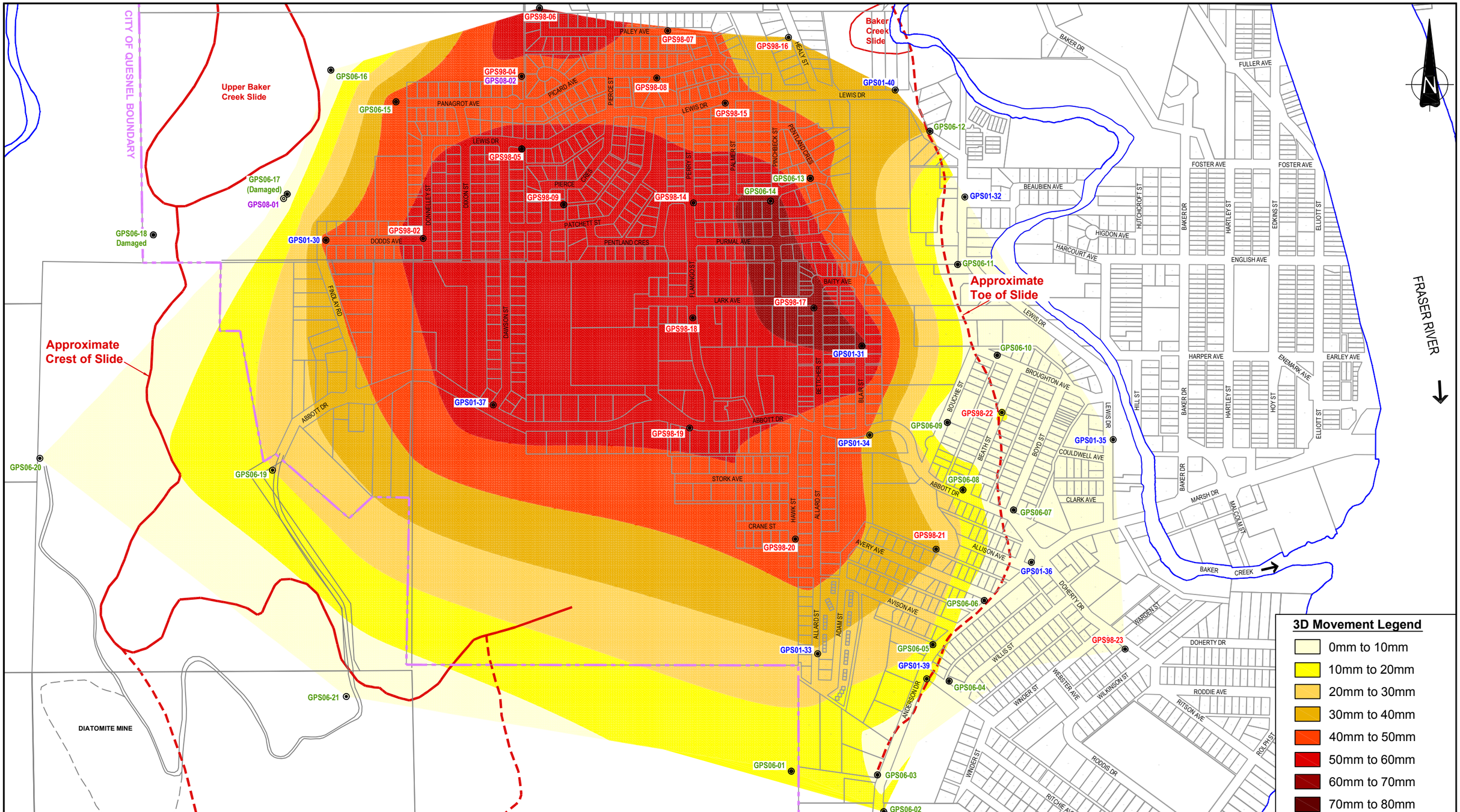
TITLE: ANNUAL HORIZONTAL MOVEMENT NOVEMBER 2008 TO NOVEMBER 2009 FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 11

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig11-H.MOVE-Nov08-Nov09-allhubs.dwg - FIGURE11 - Feb. 04, 2011 1:35pm - shelley.ruiz

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm

GPS Hubs installed:

GPS98-02 ◎ - September 1998
GPS01-30 ◎ - December 2001
GPS06-01 ◎ - November 2006
GPS08-01 ◎ - June 2008

0m 50 100 150 200 250 300
1 : 7500

CLIENT LOGO

West Quesnel Land Stability Program

CLIENT: CITY OF QUESNEL

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Prince George, BC, CANADA V2N 2P9
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amec

DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

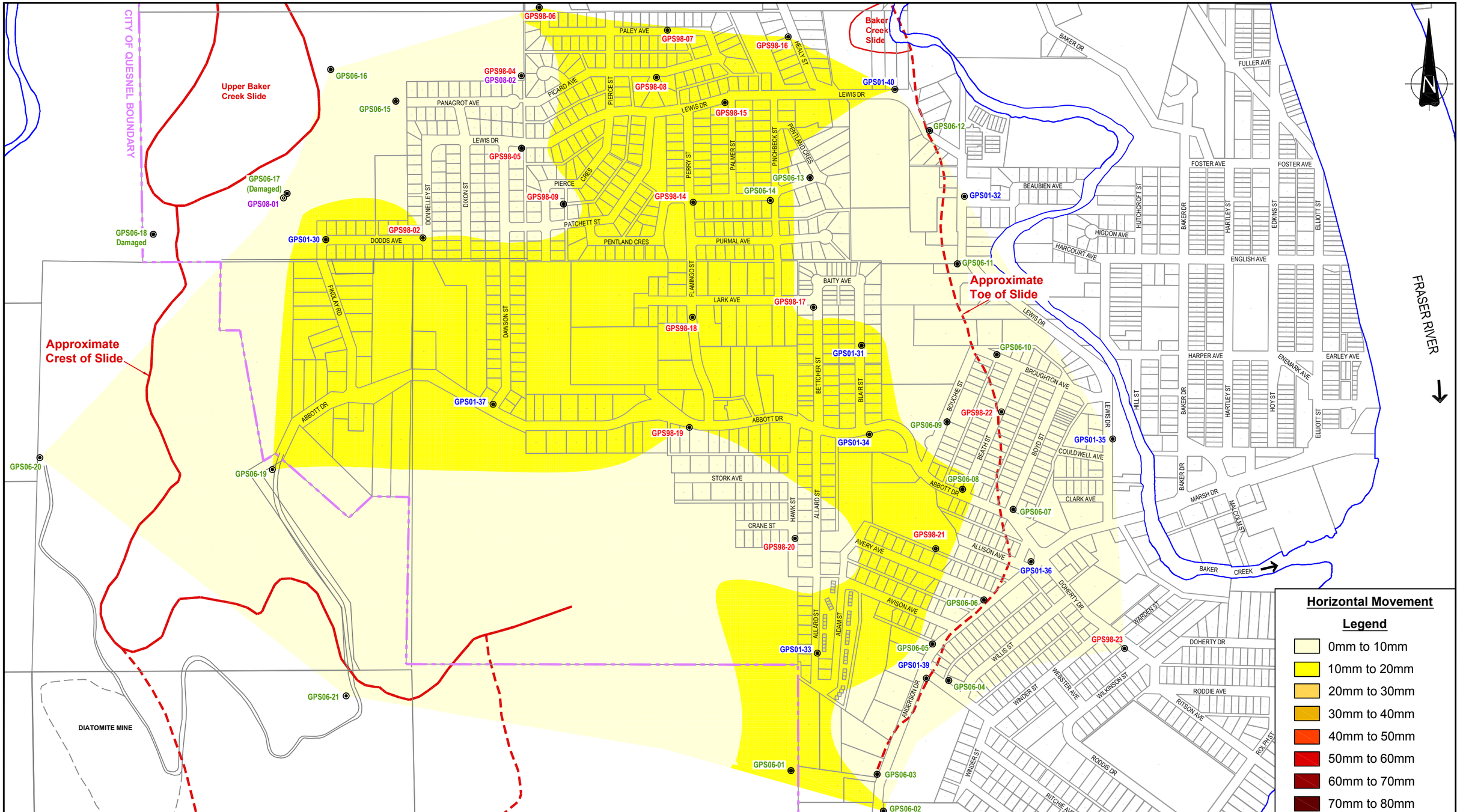
TITLE
ANNUAL 3D MOVEMENT
NOVEMBER 2008 TO NOVEMBER 2009
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT
WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 12

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig12-3D.MOVE-Nov08-Nov09-allhubs.dwg - FIGURE12 - Feb. 04, 2011 1:37pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◉ - September 1998
GPS01-30 ◉ - December 2001
GPS06-01 ◉ - November 2006
GPS08-01 ◉ - June 2008

0m 50 100 150 200 250 300
1 : 7500

CLIENT LOGO

West Quesnel Land Stability Program

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Prince George, BC, CANADA V2N 2P9
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amec

DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

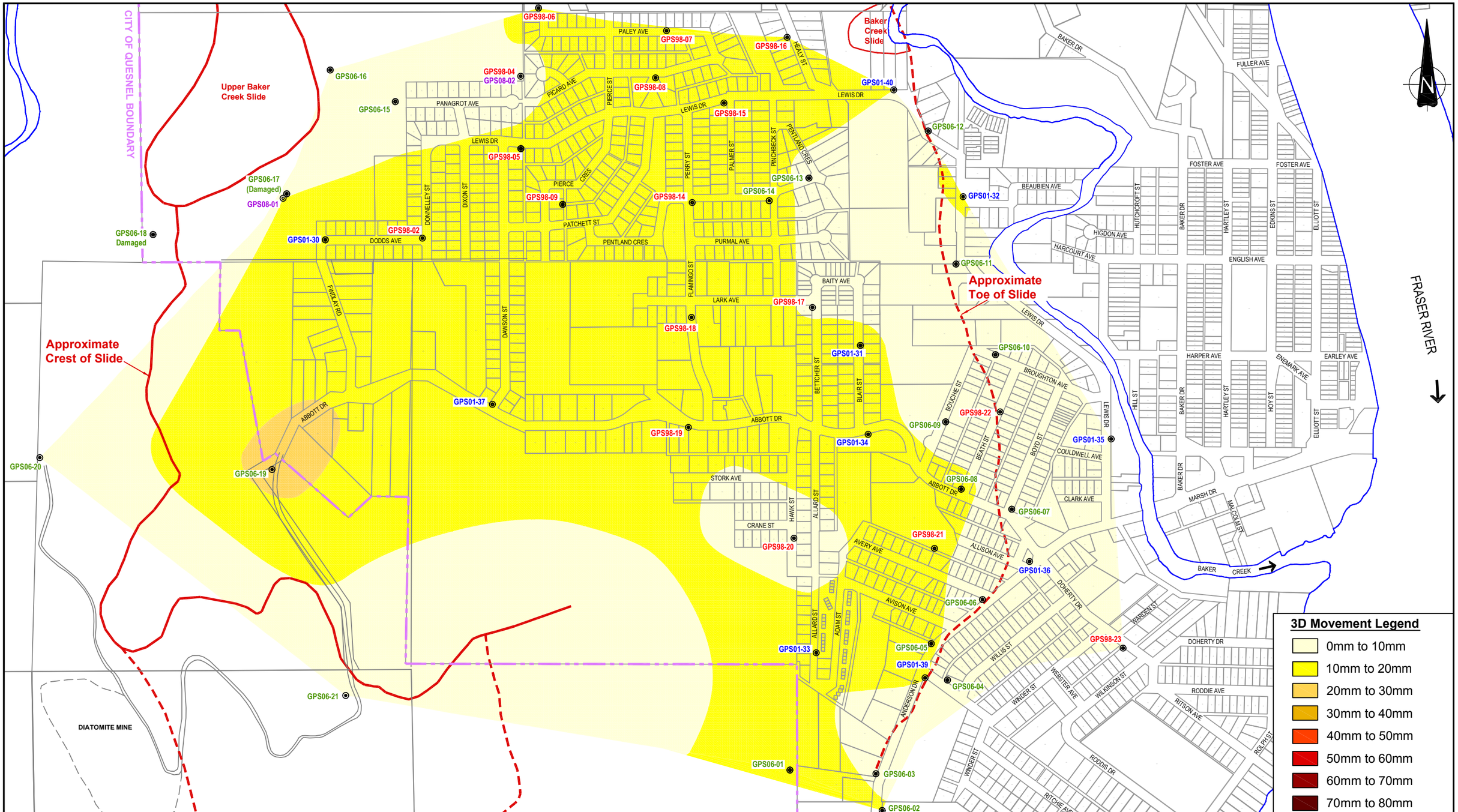
TITLE: ANNUAL HORIZONTAL MOVEMENT NOVEMBER 2009 TO NOVEMBER 2010 FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 13

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig13-H.MOVE-Nov09-Nov10-allhubs.dwg - FIGURE13 - Feb. 04, 2011 1:42pm - shelley.ruiz

This drawing was originally produced in colour.



GPS Hubs installed:

GPS98-02 ◎ - September 1998
GPS01-30 ◎ - December 2001
GPS06-01 ◎ - November 2006
GPS08-01 ◎ - June 2008

0m 50 100 150 200 250 300
1 : 7500

CLIENT LOGO

West Quesnel Land Stability Program

CLIENT: CITY OF QUESNEL

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amec

DWN BY:	S.Ruiz
CHK'D BY:	N.Polysou
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

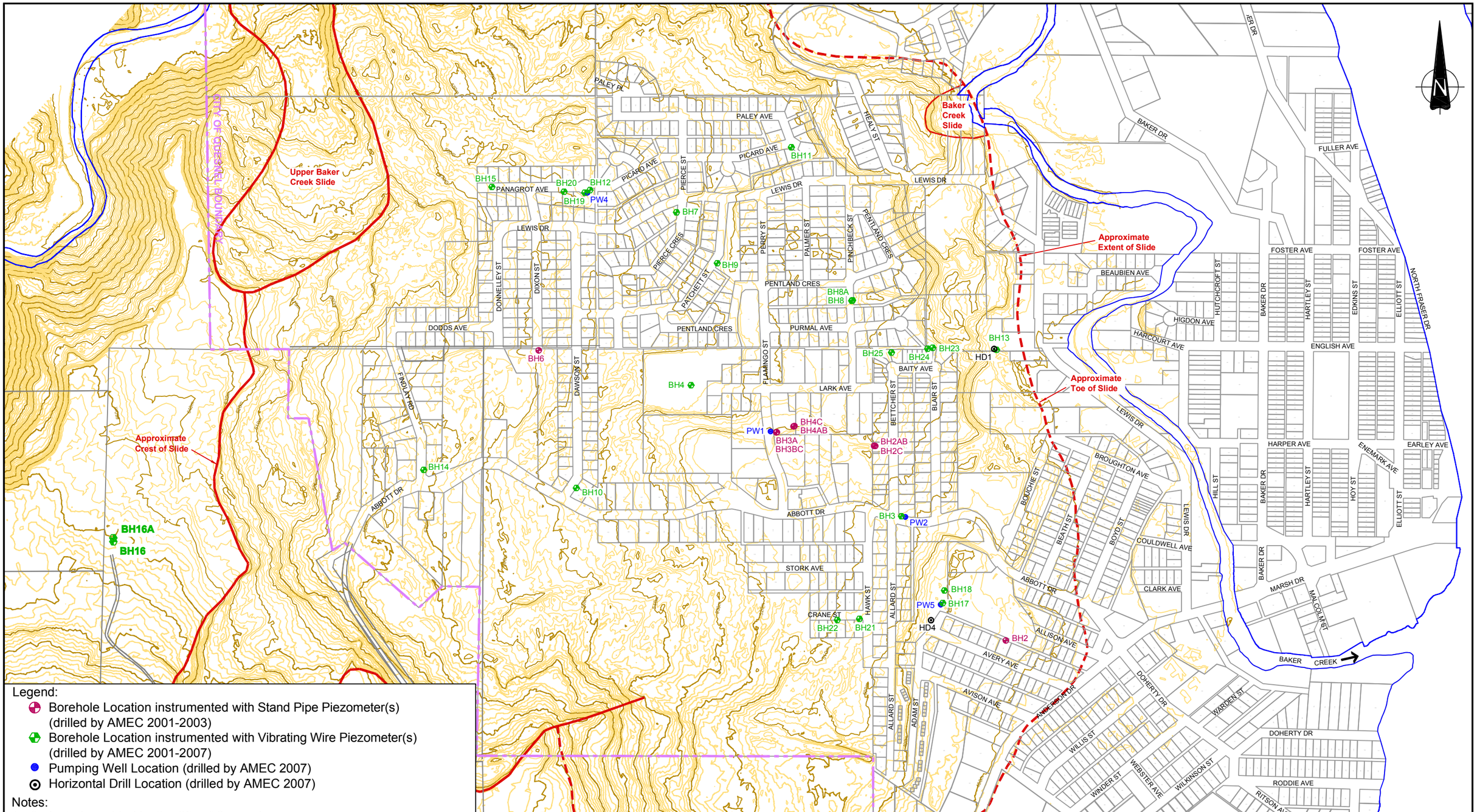
TITLE: ANNUAL 3D MOVEMENT NOVEMBER 2009 TO NOVEMBER 2010 FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 14

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig14-3D.MOVE-Nov09-Nov10-allhubs.dwg - FIGURE12 - Feb. 04, 2011 1:47pm - shelley.ruiz

This drawing was originally produced in colour.



Legend:

- Borehole Location instrumented with Stand Pipe Piezometer(s) (drilled by AMEC 2001-2003)
- Borehole Location instrumented with Vibrating Wire Piezometer(s) (drilled by AMEC 2001-2007)
- Pumping Well Location (drilled by AMEC 2007)
- Horizontal Drill Location (drilled by AMEC 2007)

Notes:

1. Cadastral provided by the City of Quesnel.
2. This drawing must be read in conjunction with AMEC Earth & Environmental Geotechnical Report, "West Quesnel Land Stability Program, Annual Monitoring Report - 2010".

0m 50 100 150 200 250 300

1 : 7500

CLIENT LOGO

West Quesnel Land Stability Program

CLIENT: CITY OF QUESNEL

AMEC Earth & Environmental
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Prince George, BC, CANADA V2N 2P9
Tel. (250) 564-3243
Fax (250) 562-7045

amec

DWN BY:	S.Ruiz
CHK'D BY:	H.Croteau
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7500

TITLE: SITE PLAN WITH PIEZOMETERS, PUMPING WELLS AND HORIZONTAL DRAINS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	4 February 2011
PROJECT NO:	KX04397
REV. NO.:	A
FIGURE No.	FIGURE 15

C:_CAD-Working\KX04397-CoQ.WQLandStab-CAD\KX04397.25-2010 Annual Monitoring-Jan2011\KX04397-fig15-SITE 11x17.dwg – Figure 15 – Feb. 04, 2011 1:58pm – shelley.ruiz

This drawing was originally produced in colour.

Appendix A

GPS Movement Hubs - Summary Table and Survey Data

APPENDIX A - GPS Movement Hubs Status

Hub	Location	Initial Survey Date	Status
98-02	Donnely/Dodds Intersection	September 1998	Active
98-04	Picard Place (Lane)	September 1998	Destroyed - replaced by 08-02
98-05	East of Dawson/Lewis Intersection	September 1998	Active
98-06	Paley West	September 1998	Active
98-07	Paley East	September 1998	Active - minor disturbance/deterioration
98-08	Picard Avenue	September 1998	Active
98-09	Lane between Patchett/Pierce	September 1998	Active
98-14	Pentland/Flamingo Intersection	September 1998	Active
98-15	Palmer/Lewis Intersection	September 1998	Active
98-16	Healy Road	September 1998	Active
98-17	Bettcher/Lark Intersection	September 1998	Active
98-18	Lark/Flamingo Intersection	September 1998	Active
98-19	Abbott/Flamingo Intersection	September 1998	Active
98-20	Hawk Street @ Crane Ave.	September 1998	Active
98-21	Lane between Avery/Allison	September 1998	Active
98-22	Lane between Beath/Bouchie	September 1998	Active
98-23	Doherty Dr. - BM	September 1998	Active
98-24	Salton Road (Hixon Road)	September 1998	Not Currently Read
98-26	Benchmark by Airport - BM	September 1998	Not Currently Read
98-28	Red Bluff Pump Station - BM	September 1998	Not Currently Read
98-29	Quesnel Hill	September 1998	Not Currently Read
01-30	West End of Dodds Avenue at Finley Road	December 2001	Active
01-31	Blair Street	December 2001	Active
01-32	Lewis Drive/Beabien Avenue	December 2001	Active
01-33	South End of Allard Street	December 2001	Active
01-34	Abbott Road and Blair Street	December 2001	Active
01-35	Lewis Drive North of Couldwell Street	December 2001	Active
01-36	Anderson Drive at Abbott Drive	December 2001	Active
01-37	Dawson Street at Abbott Drive	December 2001	Active
01-38	Quesnel No. 1 Station - BM	December 2001	Active - Benchmark Station
01-39	Anderson Avenue at Wade Avenue	December 2001	Active
01-40	Lewis Drive East of Healy Street	December 2001	Active
82C256	Government Benchmark at Airport	December 1998	Not Currently Read
WaterTank	Water Tank	March 2006	Active - Benchmark Station
06-01	End alley E. of Anderson Dr., opposite school	November 2006	Active
06-02	East side Anderson Drive by school	November 2006	Active
06-03	West side Anderson Dr., opposite school yard	November 2006	Active
06-04	North side Wade Ave, one lot E. Anderson Dr.	November 2006	Active
06-05	Anderson Drive west side, one lot S. of Avison	November 2006	Active
06-06	North corner Avery Ave / Anderson Drive	November 2006	Active - minor disturbance/deterioration
06-07	NE. corner Boyd Street / Abbott Rd.	November 2006	Active
06-08	North side Abbott Road., alley E. Beath Street	November 2006	Active
06-09	East side Bouchie Street	November 2006	Active - minor disturbance/deterioration
06-10	South side Broughton Avenue	November 2006	Active - minor disturbance/deterioration
06-11	East side Lewis Road, opposite house # 391	November 2006	Active
06-12	East side Lewis Road, opposite house # 547	November 2006	Active
06-13	NW. corner Pentland Crescent	November 2006	Active
06-14	SW. corner Pinchbeck Street / Pentland Crescent	November 2006	Active - minor disturbance/deterioration
06-15	By trail, NW unnamed Rd. N. Dixon St.	November 2006	Active - minor disturbance/deterioration
06-16	By end trail, NW unnamed road N. Dixon St.	November 2006	Active
06-17	In clearing, NW of end Findlay Road	November 2006	Disturbed - replaced by 08-01
06-18	On upper bench by trail, off end Findlay Road	November 2006	Destroyed
06-19	West side Abbott Dr.100m south last house	November 2006	Active
06-20	End of trail, by BH 16,off end Abbott Drive	November 2006	Active
06-21	100m past gate, off end Abbott Drive	November 2006	Active
08-01	In clearing, NW of end Findlay Road	June 2008	Active
08-02	Picard Place (Lane)	August 2008	Active

Data Summary by GPS Movement Hub Number

GPS Hub	Initial				Previous				Most Recent				Total Movement									Incremental Movement						
	Date	Northing m	Easting m	Elevation m	Date	Northing m	Easting m	Elevation m	Date	Northing m	Easting m	Elevation m	Time years	Northing m	Easting m	Horizontal m	Vertical m	Total m	Azimuth °	Plunge °	Rate m/year	Time years	Northing m	Easting m	Horizontal m	Vertical m	Total m	Rate m/year
98-02	15/09/1998	5869992.878	531420.902	563.021	13/09/2010	5869992.800	531421.370	562.956	22/11/2010	5869992.806	531421.378	562.955	12.2	-0.072	0.476	0.481	-0.066	0.486	98.6	-7.8	0.040	0.2	0.006	0.008	0.010	-0.001	0.010	0.052
98-04	15/09/1998	5870331.949	531626.829	557.171	03/06/2008	5870332.147	531627.118	557.060	29/07/2008	5870332.153	531627.120	557.048	9.9	0.204	0.291	0.355	-0.123	0.376	55.0	-19.1	0.038	0.2	0.006	0.002	0.006	-0.012	0.013	0.041
98-05	15/09/1998	5870180.442	531627.209	551.978	13/09/2010	5870180.457	531627.629	551.851	22/11/2010	5870180.460	531627.632	551.862	12.2	0.018	0.423	0.423	-0.116	0.439	87.6	-15.3	0.036	0.2	0.003	0.003	0.004	0.011	0.012	0.022
98-06	15/09/1998	5870474.774	531664.168	539.628	13/09/2010	5870475.144	531664.522	539.490	22/11/2010	5870475.151	531664.516	539.453	12.2	0.377	0.348	0.513	-0.175	0.542	42.7	-18.8	0.044	0.2	0.007	-0.006	0.009	-0.037	0.038	0.048
98-07	15/09/1998	5870427.297	531932.241	533.473	13/09/2010	5870427.496	531932.611	533.363	22/11/2010	5870427.504	531932.621	533.356	12.2	0.207	0.380	0.433	-0.117	0.449	61.4	-15.1	0.037	0.2	0.008	0.010	0.013	-0.007	0.015	0.067
98-08	15/09/1998	5870328.580	531909.295	536.943	13/09/2010	5870328.743	531909.668	536.813	22/11/2010	5870328.745	531909.673	536.808	12.2	0.165	0.378	0.412	-0.135	0.434	66.4	-18.1	0.036	0.2	0.002	0.005	0.005	-0.005	0.007	0.028
98-09	15/09/1998	5870063.599	531714.863	549.785	13/09/2010	5870063.596	531715.384	549.726	22/11/2010	5870063.598	531715.390	549.718	12.2	-0.001	0.527	0.527	-0.067	0.531	90.1	-7.2	0.044	0.2	0.002	0.006	0.006	-0.008	0.010	0.033
98-14	15/09/1998	5870067.437	531986.027	531.224	13/09/2010	5870067.407	531986.530	531.163	22/11/2010	5870067.404	531986.536	531.151	12.2	-0.033	0.509	0.510	-0.073	0.515	93.7	-8.1	0.042	0.2	-0.003	0.006	0.007	-0.012	0.014	0.035
98-15	15/09/1998	5870275.888	532052.513	524.385	13/09/2010	5870275.980	532052.875	524.264	22/11/2010	5870275.984	532052.882	524.252	12.2	0.096	0.369	0.381	-0.133	0.404	75.4	-19.2	0.033	0.2	0.004	0.007	0.008	-0.012	0.014	0.042
98-16	15/09/1998	5870413.504	532184.864	509.104	13/09/2010	5870413.590	532185.121	509.021	22/11/2010	5870413.595	532185.130	509.039	12.2	0.091	0.266	0.281	-0.065	0.288	71.1	-13.0	0.024	0.2	0.005	0.009	0.010	0.018	0.021	0.054
98-17	15/09/1998	5869847.647	532237.862	519.610	13/09/2010	5869847.586	532238.431	519.560	22/11/2010	5869847.580	532238.438	519.551	12.2	-0.067	0.576	0.580	-0.059	0.583	96.6	-5.8	0.048	0.2	-0.006	0.007	0.009	-0.009	0.013	0.048
98-18	15/09/1998	5869826.923	531984.617	524.147	13/09/2010	5869826.848	531985.133	524.074	22/11/2010	5869826.849	531985.135	524.067	12.2	-0.074	0.518	0.523	-0.080	0.529	98.1	-8.7	0.043	0.2	0.001	0.002	0.002	-0.007	0.007	0.012
98-19	15/09/1998	5869596.532	531978.061	517.225	13/09/2010	5869596.437	531978.501	517.258	22/11/2010	5869596.432	531978.506	517.249	12.2	-0.100	0.445	0.456	0.024	0.457	102.7	3.0	0.038	0.2	-0.005	0.005	0.007	-0.009	0.011	0.037
98-20	15/09/1998	5869364.259	532199.105	504.356	13/09/2010	5869364.146	532199.506	504.317	22/11/2010	5869364.142	532199.510	504.309	12.2	-0.117	0.405	0.422	-0.047	0.425	106.1	-6.4	0.035	0.2	-0.004	0.004	0.006	-0.008	0.010	0.030
98-21	15/09/1998	5869342.996	532493.483	485.474	13/09/2010	5869342.880	532493.716	485.538	22/11/2010	5869342.881	532493.725	485.521	12.2	-0.115	0.242	0.268	0.047	0.272	115.4	9.9	0.022	0.2	0.001	0.009	0.009	-0.017	0.019	0.047
98-22	15/09/1998	5869628.968	532631.086	478.920	13/09/2010	5869628.966	532631.137	478.925	22/11/2010	5869628.968	532631.134	478.927	12.2	0.000	0.048	0.048	0.007	0.049	90.0	8.3	0.004	0.2	0.002	-0.003	0.004	0.002	0.004	-0.019
98-24	15/09/1998	5878341.399	531399.210	589.609	30/11/2000	5878341.379	531399.224	589.591	05/05/2001	5878341.388	531399.222	589.575	2.6	-0.011	0.012	0.016	-0.034	0.038	132.5	-64.8	0.014	0.4	0.009	-0.002	0.009	-0.016	0.018	-0.022
98-29	15/09/1998	5870484.887	536304.120	575.014	05/05/2001	5870484.884	536304.133	574.998	12/11/2003	5870484.879	536304.132	574.983	5.2	-0.008	0.012	0.014	-0.031	0.034	123.8	-66.0	0.007	2.5	-0.005	-0.001	0.005	-0.015	0.016	0.002
01-30	15/12/2001	5869989.266	531217.807	575.401	13/09/2010	5869989.204	531218.034	575.357	22/11/2010	5869989.205	531218.037	575.355	8.9	-0.061	0.230	0.238	-0.046	0.242	104.9	-10.9	0.027	0.2	0.001	0.003	0.003	-0.002	0.004	0.017
01-31	15/12/2001	5869768.124	532338.411	508.144	13/09/2010	5869768.101	532338.780	508.052	22/11/2010	5869768.095	532338.790	508.091	8.9	-0.029	0.379	0.380	-0.053	0.384	94.4	-7.9	0.043	0.2	-0.006	0.010	0.012	0.039	0.041	0.061
01-32	15/12/2001	5870079.631	532553.538	481.549	13/09/2010	5870079.619	532553.547	481.542	22/11/2010	5870079.616	532553.555	481.555	8.9	-0.015	0.017	0.023	0.006	0.024	131.4	14.6	0.003	0.2	-0.003	0.008	0.009	0.013	0.016	0.045
01-33	15/12/2001	5869124.379	532245.960	495.342	13/09/2010	5869124.321	532246.146	495.320	22/11/2010	5869124.326	532246.151	495.314	8.9	-0.053	0.191	0.198	-0.028	0.200	105.5	-8.0	0.022	0.2	0.005	0.005	0.007	-0.006	0.009	0.037
01-34	15/12/2001	5869581.862	532354.652	494.462	13/09/2010	5869581.784	532354.918	494.398	22/11/2010	5869581.775	532354.919	494.380	8.9	-0.087	0.267	0.281	-0.082	0.293	108.0	-16.3	0.033	0.2	-0.009	0.001	0.009	-0.018	0.020	0.047
01-35	15/12/2001	5869572.261	532863.710	473.090	13/09/2010	5869572.255	532863.723	473.097	22/11/2010	5869572.253	532863.724	473.084	8.9	-0.008	0.014	0.016	-0.006	0.017	119.7	-20.6	0.002	0.2	-0.002	0.001	0.002	-0.013	0.013	0.012
01-36	15/12/2001	5869315.625	532692.784	476.837	13/09/2010	5869315.634	532692.797	476.820	22/11/2010	5869315.640	532692.797	476.817	8.9	0.015	0.013	0.020	-0.020	0.028	40.9	-45.0	0.003	0.2	0.006	0.000	0.006	-0.003	0.007	0.031
01-37	15/12/2001	5869644.821	531567.709	545.684	13/09/2010	5869644.785	531568.020	545.665	22/11/2010	5869644.781	531568.026	545.673	8.9	-0.040	0.317	0.320	-0.011	0.320	97.2	-2.0	0.036	0.2	-0.004	0.006	0.007	0.008	0.011	0.038
01-39	15/12/2001	5869071.953	532473.937	476.875	13/09/2010	5869071.883	532474.023	476.890	22/11/2010	5869071.879	532474.019	476.889	8.9	-0.074	0.082	0.110	0.014	0.111	132.1	7.3	0.012	0.2	-0.004	-0.004	0.006	-0.001	0.006	-0.030
01-40	15/12/2001	5870303.346	532408.207	493.536	13/09/2010	5870303.364	532408.360	493.610	22/11/2010	5870303.373	532408.364	493.643	8.9	0.027	0.157	0.159	0.107	0.192	80.2	33.9	0.021	0.2	0.009	0.004	0.010	0.033	0.034	0.051
06-01	10/11/2006	5868878.710	532190.793	487.817	03/06/2008	5868878.710	532190.800	487.847	29/08/2008	5868878.670	532190.776	487.819	1.8	-0.040	-0.017	0.043	0.002	0.043	203.0	2.7	0.024	0.2	-0.040	-0.024	0.047	-0.028	0.055	0.196
06-02	10/11/2006	5868793.977	532384.115	473.102	13/09/2010	5868793.998	532384.123	473.121	22/11/2010	5868793.998	532384.118	473.112	4.0	0.021	0.003	0.021	0.010	0.023	8.1	25.5	0.006	0.2	0.000	-0.005	0.005	-0.009	0.010	-0.026
06-03	10/11/2006	5868871.062	532370.952	474.521	13/09/2010	5868871.063	532370.970	474.543	22/11/2010	5868871.063	532370.957	474.518	4.0	0.001	0.005	0.005	-0.003	0.006	78.7	-31.0	0.001	0.2	0.000	-0.013	0.013	-0.025	0.028	-0.068
06-04	10/11/2006	5869067.298	532520.728	474.933	13/09/2010	5869067.298	532520.727	474.927	22/11/2010	5869067.301	532520.729	474.930	4.0	0.003	0.001	0.003	-0.003	0.004	18.4	-45.0	0.001	0.2	0.003	0.002	0.004	0.003	0.005	0.019
06-05	10/11/2006	5869143.444	532486.772	478.133	13/09/2010	5869143.430	532486.814	478.160	22/11/2010	5869143.430	532486.813	478.160	4.0	-0.014	0.041	0.043	0.027	0.051	108.9	32.1	0.013	0.2	0.000	-0.001	0.001	0.000	0.001	-0.005
06-06	10/11/2006	5869235.696	532594.188	476.641	13/09/2010	5869235.679	532594.198	476.656	22/11/2010	5869235.685	532594.202	476.653	4.0	-0.011	0.014	0.018	0.012	0.022	128.2	33.7	0.005	0.2	0.006	0.004	0.007	-0.003	0.008	-0.038
06-07	10/11/2006	5869425.109	532655.428	477.850	13/09/2010	5869425.098	532655.417	477.856	22/11/2010	5869425.107	532655.424	477.849	4.0	-0.002	-0.004	0.004	-0.001	0.004	243.4	-14.0	0.001	0.2	0.009	0.007	0.011	-0.007	0.013	-0.059
06-08	10/11/2006	5869467.088	532549.595	480.412	13/09/2010	5869467.063	532549.646	480.437	22/11/2010	5869467.062	532549.645	480.432	4.0	-0.026	0.050	0.056	0.020	0.059	117.5	19.7	0.015	0.2	-0.001	-0.001	0.001	-0.005	0.005	-0.007
06-09	10/11/2006	5869608.045	532517.087	491.073	13/09/2010	5869608.052	532517.128	491.086	22/11/2010	5869608.054	532517.135	491.079	4.0	0.009	0.048	0.049	0.006	0.049	79.4	7.0	0.012	0.2	0.002	0.007	0.007	-0.007	0.010	0.038
06-10	10/11/2006	5869748.671	532621.351	478.410	23/11/2009	5869748.668	532621.359	478.413	27/03/2010	5869748.669	532621.354	478.406	3.4	-0.002	0.003	0.004	-0.004	0.006	123.7	-45.0	0.002	0.3	0.001	-0.005	0.005	-0.007	0.009	-0.015
06-11	10/11/2006	5869938.491	532538.683	480.061	13/09/2010	5869938.499	532538.689	480.041	22/11/2010	5869938.496	532538.695	480.070	4.0	0.005	0.012	0.013	0.009	0.016	67.4	34.7	0.004	0.2	-0.003	0.006	0.007	0.029	0.030	0.035
06-12	10/11/2006	5870217.210	532480.538	484.776	13/09/2010	5870217.227	532480.566	484.825	22/11/2010	5870217.224	532480.568	484.837	4.0	0.014	0.030	0.033	0.061	0.069	65.0	61.6	0.017	0.2	-0.003	0.002	0.004	0.012	0.013	0.019
06-13	10/11/2006	5870118.621	532230.725	527.301	13/09/2010	5870118.649	532230.827	527.285	22/11/2010	5870118.650	532230.833	527.274	4.0	0.029	0.108	0.112	-0.027	0.115	75.0	-13.6	0.029	0.2	0.001	0.006	0.006	-0.011	0.013	0.032
06-14	10/11/2006	5870071.251	532147.507	527.150	13/09/2010	5870071.260	532147.635	527.110	22/11/2010	5870071.197	532147.670	527.098	4.0	-0.054	0.163	0.172	-0.052	0.180	108.3	-16.8	0.045	0.2	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
06-15	10/11/2006	5870278.754	531364.331	568.367	13/09/2010	5870278.780	531364.410	568.335	22/11/2010	5870278.788	531364.414	568.306	4.0	0.034	0.083	0.090	-0.061	0.109	67.7	-34.1	0.027	0.2	0.008	0.004	0.009	-0.029	0.030	0.047
06-16	10/11/2006	5870345.023	531228.061	572.222	13/09/2010	5870345.031	531228.070	572.196	22/11/2010	5870345.038	531228.069	572.177	4.0	0.015	0.008	0.017	-0.045	0.048	28.1	-69.3	0.012	0.2	0.007	-0.001	0.007	-0.019	0.020	0.037
06-17	10/11/2006	5870085.686	531136.829	595.126	13/12/2007	5870085.709	531136.933	595.049	18/03/2008	5870085.723	531136.990	595.109	1.4	0.037	0.161	0.165	-0.017	0.166	77.1	-5.9	0.123	0.3	0.014	0.057	0.059	0.060	0.084	0.223
06-18	10/11/2006	5870000.421	530856.972	632.066	18/03/2008	5870000.410	530856.974	632.052	03/06/2008	5870000.414	530856.980	632.070	1.6	-0.007	0.008	0.011	0.004	0.012	131.2	20.0	0.008	0.2	0.004	0.006	0.007	0.018	0.019	-0.034
06-19	10/11/2006	5869508.279	531106.114	585.415	13/09/2010	5869508.288	531106.147	585.387	22/11/2010	5869508.287	531106.155	585.395	4.0	0.008	0.041	0.042	-0.020	0.047	79.0	-25.5	0.012	0.2	-0.001	0.008	0.008	0.008	0.011	0.042
06-20	10/11/2006	5869533.109	530619.695	661.719	13/09/2010	5869533.118	530619.695	661.729	22/11/2010	5869533.109	530619.698	661.725	4.0	0.000	0.003	0.003	0.006	0.007	90.0	63.4	0.002	0.2	-0.009	0.003	0.009	-0.004	0.010	-0.050
06-21	10/11/2006	5869034.916	531260.448	620.924	13/09/2010	5869034.918	531260.454	620.926	22/11/2010	5869034.909	531260.450	620.926	4.0	-0.007	0.002	0.007	0.002	0.007	164.1	15.9	0.002	0.2	-0.009	-0.004	0.010	0.000	0.010	0.051
08-01	03/06/2008	5870076.380	531129.361	595.426	13/09/2010	5870076.375	531129.368	595.418	22/11/2010	5870076.371	531129.371	595.402	2.5	-0.009	0.010	0.013	-0.024	0.027	132.0	-61.6	0.011	0.2	-0.004	0.003	0.005	-0.016	0.017	0.026
08-02	29/08/2008	5870332.611	531627.128	557.121	13/09/2010	5870332.652	531627.173	557.103	22/11/2010	5870332.648	531627.176	557.094	2.2	0.037	0.048	0.061	-0.027	0.067	52.4	-23.9	0.030	0.2	-0.004	0.003	0.005	-0.009	0.010	-0.026
98-23	15/09/1998	5869134.064	532888.607	475.384	13/09/2010	5869134.060	532888.628	475.370	22/11/2010	5869134.059	532888.639	475.374	12.2	-0.005	0.032	0.032	-0.010	0.034	98.9	-17.4	0.003	0.2	-0.001	0.011	0.011	0.004	0.012	0.058
98-26	15/09/1998	5873887.634	533765.361	545.429	24/10/2002	5873887.633	533765.364	545.313	12/11/2003	5873887.630	533765.368	545.325	5.2	-0.004	0.007	0.008	-0.104	0.105	121.2	-85.6	0.020	1.1	-0.003	0.004	0.005	0.012	0.013	0.005
98-28	15/09/1998	5870190.608	537039.418	595.773	30/11/2000	5870190.608	537039.418	595.773	05/05/2001	5870190.608	537039.418	595.773	2.6	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.4	0.000	0.000	0.000	0.000	0.000	0.000
82C256	15/12/1998	5875411.453	533109.702	542.947	15/12/2001	5875411.453	533109.702	542.946	12/11/2003	5875411.453	533109.702	542.946	4.9	0.000	0.000	0.000	-0.001	0.001	0.0	0.0	0.000	1.9	0.000	0.000	0.000	0.000	0.000	0.000
01-38	15/12/2001	5870193.015	537018.228	596.514	13/09/2010	5870193.011	537018.235	596.504	22/11/2010	5870193.016	537018.238	596.505	8.9	0.001	0.010	0.010	-0.009	0.013	84.3	-42.0	0.001	0.2	0.005	0.003	0.006	0.001	0.006	0.030
WaterTank	10/03/2006	5872728.745	532867.388	527.263	13/09/2010	5872728.745	532867.388	527.263	22/11/2010	5872728.745	532867.388	527.263	4.7	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.2	0.000	0.000	0.000	0.000	0.000	0.000

* Note: GPS Hub 06-14 incremental data recorded as N/A due to suspected disturbance of the GPS Hub

Data Summary by GPS Movement Hub Location

Benchmark Hubs

GPS Hub	Initial Date	Initial Northing m	Initial Easting m	Initial Elevation m	Previous Date	Previous Northing m	Previous Easting m	Previous Elevation m	Most Recent Date	Most Recent Northing m	Most Recent Easting m	Most Recent Elevation m	Total Movement Time years	Total Northing m	Total Easting m	Total Horizontal m	Total Vertical m	Total Total m	Total Azimuth °	Total Plunge °	Total Hor. Rate m/year	Incremental Movement Time years	Incremental Northing m	Incremental Easting m	Incremental Horizontal m	Incremental Vertical m	Incremental Total m	Incremental Hor. Rate m/year
98-23	15/09/1998	5869134.064	532888.607	475.384	13/09/2010	5869134.060	532888.628	475.370	22/11/2010	5869134.059	532888.639	475.374	12.2	-0.005	0.032	0.032	-0.010	0.034	98.9	-17.4	0.003	0.2	-0.001	0.011	0.011	0.004	0.012	0.058
98-24	15/09/1998	5878341.399	531399.210	589.609	30/11/2000	5878341.379	531399.224	589.591	05/05/2001	5878341.388	531399.222	589.575	2.6	-0.011	0.012	0.016	-0.034	0.038	132.5	-64.8	0.006	0.4	0.009	-0.002	0.009	-0.016	0.018	-0.022
98-26	15/09/1998	5873887.634	533765.361	545.429	24/10/2002	5873887.633	533765.364	545.313	12/11/2003	5873887.630	533765.368	545.325	5.2	-0.004	0.007	0.008	-0.104	0.105	121.2	-85.6	0.002	1.1	-0.003	0.004	0.005	0.012	0.013	0.005
98-28	15/09/1998	5870190.608	537039.418	595.773	30/11/2000	5870190.608	537039.418	595.773	05/05/2001	5870190.608	537039.418	595.773	2.6	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.4	0.000	0.000	0.000	0.000	0.000	0.000
98-29	15/09/1998	5870484.887	536304.120	575.014	05/05/2001	5870484.884	536304.133	574.998	12/11/2003	5870484.879	536304.132	574.983	5.2	-0.008	0.012	0.014	-0.031	0.034	123.8	-66.0	0.003	2.5	-0.005	-0.001	0.005	-0.015	0.016	0.002
82C256	15/12/1998	5875411.453	533109.702	542.947	15/12/2001	5875411.453	533109.702	542.946	12/11/2003	5875411.453	533109.702	542.946	4.9	0.000	0.000	0.000	-0.001	0.001	0.0	0.0	0.000	1.9	0.000	0.000	0.000	0.000	0.000	0.000
01-38	15/12/2001	5870193.015	537018.228	596.514	13/09/2010	5870193.011	537018.235	596.504	22/11/2010	5870193.016	537018.238	596.505	8.9	0.001	0.010	0.010	-0.009	0.013	84.3	-42.0	0.001	0.2	0.005	0.003	0.006	0.001	0.006	0.030
WaterTank	10/03/2006	5872728.745	532867.388	527.263	13/09/2010	5872728.745	532867.388	527.263	22/11/2010	5872728.745	532867.388	527.263	4.7	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.2	0.000	0.000	0.000	0.000	0.000	0.000
													Average	-0.003	0.009	0.010	-0.024	0.028	70.079	-34.473	0.002	0.864	0.001	0.002	0.005	-0.002	0.008	0.009
													Standard Deviation	0.004	0.011	0.011	0.035	0.035	59.948	34.736	0.002	0.895	0.004	0.004	0.004	0.009	0.008	0.024

Hubs Below Slide Toe or on Slide Toe

GPS Hub	Initial Date	Initial Northing m	Initial Easting m	Initial Elevation m	Previous Date	Previous Northing m	Previous Easting m	Previous Elevation m	Most Recent Date	Most Recent Northing m	Most Recent Easting m	Most Recent Elevation m	Total Movement Time years	Total Northing m	Total Easting m	Total Horizontal m	Total Vertical m	Total Total m	Total Azimuth °	Total Plunge °	Total Hor. Rate m/year	Incremental Movement Time years	Incremental Northing m	Incremental Easting m	Incremental Horizontal m	Incremental Vertical m	Incremental Total m	Incremental Hor. Rate m/year
98-22	15/09/1998	5869628.968	532631.086	478.920	13/09/2010	5869628.966	532631.137	478.925	22/11/2010	5869628.968	532631.134	478.927	12.2	0.000	0.048	0.048	0.007	0.049	90.0	8.3	0.004	0.2	0.002	-0.003	0.004	0.002	0.004	-0.019
01-32	15/12/2001	5870079.631	532553.538	481.549	13/09/2010	5870079.619	532553.547	481.542	22/11/2010	5870079.616	532553.555	481.555	8.9	-0.015	0.017	0.023	0.006	0.024	131.4	14.6	0.003	0.2	-0.003	0.008	0.009	0.013	0.016	0.045
01-35	15/12/2001	5869572.261	532863.710	473.090	13/09/2010	5869572.255	532863.723	473.097	22/11/2010	5869572.253	532863.724	473.084	8.9	-0.008	0.014	0.016	-0.006	0.017	119.7	-20.6	0.002	0.2	-0.002	0.001	0.002	-0.013	0.013	0.012
01-36	15/12/2001	5869315.625	532692.784	476.837	13/09/2010	5869315.634	532692.797	476.820	22/11/2010	5869315.640	532692.797	476.817	8.9	0.015	0.013	0.020	-0.020	0.028	40.9	-45.0	0.002	0.2	0.006	0.000	0.006	-0.003	0.007	0.031
06-02	10/11/2006	5868793.977	532384.115	473.102	13/09/2010	5868793.998	532384.123	473.121	22/11/2010	5868793.998	532384.118	473.112	4.0	0.021	0.003	0.021	0.010	0.023	8.1	25.5	0.005	0.2	0.000	-0.005	0.005	-0.009	0.010	-0.026
06-03	10/11/2006	5868871.062	532370.952	474.521	13/09/2010	5868871.063	532370.970	474.543	22/11/2010	5868871.063	532370.957	474.518	4.0	0.001	0.005	0.005	-0.003	0.006	78.7	-31.0	0.001	0.2	0.000	-0.013	0.013	-0.025	0.028	-0.068
06-04	10/11/2006	5869067.298	532520.728	474.933	13/09/2010	5869067.298	532520.727	474.927	22/11/2010	5869067.301	532520.729	474.930	4.0	0.003	0.001	0.003	-0.003	0.004	18.4	-45.0	0.001	0.2	0.003	0.002	0.004	0.003	0.005	0.019
06-05	10/11/2006	5869143.444	532486.772	478.133	13/09/2010	5869143.430	532486.814	478.160	22/11/2010	5869143.430	532486.813	478.160	4.0	-0.014	0.041	0.043	0.027	0.051	108.9	32.1	0.011	0.2	0.000	-0.001	0.001	0.000	0.001	-0.005
06-06	10/11/2006	5869235.696	532594.188	476.641	13/09/2010	5869235.679	532594.198	476.656	22/11/2010	5869235.685	532594.202	476.653	4.0	-0.011	0.014	0.018	0.012	0.022	128.2	33.7	0.004	0.2	0.006	0.004	0.007	-0.003	0.008	-0.038
06-07	10/11/2006	5869425.109	532655.428	477.850	13/09/2010	5869425.098	532655.417	477.856	22/11/2010	5869425.107	532655.424	477.849	4.0	-0.002	-0.004	0.004	-0.001	0.004	243.4	-14.0	0.001	0.2	0.009	0.007	0.011	-0.007	0.013	-0.059
06-10	10/11/2006	5869748.671	532621.351	478.410	23/11/2009	5869748.668	532621.359	478.413	27/03/2010	5869748.669	532621.354	478.406	3.4	-0.002	0.003	0.004	-0.004	0.006	123.7	-45.0	0.001	0.3	0.001	-0.005	0.005	-0.007	0.009	-0.015
06-11	10/11/2006	5869938.491	532538.683	480.061	13/09/2010	5869938.499	532538.689	480.041	22/11/2010	5869938.496	532538.695	480.070	4.0	0.005	0.012	0.013	0.009	0.016	67.4	34.7	0.003	0.2	-0.003	0.006	0.007	0.029	0.030	0.035
06-12	10/11/2006	5870217.210	532480.538	484.776	13/09/2010	5870217.227	532480.566	484.825	22/11/2010	5870217.224	532480.568	484.837	4.0	0.014	0.030	0.033	0.061	0.069	65.0	61.6	0.008	0.2	-0.003	0.002	0.004	0.012	0.013	0.019
													Average	0.001	0.015	0.019	0.007	0.025	94.141	0.763	0.004	0.203	0.001	0.000	0.006	-0.001	0.012	-0.005
													Standard Deviation	0.011	0.016	0.015	0.020	0.020	60.804	36.218	0.003	0.041	0.004	0.006	0.003	0.013	0.009	0.036

Hubs Above Crest

GPS Hub	Initial Date	Initial Northing m	Initial Easting m	Initial Elevation m	Previous Date	Previous Northing m	Previous Easting m	Previous Elevation m	Most Recent Date	Most Recent Northing m	Most Recent Easting m	Most Recent Elevation m	Total Movement Time years	Total Northing m	Total Easting m	Total Horizontal m	Total Vertical m	Total Total m	Total Azimuth °	Total Plunge °	Total Hor. Rate m/year	Incremental Movement Time years	Incremental Northing m	Incremental Easting m	Incremental Horizontal m	Incremental Vertical m	Incremental Total m	Incremental Rate m/year
06-18	10/11/2006	5870000.421	530856.972	632.066	18/03/2008	5870000.410	530856.974	632.052	03/06/2008	5870000.414	530856.980	632.070	1.6	-0.007	0.008	0.011	0.004	0.012	131.2	20.0	0.007	0.2	0.004	0.006	0.007	0.018	0.019	-0.034
06-20	10/11/2006	5869533.109	530619.695	661.719	13/09/2010	5869533.118	530619.695	661.729	22/11/2010	5869533.109	530619.698	661.725	4.0	0.000	0.003	0.003	0.006	0.007	90.0	63.4	0.001	0.2	-0.009	0.003	0.009	-0.004	0.010	-0.050
06-21	10/11/2006	5869034.916	531260.448	620.924	13/09/2010	5869034.918	531260.454	620.926	22/11/2010	5869034.909	531260.450	620.926	4.0	-0.007	0.002	0.007	0.002	0.007	164.1	15.9	0.002	0.2	-0.009	-0.004	0.010	0.000	0.010	0.051
													Average	-0.005	0.004	0.007	0.004	0.009	128.414	33.121	0.003	0.198	-0.005	0.002	0.009	0.005	0.013	-0.011
													Standard Deviation	0.004	0.003	0.004	0.002	0.003	37.105	26.330	0.003	0.011	0.008	0.005	0.002	0.012	0.005	0.054

Hubs Within Slide

GPS Hub	Initial Date	Initial Northing m	Initial Easting m	Initial Elevation m	Previous Date	Previous Northing m	Previous Easting m	Previous Elevation m	Most Recent Date	Most Recent Northing m	Most Recent Easting m	Most Recent Elevation m	Total Movement Time years	Total Movement Northing m	Total Movement Easting m	Total Movement Horizontal m	Total Movement Vertical m	Total Movement Total m	Total Movement Azimuth °	Total Movement Plunge °	Total Movement Hor. Rate m/year	Incremental Movement Time years	Incremental Movement Northing m	Incremental Movement Easting m	Incremental Movement Horizontal m	Incremental Movement Vertical m	Incremental Movement Total m	Incremental Movement Hor. Rate m/year
98-02	15/09/1998	5869992.878	531420.902	563.021	13/09/2010	5869992.800	531421.370	562.956	22/11/2010	5869992.806	531421.378	562.955	12.2	-0.072	0.476	0.481	-0.066	0.486	98.6	-7.8	0.039	0.2	0.006	0.008	0.010	-0.001	0.010	0.052
98-04	15/09/1998	5870331.949	531626.829	557.171	03/06/2008	5870332.147	531627.118	557.060	29/07/2008	5870332.153	531627.120	557.048	9.9	0.204	0.291	0.355	-0.123	0.376	55.0	-19.1	0.036	0.2	0.006	0.002	0.006	-0.012	0.013	0.041
98-05	15/09/1998	5870180.442	531627.209	551.978	13/09/2010	5870180.457	531627.629	551.851	22/11/2010	5870180.460	531627.632	551.862	12.2	0.018	0.423	0.423	-0.116	0.439	87.6	-15.3	0.035	0.2	0.003	0.003	0.004	0.011	0.012	0.022
98-06	15/09/1998	5870474.774	531664.168	539.628	13/09/2010	5870475.144	531664.522	539.490	22/11/2010	5870475.151	531664.516	539.453	12.2	0.377	0.348	0.513	-0.175	0.542	42.7	-18.8	0.042	0.2	0.007	-0.006	0.009	-0.037	0.038	0.048
98-07	15/09/1998	5870427.297	531932.241	533.473	13/09/2010	5870427.496	531932.611	533.363	22/11/2010	5870427.504	531932.621	533.356	12.2	0.207	0.380	0.433	-0.117	0.449	61.4	-15.1	0.036	0.2	0.008	0.010	0.013	-0.007	0.015	0.067
98-08	15/09/1998	5870328.580	531909.295	536.943	13/09/2010	5870328.743	531909.668	536.813	22/11/2010	5870328.745	531909.673	536.808	12.2	0.165	0.378	0.412	-0.135	0.434	66.4	-18.1	0.034	0.2	0.002	0.005	0.005	-0.005	0.007	0.028
98-09	15/09/1998	5870063.599	531714.863	549.785	13/09/2010	5870063.596	531715.384	549.726	22/11/2010	5870063.598	531715.390	549.718	12.2	-0.001	0.527	0.527	-0.067	0.531	90.1	-7.2	0.043	0.2	0.002	0.006	0.006	-0.008	0.010	0.033
98-14	15/09/1998	5870067.437	531986.027	531.224	13/09/2010	5870067.407	531986.530	531.163	22/11/2010	5870067.404	531986.536	531.151	12.2	-0.033	0.509	0.510	-0.073	0.515	93.7	-8.1	0.042	0.2	-0.003	0.006	0.007	-0.012	0.014	0.035
98-15	15/09/1998	5870275.888	532052.513	524.385	13/09/2010	5870275.980	532052.875	524.264	22/11/2010	5870275.984	532052.882	524.252	12.2	0.096	0.369	0.381	-0.133	0.404	75.4	-19.2	0.031	0.2	0.004	0.007	0.008	-0.012	0.014	0.042
98-16	15/09/1998	5870413.504	532184.864	509.104	13/09/2010	5870413.590	532185.121	509.021	22/11/2010	5870413.595	532185.130	509.039	12.2	0.091	0.266	0.281	-0.065	0.288	71.1	-13.0	0.023	0.2	0.005	0.009	0.010	0.018	0.021	0.054
98-17	15/09/1998	5869847.647	532237.862	519.610	13/09/2010	5869847.586	532238.431	519.560	22/11/2010	5869847.580	532238.438	519.551	12.2	-0.067	0.576	0.580	-0.059	0.583	96.6	-5.8	0.048	0.2	-0.006	0.007	0.009	-0.009	0.013	0.048
98-18	15/09/1998	5869826.923	531984.617	524.147	13/09/2010	5869826.848	531985.133	524.074	22/11/2010	5869826.849	531985.135	524.067	12.2	-0.074	0.518	0.523	-0.080	0.529	98.1	-8.7	0.043	0.2	0.001	0.002	0.002	-0.007	0.007	0.012
98-19	15/09/1998	5869596.532	531978.061	517.225	13/09/2010	5869596.437	531978.501	517.258	22/11/2010	5869596.432	531978.506	517.249	12.2	-0.100	0.445	0.456	0.024	0.457	102.7	3.0	0.037	0.2	-0.005	0.005	0.007	-0.009	0.011	0.037
98-20	15/09/1998	5869364.259	532199.105	504.356	13/09/2010	5869364.146	532199.506	504.317	22/11/2010	5869364.142	532199.510	504.309	12.2	-0.117	0.405	0.422	-0.047	0.425	106.1	-6.4	0.035	0.2	-0.004	0.004	0.006	-0.008	0.010	0.030
98-21	15/09/1998	5869342.996	532493.483	485.474	13/09/2010	5869342.880	532493.716	485.538	22/11/2010	5869342.881	532493.725	485.521	12.2	-0.115	0.242	0.268	0.047	0.272	115.4	9.9	0.022	0.2	0.001	0.009	0.009	-0.017	0.019	0.047
01-30	15/12/2001	5869989.266	531217.807	575.401	13/09/2010	5869989.204	531218.034	575.357	22/11/2010	5869989.205	531218.037	575.355	8.9	-0.061	0.230	0.238	-0.046	0.242	104.9	-10.9	0.027	0.2	0.001	0.003	0.003	-0.002	0.004	0.017
01-31	15/12/2001	5869768.124	532338.411	508.144	13/09/2010	5869768.101	532338.780	508.052	22/11/2010	5869768.095	532338.790	508.091	8.9	-0.029	0.379	0.380	-0.053	0.384	94.4	-7.9	0.043	0.2	-0.006	0.010	0.012	0.039	0.041	0.061
01-33	15/12/2001	5869124.379	532245.960	495.342	13/09/2010	5869124.321	532246.146	495.320	22/11/2010	5869124.326	532246.151	495.314	8.9	-0.053	0.191	0.198	-0.028	0.200	105.5	-8.0	0.022	0.2	0.005	0.005	0.007	-0.006	0.009	0.037
01-34	15/12/2001	5869581.862	532354.652	494.462	13/09/2010	5869581.784	532354.918	494.398	22/11/2010	5869581.775	532354.919	494.380	8.9	-0.087	0.267	0.281	-0.082	0.293	108.0	-16.3	0.031	0.2	-0.009	0.001	0.009	-0.018	0.020	0.047
01-37	15/12/2001	5869644.821	531567.709	545.684	13/09/2010	5869644.785	531568.020	545.665	22/11/2010	5869644.781	531568.026	545.673	8.9	-0.040	0.317	0.320	-0.011	0.320	97.2	-2.0	0.036	0.2	-0.004	0.006	0.007	0.008	0.011	0.038
01-39	15/12/2001	5869071.953	532473.937	476.875	13/09/2010	5869071.883	532474.023	476.890	22/11/2010	5869071.879	532474.019	476.889	8.9	-0.074	0.082	0.110	0.014	0.111	132.1	7.3	0.012	0.2	-0.004	-0.004	0.006	-0.001	0.006	-0.030
01-40	15/12/2001	5870303.346	532408.207	493.536	13/09/2010	5870303.364	532408.360	493.610	22/11/2010	5870303.373	532408.364	493.643	8.9	0.027	0.157	0.159	0.107	0.192	80.2	33.9	0.018	0.2	0.009	0.004	0.010	0.033	0.034	0.051
06-01	10/11/2006	5868878.710	532190.793	487.817	03/06/2008	5868878.710	532190.800	487.847	29/08/2008	5868878.670	532190.776	487.819	1.8	-0.040	-0.017	0.043	0.002	0.043	203.0	2.7	0.024	0.2	-0.040	-0.024	0.047	-0.028	0.055	0.196
06-08	10/11/2006	5869467.088	532549.595	480.412	13/09/2010	5869467.063	532549.646	480.437	22/11/2010	5869467.062	532549.645	480.432	4.0	-0.026	0.050	0.056	0.020	0.059	117.5	19.7	0.014	0.2	-0.001	-0.001	0.001	-0.005	0.005	-0.007
06-09	10/11/2006	5869608.045	532517.087	491.073	13/09/2010	5869608.052	532517.128	491.086	22/11/2010	5869608.054	532517.135	491.079	4.0	0.009	0.048	0.049	0.006	0.049	79.4	7.0	0.012	0.2	0.002	0.007	0.007	-0.007	0.010	0.038
06-13	10/11/2006	5870118.621	532230.725	527.301	13/09/2010	5870118.649	532230.827	527.285	22/11/2010	5870118.650	532230.833	527.274	4.0	0.029	0.108	0.112	-0.027	0.115	75.0	-13.6	0.028	0.2	0.001	0.006	0.006	-0.011	0.013	0.032
06-14	10/11/2006	5870071.251	532147.507	527.150	13/09/2010	5870071.260	532147.635	527.110	22/11/2010	5870071.197	532147.670	527.098	4.0	-0.054	0.163	0.172	-0.052	0.180	108.3	-16.8	0.043	0.2	N/A	N/A	N/A	N/A	N/A	N/A
06-15	10/11/2006	5870278.754	531364.331	568.367	13/09/2010	5870278.780	531364.410	568.335	22/11/2010	5870278.788	531364.414	568.306	4.0	0.034	0.083	0.090	-0.061	0.109	67.7	-34.1	0.022	0.2	0.008	0.004	0.009	-0.029	0.030	0.047
06-16	10/11/2006	5870345.023	531228.061	572.222	13/09/2010	5870345.031	531228.070	572.196	22/11/2010	5870345.038	531228.069	572.177	4.0	0.015	0.008	0.017	-0.045	0.048	28.1	-69.3	0.004	0.2	0.007	-0.001	0.007	-0.019	0.020	0.037
06-17	10/11/2006	5870085.686	531136.829	595.126	13/12/2007	5870085.709	531136.933	595.049	18/03/2008	5870085.723	531136.990	595.109	1.4	0.037	0.161	0.165	-0.017	0.166	77.1	-5.9	0.122	0.3	0.014	0.057	0.059	0.060	0.084	0.223
06-19	10/11/2006	5869508.279	531106.114	585.415	13/09/2010	5869508.288	531106.147	585.387	22/11/2010	5869508.287	531106.155	585.395	4.0	0.008	0.041	0.042	-0.020	0.047	79.0	-25.5	0.010	0.2	-0.001	0.008	0.008	0.008	0.011	0.042
08-01	03/06/2008	5870076.380	531129.361	595.426	13/09/2010	5870076.375	531129.368	595.418	22/11/2010	5870076.371	531129.371	595.402	2.5	-0.009	0.010	0.013	-0.024	0.027	132.0	-61.6	0.005	0.2	-0.004	0.003	0.005	-0.016	0.017	0.026
08-02	29/08/2008	5870332.611	531627.128	557.121	13/09/2010	5870332.652	531627.173	557.103	22/11/2010	5870332.648	531627.176	557.094	2.2	0.037	0.048	0.061	-0.027	0.067	52.4	-23.9	0.027	0.2	-0.004	0.003	0.005	-0.009	0.010	-0.026
													Average*	0.011	0.260	0.278	-0.046	0.288	90.447	-11.199	0.031	0.194	0.000	0.005	0.010	-0.004	0.019	0.044
													Standard Deviation*	0.106	0.179	0.182	0.059	0.183	31.653	19.538	0.020	0.017	0.009	0.011	0.012	0.019	0.017	0.048

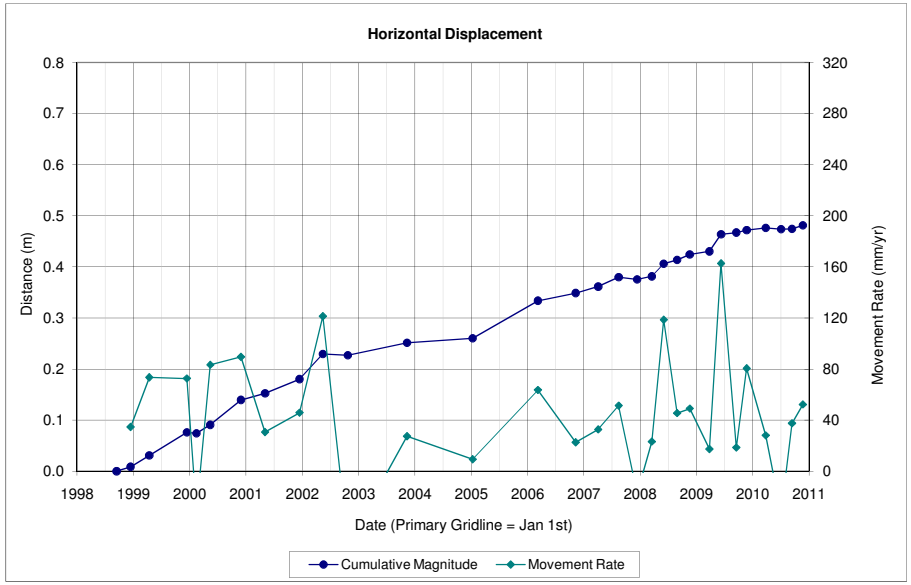
* Note: Average and standard deviation does not include data from GPS Hub 06-14 due to suspected disturbance of the GPS Hub

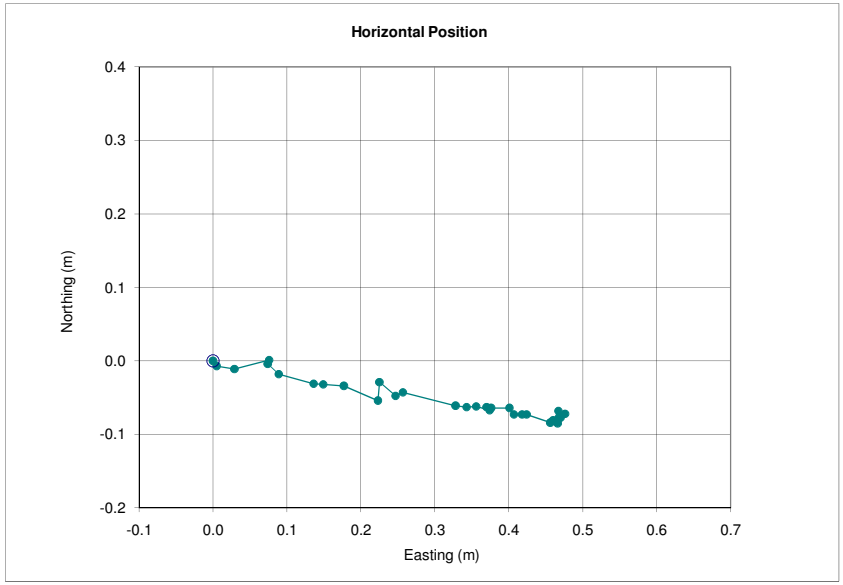
Survey and Displacement Data - Hub 98-02

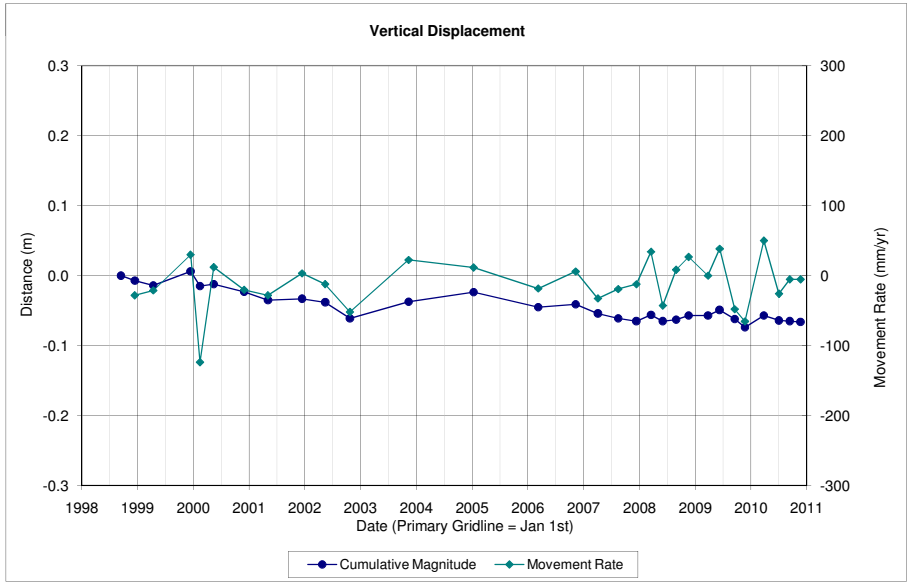
Donnelly/Dodds Intersection

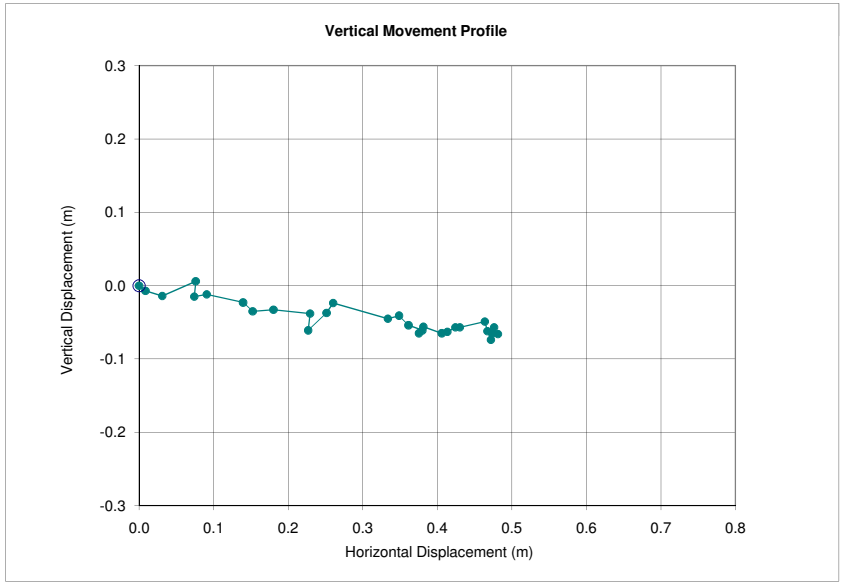
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869992.878	531420.902	563.021	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869992.871	531420.907	563.014	0.25	-0.007	0.005	0.009	-0.007	144.5	-39.1	0.035	-0.028	0.25	-0.007	0.005	0.009	-0.007	144.5	-39.1	34.527	-28.096
15/04/1999	5869992.867	531420.931	563.007	0.58	-0.011	0.029	0.031	-0.014	110.8	-24.3	0.053	-0.024	0.33	-0.004	0.024	0.024	-0.007	99.5	-16.1	73.446	-21.130
15/12/1999	5869992.879	531420.978	563.027	1.25	0.001	0.076	0.076	0.006	89.2	4.5	0.061	0.005	0.67	0.012	0.047	0.049	0.020	75.7	22.4	72.612	29.939
15/02/2000	5869992.874	531420.976	563.006	1.42	-0.004	0.074	0.074	-0.015	93.1	-11.4	0.052	-0.011	0.17	-0.005	-0.002	0.005	-0.021	201.8	-75.6	-31.725	-123.714
15/05/2000	5869992.860	531420.991	563.009	1.66	-0.018	0.089	0.091	-0.012	101.4	-7.5	0.055	-0.007	0.25	-0.014	0.015	0.021	0.003	133.0	8.3	83.270	12.175
30/11/2000	5869992.847	531421.038	562.998	2.21	-0.031	0.136	0.139	-0.023	102.8	-9.4	0.063	-0.010	0.54	-0.013	0.047	0.049	-0.011	105.5	-12.7	89.504	-20.190
05/05/2001	5869992.846	531421.051	562.986	2.64	-0.032	0.149	0.152	-0.035	102.1	-12.9	0.058	-0.013	0.43	-0.001	0.013	0.013	-0.012	94.4	-42.6	30.527	-28.096
15/12/2001	5869992.844	531421.079	562.988	3.25	-0.034	0.177	0.180	-0.033	100.9	-10.4	0.055	-0.010	0.61	-0.002	0.028	0.028	0.002	94.1	4.1	45.773	3.261
15/05/2002	5869992.824	531421.125	562.983	3.66	-0.054	0.223	0.229	-0.038	103.6	-9.4	0.063	-0.010	0.41	-0.020	0.046	0.050	-0.005	113.5	-5.7	121.330	-12.094
24/10/2002	5869992.849	531421.127	562.960	4.11	-0.029	0.225	0.227	-0.061	97.3	-15.1	0.055	-0.015	0.44	0.025	0.002	0.025	-0.023	4.6	-42.5	-56.546	-51.856
12/11/2003	5869992.830	531421.149	562.984	5.16	-0.048	0.247	0.251	-0.037	100.9	-8.5	0.049	-0.007	1.05	-0.019	0.022	0.029	0.024	130.2	39.4	27.323	22.467
11/01/2005	5869992.835	531421.159	562.997	6.32	-0.043	0.257	0.260	-0.024	99.5	-5.2	0.041	-0.004	1.17	0.005	0.010	0.011	0.014	64.1	51.6	9.291	11.729
10/03/2006	5869992.817	531421.230	562.976	7.48	-0.061	0.328	0.334	-0.045	100.5	-7.7	0.045	-0.006	1.16	-0.018	0.071	0.074	-0.021	104.3	-16.1	63.540	-18.392
10/11/2006	5869992.815	531421.245	562.980	8.15	-0.063	0.343	0.349	-0.041	100.4	-6.7	0.043	-0.005	0.67	-0.002	0.015	0.015	0.004	97.6	14.8	22.560	5.963
05/04/2007	5869992.816	531421.258	562.967	8.55	-0.062	0.356	0.361	-0.054	99.9	-8.5	0.042	-0.006	0.40	0.001	0.013	0.013	-0.013	85.6	-44.9	32.618	-32.522
16/08/2007	5869992.811	531421.276	562.960	8.92	-0.067	0.374	0.380	-0.061	100.2	-9.1	0.043	-0.007	0.36	-0.005	0.018	0.019	-0.007	105.5	-20.5	51.304	-19.224
13/12/2007	5869992.815	531421.272	562.956	9.24	-0.063	0.370	0.375	-0.065	99.7	-9.8	0.041	-0.007	0.33	0.004	-0.004	0.006	-0.004	315.0	-35.3	-17.363	-12.277
18/03/2008	5869992.814	531421.278	562.965	9.51	-0.064	0.376	0.381	-0.056	99.7	-8.4	0.040	-0.006	0.26	-0.001	0.006	0.006	0.009	99.5	55.9	23.143	34.242
03/06/2008	5869992.814	531421.303	562.956	9.72	-0.064	0.401	0.406	-0.065	99.1	-9.1	0.042	-0.007	0.21	0.000	0.025	0.025	-0.009	90.0	-19.8	118.588	-42.692
29/08/2008	5869992.805	531421.309	562.958	9.95	-0.073	0.407	0.413	-0.063	100.2	-8.7	0.042	-0.006	0.24	-0.009	0.006	0.011	0.002	146.3	10.5	45.411	8.397
19/11/2008	5869992.805	531421.320	562.964	10.18	-0.073	0.418	0.424	-0.057	99.9	-7.7	0.042	-0.006	0.22	0.000	0.011	0.011	0.006	90.0	28.6	48.997	26.726
26/03/2009	5869992.805	531421.326	562.964	10.53	-0.073	0.424	0.430	-0.057	99.8	-7.5	0.041	-0.005	0.35	0.000	0.006	0.006	0.000	90.0	0.0	17.256	0.000
10/06/2009	5869992.794	531421.358	562.972	10.74	-0.084	0.456	0.464	-0.049	100.4	-6.0	0.043	-0.005	0.21	-0.011	0.032	0.034	0.008	109.0	13.3	162.622	38.447
17/09/2009	5869992.797	531421.362	562.959	11.01	-0.081	0.460	0.467	-0.062	100.0	-7.6	0.042	-0.006	0.27	0.003	0.004	0.005	-0.013	53.1	-69.0	18.447	-47.962
23/11/2009	5869992.810	531421.369	562.947	11.19	-0.068	0.467	0.472	-0.074	98.3	-8.9	0.042	-0.007	0.18	0.013	0.007	0.015	-0.012	28.3	-39.1	80.490	-65.418
27/03/2010	5869992.801	531421.372	562.964	11.53	-0.077	0.470	0.476	-0.057	99.3	-6.8	0.041	-0.005	0.34	-0.009	0.003	0.009	0.017	161.6	60.8	27.944	50.075
04/07/2010	5869992.793	531421.368	562.957	11.80	-0.085	0.466	0.474	-0.064	100.3	-7.7	0.040	-0.005	0.27	-0.008	-0.004	0.009	-0.007	206.6	-38.0	-32.999	-25.826
13/09/2010	5869992.800	531421.370	562.956	11.99	-0.078	0.468	0.474	-0.065	99.5	-7.8	0.040	-0.005	0.19	0.007	0.002	0.007	-0.001	15.9	-7.8	37.452	-5.144
22/11/2010	5869992.806	531421.378	562.955	12.19	-0.072	0.476	0.481	-0.066	98.6	-7.8	0.040	-0.005	0.19	0.006	0.008	0.010	-0.001	53.1	-5.7	52.179	-5.218

Displacement Graphs - Hub 98-02
Donnelly/Dodds Intersection









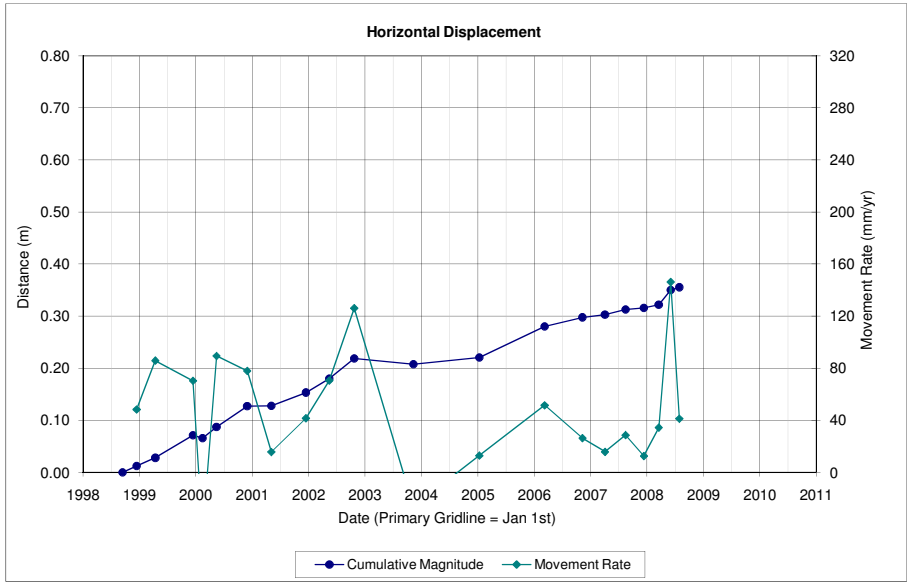
Survey and Displacement Data - Hub 98-04

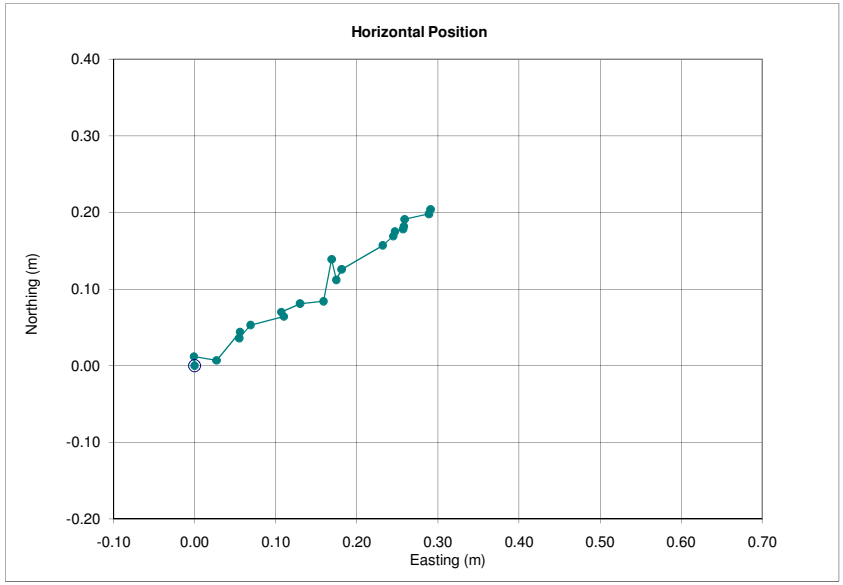
Picard Place (Lane)

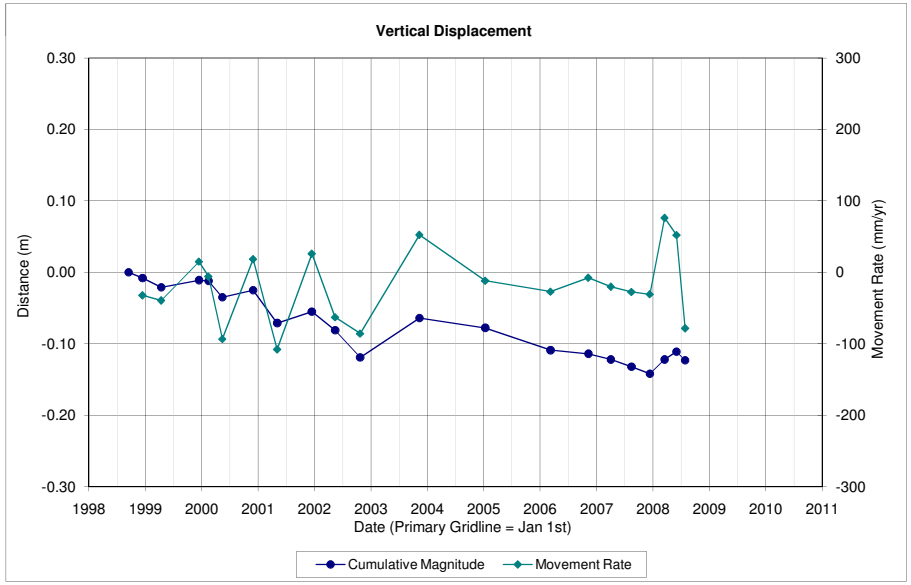
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870331.949	531626.829	557.171	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870331.961	531626.828	557.163	0.25	0.012	-0.001	0.012	-0.008	355.2	-33.6	0.048	-0.032	0.25	0.012	-0.001	0.012	-0.008	355.2	-33.6	48.332	-32.110
15/04/1999	5870331.956	531626.856	557.150	0.58	0.007	0.027	0.028	-0.021	75.5	-37.0	0.048	-0.036	0.33	-0.005	0.028	0.028	-0.013	100.1	-24.6	85.858	-39.242
15/12/1999	5870331.993	531626.885	557.160	1.25	0.044	0.056	0.071	-0.011	51.8	-8.8	0.057	-0.009	0.67	0.037	0.029	0.047	0.010	38.1	12.0	70.371	14.969
15/02/2000	5870331.985	531626.884	557.159	1.42	0.036	0.055	0.066	-0.012	56.8	-10.3	0.046	-0.008	0.17	-0.008	-0.001	0.008	-0.001	187.1	-7.1	-47.496	-5.891
15/05/2000	5870332.002	531626.898	557.136	1.66	0.053	0.069	0.087	-0.035	52.5	-21.9	0.052	-0.021	0.25	0.017	0.014	0.022	-0.023	39.5	-46.2	89.376	-93.342
30/11/2000	5870332.013	531626.939	557.146	2.21	0.064	0.110	0.127	-0.025	59.8	-11.1	0.058	-0.011	0.54	0.011	0.041	0.042	0.010	75.0	13.3	77.914	18.354
05/05/2001	5870332.019	531626.936	557.100	2.64	0.070	0.107	0.128	-0.071	56.8	-29.0	0.048	-0.027	0.43	0.006	-0.003	0.007	-0.046	333.4	-81.7	15.706	-107.702
15/12/2001	5870332.030	531626.959	557.116	3.25	0.081	0.130	0.153	-0.055	58.1	-19.8	0.047	-0.017	0.61	0.011	0.023	0.025	0.016	64.4	32.1	41.572	26.089
15/05/2002	5870332.033	531626.988	557.090	3.66	0.084	0.159	0.180	-0.081	62.2	-24.2	0.049	-0.022	0.41	0.003	0.029	0.029	-0.026	84.1	-41.7	70.522	-62.891
24/10/2002	5870332.088	531626.998	557.052	4.11	0.139	0.169	0.219	-0.119	50.6	-28.5	0.053	-0.029	0.44	0.055	0.010	0.056	-0.038	10.3	-34.2	126.038	-85.676
12/11/2003	5870332.061	531627.004	557.107	5.16	0.112	0.175	0.208	-0.064	57.4	-17.1	0.040	-0.012	1.05	-0.027	0.006	0.028	0.055	167.8	63.4	-26.278	52.381
11/01/2005	5870332.075	531627.010	557.093	6.32	0.126	0.181	0.221	-0.078	55.3	-19.4	0.035	-0.012	1.17	0.014	0.006	0.015	-0.014	24.9	-42.4	12.947	-11.806
10/03/2006	5870332.106	531627.061	557.062	7.48	0.157	0.232	0.280	-0.109	55.9	-21.3	0.037	-0.015	1.16	0.031	0.051	0.060	-0.031	58.4	-27.7	51.522	-27.027
10/11/2006	5870332.118	531627.074	557.057	8.15	0.169	0.245	0.298	-0.114	55.4	-21.0	0.037	-0.014	0.67	0.012	0.013	0.018	-0.005	47.3	-15.8	26.375	-7.454
05/04/2007	5870332.124	531627.076	557.049	8.55	0.175	0.247	0.303	-0.122	54.7	-22.0	0.035	-0.014	0.40	0.006	0.002	0.006	-0.008	18.4	-51.7	15.822	-20.014
16/08/2007	5870332.127	531627.086	557.039	8.92	0.178	0.257	0.313	-0.132	55.3	-22.9	0.035	-0.015	0.36	0.003	0.010	0.010	-0.010	73.3	-43.8	28.672	-27.462
13/12/2007	5870332.131	531627.087	557.029	9.24	0.182	0.258	0.316	-0.142	54.8	-24.2	0.034	-0.015	0.33	0.004	0.001	0.004	-0.010	14.0	-67.6	12.655	-30.693
18/03/2008	5870332.140	531627.088	557.049	9.51	0.191	0.259	0.322	-0.122	53.6	-20.8	0.034	-0.013	0.26	0.009	0.001	0.009	0.020	6.3	65.6	34.453	76.094
03/06/2008	5870332.147	531627.118	557.060	9.72	0.198	0.289	0.350	-0.111	55.6	-17.6	0.036	-0.011	0.21	0.007	0.030	0.031	0.011	76.9	19.7	146.128	52.179
29/07/2008	5870332.153	531627.120	557.048	9.87	0.204	0.291	0.355	-0.123	55.0	-19.1	0.036	-0.012	0.15	0.006	0.002	0.006	-0.012	18.4	-62.2	41.251	-78.268

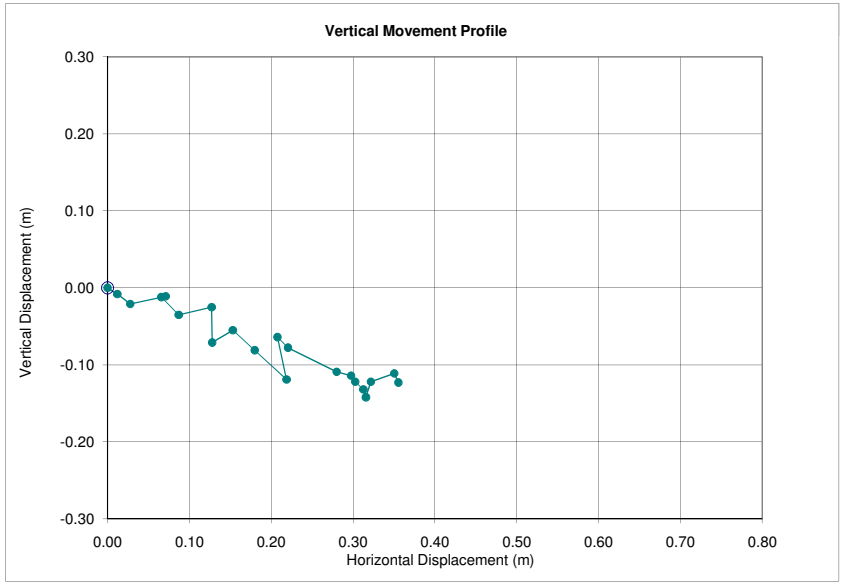
Displacement Graphs - Hub 98-04

Picard Place (Lane)







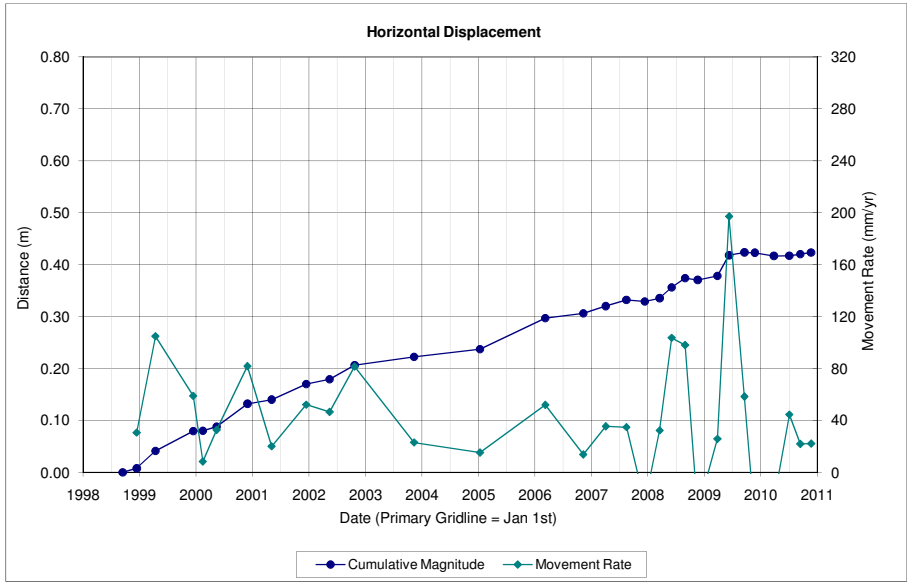


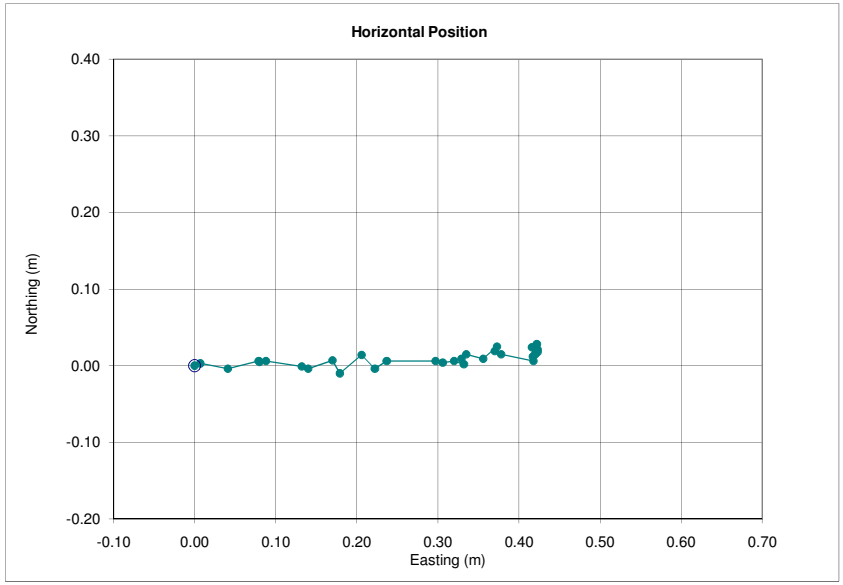
Survey and Displacement Data - Hub 98-05

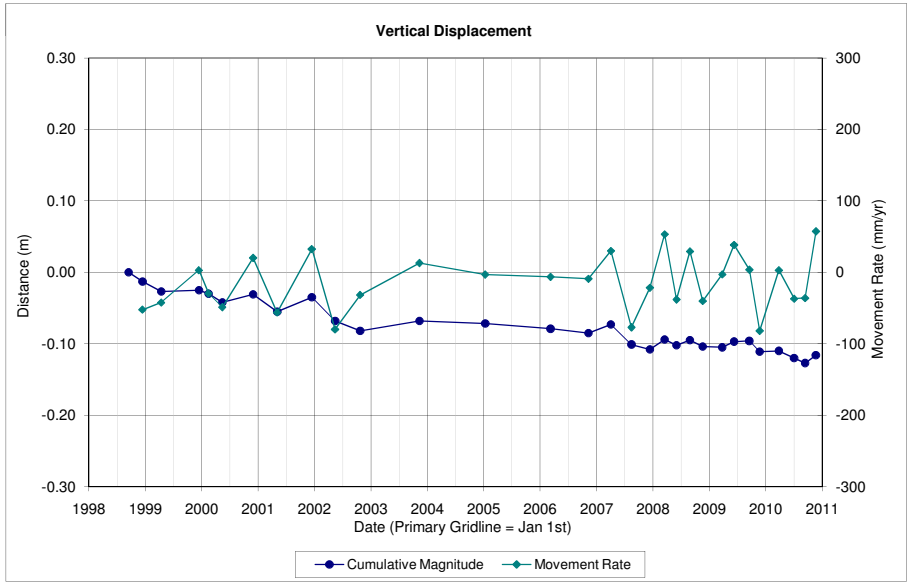
East of Dawson/Lewis Intersection

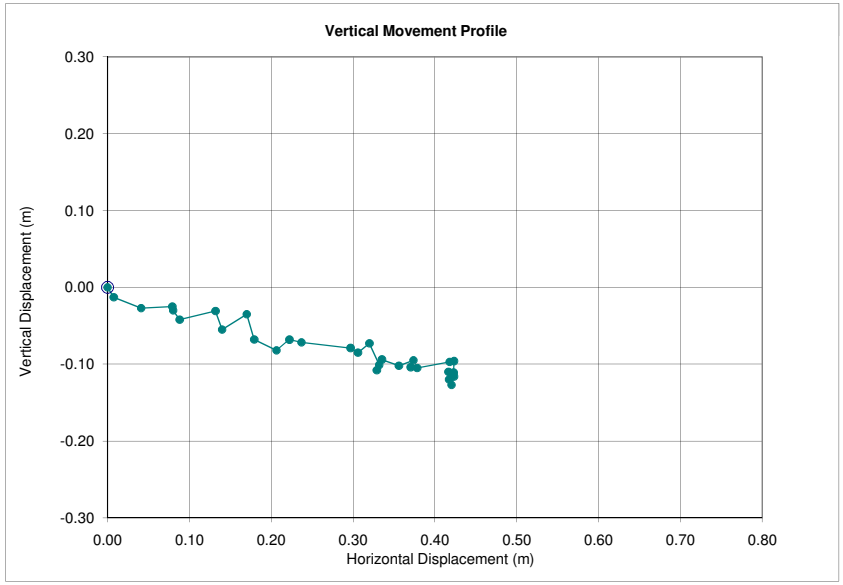
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870180.442	531627.209	551.978	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870180.445	531627.216	551.965	0.25	0.003	0.007	0.008	-0.013	66.8	-59.6	0.031	-0.052	0.25	0.003	0.007	0.008	-0.013	66.8	-59.6	30.568	-52.179
15/04/1999	5870180.438	531627.250	551.951	0.58	-0.004	0.041	0.041	-0.027	95.6	-33.2	0.071	-0.047	0.33	-0.007	0.034	0.035	-0.014	101.6	-22.0	104.785	-42.260
15/12/1999	5870180.448	531627.288	551.953	1.25	0.006	0.079	0.079	-0.025	85.7	-17.5	0.063	-0.020	0.67	0.010	0.038	0.039	0.002	75.3	2.9	58.820	2.994
15/02/2000	5870180.447	531627.289	551.948	1.42	0.005	0.080	0.080	-0.030	86.4	-20.5	0.057	-0.021	0.17	-0.001	0.001	0.001	-0.005	135.0	-74.2	8.331	-29.456
15/05/2000	5870180.448	531627.297	551.936	1.66	0.006	0.088	0.088	-0.042	86.1	-25.5	0.053	-0.025	0.25	0.001	0.008	0.008	-0.012	82.9	-56.1	32.719	-48.700
30/11/2000	5870180.441	531627.341	551.947	2.21	-0.001	0.132	0.132	-0.031	90.4	-13.2	0.060	-0.014	0.54	-0.007	0.044	0.045	0.011	99.0	13.9	81.774	20.190
05/05/2001	5870180.438	531627.349	551.923	2.64	-0.004	0.140	0.140	-0.055	91.6	-21.4	0.053	-0.021	0.43	-0.003	0.008	0.009	-0.024	110.6	-70.4	20.004	-56.192
15/12/2001	5870180.449	531627.379	551.943	3.25	0.007	0.170	0.170	-0.035	87.6	-11.6	0.052	-0.011	0.61	0.011	0.030	0.032	0.020	69.9	32.0	52.102	32.612
15/05/2002	5870180.432	531627.388	551.910	3.66	-0.010	0.179	0.179	-0.068	93.2	-20.8	0.049	-0.019	0.41	-0.017	0.009	0.019	-0.033	152.1	-59.8	46.528	-79.823
24/10/2002	5870180.456	531627.415	551.896	4.11	0.014	0.206	0.206	-0.082	86.1	-21.7	0.050	-0.020	0.44	0.024	0.027	0.036	-0.014	48.4	-21.2	81.448	-31.565
12/11/2003	5870180.438	531627.431	551.910	5.16	-0.004	0.222	0.222	-0.068	91.0	-17.0	0.043	-0.013	1.05	-0.018	0.016	0.024	0.014	137.7	29.9	22.974	13.193
11/01/2005	5870180.448	531627.446	551.906	6.32	0.006	0.237	0.237	-0.072	88.5	-16.8	0.037	-0.011	1.17	0.010	0.015	0.018	-0.004	56.0	-11.4	15.146	-3.061
10/03/2006	5870180.448	531627.506	551.899	7.48	0.006	0.297	0.297	-0.079	88.8	-14.9	0.040	-0.011	1.16	0.000	0.060	0.060	-0.007	90.0	-6.9	51.895	-6.303
10/11/2006	5870180.446	531627.515	551.893	8.15	0.004	0.306	0.306	-0.085	89.3	-15.5	0.038	-0.010	0.67	-0.002	0.009	0.009	-0.006	102.5	-33.1	13.745	-8.945
05/04/2007	5870180.448	531627.529	551.905	8.55	0.006	0.320	0.320	-0.073	88.9	-12.8	0.037	-0.009	0.40	0.002	0.014	0.014	0.012	81.9	40.3	35.380	30.021
16/08/2007	5870180.444	531627.541	551.877	8.92	0.002	0.332	0.332	-0.101	89.7	-16.9	0.037	-0.011	0.36	-0.004	0.012	0.013	-0.028	108.4	-65.7	34.738	-76.895
13/12/2007	5870180.451	531627.538	551.870	9.24	0.009	0.329	0.329	-0.108	88.4	-18.2	0.036	-0.012	0.33	0.007	-0.003	0.008	-0.007	336.8	-42.6	-23.375	-21.485
18/03/2008	5870180.457	531627.544	551.884	9.51	0.015	0.335	0.335	-0.094	87.4	-15.7	0.035	-0.010	0.26	0.006	0.006	0.008	0.014	45.0	58.8	32.284	53.266
03/06/2008	5870180.451	531627.565	551.876	9.72	0.009	0.356	0.356	-0.102	88.6	-16.0	0.037	-0.010	0.21	-0.006	0.021	0.022	-0.008	105.9	-20.1	103.600	-37.948
29/08/2008	5870180.467	531627.582	551.883	9.95	0.025	0.373	0.374	-0.095	86.2	-14.3	0.038	-0.010	0.24	0.016	0.017	0.023	0.007	46.7	16.7	98.010	29.388
19/11/2008	5870180.461	531627.579	551.874	10.18	0.019	0.370	0.370	-0.104	87.1	-15.7	0.036	-0.010	0.22	-0.006	-0.003	0.007	-0.009	206.6	-53.3	-29.880	-40.088
26/03/2009	5870180.457	531627.587	551.873	10.53	0.015	0.378	0.378	-0.105	87.7	-15.5	0.036	-0.010	0.35	-0.004	0.008	0.009	-0.001	116.6	-6.4	25.724	-2.876
10/06/2009	5870180.448	531627.627	551.881	10.74	0.006	0.418	0.418	-0.097	89.2	-13.1	0.039	-0.009	0.21	-0.009	0.040	0.041	0.008	102.7	11.0	197.043	38.447
17/09/2009	5870180.463	531627.632	551.882	11.01	0.021	0.423	0.424	-0.096	87.2	-12.8	0.038	-0.009	0.27	0.015	0.005	0.016	0.001	18.4	3.6	58.334	3.689
23/11/2009	5870180.470	531627.631	551.867	11.19	0.028	0.422	0.423	-0.111	86.2	-14.7	0.038	-0.010	0.18	0.007	-0.001	0.007	-0.015	351.9	-64.8	-38.548	-81.772
27/03/2010	5870180.466	531627.625	551.868	11.53	0.024	0.416	0.417	-0.110	86.7	-14.8	0.036	-0.010	0.34	-0.004	-0.006	0.007	0.001	236.3	7.9	-21.241	2.946
04/07/2010	5870180.454	531627.626	551.858	11.80	0.012	0.417	0.417	-0.120	88.4	-16.0	0.035	-0.010	0.27	-0.012	0.001	0.012	-0.010	175.2	-39.7	44.426	-36.894
13/09/2010	5870180.457	531627.629	551.851	11.99	0.015	0.420	0.420	-0.127	88.0	-16.8	0.035	-0.011	0.19	0.003	0.003	0.004	-0.007	45.0	-58.8	21.826	-36.011
22/11/2010	5870180.460	531627.632	551.862	12.19	0.018	0.423	0.423	-0.116	87.6	-15.3	0.035	-0.010	0.19	0.003	0.003	0.004	0.011	45.0	68.9	22.137	57.396

Displacement Graphs - Hub 98-05
East of Dawson/Lewis Intersection









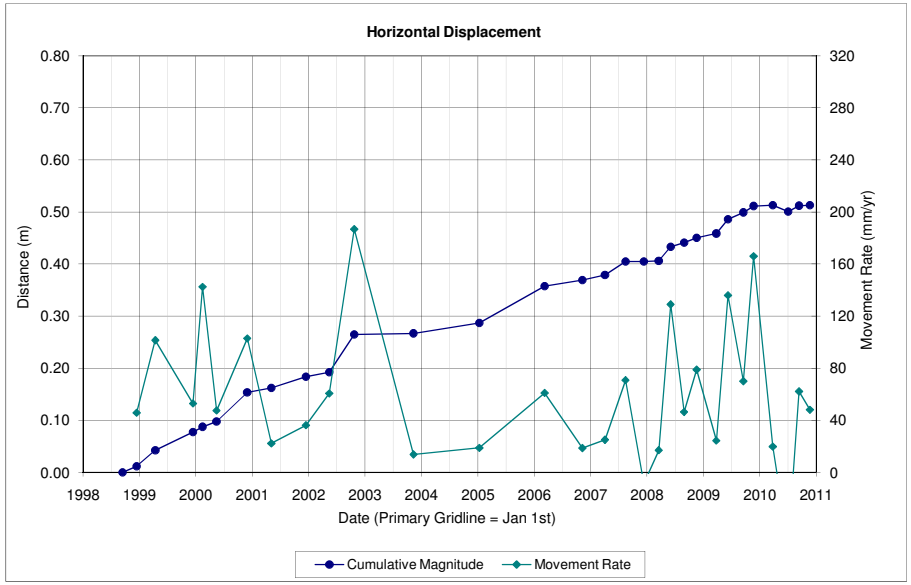
Survey and Displacement Data - Hub 98-06

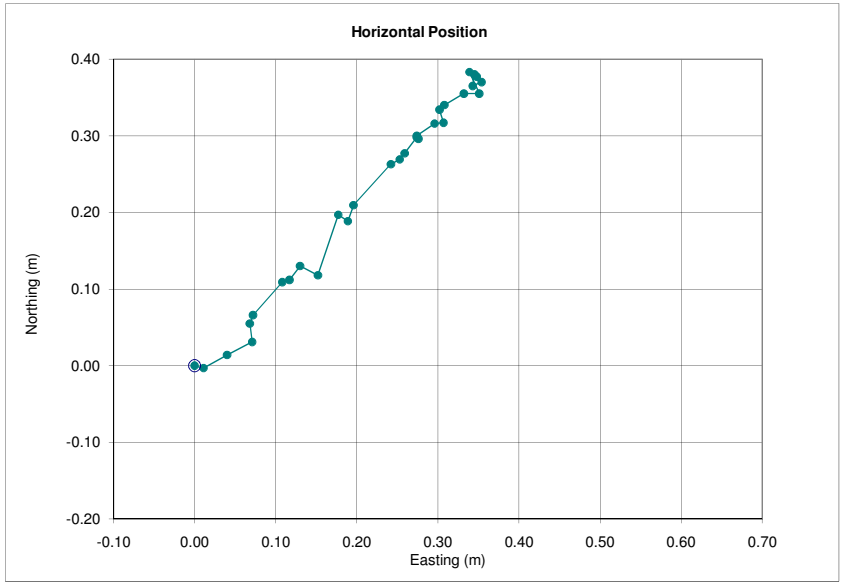
Paley West

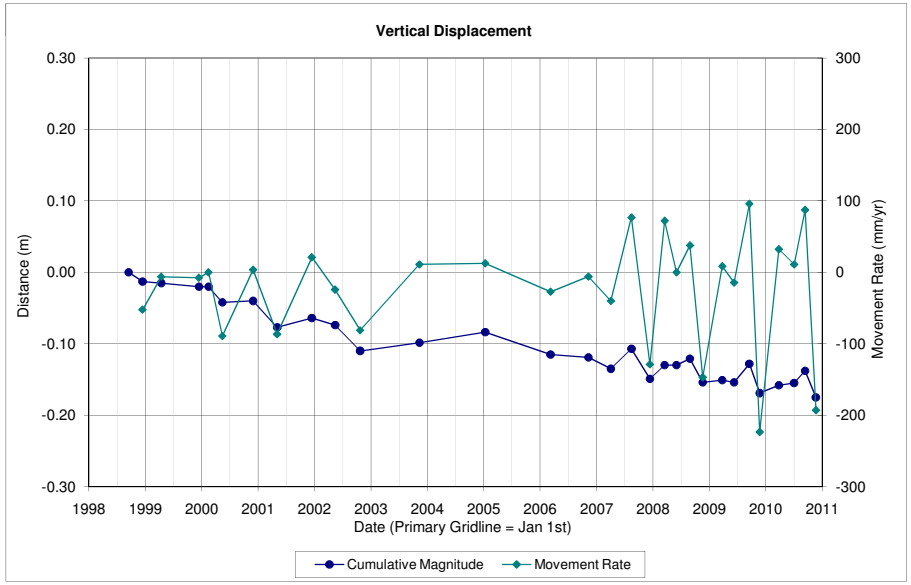
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870474.774	531664.168	539.628	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870474.771	531664.179	539.615	0.25	-0.003	0.011	0.011	-0.013	105.3	-48.7	0.046	-0.052	0.25	-0.003	0.011	0.011	-0.013	105.3	-48.7	45.764	-52.179
15/04/1999	5870474.788	531664.208	539.613	0.58	0.014	0.040	0.042	-0.015	70.7	-19.5	0.073	-0.026	0.33	0.017	0.029	0.034	-0.002	59.6	-3.4	101.471	-6.037
15/12/1999	5870474.805	531664.239	539.608	1.25	0.031	0.071	0.077	-0.020	66.4	-14.5	0.062	-0.016	0.67	0.017	0.031	0.035	-0.005	61.3	-8.0	52.924	-7.485
15/02/2000	5870474.829	531664.236	539.608	1.42	0.055	0.068	0.087	-0.020	51.0	-12.9	0.062	-0.014	0.17	0.024	-0.003	0.024	0.000	352.9	0.0	142.487	0.000
15/05/2000	5870474.840	531664.240	539.586	1.66	0.066	0.072	0.098	-0.042	47.5	-23.3	0.059	-0.025	0.25	0.011	0.004	0.012	-0.022	20.0	-62.0	47.502	-89.283
30/11/2000	5870474.883	531664.276	539.588	2.21	0.109	0.108	0.153	-0.040	44.7	-14.6	0.069	-0.018	0.54	0.043	0.036	0.056	0.002	39.9	2.0	102.931	3.671
05/05/2001	5870474.886	531664.285	539.551	2.64	0.112	0.117	0.162	-0.077	46.3	-25.4	0.061	-0.029	0.43	0.003	0.009	0.009	-0.037	71.6	-75.6	22.212	-86.630
15/12/2001	5870474.904	531664.298	539.564	3.25	0.130	0.130	0.184	-0.064	45.0	-19.2	0.057	-0.020	0.61	0.018	0.013	0.022	0.013	35.8	30.3	36.205	21.198
15/05/2002	5870474.892	531664.320	539.554	3.66	0.118	0.152	0.192	-0.074	52.2	-21.0	0.053	-0.020	0.41	-0.012	0.022	0.025	-0.010	118.6	-21.8	60.617	-24.189
24/10/2002	5870474.971	531664.345	539.518	4.11	0.197	0.177	0.265	-0.110	41.9	-22.6	0.064	-0.027	0.44	0.079	0.025	0.083	-0.036	17.6	-23.5	186.822	-81.167
12/11/2003	5870474.963	531664.357	539.530	5.16	0.189	0.189	0.267	-0.098	45.0	-20.2	0.052	-0.019	1.05	-0.008	0.012	0.014	0.012	125.2	38.8	13.775	11.072
11/01/2005	5870474.983	531664.364	539.544	6.32	0.209	0.196	0.287	-0.084	43.1	-16.3	0.045	-0.013	1.17	0.021	0.007	0.022	0.015	18.8	34.0	18.784	12.655
10/03/2006	5870475.037	531664.410	539.513	7.48	0.263	0.242	0.357	-0.115	42.6	-17.8	0.048	-0.015	1.16	0.054	0.046	0.071	-0.031	40.7	-23.9	61.046	-27.113
10/11/2006	5870475.043	531664.421	539.509	8.15	0.269	0.253	0.369	-0.119	43.2	-17.9	0.045	-0.015	0.67	0.006	0.011	0.013	-0.004	61.4	-17.7	18.680	-5.963
05/04/2007	5870475.051	531664.427	539.493	8.55	0.277	0.259	0.379	-0.135	43.1	-19.6	0.044	-0.016	0.40	0.008	0.006	0.010	-0.016	36.9	-58.0	25.017	-40.027
16/08/2007	5870475.072	531664.442	539.521	8.92	0.298	0.274	0.405	-0.107	42.6	-14.8	0.045	-0.012	0.36	0.021	0.015	0.026	0.028	35.5	47.3	70.872	76.895
13/12/2007	5870475.070	531664.444	539.479	9.24	0.296	0.276	0.405	-0.149	43.0	-20.2	0.044	-0.016	0.33	-0.002	0.002	0.003	-0.042	135.0	-86.1	-8.681	-128.912
18/03/2008	5870475.074	531664.442	539.498	9.51	0.300	0.274	0.406	-0.130	42.4	-17.7	0.043	-0.014	0.26	0.004	-0.002	0.004	0.019	333.4	76.8	17.015	72.289
03/06/2008	5870475.090	531664.464	539.498	9.72	0.316	0.296	0.433	-0.130	43.1	-16.7	0.045	-0.013	0.21	0.016	0.022	0.027	0.000	54.0	0.0	129.037	0.000
29/08/2008	5870475.091	531664.475	539.507	9.95	0.317	0.307	0.441	-0.121	44.1	-15.3	0.044	-0.012	0.24	0.001	0.011	0.011	0.009	84.8	39.2	46.371	37.784
19/11/2008	5870475.108	531664.470	539.474	10.18	0.334	0.302	0.450	-0.154	42.1	-18.9	0.044	-0.015	0.22	0.017	-0.005	0.018	-0.033	343.6	-61.8	78.930	-146.991
26/03/2009	5870475.114	531664.476	539.477	10.53	0.340	0.308	0.459	-0.151	42.2	-18.2	0.044	-0.014	0.35	0.006	0.006	0.008	0.003	45.0	19.5	24.404	8.628
10/06/2009	5870475.129	531664.500	539.474	10.74	0.355	0.332	0.486	-0.154	43.1	-17.6	0.045	-0.014	0.21	0.015	0.024	0.028	-0.003	58.0	-6.1	136.017	-14.418
17/09/2009	5870475.129	531664.519	539.500	11.01	0.355	0.351	0.499	-0.128	44.7	-14.4	0.045	-0.012	0.27	0.000	0.019	0.019	0.026	90.0	53.8	70.098	95.924
23/11/2009	5870475.157	531664.507	539.459	11.19	0.383	0.339	0.511	-0.169	41.5	-18.3	0.046	-0.015	0.18	0.028	-0.012	0.030	-0.041	336.8	-53.4	166.069	-223.511
27/03/2010	5870475.154	531664.513	539.470	11.53	0.380	0.345	0.513	-0.158	42.2	-17.1	0.045	-0.014	0.34	-0.003	0.006	0.007	0.011	116.6	58.6	19.759	32.401
04/07/2010	5870475.139	531664.511	539.473	11.80	0.365	0.343	0.501	-0.155	43.2	-17.2	0.042	-0.013	0.27	-0.015	-0.002	0.015	0.003	187.6	11.2	-55.831	11.068
13/09/2010	5870475.144	531664.522	539.490	11.99	0.370	0.354	0.512	-0.138	43.7	-15.1	0.043	-0.012	0.19	0.005	0.011	0.012	0.017	65.6	54.6	62.160	87.454
22/11/2010	5870475.151	531664.516	539.453	12.19	0.377	0.348	0.513	-0.175	42.7	-18.8	0.042	-0.014	0.19	0.007	-0.006	0.009	-0.037	319.4	-76.0	48.106	-193.061

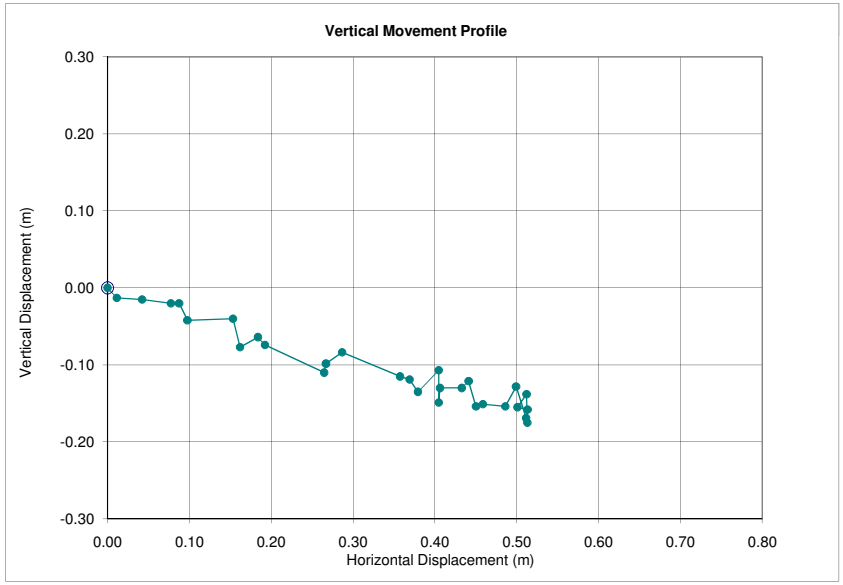
Displacement Graphs - Hub 98-06

Paley West









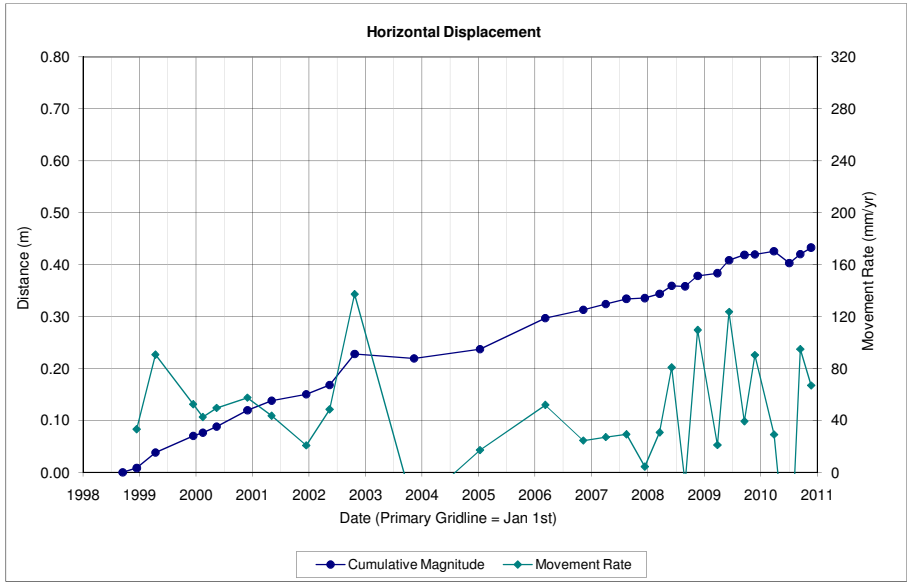
Survey and Displacement Data - Hub 98-07

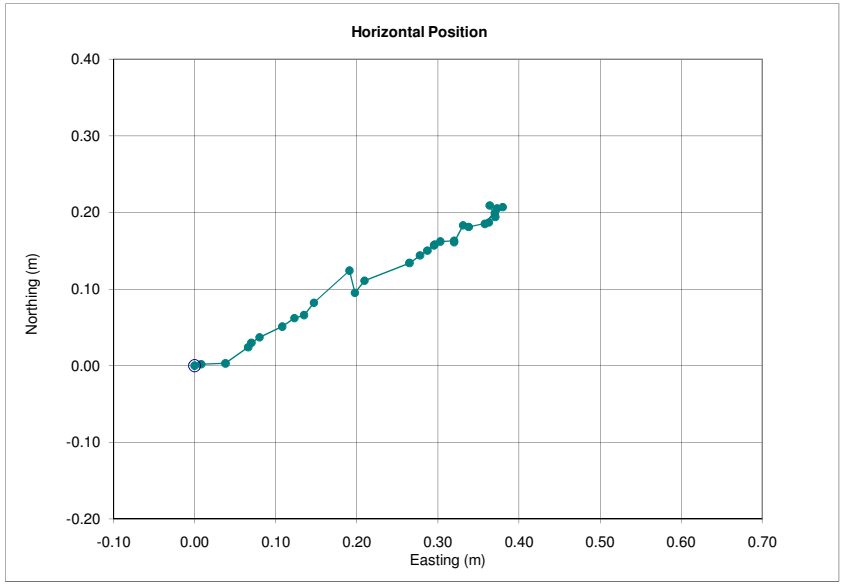
Paley East

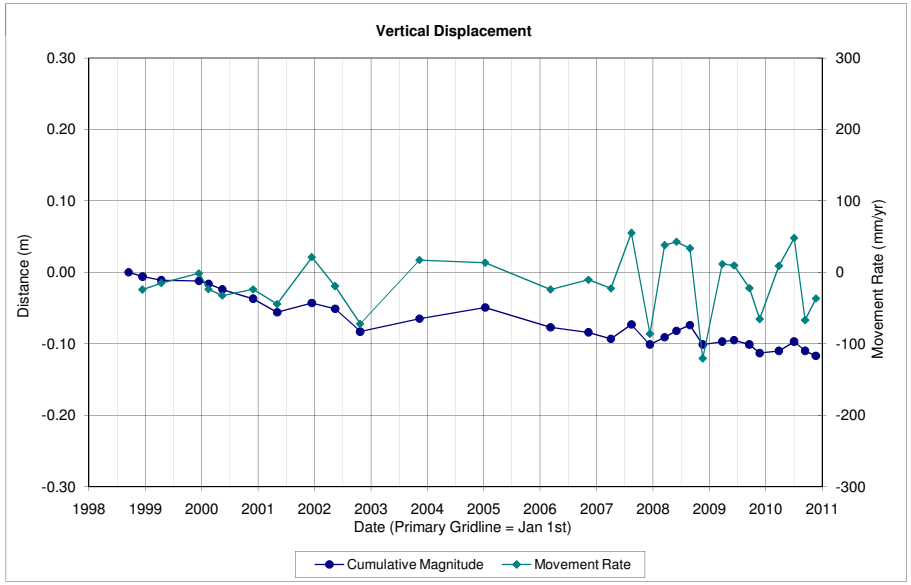
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870427.297	531932.241	533.473	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870427.299	531932.249	533.467	0.25	0.002	0.008	0.008	-0.006	76.0	-36.0	0.033	-0.024	0.25	0.002	0.008	0.008	-0.006	76.0	-36.0	33.098	-24.082
15/04/1999	5870427.300	531932.279	533.462	0.58	0.003	0.038	0.038	-0.011	85.5	-16.1	0.066	-0.019	0.33	0.001	0.030	0.030	-0.005	88.1	-9.5	90.608	-15.093
15/12/1999	5870427.321	531932.307	533.461	1.25	0.024	0.066	0.070	-0.012	70.0	-9.7	0.056	-0.010	0.67	0.021	0.028	0.035	-0.001	53.1	-1.6	52.392	-1.497
15/02/2000	5870427.327	531932.311	533.457	1.42	0.030	0.070	0.076	-0.016	66.8	-11.9	0.054	-0.011	0.17	0.006	0.004	0.007	-0.004	33.7	-29.0	42.482	-23.565
15/05/2000	5870427.334	531932.321	533.449	1.66	0.037	0.080	0.088	-0.024	65.2	-15.2	0.053	-0.014	0.25	0.007	0.010	0.012	-0.008	55.0	-33.2	49.538	-32.467
30/11/2000	5870427.348	531932.349	533.436	2.21	0.051	0.108	0.119	-0.037	64.7	-17.2	0.054	-0.017	0.54	0.014	0.028	0.031	-0.013	63.4	-22.6	57.458	-23.861
05/05/2001	5870427.359	531932.364	533.417	2.64	0.062	0.123	0.138	-0.056	63.2	-22.1	0.052	-0.021	0.43	0.011	0.015	0.019	-0.019	53.7	-45.6	43.552	-44.486
15/12/2001	5870427.363	531932.376	533.430	3.25	0.066	0.135	0.150	-0.043	63.9	-16.0	0.046	-0.013	0.61	0.004	0.012	0.013	0.013	71.6	45.8	20.625	21.198
15/05/2002	5870427.379	531932.388	533.422	3.66	0.082	0.147	0.168	-0.051	60.8	-16.9	0.046	-0.014	0.41	0.016	0.012	0.020	-0.008	36.9	-21.8	48.377	-19.351
24/10/2002	5870427.421	531932.432	533.390	4.11	0.124	0.191	0.228	-0.083	57.0	-20.0	0.055	-0.020	0.44	0.042	0.044	0.061	-0.032	46.3	-27.7	137.144	-72.148
12/11/2003	5870427.392	531932.439	533.408	5.16	0.095	0.198	0.219	-0.065	64.3	-16.5	0.043	-0.013	1.05	-0.029	0.007	0.030	0.018	167.1	31.3	-28.284	17.169
11/01/2005	5870427.408	531932.451	533.424	6.32	0.111	0.210	0.237	-0.049	62.1	-11.7	0.037	-0.008	1.17	0.016	0.012	0.020	0.016	37.0	38.4	17.062	13.504
10/03/2006	5870427.431	531932.506	533.396	7.48	0.134	0.265	0.297	-0.077	63.2	-14.5	0.040	-0.010	1.16	0.023	0.055	0.060	-0.028	67.4	-24.9	51.828	-24.005
10/11/2006	5870427.441	531932.519	533.389	8.15	0.144	0.278	0.313	-0.084	62.6	-15.0	0.038	-0.010	0.67	0.010	0.013	0.016	-0.007	52.4	-23.1	24.451	-10.436
05/04/2007	5870427.447	531932.528	533.380	8.55	0.150	0.287	0.324	-0.093	62.4	-16.0	0.038	-0.011	0.40	0.006	0.009	0.011	-0.009	56.3	-39.8	27.060	-22.515
16/08/2007	5870427.454	531932.536	533.400	8.92	0.157	0.295	0.334	-0.073	62.0	-12.3	0.037	-0.008	0.36	0.007	0.008	0.011	0.020	48.8	62.0	29.193	54.925
13/12/2007	5870427.455	531932.537	533.372	9.24	0.158	0.296	0.336	-0.101	61.9	-16.8	0.036	-0.011	0.33	0.001	0.001	0.001	-0.028	45.0	-87.1	4.341	-85.941
18/03/2008	5870427.459	531932.544	533.382	9.51	0.162	0.303	0.344	-0.091	61.9	-14.8	0.036	-0.010	0.26	0.004	0.007	0.008	0.010	60.3	51.1	30.674	38.047
03/06/2008	5870427.460	531932.561	533.391	9.72	0.163	0.320	0.359	-0.082	63.0	-12.9	0.037	-0.008	0.21	0.001	0.017	0.017	0.009	86.6	27.9	80.779	42.692
29/08/2008	5870427.458	531932.561	533.399	9.95	0.161	0.320	0.358	-0.074	63.3	-11.7	0.036	-0.007	0.24	-0.002	0.000	0.002	0.008	180.0	76.0	-8.397	33.586
19/11/2008	5870427.480	531932.572	533.372	10.18	0.183	0.331	0.378	-0.101	61.1	-15.0	0.037	-0.010	0.22	0.022	0.011	0.025	-0.027	26.6	-47.7	109.561	-120.265
26/03/2009	5870427.478	531932.579	533.376	10.53	0.181	0.338	0.383	-0.097	61.8	-14.2	0.036	-0.009	0.35	-0.002	0.007	0.007	0.004	105.9	28.8	20.937	11.504
10/06/2009	5870427.484	531932.604	533.378	10.74	0.187	0.363	0.408	-0.095	62.7	-13.1	0.038	-0.009	0.21	0.006	0.025	0.026	0.002	76.5	4.4	123.560	9.612
17/09/2009	5870427.491	531932.612	533.372	11.01	0.194	0.371	0.419	-0.101	62.4	-13.6	0.038	-0.009	0.27	0.007	0.008	0.011	-0.006	48.8	-29.4	39.219	-22.136
23/11/2009	5870427.506	531932.605	533.360	11.19	0.209	0.364	0.420	-0.113	60.1	-15.1	0.038	-0.010	0.18	0.015	-0.007	0.017	-0.012	335.0	-35.9	90.238	-65.418
27/03/2010	5870427.502	531932.614	533.363	11.53	0.205	0.373	0.426	-0.110	61.2	-14.5	0.037	-0.010	0.34	-0.004	0.009	0.010	0.003	114.0	16.9	29.010	8.837
04/07/2010	5870427.482	531932.599	533.376	11.80	0.185	0.358	0.403	-0.097	62.7	-13.5	0.034	-0.008	0.27	-0.020	-0.015	0.025	0.013	216.9	27.5	-92.235	47.962
13/09/2010	5870427.496	531932.611	533.363	11.99	0.199	0.370	0.420	-0.110	61.7	-14.7	0.035	-0.009	0.19	0.014	0.012	0.018	-0.013	40.6	-35.2	94.857	-66.877
22/11/2010	5870427.504	531932.621	533.356	12.19	0.207	0.380	0.433	-0.117	61.4	-15.1	0.036	-0.010	0.19	0.008	0.010	0.013	-0.007	51.3	-28.7	66.821	-36.525

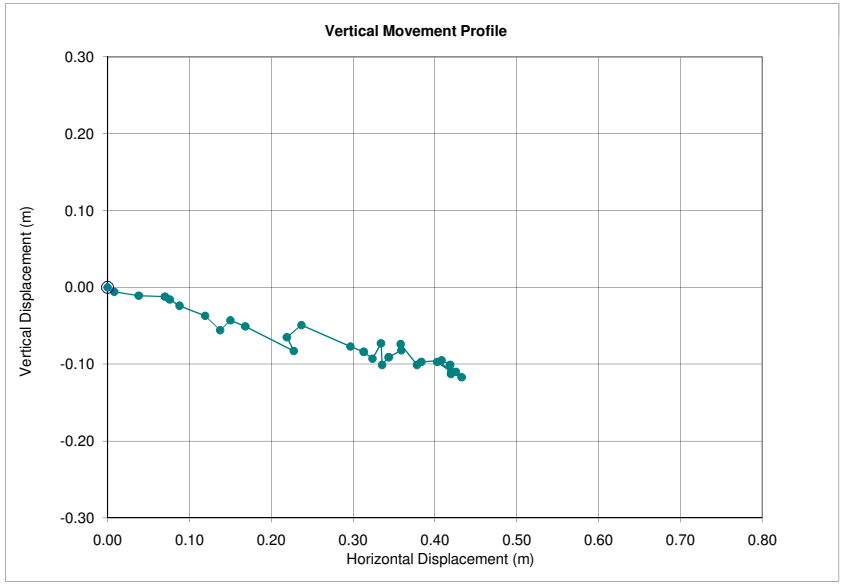
Displacement Graphs - Hub 98-07

Paley East









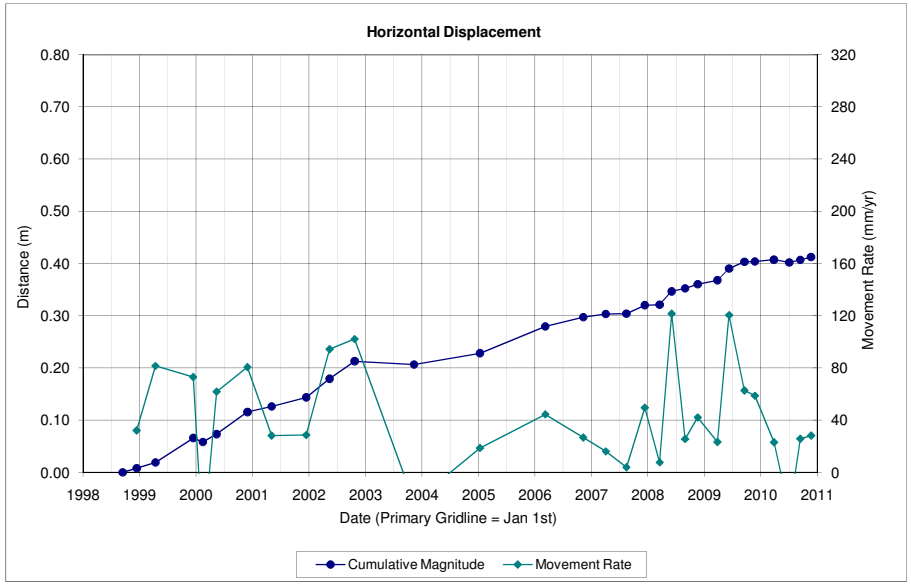
Survey and Displacement Data - Hub 98-08

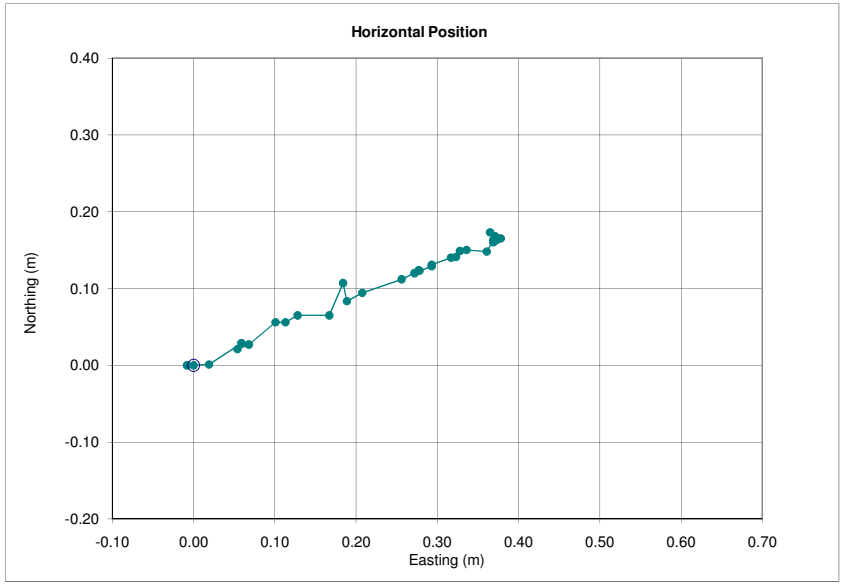
Picard Avenue

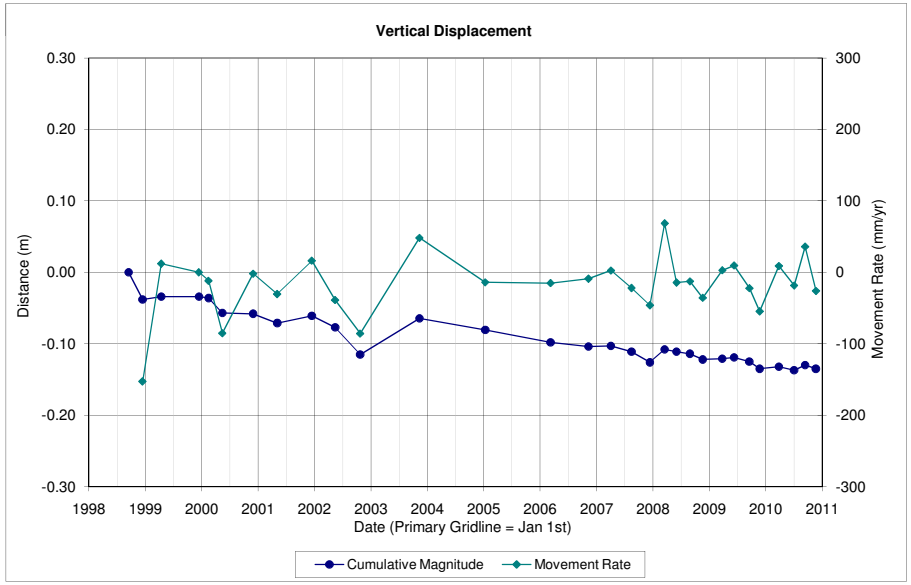
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870328.580	531909.295	536.943	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870328.580	531909.287	536.905	0.25	0.000	-0.008	0.008	-0.038	270.0	-78.1	0.032	-0.153	0.25	0.000	-0.008	0.008	-0.038	270.0	-78.1	32.110	-152.522
15/04/1999	5870328.581	531909.314	536.909	0.58	0.001	0.019	0.019	-0.034	87.0	-60.8	0.033	-0.059	0.33	0.001	0.027	0.027	0.004	87.9	8.4	81.558	12.074
15/12/1999	5870328.609	531909.354	536.909	1.25	0.029	0.059	0.066	-0.034	63.8	-27.3	0.053	-0.027	0.67	0.028	0.040	0.049	0.000	55.0	0.0	73.089	0.000
15/02/2000	5870328.601	531909.349	536.907	1.42	0.021	0.054	0.058	-0.036	68.7	-31.9	0.041	-0.025	0.17	-0.008	-0.005	0.009	-0.002	212.0	-12.0	-55.577	-11.782
15/05/2000	5870328.607	531909.363	536.886	1.66	0.027	0.068	0.073	-0.057	68.3	-37.9	0.044	-0.034	0.25	0.006	0.014	0.015	-0.021	66.8	-54.0	61.815	-85.225
30/11/2000	5870328.636	531909.396	536.885	2.21	0.056	0.101	0.115	-0.058	61.0	-26.7	0.052	-0.026	0.54	0.029	0.033	0.044	-0.001	48.7	-1.3	80.634	-1.835
05/05/2001	5870328.636	531909.408	536.872	2.64	0.056	0.113	0.126	-0.071	63.6	-29.4	0.048	-0.027	0.43	0.000	0.012	0.012	-0.013	90.0	-47.3	28.096	-30.438
15/12/2001	5870328.645	531909.423	536.882	3.25	0.065	0.128	0.144	-0.061	63.1	-23.0	0.044	-0.019	0.61	0.009	0.015	0.017	0.010	59.0	29.8	28.524	16.306
15/05/2002	5870328.645	531909.462	536.866	3.66	0.065	0.167	0.179	-0.077	68.7	-23.3	0.049	-0.021	0.41	0.000	0.039	0.039	-0.016	90.0	-22.3	94.336	-38.702
24/10/2002	5870328.687	531909.479	536.828	4.11	0.107	0.184	0.213	-0.115	59.8	-28.4	0.052	-0.028	0.44	0.042	0.017	0.045	-0.038	22.0	-40.0	102.157	-85.676
12/11/2003	5870328.664	531909.484	536.879	5.16	0.084	0.189	0.206	-0.064	66.1	-17.3	0.040	-0.012	1.05	-0.023	0.005	0.024	0.051	168.3	64.7	-22.796	48.167
11/01/2005	5870328.674	531909.503	536.862	6.32	0.094	0.208	0.228	-0.081	65.6	-19.5	0.036	-0.013	1.17	0.011	0.019	0.022	-0.016	60.0	-36.7	18.657	-13.924
10/03/2006	5870328.692	531909.551	536.845	7.48	0.112	0.256	0.279	-0.098	66.4	-19.3	0.037	-0.013	1.16	0.018	0.048	0.051	-0.017	70.0	-18.7	44.388	-15.024
10/11/2006	5870328.700	531909.567	536.839	8.15	0.120	0.272	0.297	-0.104	66.2	-19.3	0.036	-0.013	0.67	0.008	0.016	0.018	-0.006	63.4	-18.5	26.669	-8.945
05/04/2007	5870328.704	531909.572	536.840	8.55	0.124	0.277	0.303	-0.103	65.9	-18.7	0.035	-0.012	0.40	0.004	0.005	0.006	0.001	51.3	8.9	16.019	2.502
16/08/2007	5870328.703	531909.573	536.832	8.92	0.123	0.278	0.304	-0.111	66.1	-20.1	0.034	-0.012	0.36	-0.001	0.001	0.001	-0.008	135.0	-80.0	3.884	-21.970
13/12/2007	5870328.709	531909.588	536.817	9.24	0.129	0.293	0.320	-0.126	66.2	-21.5	0.035	-0.014	0.33	0.006	0.015	0.016	-0.015	68.2	-42.9	49.587	-46.040
18/03/2008	5870328.711	531909.588	536.835	9.51	0.131	0.293	0.321	-0.108	65.9	-18.6	0.034	-0.011	0.26	0.002	0.000	0.002	0.018	0.0	83.7	7.609	68.484
03/06/2008	5870328.720	531909.612	536.832	9.72	0.140	0.317	0.347	-0.111	66.2	-17.8	0.036	-0.011	0.21	0.009	0.024	0.026	-0.003	69.4	-6.7	121.586	-14.231
29/08/2008	5870328.721	531909.618	536.829	9.95	0.141	0.323	0.352	-0.114	66.4	-17.9	0.035	-0.011	0.24	0.001	0.006	0.006	-0.003	80.5	-26.3	25.537	-12.595
19/11/2008	5870328.729	531909.623	536.821	10.18	0.149	0.328	0.360	-0.122	65.6	-18.7	0.035	-0.012	0.22	0.008	0.005	0.009	-0.008	32.0	-40.3	42.021	-35.634
26/03/2009	5870328.730	531909.631	536.822	10.53	0.150	0.336	0.368	-0.121	65.9	-18.2	0.035	-0.011	0.35	0.001	0.008	0.008	0.001	82.9	7.1	23.187	2.876
10/06/2009	5870328.728	531909.656	536.824	10.74	0.148	0.361	0.390	-0.119	67.7	-17.0	0.036	-0.011	0.21	-0.002	0.025	0.025	0.002	94.6	4.6	120.532	9.612
17/09/2009	5870328.743	531909.664	536.818	11.01	0.163	0.369	0.403	-0.125	66.2	-17.2	0.037	-0.011	0.27	0.015	0.008	0.017	-0.006	28.1	-19.4	62.720	-22.136
23/11/2009	5870328.753	531909.660	536.808	11.19	0.173	0.365	0.404	-0.135	64.6	-18.5	0.036	-0.012	0.18	0.010	-0.004	0.011	-0.010	338.2	-42.9	58.714	-54.515
27/03/2010	5870328.748	531909.666	536.811	11.53	0.168	0.371	0.407	-0.132	65.6	-18.0	0.035	-0.011	0.34	-0.005	0.006	0.008	0.003	129.8	21.0	23.006	8.837
04/07/2010	5870328.740	531909.664	536.806	11.80	0.160	0.369	0.402	-0.137	66.6	-18.8	0.034	-0.012	0.27	-0.008	-0.002	0.008	-0.005	194.0	-31.2	-30.424	-18.447
13/09/2010	5870328.743	531909.668	536.813	11.99	0.163	0.373	0.407	-0.130	66.4	-17.7	0.034	-0.011	0.19	0.003	0.004	0.005	0.007	53.1	54.5	25.722	36.011
22/11/2010	5870328.745	531909.673	536.808	12.19	0.165	0.378	0.412	-0.135	66.4	-18.1	0.034	-0.011	0.19	0.002	0.005	0.005	-0.005	68.2	-42.9	28.099	-26.089

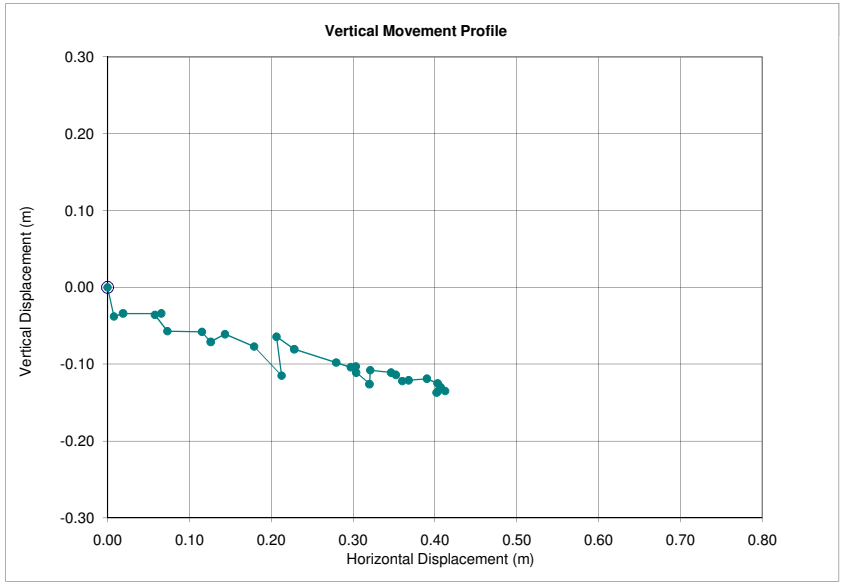
Displacement Graphs - Hub 98-08

Picard Avenue









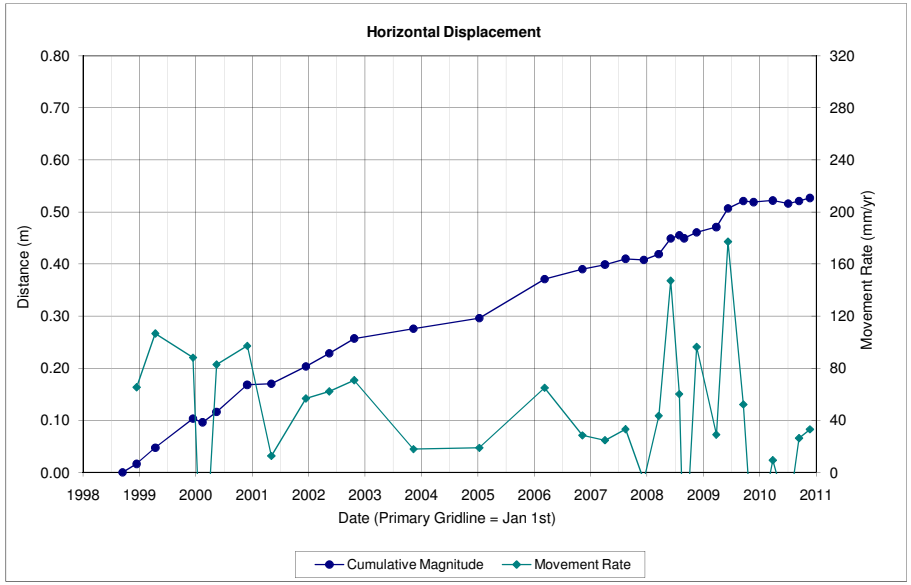
Survey and Displacement Data - Hub 98-09

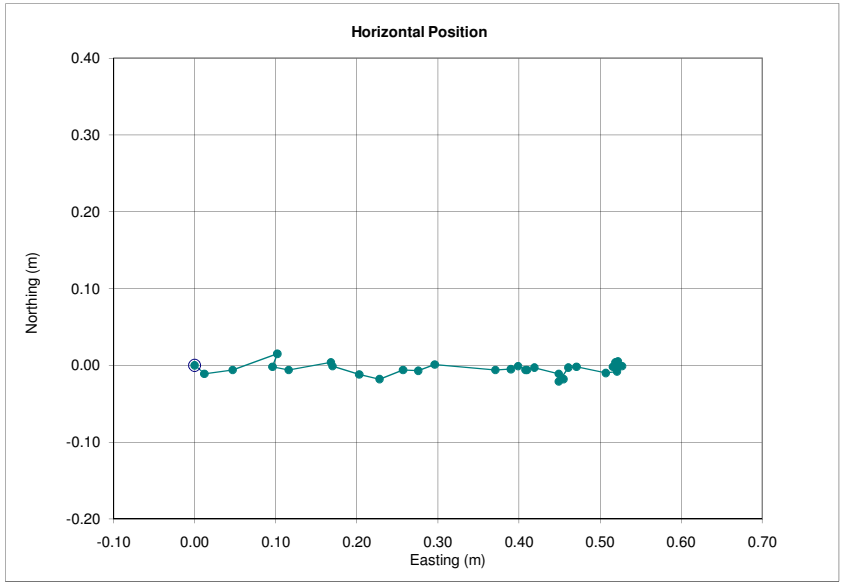
Lane between Patchett/Pierce

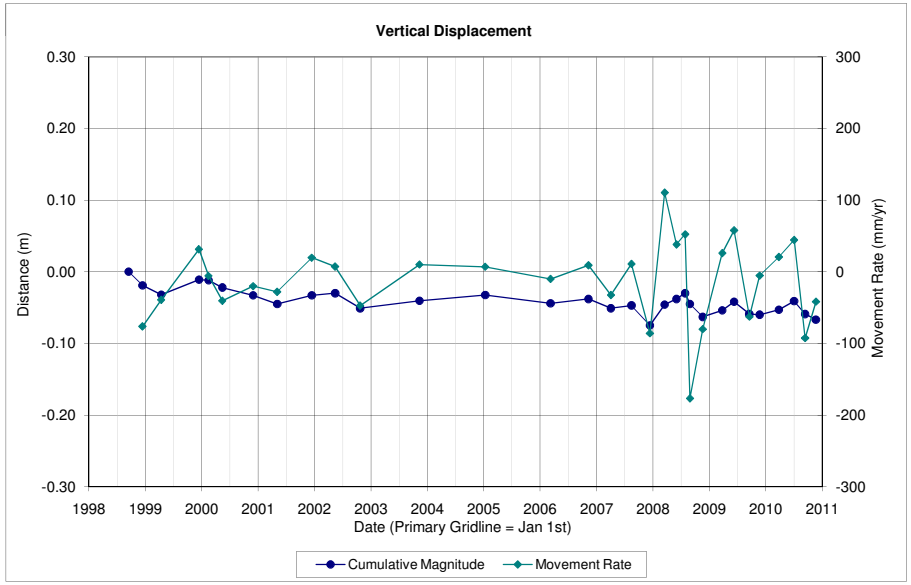
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870063.599	531714.863	549.785	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870063.588	531714.875	549.766	0.25	-0.011	0.012	0.016	-0.019	132.5	-49.4	0.065	-0.076	0.25	-0.011	0.012	0.016	-0.019	132.5	-49.4	65.339	-76.261
15/04/1999	5870063.593	531714.910	549.753	0.58	-0.006	0.047	0.047	-0.032	97.3	-34.0	0.082	-0.055	0.33	0.005	0.035	0.035	-0.013	81.9	-20.2	106.723	-39.242
15/12/1999	5870063.614	531714.965	549.774	1.25	0.015	0.102	0.103	-0.011	81.6	-6.1	0.083	-0.009	0.67	0.021	0.055	0.059	0.021	69.1	19.6	88.128	31.435
15/02/2000	5870063.597	531714.959	549.773	1.42	-0.002	0.096	0.096	-0.012	91.2	-7.1	0.068	-0.008	0.17	-0.017	-0.006	0.018	-0.001	199.4	-3.2	-106.204	-5.891
15/05/2000	5870063.593	531714.979	549.763	1.66	-0.006	0.116	0.116	-0.022	93.0	-10.7	0.070	-0.013	0.25	-0.004	0.020	0.020	-0.010	101.3	-26.1	82.774	-40.583
30/11/2000	5870063.603	531715.031	549.752	2.21	0.004	0.168	0.168	-0.033	88.6	-11.1	0.076	-0.015	0.54	0.010	0.052	0.053	-0.011	79.1	-11.7	97.191	-20.190
05/05/2001	5870063.598	531715.033	549.740	2.64	-0.001	0.170	0.170	-0.045	90.3	-14.8	0.064	-0.017	0.43	-0.005	0.002	0.005	-0.012	158.2	-65.8	12.609	-28.096
15/12/2001	5870063.587	531715.066	549.752	3.25	-0.012	0.203	0.203	-0.033	93.4	-9.2	0.063	-0.010	0.61	-0.011	0.033	0.035	0.012	108.4	19.0	56.720	19.567
15/05/2002	5870063.581	531715.091	549.755	3.66	-0.018	0.228	0.229	-0.030	94.5	-7.5	0.062	-0.008	0.41	-0.006	0.025	0.026	0.003	103.5	6.7	62.189	7.257
24/10/2002	5870063.593	531715.120	549.734	4.11	-0.006	0.257	0.257	-0.051	91.3	-11.2	0.063	-0.012	0.44	0.012	0.029	0.031	-0.021	67.5	-33.8	70.761	-47.347
12/11/2003	5870063.592	531715.139	549.745	5.16	-0.007	0.276	0.276	-0.040	91.5	-8.3	0.053	-0.008	1.05	-0.001	0.019	0.019	0.011	93.3	29.4	17.808	10.054
11/01/2005	5870063.600	531715.159	549.753	6.32	0.001	0.296	0.296	-0.032	89.8	-6.2	0.047	-0.005	1.17	0.008	0.020	0.022	0.008	68.6	20.1	18.793	6.885
10/03/2006	5870063.593	531715.234	549.741	7.48	-0.006	0.371	0.371	-0.044	90.9	-6.8	0.050	-0.006	1.16	-0.007	0.075	0.075	-0.012	95.3	-8.8	64.948	-10.016
10/11/2006	5870063.594	531715.253	549.747	8.15	-0.005	0.390	0.390	-0.038	90.7	-5.6	0.048	-0.005	0.67	0.001	0.019	0.019	0.006	87.0	17.5	28.365	8.945
05/04/2007	5870063.598	531715.262	549.734	8.55	-0.001	0.399	0.399	-0.051	90.1	-7.3	0.047	-0.006	0.40	0.004	0.009	0.010	-0.013	66.0	-52.9	24.639	-32.522
16/08/2007	5870063.593	531715.273	549.738	8.92	-0.006	0.410	0.410	-0.047	90.8	-6.5	0.046	-0.005	0.36	-0.005	0.011	0.012	0.004	114.4	18.3	33.183	10.985
13/12/2007	5870063.593	531715.271	549.710	9.24	-0.006	0.408	0.408	-0.075	90.8	-10.4	0.044	-0.008	0.33	0.000	-0.002	0.002	-0.028	270.0	-85.9	-6.139	-85.941
18/03/2008	5870063.596	531715.282	549.739	9.51	-0.003	0.419	0.419	-0.046	90.4	-6.3	0.044	-0.005	0.26	0.003	0.011	0.011	0.029	74.7	68.5	43.380	110.336
03/06/2008	5870063.588	531715.312	549.747	9.72	-0.011	0.449	0.449	-0.038	91.4	-4.8	0.046	-0.004	0.21	-0.008	0.030	0.031	0.008	104.9	14.4	147.278	37.948
29/07/2008	5870063.581	531715.318	549.755	9.87	-0.018	0.455	0.455	-0.030	92.3	-3.8	0.046	-0.003	0.15	-0.007	0.006	0.009	0.008	139.4	40.9	60.133	52.179
29/08/2008	5870063.578	531715.312	549.740	9.95	-0.021	0.449	0.449	-0.045	92.7	-5.7	0.045	-0.005	0.08	-0.003	-0.006	0.007	-0.015	243.4	-65.9	-79.038	-176.734
19/11/2008	5870063.596	531715.324	549.722	10.18	-0.003	0.461	0.461	-0.063	90.4	-7.8	0.045	-0.006	0.22	0.018	0.012	0.022	-0.018	33.7	-39.8	96.361	-80.177
26/03/2009	5870063.597	531715.334	549.731	10.53	-0.002	0.471	0.471	-0.054	90.2	-6.5	0.045	-0.005	0.35	0.001	0.010	0.010	0.009	84.3	41.8	28.903	25.884
10/06/2009	5870063.589	531715.370	549.743	10.74	-0.010	0.507	0.507	-0.042	91.1	-4.7	0.047	-0.004	0.21	-0.008	0.036	0.037	0.012	102.5	18.0	177.234	57.671
17/09/2009	5870063.591	531715.384	549.726	11.01	-0.008	0.521	0.521	-0.059	90.9	-6.5	0.047	-0.005	0.27	0.002	0.014	0.014	-0.017	81.9	-50.2	52.176	-62.720
23/11/2009	5870063.603	531715.382	549.725	11.19	0.004	0.519	0.519	-0.060	89.6	-6.6	0.046	-0.005	0.18	0.012	-0.002	0.012	-0.001	350.5	-4.7	-66.320	-5.451
27/03/2010	5870063.604	531715.385	549.732	11.53	0.005	0.522	0.522	-0.053	89.5	-5.8	0.045	-0.005	0.34	0.001	0.003	0.003	0.007	71.6	65.7	9.315	20.619
04/07/2010	5870063.597	531715.379	549.744	11.80	-0.002	0.516	0.516	-0.041	90.2	-4.5	0.044	-0.003	0.27	-0.007	-0.006	0.009	0.012	220.6	52.5	-34.015	44.273
13/09/2010	5870063.596	531715.384	549.726	11.99	-0.003	0.521	0.521	-0.059	90.3	-6.5	0.043	-0.005	0.19	-0.001	0.005	0.005	-0.018	101.3	-74.2	26.231	-92.599
22/11/2010	5870063.598	531715.390	549.718	12.19	-0.001	0.527	0.527	-0.067	90.1	-7.2	0.043	-0.005	0.19	0.002	0.006	0.006	-0.008	71.6	-51.7	33.001	-41.743

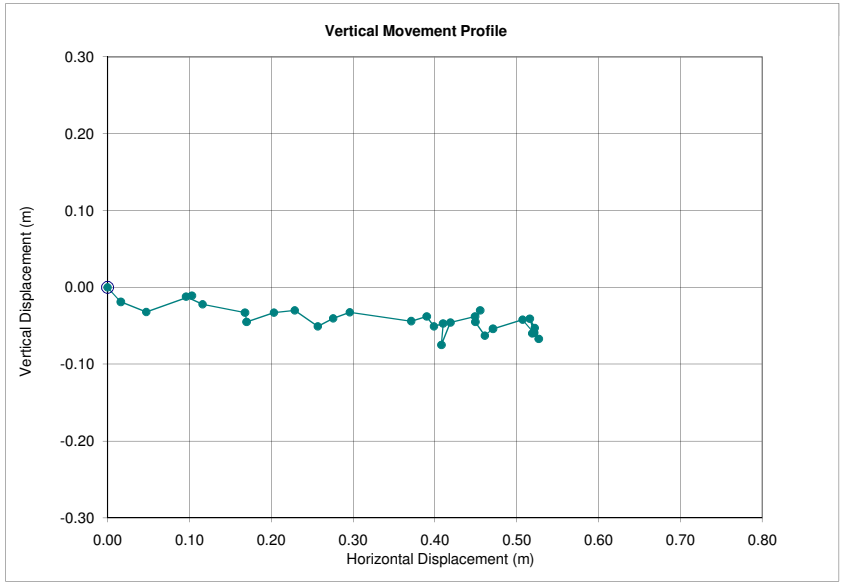
Displacement Graphs - Hub 98-09

Lane between Patchett/Pierce







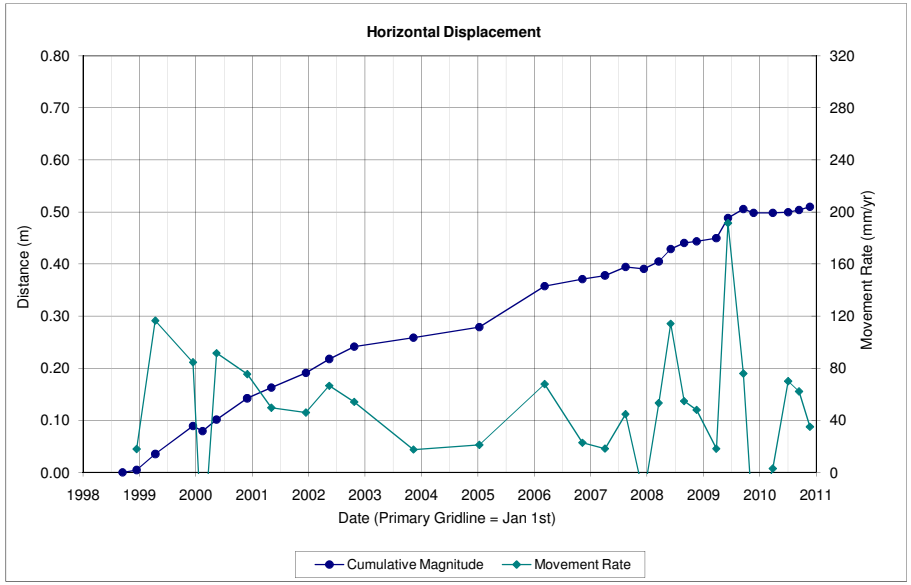


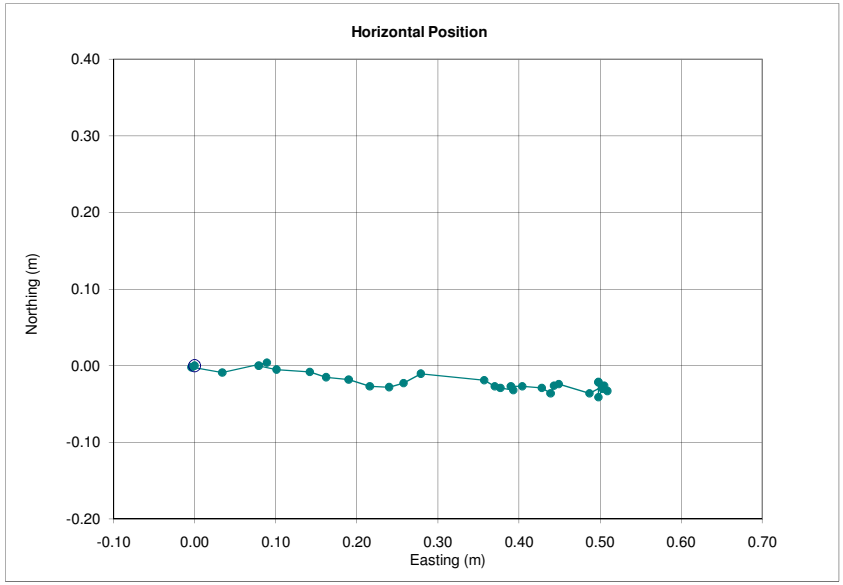
Survey and Displacement Data - Hub 98-14

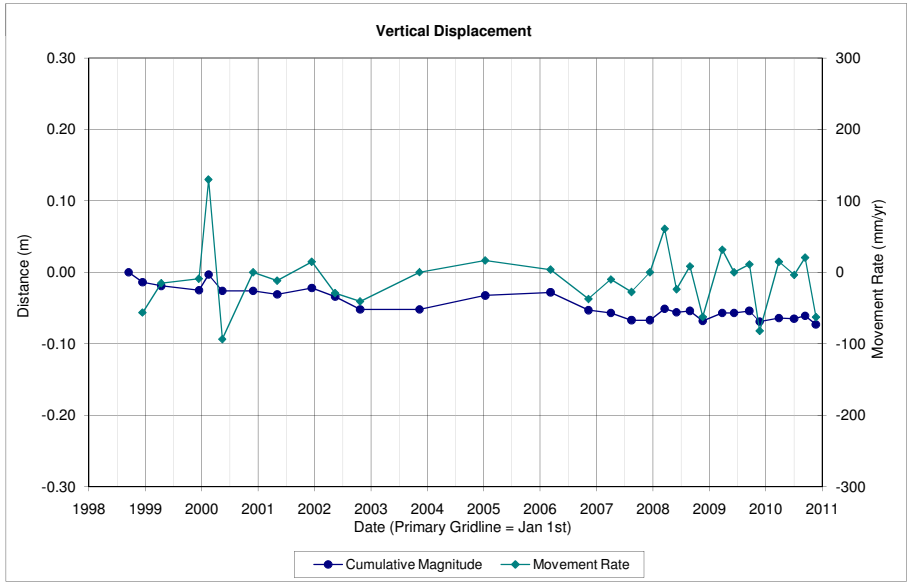
Pentland/Flamingo Intersection

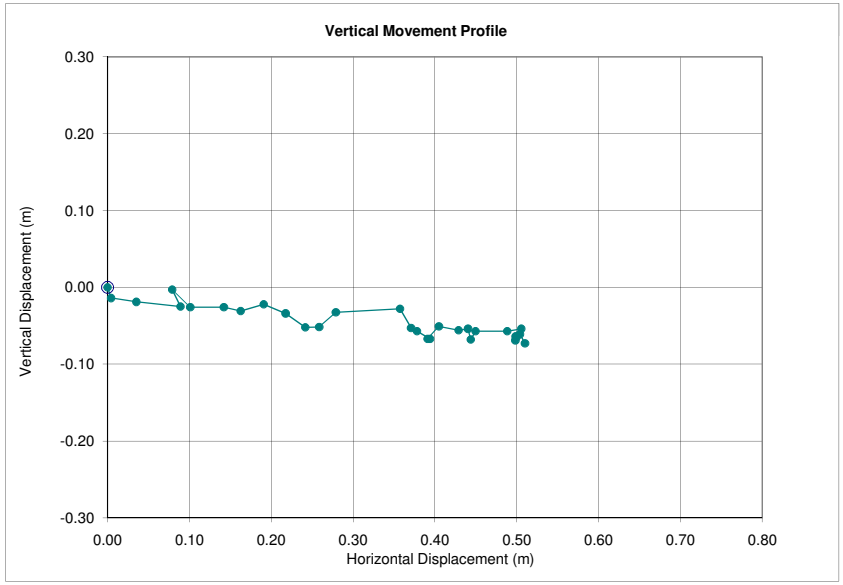
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870067.437	531986.027	531.224	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870067.435	531986.023	531.210	0.25	-0.002	-0.004	0.004	-0.014	243.4	-72.3	0.018	-0.056	0.25	-0.002	-0.004	0.004	-0.014	243.4	-72.3	17.950	-56.192
15/04/1999	5870067.428	531986.061	531.205	0.58	-0.009	0.034	0.035	-0.019	104.8	-28.4	0.061	-0.033	0.33	-0.007	0.038	0.039	-0.005	100.4	-7.4	116.637	-15.093
15/12/1999	5870067.441	531986.116	531.199	1.25	0.004	0.089	0.089	-0.025	87.4	-15.7	0.071	-0.020	0.67	0.013	0.055	0.057	-0.006	76.7	-6.1	84.600	-8.982
15/02/2000	5870067.437	531986.106	531.221	1.42	0.000	0.079	0.079	-0.003	90.0	-2.2	0.056	-0.002	0.17	-0.004	-0.010	0.011	0.022	248.2	63.9	-63.449	129.605
15/05/2000	5870067.432	531986.128	531.198	1.66	-0.005	0.101	0.101	-0.026	92.8	-14.4	0.061	-0.016	0.25	-0.005	0.022	0.023	-0.023	102.8	-45.6	91.560	-93.342
30/11/2000	5870067.429	531986.169	531.198	2.21	-0.008	0.142	0.142	-0.026	93.2	-10.4	0.064	-0.012	0.54	-0.003	0.041	0.041	0.000	94.2	0.0	75.454	0.000
05/05/2001	5870067.422	531986.189	531.193	2.64	-0.015	0.162	0.163	-0.031	95.3	-10.8	0.062	-0.012	0.43	-0.007	0.020	0.021	-0.005	109.3	-13.3	49.612	-11.707
15/12/2001	5870067.419	531986.217	531.202	3.25	-0.018	0.190	0.191	-0.022	95.4	-6.6	0.059	-0.007	0.61	-0.003	0.028	0.028	0.009	96.1	17.7	45.918	14.675
15/05/2002	5870067.410	531986.243	531.190	3.66	-0.027	0.216	0.218	-0.034	97.1	-8.9	0.059	-0.009	0.41	-0.009	0.026	0.028	-0.012	109.1	-23.6	66.552	-29.026
24/10/2002	5870067.409	531986.267	531.172	4.11	-0.028	0.240	0.242	-0.052	96.7	-12.1	0.059	-0.013	0.44	-0.001	0.024	0.024	-0.018	92.4	-36.8	54.158	-40.583
12/11/2003	5870067.414	531986.285	531.172	5.16	-0.023	0.258	0.259	-0.052	95.1	-11.3	0.050	-0.010	1.05	0.005	0.018	0.018	0.000	73.5	0.6	17.507	0.181
11/01/2005	5870067.427	531986.306	531.192	6.32	-0.010	0.279	0.279	-0.032	92.1	-6.6	0.044	-0.005	1.17	0.012	0.021	0.025	0.019	59.8	38.3	21.086	16.642
10/03/2006	5870067.418	531986.384	531.196	7.48	-0.019	0.357	0.358	-0.028	93.0	-4.5	0.048	-0.004	1.16	-0.009	0.078	0.079	0.004	96.3	3.2	67.845	3.799
10/11/2006	5870067.410	531986.397	531.171	8.15	-0.027	0.370	0.371	-0.053	94.2	-8.1	0.046	-0.007	0.67	-0.008	0.013	0.015	-0.025	121.6	-58.6	22.756	-37.270
05/04/2007	5870067.408	531986.404	531.167	8.55	-0.029	0.377	0.378	-0.057	94.4	-8.6	0.044	-0.007	0.40	-0.002	0.007	0.007	-0.004	105.9	-28.8	18.213	-10.007
16/08/2007	5870067.405	531986.420	531.157	8.92	-0.032	0.393	0.394	-0.067	94.7	-9.6	0.044	-0.008	0.36	-0.003	0.016	0.016	-0.010	100.6	-31.6	44.706	-27.462
13/12/2007	5870067.410	531986.417	531.157	9.24	-0.027	0.390	0.391	-0.067	94.0	-9.7	0.042	-0.007	0.33	0.005	-0.003	0.006	0.000	329.0	0.0	-17.897	0.000
18/03/2008	5870067.410	531986.431	531.173	9.51	-0.027	0.404	0.405	-0.051	93.8	-7.2	0.043	-0.005	0.26	0.000	0.014	0.014	0.016	90.0	48.8	53.266	60.875
03/06/2008	5870067.408	531986.455	531.168	9.72	-0.029	0.428	0.429	-0.056	93.9	-7.4	0.044	-0.006	0.21	-0.002	0.024	0.024	-0.005	94.8	-11.7	114.239	-23.718
29/08/2008	5870067.401	531986.466	531.170	9.95	-0.036	0.439	0.440	-0.054	94.7	-7.0	0.044	-0.005	0.24	-0.007	0.011	0.013	0.002	122.5	8.7	54.739	8.397
19/11/2008	5870067.411	531986.470	531.156	10.18	-0.026	0.443	0.444	-0.068	93.4	-8.7	0.044	-0.007	0.22	0.010	0.004	0.011	-0.014	21.8	-52.4	47.974	-62.360
26/03/2009	5870067.413	531986.476	531.167	10.53	-0.024	0.449	0.450	-0.057	93.1	-7.2	0.043	-0.005	0.35	0.002	0.006	0.006	0.011	71.6	60.1	18.189	31.636
10/06/2009	5870067.401	531986.514	531.167	10.74	-0.036	0.487	0.488	-0.057	94.2	-6.7	0.045	-0.005	0.21	-0.012	0.038	0.040	0.000	107.5	0.0	191.515	0.000
17/09/2009	5870067.411	531986.532	531.170	11.01	-0.026	0.505	0.506	-0.054	92.9	-6.1	0.046	-0.005	0.27	0.010	0.018	0.021	0.003	60.9	8.3	75.969	11.068
23/11/2009	5870067.416	531986.525	531.155	11.19	-0.021	0.498	0.498	-0.069	92.4	-7.9	0.045	-0.006	0.18	0.005	-0.007	0.009	-0.015	305.5	-60.2	-46.896	-81.772
27/03/2010	5870067.415	531986.525	531.160	11.53	-0.022	0.498	0.498	-0.064	92.5	-7.3	0.043	-0.006	0.34	-0.001	0.000	0.001	0.005	180.0	78.7	2.946	14.728
04/07/2010	5870067.396	531986.525	531.159	11.80	-0.041	0.498	0.500	-0.065	94.7	-7.4	0.042	-0.006	0.27	-0.019	0.000	0.019	-0.001	180.0	-3.0	70.098	-3.689
13/09/2010	5870067.407	531986.530	531.163	11.99	-0.030	0.503	0.504	-0.061	93.4	-6.9	0.042	-0.005	0.19	0.011	0.005	0.012	0.004	24.4	18.3	62.160	20.577
22/11/2010	5870067.404	531986.536	531.151	12.19	-0.033	0.509	0.510	-0.073	93.7	-8.1	0.042	-0.006	0.19	-0.003	0.006	0.007	-0.012	116.6	-60.8	35.002	-62.614

Displacement Graphs - Hub 98-14
Pentland/Flamingo Intersection









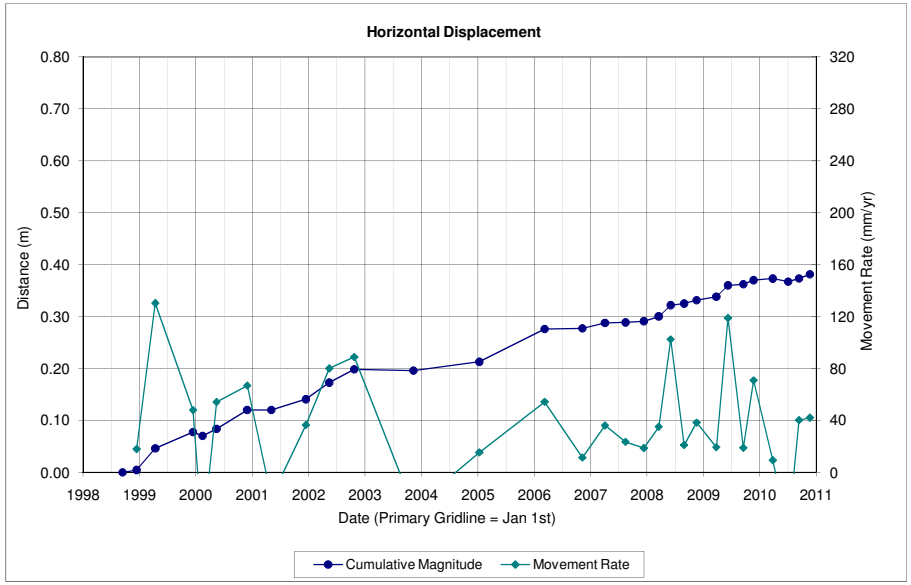
Survey and Displacement Data - Hub 98-15

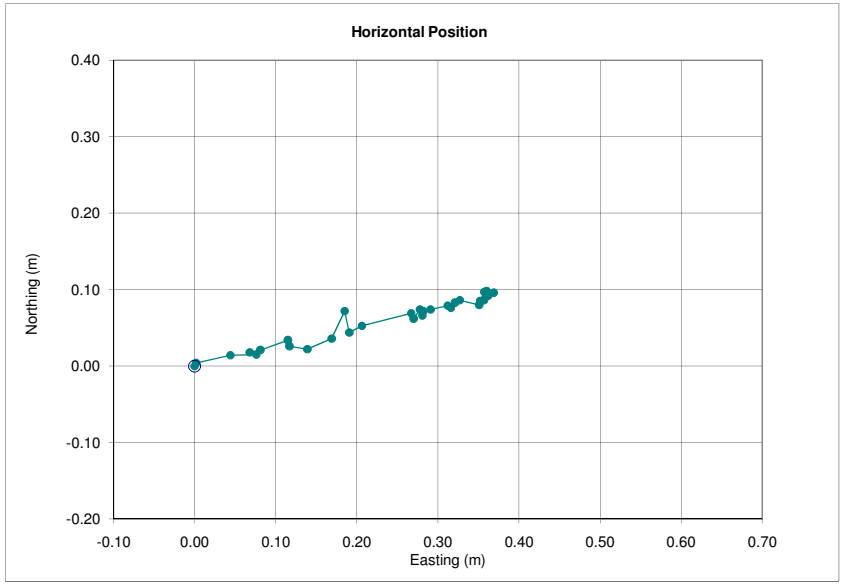
Palmer/Lewis Intersection

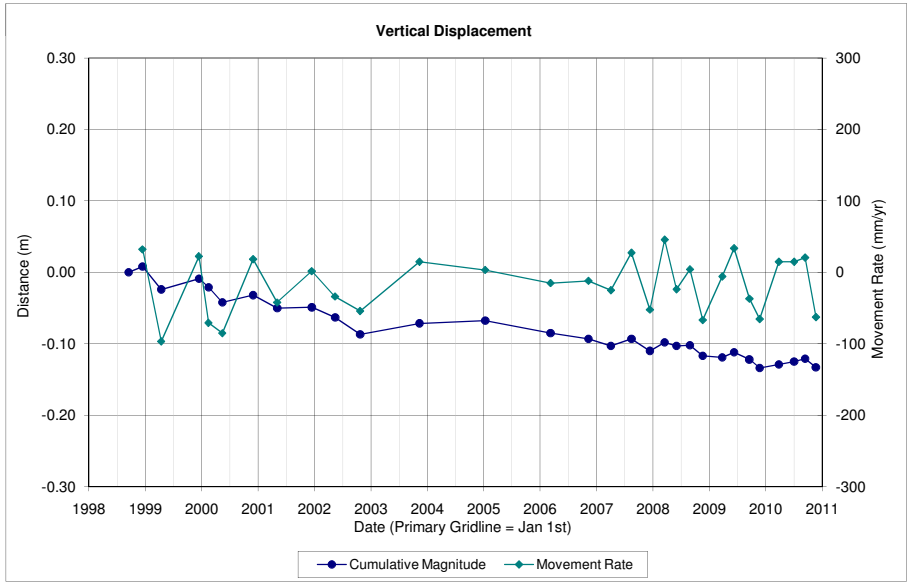
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870275.888	532052.513	524.385	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870275.892	532052.515	524.393	0.25	0.004	0.002	0.004	0.008	26.6	60.8	0.018	0.032	0.25	0.004	0.002	0.004	0.008	26.6	60.8	17.950	32.110
15/04/1999	5870275.902	532052.557	524.361	0.58	0.014	0.044	0.046	-0.024	72.3	-27.5	0.080	-0.041	0.33	0.010	0.042	0.043	-0.032	76.6	-36.5	130.325	-96.595
15/12/1999	5870275.903	532052.589	524.376	1.25	0.015	0.076	0.077	-0.009	78.8	-6.6	0.062	-0.007	0.67	0.001	0.032	0.032	0.015	88.2	25.1	47.925	22.454
15/02/2000	5870275.906	532052.581	524.364	1.42	0.018	0.068	0.070	-0.021	75.2	-16.6	0.050	-0.015	0.17	0.003	-0.008	0.009	-0.012	290.6	-54.5	-50.334	-70.694
15/05/2000	5870275.909	532052.594	524.343	1.66	0.021	0.081	0.084	-0.042	75.5	-26.7	0.050	-0.025	0.25	0.003	0.013	0.013	-0.021	77.0	-57.6	54.145	-85.225
30/11/2000	5870275.922	532052.628	524.353	2.21	0.034	0.115	0.120	-0.032	73.5	-14.9	0.054	-0.014	0.54	0.013	0.034	0.036	0.010	69.1	15.4	66.811	18.354
05/05/2001	5870275.914	532052.630	524.335	2.64	0.026	0.117	0.120	-0.050	77.5	-22.6	0.045	-0.019	0.43	-0.008	0.002	0.008	-0.018	166.0	-65.4	-19.307	-42.144
15/12/2001	5870275.910	532052.652	524.336	3.25	0.022	0.139	0.141	-0.049	81.0	-19.2	0.043	-0.015	0.61	-0.004	0.022	0.022	0.001	100.3	2.6	36.461	1.631
15/05/2002	5870275.924	532052.682	524.322	3.66	0.036	0.169	0.173	-0.063	78.0	-20.0	0.047	-0.017	0.41	0.014	0.030	0.033	-0.014	65.0	-22.9	80.079	-33.864
24/10/2002	5870275.960	532052.698	524.298	4.11	0.072	0.185	0.199	-0.087	68.7	-23.7	0.048	-0.021	0.44	0.036	0.016	0.039	-0.024	24.0	-31.4	88.822	-54.111
12/11/2003	5870275.932	532052.704	524.314	5.16	0.044	0.191	0.196	-0.071	77.0	-20.1	0.038	-0.014	1.05	-0.028	0.006	0.029	0.016	168.5	28.4	-27.242	14.753
11/01/2005	5870275.941	532052.719	524.317	6.32	0.053	0.206	0.213	-0.068	75.7	-17.6	0.034	-0.011	1.17	0.009	0.016	0.018	0.004	61.0	12.3	15.310	3.335
10/03/2006	5870275.957	532052.780	524.300	7.48	0.069	0.267	0.276	-0.085	75.5	-17.1	0.037	-0.011	1.16	0.016	0.061	0.063	-0.017	74.9	-15.5	54.292	-15.024
10/11/2006	5870275.950	532052.783	524.292	8.15	0.062	0.270	0.277	-0.093	77.1	-18.6	0.034	-0.011	0.67	-0.007	0.003	0.008	-0.008	156.8	-46.4	11.354	-11.927
05/04/2007	5870275.962	532052.791	524.282	8.55	0.074	0.278	0.288	-0.103	75.1	-19.7	0.034	-0.012	0.40	0.012	0.008	0.014	-0.010	33.7	-34.7	36.080	-25.017
16/08/2007	5870275.954	532052.794	524.292	8.92	0.066	0.281	0.289	-0.093	76.8	-17.9	0.032	-0.010	0.36	-0.008	0.003	0.009	0.010	159.4	49.5	23.464	27.462
13/12/2007	5870275.960	532052.795	524.275	9.24	0.072	0.282	0.291	-0.110	75.7	-20.7	0.031	-0.012	0.33	0.006	0.001	0.006	-0.017	9.5	-70.3	18.670	-52.179
18/03/2008	5870275.962	532052.804	524.287	9.51	0.074	0.291	0.300	-0.098	75.7	-18.1	0.032	-0.010	0.26	0.002	0.009	0.009	0.012	77.5	52.5	35.077	45.656
03/06/2008	5870275.967	532052.825	524.282	9.72	0.079	0.312	0.322	-0.103	75.8	-17.7	0.033	-0.011	0.21	0.005	0.021	0.022	-0.005	76.6	-13.0	102.398	-23.718
29/08/2008	5870275.964	532052.829	524.283	9.95	0.076	0.316	0.325	-0.102	76.5	-17.4	0.033	-0.010	0.24	-0.003	0.004	0.005	0.001	126.9	11.3	20.991	4.198
19/11/2008	5870275.971	532052.834	524.268	10.18	0.083	0.321	0.332	-0.117	75.5	-19.4	0.033	-0.011	0.22	0.007	0.005	0.009	-0.015	35.5	-60.2	38.317	-66.814
26/03/2009	5870275.974	532052.840	524.266	10.53	0.086	0.327	0.338	-0.119	75.3	-19.4	0.032	-0.011	0.35	0.003	0.006	0.007	-0.002	63.4	-16.6	19.293	-5.752
10/06/2009	5870275.968	532052.864	524.273	10.74	0.080	0.351	0.360	-0.112	77.2	-17.3	0.034	-0.010	0.21	-0.006	0.024	0.025	0.007	104.0	15.8	118.892	33.641
17/09/2009	5870275.973	532052.865	524.263	11.01	0.085	0.352	0.362	-0.122	76.4	-18.6	0.033	-0.011	0.27	0.005	0.001	0.005	-0.010	11.3	-63.0	18.812	-36.894
23/11/2009	5870275.985	532052.870	524.251	11.19	0.097	0.357	0.370	-0.134	74.8	-19.9	0.033	-0.012	0.18	0.012	0.005	0.013	-0.012	22.6	-42.7	70.869	-65.418
27/03/2010	5870275.986	532052.873	524.256	11.53	0.098	0.360	0.373	-0.129	74.8	-19.1	0.032	-0.011	0.34	0.001	0.003	0.003	0.005	71.6	57.7	9.315	14.728
04/07/2010	5870275.974	532052.870	524.260	11.80	0.086	0.357	0.367	-0.125	76.5	-18.8	0.031	-0.011	0.27	-0.012	-0.003	0.012	0.004	194.0	17.9	-45.635	14.758
13/09/2010	5870275.980	532052.875	524.264	11.99	0.092	0.362	0.374	-0.121	75.7	-18.0	0.031	-0.010	0.19	0.006	0.005	0.008	0.004	39.8	27.1	40.179	20.577
22/11/2010	5870275.984	532052.882	524.252	12.19	0.096	0.369	0.381	-0.133	75.4	-19.2	0.031	-0.011	0.19	0.004	0.007	0.008	-0.012	60.3	-56.1	42.068	-62.614

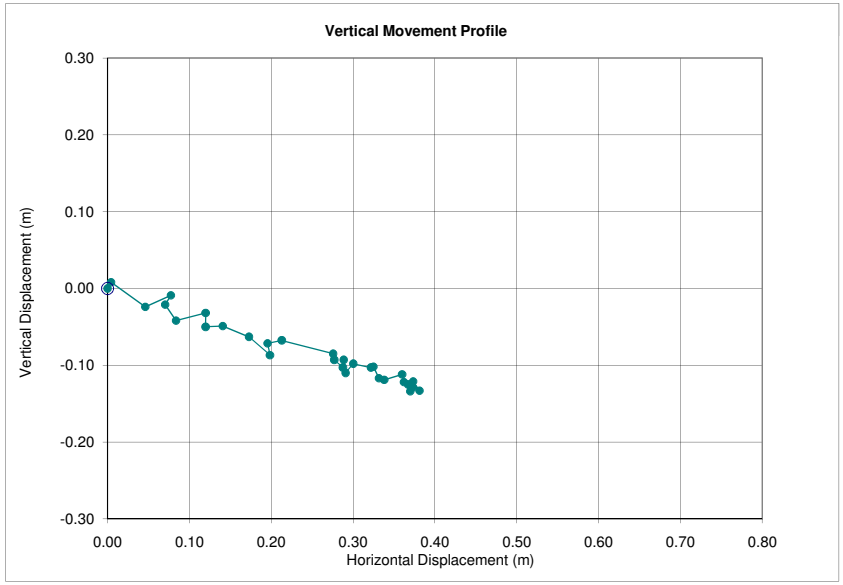
Displacement Graphs - Hub 98-15

Palmer/Lewis Intersection







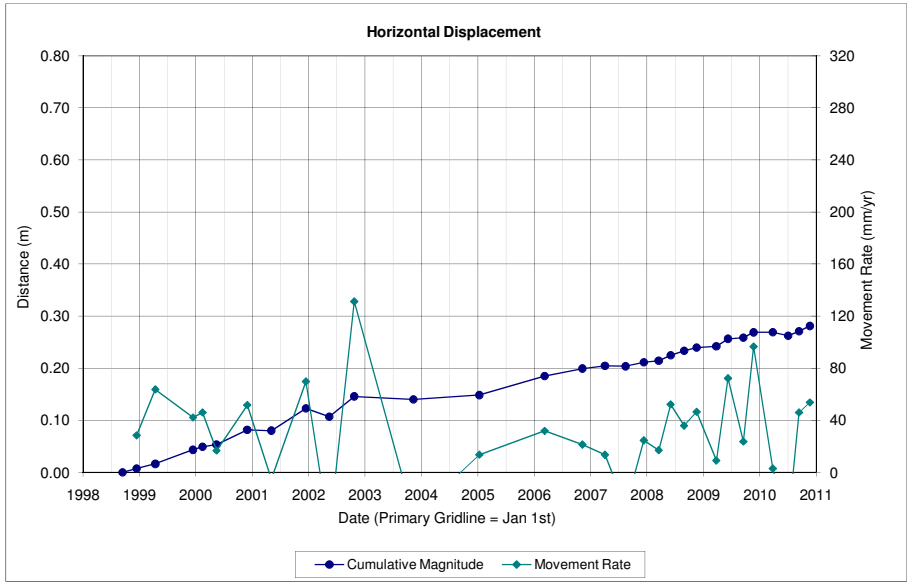


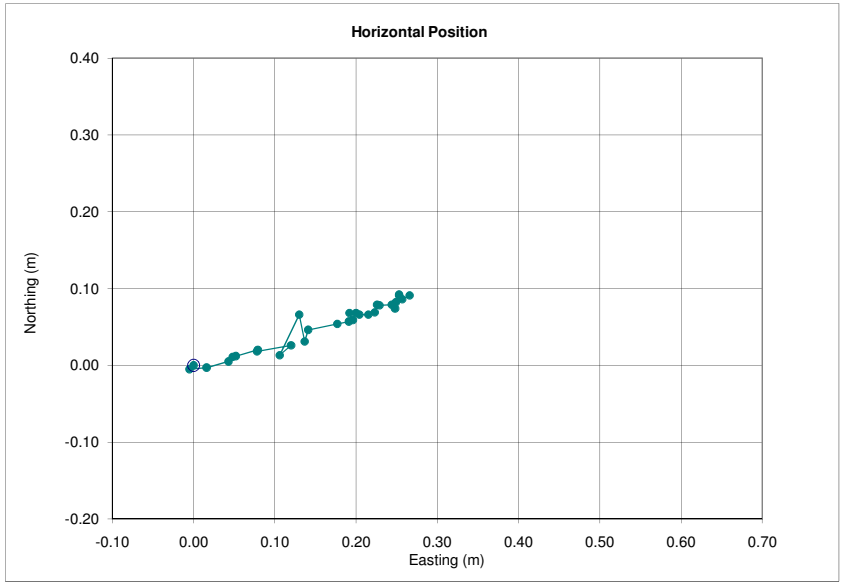
Survey and Displacement Data - Hub 98-16

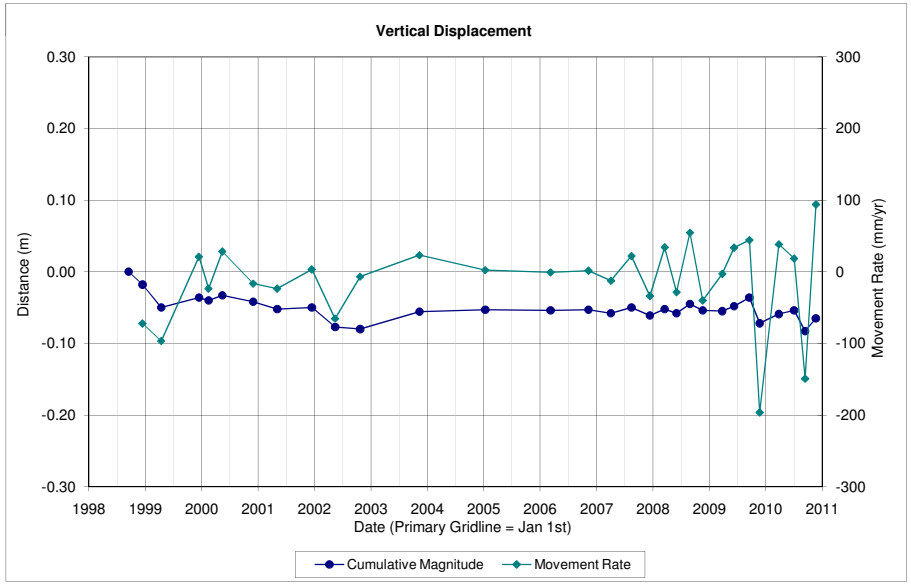
Healy Road

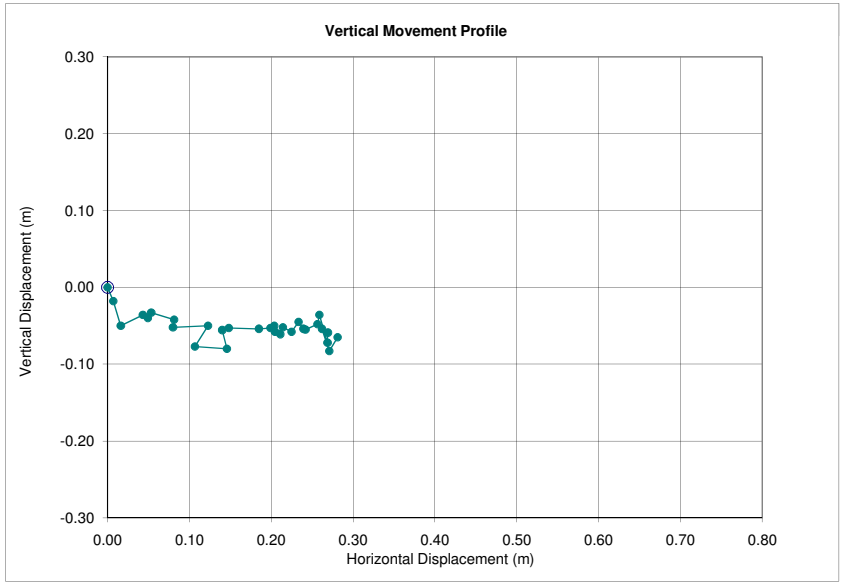
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870413.504	532184.864	509.104	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870413.499	532184.859	509.086	0.25	-0.005	-0.005	0.007	-0.018	225.0	-68.6	0.028	-0.072	0.25	-0.005	-0.005	0.007	-0.018	225.0	-68.6	28.381	-72.247
15/04/1999	5870413.501	532184.880	509.054	0.58	-0.003	0.016	0.016	-0.050	100.6	-72.0	0.028	-0.086	0.33	0.002	0.021	0.021	-0.032	84.6	-56.6	63.677	-96.595
15/12/1999	5870413.509	532184.907	509.068	1.25	0.005	0.043	0.043	-0.036	83.4	-39.7	0.035	-0.029	0.67	0.008	0.027	0.028	0.014	73.5	26.4	42.154	20.957
15/02/2000	5870413.515	532184.912	509.064	1.42	0.011	0.048	0.049	-0.040	77.1	-39.1	0.035	-0.028	0.17	0.006	0.005	0.008	-0.004	39.8	-27.1	46.011	-23.565
15/05/2000	5870413.516	532184.916	509.071	1.66	0.012	0.052	0.053	-0.033	77.0	-31.7	0.032	-0.020	0.25	0.001	0.004	0.004	0.007	76.0	59.5	16.733	28.408
30/11/2000	5870413.524	532184.943	509.062	2.21	0.020	0.079	0.081	-0.042	75.8	-27.3	0.037	-0.019	0.54	0.008	0.027	0.028	-0.009	73.5	-17.7	51.686	-16.519
05/05/2001	5870413.522	532184.942	509.052	2.64	0.018	0.078	0.080	-0.052	77.0	-33.0	0.030	-0.020	0.43	-0.002	-0.001	0.002	-0.010	206.6	-77.4	-5.235	-23.413
15/12/2001	5870413.530	532184.984	509.054	3.25	0.026	0.120	0.123	-0.050	77.8	-22.2	0.038	-0.015	0.61	0.008	0.042	0.043	0.002	79.2	2.7	69.716	3.261
15/05/2002	5870413.517	532184.970	509.027	3.66	0.013	0.106	0.107	-0.077	83.0	-35.8	0.029	-0.021	0.41	-0.013	-0.014	0.019	-0.027	227.1	-54.7	-46.213	-65.310
24/10/2002	5870413.570	532184.994	509.024	4.11	0.066	0.130	0.146	-0.080	63.1	-28.8	0.036	-0.019	0.44	0.053	0.024	0.058	-0.003	24.4	-3.0	131.176	-6.764
12/11/2003	5870413.535	532185.001	509.048	5.16	0.031	0.137	0.140	-0.056	77.2	-21.7	0.027	-0.011	1.05	-0.035	0.007	0.036	0.024	169.1	34.3	-33.908	23.161
11/01/2005	5870413.550	532185.005	509.051	6.32	0.046	0.141	0.148	-0.053	71.9	-19.7	0.023	-0.008	1.17	0.015	0.004	0.016	0.003	15.7	9.5	13.547	2.272
10/03/2006	5870413.558	532185.041	509.050	7.48	0.054	0.177	0.185	-0.054	73.0	-16.3	0.025	-0.007	1.16	0.008	0.036	0.037	-0.001	77.8	-1.6	31.806	-0.863
10/11/2006	5870413.561	532185.055	509.051	8.15	0.057	0.191	0.199	-0.053	73.4	-14.9	0.024	-0.007	0.67	0.003	0.014	0.014	0.001	77.9	4.0	21.345	1.491
05/04/2007	5870413.563	532185.060	509.046	8.55	0.059	0.196	0.205	-0.058	73.2	-15.8	0.024	-0.007	0.40	0.002	0.005	0.005	-0.005	68.2	-42.9	13.472	-12.509
16/08/2007	5870413.572	532185.056	509.054	8.92	0.068	0.192	0.204	-0.050	70.5	-13.8	0.023	-0.006	0.36	0.009	-0.004	0.010	0.008	336.0	39.1	-27.047	21.970
13/12/2007	5870413.572	532185.064	509.043	9.24	0.068	0.200	0.211	-0.061	71.2	-16.1	0.023	-0.007	0.33	0.000	0.008	0.008	-0.011	90.0	-54.0	24.555	-33.763
18/03/2008	5870413.570	532185.068	509.052	9.51	0.066	0.204	0.214	-0.052	72.1	-13.6	0.023	-0.005	0.26	-0.002	0.004	0.004	0.009	116.6	63.6	17.015	34.242
03/06/2008	5870413.570	532185.079	509.046	9.72	0.066	0.215	0.225	-0.058	72.9	-14.5	0.023	-0.006	0.21	0.000	0.011	0.011	-0.006	90.0	-28.6	52.179	-28.461
29/08/2008	5870413.573	532185.087	509.059	9.95	0.069	0.223	0.233	-0.045	72.8	-10.9	0.023	-0.005	0.24	0.003	0.008	0.009	0.013	69.4	56.7	35.870	54.578
19/11/2008	5870413.583	532185.090	509.050	10.18	0.079	0.226	0.239	-0.054	70.7	-12.7	0.024	-0.005	0.22	0.010	0.003	0.010	-0.009	16.7	-40.8	46.504	-40.088
26/03/2009	5870413.582	532185.093	509.049	10.53	0.078	0.229	0.242	-0.055	71.2	-12.8	0.023	-0.005	0.35	-0.001	0.003	0.003	-0.001	108.4	-17.5	9.095	-2.876
10/06/2009	5870413.583	532185.108	509.056	10.74	0.079	0.244	0.256	-0.048	72.1	-10.6	0.024	-0.004	0.21	0.001	0.015	0.015	0.007	86.2	25.0	72.249	33.641
17/09/2009	5870413.578	532185.112	509.068	11.01	0.074	0.248	0.259	-0.036	73.4	-7.9	0.024	-0.003	0.27	-0.005	0.004	0.006	0.012	141.3	61.9	23.624	44.273
23/11/2009	5870413.595	532185.117	509.032	11.19	0.091	0.253	0.269	-0.072	70.2	-15.0	0.024	-0.006	0.18	0.017	0.005	0.018	-0.036	16.4	-63.8	96.601	-196.254
27/03/2010	5870413.596	532185.117	509.045	11.53	0.092	0.253	0.269	-0.059	70.0	-12.4	0.023	-0.005	0.34	0.001	0.000	0.001	0.013	0.0	85.6	2.946	38.292
04/07/2010	5870413.586	532185.113	509.050	11.80	0.082	0.249	0.262	-0.054	71.8	-11.6	0.022	-0.005	0.27	-0.010	-0.004	0.011	0.005	201.8	24.9	-39.736	18.447
13/09/2010	5870413.590	532185.121	509.021	11.99	0.086	0.257	0.271	-0.083	71.5	-17.0	0.023	-0.007	0.19	0.004	0.008	0.009	-0.029	63.4	-72.9	46.013	-149.187
22/11/2010	5870413.595	532185.130	509.039	12.19	0.091	0.266	0.281	-0.065	71.1	-13.0	0.023	-0.005	0.19	0.005	0.009	0.010	0.018	60.9	60.2	53.721	93.921

Displacement Graphs - Hub 98-16
Healy Road







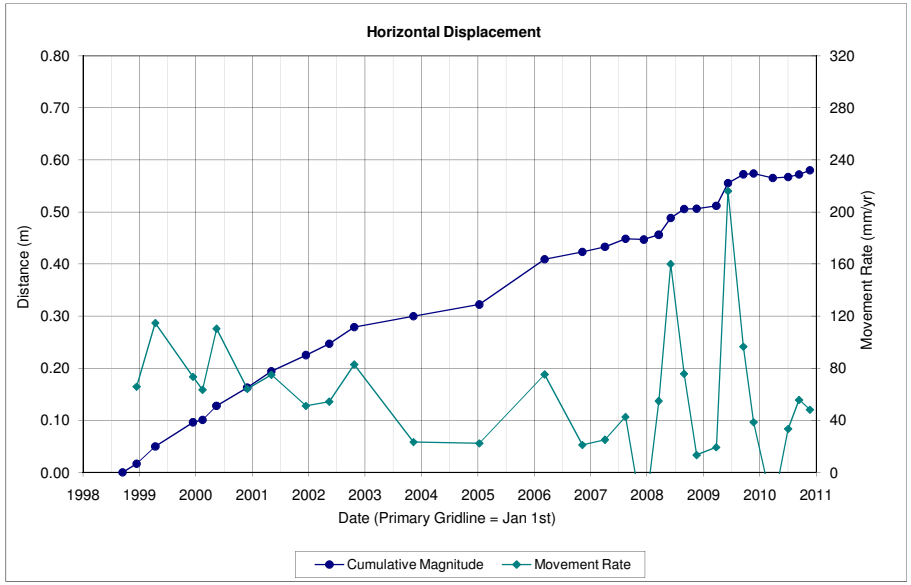


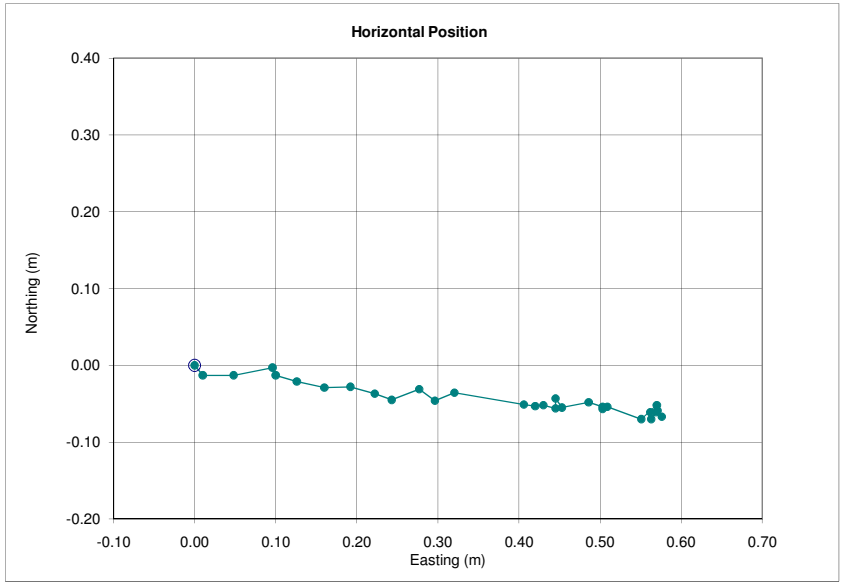
Survey and Displacement Data - Hub 98-17

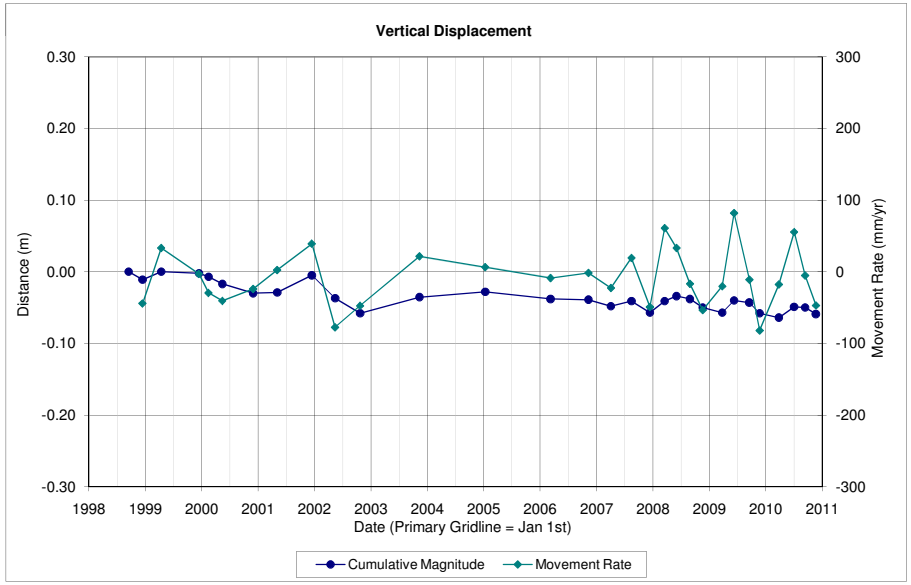
Bettcher/Lark Intersection

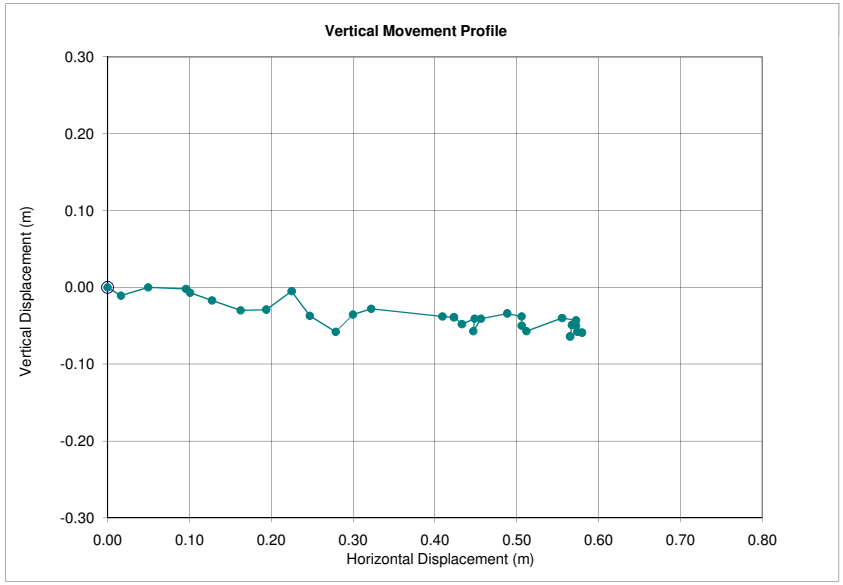
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869847.647	532237.862	519.610	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869847.634	532237.872	519.599	0.25	-0.013	0.010	0.016	-0.011	142.4	-33.8	0.066	-0.044	0.25	-0.013	0.010	0.016	-0.011	142.4	-33.8	65.830	-44.151
15/04/1999	5869847.634	532237.910	519.610	0.58	-0.013	0.048	0.050	0.000	105.2	0.0	0.086	0.000	0.33	0.000	0.038	0.038	0.011	90.0	16.1	114.707	33.205
15/12/1999	5869847.644	532237.958	519.608	1.25	-0.003	0.096	0.096	-0.002	91.8	-1.2	0.077	-0.002	0.67	0.010	0.048	0.049	-0.002	78.2	-2.3	73.395	-2.994
15/02/2000	5869847.634	532237.962	519.603	1.42	-0.013	0.100	0.101	-0.007	97.4	-4.0	0.071	-0.005	0.17	-0.010	0.004	0.011	-0.005	158.2	-24.9	63.449	-29.456
15/05/2000	5869847.626	532237.988	519.593	1.66	-0.021	0.126	0.128	-0.017	99.5	-7.6	0.077	-0.010	0.25	-0.008	0.026	0.027	-0.010	107.1	-20.2	110.399	-40.583
30/11/2000	5869847.618	532238.022	519.580	2.21	-0.029	0.160	0.163	-0.030	100.3	-10.5	0.074	-0.014	0.54	-0.008	0.034	0.035	-0.013	103.2	-20.4	64.109	-23.861
05/05/2001	5869847.619	532238.054	519.581	2.64	-0.028	0.192	0.194	-0.029	98.3	-8.5	0.074	-0.011	0.43	0.001	0.032	0.032	0.001	88.2	1.8	74.960	2.341
15/12/2001	5869847.610	532238.084	519.605	3.25	-0.037	0.222	0.225	-0.005	99.5	-1.3	0.069	-0.002	0.61	-0.009	0.030	0.031	0.024	106.7	37.5	51.071	39.134
15/05/2002	5869847.602	532238.105	519.573	3.66	-0.045	0.243	0.247	-0.037	100.5	-8.5	0.067	-0.010	0.41	-0.008	0.021	0.022	-0.032	110.9	-54.9	54.357	-77.404
24/10/2002	5869847.616	532238.139	519.552	4.11	-0.031	0.277	0.279	-0.058	96.4	-11.8	0.068	-0.014	0.44	0.014	0.034	0.037	-0.021	67.6	-29.7	82.902	-47.347
12/11/2003	5869847.601	532238.158	519.575	5.16	-0.046	0.296	0.300	-0.035	98.8	-6.7	0.058	-0.007	1.05	-0.015	0.019	0.024	0.023	127.6	42.7	23.302	21.506
11/01/2005	5869847.611	532238.182	519.582	6.32	-0.036	0.320	0.322	-0.028	96.3	-4.9	0.051	-0.004	1.17	0.010	0.024	0.026	0.007	66.6	16.0	22.334	6.422
10/03/2006	5869847.596	532238.268	519.572	7.48	-0.051	0.406	0.409	-0.038	97.2	-5.3	0.055	-0.005	1.16	-0.015	0.086	0.087	-0.010	100.2	-6.6	75.185	-8.721
10/11/2006	5869847.594	532238.282	519.571	8.15	-0.053	0.420	0.423	-0.039	97.2	-5.3	0.052	-0.005	0.67	-0.002	0.014	0.014	-0.001	98.1	-4.0	21.083	-1.491
05/04/2007	5869847.595	532238.292	519.562	8.55	-0.052	0.430	0.433	-0.048	96.9	-6.3	0.051	-0.006	0.40	0.001	0.010	0.010	-0.009	84.3	-41.8	25.142	-22.515
16/08/2007	5869847.591	532238.307	519.569	8.92	-0.056	0.445	0.449	-0.041	97.2	-5.2	0.050	-0.005	0.36	-0.004	0.015	0.016	0.007	104.9	24.3	42.633	19.224
13/12/2007	5869847.604	532238.307	519.553	9.24	-0.043	0.445	0.447	-0.057	95.5	-7.3	0.048	-0.006	0.33	0.013	0.000	0.013	-0.016	0.0	-50.9	-39.901	-49.109
18/03/2008	5869847.592	532238.315	519.569	9.51	-0.055	0.453	0.456	-0.041	96.9	-5.1	0.048	-0.004	0.26	-0.012	0.008	0.014	0.016	146.3	48.0	54.872	60.875
03/06/2008	5869847.599	532238.348	519.576	9.72	-0.048	0.486	0.488	-0.034	95.6	-4.0	0.050	-0.003	0.21	0.007	0.033	0.034	0.007	78.0	11.7	160.019	33.205
29/08/2008	5869847.593	532238.365	519.572	9.95	-0.054	0.503	0.506	-0.038	96.1	-4.3	0.051	-0.004	0.24	-0.006	0.017	0.018	-0.004	109.4	-12.5	75.685	-16.793
19/11/2008	5869847.590	532238.365	519.560	10.18	-0.057	0.503	0.506	-0.050	96.5	-5.6	0.050	-0.005	0.22	-0.003	0.000	0.003	-0.012	180.0	-76.0	13.363	-53.451
26/03/2009	5869847.593	532238.371	519.553	10.53	-0.054	0.509	0.512	-0.057	96.1	-6.4	0.049	-0.005	0.35	0.003	0.006	0.007	-0.007	63.4	-46.2	19.293	-20.132
10/06/2009	5869847.577	532238.413	519.570	10.74	-0.070	0.551	0.555	-0.040	97.2	-4.1	0.052	-0.004	0.21	-0.016	0.042	0.045	0.017	110.9	20.7	215.999	81.701
17/09/2009	5869847.595	532238.432	519.567	11.01	-0.052	0.570	0.572	-0.043	95.2	-4.3	0.052	-0.004	0.27	0.018	0.019	0.026	-0.003	46.5	-6.5	96.561	-11.068
23/11/2009	5869847.588	532238.433	519.552	11.19	-0.059	0.571	0.574	-0.058	95.9	-5.8	0.051	-0.005	0.18	-0.007	0.001	0.007	-0.015	171.9	-64.8	38.548	-81.772
27/03/2010	5869847.586	532238.424	519.546	11.53	-0.061	0.562	0.565	-0.064	96.2	-6.5	0.049	-0.006	0.34	-0.002	-0.009	0.009	-0.006	257.5	-33.1	-27.157	-17.673
04/07/2010	5869847.577	532238.425	519.561	11.80	-0.070	0.563	0.567	-0.049	97.1	-4.9	0.048	-0.004	0.27	-0.009	0.001	0.009	0.015	173.7	58.9	33.409	55.341
13/09/2010	5869847.586	532238.431	519.560	11.99	-0.061	0.569	0.572	-0.050	96.1	-5.0	0.048	-0.004	0.19	0.009	0.006	0.011	-0.001	33.7	-5.3	55.645	-5.144
22/11/2010	5869847.580	532238.438	519.551	12.19	-0.067	0.576	0.580	-0.059	96.6	-5.8	0.048	-0.005	0.19	-0.006	0.007	0.009	-0.009	130.6	-44.3	48.106	-46.961

Displacement Graphs - Hub 98-17
Bettcher/Lark Intersection







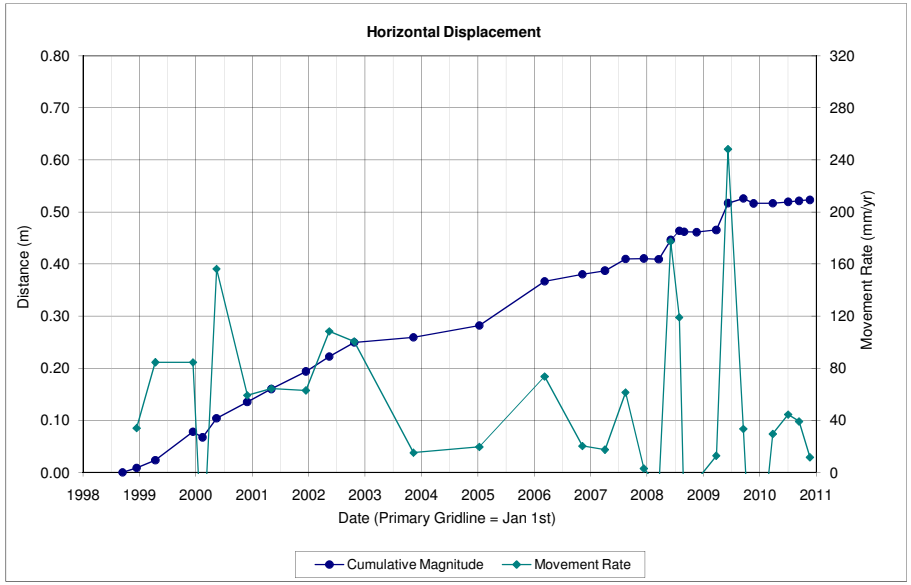


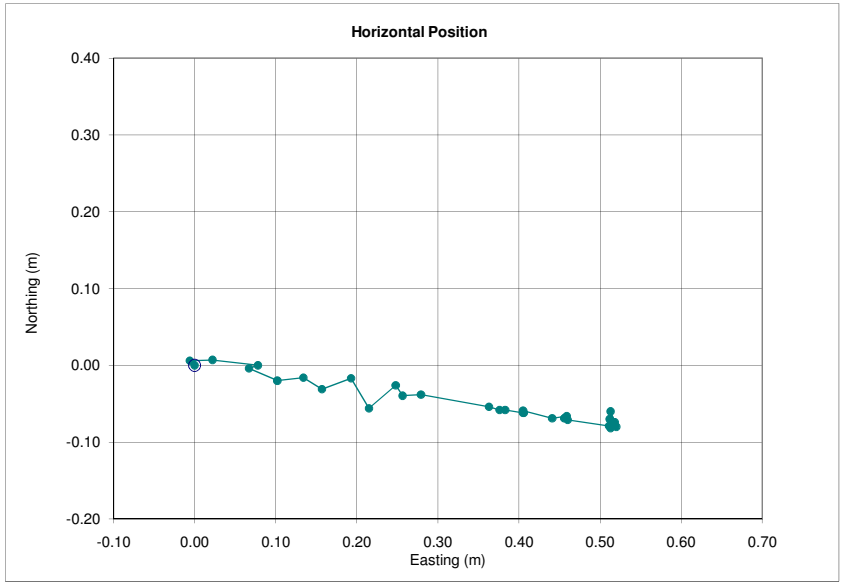
Survey and Displacement Data - Hub 98-18

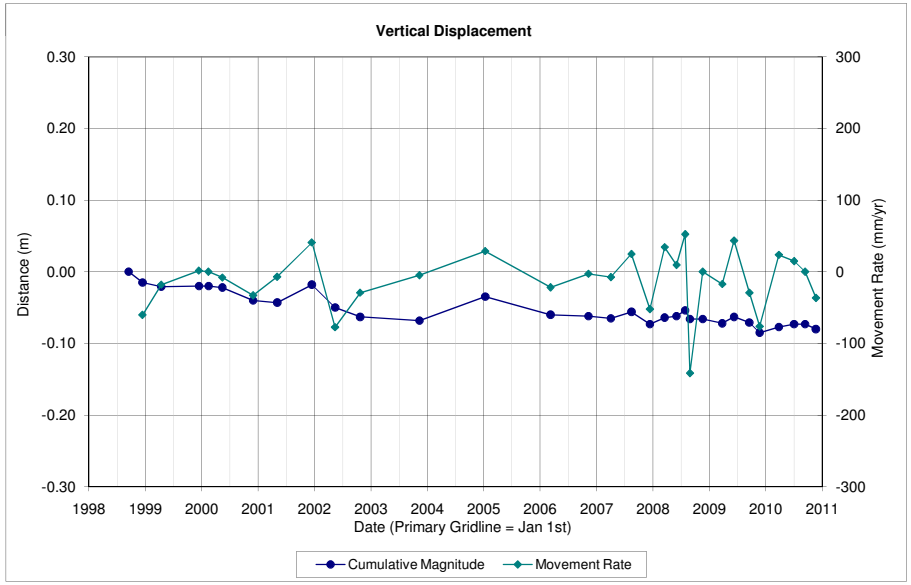
Lark/Flamingo Intersection

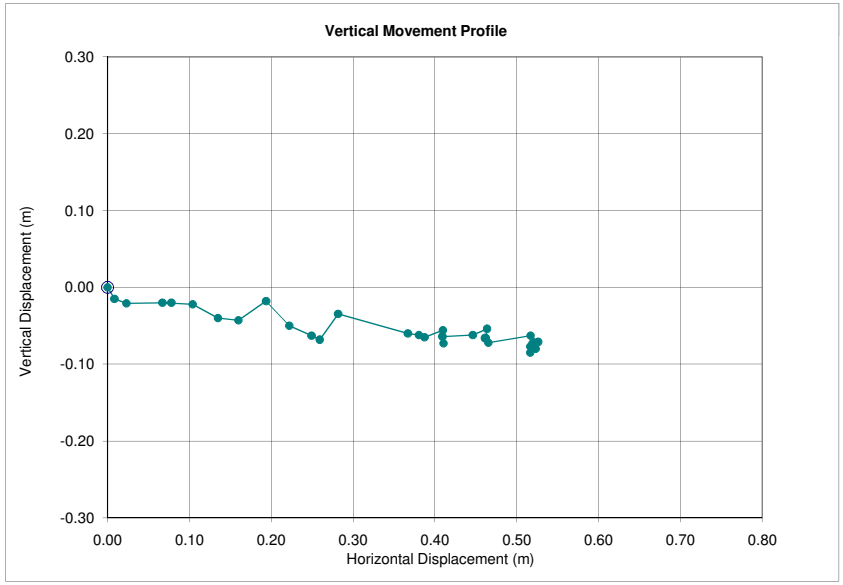
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869826.923	531984.617	524.147	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869826.929	531984.611	524.132	0.25	0.006	-0.006	0.008	-0.015	315.0	-60.5	0.034	-0.060	0.25	0.006	-0.006	0.008	-0.015	315.0	-60.5	34.058	-60.206
15/04/1999	5869826.930	531984.639	524.126	0.58	0.007	0.022	0.023	-0.021	72.3	-42.3	0.040	-0.036	0.33	0.001	0.028	0.028	-0.006	88.0	-12.1	84.575	-18.112
15/12/1999	5869826.923	531984.695	524.127	1.25	0.000	0.078	0.078	-0.020	90.0	-14.4	0.062	-0.016	0.67	-0.007	0.056	0.056	0.001	97.1	1.0	84.480	1.497
15/02/2000	5869826.919	531984.684	524.127	1.42	-0.004	0.067	0.067	-0.020	93.4	-16.6	0.047	-0.014	0.17	-0.004	-0.011	0.012	0.000	250.0	0.0	-68.954	0.000
15/05/2000	5869826.903	531984.719	524.125	1.66	-0.020	0.102	0.104	-0.022	101.1	-12.0	0.062	-0.013	0.25	-0.016	0.035	0.038	-0.002	114.6	-3.0	156.180	-8.117
30/11/2000	5869826.907	531984.751	524.107	2.21	-0.016	0.134	0.135	-0.040	96.8	-16.5	0.061	-0.018	0.54	0.004	0.032	0.032	-0.018	82.9	-29.2	59.191	-33.038
05/05/2001	5869826.892	531984.774	524.104	2.64	-0.031	0.157	0.160	-0.043	101.2	-15.0	0.061	-0.016	0.43	-0.015	0.023	0.027	-0.003	123.1	-6.2	64.291	-7.024
15/12/2001	5869826.906	531984.810	524.129	3.25	-0.017	0.193	0.194	-0.018	95.0	-5.3	0.060	-0.006	0.61	0.014	0.036	0.039	0.025	68.7	32.9	62.983	40.765
15/05/2002	5869826.867	531984.832	524.097	3.66	-0.056	0.215	0.222	-0.050	104.6	-12.7	0.061	-0.014	0.41	-0.039	0.022	0.045	-0.032	150.6	-35.6	108.310	-77.404
24/10/2002	5869826.897	531984.865	524.084	4.11	-0.026	0.248	0.249	-0.063	96.0	-14.2	0.061	-0.015	0.44	0.030	0.033	0.045	-0.013	47.7	-16.3	100.552	-29.310
12/11/2003	5869826.883	531984.873	524.079	5.16	-0.040	0.256	0.259	-0.068	98.8	-14.7	0.050	-0.013	1.05	-0.014	0.008	0.016	-0.005	148.3	-18.0	15.157	-4.927
11/01/2005	5869826.885	531984.896	524.112	6.32	-0.038	0.279	0.282	-0.035	97.8	-7.0	0.045	-0.005	1.17	0.001	0.023	0.023	0.033	86.6	55.7	19.609	28.706
10/03/2006	5869826.869	531984.980	524.087	7.48	-0.054	0.363	0.367	-0.060	98.5	-9.3	0.049	-0.008	1.16	-0.016	0.084	0.085	-0.025	100.7	-16.5	73.634	-21.846
10/11/2006	5869826.865	531984.993	524.085	8.15	-0.058	0.376	0.380	-0.062	98.8	-9.3	0.047	-0.008	0.67	-0.004	0.013	0.014	-0.002	107.1	-8.4	20.277	-2.982
05/04/2007	5869826.865	531985.000	524.082	8.55	-0.058	0.383	0.387	-0.065	98.6	-9.5	0.045	-0.008	0.40	0.000	0.007	0.007	-0.003	90.0	-23.2	17.512	-7.505
16/08/2007	5869826.861	531985.022	524.091	8.92	-0.062	0.405	0.410	-0.056	98.7	-7.8	0.046	-0.006	0.36	-0.004	0.022	0.022	0.009	100.3	21.9	61.408	24.716
13/12/2007	5869826.861	531985.023	524.074	9.24	-0.062	0.406	0.411	-0.073	98.7	-10.1	0.044	-0.008	0.33	0.000	0.001	0.001	-0.017	90.0	-86.6	3.069	-52.179
18/03/2008	5869826.864	531985.022	524.083	9.51	-0.059	0.405	0.409	-0.064	98.3	-8.9	0.043	-0.007	0.26	0.003	-0.001	0.003	0.009	341.6	70.6	-12.031	34.242
03/06/2008	5869826.854	531985.058	524.085	9.72	-0.069	0.441	0.446	-0.062	98.9	-7.9	0.046	-0.006	0.21	-0.010	0.036	0.037	0.002	105.5	3.1	177.232	9.487
29/07/2008	5869826.857	531985.076	524.093	9.87	-0.066	0.459	0.464	-0.054	98.2	-6.6	0.047	-0.005	0.15	0.003	0.018	0.018	0.008	80.5	23.7	119.021	52.179
29/08/2008	5869826.855	531985.074	524.081	9.95	-0.068	0.457	0.462	-0.066	98.5	-8.1	0.046	-0.007	0.08	-0.002	-0.002	0.003	-0.012	225.0	-76.7	-33.325	-141.387
19/11/2008	5869826.854	531985.073	524.081	10.18	-0.069	0.456	0.461	-0.066	98.6	-8.1	0.045	-0.006	0.22	-0.001	-0.001	0.001	0.000	225.0	0.0	-6.299	0.000
26/03/2009	5869826.852	531985.077	524.075	10.53	-0.071	0.460	0.465	-0.072	98.8	-8.8	0.044	-0.007	0.35	-0.002	0.004	0.004	-0.006	116.6	-53.3	12.862	-17.256
10/06/2009	5869826.844	531985.128	524.084	10.74	-0.079	0.511	0.517	-0.063	98.8	-6.9	0.048	-0.006	0.21	-0.008	0.051	0.052	0.009	98.9	9.9	248.099	43.253
17/09/2009	5869826.843	531985.137	524.076	11.01	-0.080	0.520	0.526	-0.071	98.7	-7.7	0.048	-0.006	0.27	-0.001	0.009	0.009	-0.008	96.3	-41.5	33.409	-29.515
23/11/2009	5869826.863	531985.130	524.062	11.19	-0.060	0.513	0.516	-0.085	96.7	-9.3	0.046	-0.008	0.18	0.020	-0.007	0.021	-0.014	340.7	-33.5	-115.515	-76.321
27/03/2010	5869826.853	531985.129	524.070	11.53	-0.070	0.512	0.517	-0.077	97.8	-8.5	0.045	-0.007	0.34	-0.010	-0.001	0.010	0.008	185.7	38.5	29.603	23.565
04/07/2010	5869826.841	531985.130	524.074	11.80	-0.082	0.513	0.520	-0.073	99.1	-8.0	0.044	-0.006	0.27	-0.012	0.001	0.012	0.004	175.2	18.4	44.426	14.758
13/09/2010	5869826.848	531985.133	524.074	11.99	-0.075	0.516	0.521	-0.073	98.3	-8.0	0.043	-0.006	0.19	0.007	0.003	0.008	0.000	23.2	0.0	39.178	0.000
22/11/2010	5869826.849	531985.135	524.067	12.19	-0.074	0.518	0.523	-0.080	98.1	-8.7	0.043	-0.007	0.19	0.001	0.002	0.002	-0.007	63.4	-72.3	11.667	-36.525

Displacement Graphs - Hub 98-18
Lark/Flamingo Intersection







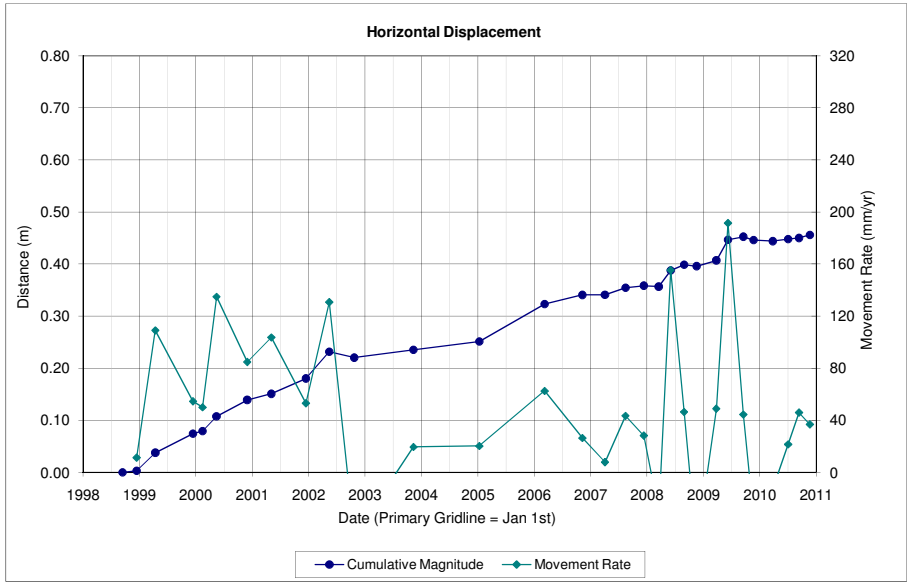


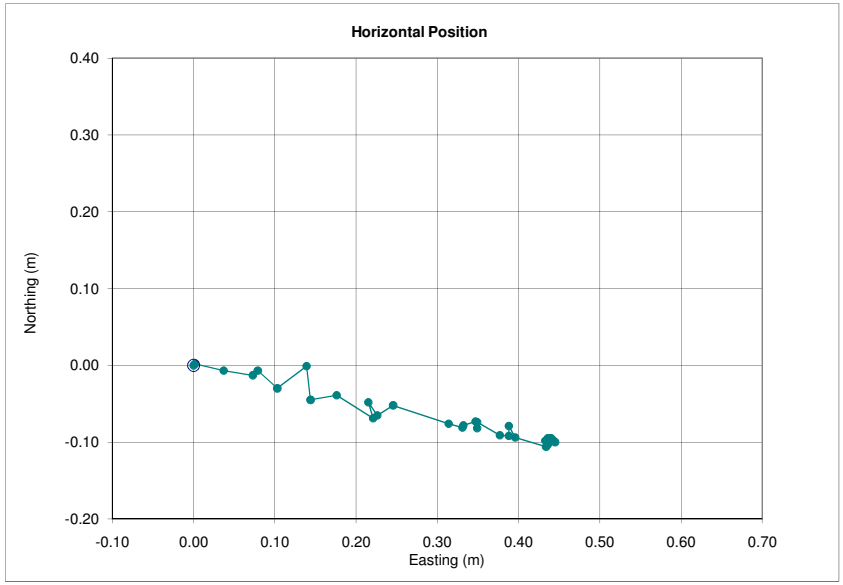
Survey and Displacement Data - Hub 98-19

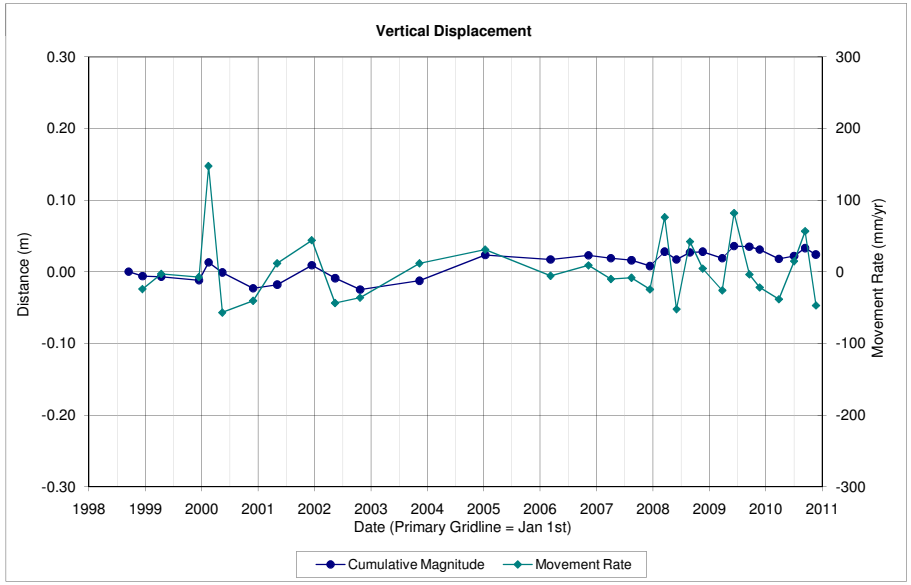
Abbott/Flamingo Intersection

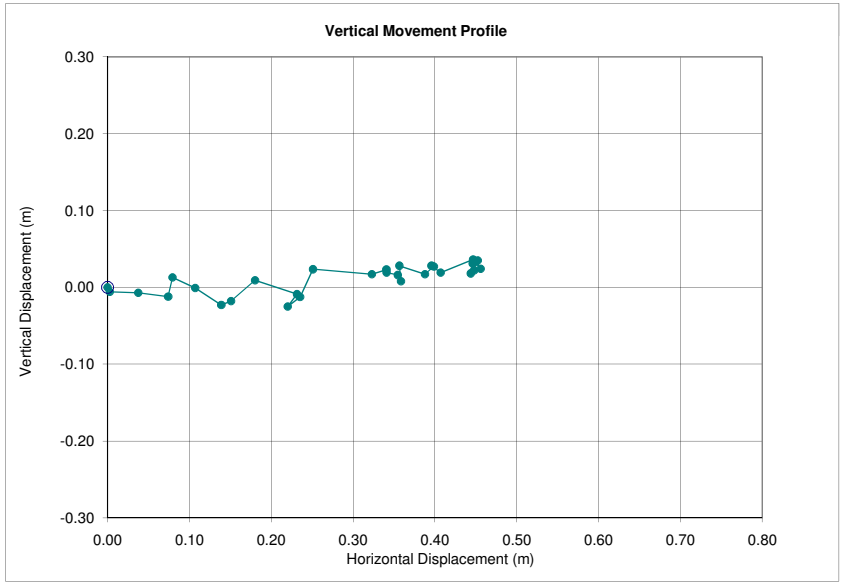
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869596.532	531978.061	517.225	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869596.534	531978.063	517.219	0.25	0.002	0.002	0.003	-0.006	45.0	-64.8	0.011	-0.024	0.25	0.002	0.002	0.003	-0.006	45.0	-64.8	11.353	-24.082
15/04/1999	5869596.525	531978.098	517.218	0.58	-0.007	0.037	0.038	-0.007	100.7	-10.5	0.065	-0.012	0.33	-0.009	0.035	0.036	-0.001	104.4	-1.6	109.088	-3.019
15/12/1999	5869596.519	531978.134	517.213	1.25	-0.013	0.073	0.074	-0.012	100.1	-9.2	0.059	-0.010	0.67	-0.006	0.036	0.036	-0.005	99.5	-7.8	54.633	-7.485
15/02/2000	5869596.525	531978.140	517.238	1.42	-0.007	0.079	0.079	0.013	95.1	9.3	0.056	0.009	0.17	0.006	0.006	0.008	0.025	45.0	71.3	49.988	147.278
15/05/2000	5869596.502	531978.164	517.224	1.66	-0.030	0.103	0.107	-0.001	106.2	-0.5	0.064	-0.001	0.25	-0.023	0.024	0.033	-0.014	133.8	-22.8	134.905	-56.817
30/11/2000	5869596.531	531978.200	517.202	2.21	-0.001	0.139	0.139	-0.023	90.4	-9.4	0.063	-0.010	0.54	0.029	0.036	0.046	-0.022	51.1	-25.5	84.848	-40.379
05/05/2001	5869596.487	531978.205	517.207	2.64	-0.045	0.144	0.151	-0.018	107.4	-6.8	0.057	-0.007	0.43	-0.044	0.005	0.044	0.005	173.5	6.4	103.682	11.707
15/12/2001	5869596.493	531978.237	517.234	3.25	-0.039	0.176	0.180	0.009	102.5	2.9	0.055	0.003	0.61	0.006	0.032	0.033	0.027	79.4	39.7	53.088	44.026
15/05/2002	5869596.463	531978.282	517.216	3.66	-0.069	0.221	0.232	-0.009	107.3	-2.2	0.063	-0.002	0.41	-0.030	0.045	0.054	-0.018	123.7	-18.4	130.821	-43.540
24/10/2002	5869596.484	531978.276	517.200	4.11	-0.048	0.215	0.220	-0.025	102.6	-6.5	0.054	-0.006	0.44	0.021	-0.006	0.022	-0.016	344.1	-36.2	-49.242	-36.074
12/11/2003	5869596.467	531978.287	517.212	5.16	-0.065	0.226	0.235	-0.013	106.1	-3.1	0.046	-0.002	1.05	-0.017	0.011	0.021	0.012	147.5	31.3	19.523	11.852
11/01/2005	5869596.480	531978.307	517.249	6.32	-0.052	0.246	0.251	0.024	102.0	5.3	0.040	0.004	1.17	0.013	0.020	0.024	0.036	56.0	56.8	20.244	30.900
10/03/2006	5869596.456	531978.375	517.242	7.48	-0.076	0.314	0.323	0.017	103.6	3.0	0.043	0.002	1.16	-0.024	0.068	0.072	-0.007	109.3	-5.1	62.563	-5.613
10/11/2006	5869596.451	531978.392	517.248	8.15	-0.081	0.331	0.341	0.023	103.8	3.9	0.042	0.003	0.67	-0.005	0.017	0.018	0.006	106.4	18.7	26.417	8.945
05/04/2007	5869596.454	531978.393	517.244	8.55	-0.078	0.332	0.341	0.019	103.2	3.2	0.040	0.002	0.40	0.003	0.001	0.003	-0.004	18.4	-51.7	7.911	-10.007
16/08/2007	5869596.459	531978.408	517.241	8.92	-0.073	0.347	0.355	0.016	101.9	2.6	0.040	0.002	0.36	0.005	0.015	0.016	-0.003	71.6	-10.7	43.422	-8.239
13/12/2007	5869596.450	531978.410	517.233	9.24	-0.082	0.349	0.359	0.008	103.2	1.3	0.039	0.001	0.33	-0.009	0.002	0.009	-0.008	167.5	-40.9	28.298	-24.555
18/03/2008	5869596.458	531978.410	517.253	9.51	-0.074	0.349	0.357	0.028	102.0	4.5	0.038	0.003	0.26	0.008	0.000	0.008	0.020	0.0	68.2	-30.437	76.094
03/06/2008	5869596.441	531978.438	517.242	9.72	-0.091	0.377	0.388	0.017	103.6	2.5	0.040	0.002	0.21	-0.017	0.028	0.033	-0.011	121.3	-18.6	155.382	-52.179
29/08/2008	5869596.440	531978.449	517.252	9.95	-0.092	0.388	0.399	0.027	103.3	3.9	0.040	0.003	0.24	-0.001	0.011	0.011	0.010	95.2	42.2	46.371	41.983
19/11/2008	5869596.453	531978.449	517.253	10.18	-0.079	0.388	0.396	0.028	101.5	4.0	0.039	0.003	0.22	0.013	0.000	0.013	0.001	0.0	4.4	-57.905	4.454
26/03/2009	5869596.438	531978.457	517.244	10.53	-0.094	0.396	0.407	0.019	103.4	2.7	0.039	0.002	0.35	-0.015	0.008	0.017	-0.009	151.9	-27.9	48.892	-25.884
10/06/2009	5869596.426	531978.495	517.261	10.74	-0.106	0.434	0.447	0.036	103.7	4.6	0.042	0.003	0.21	-0.012	0.038	0.040	0.017	107.5	23.1	191.515	81.701
17/09/2009	5869596.435	531978.503	517.260	11.01	-0.097	0.442	0.453	0.035	102.4	4.4	0.041	0.003	0.27	0.009	0.008	0.012	-0.001	41.6	-4.7	44.426	-3.689
23/11/2009	5869596.437	531978.497	517.256	11.19	-0.095	0.436	0.446	0.031	102.3	4.0	0.040	0.003	0.18	0.002	-0.006	0.006	-0.004	288.4	-32.3	-34.478	-21.806
27/03/2010	5869596.434	531978.494	517.243	11.53	-0.098	0.433	0.444	0.018	102.8	2.3	0.039	0.002	0.34	-0.003	-0.003	0.004	-0.013	225.0	-71.9	-12.497	-38.292
04/07/2010	5869596.429	531978.497	517.247	11.80	-0.103	0.436	0.448	0.022	103.3	2.8	0.038	0.002	0.27	-0.005	0.003	0.006	0.004	149.0	34.4	21.513	14.758
13/09/2010	5869596.437	531978.501	517.258	11.99	-0.095	0.440	0.450	0.033	102.2	4.2	0.038	0.003	0.19	0.008	0.004	0.009	0.011	26.6	50.9	46.013	56.588
22/11/2010	5869596.432	531978.506	517.249	12.19	-0.100	0.445	0.456	0.024	102.7	3.0	0.037	0.002	0.19	-0.005	0.005	0.007	-0.009	135.0	-51.8	36.896	-46.961

Displacement Graphs - Hub 98-19
Abbott/Flamingo Intersection







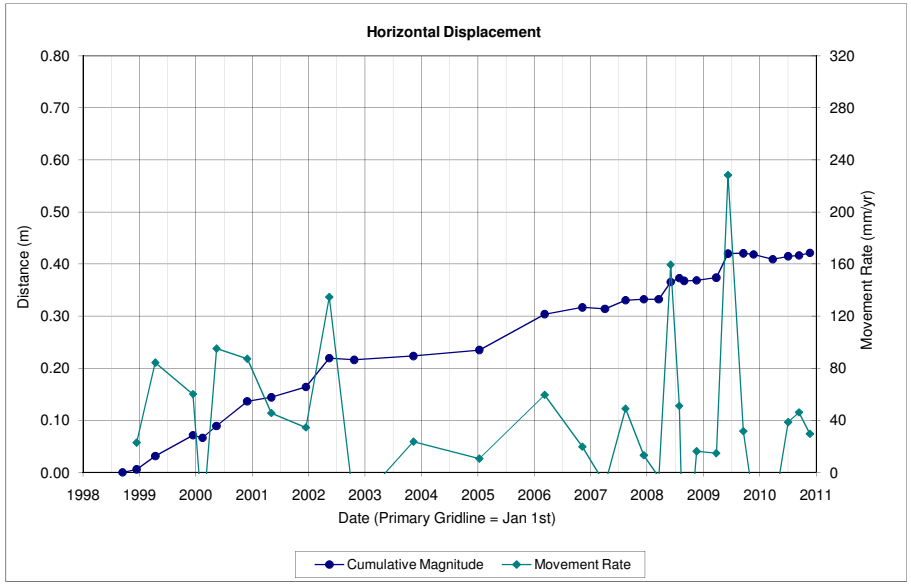


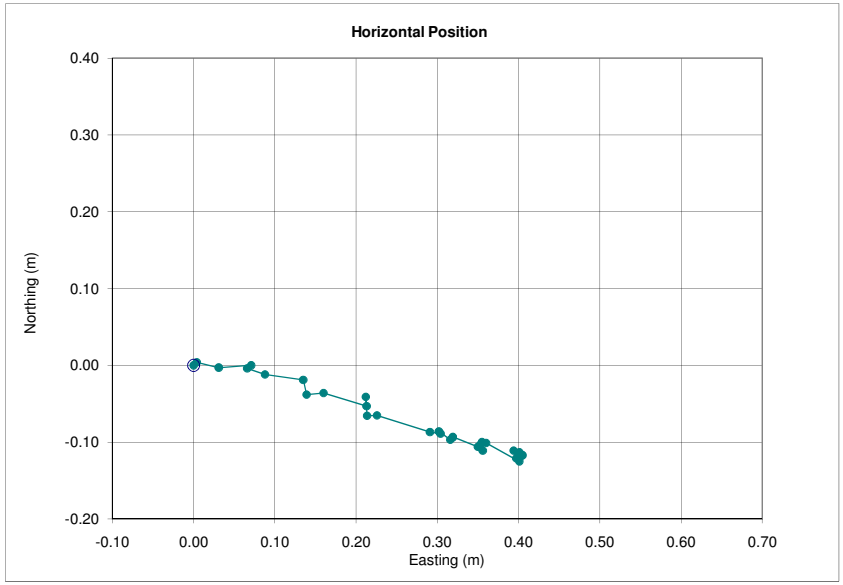
Survey and Displacement Data - Hub 98-20

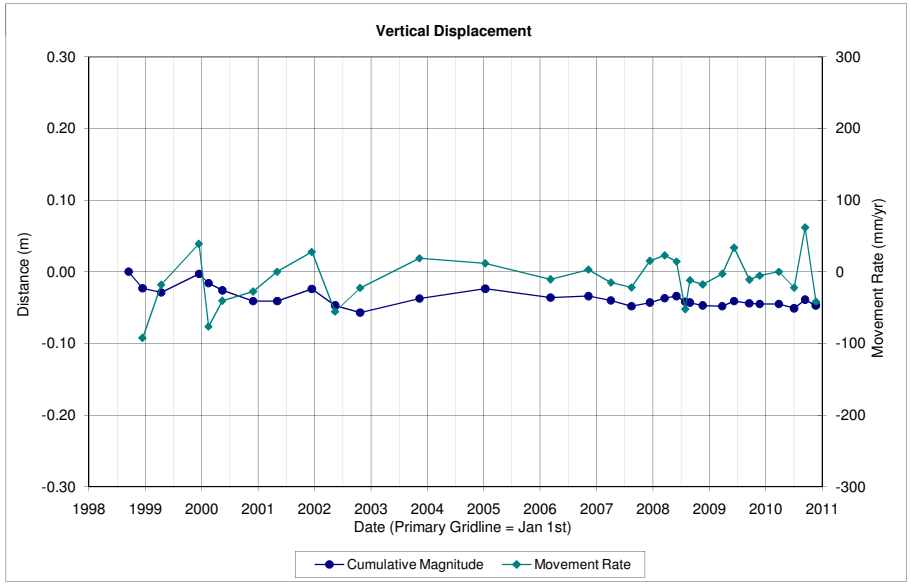
Hawk Street @ Crane Ave.

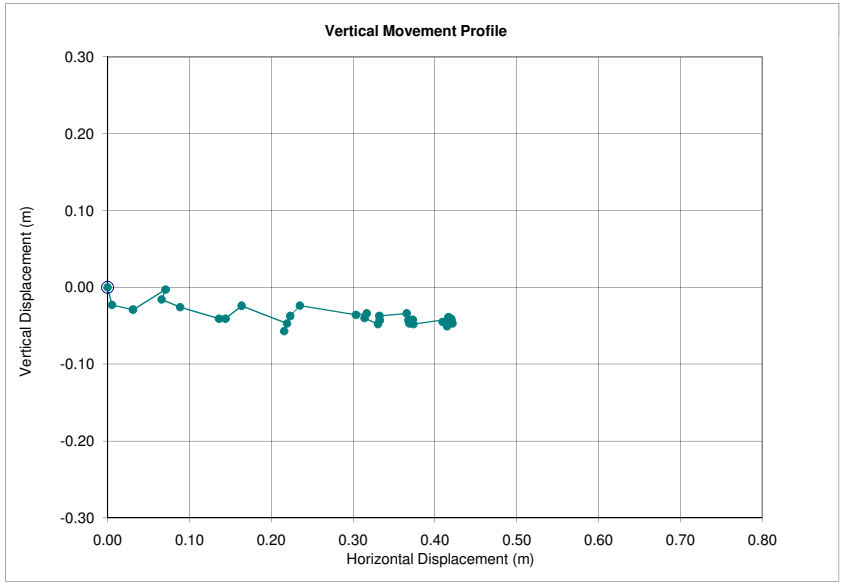
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869364.259	532199.105	504.356	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869364.263	532199.109	504.333	0.25	0.004	0.004	0.006	-0.023	45.0	-76.2	0.023	-0.092	0.25	0.004	0.004	0.006	-0.023	45.0	-76.2	22.705	-92.316
15/04/1999	5869364.256	532199.136	504.327	0.58	-0.003	0.031	0.031	-0.029	95.5	-43.0	0.054	-0.050	0.33	-0.007	0.027	0.028	-0.006	104.5	-12.1	84.197	-18.112
15/12/1999	5869364.259	532199.176	504.353	1.25	0.000	0.071	0.071	-0.003	90.0	-2.4	0.057	-0.002	0.67	0.003	0.040	0.040	0.026	85.7	33.0	60.045	38.920
15/02/2000	5869364.255	532199.171	504.340	1.42	-0.004	0.066	0.066	-0.016	93.5	-13.6	0.047	-0.011	0.17	-0.004	-0.005	0.006	-0.013	231.3	-63.8	-37.722	-76.585
15/05/2000	5869364.247	532199.193	504.330	1.66	-0.012	0.088	0.089	-0.026	97.8	-16.3	0.053	-0.016	0.25	-0.008	0.022	0.023	-0.010	110.0	-23.1	95.003	-40.583
30/11/2000	5869364.240	532199.240	504.315	2.21	-0.019	0.135	0.136	-0.041	98.0	-16.7	0.062	-0.019	0.54	-0.007	0.047	0.048	-0.015	98.5	-17.5	87.217	-27.531
05/05/2001	5869364.221	532199.244	504.315	2.64	-0.038	0.139	0.144	-0.041	105.3	-15.9	0.055	-0.016	0.43	-0.019	0.004	0.019	0.000	168.1	0.0	45.461	0.000
15/12/2001	5869364.223	532199.265	504.332	3.25	-0.036	0.160	0.164	-0.024	102.7	-8.3	0.050	-0.007	0.61	0.002	0.021	0.021	0.017	84.6	38.9	34.397	27.720
15/05/2002	5869364.206	532199.318	504.309	3.66	-0.053	0.213	0.219	-0.047	104.0	-12.1	0.060	-0.013	0.41	-0.017	0.053	0.056	-0.023	107.8	-22.5	134.634	-55.634
24/10/2002	5869364.218	532199.317	504.299	4.11	-0.041	0.212	0.216	-0.057	100.9	-14.8	0.053	-0.014	0.44	0.012	-0.001	0.012	-0.010	355.2	-39.7	-27.149	-22.546
12/11/2003	5869364.193	532199.318	504.319	5.16	-0.066	0.213	0.223	-0.037	107.1	-9.5	0.043	-0.007	1.05	-0.025	0.001	0.025	0.020	176.6	38.5	23.517	18.729
11/01/2005	5869364.194	532199.331	504.332	6.32	-0.065	0.226	0.235	-0.024	106.1	-5.8	0.037	-0.004	1.17	0.000	0.012	0.012	0.014	87.8	48.1	10.485	11.669
10/03/2006	5869364.172	532199.396	504.320	7.48	-0.087	0.291	0.304	-0.036	106.6	-6.8	0.041	-0.005	1.16	-0.022	0.065	0.069	-0.012	108.5	-10.1	59.444	-10.621
10/11/2006	5869364.170	532199.409	504.322	8.15	-0.089	0.304	0.317	-0.034	106.3	-6.1	0.039	-0.004	0.67	-0.002	0.013	0.013	0.002	98.7	8.6	19.609	2.982
05/04/2007	5869364.173	532199.407	504.316	8.55	-0.086	0.302	0.314	-0.040	105.9	-7.3	0.037	-0.005	0.40	0.003	-0.002	0.004	-0.006	326.3	-59.0	-9.020	-15.010
16/08/2007	5869364.162	532199.421	504.308	8.92	-0.097	0.316	0.331	-0.048	107.1	-8.3	0.037	-0.005	0.36	-0.011	0.014	0.018	-0.008	128.2	-24.2	48.895	-21.970
13/12/2007	5869364.165	532199.424	504.313	9.24	-0.094	0.319	0.333	-0.043	106.4	-7.4	0.036	-0.005	0.33	0.003	0.003	0.004	0.005	45.0	49.7	13.022	15.347
18/03/2008	5869364.166	532199.424	504.319	9.51	-0.093	0.319	0.332	-0.037	106.3	-6.4	0.035	-0.004	0.26	0.001	0.000	0.001	0.006	0.0	80.5	-3.805	22.828
03/06/2008	5869364.153	532199.455	504.322	9.72	-0.106	0.350	0.366	-0.034	106.8	-5.3	0.038	-0.003	0.21	-0.013	0.031	0.034	0.003	112.8	5.1	159.455	14.231
29/07/2008	5869364.148	532199.461	504.314	9.87	-0.111	0.356	0.373	-0.042	107.3	-6.4	0.038	-0.004	0.15	-0.005	0.006	0.008	-0.008	129.8	-45.7	50.941	-52.179
29/08/2008	5869364.156	532199.458	504.313	9.95	-0.103	0.353	0.368	-0.043	106.3	-6.7	0.037	-0.004	0.08	0.008	-0.003	0.009	-0.001	339.4	-6.7	-100.668	-11.782
19/11/2008	5869364.159	532199.460	504.309	10.18	-0.100	0.355	0.369	-0.047	105.7	-7.3	0.036	-0.005	0.22	0.003	0.002	0.004	-0.004	33.7	-48.0	16.060	-17.817
26/03/2009	5869364.158	532199.465	504.308	10.53	-0.101	0.360	0.374	-0.048	105.7	-7.3	0.036	-0.005	0.35	-0.001	0.005	0.005	-0.001	101.3	-11.1	14.665	-2.876
10/06/2009	5869364.134	532199.506	504.315	10.74	-0.125	0.401	0.420	-0.041	107.3	-5.6	0.039	-0.004	0.21	-0.024	0.041	0.048	0.007	120.3	8.4	228.319	33.641
17/09/2009	5869364.142	532199.509	504.312	11.01	-0.117	0.404	0.421	-0.044	106.2	-6.0	0.038	-0.004	0.27	0.008	0.003	0.009	-0.003	20.6	-19.3	31.522	-11.068
23/11/2009	5869364.139	532199.506	504.311	11.19	-0.120	0.401	0.419	-0.045	106.7	-6.1	0.037	-0.004	0.18	-0.003	-0.003	0.004	-0.001	225.0	-13.3	-23.129	-5.451
27/03/2010	5869364.148	532199.499	504.311	11.53	-0.111	0.394	0.409	-0.045	105.7	-6.3	0.036	-0.004	0.34	0.009	-0.007	0.011	0.000	322.1	0.0	-33.585	0.000
04/07/2010	5869364.138	532199.502	504.305	11.80	-0.121	0.397	0.415	-0.051	107.0	-7.0	0.035	-0.004	0.27	-0.010	0.003	0.010	-0.006	163.3	-29.9	38.518	-22.136
13/09/2010	5869364.146	532199.506	504.317	11.99	-0.113	0.401	0.417	-0.039	105.7	-5.3	0.035	-0.003	0.19	0.008	0.004	0.009	0.012	26.6	53.3	46.013	61.732
22/11/2010	5869364.142	532199.510	504.309	12.19	-0.117	0.405	0.422	-0.047	106.1	-6.4	0.035	-0.004	0.19	-0.004	0.004	0.006	-0.008	135.0	-54.7	29.517	-41.743

Displacement Graphs - Hub 98-20
Hawk Street @ Crane Ave.







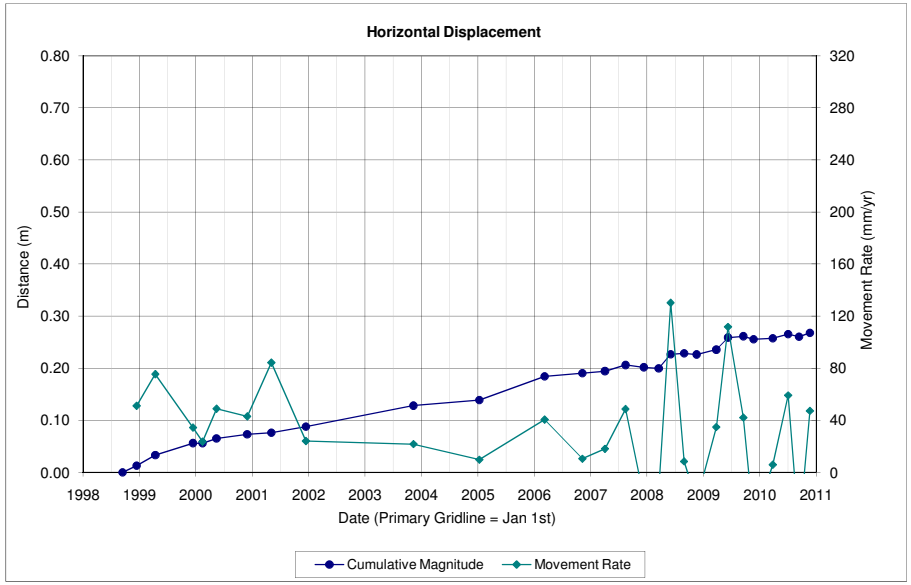


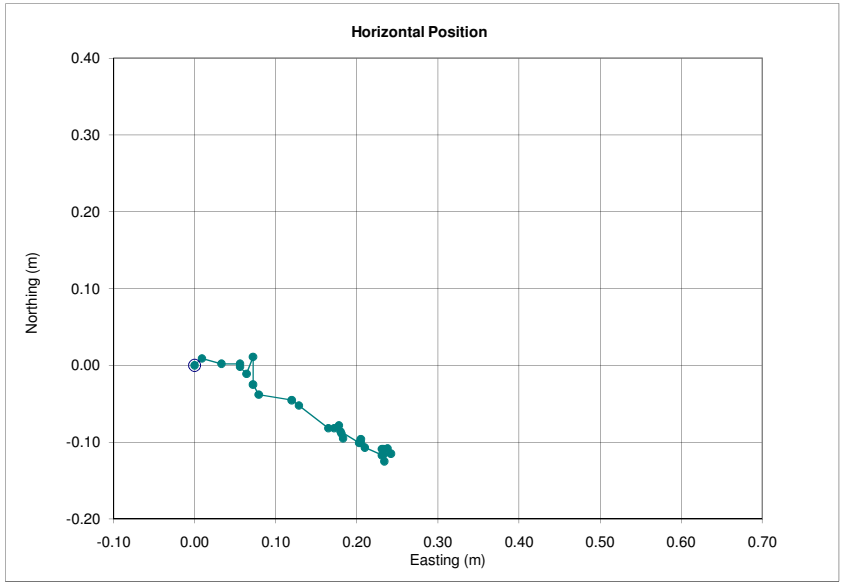
Survey and Displacement Data - Hub 98-21

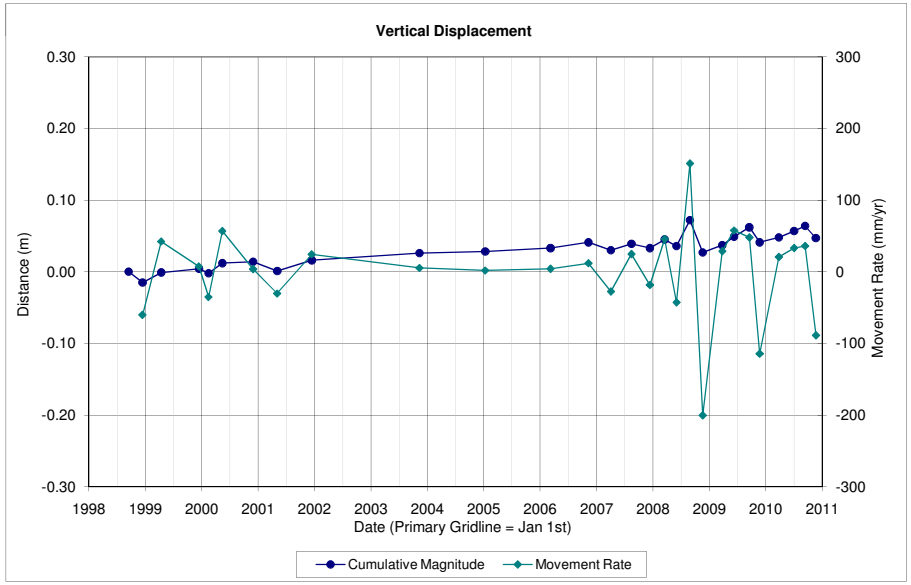
Lane between Avery/Allison

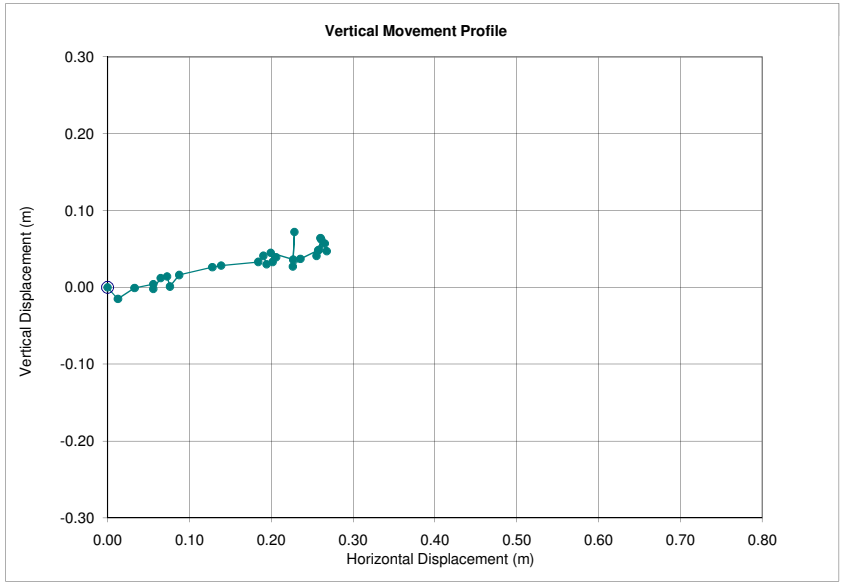
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869342.996	532493.483	485.474	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869343.005	532493.492	485.459	0.25	0.009	0.009	0.013	-0.015	45.0	-49.7	0.051	-0.060	0.25	0.009	0.009	0.013	-0.015	45.0	-49.7	51.087	-60.206
15/04/1999	5869342.998	532493.516	485.473	0.58	0.002	0.033	0.033	-0.001	86.5	-1.7	0.057	-0.002	0.33	-0.007	0.024	0.025	0.014	106.3	29.2	75.465	42.260
15/12/1999	5869342.998	532493.539	485.478	1.25	0.002	0.056	0.056	0.004	88.0	4.1	0.045	0.003	0.67	0.000	0.023	0.023	0.005	90.0	12.3	34.429	7.485
15/02/2000	5869342.994	532493.539	485.472	1.42	-0.002	0.056	0.056	-0.002	92.0	-2.0	0.040	-0.001	0.17	-0.004	0.000	0.004	-0.006	180.0	-56.3	23.565	-35.347
15/05/2000	5869342.985	532493.547	485.486	1.66	-0.011	0.064	0.065	0.012	99.8	10.5	0.039	0.007	0.25	-0.009	0.008	0.012	0.014	138.4	49.3	48.869	56.817
30/11/2000	5869343.007	532493.555	485.488	2.21	0.011	0.072	0.073	0.014	81.3	10.9	0.033	0.006	0.54	0.022	0.008	0.023	0.002	20.0	4.9	42.966	3.671
05/05/2001	5869342.971	532493.555	485.475	2.64	-0.025	0.072	0.076	0.001	109.1	0.8	0.029	0.000	0.43	-0.036	0.000	0.036	-0.013	180.0	-19.9	84.288	-30.437
15/12/2001	5869342.958	532493.562	485.490	3.25	-0.038	0.079	0.088	0.016	115.7	10.3	0.027	0.005	0.61	-0.013	0.007	0.015	0.015	151.7	45.5	24.075	24.459
12/11/2003	5869342.951	532493.603	485.500	5.16	-0.045	0.120	0.128	0.026	110.7	11.5	0.025	0.005	1.91	-0.007	0.041	0.041	0.010	100.2	13.7	21.700	5.293
11/01/2005	5869342.944	532493.612	485.502	6.32	-0.052	0.129	0.139	0.028	112.1	11.5	0.022	0.004	1.17	-0.007	0.009	0.011	0.002	127.8	10.5	9.710	1.801
10/03/2006	5869342.914	532493.648	485.507	7.48	-0.082	0.165	0.184	0.033	116.4	10.2	0.025	0.004	1.16	-0.030	0.036	0.047	0.005	129.3	5.8	40.499	4.145
10/11/2006	5869342.914	532493.655	485.515	8.15	-0.082	0.172	0.191	0.041	115.5	12.1	0.023	0.005	0.67	0.000	0.007	0.007	0.008	90.0	48.8	10.436	11.927
05/04/2007	5869342.918	532493.661	485.504	8.55	-0.078	0.178	0.194	0.030	113.7	8.8	0.023	0.004	0.40	0.004	0.006	0.007	-0.011	56.3	-56.8	18.040	-27.519
16/08/2007	5869342.901	532493.666	485.513	8.92	-0.095	0.183	0.206	0.039	117.4	10.7	0.023	0.004	0.36	-0.017	0.005	0.018	0.009	163.6	26.9	48.664	24.716
13/12/2007	5869342.907	532493.664	485.507	9.24	-0.089	0.181	0.202	0.033	116.2	9.3	0.022	0.004	0.33	0.006	-0.002	0.006	-0.006	341.6	-43.5	-19.412	-18.416
18/03/2008	5869342.910	532493.663	485.519	9.51	-0.086	0.180	0.199	0.045	115.5	12.7	0.021	0.005	0.26	0.003	-0.001	0.003	0.012	341.6	75.2	-12.031	45.656
03/06/2008	5869342.895	532493.686	485.510	9.72	-0.101	0.203	0.227	0.036	116.5	9.0	0.023	0.004	0.21	-0.015	0.023	0.027	-0.009	123.1	-18.1	130.252	-42.692
29/08/2008	5869342.895	532493.688	485.546	9.95	-0.101	0.205	0.229	0.072	116.2	17.5	0.023	0.007	0.24	0.000	0.002	0.002	0.036	90.0	86.8	8.397	151.138
19/11/2008	5869342.900	532493.688	485.501	10.18	-0.096	0.205	0.226	0.027	115.1	6.8	0.022	0.003	0.22	0.005	0.000	0.005	-0.045	0.0	-83.7	-22.271	-200.442
26/03/2009	5869342.889	532493.693	485.511	10.53	-0.107	0.210	0.236	0.037	117.0	8.9	0.022	0.004	0.35	-0.011	0.005	0.012	0.010	155.6	39.6	34.751	28.760
10/06/2009	5869342.879	532493.714	485.523	10.74	-0.117	0.231	0.259	0.049	116.9	10.7	0.024	0.005	0.21	-0.010	0.021	0.023	0.012	115.5	27.3	111.783	57.671
17/09/2009	5869342.888	532493.721	485.536	11.01	-0.108	0.238	0.261	0.062	114.4	13.3	0.024	0.006	0.27	0.009	0.007	0.011	0.013	37.9	48.7	42.066	47.962
23/11/2009	5869342.887	532493.714	485.515	11.19	-0.109	0.231	0.255	0.041	115.3	9.1	0.023	0.004	0.18	-0.001	-0.007	0.007	-0.021	261.9	-71.4	-38.548	-114.481
27/03/2010	5869342.887	532493.716	485.522	11.53	-0.109	0.233	0.257	0.048	115.1	10.6	0.022	0.004	0.34	0.000	0.002	0.002	0.007	90.0	74.1	5.891	20.619
04/07/2010	5869342.871	532493.717	485.531	11.80	-0.125	0.234	0.265	0.057	118.1	12.1	0.022	0.005	0.27	-0.016	0.001	0.016	0.009	176.4	29.3	59.145	33.205
13/09/2010	5869342.880	532493.716	485.538	11.99	-0.116	0.233	0.260	0.064	116.5	13.8	0.022	0.005	0.19	0.009	-0.001	0.009	0.007	353.7	37.7	-46.584	36.011
22/11/2010	5869342.881	532493.725	485.521	12.19	-0.115	0.242	0.268	0.047	115.4	9.9	0.022	0.004	0.19	0.001	0.009	0.009	-0.017	83.7	-62.0	47.250	-88.704

Displacement Graphs - Hub 98-21
Lane between Avery/Allison







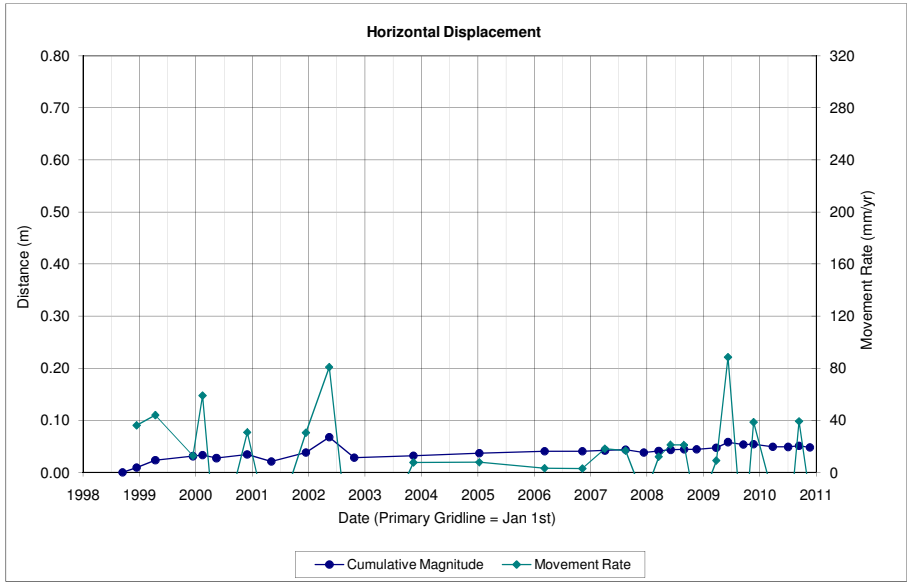


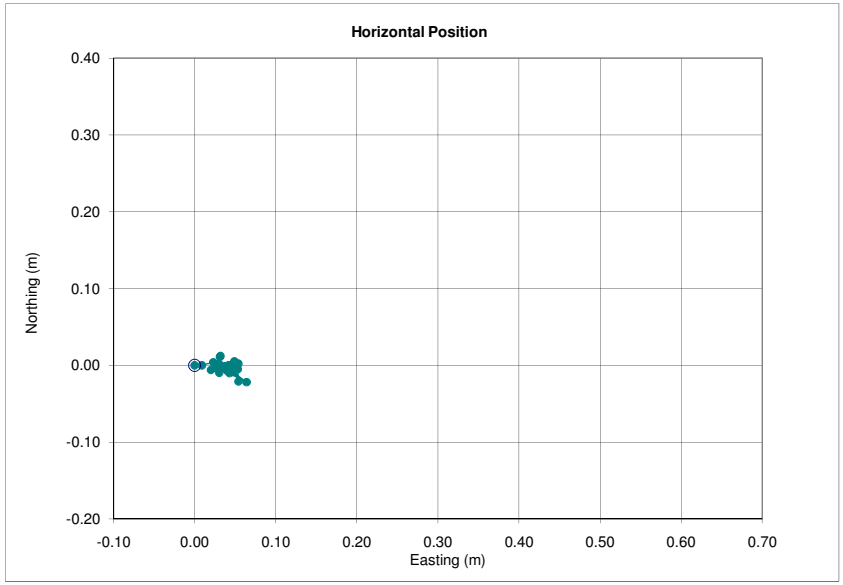
Survey and Displacement Data - Hub 98-22

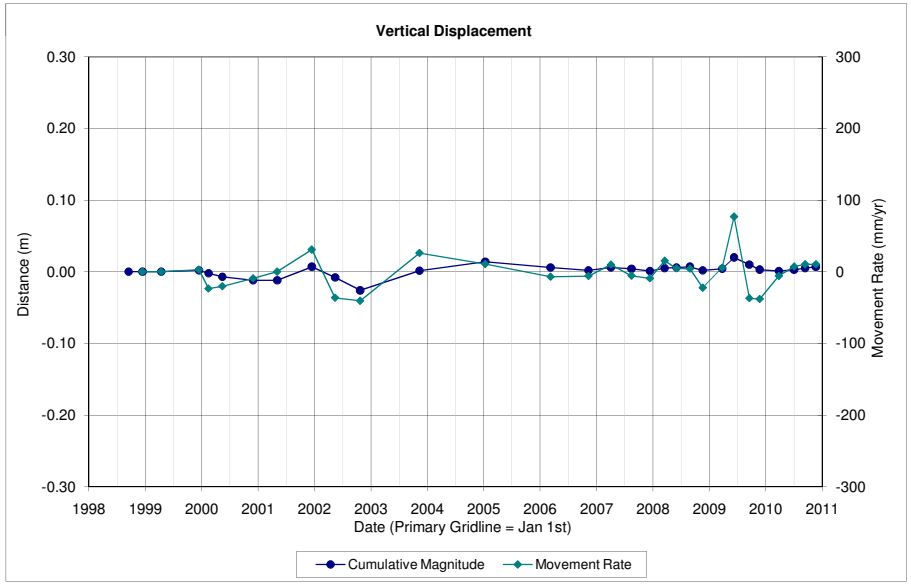
Lane between Beath/Bouchie

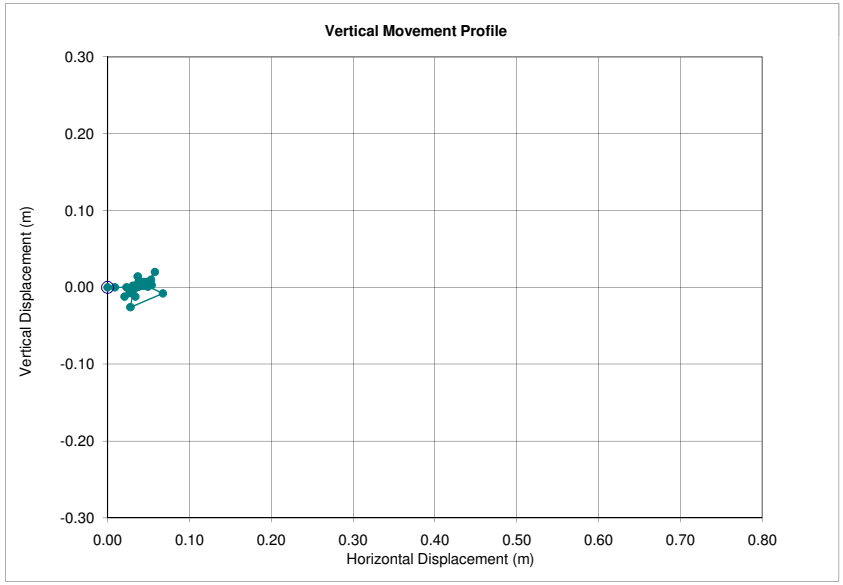
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869628.968	532631.086	478.920	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869628.968	532631.095	478.920	0.25	0.000	0.009	0.009	0.000	90.0	0.0	0.036	0.000	0.25	0.000	0.009	0.009	0.000	90.0	0.0	36.124	0.000
15/04/1999	5869628.972	532631.109	478.920	0.58	0.004	0.023	0.023	0.000	80.1	0.0	0.040	0.000	0.33	0.004	0.014	0.015	0.000	74.1	0.0	43.951	0.000
15/12/1999	5869628.969	532631.117	478.922	1.25	0.001	0.031	0.031	0.002	88.2	3.7	0.025	0.002	0.67	-0.003	0.008	0.009	0.002	110.6	13.2	12.790	2.994
15/02/2000	5869628.979	532631.117	478.918	1.42	0.011	0.031	0.033	-0.002	70.5	-3.5	0.023	-0.001	0.17	0.010	0.000	0.010	-0.004	0.0	-21.8	58.911	-23.565
15/05/2000	5869628.964	532631.113	478.913	1.66	-0.004	0.027	0.027	-0.007	98.4	-14.4	0.016	-0.004	0.25	-0.015	-0.004	0.016	-0.005	194.9	-17.9	-63.002	-20.292
30/11/2000	5869628.980	532631.118	478.908	2.21	0.012	0.032	0.034	-0.012	69.4	-19.3	0.015	-0.005	0.54	0.016	0.005	0.017	-0.005	17.4	-16.6	30.767	-9.177
05/05/2001	5869628.962	532631.106	478.908	2.64	-0.006	0.020	0.021	-0.012	106.7	-29.9	0.008	-0.005	0.43	-0.018	-0.012	0.022	0.000	213.7	0.0	-50.651	0.000
15/12/2001	5869628.967	532631.124	478.927	3.25	-0.001	0.038	0.038	0.007	91.5	10.4	0.012	0.002	0.61	0.005	0.018	0.019	0.019	74.5	45.5	30.462	30.981
15/05/2002	5869628.946	532631.150	478.912	3.66	-0.022	0.064	0.068	-0.008	109.0	-6.7	0.018	-0.002	0.41	-0.021	0.026	0.033	-0.015	128.9	-24.2	80.843	-36.283
24/10/2002	5869628.966	532631.114	478.894	4.11	-0.002	0.028	0.028	-0.026	94.1	-42.8	0.007	-0.006	0.44	0.020	-0.036	0.041	-0.018	299.1	-23.6	-92.851	-40.583
12/11/2003	5869628.958	532631.116	478.922	5.16	-0.010	0.030	0.032	0.002	107.7	2.8	0.006	0.000	1.05	-0.008	0.002	0.008	0.028	162.9	73.8	7.621	26.195
11/01/2005	5869628.965	532631.123	478.934	6.32	-0.003	0.037	0.037	0.014	95.1	20.9	0.006	0.002	1.17	0.006	0.006	0.009	0.013	45.4	54.2	7.767	10.769
10/03/2006	5869628.963	532631.126	478.926	7.48	-0.005	0.040	0.040	0.006	97.1	8.5	0.005	0.001	1.16	-0.002	0.003	0.004	-0.008	118.0	-65.9	3.129	-6.994
10/11/2006	5869628.961	532631.126	478.922	8.15	-0.007	0.040	0.041	0.002	99.9	2.8	0.005	0.000	0.67	-0.002	0.000	0.002	-0.004	180.0	-63.4	2.982	-5.963
05/04/2007	5869628.968	532631.128	478.926	8.55	0.000	0.042	0.042	0.006	90.0	8.1	0.005	0.001	0.40	0.007	0.002	0.007	0.004	15.9	28.8	18.213	10.007
16/08/2007	5869628.962	532631.129	478.924	8.92	-0.006	0.043	0.043	0.004	97.9	5.3	0.005	0.000	0.36	-0.006	0.001	0.006	-0.002	170.5	-18.2	16.705	-5.492
13/12/2007	5869628.966	532631.124	478.921	9.24	-0.002	0.038	0.038	0.001	93.0	1.5	0.004	0.000	0.33	0.004	-0.005	0.006	-0.003	308.7	-25.1	-19.653	-9.208
18/03/2008	5869628.967	532631.127	478.925	9.51	-0.001	0.041	0.041	0.005	91.4	7.0	0.004	0.001	0.26	0.001	0.003	0.003	0.004	71.6	51.7	12.031	15.219
03/06/2008	5869628.963	532631.129	478.926	9.72	-0.005	0.043	0.043	0.006	96.6	7.9	0.004	0.001	0.21	-0.004	0.002	0.004	0.001	153.4	12.6	21.214	4.744
29/08/2008	5869628.958	532631.129	478.927	9.95	-0.010	0.043	0.044	0.007	103.1	9.0	0.004	0.001	0.24	-0.005	0.000	0.005	0.001	180.0	11.3	20.991	4.198
19/11/2008	5869628.965	532631.130	478.922	10.18	-0.003	0.044	0.044	0.002	93.9	2.6	0.004	0.000	0.22	0.007	0.001	0.007	-0.005	8.1	-35.3	-31.496	-22.271
26/03/2009	5869628.964	532631.133	478.924	10.53	-0.004	0.047	0.047	0.004	94.9	4.8	0.004	0.000	0.35	-0.001	0.003	0.003	0.002	108.4	32.3	9.095	5.752
10/06/2009	5869628.947	532631.140	478.940	10.74	-0.021	0.054	0.058	0.020	111.3	19.0	0.005	0.002	0.21	-0.017	0.007	0.018	0.016	157.6	41.0	88.356	76.895
17/09/2009	5869628.963	532631.139	478.930	11.01	-0.005	0.053	0.053	0.010	95.4	10.6	0.005	0.001	0.27	0.016	-0.001	0.016	-0.010	356.4	-32.0	-59.145	-36.894
23/11/2009	5869628.970	532631.140	478.923	11.19	0.002	0.054	0.054	0.003	87.9	3.2	0.005	0.000	0.18	0.007	0.001	0.007	-0.007	8.1	-44.7	38.548	-38.160
27/03/2010	5869628.973	532631.135	478.921	11.53	0.005	0.049	0.049	0.001	84.2	1.2	0.004	0.000	0.34	0.003	-0.005	0.006	-0.002	301.0	-18.9	-17.175	-5.891
04/07/2010	5869628.959	532631.134	478.923	11.80	-0.009	0.048	0.049	0.003	100.6	3.5	0.004	0.000	0.27	-0.014	-0.001	0.014	0.002	184.1	8.1	-51.783	7.379
13/09/2010	5869628.966	532631.137	478.925	11.99	-0.002	0.051	0.051	0.005	92.2	5.6	0.004	0.000	0.19	0.007	0.003	0.008	0.002	23.2	14.7	39.178	10.289
22/11/2010	5869628.968	532631.134	478.927	12.19	0.000	0.048	0.048	0.007	90.0	8.3	0.004	0.001	0.19	0.002	-0.003	0.004	0.002	303.7	29.0	-18.813	10.436

Displacement Graphs - Hub 98-22
Lane between Beath/Bouchie







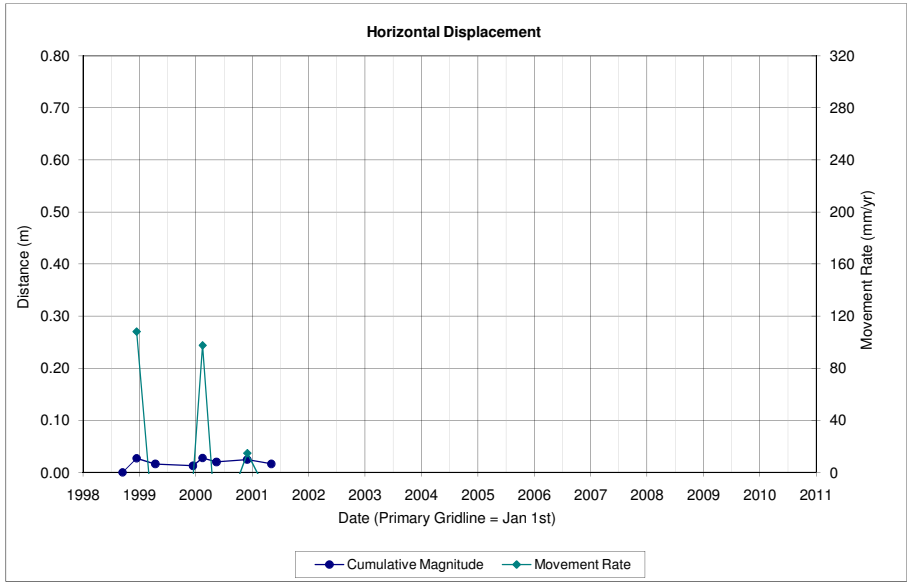


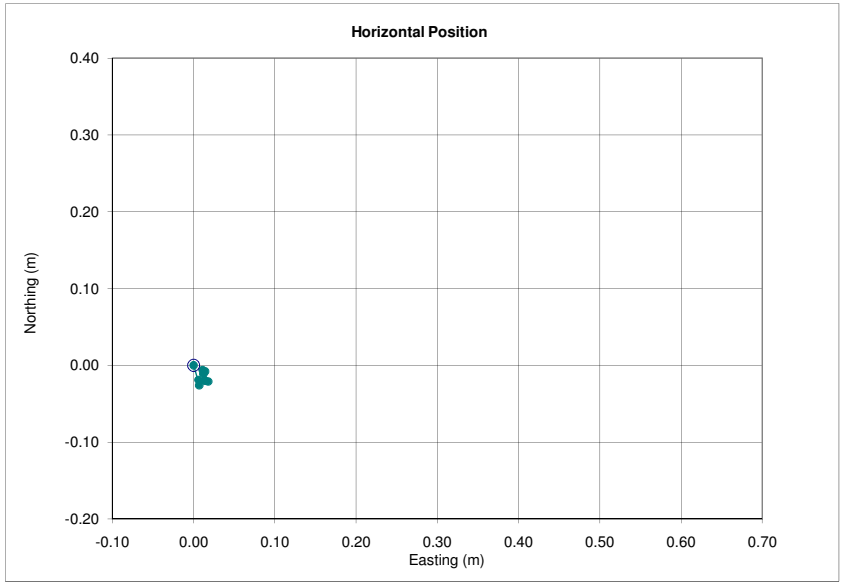
Survey and Displacement Data - Hub 98-24

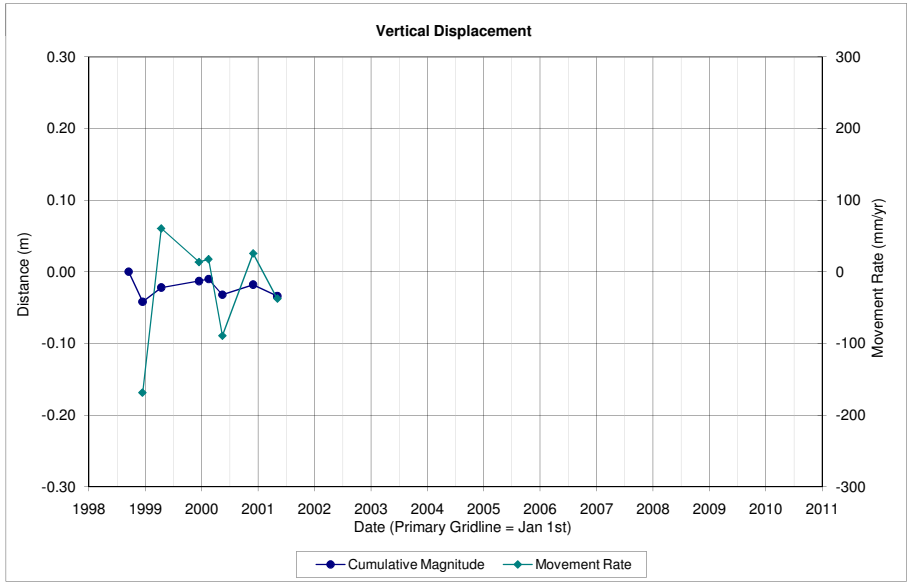
Salton Road (Hixon Road)

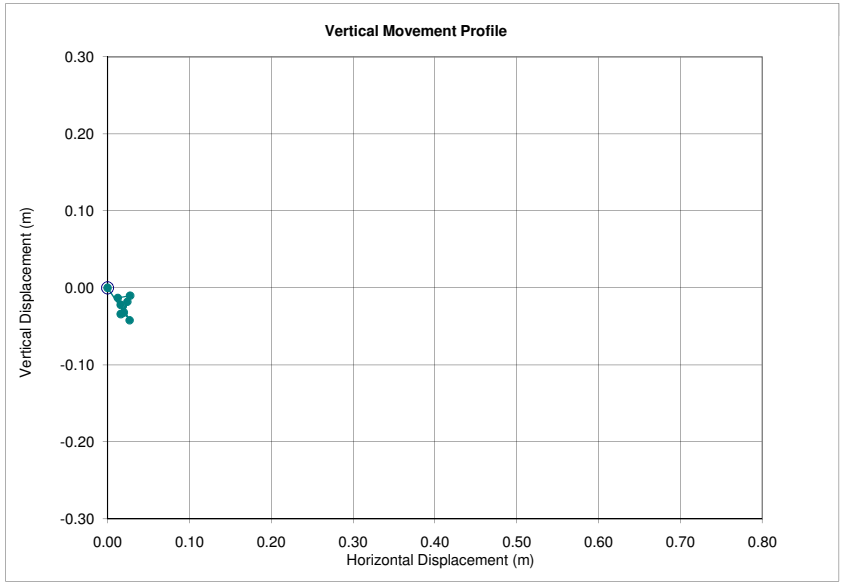
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5878341.399	531399.210	589.609	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5878341.373	531399.217	589.567	0.25	-0.026	0.007	0.027	-0.042	164.9	-57.3	0.108	-0.169	0.25	-0.026	0.007	0.027	-0.042	164.9	-57.3	108.073	-168.577
15/04/1999	5878341.391	531399.224	589.587	0.58	-0.008	0.014	0.016	-0.022	119.7	-53.8	0.028	-0.038	0.33	0.018	0.007	0.019	0.020	21.3	46.0	-58.299	60.372
15/12/1999	5878341.393	531399.221	589.596	1.25	-0.006	0.011	0.013	-0.013	118.6	-46.1	0.010	-0.010	0.67	0.002	-0.003	0.004	0.009	303.7	68.2	-5.397	13.472
15/02/2000	5878341.378	531399.228	589.599	1.42	-0.021	0.018	0.028	-0.010	139.4	-19.9	0.020	-0.007	0.17	-0.015	0.007	0.017	0.003	155.0	10.3	97.516	17.673
15/05/2000	5878341.380	531399.216	589.577	1.66	-0.019	0.006	0.020	-0.032	162.5	-58.1	0.012	-0.019	0.25	0.002	-0.012	0.012	-0.022	279.5	-61.1	-49.372	-89.283
30/11/2000	5878341.379	531399.224	589.591	2.21	-0.020	0.014	0.024	-0.018	145.0	-36.4	0.011	-0.008	0.54	-0.001	0.008	0.008	0.014	97.1	60.1	14.798	25.696
05/05/2001	5878341.388	531399.222	589.575	2.64	-0.011	0.012	0.016	-0.034	132.5	-64.4	0.006	-0.013	0.43	0.009	-0.002	0.009	-0.016	347.5	-60.0	-21.586	-37.462

Displacement Graphs - Hub 98-24
Salton Road (Hixon Road)









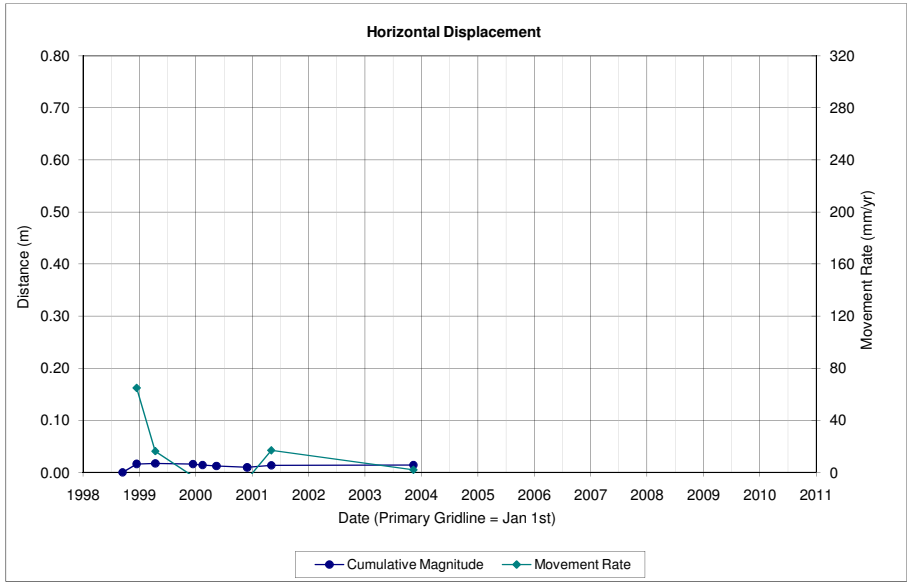
Survey and Displacement Data - Hub 98-29

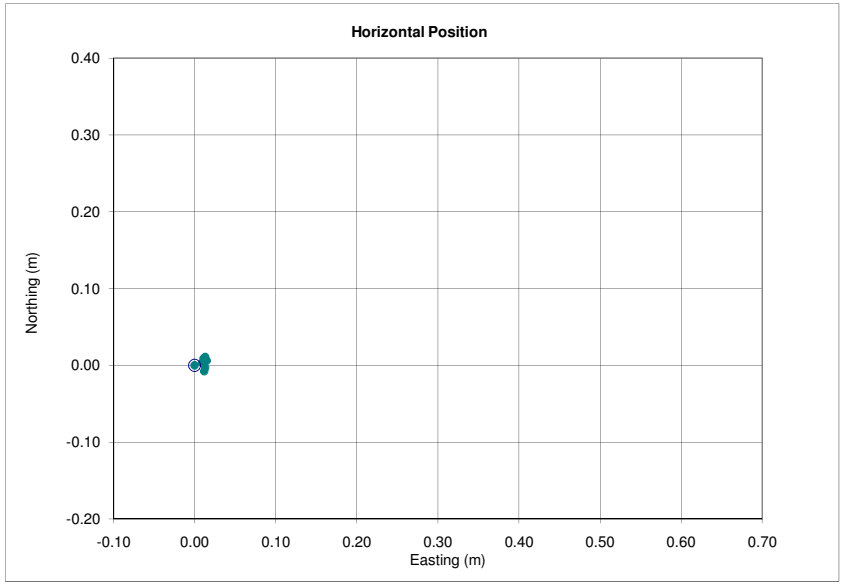
Quesnel Hill

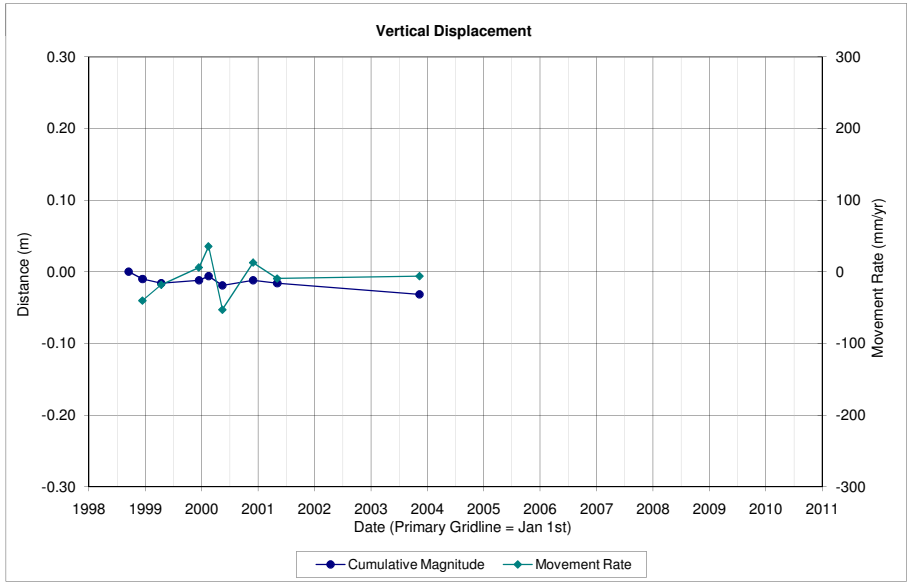
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870484.887	536304.120	575.014	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870484.893	536304.135	575.004	0.25	0.006	0.015	0.016	-0.010	68.2	-31.8	0.065	-0.040	0.25	0.006	0.015	0.016	-0.010	68.2	-31.8	64.844	-40.137
15/04/1999	5870484.898	536304.133	574.998	0.58	0.011	0.013	0.017	-0.016	49.8	-43.2	0.029	-0.028	0.33	0.005	-0.002	0.005	-0.006	338.2	-48.1	16.256	-18.112
15/12/1999	5870484.896	536304.133	575.002	1.25	0.009	0.013	0.016	-0.012	55.3	-37.2	0.013	-0.010	0.67	-0.002	0.000	0.002	0.004	180.0	63.4	-2.994	5.988
15/02/2000	5870484.896	536304.131	575.008	1.42	0.009	0.011	0.014	-0.006	50.7	-22.9	0.010	-0.004	0.17	0.000	-0.002	0.002	0.006	270.0	71.6	-11.782	35.347
15/05/2000	5870484.892	536304.131	574.995	1.66	0.005	0.011	0.012	-0.019	65.6	-57.5	0.007	-0.011	0.25	-0.004	0.000	0.004	-0.013	180.0	-72.9	-16.233	-52.758
30/11/2000	5870484.890	536304.129	575.002	2.21	0.003	0.009	0.009	-0.012	71.6	-51.7	0.004	-0.005	0.54	-0.002	-0.002	0.003	0.007	225.0	68.0	-5.191	12.848
05/05/2001	5870484.884	536304.133	574.998	2.64	-0.003	0.013	0.013	-0.016	103.0	-50.2	0.005	-0.006	0.43	-0.006	0.004	0.007	-0.004	146.3	-29.0	16.884	-9.365
12/11/2003	5870484.879	536304.132	574.983	5.16	-0.008	0.012	0.014	-0.031	123.8	-66.0	0.003	-0.006	2.52	-0.005	-0.001	0.005	-0.015	195.5	-72.1	1.979	-6.143

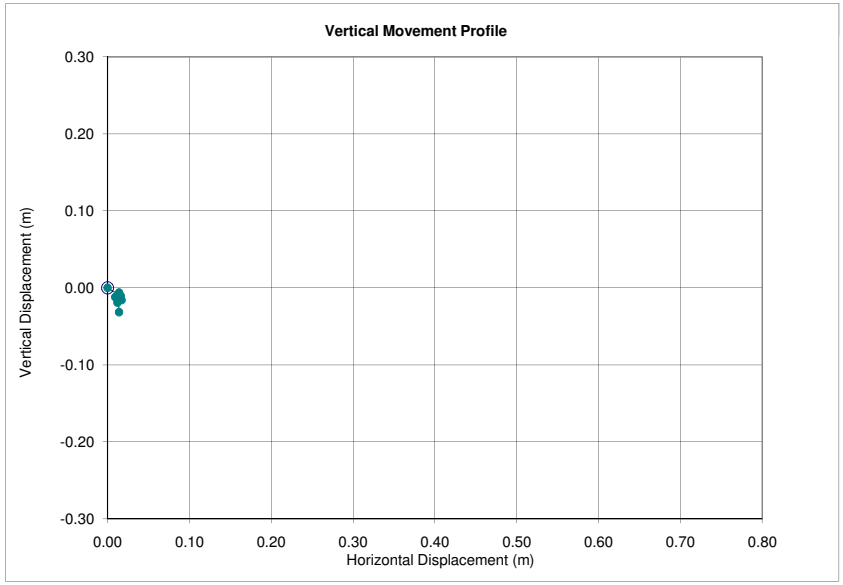
Displacement Graphs - Hub 98-29

Quesnel Hill









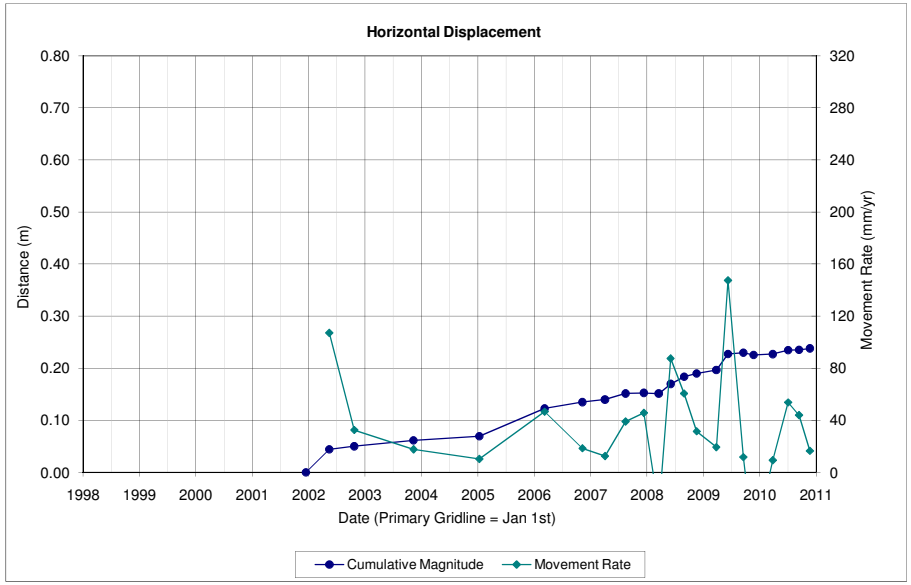
Survey and Displacement Data - Hub 01-30

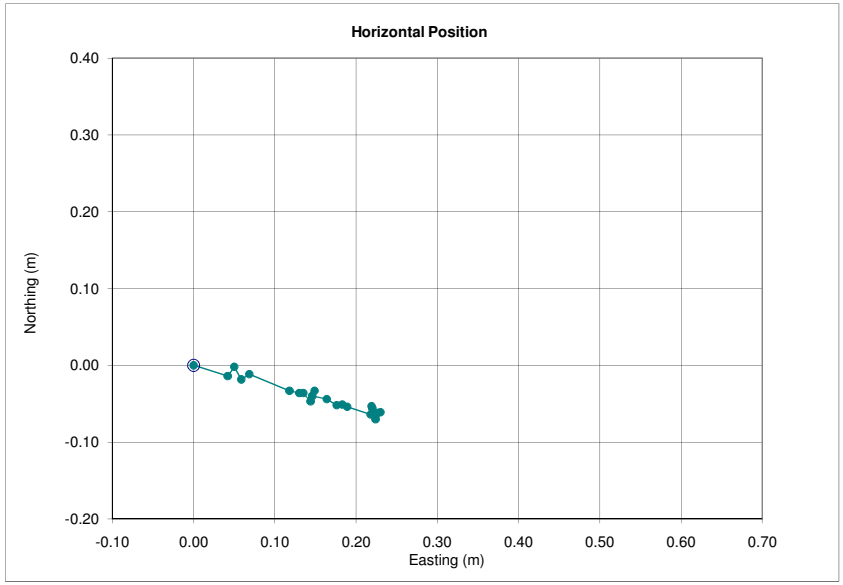
West End of Dodds Avenue at Finley Road

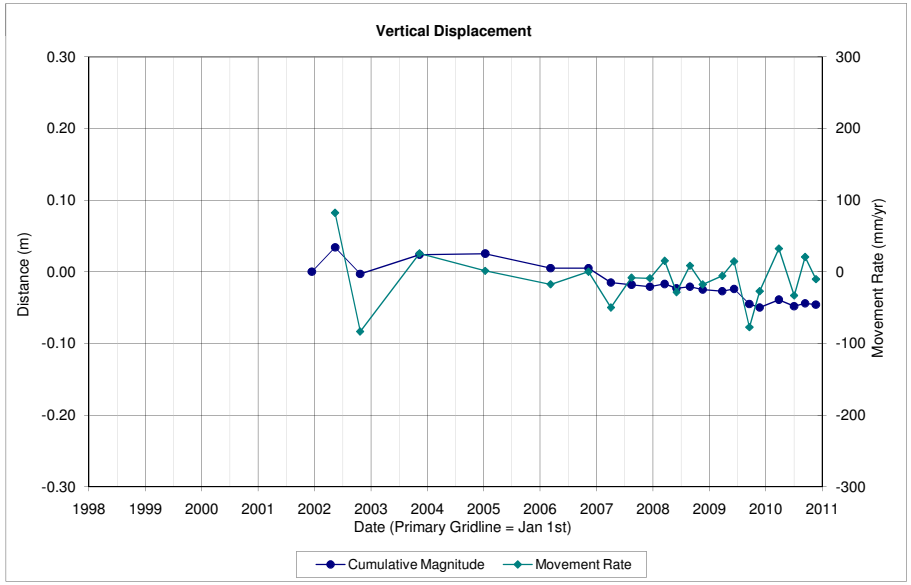
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869989.266	531217.807	575.401	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869989.252	531217.849	575.435	0.41	-0.014	0.042	0.044	0.034	108.4	37.5	0.107	0.082	0.41	-0.014	0.042	0.044	0.034	108.4	37.5	107.088	82.242
24/10/2002	5869989.264	531217.857	575.398	0.86	-0.002	0.050	0.050	-0.003	92.3	-3.4	0.058	-0.004	0.44	0.012	0.008	0.014	-0.037	33.7	-68.7	32.517	-83.421
12/11/2003	5869989.248	531217.866	575.425	1.91	-0.018	0.059	0.061	0.024	107.4	21.2	0.032	0.012	1.05	-0.016	0.009	0.019	0.027	152.1	55.4	17.628	25.510
11/01/2005	5869989.254	531217.876	575.426	3.07	-0.012	0.068	0.069	0.025	99.6	20.0	0.023	0.008	1.17	0.007	0.010	0.012	0.001	55.4	7.1	10.238	1.269
10/03/2006	5869989.233	531217.925	575.406	4.23	-0.033	0.118	0.123	0.005	105.6	2.3	0.029	0.001	1.16	-0.021	0.050	0.054	-0.020	113.4	-20.6	46.565	-17.529
10/11/2006	5869989.230	531217.937	575.406	4.90	-0.036	0.130	0.135	0.005	105.5	2.1	0.028	0.001	0.67	-0.003	0.012	0.012	0.000	104.0	0.0	18.440	0.000
05/04/2007	5869989.230	531217.942	575.386	5.30	-0.036	0.135	0.140	-0.015	104.9	-6.1	0.026	-0.003	0.40	0.000	0.005	0.005	-0.020	90.0	-76.0	12.509	-50.034
16/08/2007	5869989.219	531217.951	575.383	5.67	-0.047	0.144	0.151	-0.018	108.1	-6.8	0.027	-0.003	0.36	-0.011	0.009	0.014	-0.003	140.7	-11.9	39.031	-8.239
13/12/2007	5869989.233	531217.956	575.380	5.99	-0.033	0.149	0.153	-0.021	102.5	-7.8	0.025	-0.004	0.33	0.014	0.005	0.015	-0.003	19.7	-11.4	45.629	-9.208
18/03/2008	5869989.226	531217.953	575.384	6.26	-0.040	0.146	0.151	-0.017	105.3	-6.4	0.024	-0.003	0.26	-0.007	-0.003	0.008	0.004	203.2	27.7	-28.976	15.219
03/06/2008	5869989.222	531217.971	575.378	6.47	-0.044	0.164	0.170	-0.023	105.0	-7.7	0.026	-0.004	0.21	-0.004	0.018	0.018	-0.006	102.5	-18.0	87.466	-28.461
29/08/2008	5869989.214	531217.983	575.380	6.70	-0.052	0.176	0.184	-0.021	106.5	-6.5	0.027	-0.003	0.24	-0.008	0.012	0.014	0.002	123.7	7.9	60.548	8.397
19/11/2008	5869989.215	531217.990	575.376	6.93	-0.051	0.183	0.190	-0.025	105.6	-7.5	0.027	-0.004	0.22	0.001	0.007	0.007	-0.004	81.9	-29.5	31.496	-17.817
26/03/2009	5869989.212	531217.996	575.374	7.28	-0.054	0.189	0.197	-0.027	105.9	-7.8	0.027	-0.004	0.35	-0.003	0.006	0.007	-0.002	116.6	-16.6	19.293	-5.752
10/06/2009	5869989.202	531218.025	575.377	7.49	-0.064	0.218	0.227	-0.024	106.4	-6.0	0.030	-0.003	0.21	-0.010	0.029	0.031	0.003	109.0	5.6	147.425	14.418
17/09/2009	5869989.203	531218.028	575.356	7.76	-0.063	0.221	0.230	-0.045	105.9	-11.1	0.030	-0.006	0.27	0.001	0.003	0.003	-0.021	71.6	-81.4	11.667	-77.477
23/11/2009	5869989.213	531218.026	575.351	7.94	-0.053	0.219	0.225	-0.050	103.6	-12.5	0.028	-0.006	0.18	0.010	-0.002	0.010	-0.005	348.7	-26.1	-55.595	-27.257
27/03/2010	5869989.210	531218.027	575.362	8.28	-0.056	0.220	0.227	-0.039	104.3	-9.7	0.027	-0.005	0.34	-0.003	0.001	0.003	0.011	161.6	74.0	9.315	32.401
04/07/2010	5869989.196	531218.031	575.353	8.55	-0.070	0.224	0.235	-0.048	107.4	-11.6	0.027	-0.006	0.27	-0.014	0.004	0.015	-0.009	164.1	-31.7	53.718	-33.205
13/09/2010	5869989.204	531218.034	575.357	8.74	-0.062	0.227	0.235	-0.044	105.3	-10.6	0.027	-0.005	0.19	0.008	0.003	0.009	0.004	20.6	25.1	43.953	20.577
22/11/2010	5869989.205	531218.037	575.355	8.94	-0.061	0.230	0.238	-0.046	104.9	-10.9	0.027	-0.005	0.19	0.001	0.003	0.003	-0.002	71.6	-32.3	16.500	-10.436

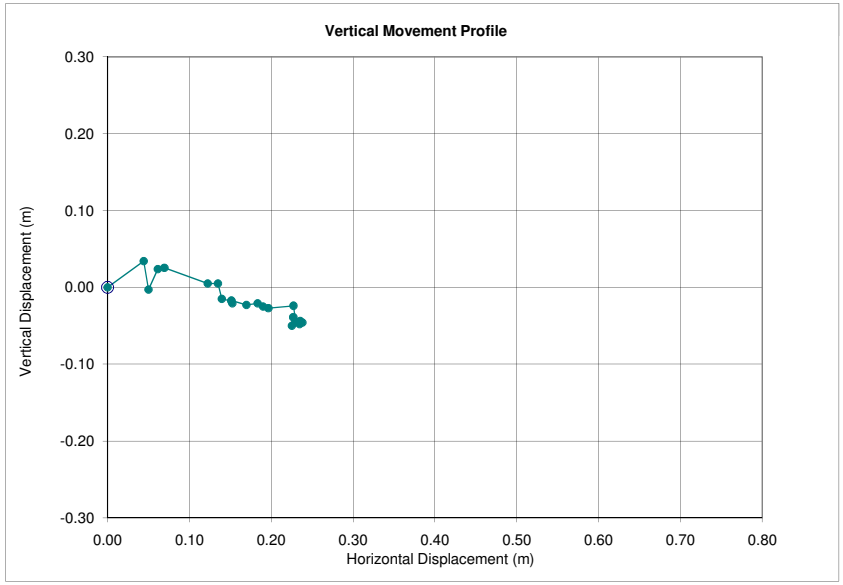
Displacement Graphs - Hub 01-30

West End of Dodds Avenue at Finley Road









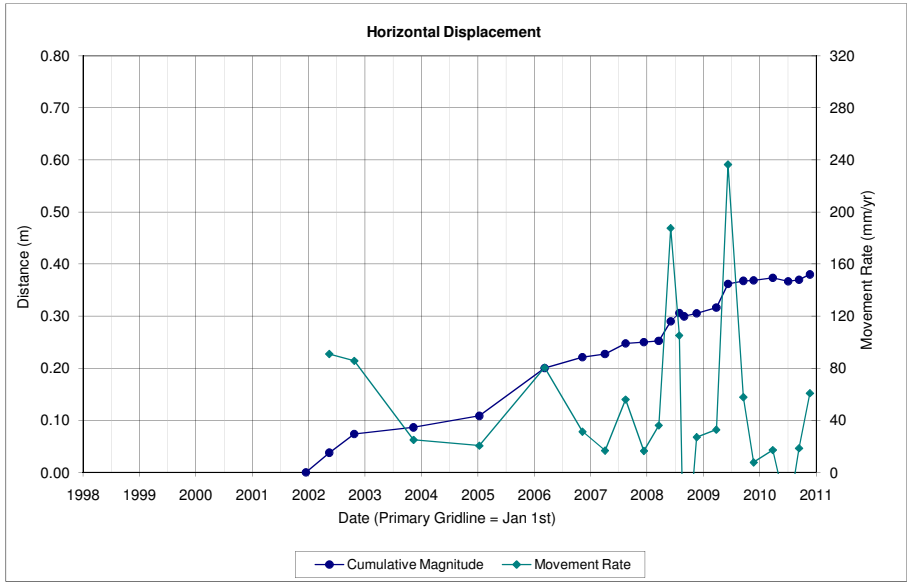
Survey and Displacement Data - Hub 01-31

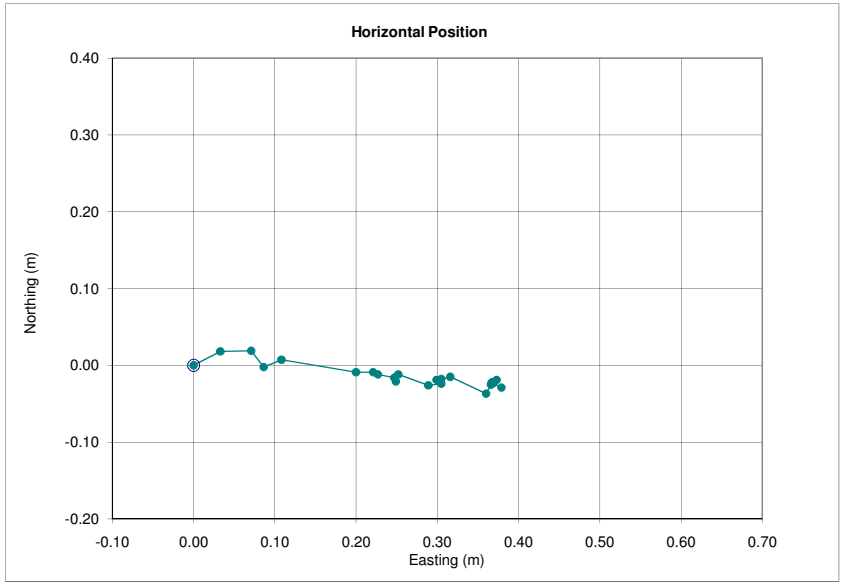
Blair Street

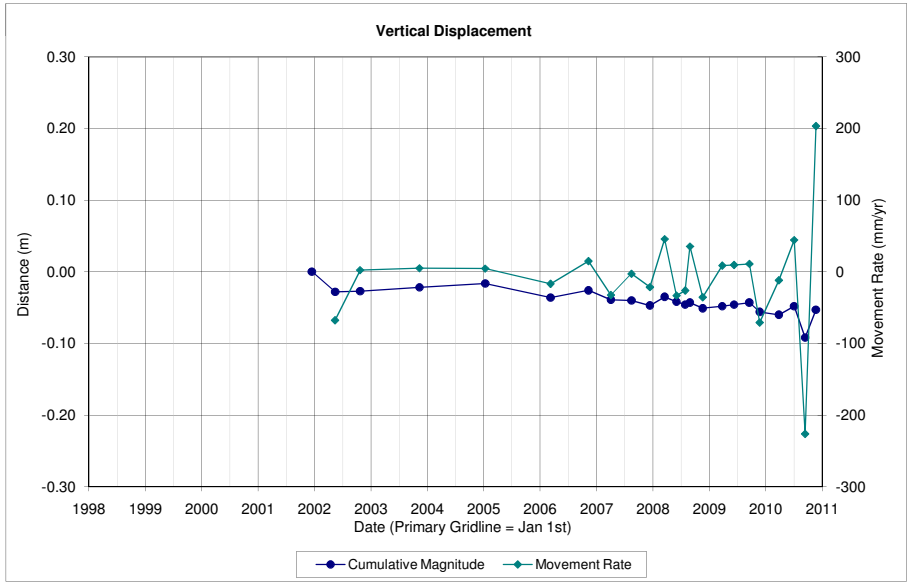
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869768.124	532338.411	508.144	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869768.142	532338.444	508.116	0.41	0.018	0.033	0.038	-0.028	61.4	-36.7	0.091	-0.068	0.41	0.018	0.033	0.038	-0.028	61.4	-36.7	90.925	-67.728
24/10/2002	5869768.143	532338.482	508.117	0.86	0.019	0.071	0.073	-0.027	75.0	-20.2	0.086	-0.032	0.44	0.001	0.038	0.038	0.001	88.5	1.5	85.706	2.255
12/11/2003	5869768.122	532338.497	508.122	1.91	-0.002	0.086	0.086	-0.022	91.6	-14.2	0.045	-0.011	1.05	-0.021	0.015	0.026	0.005	144.4	11.2	24.997	4.946
11/01/2005	5869768.131	532338.519	508.128	3.07	0.007	0.108	0.108	-0.017	86.1	-8.7	0.035	-0.005	1.17	0.010	0.022	0.024	0.005	66.2	12.5	20.515	4.544
10/03/2006	5869768.115	532338.611	508.108	4.23	-0.009	0.200	0.200	-0.036	92.6	-10.2	0.047	-0.009	1.16	-0.016	0.092	0.093	-0.019	100.1	-11.8	80.507	-16.838
10/11/2006	5869768.115	532338.632	508.118	4.90	-0.009	0.221	0.221	-0.026	92.3	-6.7	0.045	-0.005	0.67	0.000	0.021	0.021	0.010	90.0	25.5	31.307	14.908
05/04/2007	5869768.112	532338.638	508.105	5.30	-0.012	0.227	0.227	-0.039	93.0	-9.7	0.043	-0.007	0.40	-0.003	0.006	0.007	-0.013	116.6	-62.7	16.782	-32.522
16/08/2007	5869768.108	532338.658	508.104	5.67	-0.016	0.247	0.248	-0.040	93.7	-9.2	0.044	-0.007	0.36	-0.004	0.020	0.020	-0.001	101.3	-2.8	56.013	-2.746
13/12/2007	5869768.103	532338.660	508.097	5.99	-0.021	0.249	0.250	-0.047	94.8	-10.7	0.042	-0.008	0.33	-0.005	0.002	0.005	-0.007	158.2	-52.4	16.529	-21.485
18/03/2008	5869768.112	532338.663	508.109	6.26	-0.012	0.252	0.252	-0.035	92.7	-7.9	0.040	-0.006	0.26	0.009	0.003	0.009	0.012	18.4	51.7	36.094	45.656
03/06/2008	5869768.098	532338.700	508.102	6.47	-0.026	0.289	0.290	-0.042	95.1	-8.2	0.045	-0.006	0.21	-0.014	0.037	0.040	-0.007	110.7	-10.0	187.653	-33.205
29/07/2008	5869768.100	532338.716	508.098	6.62	-0.024	0.305	0.306	-0.046	94.5	-8.6	0.046	-0.007	0.15	0.002	0.016	0.016	-0.004	82.9	-13.9	105.169	-26.089
29/08/2008	5869768.105	532338.710	508.101	6.70	-0.019	0.299	0.300	-0.043	93.6	-8.2	0.045	-0.006	0.08	0.005	-0.006	0.008	0.003	309.8	21.0	-92.022	35.347
19/11/2008	5869768.106	532338.716	508.093	6.93	-0.018	0.305	0.306	-0.051	93.4	-9.5	0.044	-0.007	0.22	0.001	0.006	0.006	-0.008	80.5	-52.8	27.094	-35.634
26/03/2009	5869768.109	532338.727	508.096	7.28	-0.015	0.316	0.316	-0.048	92.7	-8.6	0.043	-0.007	0.35	0.003	0.011	0.011	0.003	74.7	14.7	32.791	8.628
10/06/2009	5869768.087	532338.771	508.098	7.49	-0.037	0.360	0.362	-0.046	95.9	-7.2	0.048	-0.006	0.21	-0.022	0.044	0.049	0.002	116.6	2.3	236.420	9.612
17/09/2009	5869768.101	532338.778	508.101	7.76	-0.023	0.367	0.368	-0.043	93.6	-6.7	0.047	-0.006	0.27	0.014	0.007	0.016	0.003	26.6	10.8	57.748	11.068
23/11/2009	5869768.102	532338.779	508.088	7.94	-0.022	0.368	0.369	-0.056	93.4	-8.6	0.046	-0.007	0.18	0.001	0.001	0.001	-0.013	45.0	-83.8	7.710	-70.869
27/03/2010	5869768.105	532338.784	508.084	8.28	-0.019	0.373	0.373	-0.060	92.9	-9.1	0.045	-0.007	0.34	0.003	0.005	0.006	-0.004	59.0	-34.4	17.175	-11.782
04/07/2010	5869768.099	532338.777	508.096	8.55	-0.025	0.366	0.367	-0.048	93.9	-7.5	0.043	-0.006	0.27	-0.006	-0.007	0.009	0.012	229.4	52.5	-34.015	44.273
13/09/2010	5869768.101	532338.780	508.052	8.74	-0.023	0.369	0.370	-0.092	93.6	-14.0	0.042	-0.011	0.19	0.002	0.003	0.004	-0.044	56.3	-85.3	18.548	-226.352
22/11/2010	5869768.095	532338.790	508.091	8.94	-0.029	0.379	0.380	-0.053	94.4	-7.9	0.043	-0.006	0.19	-0.006	0.010	0.012	0.039	121.0	73.4	60.850	203.496

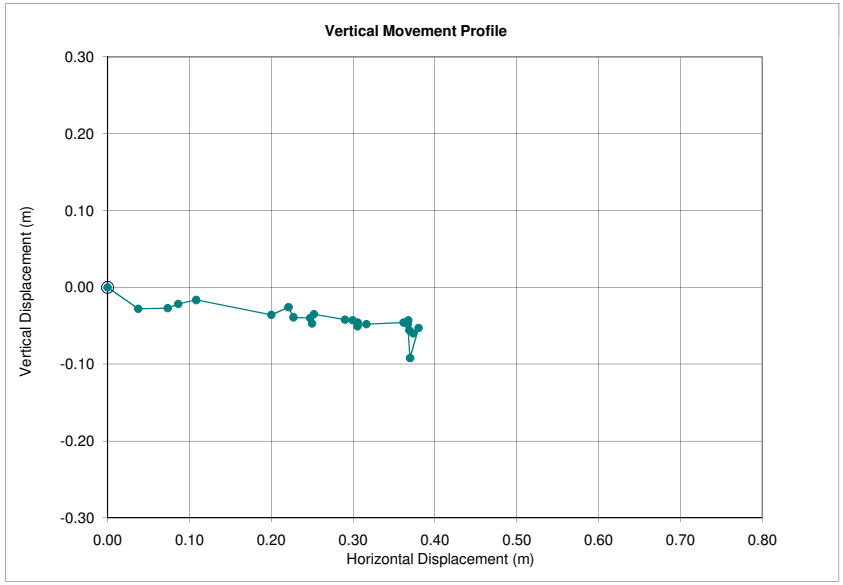
Displacement Graphs - Hub 01-31

Blair Street







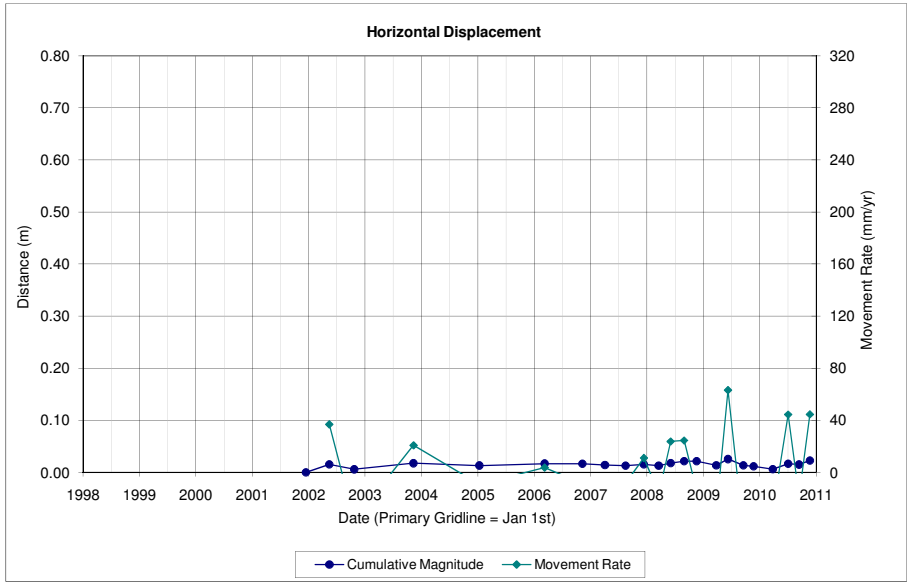


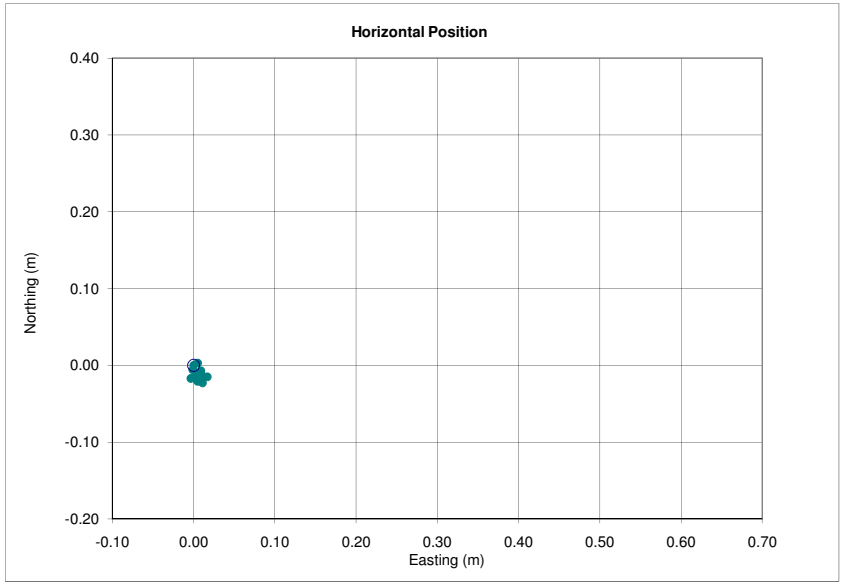
Survey and Displacement Data - Hub 01-32

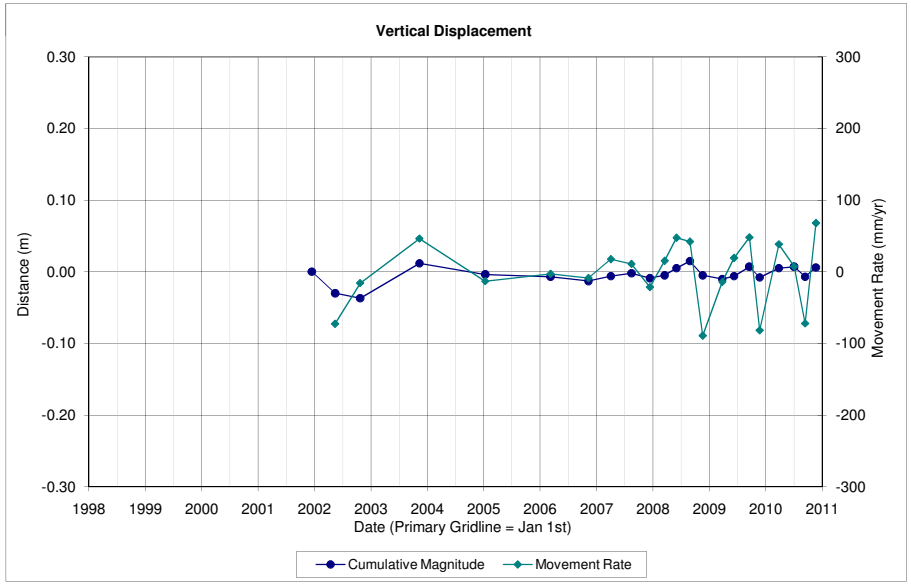
Lewis Drive/Beabien Avenue

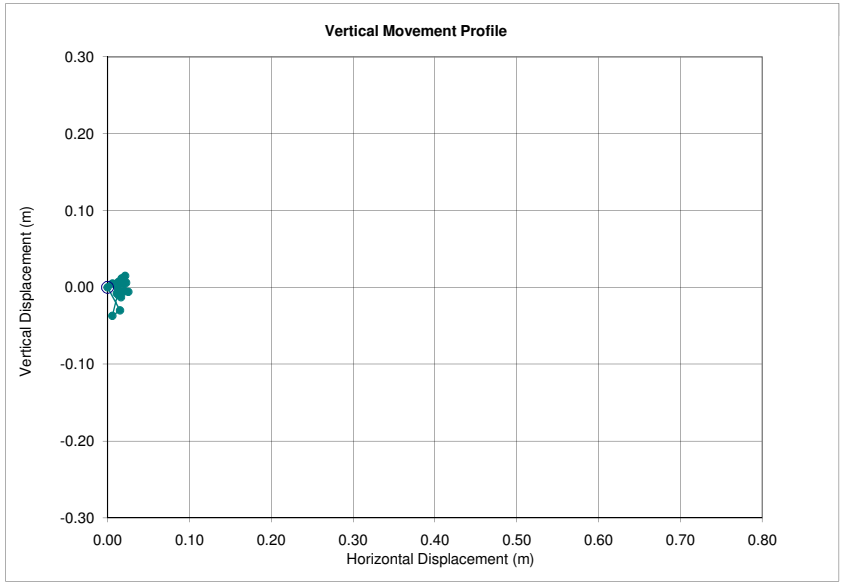
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5870079.631	532553.538	481.549	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5870079.618	532553.546	481.519	0.41	-0.013	0.008	0.015	-0.030	148.4	-63.0	0.037	-0.073	0.41	-0.013	0.008	0.015	-0.030	148.4	-63.0	36.923	-72.566
24/10/2002	5870079.634	532553.543	481.512	0.86	0.003	0.005	0.006	-0.037	59.0	-81.0	0.007	-0.043	0.44	0.016	-0.003	0.016	-0.007	349.4	-23.3	-36.703	-15.782
12/11/2003	5870079.614	532553.534	481.561	1.91	-0.017	-0.004	0.017	0.012	191.7	33.7	0.009	0.006	1.05	-0.020	-0.009	0.022	0.049	203.0	65.8	20.743	46.246
11/01/2005	5870079.619	532553.544	481.545	3.07	-0.012	0.006	0.013	-0.004	154.2	-15.8	0.004	-0.001	1.17	0.005	0.009	0.011	-0.015	60.3	-55.2	-9.113	-13.135
10/03/2006	5870079.615	532553.543	481.542	4.23	-0.016	0.005	0.017	-0.007	162.6	-22.7	0.004	-0.002	1.16	-0.004	-0.001	0.004	-0.003	189.5	-37.8	3.677	-2.849
10/11/2006	5870079.618	532553.548	481.536	4.90	-0.013	0.010	0.016	-0.013	142.4	-38.4	0.003	-0.003	0.67	0.003	0.005	0.006	-0.006	59.0	-45.8	-8.693	-8.945
05/04/2007	5870079.619	532553.545	481.543	5.30	-0.012	0.007	0.014	-0.006	149.7	-23.4	0.003	-0.001	0.40	0.001	-0.003	0.003	0.007	288.4	65.7	-7.911	17.512
16/08/2007	5870079.619	532553.542	481.547	5.67	-0.012	0.004	0.013	-0.002	161.6	-9.0	0.002	0.000	0.36	0.000	-0.003	0.003	0.004	270.0	53.1	-8.239	10.985
13/12/2007	5870079.616	532553.540	481.540	5.99	-0.015	0.002	0.015	-0.009	172.4	-30.7	0.003	-0.002	0.33	-0.003	-0.002	0.004	-0.007	213.7	-62.7	11.067	-21.485
18/03/2008	5870079.619	532553.543	481.544	6.26	-0.012	0.005	0.013	-0.005	157.4	-21.0	0.002	-0.001	0.26	0.003	0.003	0.004	0.004	45.0	43.3	-16.142	15.219
03/06/2008	5870079.615	532553.546	481.554	6.47	-0.016	0.008	0.018	0.005	153.4	15.6	0.003	0.001	0.21	-0.004	0.003	0.005	0.010	143.1	63.4	23.718	47.435
29/08/2008	5870079.610	532553.543	481.564	6.70	-0.021	0.005	0.022	0.015	166.6	34.8	0.003	0.002	0.24	-0.005	-0.003	0.006	0.010	211.0	59.8	24.480	41.983
19/11/2008	5870079.611	532553.546	481.544	6.93	-0.020	0.008	0.022	-0.005	158.2	-13.1	0.003	-0.001	0.22	0.001	0.003	0.003	-0.020	71.6	-81.0	-14.086	-89.085
26/03/2009	5870079.621	532553.547	481.539	7.28	-0.010	0.009	0.013	-0.010	138.0	-36.6	0.002	-0.001	0.35	0.010	0.001	0.010	-0.005	5.7	-26.5	-28.903	-14.380
10/06/2009	5870079.608	532553.549	481.543	7.49	-0.023	0.011	0.025	-0.006	154.4	-13.2	0.003	-0.001	0.21	-0.013	0.002	0.013	0.004	171.3	16.9	63.212	19.224
17/09/2009	5870079.618	532553.542	481.556	7.76	-0.013	0.004	0.014	0.007	162.9	27.2	0.002	0.001	0.27	0.010	-0.007	0.012	0.013	325.0	46.8	-45.035	47.962
23/11/2009	5870079.624	532553.547	481.541	7.94	-0.007	0.009	0.011	-0.008	127.9	-35.1	0.001	-0.001	0.18	0.006	0.005	0.008	-0.015	39.8	-62.5	-42.578	-81.772
27/03/2010	5870079.625	532553.537	481.554	8.28	-0.006	-0.001	0.006	0.005	189.5	39.4	0.001	0.001	0.34	0.001	-0.010	0.010	0.013	275.7	52.3	-29.603	38.292
04/07/2010	5870079.616	532553.545	481.556	8.55	-0.015	0.007	0.017	0.007	155.0	22.9	0.002	0.001	0.27	-0.009	0.008	0.012	0.002	138.4	9.4	44.426	7.379
13/09/2010	5870079.619	532553.547	481.542	8.74	-0.012	0.009	0.015	-0.007	143.1	-25.0	0.002	-0.001	0.19	0.003	0.002	0.004	-0.014	33.7	-75.6	-18.548	-72.021
22/11/2010	5870079.616	532553.555	481.555	8.94	-0.015	0.017	0.023	0.006	131.4	14.8	0.003	0.001	0.19	-0.003	0.008	0.009	0.013	110.6	56.7	44.581	67.832

Displacement Graphs - Hub 01-32
Lewis Drive/Beabien Avenue







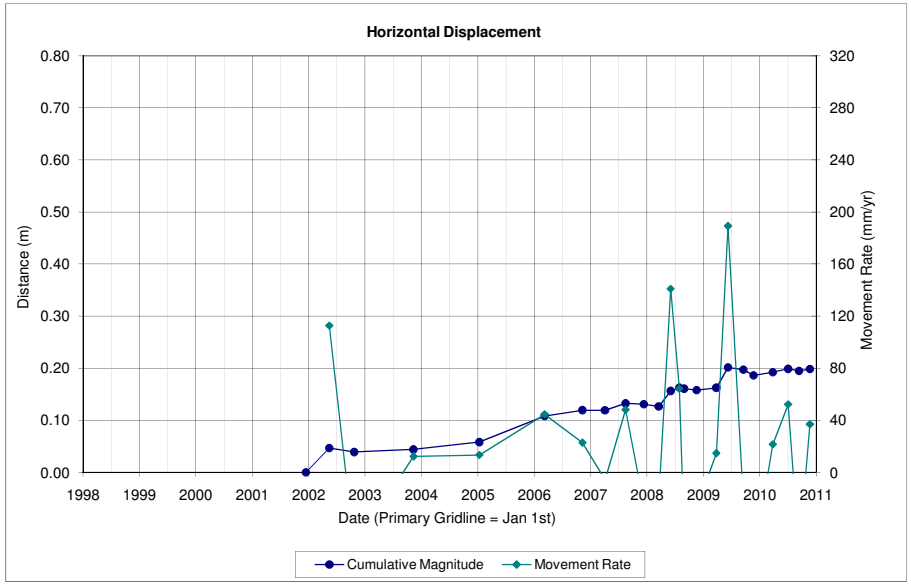


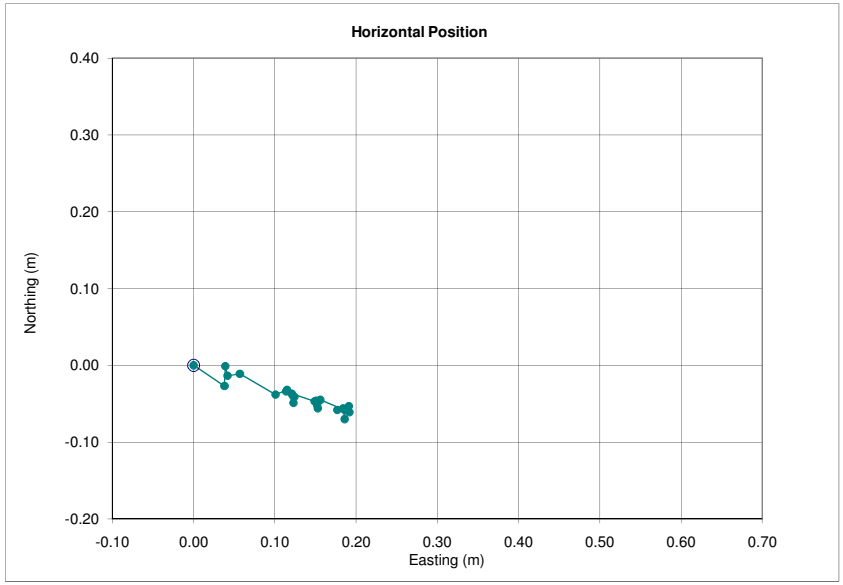
Survey and Displacement Data - Hub 01-33

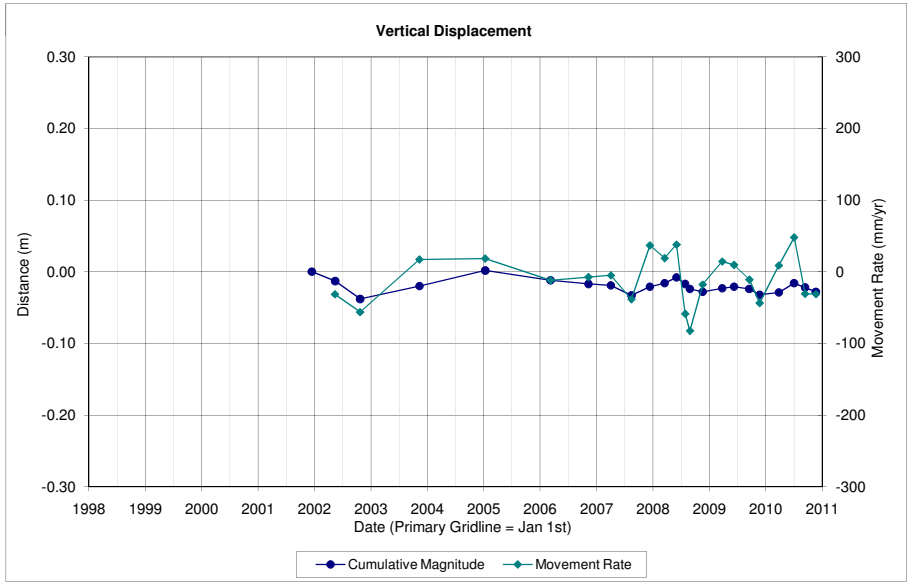
South End of Allard Street

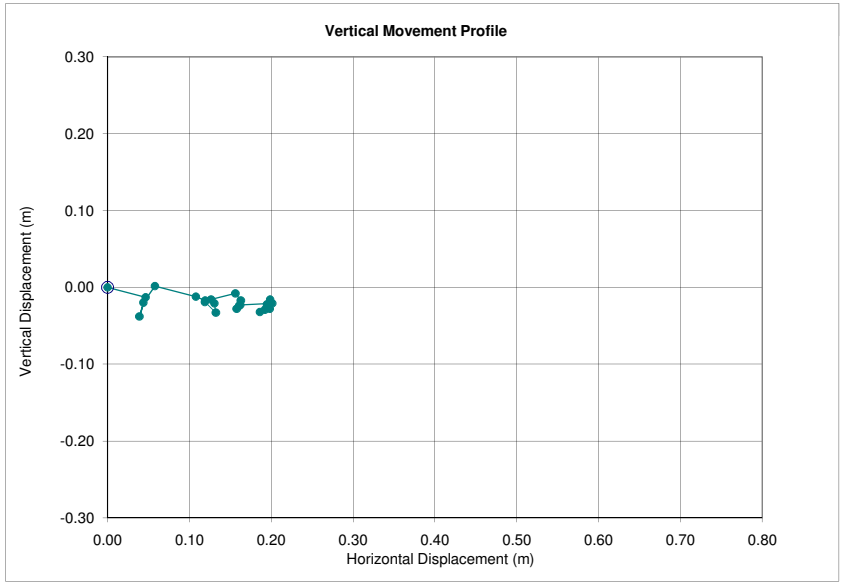
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869124.379	532245.960	495.342	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869124.352	532245.998	495.329	0.41	-0.027	0.038	0.047	-0.013	125.4	-15.6	0.113	-0.031	0.41	-0.027	0.038	0.047	-0.013	125.4	-15.6	112.757	-31.445
24/10/2002	5869124.378	532245.999	495.304	0.86	-0.001	0.039	0.039	-0.038	91.5	-44.2	0.046	-0.044	0.44	0.026	0.001	0.026	-0.025	2.2	-43.9	-58.664	-56.366
12/11/2003	5869124.365	532246.002	495.322	1.91	-0.014	0.042	0.044	-0.020	108.0	-24.4	0.023	-0.010	1.05	-0.013	0.003	0.013	0.018	167.8	54.7	12.196	17.245
11/01/2005	5869124.368	532246.017	495.344	3.07	-0.011	0.057	0.058	0.002	100.9	1.7	0.019	0.001	1.17	0.003	0.015	0.015	0.022	80.6	54.3	13.279	18.494
10/03/2006	5869124.341	532246.061	495.330	4.23	-0.038	0.101	0.108	-0.012	110.6	-6.3	0.025	-0.003	1.16	-0.027	0.044	0.052	-0.014	121.5	-14.9	44.576	-11.830
10/11/2006	5869124.347	532246.075	495.325	4.90	-0.032	0.115	0.119	-0.017	105.5	-8.1	0.024	-0.003	0.67	0.006	0.014	0.015	-0.005	66.8	-18.2	22.707	-7.454
05/04/2007	5869124.345	532246.074	495.323	5.30	-0.034	0.114	0.119	-0.019	106.6	-9.1	0.022	-0.004	0.40	-0.002	-0.001	0.002	-0.002	206.6	-41.8	-5.594	-5.003
16/08/2007	5869124.330	532246.083	495.309	5.67	-0.049	0.123	0.132	-0.033	111.7	-14.0	0.023	-0.006	0.36	-0.015	0.009	0.017	-0.014	149.0	-38.7	48.040	-38.447
13/12/2007	5869124.338	532246.084	495.321	5.99	-0.041	0.124	0.131	-0.021	108.3	-9.1	0.022	-0.004	0.33	0.008	0.001	0.008	0.012	7.1	56.1	-24.746	36.832
18/03/2008	5869124.342	532246.081	495.326	6.26	-0.037	0.121	0.127	-0.016	107.0	-7.2	0.020	-0.003	0.26	0.004	-0.003	0.005	0.005	323.1	45.0	-19.023	19.023
03/06/2008	5869124.332	532246.109	495.334	6.47	-0.047	0.149	0.156	-0.008	107.5	-2.9	0.024	-0.001	0.21	-0.010	0.028	0.030	0.008	109.7	15.1	141.035	37.948
29/07/2008	5869124.323	532246.113	495.325	6.62	-0.056	0.153	0.163	-0.017	110.1	-6.0	0.025	-0.003	0.15	-0.009	0.004	0.010	-0.009	156.0	-42.4	64.237	-58.701
29/08/2008	5869124.327	532246.112	495.318	6.70	-0.052	0.152	0.161	-0.024	108.9	-8.5	0.024	-0.004	0.08	0.004	-0.001	0.004	-0.007	346.0	-59.5	-48.579	-82.476
19/11/2008	5869124.333	532246.111	495.314	6.93	-0.046	0.151	0.158	-0.028	106.9	-10.1	0.023	-0.004	0.22	0.006	-0.001	0.006	-0.004	350.5	-33.3	-27.094	-17.817
26/03/2009	5869124.334	532246.116	495.319	7.28	-0.045	0.156	0.162	-0.023	106.1	-8.1	0.022	-0.003	0.35	0.001	0.005	0.005	0.005	78.7	44.4	14.665	14.380
10/06/2009	5869124.318	532246.152	495.321	7.49	-0.061	0.192	0.201	-0.021	107.6	-6.0	0.027	-0.003	0.21	-0.016	0.036	0.039	0.002	114.0	2.9	189.331	9.612
17/09/2009	5869124.323	532246.149	495.318	7.76	-0.056	0.189	0.197	-0.024	106.5	-6.9	0.025	-0.003	0.27	0.005	-0.003	0.006	-0.003	329.0	-27.2	-21.513	-11.068
23/11/2009	5869124.321	532246.137	495.310	7.94	-0.058	0.177	0.186	-0.032	108.1	-9.7	0.023	-0.004	0.18	-0.002	-0.012	0.012	-0.008	260.5	-33.3	-66.320	-43.612
27/03/2010	5869124.323	532246.144	495.313	8.28	-0.056	0.184	0.192	-0.029	106.9	-8.6	0.023	-0.004	0.34	0.002	0.007	0.007	0.003	74.1	22.4	21.444	8.837
04/07/2010	5869124.309	532246.146	495.326	8.55	-0.070	0.186	0.199	-0.016	110.6	-4.6	0.023	-0.002	0.27	-0.014	0.002	0.014	0.013	171.9	42.6	52.176	47.962
13/09/2010	5869124.321	532246.146	495.320	8.74	-0.058	0.186	0.195	-0.022	107.3	-6.4	0.022	-0.003	0.19	0.012	0.000	0.012	-0.006	0.0	-26.6	-61.732	-30.866
22/11/2010	5869124.326	532246.151	495.314	8.94	-0.053	0.191	0.198	-0.028	105.5	-8.0	0.022	-0.003	0.19	0.005	0.005	0.007	-0.006	45.0	-40.3	36.896	-31.307

Displacement Graphs - Hub 01-33
South End of Allard Street







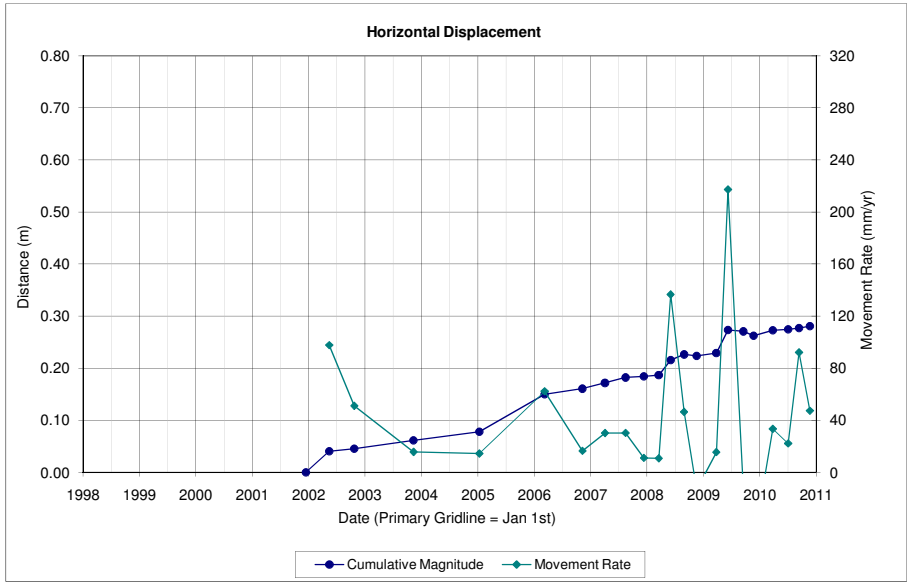


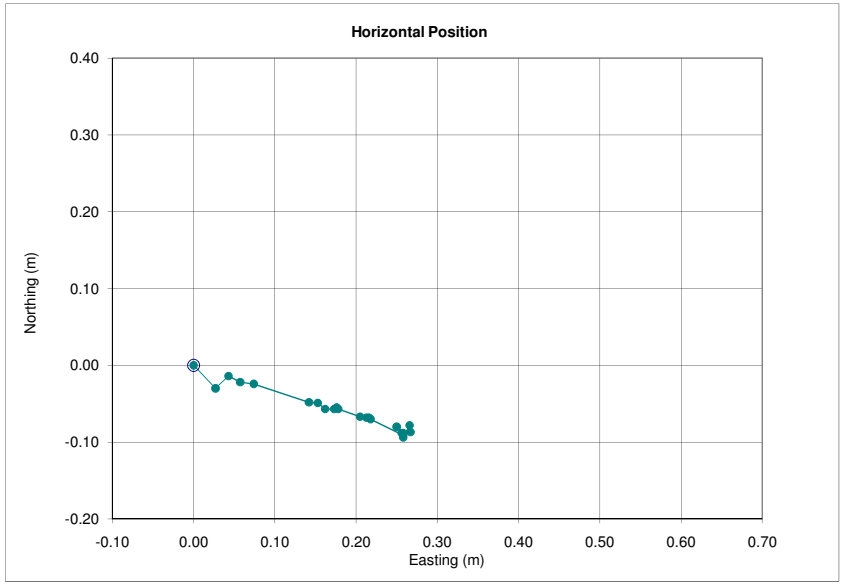
Survey and Displacement Data - Hub 01-34

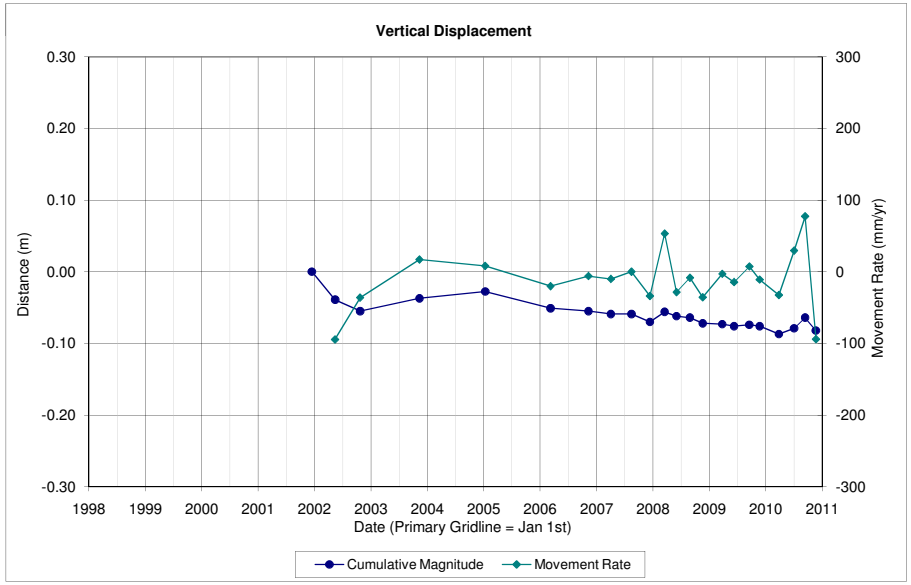
Abbott Road and Blair Street

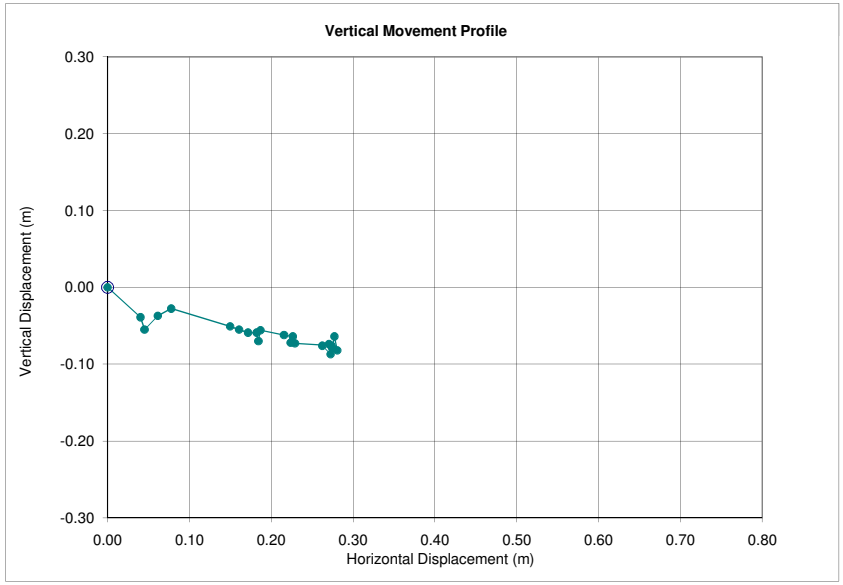
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869581.862	532354.652	494.462	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869581.832	532354.679	494.423	0.41	-0.030	0.027	0.040	-0.039	138.0	-44.0	0.098	-0.094	0.41	-0.030	0.027	0.040	-0.039	138.0	-44.0	97.628	-94.336
24/10/2002	5869581.848	532354.695	494.407	0.86	-0.014	0.043	0.045	-0.055	108.0	-50.6	0.053	-0.064	0.44	0.016	0.016	0.023	-0.016	45.0	-35.3	51.016	-36.074
12/11/2003	5869581.840	532354.709	494.425	1.91	-0.022	0.057	0.061	-0.037	110.8	-31.2	0.032	-0.019	1.05	-0.008	0.014	0.016	0.018	118.6	47.4	15.595	16.988
11/01/2005	5869581.838	532354.726	494.434	3.07	-0.024	0.074	0.078	-0.028	108.1	-19.6	0.025	-0.009	1.17	-0.002	0.017	0.017	0.009	98.1	29.4	14.376	8.094
10/03/2006	5869581.814	532354.794	494.411	4.23	-0.048	0.142	0.150	-0.051	108.7	-18.8	0.035	-0.012	1.16	-0.024	0.068	0.072	-0.023	109.3	-17.9	62.209	-20.119
10/11/2006	5869581.813	532354.805	494.407	4.90	-0.049	0.153	0.161	-0.055	107.8	-18.9	0.033	-0.011	0.67	-0.001	0.011	0.011	-0.004	95.2	-19.9	16.467	-5.963
05/04/2007	5869581.805	532354.814	494.403	5.30	-0.057	0.162	0.172	-0.059	109.4	-19.0	0.032	-0.011	0.40	-0.008	0.009	0.012	-0.004	131.6	-18.4	30.125	-10.007
16/08/2007	5869581.805	532354.825	494.403	5.67	-0.057	0.173	0.182	-0.059	108.2	-17.9	0.032	-0.010	0.36	0.000	0.011	0.011	0.000	90.0	0.0	30.209	0.000
13/12/2007	5869581.807	532354.828	494.392	5.99	-0.055	0.176	0.184	-0.070	107.4	-20.8	0.031	-0.012	0.33	0.002	0.003	0.004	-0.011	56.3	-71.9	11.067	-33.763
18/03/2008	5869581.805	532354.830	494.406	6.26	-0.057	0.178	0.187	-0.056	107.8	-16.7	0.030	-0.009	0.26	-0.002	0.002	0.003	0.014	135.0	78.6	10.761	53.266
03/06/2008	5869581.795	532354.857	494.400	6.47	-0.067	0.205	0.216	-0.062	108.1	-16.0	0.033	-0.010	0.21	-0.010	0.027	0.029	-0.006	110.3	-11.8	136.577	-28.461
29/08/2008	5869581.794	532354.868	494.398	6.70	-0.068	0.216	0.226	-0.064	107.5	-15.8	0.034	-0.010	0.24	-0.001	0.011	0.011	-0.002	95.2	-10.3	46.371	-8.397
19/11/2008	5869581.794	532354.865	494.390	6.93	-0.068	0.213	0.224	-0.072	107.7	-17.8	0.032	-0.010	0.22	0.000	-0.003	0.003	-0.008	270.0	-69.4	-13.363	-35.634
26/03/2009	5869581.792	532354.870	494.389	7.28	-0.070	0.218	0.229	-0.073	107.8	-17.7	0.031	-0.010	0.35	-0.002	0.005	0.005	-0.001	111.8	-10.5	15.488	-2.876
10/06/2009	5869581.771	532354.910	494.386	7.49	-0.091	0.258	0.274	-0.076	109.4	-15.5	0.037	-0.010	0.21	-0.021	0.040	0.045	-0.003	117.7	-3.8	217.119	-14.418
17/09/2009	5869581.774	532354.908	494.388	7.76	-0.088	0.256	0.271	-0.074	109.0	-15.3	0.035	-0.010	0.27	0.003	-0.002	0.004	0.002	326.3	29.0	-13.302	7.379
23/11/2009	5869581.782	532354.902	494.386	7.94	-0.080	0.250	0.262	-0.076	107.7	-16.1	0.033	-0.010	0.18	0.008	-0.006	0.010	-0.002	323.1	-11.3	-54.515	-10.903
27/03/2010	5869581.774	532354.910	494.375	8.28	-0.088	0.258	0.273	-0.087	108.8	-17.7	0.033	-0.011	0.34	-0.008	0.008	0.011	-0.011	135.0	-44.2	33.325	-32.401
04/07/2010	5869581.768	532354.910	494.383	8.55	-0.094	0.258	0.275	-0.079	110.0	-16.1	0.032	-0.009	0.27	-0.006	0.000	0.006	0.008	180.0	53.1	22.136	29.515
13/09/2010	5869581.784	532354.918	494.398	8.74	-0.078	0.266	0.277	-0.064	106.3	-13.0	0.032	-0.007	0.19	0.016	0.008	0.018	0.015	26.6	40.0	92.025	77.165
22/11/2010	5869581.775	532354.919	494.380	8.94	-0.087	0.267	0.281	-0.082	108.0	-16.3	0.031	-0.009	0.19	-0.009	0.001	0.009	-0.018	173.7	-63.3	47.250	-93.921

Displacement Graphs - Hub 01-34
Abbott Road and Blair Street







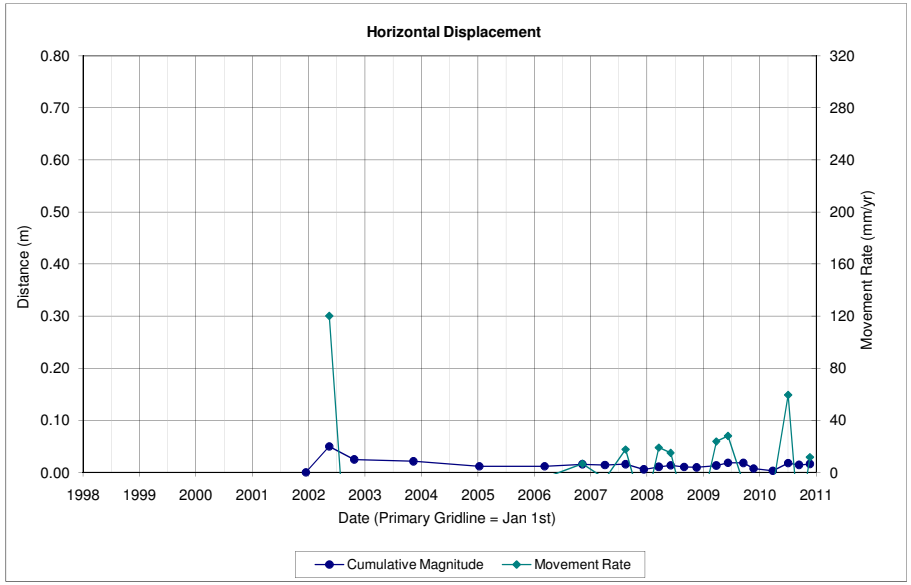


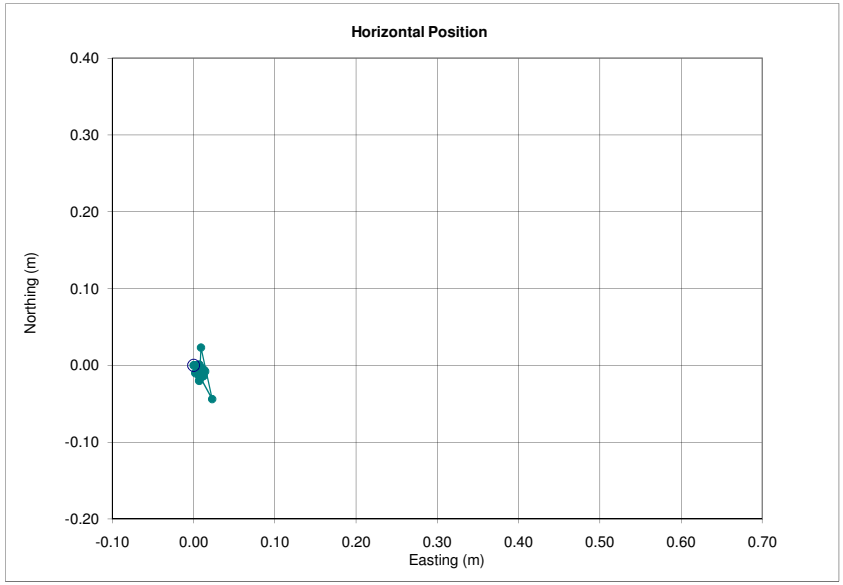
Survey and Displacement Data - Hub 01-35

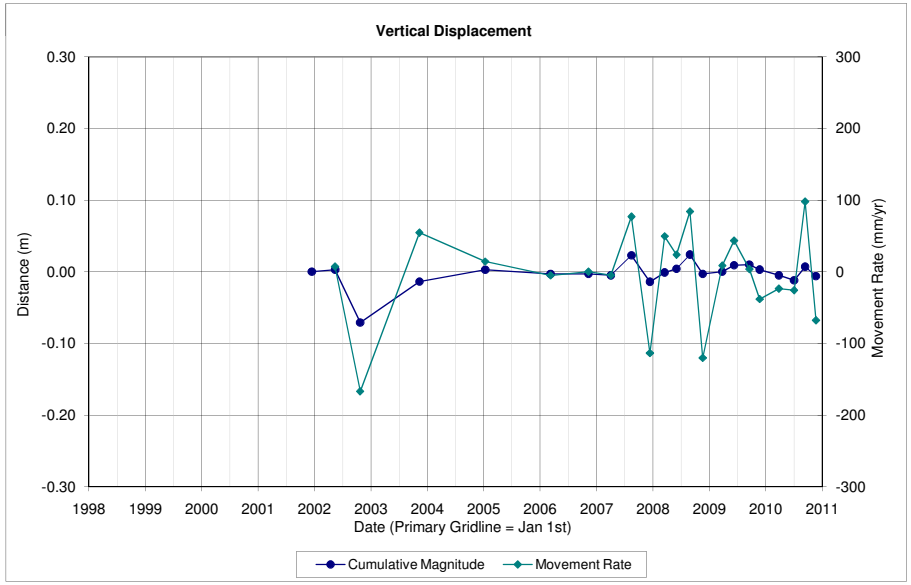
Lewis Drive North of Couldwell Street

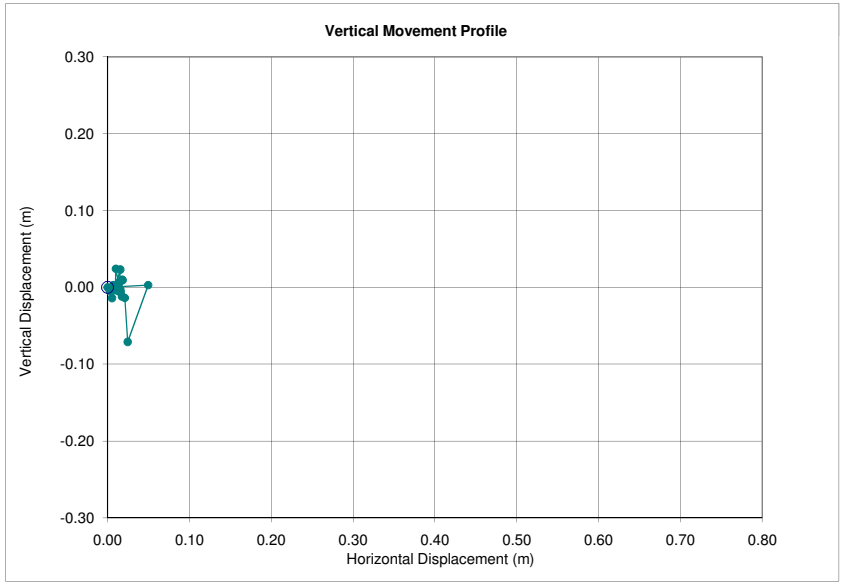
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869572.261	532863.710	473.090	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869572.217	532863.733	473.093	0.41	-0.044	0.023	0.050	0.003	152.4	3.5	0.120	0.007	0.41	-0.044	0.023	0.050	0.003	152.4	3.5	120.094	7.257
24/10/2002	5869572.284	532863.719	473.019	0.86	0.023	0.009	0.025	-0.071	21.4	-70.8	0.029	-0.083	0.44	0.067	-0.014	0.068	-0.074	348.2	-47.2	-154.323	-166.843
12/11/2003	5869572.241	532863.717	473.076	1.91	-0.020	0.007	0.021	-0.014	160.8	-32.9	0.011	-0.007	1.05	-0.043	-0.002	0.043	0.057	182.7	53.1	-40.918	54.521
11/01/2005	5869572.256	532863.720	473.093	3.07	-0.005	0.010	0.011	0.003	117.5	14.2	0.004	0.001	1.17	0.015	0.003	0.015	0.017	12.5	47.8	-12.881	14.216
10/03/2006	5869572.252	532863.717	473.087	4.23	-0.009	0.007	0.011	-0.003	142.1	-14.7	0.003	-0.001	1.16	-0.004	-0.003	0.005	-0.006	220.9	-50.3	-4.224	-5.095
10/11/2006	5869572.250	532863.721	473.087	4.90	-0.011	0.011	0.016	-0.003	135.0	-10.9	0.003	-0.001	0.67	-0.002	0.004	0.004	0.000	116.6	0.0	6.667	0.000
05/04/2007	5869572.252	532863.721	473.085	5.30	-0.009	0.011	0.014	-0.005	129.3	-19.4	0.003	-0.001	0.40	0.002	0.000	0.002	-0.002	0.0	-45.0	-5.003	-5.003
16/08/2007	5869572.247	532863.717	473.113	5.67	-0.014	0.007	0.016	0.023	153.4	55.8	0.003	0.004	0.36	-0.005	-0.004	0.006	0.028	218.7	77.1	17.585	76.895
13/12/2007	5869572.257	532863.714	473.076	5.99	-0.004	0.004	0.006	-0.014	135.0	-68.0	0.001	-0.002	0.33	0.010	-0.003	0.010	-0.037	343.3	-74.2	-32.045	-113.565
18/03/2008	5869572.253	532863.717	473.089	6.26	-0.008	0.007	0.011	-0.001	138.8	-5.4	0.002	0.000	0.26	-0.004	0.003	0.005	0.013	143.1	69.0	19.023	49.461
03/06/2008	5869572.250	532863.718	473.094	6.47	-0.011	0.008	0.014	0.004	144.0	16.4	0.002	0.001	0.21	-0.003	0.001	0.003	0.005	161.6	57.7	15.000	23.718
29/08/2008	5869572.251	532863.712	473.114	6.70	-0.010	0.002	0.010	0.024	168.7	67.0	0.002	0.004	0.24	0.001	-0.006	0.006	0.020	279.5	73.1	-25.537	83.966
19/11/2008	5869572.258	532863.719	473.087	6.93	-0.003	0.009	0.009	-0.003	108.4	-17.5	0.001	0.000	0.22	0.007	0.007	0.010	-0.027	45.0	-69.9	-44.095	-120.265
26/03/2009	5869572.250	532863.717	473.090	7.28	-0.011	0.007	0.013	0.000	147.5	0.0	0.002	0.000	0.35	-0.008	-0.002	0.008	0.003	194.0	20.0	23.716	8.628
10/06/2009	5869572.247	532863.722	473.099	7.49	-0.014	0.012	0.018	0.009	139.4	26.0	0.002	0.001	0.21	-0.003	0.005	0.006	0.009	121.0	57.1	28.023	43.253
17/09/2009	5869572.246	532863.720	473.100	7.76	-0.015	0.010	0.018	0.010	146.3	29.0	0.002	0.001	0.27	-0.001	-0.002	0.002	0.001	243.4	24.1	-8.250	3.689
23/11/2009	5869572.262	532863.717	473.093	7.94	0.001	0.007	0.007	0.003	81.9	23.0	0.001	0.000	0.18	0.016	-0.003	0.016	-0.007	349.4	-23.3	-88.744	-38.160
27/03/2010	5869572.261	532863.713	473.085	8.28	0.000	0.003	0.003	-0.005	90.0	-59.0	0.000	-0.001	0.34	-0.001	-0.004	0.004	-0.008	256.0	-62.7	-12.145	-23.565
04/07/2010	5869572.247	532863.721	473.078	8.55	-0.014	0.011	0.018	-0.012	141.8	-34.0	0.002	-0.001	0.27	-0.014	0.008	0.016	-0.007	150.3	-23.5	59.490	-25.826
13/09/2010	5869572.255	532863.723	473.097	8.74	-0.006	0.013	0.014	0.007	114.8	26.1	0.002	0.001	0.19	0.008	0.002	0.008	0.019	14.0	66.5	-42.422	97.743
22/11/2010	5869572.253	532863.724	473.084	8.94	-0.008	0.014	0.016	-0.006	119.7	-20.4	0.002	-0.001	0.19	-0.002	0.001	0.002	-0.013	153.4	-80.2	11.667	-67.832

Displacement Graphs - Hub 01-35
Lewis Drive North of Couldwell Street







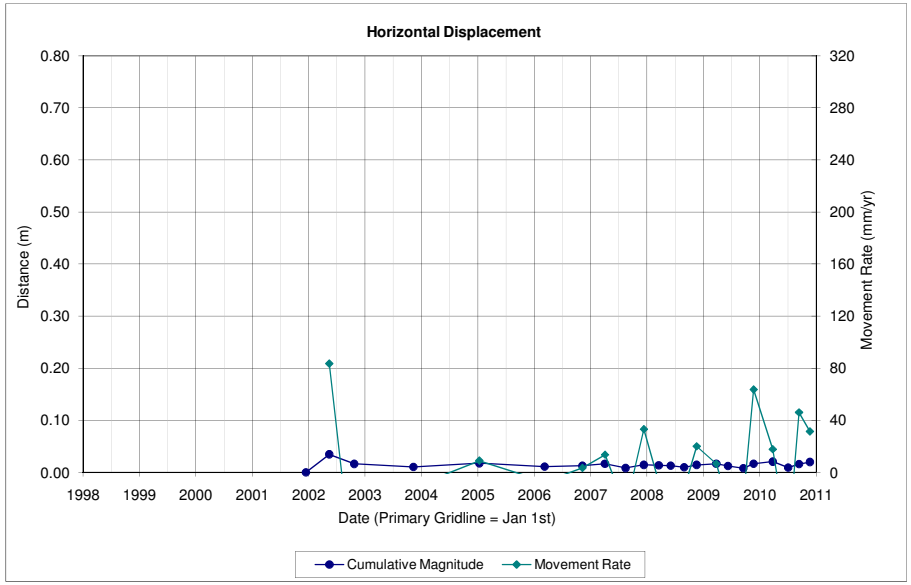


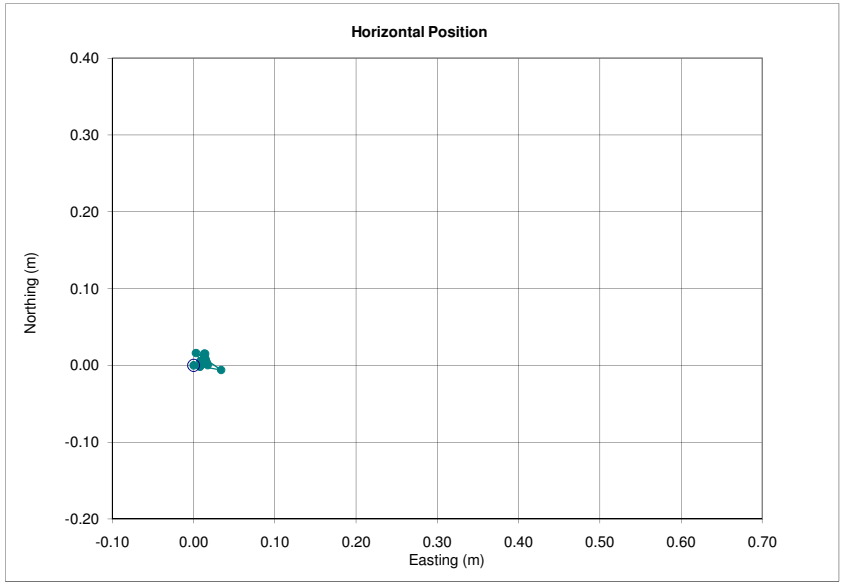
Survey and Displacement Data - Hub 01-36

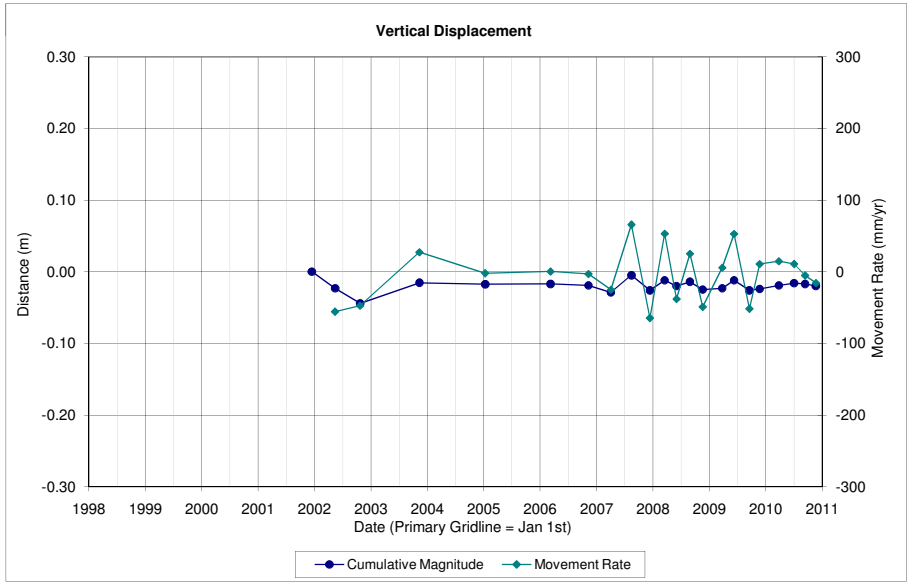
Anderson Drive at Abbott Drive

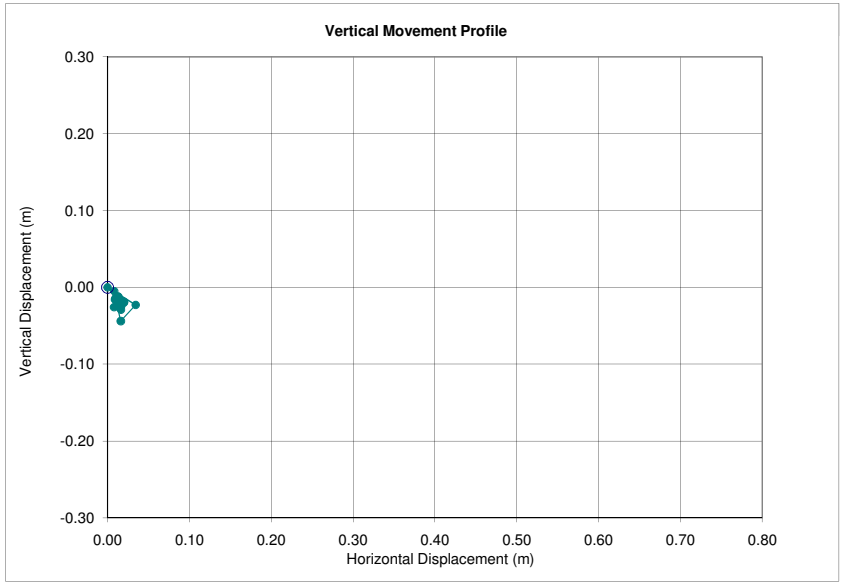
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869315.625	532692.784	476.837	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869315.619	532692.818	476.814	0.41	-0.006	0.034	0.035	-0.023	100.0	-33.7	0.084	-0.056	0.41	-0.006	0.034	0.035	-0.023	100.0	-33.7	83.512	-55.634
24/10/2002	5869315.641	532692.787	476.793	0.86	0.016	0.003	0.016	-0.044	10.6	-69.7	0.019	-0.051	0.44	0.022	-0.031	0.038	-0.021	305.4	-28.9	-85.706	-47.347
12/11/2003	5869315.631	532692.792	476.822	1.91	0.006	0.008	0.010	-0.015	56.7	-56.4	0.005	-0.008	1.05	-0.010	0.005	0.012	0.029	152.2	67.7	-11.203	27.299
11/01/2005	5869315.625	532692.802	476.820	3.07	0.000	0.017	0.018	-0.017	88.7	-45.0	0.006	-0.006	1.17	-0.005	0.009	0.010	-0.002	119.9	-12.0	8.911	-1.886
10/03/2006	5869315.629	532692.794	476.820	4.23	0.004	0.010	0.011	-0.017	68.2	-57.6	0.003	-0.004	1.16	0.004	-0.007	0.008	0.000	295.6	3.4	-7.183	0.432
10/11/2006	5869315.631	532692.795	476.818	4.90	0.006	0.011	0.013	-0.019	61.4	-56.6	0.003	-0.004	0.67	0.002	0.001	0.002	-0.002	26.6	-41.8	3.334	-2.982
05/04/2007	5869315.629	532692.800	476.808	5.30	0.004	0.016	0.016	-0.029	76.0	-60.4	0.003	-0.005	0.40	-0.002	0.005	0.005	-0.010	111.8	-61.7	13.472	-25.017
16/08/2007	5869315.623	532692.792	476.832	5.67	-0.002	0.008	0.008	-0.005	104.0	-31.2	0.001	-0.001	0.36	-0.006	-0.008	0.010	0.024	233.1	67.4	-27.462	65.910
13/12/2007	5869315.633	532692.796	476.811	5.99	0.008	0.012	0.014	-0.026	56.3	-61.0	0.002	-0.004	0.33	0.010	0.004	0.011	-0.021	21.8	-62.8	33.058	-64.456
18/03/2008	5869315.631	532692.796	476.825	6.26	0.006	0.012	0.013	-0.012	63.4	-41.8	0.002	-0.002	0.26	-0.002	0.000	0.002	0.014	180.0	81.9	-7.609	53.266
03/06/2008	5869315.629	532692.796	476.817	6.47	0.004	0.012	0.013	-0.020	71.6	-57.7	0.002	-0.003	0.21	-0.002	0.000	0.002	-0.008	180.0	-76.0	-9.487	-37.948
29/08/2008	5869315.629	532692.793	476.823	6.70	0.004	0.009	0.010	-0.014	66.0	-54.9	0.001	-0.002	0.24	0.000	-0.003	0.003	0.006	270.0	63.4	-12.595	25.190
19/11/2008	5869315.631	532692.797	476.812	6.93	0.006	0.013	0.014	-0.025	65.2	-60.2	0.002	-0.004	0.22	0.002	0.004	0.004	-0.011	63.4	-67.9	19.920	-48.997
26/03/2009	5869315.632	532692.799	476.814	7.28	0.007	0.015	0.017	-0.023	65.0	-54.3	0.002	-0.003	0.35	0.001	0.002	0.002	0.002	63.4	41.8	6.431	5.752
10/06/2009	5869315.628	532692.796	476.825	7.49	0.003	0.012	0.012	-0.012	76.0	-44.1	0.002	-0.002	0.21	-0.004	-0.003	0.005	0.011	216.9	65.6	-24.030	52.865
17/09/2009	5869315.624	532692.792	476.811	7.76	-0.001	0.008	0.008	-0.026	97.1	-72.8	0.001	-0.003	0.27	-0.004	-0.004	0.006	-0.014	225.0	-68.0	-20.870	-51.652
23/11/2009	5869315.634	532692.798	476.813	7.94	0.009	0.014	0.017	-0.024	57.3	-55.3	0.002	-0.003	0.18	0.010	0.006	0.012	0.002	31.0	9.7	63.575	10.903
27/03/2010	5869315.640	532692.798	476.818	8.28	0.015	0.014	0.021	-0.019	43.0	-42.8	0.002	-0.002	0.34	0.006	0.000	0.006	0.005	0.0	39.8	17.673	14.728
04/07/2010	5869315.626	532692.793	476.821	8.55	0.001	0.009	0.009	-0.016	83.7	-60.5	0.001	-0.002	0.27	-0.014	-0.005	0.015	0.003	199.7	11.4	-54.847	11.068
13/09/2010	5869315.634	532692.797	476.820	8.74	0.009	0.013	0.016	-0.017	55.3	-47.1	0.002	-0.002	0.19	0.008	0.004	0.009	-0.001	26.6	-6.4	46.013	-5.144
22/11/2010	5869315.640	532692.797	476.817	8.94	0.015	0.013	0.020	-0.020	40.9	-45.2	0.002	-0.002	0.19	0.006	0.000	0.006	-0.003	0.0	-26.6	31.307	-15.654

Displacement Graphs - Hub 01-36
Anderson Drive at Abbott Drive







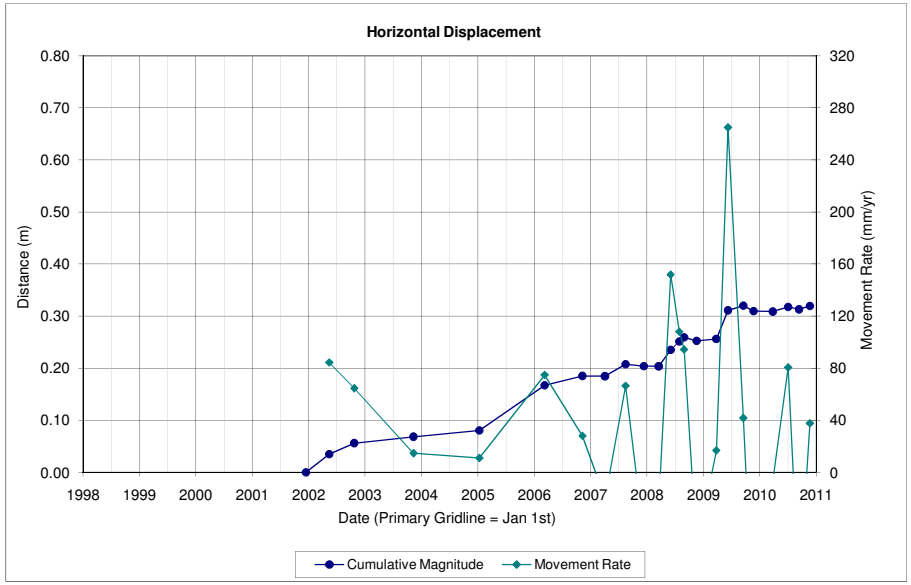


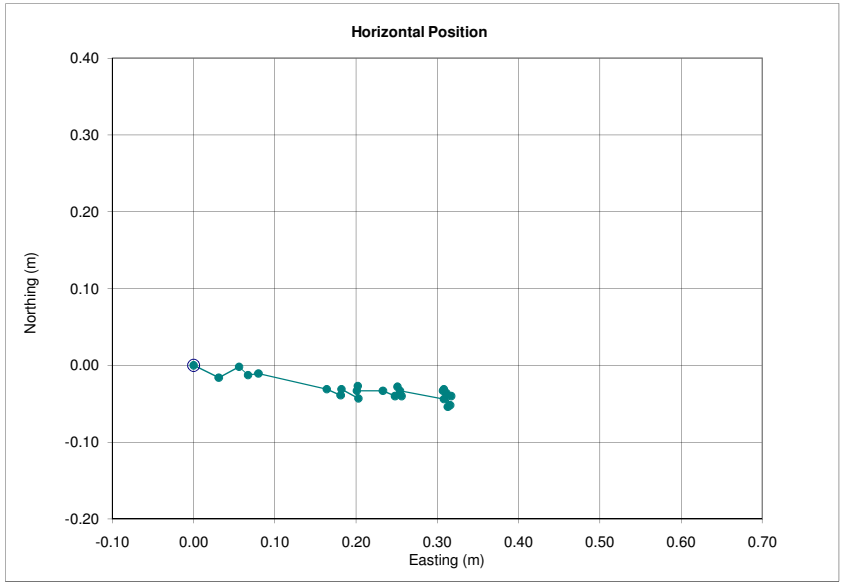
Survey and Displacement Data - Hub 01-37

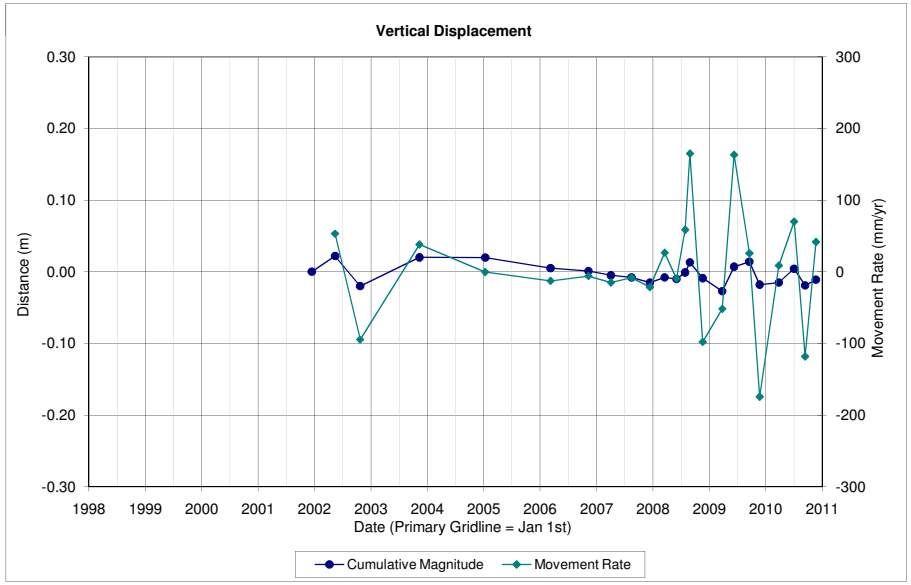
Dawson Street at Abbott Drive

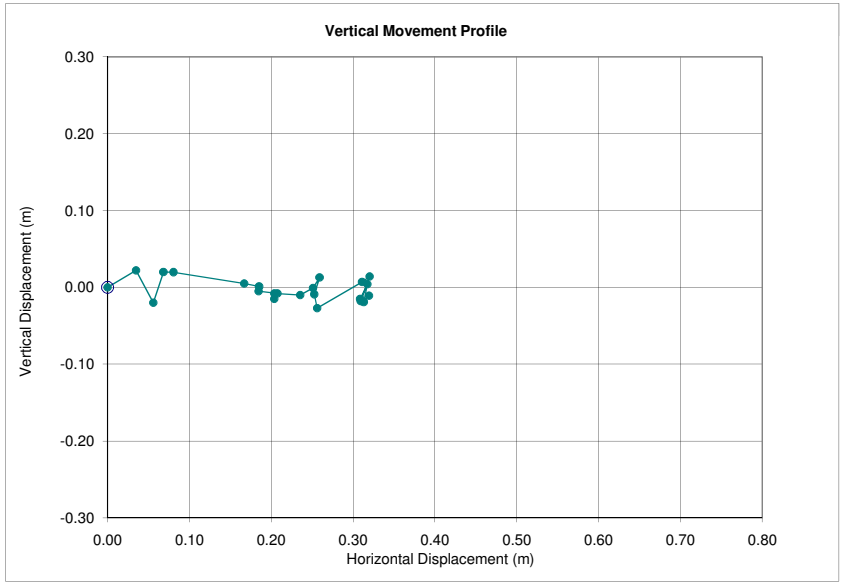
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869644.821	531567.709	545.684	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869644.805	531567.740	545.706	0.41	-0.016	0.031	0.035	0.022	117.3	32.2	0.084	0.053	0.41	-0.016	0.031	0.035	0.022	117.3	32.2	84.384	53.215
24/10/2002	5869644.819	531567.765	545.664	0.86	-0.002	0.056	0.056	-0.020	92.0	-19.6	0.065	-0.023	0.44	0.014	0.025	0.029	-0.042	60.8	-55.7	64.602	-94.694
12/11/2003	5869644.808	531567.776	545.704	1.91	-0.013	0.067	0.068	0.020	100.7	16.3	0.036	0.010	1.05	-0.011	0.011	0.015	0.040	133.9	68.9	14.698	38.075
11/01/2005	5869644.810	531567.789	545.704	3.07	-0.011	0.080	0.081	0.020	97.6	13.8	0.026	0.006	1.17	0.002	0.013	0.013	0.000	80.5	-1.5	11.014	-0.283
10/03/2006	5869644.790	531567.873	545.689	4.23	-0.031	0.164	0.167	0.005	100.7	1.7	0.039	0.001	1.16	-0.020	0.084	0.087	-0.015	103.6	-9.6	74.808	-12.693
10/11/2006	5869644.782	531567.890	545.685	4.90	-0.039	0.181	0.185	0.001	102.2	0.3	0.038	0.000	0.67	-0.008	0.017	0.019	-0.004	115.2	-12.0	28.010	-5.963
05/04/2007	5869644.790	531567.891	545.679	5.30	-0.031	0.182	0.185	-0.005	99.7	-1.6	0.035	-0.001	0.40	0.008	0.001	0.008	-0.006	7.1	-36.7	-20.169	-15.010
16/08/2007	5869644.778	531567.912	545.676	5.67	-0.043	0.203	0.208	-0.008	102.0	-2.2	0.037	-0.001	0.36	-0.012	0.021	0.024	-0.003	119.7	-7.1	66.423	-8.239
13/12/2007	5869644.794	531567.911	545.669	5.99	-0.027	0.202	0.204	-0.015	97.6	-4.2	0.034	-0.003	0.33	0.016	-0.001	0.016	-0.007	356.4	-23.6	-49.205	-21.485
18/03/2008	5869644.788	531567.910	545.676	6.26	-0.033	0.201	0.204	-0.008	99.3	-2.2	0.033	-0.001	0.26	-0.006	-0.001	0.006	0.007	189.5	49.0	-23.143	26.633
03/06/2008	5869644.788	531567.942	545.674	6.47	-0.033	0.233	0.235	-0.010	98.1	-2.4	0.036	-0.002	0.21	0.000	0.032	0.032	-0.002	90.0	-3.6	151.792	-9.487
29/07/2008	5869644.781	531567.957	545.683	6.62	-0.040	0.248	0.251	-0.001	99.2	-0.2	0.038	0.000	0.15	-0.007	0.015	0.017	0.009	115.0	28.5	107.964	58.701
29/08/2008	5869644.781	531567.965	545.697	6.70	-0.040	0.256	0.259	0.013	98.9	2.9	0.039	0.002	0.08	0.000	0.008	0.008	0.014	90.0	60.3	94.258	164.952
19/11/2008	5869644.793	531567.960	545.675	6.93	-0.028	0.251	0.253	-0.009	96.4	-2.0	0.036	-0.001	0.22	0.012	-0.005	0.013	-0.022	337.4	-59.4	-57.905	-97.994
26/03/2009	5869644.788	531567.963	545.657	7.28	-0.033	0.254	0.256	-0.027	97.4	-6.0	0.035	-0.004	0.35	-0.005	0.003	0.006	-0.018	149.0	-72.1	16.770	-51.768
10/06/2009	5869644.777	531568.017	545.691	7.49	-0.044	0.308	0.311	0.007	98.1	1.3	0.042	0.001	0.21	-0.011	0.054	0.055	0.034	101.5	31.7	264.849	163.401
17/09/2009	5869644.769	531568.025	545.698	7.76	-0.052	0.316	0.320	0.014	99.3	2.5	0.041	0.002	0.27	-0.008	0.008	0.011	0.007	135.0	31.7	41.741	25.826
23/11/2009	5869644.790	531568.017	545.666	7.94	-0.031	0.308	0.310	-0.018	95.7	-3.3	0.039	-0.002	0.18	0.021	-0.008	0.022	-0.032	339.1	-54.9	-122.507	-174.448
27/03/2010	5869644.788	531568.016	545.669	8.28	-0.033	0.307	0.309	-0.015	96.1	-2.8	0.037	-0.002	0.34	-0.002	-0.001	0.002	0.003	206.6	53.3	-6.586	8.837
04/07/2010	5869644.767	531568.022	545.688	8.55	-0.054	0.313	0.318	0.004	99.8	0.7	0.037	0.000	0.27	-0.021	0.006	0.022	0.019	164.1	41.0	80.578	70.098
13/09/2010	5869644.785	531568.020	545.665	8.74	-0.036	0.311	0.313	-0.019	96.6	-3.5	0.036	-0.002	0.19	0.018	-0.002	0.018	-0.023	353.7	-51.8	-93.168	-118.320
22/11/2010	5869644.781	531568.026	545.673	8.94	-0.040	0.317	0.320	-0.011	97.2	-2.0	0.036	-0.001	0.19	-0.004	0.006	0.007	0.008	123.7	48.0	37.627	41.743

Displacement Graphs - Hub 01-37
Dawson Street at Abbott Drive







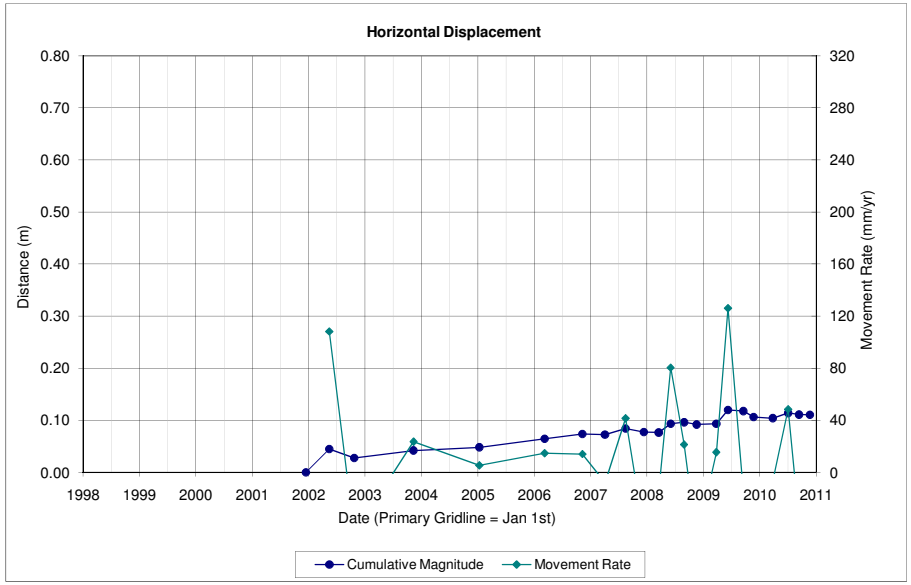


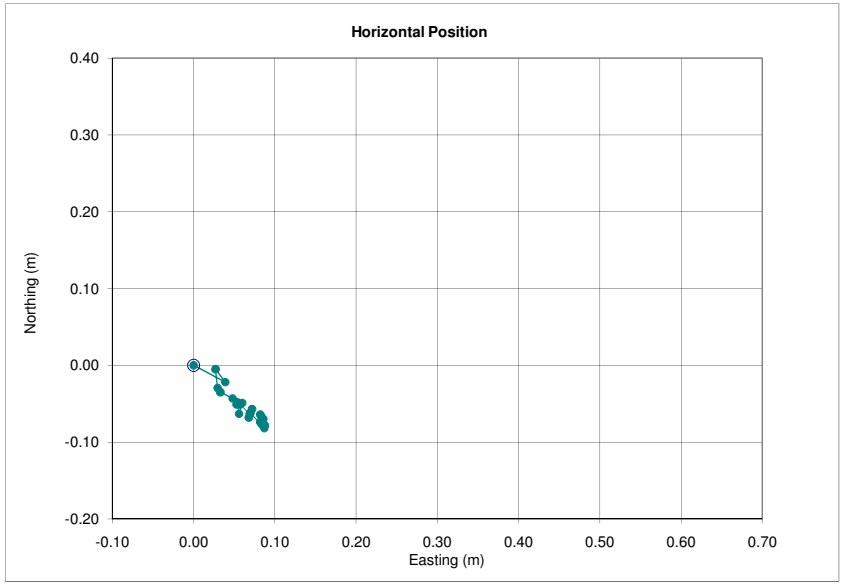
Survey and Displacement Data - Hub 01-39

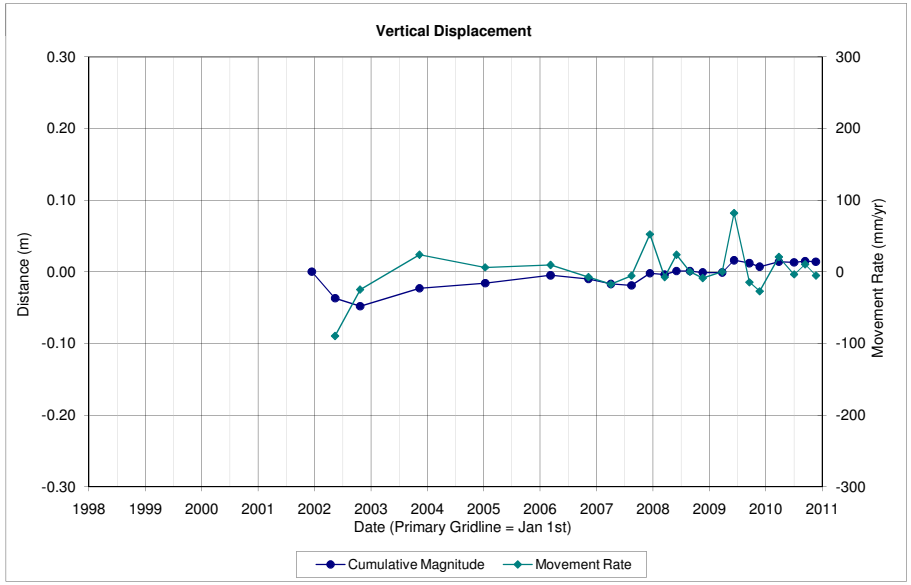
Anderson Avenue at Wade Avenue

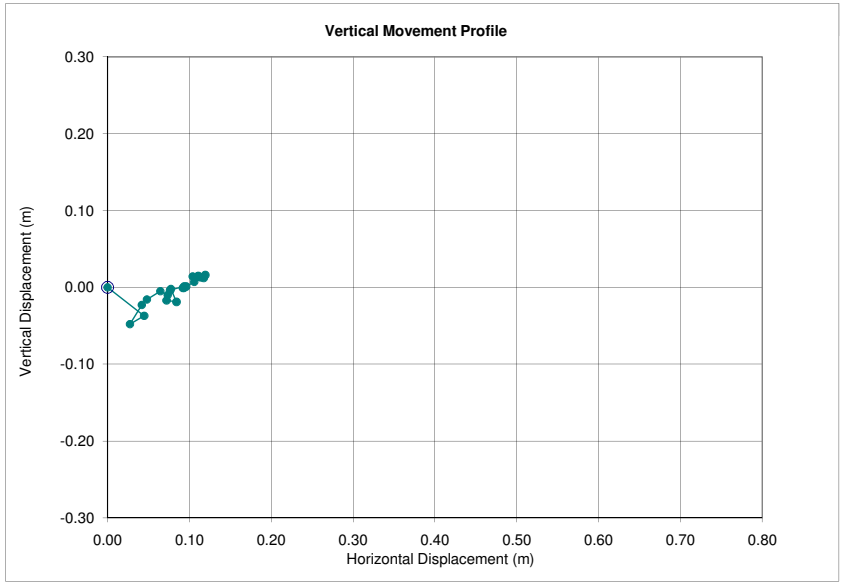
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869071.953	532473.937	476.875	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5869071.931	532473.976	476.838	0.41	-0.022	0.039	0.045	-0.037	119.4	-39.6	0.108	-0.089	0.41	-0.022	0.039	0.045	-0.037	119.4	-39.6	108.310	-89.498
24/10/2002	5869071.948	532473.964	476.827	0.86	-0.005	0.027	0.027	-0.048	100.5	-60.2	0.032	-0.056	0.44	0.017	-0.012	0.021	-0.011	324.8	-27.9	-46.916	-24.801
12/11/2003	5869071.923	532473.967	476.852	1.91	-0.030	0.030	0.042	-0.023	135.0	-28.8	0.022	-0.012	1.05	-0.025	0.003	0.025	0.025	174.0	45.2	23.587	23.713
11/01/2005	5869071.918	532473.970	476.859	3.07	-0.035	0.033	0.048	-0.016	136.7	-18.4	0.016	-0.005	1.17	-0.005	0.003	0.006	0.007	147.6	48.2	5.423	6.062
10/03/2006	5869071.910	532473.985	476.870	4.23	-0.043	0.048	0.064	-0.005	131.9	-4.4	0.015	-0.001	1.16	-0.008	0.015	0.017	0.011	118.1	32.9	14.679	9.498
10/11/2006	5869071.902	532473.990	476.865	4.90	-0.051	0.053	0.074	-0.010	133.9	-7.7	0.015	-0.002	0.67	-0.008	0.005	0.009	-0.005	148.0	-27.9	14.064	-7.454
05/04/2007	5869071.905	532473.991	476.858	5.30	-0.048	0.054	0.072	-0.017	131.6	-13.2	0.014	-0.003	0.40	0.003	0.001	0.003	-0.007	18.4	-65.7	-7.911	-17.512
16/08/2007	5869071.890	532473.993	476.856	5.67	-0.063	0.056	0.084	-0.019	138.4	-12.7	0.015	-0.003	0.36	-0.015	0.002	0.015	-0.002	172.4	-7.5	41.558	-5.492
13/12/2007	5869071.904	532473.997	476.873	5.99	-0.049	0.060	0.077	-0.002	129.2	-1.5	0.013	0.000	0.33	0.014	0.004	0.015	0.017	15.9	49.4	-44.690	52.179
18/03/2008	5869071.902	532473.994	476.871	6.26	-0.051	0.057	0.076	-0.004	131.8	-3.0	0.012	-0.001	0.26	-0.002	-0.003	0.004	-0.002	236.3	-29.0	-13.718	-7.609
03/06/2008	5869071.890	532474.006	476.876	6.47	-0.063	0.069	0.093	0.001	132.4	0.6	0.014	0.000	0.21	-0.012	0.012	0.017	0.005	135.0	16.4	80.500	23.718
29/08/2008	5869071.885	532474.005	476.876	6.70	-0.068	0.068	0.096	0.001	135.0	0.6	0.014	0.000	0.24	-0.005	-0.001	0.005	0.000	191.3	0.0	21.407	0.000
19/11/2008	5869071.896	532474.009	476.874	6.93	-0.057	0.072	0.092	-0.001	128.4	-0.6	0.013	0.000	0.22	0.011	0.004	0.012	-0.002	20.0	-9.7	-52.136	-8.909
26/03/2009	5869071.891	532474.007	476.874	7.28	-0.062	0.070	0.094	-0.001	131.5	-0.6	0.013	0.000	0.35	-0.005	-0.002	0.005	0.000	201.8	0.0	15.488	0.000
10/06/2009	5869071.871	532474.024	476.891	7.49	-0.082	0.087	0.120	0.016	133.3	7.6	0.016	0.002	0.21	-0.020	0.017	0.026	0.017	139.6	32.9	126.150	81.701
17/09/2009	5869071.875	532474.025	476.887	7.76	-0.078	0.088	0.118	0.012	131.6	5.8	0.015	0.002	0.27	0.004	0.001	0.004	-0.004	14.0	-44.1	-15.212	-14.758
23/11/2009	5869071.887	532474.020	476.882	7.94	-0.066	0.083	0.106	0.007	128.5	3.8	0.013	0.001	0.18	0.012	-0.005	0.013	-0.005	337.4	-21.0	-70.869	-27.257
27/03/2010	5869071.889	532474.019	476.889	8.28	-0.064	0.082	0.104	0.014	128.0	7.7	0.013	0.002	0.34	0.002	-0.001	0.002	0.007	333.4	72.3	-6.586	20.619
04/07/2010	5869071.876	532474.021	476.888	8.55	-0.077	0.084	0.114	0.013	132.5	6.5	0.013	0.002	0.27	-0.013	0.002	0.013	-0.001	171.3	-4.3	48.526	-3.689
13/09/2010	5869071.883	532474.023	476.890	8.74	-0.070	0.086	0.111	0.015	129.1	7.7	0.013	0.002	0.19	0.007	0.002	0.007	0.002	15.9	15.4	-37.452	10.289
22/11/2010	5869071.879	532474.019	476.889	8.94	-0.074	0.082	0.110	0.014	132.1	7.2	0.012	0.002	0.19	-0.004	-0.004	0.006	-0.001	225.0	-10.0	-29.517	-5.218

Displacement Graphs - Hub 01-39
Anderson Avenue at Wade Avenue







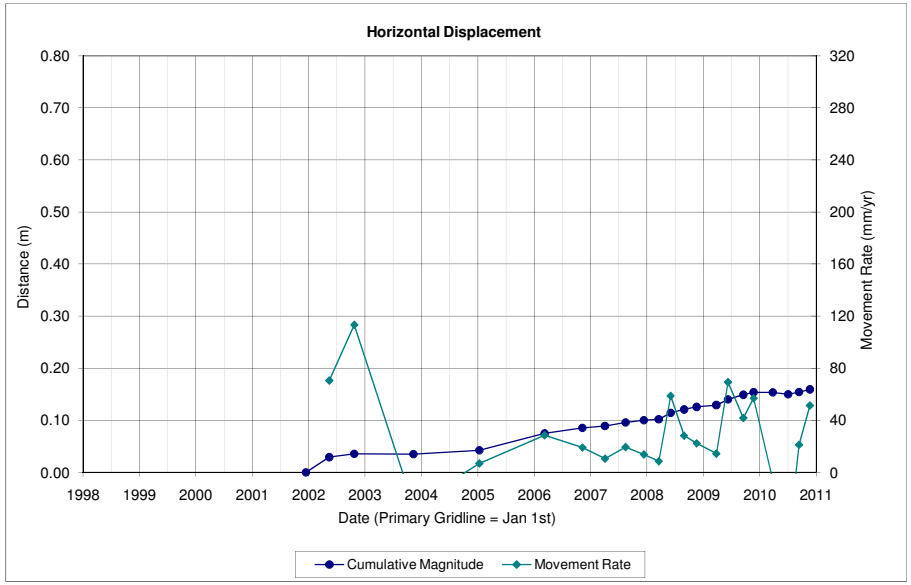


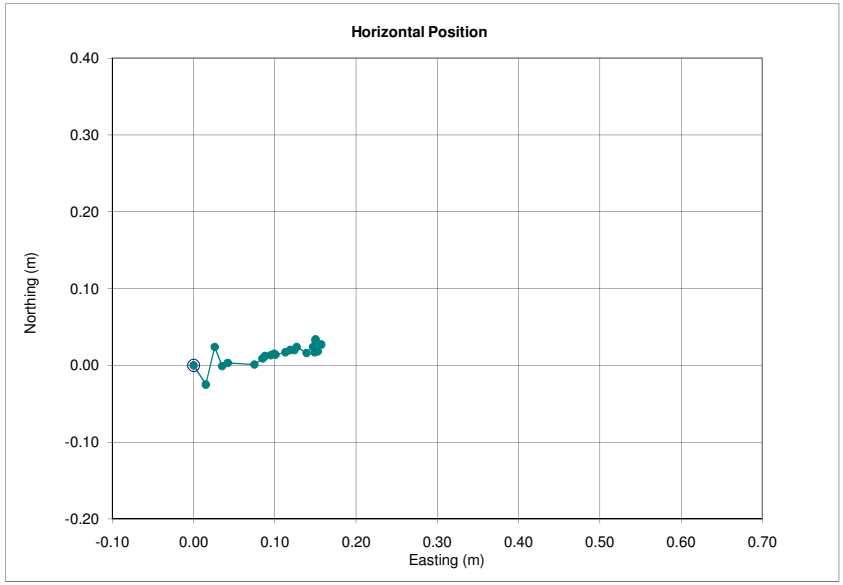
Survey and Displacement Data - Hub 01-40

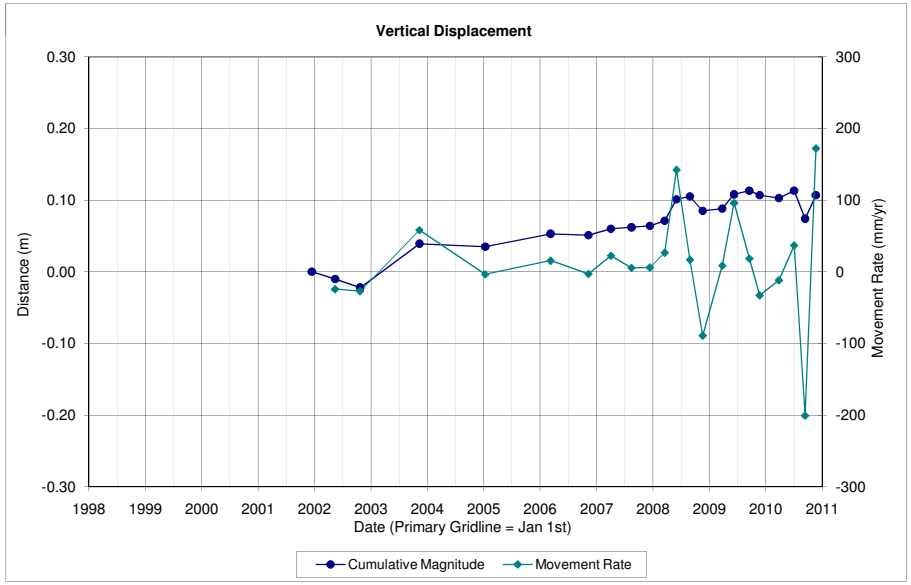
Lewis Drive East of Healy Street

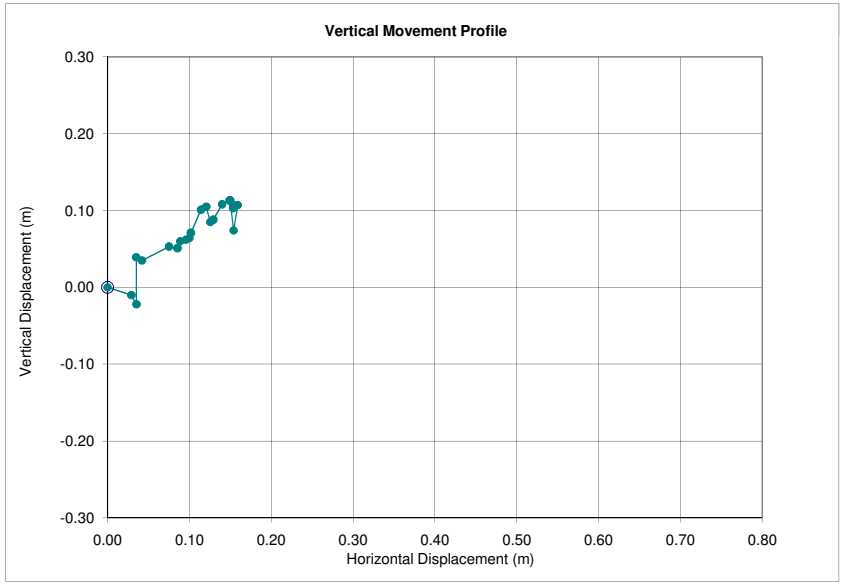
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5870303.346	532408.207	493.536	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/05/2002	5870303.321	532408.222	493.526	0.41	-0.025	0.015	0.029	-0.010	149.0	-18.9	0.071	-0.024	0.41	-0.025	0.015	0.029	-0.010	149.0	-18.9	70.522	-24.189
24/10/2002	5870303.370	532408.233	493.514	0.86	0.024	0.026	0.035	-0.022	47.3	-31.9	0.041	-0.026	0.44	0.049	0.011	0.050	-0.012	12.7	-13.4	113.226	-27.056
12/11/2003	5870303.345	532408.242	493.575	1.91	-0.001	0.035	0.035	0.039	92.0	48.2	0.018	0.021	1.05	-0.025	0.009	0.027	0.061	160.2	66.4	-25.478	58.202
11/01/2005	5870303.349	532408.249	493.571	3.07	0.003	0.042	0.042	0.035	85.9	39.7	0.014	0.011	1.17	0.004	0.007	0.008	-0.004	58.7	-27.4	6.940	-3.592
10/03/2006	5870303.347	532408.282	493.589	4.23	0.001	0.075	0.075	0.053	89.2	35.2	0.018	0.013	1.16	-0.002	0.033	0.033	0.018	93.5	28.6	28.547	15.543
10/11/2006	5870303.355	532408.292	493.587	4.90	0.009	0.085	0.085	0.051	84.0	30.8	0.017	0.010	0.67	0.008	0.010	0.013	-0.002	51.3	-8.9	19.092	-2.982
05/04/2007	5870303.358	532408.295	493.596	5.30	0.012	0.088	0.089	0.060	82.2	34.0	0.017	0.011	0.40	0.003	0.003	0.004	0.009	45.0	64.8	10.614	22.515
16/08/2007	5870303.359	532408.302	493.598	5.67	0.013	0.095	0.096	0.062	82.2	32.9	0.017	0.011	0.36	0.001	0.007	0.007	0.002	81.9	15.8	19.419	5.492
13/12/2007	5870303.361	532408.306	493.600	5.99	0.015	0.099	0.100	0.064	81.4	32.6	0.017	0.011	0.33	0.002	0.004	0.004	0.002	63.4	24.1	13.726	6.139
18/03/2008	5870303.360	532408.308	493.607	6.26	0.014	0.101	0.102	0.071	82.1	34.8	0.016	0.011	0.26	-0.001	0.002	0.002	0.007	116.6	72.3	8.508	26.633
03/06/2008	5870303.363	532408.320	493.637	6.47	0.017	0.113	0.114	0.101	81.4	41.5	0.018	0.016	0.21	0.003	0.012	0.012	0.030	76.0	67.6	58.674	142.305
29/08/2008	5870303.366	532408.326	493.641	6.70	0.020	0.119	0.121	0.105	80.5	41.0	0.018	0.016	0.24	0.003	0.006	0.007	0.004	63.4	30.8	28.163	16.793
19/11/2008	5870303.366	532408.331	493.621	6.93	0.020	0.124	0.126	0.085	80.8	34.1	0.018	0.012	0.22	0.000	0.005	0.005	-0.020	90.0	-76.0	22.271	-89.085
26/03/2009	5870303.370	532408.334	493.624	7.28	0.024	0.127	0.129	0.088	79.3	34.2	0.018	0.012	0.35	0.004	0.003	0.005	0.003	36.9	31.0	14.380	8.628
10/06/2009	5870303.362	532408.346	493.644	7.49	0.016	0.139	0.140	0.108	83.4	37.7	0.019	0.014	0.21	-0.008	0.012	0.014	0.020	123.7	54.2	69.312	96.118
17/09/2009	5870303.370	532408.354	493.649	7.76	0.024	0.147	0.149	0.113	80.7	37.2	0.019	0.015	0.27	0.008	0.008	0.011	0.005	45.0	23.8	41.741	18.447
23/11/2009	5870303.380	532408.357	493.643	7.94	0.034	0.150	0.154	0.107	77.2	34.8	0.019	0.013	0.18	0.010	0.003	0.010	-0.006	16.7	-29.9	56.915	-32.709
27/03/2010	5870303.378	532408.357	493.639	8.28	0.032	0.150	0.153	0.103	78.0	33.9	0.019	0.012	0.34	-0.002	0.000	0.002	-0.004	180.0	-63.4	-5.891	-11.782
04/07/2010	5870303.363	532408.356	493.649	8.55	0.017	0.149	0.150	0.113	83.5	37.0	0.018	0.013	0.27	-0.015	-0.001	0.015	0.010	183.8	33.6	-55.464	36.894
13/09/2010	5870303.364	532408.360	493.610	8.74	0.018	0.153	0.154	0.074	83.3	25.7	0.018	0.008	0.19	0.001	0.004	0.004	-0.039	76.0	-84.0	21.211	-200.630
22/11/2010	5870303.373	532408.364	493.643	8.94	0.027	0.157	0.159	0.107	80.2	33.9	0.018	0.012	0.19	0.009	0.004	0.010	0.033	24.0	73.4	51.390	172.189

Displacement Graphs - Hub 01-40
Lewis Drive East of Healy Street









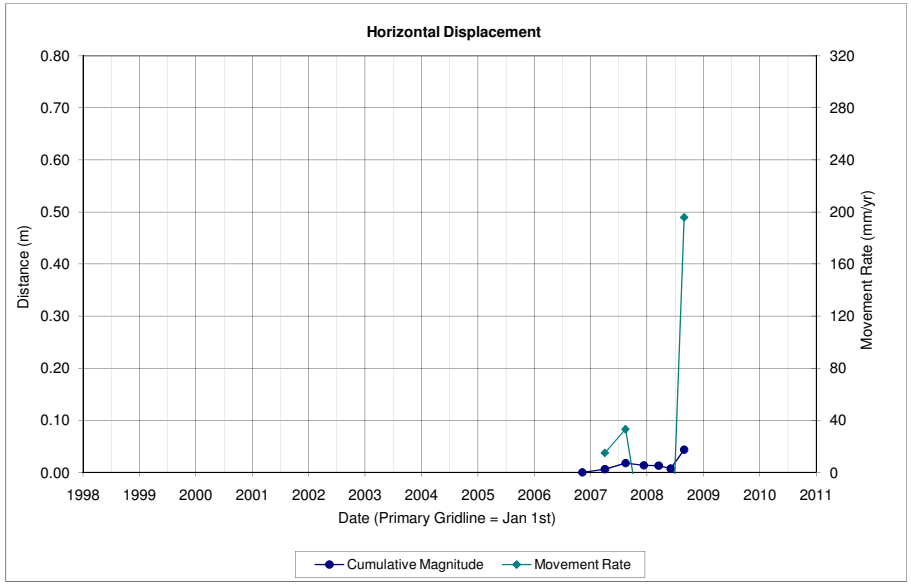
Survey and Displacement Data - Hub 06-01

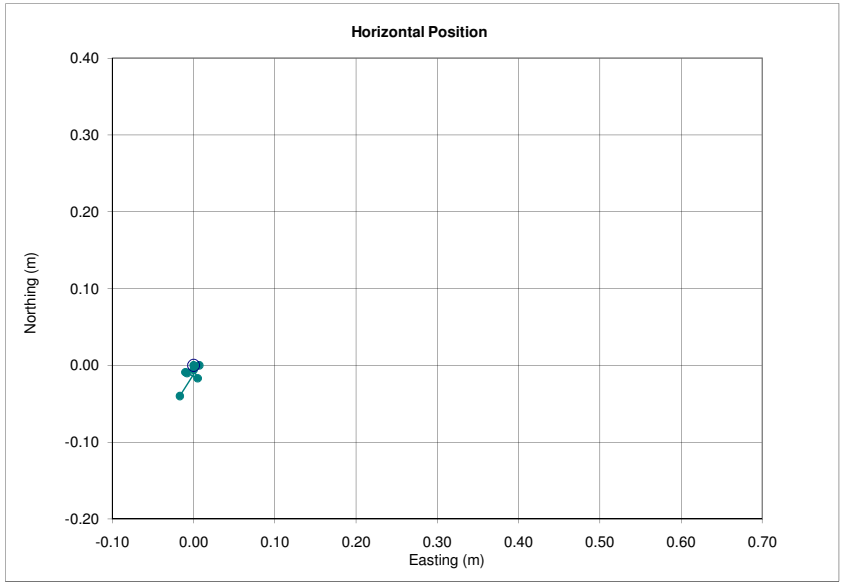
End alley E. of Anderson Dr., opposite school

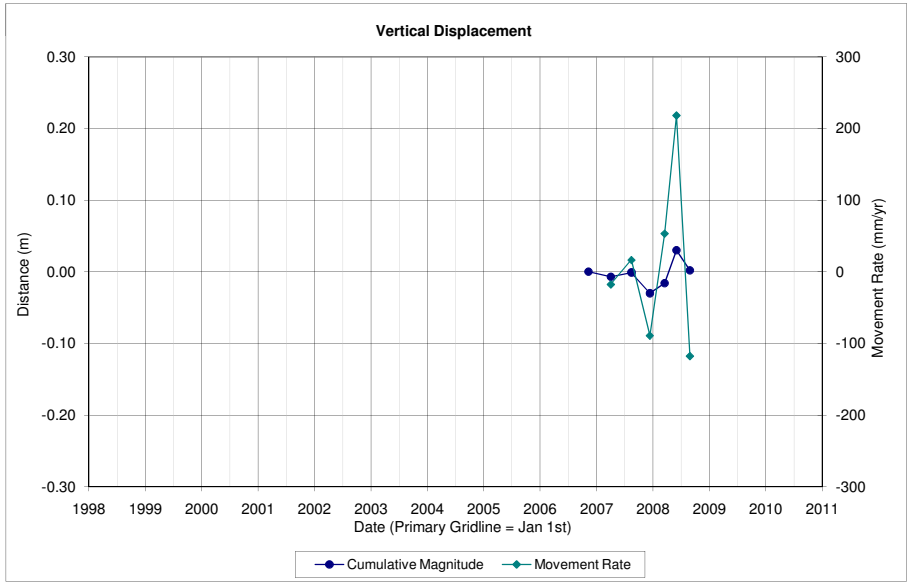
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5868878.710	532190.793	487.817	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5868878.704	532190.793	487.810	0.40	-0.006	0.000	0.006	-0.007	180.0	-49.4	0.015	-0.018	0.40	-0.006	0.000	0.006	-0.007	180.0	-49.4	15.010	-17.512
16/08/2007	5868878.693	532190.798	487.816	0.76	-0.017	0.005	0.018	-0.001	163.6	-3.2	0.023	-0.001	0.36	-0.011	0.005	0.012	0.006	155.6	26.4	33.183	16.477
13/12/2007	5868878.701	532190.783	487.787	1.09	-0.009	-0.010	0.013	-0.030	228.0	-65.8	0.012	-0.028	0.33	0.008	-0.015	0.017	-0.029	298.1	-59.6	-52.179	-89.011
18/03/2008	5868878.700	532190.785	487.801	1.35	-0.010	-0.008	0.013	-0.016	218.7	-51.3	0.009	-0.012	0.26	-0.001	0.002	0.002	0.014	116.6	80.9	-8.508	53.266
03/06/2008	5868878.710	532190.800	487.847	1.56	0.000	0.007	0.007	0.030	90.0	76.9	0.004	0.019	0.21	0.010	0.015	0.018	0.046	56.3	68.6	-85.515	218.201
29/08/2008	5868878.670	532190.776	487.819	1.80	-0.040	-0.017	0.043	0.002	203.0	2.6	0.024	0.001	0.24	-0.040	-0.024	0.047	-0.028	211.0	-31.0	195.840	-117.552

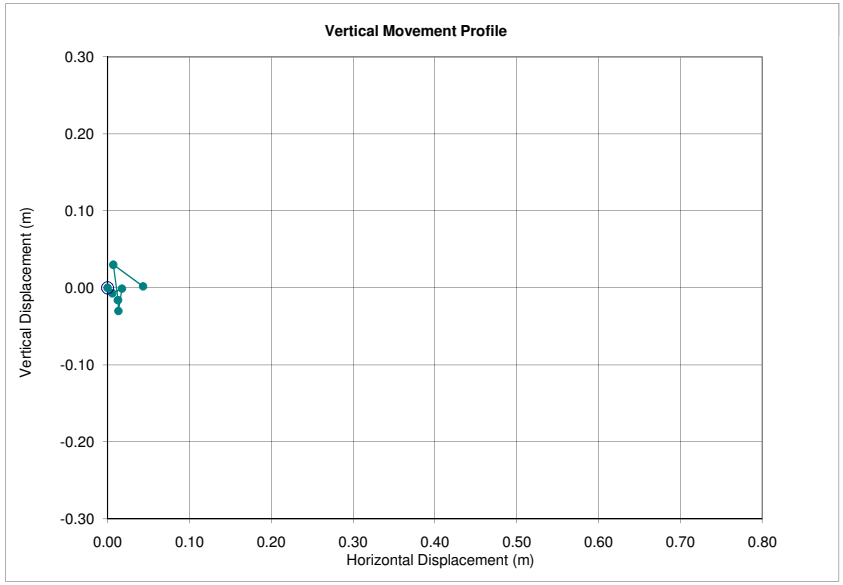
Displacement Graphs - Hub 06-01

End alley E. of Anderson Dr., opposite school







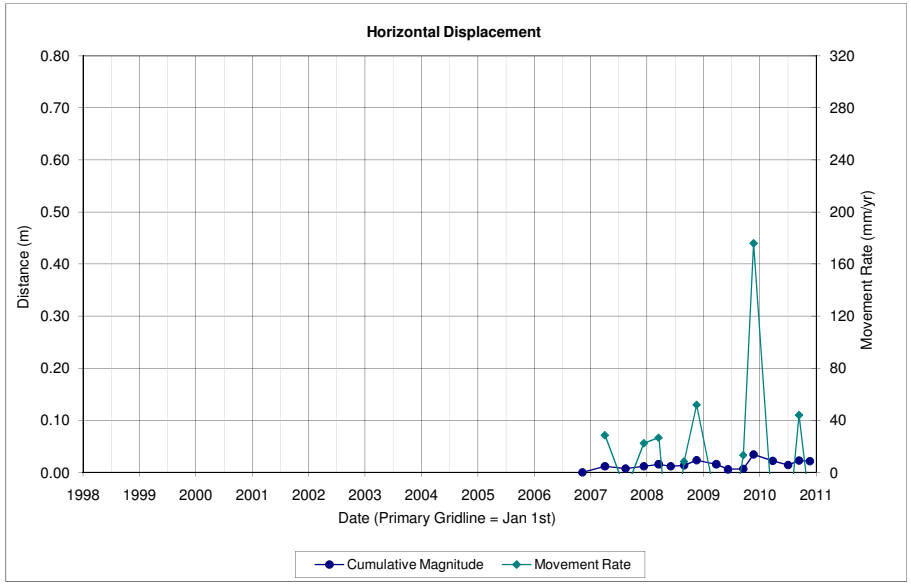


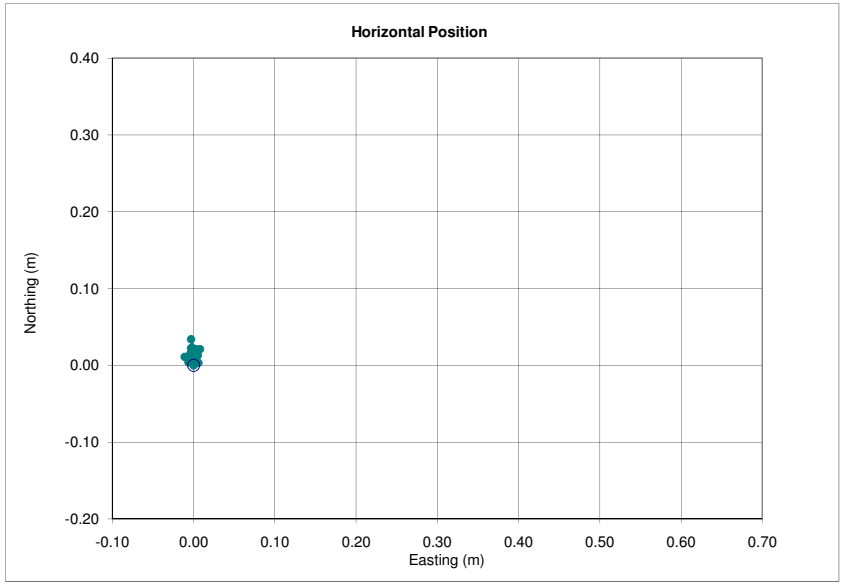
Survey and Displacement Data - Hub 06-02

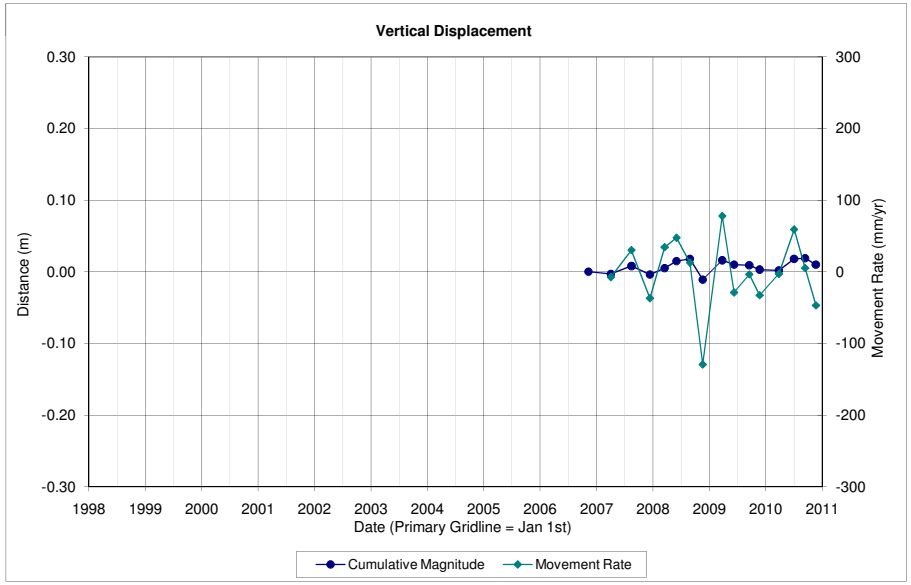
East side Anderson Drive by school

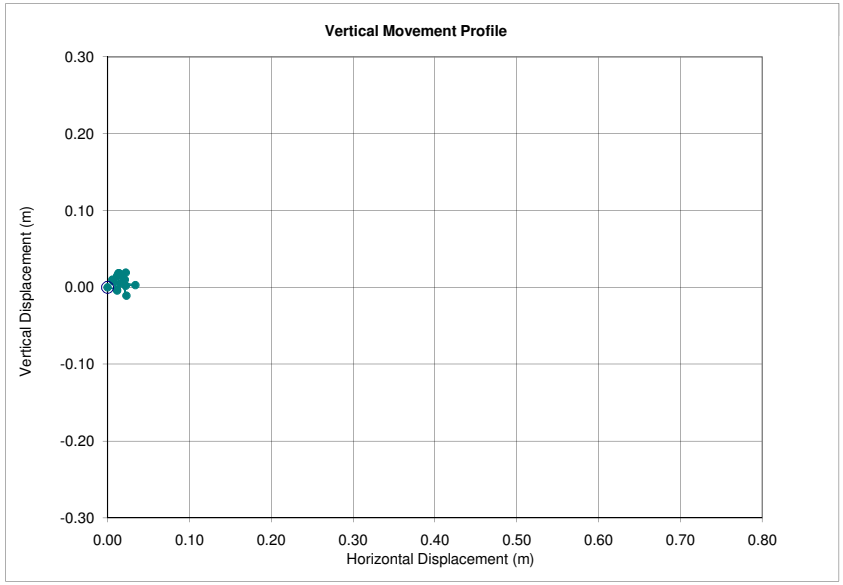
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5868793.977	532384.115	473.102	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5868793.986	532384.108	473.099	0.40	0.009	-0.007	0.011	-0.003	322.1	-14.7	0.029	-0.008	0.40	0.009	-0.007	0.011	-0.003	322.1	-14.7	28.524	-7.505
16/08/2007	5868793.981	532384.109	473.110	0.76	0.004	-0.006	0.007	0.008	303.7	48.0	0.009	0.010	0.36	-0.005	0.001	0.005	0.011	168.7	65.1	-14.003	30.209
13/12/2007	5868793.988	532384.111	473.098	1.09	0.011	-0.004	0.012	-0.004	340.0	-18.9	0.011	-0.004	0.33	0.007	0.002	0.007	-0.012	15.9	-58.8	22.345	-36.832
18/03/2008	5868793.988	532384.104	473.107	1.35	0.011	-0.011	0.016	0.005	315.0	17.8	0.012	0.004	0.26	0.000	-0.007	0.007	0.009	270.0	52.1	26.633	34.242
03/06/2008	5868793.988	532384.119	473.117	1.56	0.011	0.004	0.012	0.015	20.0	52.0	0.007	0.010	0.21	0.000	0.015	0.015	0.010	90.0	33.7	-71.153	47.435
29/08/2008	5868793.990	532384.119	473.120	1.80	0.013	0.004	0.014	0.018	17.1	52.9	0.008	0.010	0.24	0.002	0.000	0.002	0.003	0.0	56.3	8.397	12.595
19/11/2008	5868794.000	532384.113	473.091	2.03	0.023	-0.002	0.023	-0.011	355.0	-25.5	0.011	-0.005	0.22	0.010	-0.006	0.012	-0.029	329.0	-68.1	51.945	-129.174
26/03/2009	5868793.992	532384.111	473.118	2.37	0.015	-0.004	0.016	0.016	345.1	45.9	0.007	0.007	0.35	-0.008	-0.002	0.008	0.027	194.0	73.0	-23.716	77.652
10/06/2009	5868793.982	532384.118	473.112	2.58	0.005	0.003	0.006	0.010	31.0	59.8	0.002	0.004	0.21	-0.010	0.007	0.012	-0.006	145.0	-26.2	-58.664	-28.836
17/09/2009	5868793.980	532384.121	473.111	2.85	0.003	0.006	0.007	0.009	63.4	53.3	0.002	0.003	0.27	-0.002	0.003	0.004	-0.001	123.7	-15.5	13.302	-3.689
23/11/2009	5868794.011	532384.112	473.105	3.04	0.034	-0.003	0.034	0.003	355.0	5.0	0.011	0.001	0.18	0.031	-0.009	0.032	-0.006	343.8	-10.5	175.974	-32.709
27/03/2010	5868793.999	532384.112	473.104	3.38	0.022	-0.003	0.022	0.002	352.2	5.1	0.007	0.001	0.34	-0.012	0.000	0.012	-0.001	180.0	-4.8	-35.347	-2.946
04/07/2010	5868793.990	532384.120	473.120	3.65	0.013	0.005	0.014	0.018	21.0	52.3	0.004	0.005	0.27	-0.009	0.008	0.012	0.016	138.4	53.0	-44.426	59.030
13/09/2010	5868793.998	532384.123	473.121	3.84	0.021	0.008	0.022	0.019	20.9	40.2	0.006	0.005	0.19	0.008	0.003	0.009	0.001	20.6	6.7	43.953	5.144
22/11/2010	5868793.998	532384.118	473.112	4.03	0.021	0.003	0.021	0.010	8.1	25.2	0.005	0.002	0.19	0.000	-0.005	0.005	-0.009	270.0	-60.9	-26.089	-46.961

Displacement Graphs - Hub 06-02
East side Anderson Drive by school









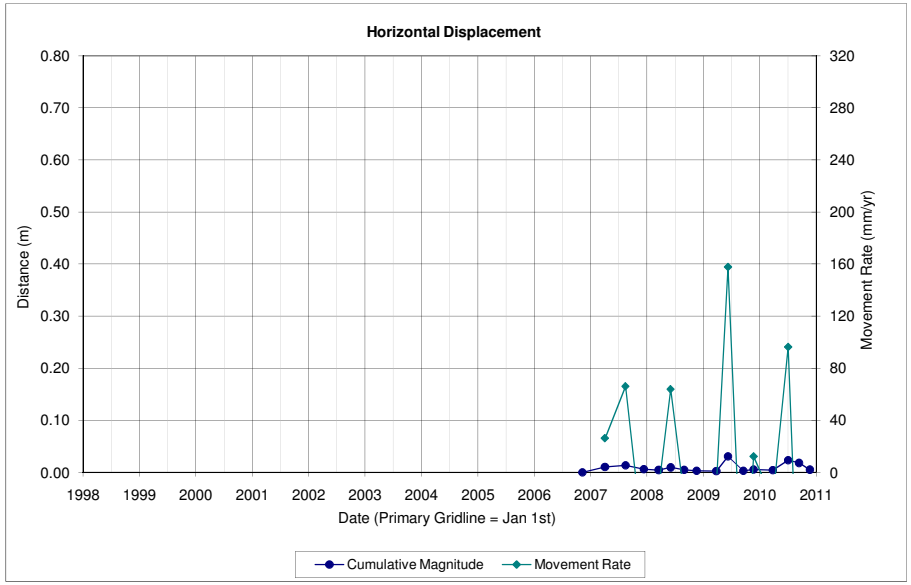
Survey and Displacement Data - Hub 06-03

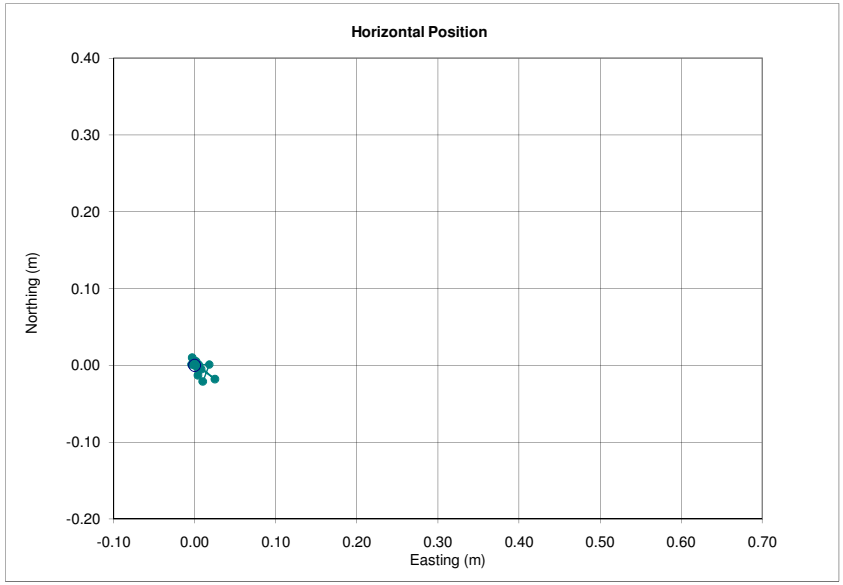
West side Anderson Dr., opposite school yard

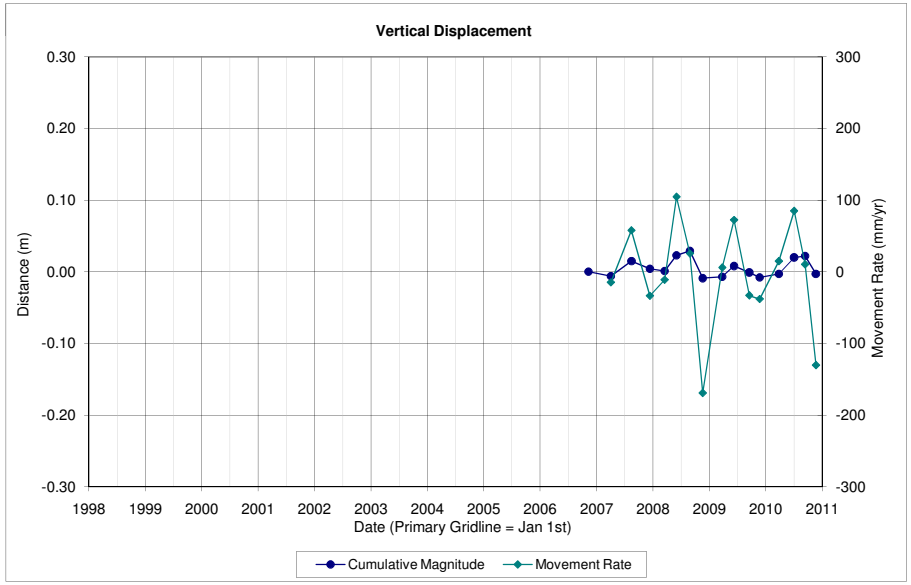
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5868871.062	532370.952	474.521	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5868871.072	532370.949	474.515	0.40	0.010	-0.003	0.010	-0.006	343.3	-29.9	0.026	-0.015	0.40	0.010	-0.003	0.010	-0.006	343.3	-29.9	26.119	-15.010
16/08/2007	5868871.049	532370.956	474.536	0.76	-0.013	0.004	0.014	0.015	162.9	47.8	0.018	0.020	0.36	-0.023	0.007	0.024	0.021	163.1	41.1	66.024	57.671
13/12/2007	5868871.068	532370.952	474.525	1.09	0.006	0.000	0.006	0.004	0.0	33.7	0.006	0.004	0.33	0.019	-0.004	0.019	-0.011	348.1	-29.5	-59.596	-33.763
18/03/2008	5868871.066	532370.950	474.522	1.35	0.004	-0.002	0.004	0.001	333.4	12.6	0.003	0.001	0.26	-0.002	-0.002	0.003	-0.003	225.0	-46.7	-10.761	-11.414
03/06/2008	5868871.057	532370.960	474.544	1.56	-0.005	0.008	0.009	0.023	122.0	67.7	0.006	0.015	0.21	-0.009	0.010	0.013	0.022	132.0	58.6	63.817	104.357
29/08/2008	5868871.059	532370.956	474.550	1.80	-0.003	0.004	0.005	0.029	126.9	80.2	0.003	0.016	0.24	0.002	-0.004	0.004	0.006	296.6	53.3	-18.775	25.190
19/11/2008	5868871.064	532370.954	474.512	2.03	0.002	0.002	0.003	-0.009	45.0	-72.6	0.001	-0.004	0.22	0.005	-0.002	0.005	-0.038	338.2	-81.9	-23.987	-169.262
26/03/2009	5868871.064	532370.951	474.514	2.37	0.002	-0.001	0.002	-0.007	333.4	-72.3	0.001	-0.003	0.35	0.000	-0.003	0.003	0.002	270.0	33.7	-8.628	5.752
10/06/2009	5868871.044	532370.977	474.529	2.58	-0.018	0.025	0.031	0.008	125.8	14.6	0.012	0.003	0.21	-0.020	0.026	0.033	0.015	127.6	24.6	157.646	72.089
17/09/2009	5868871.065	532370.953	474.520	2.85	0.003	0.001	0.003	-0.001	18.4	-17.5	0.001	0.000	0.27	0.021	-0.024	0.032	-0.009	311.2	-15.8	-117.656	-33.205
23/11/2009	5868871.067	532370.954	474.513	3.04	0.005	0.002	0.005	-0.008	21.8	-56.1	0.002	-0.003	0.18	0.002	0.001	0.002	-0.007	26.6	-72.3	12.190	-38.160
27/03/2010	5868871.063	532370.948	474.518	3.38	0.001	-0.004	0.004	-0.003	284.0	-36.0	0.001	-0.001	0.34	-0.004	-0.006	0.007	0.005	236.3	34.7	-21.241	14.728
04/07/2010	5868871.041	532370.962	474.541	3.65	-0.021	0.010	0.023	0.020	154.5	40.7	0.006	0.005	0.27	-0.022	0.014	0.026	0.023	147.5	41.4	96.208	84.856
13/09/2010	5868871.063	532370.970	474.543	3.84	0.001	0.018	0.018	0.022	86.8	50.7	0.005	0.006	0.19	0.022	0.008	0.023	0.002	20.0	4.9	-120.427	10.289
22/11/2010	5868871.063	532370.957	474.518	4.03	0.001	0.005	0.005	-0.003	78.7	-30.5	0.001	-0.001	0.19	0.000	-0.013	0.013	-0.025	270.0	-62.5	-67.832	-130.446

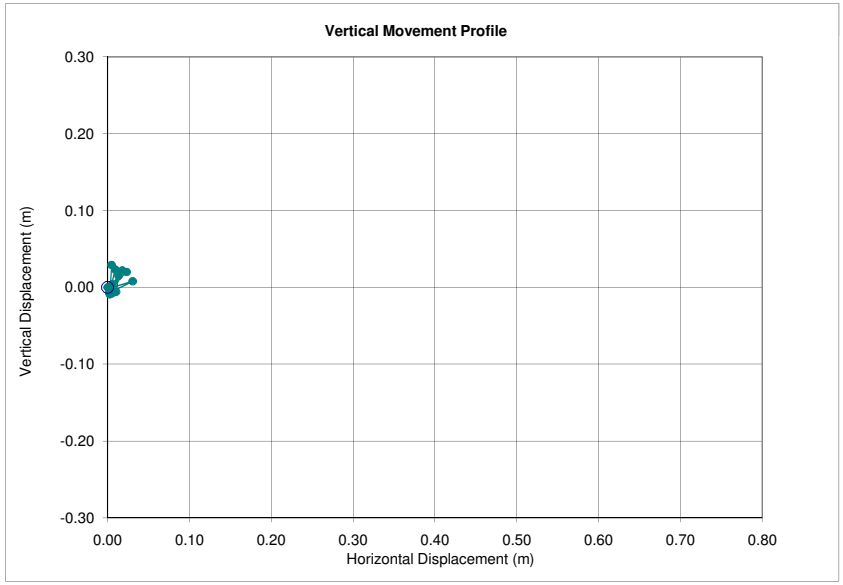
Displacement Graphs - Hub 06-03

West side Anderson Dr., opposite school yard









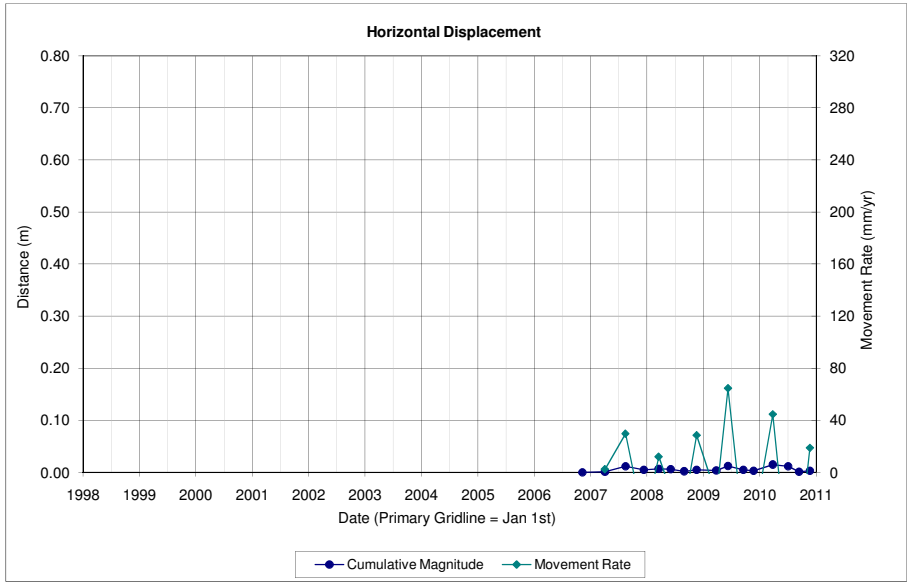
Survey and Displacement Data - Hub 06-04

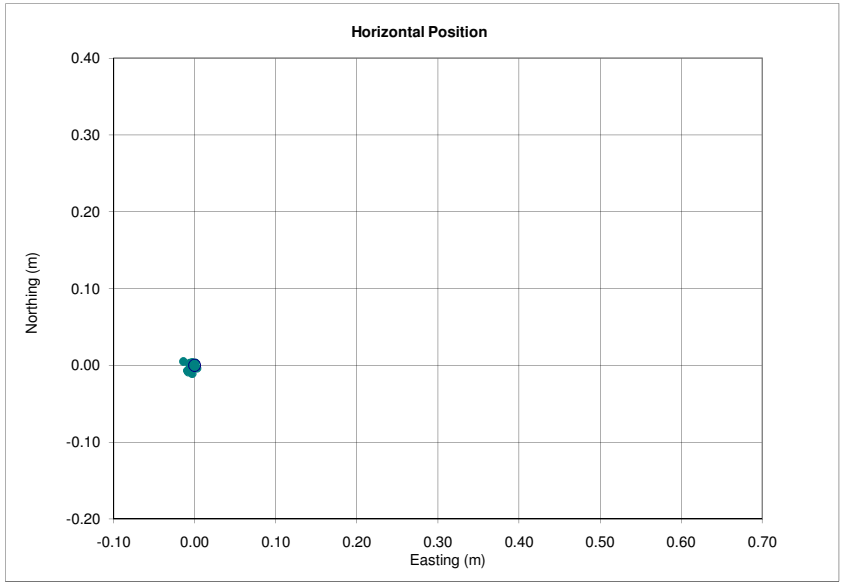
North side Wade Ave, one lot E. Anderson Dr.

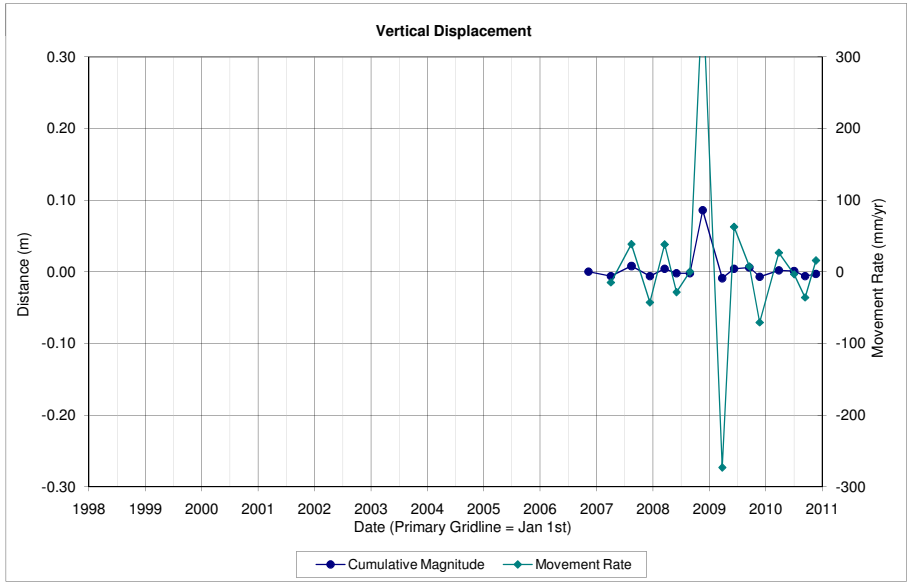
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869067.298	532520.728	474.933	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869067.297	532520.728	474.927	0.40	-0.001	0.000	0.001	-0.006	180.0	-80.5	0.003	-0.015	0.40	-0.001	0.000	0.001	-0.006	180.0	-80.5	2.502	-15.010
16/08/2007	5869067.291	532520.719	474.941	0.76	-0.007	-0.009	0.011	0.008	232.1	35.1	0.015	0.010	0.36	-0.006	-0.009	0.011	0.014	236.3	52.3	29.705	38.447
13/12/2007	5869067.302	532520.725	474.927	1.09	0.004	-0.003	0.005	-0.006	323.1	-50.2	0.005	-0.006	0.33	0.011	0.006	0.013	-0.014	28.6	-48.2	-38.459	-42.971
18/03/2008	5869067.301	532520.722	474.937	1.35	0.003	-0.006	0.007	0.004	296.6	30.8	0.005	0.003	0.26	-0.001	-0.003	0.003	0.010	251.6	72.5	12.031	38.047
03/06/2008	5869067.298	532520.722	474.931	1.56	0.000	-0.006	0.006	-0.002	270.0	-18.4	0.004	-0.001	0.21	-0.003	0.000	0.003	-0.006	180.0	-63.4	-14.231	-28.461
29/08/2008	5869067.300	532520.728	474.931	1.80	0.002	0.000	0.002	-0.002	0.0	-45.0	0.001	-0.001	0.24	0.002	0.006	0.006	0.000	71.6	0.0	-26.552	0.000
19/11/2008	5869067.295	532520.724	475.019	2.03	-0.003	-0.004	0.005	0.086	233.1	86.7	0.002	0.042	0.22	-0.005	-0.004	0.006	0.088	218.7	85.8	28.521	391.976
26/03/2009	5869067.301	532520.726	474.924	2.37	0.003	-0.002	0.004	-0.009	326.3	-68.2	0.002	-0.004	0.35	0.006	0.002	0.006	-0.095	18.4	-86.2	-18.189	-273.219
10/06/2009	5869067.289	532520.720	474.937	2.58	-0.009	-0.008	0.012	0.004	221.6	18.4	0.005	0.002	0.21	-0.012	-0.006	0.013	0.013	206.6	44.1	64.478	62.477
17/09/2009	5869067.294	532520.731	474.939	2.85	-0.004	0.003	0.005	0.006	143.1	50.2	0.002	0.002	0.27	0.005	0.011	0.012	0.002	65.6	9.4	-44.579	7.379
23/11/2009	5869067.301	532520.729	474.926	3.04	0.003	0.001	0.003	-0.007	18.4	-65.7	0.001	-0.002	0.18	0.007	-0.002	0.007	-0.013	344.1	-60.8	-39.687	-70.869
27/03/2010	5869067.303	532520.714	474.935	3.38	0.005	-0.014	0.015	0.002	289.7	7.7	0.004	0.001	0.34	0.002	-0.015	0.015	0.009	277.6	30.7	44.574	26.510
04/07/2010	5869067.287	532520.725	474.934	3.65	-0.011	-0.003	0.011	0.001	195.3	5.0	0.003	0.000	0.27	-0.016	0.011	0.019	-0.001	145.5	-2.9	-71.635	-3.689
13/09/2010	5869067.298	532520.727	474.927	3.84	0.000	-0.001	0.001	-0.006	270.0	-80.5	0.000	-0.002	0.19	0.011	0.002	0.011	-0.007	10.3	-32.1	-57.516	-36.011
22/11/2010	5869067.301	532520.729	474.930	4.03	0.003	0.001	0.003	-0.003	18.4	-43.5	0.001	-0.001	0.19	0.003	0.002	0.004	0.003	33.7	39.8	18.813	15.654

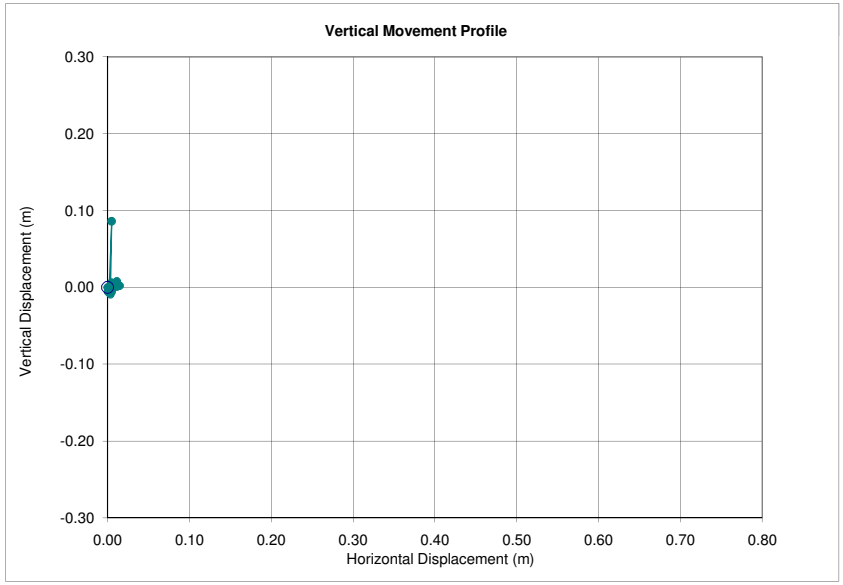
Displacement Graphs - Hub 06-04

North side Wade Ave, one lot E. Anderson Dr.









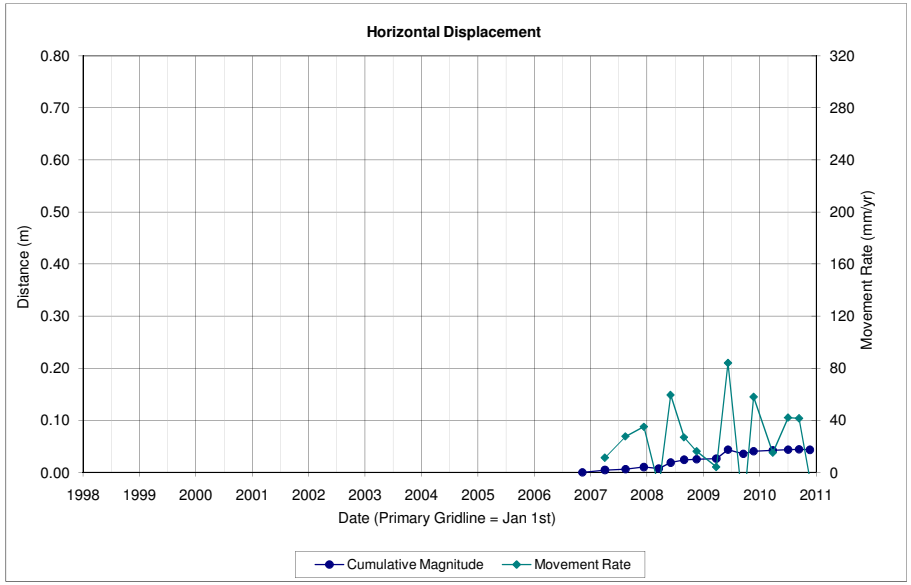
Survey and Displacement Data - Hub 06-05

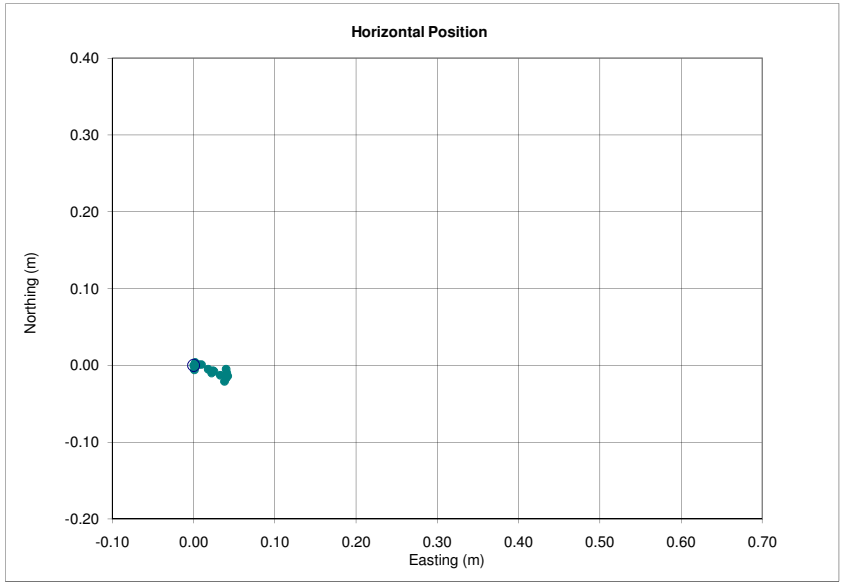
Anderson Drive west side, one lot S. of Avison

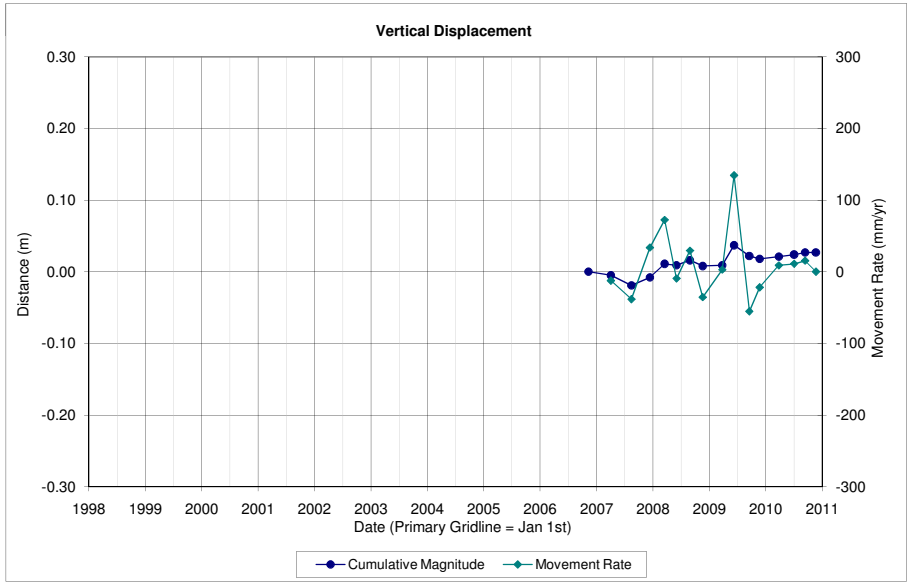
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869143.444	532486.772	478.133	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869143.448	532486.774	478.128	0.40	0.004	0.002	0.004	-0.005	26.6	-48.2	0.011	-0.013	0.40	0.004	0.002	0.004	-0.005	26.6	-48.2	11.188	-12.509
16/08/2007	5869143.438	532486.773	478.114	0.76	-0.006	0.001	0.006	-0.019	170.5	-72.2	0.008	-0.025	0.36	-0.010	-0.001	0.010	-0.014	185.7	-54.3	27.599	-38.447
13/12/2007	5869143.445	532486.782	478.125	1.09	0.001	0.010	0.010	-0.008	84.3	-38.5	0.009	-0.007	0.33	0.007	0.009	0.011	0.011	52.1	44.0	34.996	33.763
18/03/2008	5869143.445	532486.779	478.144	1.35	0.001	0.007	0.007	0.011	81.9	57.3	0.005	0.008	0.26	0.000	-0.003	0.003	0.019	270.0	81.0	-11.414	72.289
03/06/2008	5869143.439	532486.790	478.142	1.56	-0.005	0.018	0.019	0.009	105.5	25.7	0.012	0.006	0.21	-0.006	0.011	0.013	-0.002	118.6	-9.1	59.436	-9.487
29/08/2008	5869143.434	532486.794	478.149	1.80	-0.010	0.022	0.024	0.016	114.4	33.5	0.013	0.009	0.24	-0.005	0.004	0.006	0.007	141.3	47.5	26.882	29.388
19/11/2008	5869143.437	532486.796	478.141	2.03	-0.007	0.024	0.025	0.008	106.3	17.7	0.012	0.004	0.22	0.003	0.002	0.004	-0.008	33.7	-65.7	16.060	-35.634
26/03/2009	5869143.436	532486.797	478.142	2.37	-0.008	0.025	0.026	0.009	107.7	18.9	0.011	0.004	0.35	-0.001	0.001	0.001	0.001	135.0	35.3	4.067	2.876
10/06/2009	5869143.427	532486.812	478.170	2.58	-0.017	0.040	0.043	0.037	113.0	40.4	0.017	0.014	0.21	-0.009	0.015	0.017	0.028	121.0	58.0	84.069	134.566
17/09/2009	5869143.431	532486.805	478.155	2.85	-0.013	0.033	0.035	0.022	111.5	31.8	0.012	0.008	0.27	0.004	-0.007	0.008	-0.015	299.7	-61.7	-29.745	-55.341
23/11/2009	5869143.439	532486.812	478.151	3.04	-0.005	0.040	0.040	0.018	97.1	24.1	0.013	0.006	0.18	0.008	0.007	0.011	-0.004	41.2	-20.6	57.950	-21.806
27/03/2010	5869143.434	532486.813	478.154	3.38	-0.010	0.041	0.042	0.021	103.7	26.5	0.013	0.006	0.34	-0.005	0.001	0.005	0.003	168.7	30.5	15.019	8.837
04/07/2010	5869143.423	532486.810	478.157	3.65	-0.021	0.038	0.043	0.024	118.9	28.9	0.012	0.007	0.27	-0.011	-0.003	0.011	0.003	195.3	14.7	42.066	11.068
13/09/2010	5869143.430	532486.814	478.160	3.84	-0.014	0.042	0.044	0.027	108.4	31.4	0.012	0.007	0.19	0.007	0.004	0.008	0.003	29.7	20.4	41.475	15.433
22/11/2010	5869143.430	532486.813	478.160	4.03	-0.014	0.041	0.043	0.027	108.9	31.9	0.011	0.007	0.19	0.000	-0.001	0.001	0.000	270.0	0.0	-5.218	0.000

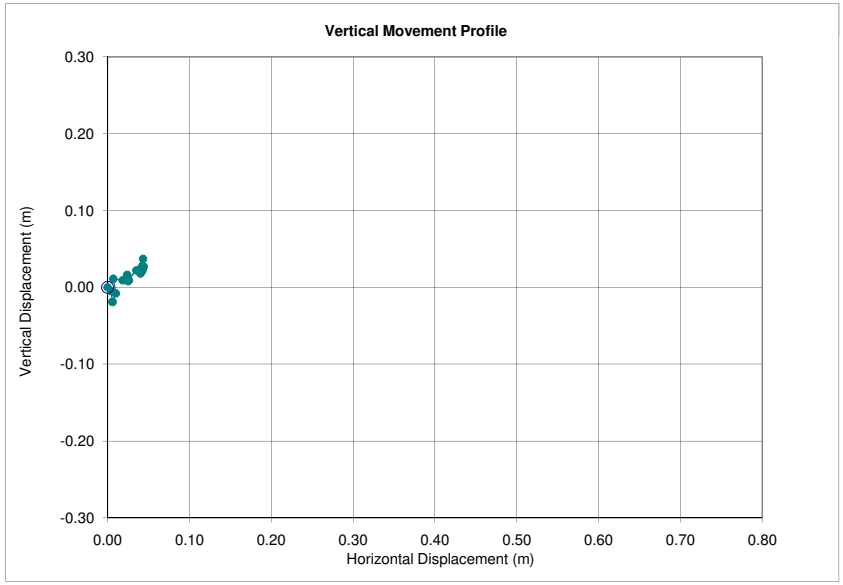
Displacement Graphs - Hub 06-05

Anderson Drive west side, one lot S. of Avison









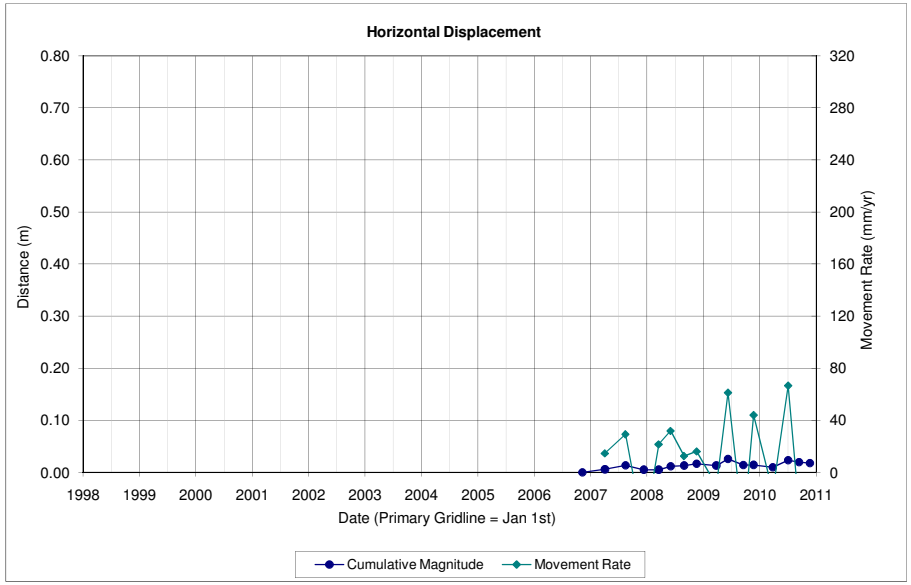
Survey and Displacement Data - Hub 06-06

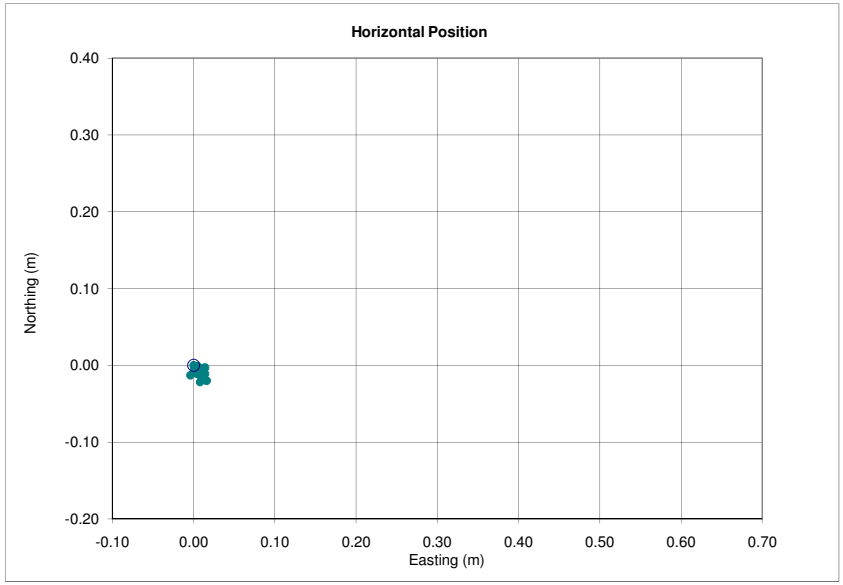
North corner Avery Ave / Anderson Drive

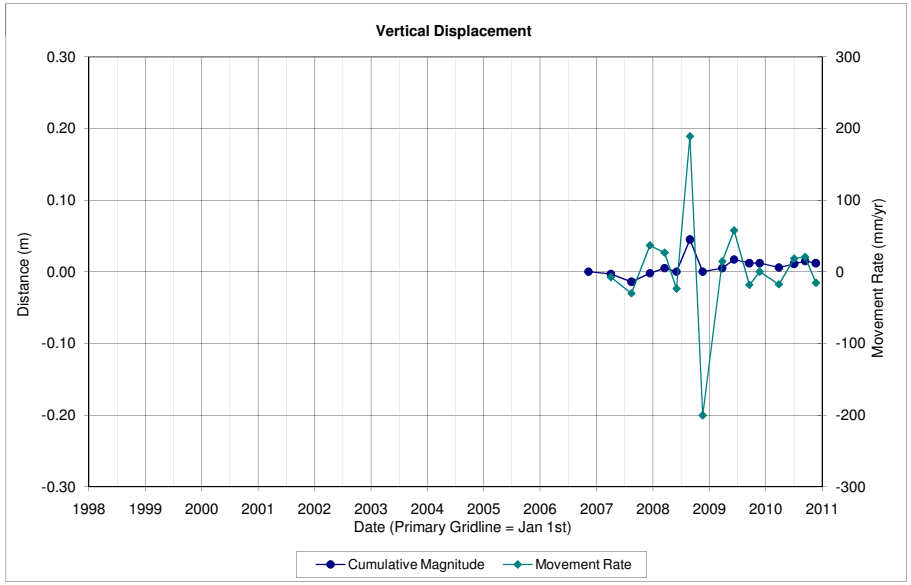
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869235.696	532594.188	476.641	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869235.691	532594.191	476.638	0.40	-0.005	0.003	0.006	-0.003	149.0	-27.2	0.015	-0.008	0.40	-0.005	0.003	0.006	-0.003	149.0	-27.2	14.587	-7.505
16/08/2007	5869235.683	532594.184	476.627	0.76	-0.013	-0.004	0.014	-0.014	197.1	-45.8	0.018	-0.018	0.36	-0.008	-0.007	0.011	-0.011	221.2	-46.0	29.193	-30.209
13/12/2007	5869235.695	532594.193	476.639	1.09	-0.001	0.005	0.005	-0.002	101.3	-21.4	0.005	-0.002	0.33	0.012	0.009	0.015	0.012	36.9	38.7	-46.040	36.832
18/03/2008	5869235.691	532594.189	476.646	1.35	-0.005	0.001	0.005	0.005	168.7	44.4	0.004	0.004	0.26	-0.004	-0.004	0.006	0.007	225.0	51.1	21.523	26.633
03/06/2008	5869235.685	532594.192	476.641	1.56	-0.011	0.004	0.012	0.000	160.0	0.0	0.007	0.000	0.21	-0.006	0.003	0.007	-0.005	153.4	-36.7	31.820	-23.718
29/08/2008	5869235.685	532594.195	476.686	1.80	-0.011	0.007	0.013	0.045	147.5	73.8	0.007	0.025	0.24	0.000	0.003	0.003	0.045	90.0	86.2	12.595	188.922
19/11/2008	5869235.682	532594.197	476.641	2.03	-0.014	0.009	0.017	0.000	147.3	0.0	0.008	0.000	0.22	-0.003	0.002	0.004	-0.045	146.3	-85.4	16.060	-200.442
26/03/2009	5869235.685	532594.195	476.646	2.37	-0.011	0.007	0.013	0.005	147.5	21.0	0.005	0.002	0.35	0.003	-0.002	0.004	0.005	326.3	54.2	-10.370	14.380
10/06/2009	5869235.676	532594.204	476.658	2.58	-0.020	0.016	0.026	0.017	141.3	33.6	0.010	0.007	0.21	-0.009	0.009	0.013	0.012	135.0	43.3	61.169	57.671
17/09/2009	5869235.686	532594.198	476.653	2.85	-0.010	0.010	0.014	0.012	135.0	40.3	0.005	0.004	0.27	0.010	-0.006	0.012	-0.005	329.0	-23.2	-43.025	-18.447
23/11/2009	5869235.693	532594.202	476.653	3.04	-0.003	0.014	0.014	0.012	102.1	40.0	0.005	0.004	0.18	0.007	0.004	0.008	0.000	29.7	0.0	43.951	0.000
27/03/2010	5869235.692	532594.197	476.647	3.38	-0.004	0.009	0.010	0.006	114.0	31.4	0.003	0.002	0.34	-0.001	-0.005	0.005	-0.006	258.7	-49.6	-15.019	-17.673
04/07/2010	5869235.674	532594.196	476.652	3.65	-0.022	0.008	0.023	0.011	160.0	25.2	0.006	0.003	0.27	-0.018	-0.001	0.018	0.005	183.2	15.5	66.511	18.447
13/09/2010	5869235.679	532594.198	476.656	3.84	-0.017	0.010	0.020	0.015	149.5	37.3	0.005	0.004	0.19	0.005	0.002	0.005	0.004	21.8	36.6	-27.703	20.577
22/11/2010	5869235.685	532594.202	476.653	4.03	-0.011	0.014	0.018	0.012	128.2	34.0	0.004	0.003	0.19	0.006	0.004	0.007	-0.003	33.7	-22.6	-37.627	-15.654

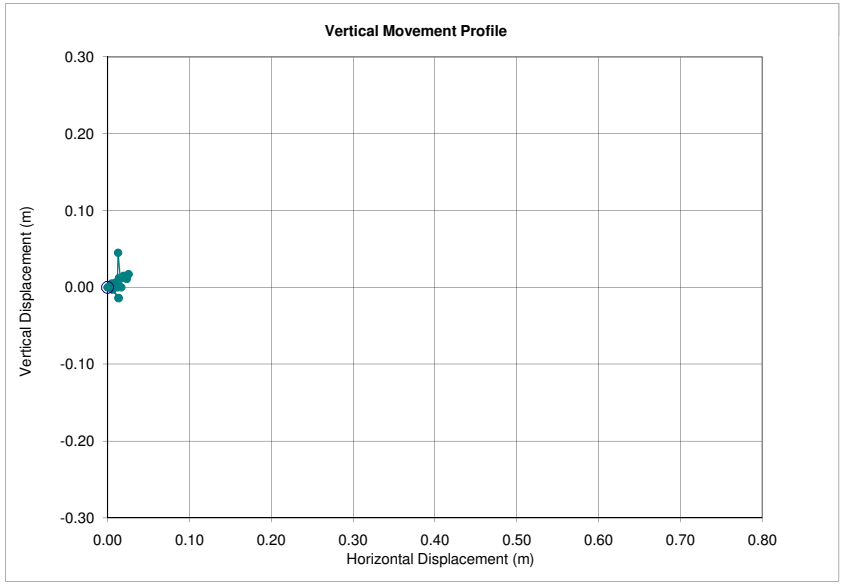
Displacement Graphs - Hub 06-06

North corner Avery Ave / Anderson Drive







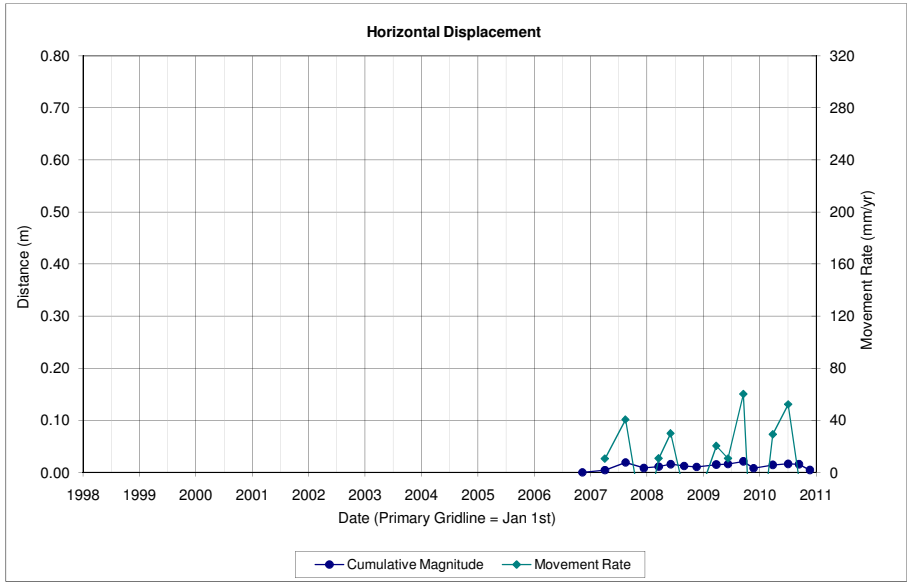


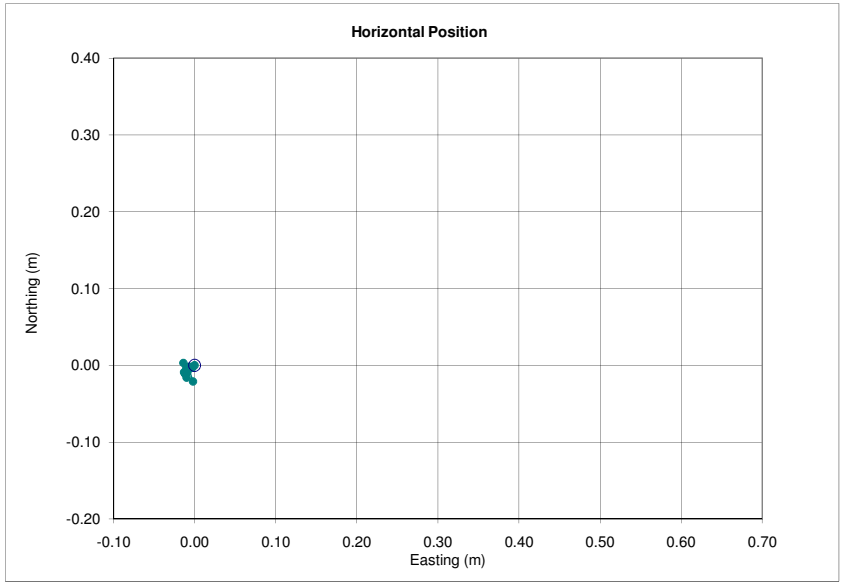
Survey and Displacement Data - Hub 06-07

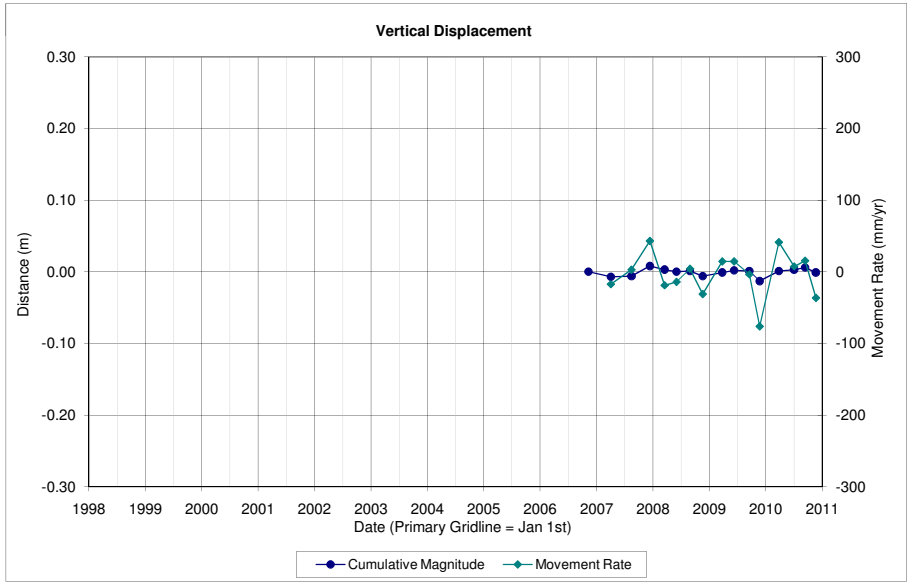
NE. corner Boyd Street / Abbott Rd.

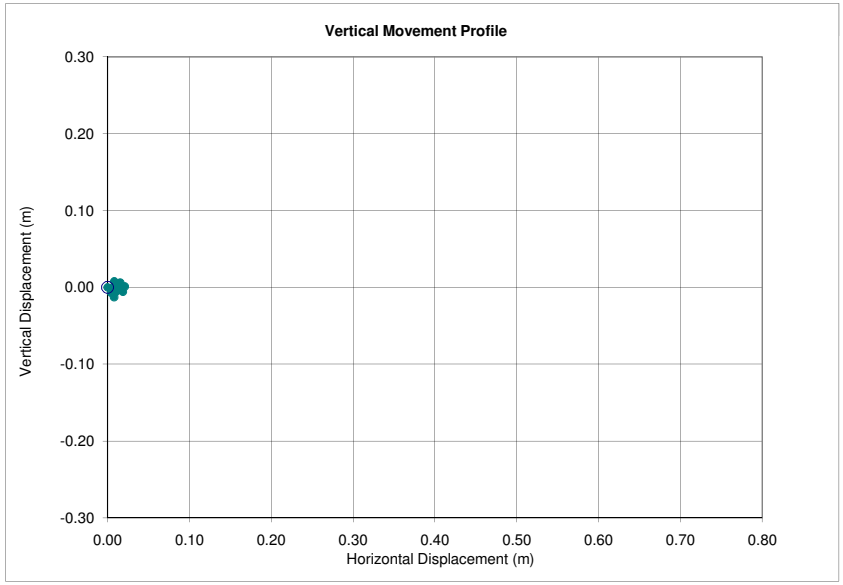
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869425.109	532655.428	477.850	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869425.106	532655.425	477.843	0.40	-0.003	-0.003	0.004	-0.007	225.0	-58.8	0.011	-0.018	0.40	-0.003	-0.003	0.004	-0.007	225.0	-58.8	10.614	-17.512
16/08/2007	5869425.093	532655.418	477.844	0.76	-0.016	-0.010	0.019	-0.006	212.0	-17.6	0.025	-0.008	0.36	-0.013	-0.007	0.015	0.001	208.3	3.9	40.548	2.746
13/12/2007	5869425.107	532655.420	477.858	1.09	-0.002	-0.008	0.008	0.008	256.0	44.1	0.008	0.007	0.33	0.014	0.002	0.014	0.014	8.1	44.7	-43.407	42.971
18/03/2008	5869425.105	532655.418	477.853	1.35	-0.004	-0.010	0.011	0.003	248.2	15.6	0.008	0.002	0.26	-0.002	-0.002	0.003	-0.005	225.0	-60.5	10.761	-19.023
03/06/2008	5869425.099	532655.416	477.850	1.56	-0.010	-0.012	0.016	0.000	230.2	0.0	0.010	0.000	0.21	-0.006	-0.002	0.006	-0.003	198.4	-25.4	30.001	-14.231
29/08/2008	5869425.101	532655.419	477.851	1.80	-0.008	-0.009	0.012	0.001	228.4	4.7	0.007	0.001	0.24	0.002	0.003	0.004	0.001	56.3	15.5	-15.137	4.198
19/11/2008	5869425.106	532655.418	477.844	2.03	-0.003	-0.010	0.010	-0.006	253.3	-29.9	0.005	-0.003	0.22	0.005	-0.001	0.005	-0.007	348.7	-53.9	-22.712	-31.180
26/03/2009	5869425.099	532655.417	477.849	2.37	-0.010	-0.011	0.015	-0.001	227.7	-3.8	0.006	0.000	0.35	-0.007	-0.001	0.007	0.005	188.1	35.3	20.336	14.380
10/06/2009	5869425.100	532655.415	477.852	2.58	-0.009	-0.013	0.016	0.002	235.3	7.2	0.006	0.001	0.21	0.001	-0.002	0.002	0.003	296.6	53.3	10.746	14.418
17/09/2009	5869425.088	532655.426	477.851	2.85	-0.021	-0.002	0.021	0.001	185.4	2.7	0.007	0.000	0.27	-0.012	0.011	0.016	-0.001	137.5	-3.5	60.059	-3.689
23/11/2009	5869425.105	532655.421	477.837	3.04	-0.004	-0.007	0.008	-0.013	240.3	-58.2	0.003	-0.004	0.18	0.017	-0.005	0.018	-0.014	343.6	-38.3	-96.601	-76.321
27/03/2010	5869425.112	532655.414	477.851	3.38	0.003	-0.014	0.014	0.001	282.1	4.0	0.004	0.000	0.34	0.007	-0.007	0.010	0.014	315.0	54.7	29.160	41.238
04/07/2010	5869425.098	532655.416	477.853	3.65	-0.011	-0.012	0.016	0.003	227.5	10.4	0.004	0.001	0.27	-0.014	0.002	0.014	0.002	171.9	8.0	52.176	7.379
13/09/2010	5869425.098	532655.417	477.856	3.84	-0.011	-0.011	0.016	0.006	225.0	21.1	0.004	0.002	0.19	0.000	0.001	0.001	0.003	90.0	71.6	-5.144	15.433
22/11/2010	5869425.107	532655.424	477.849	4.03	-0.002	-0.004	0.004	-0.001	243.4	-12.6	0.001	0.000	0.19	0.009	0.007	0.011	-0.007	37.9	-31.5	-59.493	-36.525

Displacement Graphs - Hub 06-07
NE. corner Boyd Street / Abbott Rd.









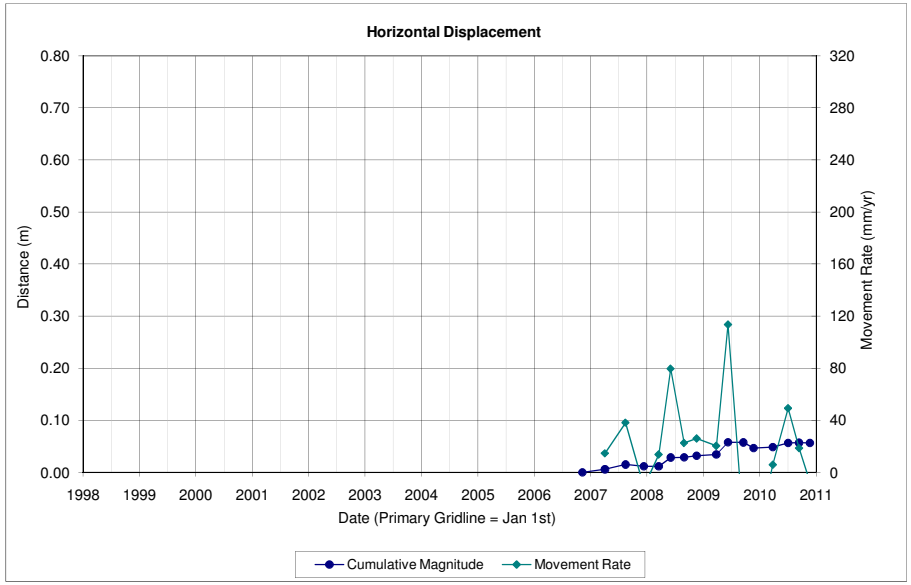
Survey and Displacement Data - Hub 06-08

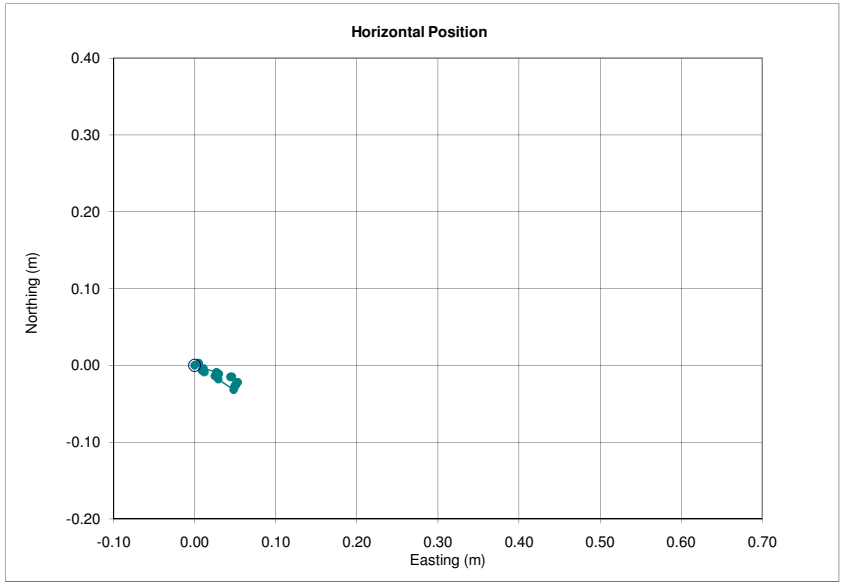
North side Abbott Road., alley E. Beath Street

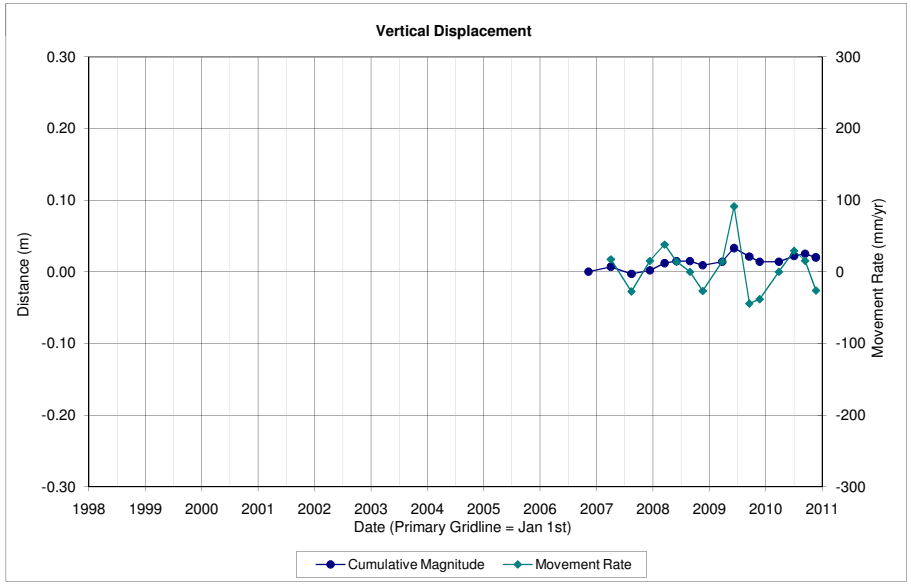
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869467.088	532549.595	480.412	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869467.091	532549.600	480.419	0.40	0.003	0.005	0.006	0.007	59.0	50.2	0.015	0.018	0.40	0.003	0.005	0.006	0.007	59.0	50.2	14.587	17.512
16/08/2007	5869467.079	532549.607	480.409	0.76	-0.009	0.012	0.015	-0.003	126.9	-11.3	0.020	-0.004	0.36	-0.012	0.007	0.014	-0.010	149.7	-35.7	38.152	-27.462
13/12/2007	5869467.081	532549.604	480.414	1.09	-0.007	0.009	0.011	0.002	127.9	9.9	0.010	0.002	0.33	0.002	-0.003	0.004	0.005	303.7	54.2	-11.067	15.347
18/03/2008	5869467.084	532549.606	480.424	1.35	-0.004	0.011	0.012	0.012	110.0	45.7	0.009	0.009	0.26	0.003	0.002	0.004	0.010	33.7	70.2	13.718	38.047
03/06/2008	5869467.079	532549.622	480.427	1.56	-0.009	0.027	0.028	0.015	108.4	27.8	0.018	0.010	0.21	-0.005	0.016	0.017	0.003	107.4	10.1	79.516	14.231
29/08/2008	5869467.074	532549.620	480.427	1.80	-0.014	0.025	0.029	0.015	119.2	27.6	0.016	0.008	0.24	-0.005	-0.002	0.005	0.000	201.8	0.0	22.608	0.000
19/11/2008	5869467.077	532549.625	480.421	2.03	-0.011	0.030	0.032	0.009	110.1	15.7	0.016	0.004	0.22	0.003	0.005	0.006	-0.006	59.0	-45.8	25.973	-26.726
26/03/2009	5869467.070	532549.624	480.426	2.37	-0.018	0.029	0.034	0.014	121.8	22.3	0.014	0.006	0.35	-0.007	-0.001	0.007	0.005	188.1	35.3	20.336	14.380
10/06/2009	5869467.056	532549.643	480.445	2.58	-0.032	0.048	0.058	0.033	123.7	29.8	0.022	0.013	0.21	-0.014	0.019	0.024	0.019	126.4	38.8	113.424	91.313
17/09/2009	5869467.066	532549.648	480.433	2.85	-0.022	0.053	0.057	0.021	112.5	20.1	0.020	0.007	0.27	0.010	0.005	0.011	-0.012	26.6	-47.0	-41.249	-44.273
23/11/2009	5869467.073	532549.639	480.426	3.04	-0.015	0.044	0.046	0.014	108.8	16.8	0.015	0.005	0.18	0.007	-0.009	0.011	-0.007	307.9	-31.5	-62.157	-38.160
27/03/2010	5869467.073	532549.641	480.426	3.38	-0.015	0.046	0.048	0.014	108.1	16.1	0.014	0.004	0.34	0.000	0.002	0.002	0.000	90.0	0.0	5.891	0.000
04/07/2010	5869467.060	532549.644	480.434	3.65	-0.028	0.049	0.056	0.022	119.7	21.3	0.015	0.006	0.27	-0.013	0.003	0.013	0.008	167.0	30.9	49.223	29.515
13/09/2010	5869467.063	532549.646	480.437	3.84	-0.025	0.051	0.057	0.025	116.1	23.8	0.015	0.007	0.19	0.003	0.002	0.004	0.003	33.7	39.8	18.548	15.433
22/11/2010	5869467.062	532549.645	480.432	4.03	-0.026	0.050	0.056	0.020	117.5	19.5	0.014	0.005	0.19	-0.001	-0.001	0.001	-0.005	225.0	-74.2	-7.379	-26.089

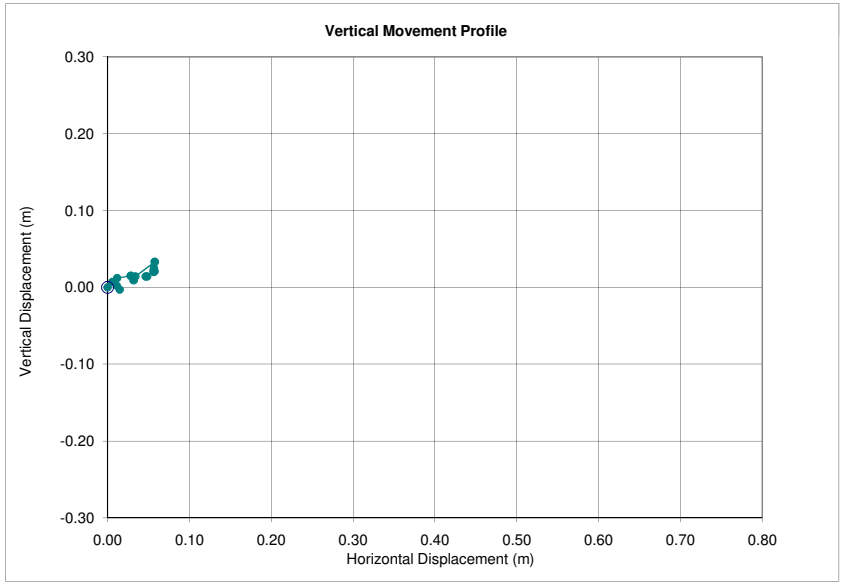
Displacement Graphs - Hub 06-08

North side Abbott Road., alley E. Beath Street









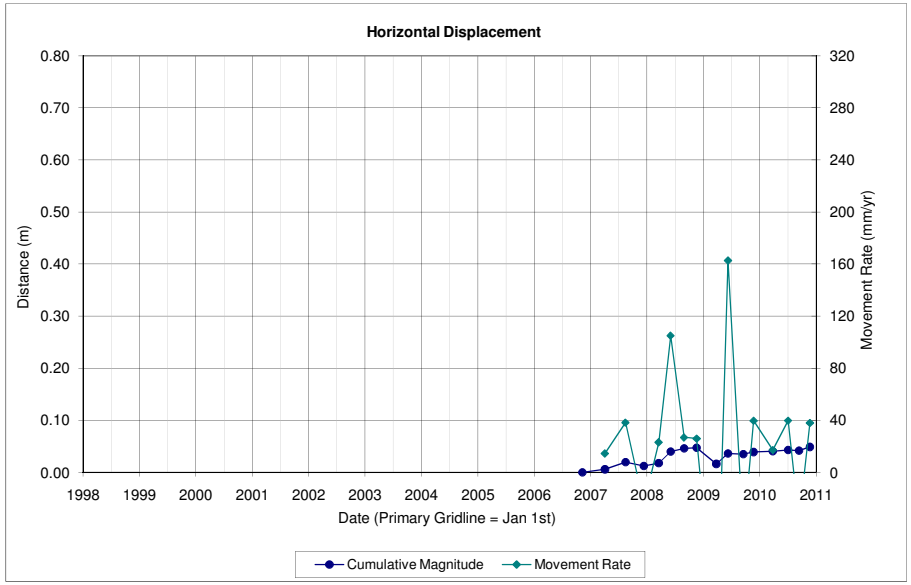
Survey and Displacement Data - Hub 06-09

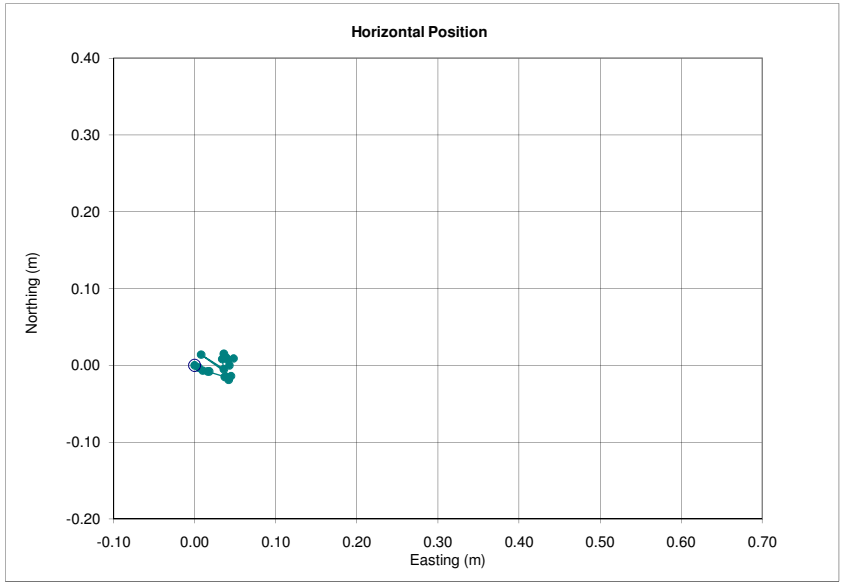
East side Bouchie Street

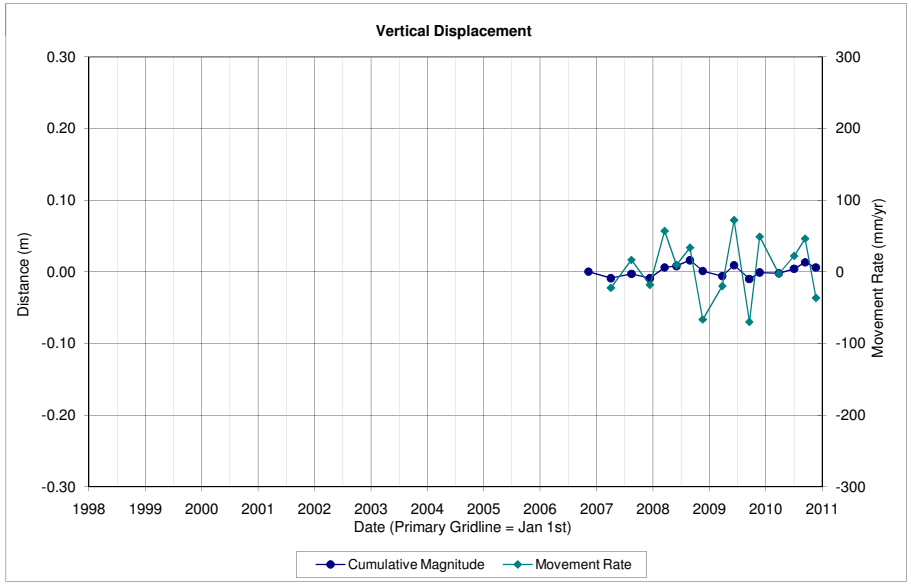
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869608.045	532517.087	491.073	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869608.042	532517.092	491.064	0.40	-0.003	0.005	0.006	-0.009	121.0	-57.1	0.015	-0.023	0.40	-0.003	0.005	0.006	-0.009	121.0	-57.1	14.587	-22.515
16/08/2007	5869608.037	532517.105	491.070	0.76	-0.008	0.018	0.020	-0.003	114.0	-8.7	0.026	-0.004	0.36	-0.005	0.013	0.014	0.006	111.0	23.3	38.251	16.477
13/12/2007	5869608.038	532517.097	491.064	1.09	-0.007	0.010	0.012	-0.009	125.0	-36.4	0.011	-0.008	0.33	0.001	-0.008	0.008	-0.006	277.1	-36.7	-24.746	-18.416
18/03/2008	5869608.037	532517.103	491.079	1.35	-0.008	0.016	0.018	0.006	116.6	18.5	0.013	0.004	0.26	-0.001	0.006	0.006	0.015	99.5	67.9	23.143	57.070
03/06/2008	5869608.030	532517.124	491.081	1.56	-0.015	0.037	0.040	0.008	112.1	11.3	0.026	0.005	0.21	-0.007	0.021	0.022	0.002	108.4	5.2	105.002	9.487
29/08/2008	5869608.026	532517.129	491.089	1.80	-0.019	0.042	0.046	0.016	114.3	19.1	0.026	0.009	0.24	-0.004	0.005	0.006	0.008	128.7	51.3	26.882	33.586
19/11/2008	5869608.031	532517.132	491.074	2.03	-0.014	0.045	0.047	0.001	107.3	1.2	0.023	0.000	0.22	0.005	0.003	0.006	-0.015	31.0	-68.8	25.973	-66.814
26/03/2009	5869608.059	532517.095	491.067	2.37	0.014	0.008	0.016	-0.006	29.7	-20.4	0.007	-0.003	0.35	0.028	-0.037	0.046	-0.007	307.1	-8.6	-133.447	-20.132
10/06/2009	5869608.040	532517.123	491.082	2.58	-0.005	0.036	0.036	0.009	97.9	13.9	0.014	0.003	0.21	-0.019	0.028	0.034	0.015	124.2	23.9	162.622	72.089
17/09/2009	5869608.053	532517.121	491.063	2.85	0.008	0.034	0.035	-0.010	76.8	-16.0	0.012	-0.004	0.27	0.013	-0.002	0.013	-0.019	351.3	-55.3	-48.526	-70.098
23/11/2009	5869608.060	532517.123	491.072	3.04	0.015	0.036	0.039	-0.001	67.4	-1.5	0.013	0.000	0.18	0.007	0.002	0.007	0.009	15.9	51.0	39.687	49.063
27/03/2010	5869608.055	532517.126	491.071	3.38	0.010	0.039	0.040	-0.002	75.6	-2.8	0.012	-0.001	0.34	-0.005	0.003	0.006	-0.001	149.0	-9.7	17.175	-2.946
04/07/2010	5869608.045	532517.130	491.077	3.65	0.000	0.043	0.043	0.004	90.0	5.3	0.012	0.001	0.27	-0.010	0.004	0.011	0.006	158.2	29.1	39.736	22.136
13/09/2010	5869608.052	532517.128	491.086	3.84	0.007	0.041	0.042	0.013	80.3	17.4	0.011	0.003	0.19	0.007	-0.002	0.007	0.009	344.1	51.0	-37.452	46.299
22/11/2010	5869608.054	532517.135	491.079	4.03	0.009	0.048	0.049	0.006	79.4	7.0	0.012	0.001	0.19	0.002	0.007	0.007	-0.007	74.1	-43.9	37.987	-36.525

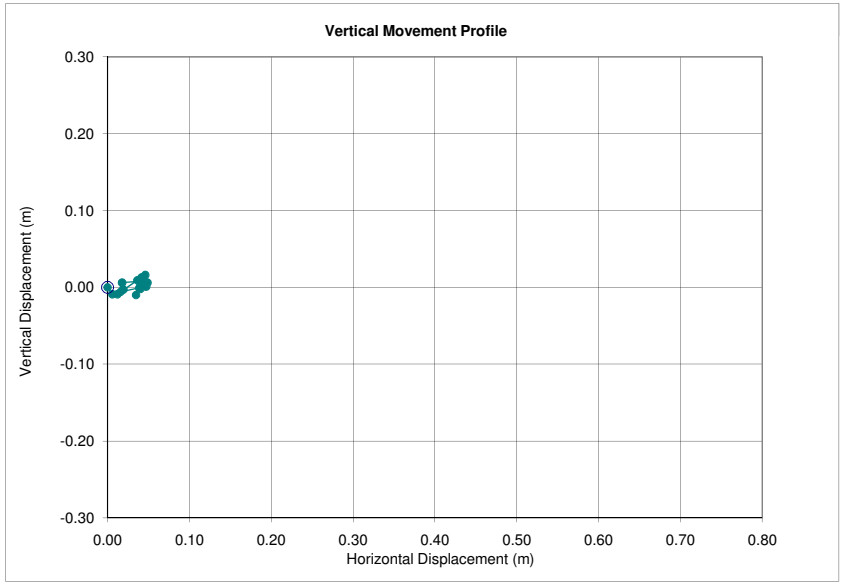
Displacement Graphs - Hub 06-09

East side Bouchie Street







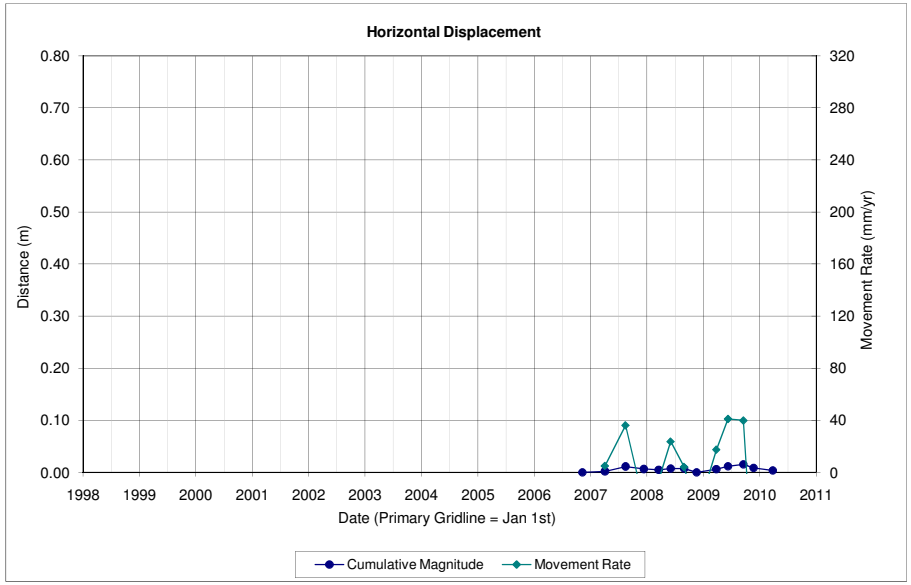


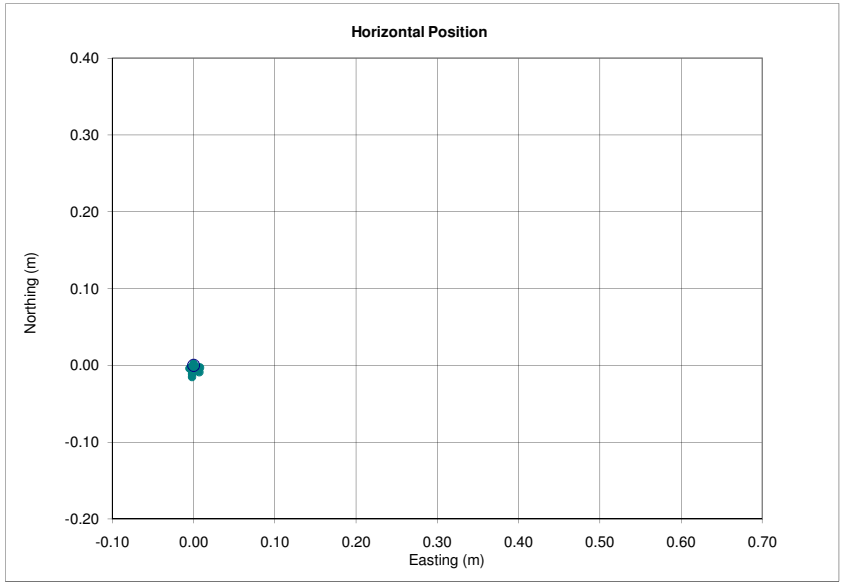
Survey and Displacement Data - Hub 06-10

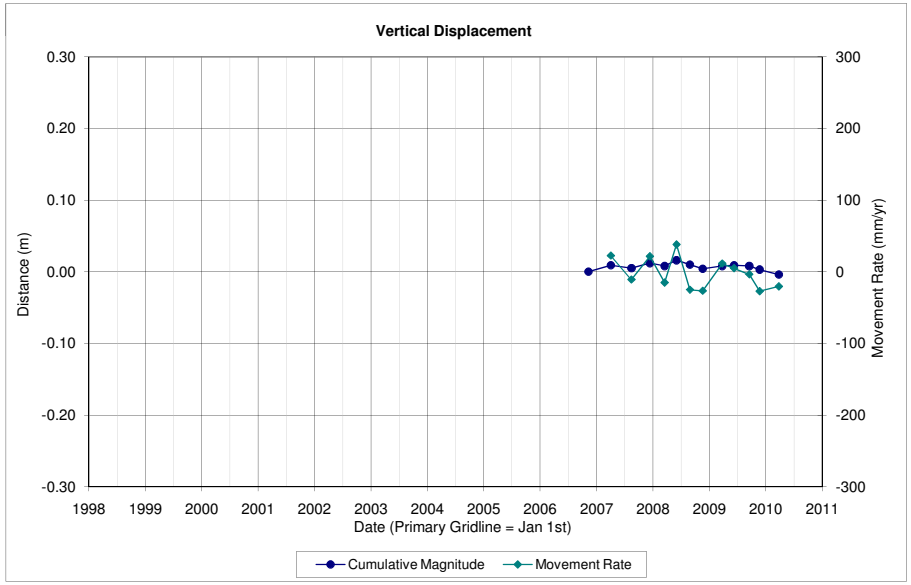
South side Broughton Street

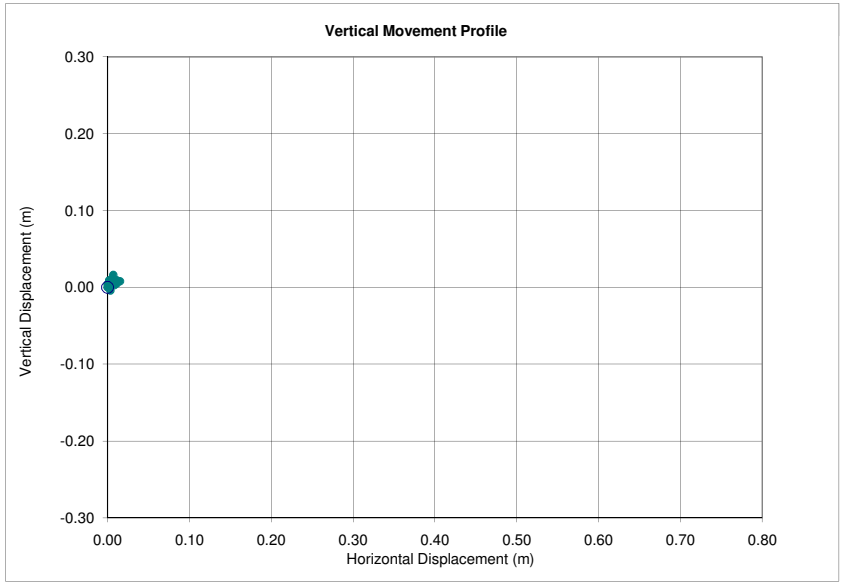
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869748.671	532621.351	478.410	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869748.673	532621.351	478.419	0.40	0.002	0.000	0.002	0.009	0.0	77.5	0.005	0.023	0.40	0.002	0.000	0.002	0.009	0.0	77.5	5.003	22.515
16/08/2007	5869748.660	532621.349	478.415	0.76	-0.011	-0.002	0.011	0.005	190.3	24.1	0.015	0.007	0.36	-0.013	-0.002	0.013	-0.004	188.7	-16.9	36.121	-10.985
13/12/2007	5869748.667	532621.346	478.422	1.09	-0.004	-0.005	0.006	0.012	231.3	61.9	0.006	0.011	0.33	0.007	-0.003	0.008	0.007	336.8	42.6	-23.375	21.485
18/03/2008	5869748.668	532621.347	478.418	1.35	-0.003	-0.004	0.005	0.008	233.1	58.0	0.004	0.006	0.26	0.001	0.001	0.001	-0.004	45.0	-70.5	-5.381	-15.219
03/06/2008	5869748.664	532621.350	478.426	1.56	-0.007	-0.001	0.007	0.016	188.1	66.2	0.005	0.010	0.21	-0.004	0.003	0.005	0.008	143.1	58.0	23.718	37.948
29/08/2008	5869748.664	532621.349	478.420	1.80	-0.007	-0.002	0.007	0.010	195.9	53.9	0.004	0.006	0.24	0.000	-0.001	0.001	-0.006	270.0	-80.5	4.198	-25.190
19/11/2008	5869748.671	532621.351	478.414	2.03	0.000	0.000	0.000	0.004	0.0	0.0	0.000	0.002	0.22	0.007	0.002	0.007	-0.006	15.9	-39.5	-32.428	-26.726
26/03/2009	5869748.665	532621.350	478.418	2.37	-0.006	-0.001	0.006	0.008	189.5	52.8	0.003	0.003	0.35	-0.006	-0.001	0.006	0.004	189.5	33.3	17.494	11.504
10/06/2009	5869748.662	532621.358	478.419	2.58	-0.009	0.007	0.011	0.009	142.1	38.3	0.004	0.003	0.21	-0.003	0.008	0.009	0.001	110.6	6.7	41.062	4.806
17/09/2009	5869748.656	532621.349	478.418	2.85	-0.015	-0.002	0.015	0.008	187.6	27.9	0.005	0.003	0.27	-0.006	-0.009	0.011	-0.001	236.3	-5.3	39.907	-3.689
23/11/2009	5869748.668	532621.359	478.413	3.04	-0.003	0.008	0.009	0.003	110.6	19.3	0.003	0.001	0.18	0.012	0.010	0.016	-0.005	39.8	-17.7	-85.155	-27.257
27/03/2010	5869748.669	532621.354	478.406	3.38	-0.002	0.003	0.004	-0.004	123.7	-48.0	0.001	-0.001	0.34	0.001	-0.005	0.005	-0.007	281.3	-53.9	-15.019	-20.619

Displacement Graphs - Hub 06-10
South side Broughton Street









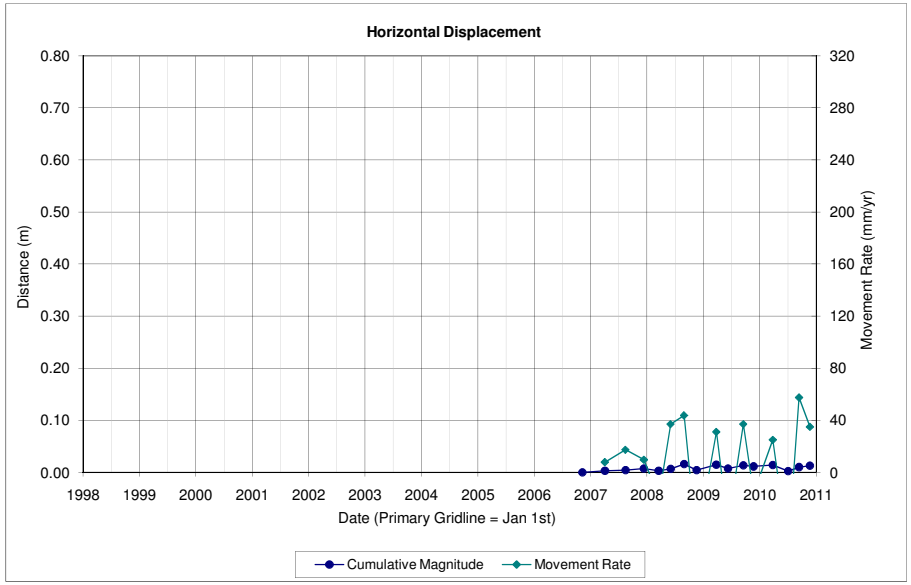
Survey and Displacement Data - Hub 06-11

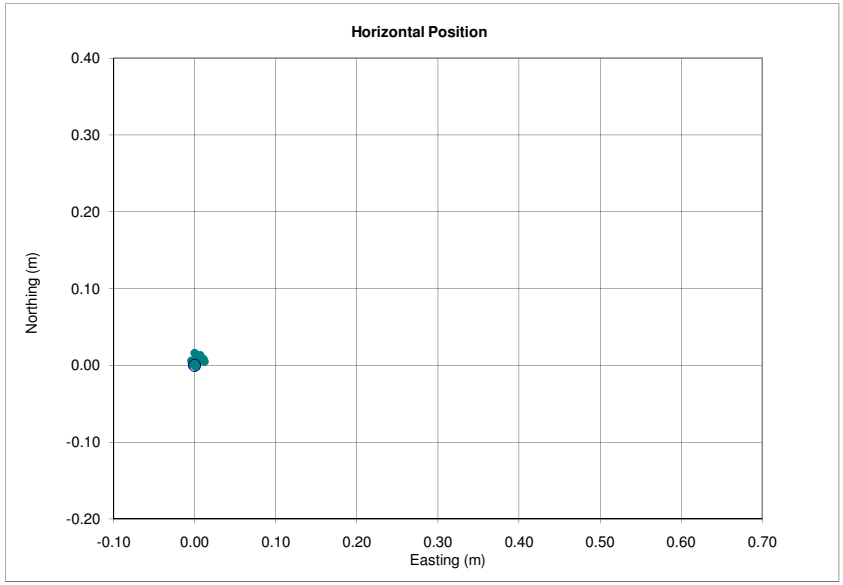
East side Lewis Road, opposite house # 391

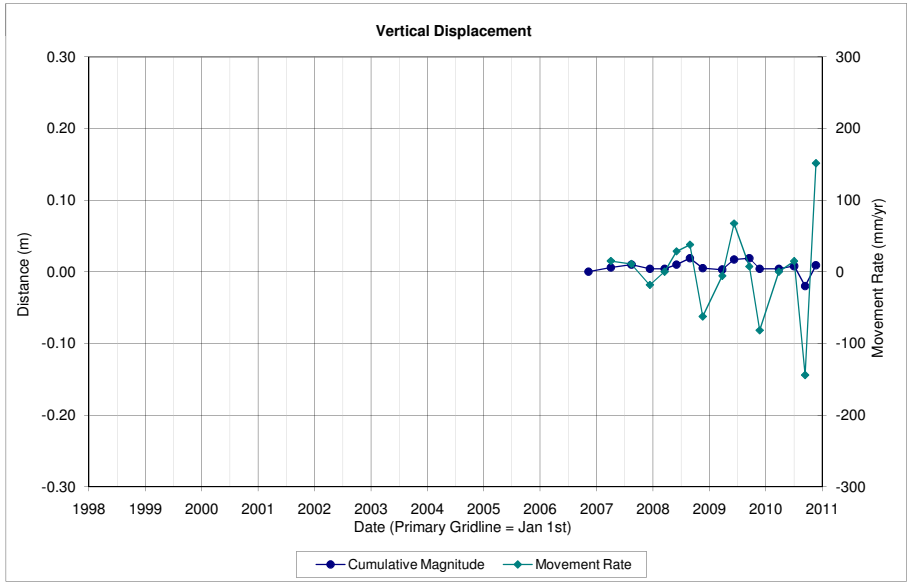
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869938.491	532538.683	480.061	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869938.492	532538.686	480.067	0.40	0.001	0.003	0.003	0.006	71.6	62.2	0.008	0.015	0.40	0.001	0.003	0.003	0.006	71.6	62.2	7.911	15.010
16/08/2007	5869938.494	532538.680	480.071	0.76	0.003	-0.003	0.004	0.010	315.0	67.0	0.006	0.013	0.36	0.002	-0.006	0.006	0.004	288.4	32.3	17.369	10.985
13/12/2007	5869938.497	532538.679	480.065	1.09	0.006	-0.004	0.007	0.004	326.3	29.0	0.007	0.004	0.33	0.003	-0.001	0.003	-0.006	341.6	-62.2	9.706	-18.416
18/03/2008	5869938.492	532538.680	480.065	1.35	0.001	-0.003	0.003	0.004	288.4	51.7	0.002	0.003	0.26	-0.005	0.001	0.005	0.000	168.7	0.0	-19.400	0.000
03/06/2008	5869938.497	532538.686	480.071	1.56	0.006	0.003	0.007	0.010	26.6	56.1	0.004	0.006	0.21	0.005	0.006	0.008	0.006	50.2	37.5	37.048	28.461
29/08/2008	5869938.507	532538.683	480.080	1.80	0.016	0.000	0.016	0.019	0.0	49.9	0.009	0.011	0.24	0.010	-0.003	0.010	0.009	343.3	40.8	43.831	37.784
19/11/2008	5869938.495	532538.684	480.066	2.03	0.004	0.001	0.004	0.005	14.0	50.5	0.002	0.002	0.22	-0.012	0.001	0.012	-0.014	175.2	-49.3	-53.636	-62.360
26/03/2009	5869938.504	532538.690	480.064	2.37	0.013	0.007	0.015	0.003	28.3	11.5	0.006	0.001	0.35	0.009	0.006	0.011	-0.002	33.7	-10.5	31.109	-5.752
10/06/2009	5869938.498	532538.684	480.078	2.58	0.007	0.001	0.007	0.017	8.1	67.4	0.003	0.007	0.21	-0.006	-0.006	0.008	0.014	225.0	58.8	-40.780	67.283
17/09/2009	5869938.499	532538.694	480.080	2.85	0.008	0.011	0.014	0.019	54.0	54.4	0.005	0.007	0.27	0.001	0.010	0.010	0.002	84.3	11.3	37.078	7.379
23/11/2009	5869938.499	532538.691	480.065	3.04	0.008	0.008	0.011	0.004	45.0	19.5	0.004	0.001	0.18	0.000	-0.003	0.003	-0.015	270.0	-78.7	-16.354	-81.772
27/03/2010	5869938.505	532538.685	480.065	3.38	0.014	0.002	0.014	0.004	8.1	15.8	0.004	0.001	0.34	0.006	-0.006	0.008	0.000	315.0	0.0	24.994	0.000
04/07/2010	5869938.489	532538.684	480.069	3.65	-0.002	0.001	0.002	0.008	153.4	74.4	0.001	0.002	0.27	-0.016	-0.001	0.016	0.004	183.6	14.0	-59.145	14.758
13/09/2010	5869938.499	532538.689	480.041	3.84	0.008	0.006	0.010	-0.020	36.9	-63.4	0.003	-0.005	0.19	0.010	0.005	0.011	-0.028	26.6	-68.2	57.516	-144.042
22/11/2010	5869938.496	532538.695	480.070	4.03	0.005	0.012	0.013	0.009	67.4	34.7	0.003	0.002	0.19	-0.003	0.006	0.007	0.029	116.6	77.0	35.002	151.318

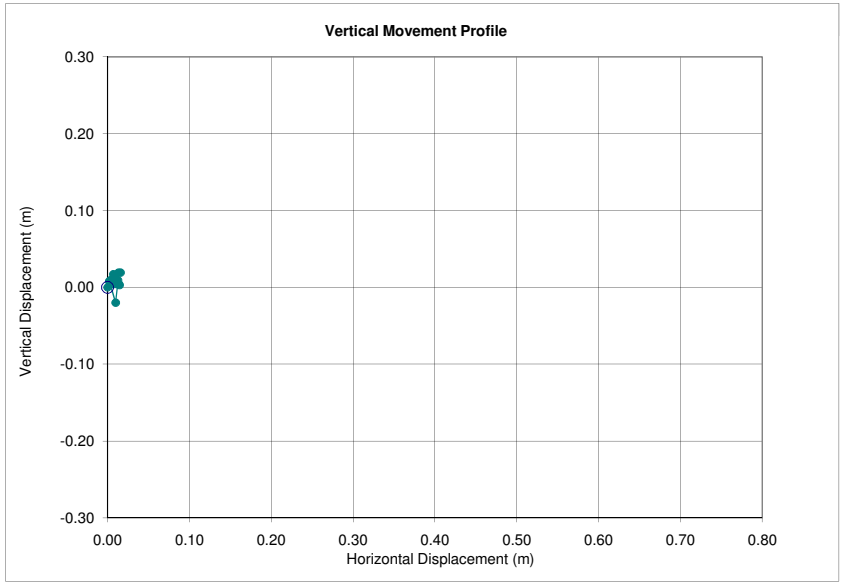
Displacement Graphs - Hub 06-11

East side Lewis Road, opposite house # 391









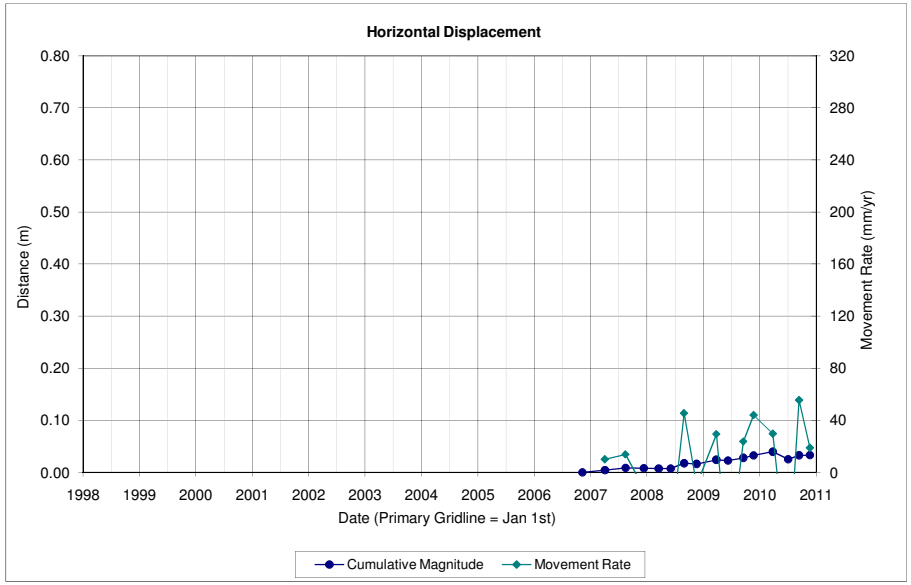
Survey and Displacement Data - Hub 06-12

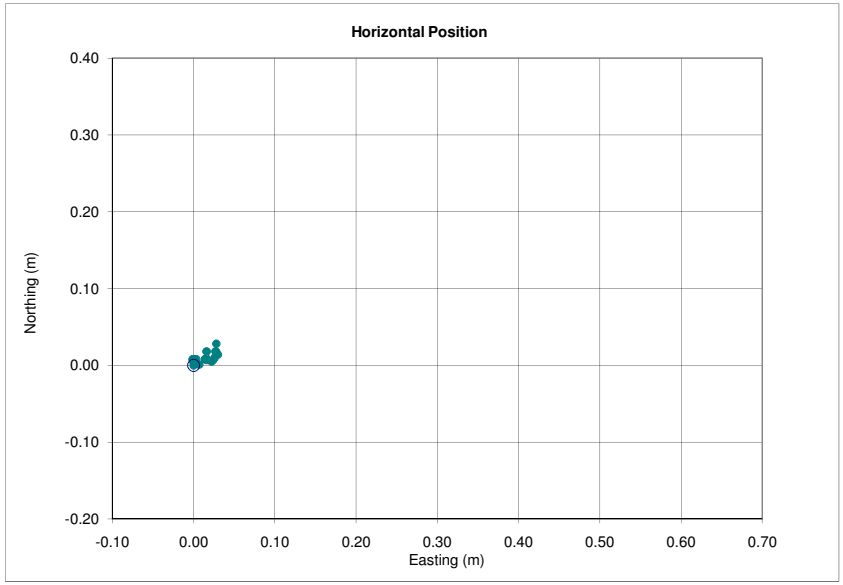
East side Lewis Road, opposite house # 547

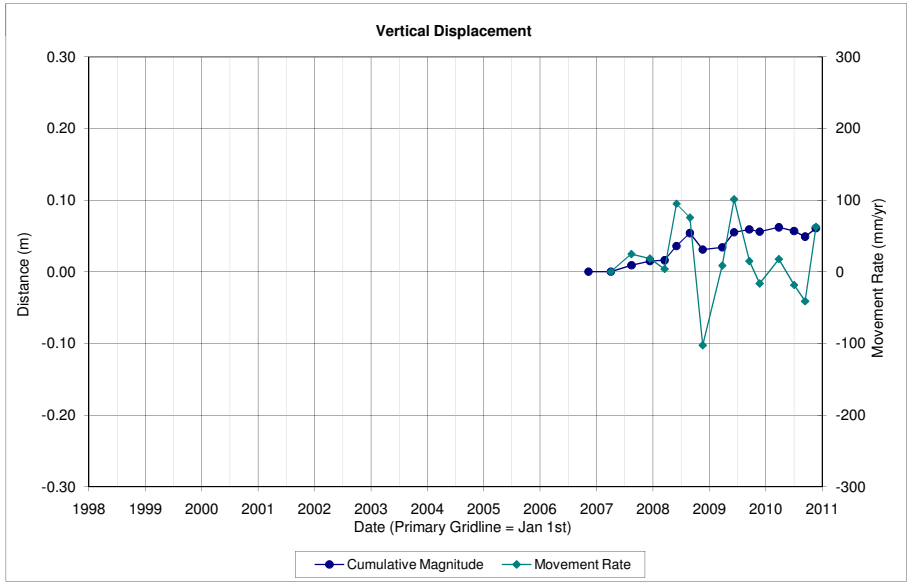
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870217.210	532480.538	484.776	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5870217.214	532480.538	484.776	0.40	0.004	0.000	0.004	0.000	0.0	0.0	0.010	0.000	0.40	0.004	0.000	0.004	0.000	0.0	0.0	10.007	0.000
16/08/2007	5870217.218	532480.541	484.785	0.76	0.008	0.003	0.009	0.009	20.6	46.5	0.011	0.012	0.36	0.004	0.003	0.005	0.009	36.9	60.9	13.731	24.716
13/12/2007	5870217.218	532480.537	484.791	1.09	0.008	-0.001	0.008	0.015	352.9	61.7	0.007	0.014	0.33	0.000	-0.004	0.004	0.006	270.0	56.3	-12.277	18.416
18/03/2008	5870217.217	532480.537	484.792	1.35	0.007	-0.001	0.007	0.016	351.9	66.2	0.005	0.012	0.26	-0.001	0.000	0.001	0.001	180.0	45.0	-3.805	3.805
03/06/2008	5870217.211	532480.545	484.812	1.56	0.001	0.007	0.007	0.036	81.9	78.9	0.005	0.023	0.21	-0.006	0.008	0.010	0.020	126.9	63.4	-47.435	94.870
29/08/2008	5870217.217	532480.554	484.830	1.80	0.007	0.016	0.017	0.054	66.4	72.1	0.010	0.030	0.24	0.006	0.009	0.011	0.018	56.3	59.0	45.411	75.569
19/11/2008	5870217.218	532480.552	484.807	2.03	0.008	0.014	0.016	0.031	60.3	62.5	0.008	0.015	0.22	0.001	-0.002	0.002	-0.023	296.6	-84.4	-9.960	-102.448
26/03/2009	5870217.228	532480.554	484.810	2.37	0.018	0.016	0.024	0.034	41.6	54.7	0.010	0.014	0.35	0.010	0.002	0.010	0.003	11.3	16.4	29.329	8.628
10/06/2009	5870217.215	532480.560	484.831	2.58	0.005	0.022	0.023	0.055	77.2	67.7	0.009	0.021	0.21	-0.013	0.006	0.014	0.021	155.2	55.7	-68.810	100.924
17/09/2009	5870217.220	532480.564	484.835	2.85	0.010	0.026	0.028	0.059	69.0	64.7	0.010	0.021	0.27	0.005	0.004	0.006	0.004	38.7	32.0	23.624	14.758
23/11/2009	5870217.228	532480.565	484.832	3.04	0.018	0.027	0.032	0.056	56.3	59.9	0.011	0.018	0.18	0.008	0.001	0.008	-0.003	7.1	-20.4	43.951	-16.354
27/03/2010	5870217.238	532480.566	484.838	3.38	0.028	0.028	0.040	0.062	45.0	57.4	0.012	0.018	0.34	0.010	0.001	0.010	0.006	5.7	30.8	29.603	17.673
04/07/2010	5870217.217	532480.562	484.833	3.65	0.007	0.024	0.025	0.057	73.7	66.3	0.007	0.016	0.27	-0.021	-0.004	0.021	-0.005	190.8	-13.2	-78.870	-18.447
13/09/2010	5870217.227	532480.566	484.825	3.84	0.017	0.028	0.033	0.049	58.7	56.2	0.009	0.013	0.19	0.010	0.004	0.011	-0.008	21.8	-36.6	55.407	-41.155
22/11/2010	5870217.224	532480.568	484.837	4.03	0.014	0.030	0.033	0.061	65.0	61.5	0.008	0.015	0.19	-0.003	0.002	0.004	0.012	146.3	73.3	18.813	62.614

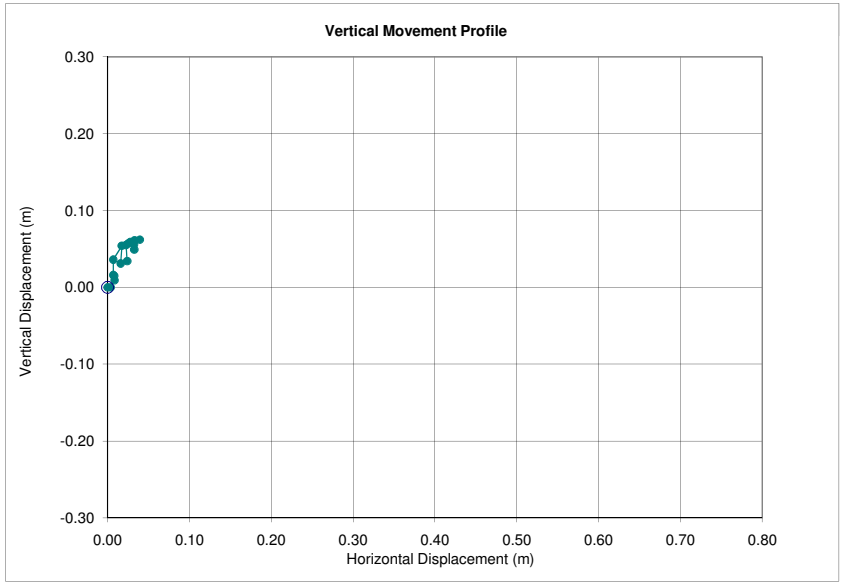
Displacement Graphs - Hub 06-12

East side Lewis Road, opposite house # 547







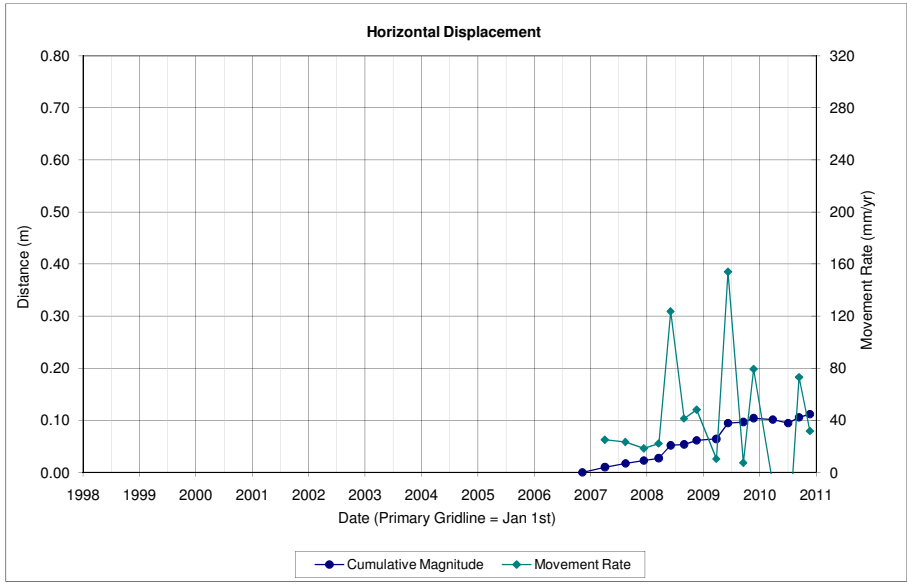


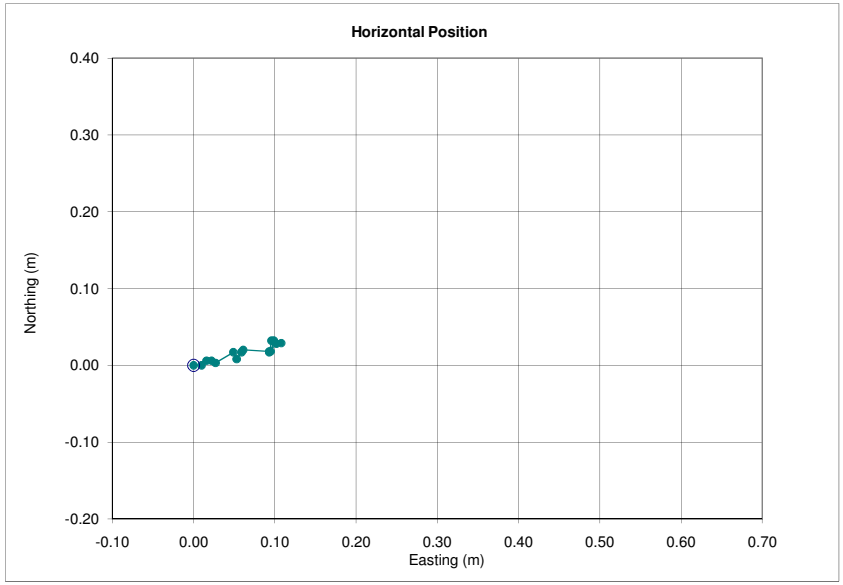
Survey and Displacement Data - Hub 06-13

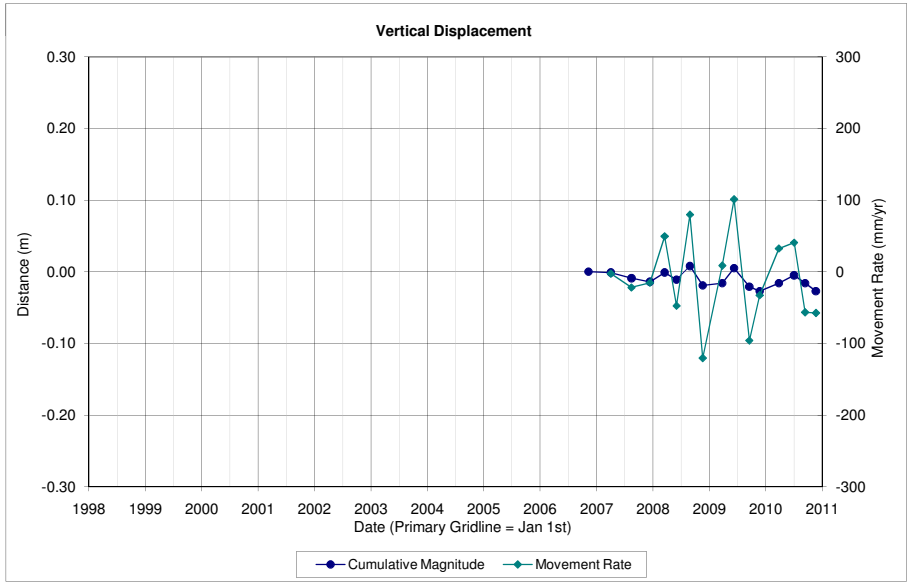
NW. corner Pentland Crescent

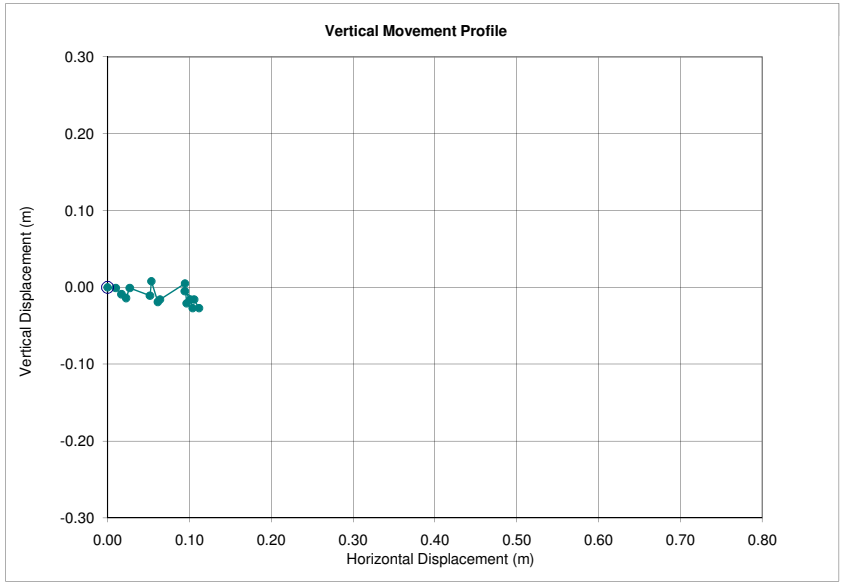
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870118.621	532230.725	527.301	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5870118.621	532230.735	527.300	0.40	0.000	0.010	0.010	-0.001	90.0	-5.7	0.025	-0.003	0.40	0.000	0.010	0.010	-0.001	90.0	-5.7	25.017	-2.502
16/08/2007	5870118.627	532230.741	527.292	0.76	0.006	0.016	0.017	-0.009	69.4	-27.8	0.022	-0.012	0.36	0.006	0.006	0.008	-0.008	45.0	-43.3	23.303	-21.970
13/12/2007	5870118.627	532230.747	527.287	1.09	0.006	0.022	0.023	-0.014	74.7	-31.5	0.021	-0.013	0.33	0.000	0.006	0.006	-0.005	90.0	-39.8	18.416	-15.347
18/03/2008	5870118.624	532230.752	527.300	1.35	0.003	0.027	0.027	-0.001	83.7	-2.1	0.020	-0.001	0.26	-0.003	0.005	0.006	0.013	121.0	65.8	22.185	49.461
03/06/2008	5870118.638	532230.774	527.290	1.56	0.017	0.049	0.052	-0.011	70.9	-12.0	0.033	-0.007	0.21	0.014	0.022	0.026	-0.010	57.5	-21.0	123.696	-47.435
29/08/2008	5870118.629	532230.778	527.309	1.80	0.008	0.053	0.054	0.008	81.4	8.5	0.030	0.004	0.24	-0.009	0.004	0.010	0.019	156.0	62.6	41.348	79.767
19/11/2008	5870118.638	532230.784	527.282	2.03	0.017	0.059	0.061	-0.019	73.9	-17.2	0.030	-0.009	0.22	0.009	0.006	0.011	-0.027	33.7	-68.2	48.180	-120.265
26/03/2009	5870118.641	532230.786	527.285	2.37	0.020	0.061	0.064	-0.016	71.8	-14.0	0.027	-0.007	0.35	0.003	0.002	0.004	0.003	33.7	39.8	10.370	8.628
10/06/2009	5870118.639	532230.818	527.306	2.58	0.018	0.093	0.095	0.005	79.0	3.0	0.037	0.002	0.21	-0.002	0.032	0.032	0.021	93.6	33.2	154.090	100.924
17/09/2009	5870118.639	532230.820	527.280	2.85	0.018	0.095	0.097	-0.021	79.3	-12.3	0.034	-0.007	0.27	0.000	0.002	0.002	-0.026	90.0	-85.6	7.379	-95.924
23/11/2009	5870118.653	532230.824	527.274	3.04	0.032	0.099	0.104	-0.027	72.1	-14.5	0.034	-0.009	0.18	0.014	0.004	0.015	-0.006	15.9	-22.4	79.375	-32.709
27/03/2010	5870118.653	532230.821	527.285	3.38	0.032	0.096	0.101	-0.016	71.6	-9.0	0.030	-0.005	0.34	0.000	-0.003	0.003	0.011	270.0	74.7	-8.837	32.401
04/07/2010	5870118.638	532230.818	527.296	3.65	0.017	0.093	0.095	-0.005	79.6	-3.0	0.026	-0.001	0.27	-0.015	-0.003	0.015	0.011	191.3	35.7	-56.437	40.583
13/09/2010	5870118.649	532230.827	527.285	3.84	0.028	0.102	0.106	-0.016	74.6	-8.6	0.028	-0.004	0.19	0.011	0.009	0.014	-0.011	39.3	-37.7	73.115	-56.588
22/11/2010	5870118.650	532230.833	527.274	4.03	0.029	0.108	0.112	-0.027	75.0	-13.6	0.028	-0.007	0.19	0.001	0.006	0.006	-0.011	80.5	-61.1	31.739	-57.396

Displacement Graphs - Hub 06-13
NW. corner Pentland Crescent









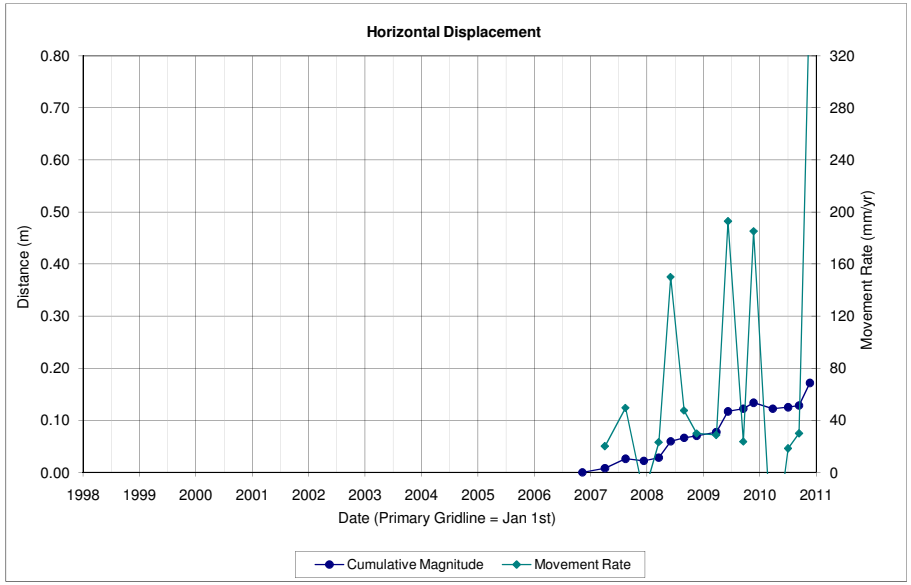
Survey and Displacement Data - Hub 06-14

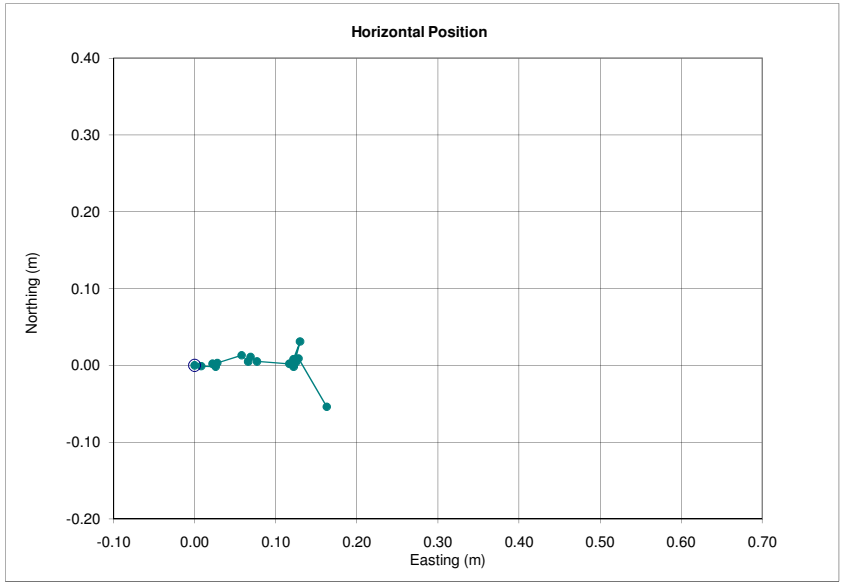
SW. corner Pinchbeck Street / Pentland Crescent

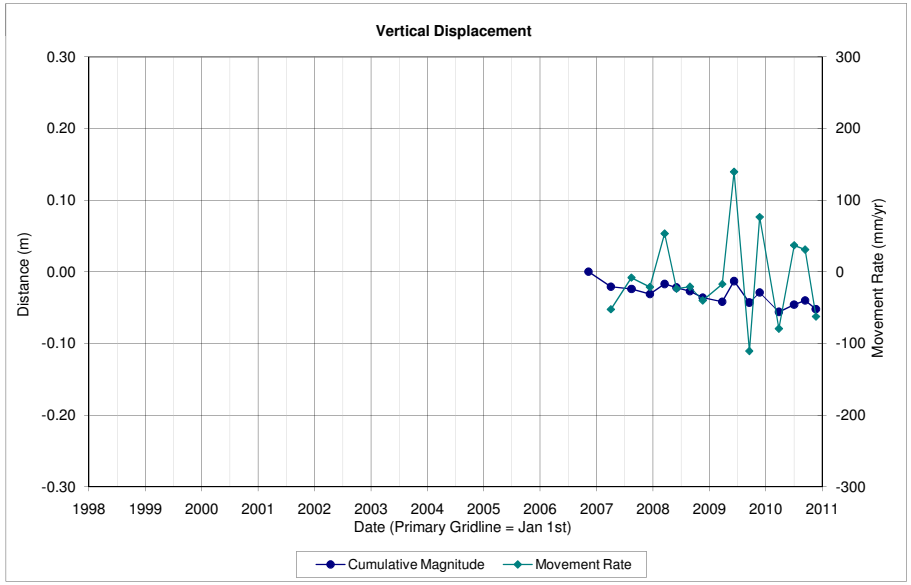
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870071.251	532147.507	527.150	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5870071.250	532147.515	527.129	0.40	-0.001	0.008	0.008	-0.021	97.1	-69.0	0.020	-0.053	0.40	-0.001	0.008	0.008	-0.021	97.1	-69.0	20.169	-52.536
16/08/2007	5870071.249	532147.533	527.126	0.76	-0.002	0.026	0.026	-0.024	94.4	-42.6	0.034	-0.031	0.36	-0.001	0.018	0.018	-0.003	93.2	-9.4	49.509	-8.239
13/12/2007	5870071.253	532147.529	527.119	1.09	0.002	0.022	0.022	-0.031	84.8	-54.5	0.020	-0.028	0.33	0.004	-0.004	0.006	-0.007	315.0	-51.1	-17.363	-21.485
18/03/2008	5870071.254	532147.535	527.133	1.35	0.003	0.028	0.028	-0.017	83.9	-31.1	0.021	-0.013	0.26	0.001	0.006	0.006	0.014	80.5	66.5	23.143	53.266
03/06/2008	5870071.264	532147.565	527.128	1.56	0.013	0.058	0.059	-0.022	77.4	-20.3	0.038	-0.014	0.21	0.010	0.030	0.032	-0.005	71.6	-9.0	150.003	-23.718
29/08/2008	5870071.256	532147.573	527.123	1.80	0.005	0.066	0.066	-0.027	85.7	-22.2	0.037	-0.015	0.24	-0.008	0.008	0.011	-0.005	135.0	-23.8	47.498	-20.991
19/11/2008	5870071.262	532147.576	527.114	2.03	0.011	0.069	0.070	-0.036	80.9	-27.3	0.034	-0.018	0.22	0.006	0.003	0.007	-0.009	26.6	-53.3	29.880	-40.088
26/03/2009	5870071.256	532147.584	527.108	2.37	0.005	0.077	0.077	-0.042	86.3	-28.6	0.033	-0.018	0.35	-0.006	0.008	0.010	-0.006	126.9	-31.0	28.760	-17.256
10/06/2009	5870071.253	532147.624	527.137	2.58	0.002	0.117	0.117	-0.013	89.0	-6.3	0.045	-0.005	0.21	-0.003	0.040	0.040	0.029	94.3	35.9	192.777	139.372
17/09/2009	5870071.249	532147.629	527.107	2.85	-0.002	0.122	0.122	-0.043	90.9	-19.4	0.043	-0.015	0.27	-0.004	0.005	0.006	-0.030	128.7	-78.0	23.624	-110.682
23/11/2009	5870071.282	532147.637	527.121	3.04	0.031	0.130	0.134	-0.029	76.6	-12.2	0.044	-0.010	0.18	0.033	0.008	0.034	0.014	13.6	22.4	185.110	76.321
27/03/2010	5870071.259	532147.629	527.094	3.38	0.008	0.122	0.122	-0.056	86.2	-24.6	0.036	-0.017	0.34	-0.023	-0.008	0.024	-0.027	199.2	-48.0	-71.729	-79.530
04/07/2010	5870071.255	532147.632	527.104	3.65	0.004	0.125	0.125	-0.046	88.2	-20.2	0.034	-0.013	0.27	-0.004	0.003	0.005	0.010	143.1	63.4	18.447	36.894
13/09/2010	5870071.260	532147.635	527.110	3.84	0.009	0.128	0.128	-0.040	86.0	-17.3	0.033	-0.010	0.19	0.005	0.003	0.006	0.006	31.0	45.8	29.997	30.866
22/11/2010	5870071.197	532147.670	527.098	4.03	-0.054	0.163	0.172	-0.052	108.3	-16.8	0.043	-0.013	0.19	-0.063	0.035	0.072	-0.012	150.9	-9.5	376.048	-62.614

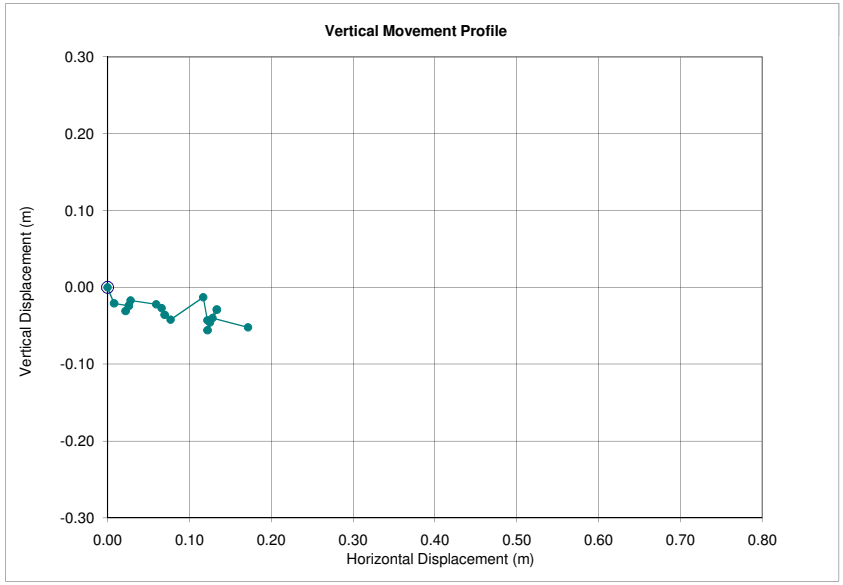
Displacement Graphs - Hub 06-14

SW. corner Pinchbeck Street / Pentland Crescent







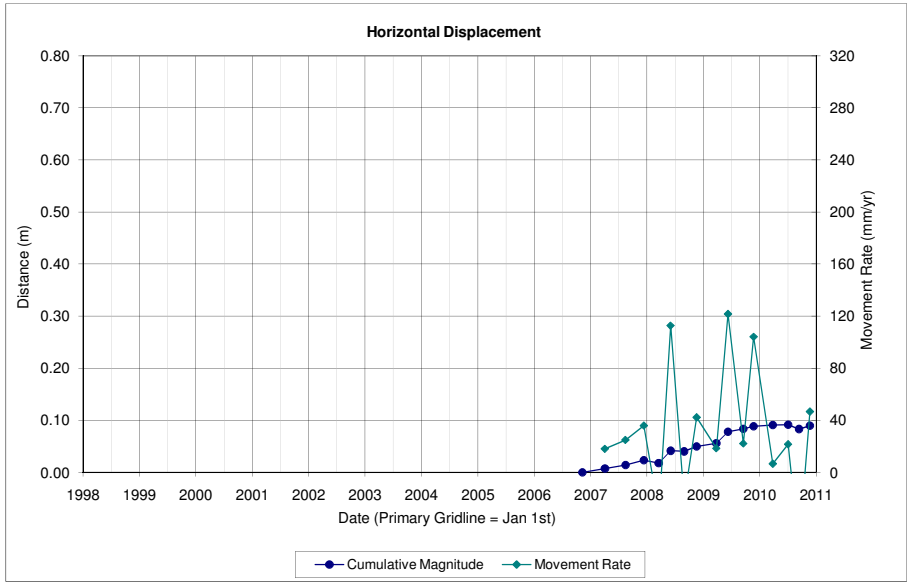


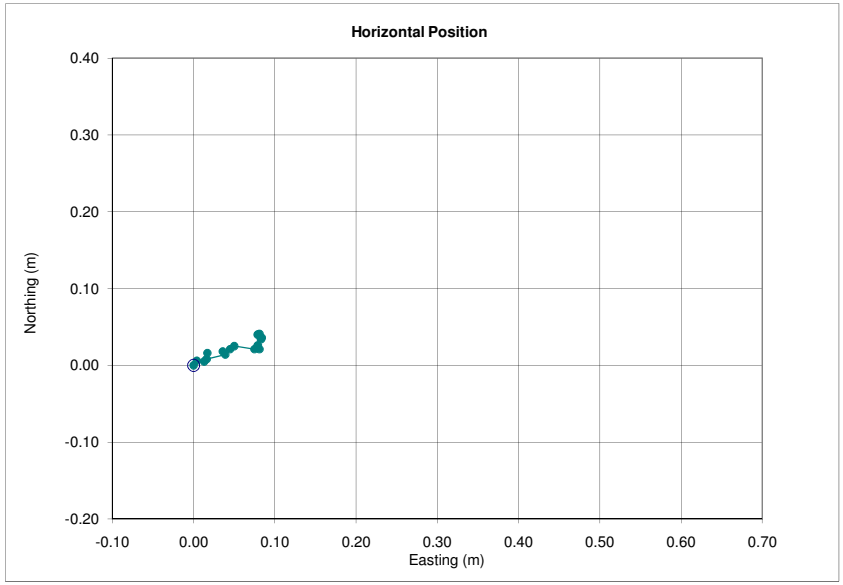
Survey and Displacement Data - Hub 06-15

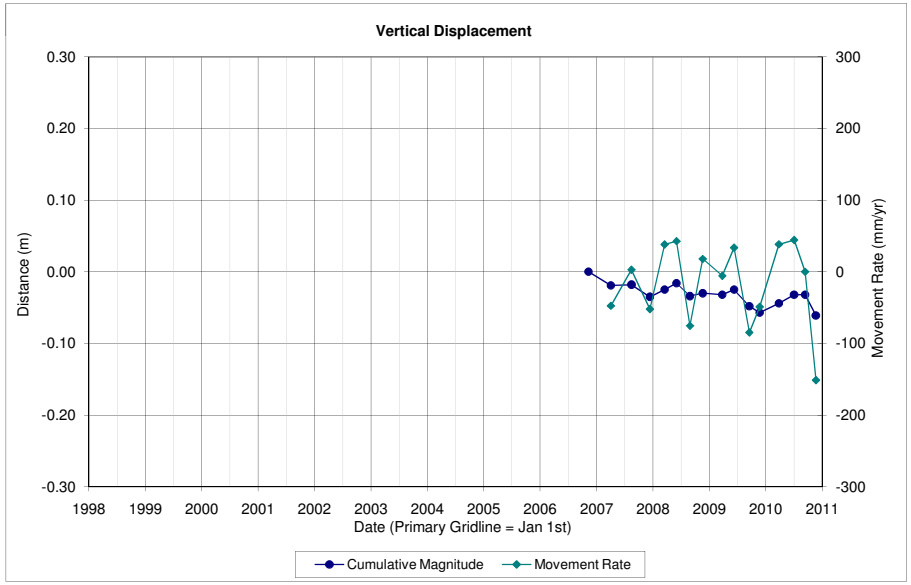
By trail, NW unnamed Rd. N. Dixon St.

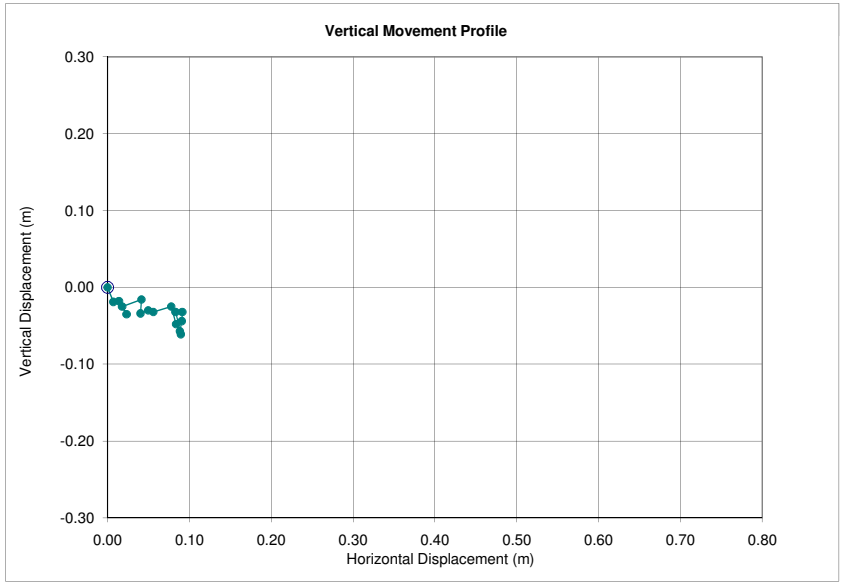
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870278.754	531364.331	568.367	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5870278.760	531364.335	568.348	0.40	0.006	0.004	0.007	-0.019	33.7	-69.2	0.018	-0.048	0.40	0.006	0.004	0.007	-0.019	33.7	-69.2	18.040	-47.533
16/08/2007	5870278.759	531364.344	568.349	0.76	0.005	0.013	0.014	-0.018	69.0	-52.3	0.018	-0.024	0.36	-0.001	0.009	0.009	0.001	96.3	6.3	24.868	2.746
13/12/2007	5870278.770	531364.348	568.332	1.09	0.016	0.017	0.023	-0.035	46.7	-56.3	0.021	-0.032	0.33	0.011	0.004	0.012	-0.017	20.0	-55.5	35.926	-52.179
18/03/2008	5870278.762	531364.347	568.342	1.35	0.008	0.016	0.018	-0.025	63.4	-54.4	0.013	-0.018	0.26	-0.008	-0.001	0.008	0.010	187.1	51.1	-30.674	38.047
03/06/2008	5870278.768	531364.370	568.351	1.56	0.014	0.039	0.041	-0.016	70.3	-21.1	0.027	-0.010	0.21	0.006	0.023	0.024	0.009	75.4	20.7	112.752	42.692
29/08/2008	5870278.772	531364.367	568.333	1.80	0.018	0.036	0.040	-0.034	63.4	-40.2	0.022	-0.019	0.24	0.004	-0.003	0.005	-0.018	323.1	-74.5	-20.991	-75.569
19/11/2008	5870278.775	531364.376	568.337	2.03	0.021	0.045	0.050	-0.030	65.0	-31.1	0.025	-0.015	0.22	0.003	0.009	0.009	0.004	71.6	22.9	42.257	17.817
26/03/2009	5870278.779	531364.381	568.335	2.37	0.025	0.050	0.056	-0.032	63.4	-29.8	0.024	-0.013	0.35	0.004	0.005	0.006	-0.002	51.3	-17.3	18.415	-5.752
10/06/2009	5870278.775	531364.406	568.342	2.58	0.021	0.075	0.078	-0.025	74.4	-17.8	0.030	-0.010	0.21	-0.004	0.025	0.025	0.007	99.1	15.5	121.676	33.641
17/09/2009	5870278.775	531364.412	568.319	2.85	0.021	0.081	0.084	-0.048	75.5	-29.8	0.029	-0.017	0.27	0.000	0.006	0.006	-0.023	90.0	-75.4	22.136	-84.856
23/11/2009	5870278.794	531364.410	568.310	3.04	0.040	0.079	0.089	-0.057	63.1	-32.8	0.029	-0.019	0.18	0.019	-0.002	0.019	-0.009	354.0	-25.2	104.151	-49.063
27/03/2010	5870278.795	531364.412	568.323	3.38	0.041	0.081	0.091	-0.044	63.2	-25.9	0.027	-0.013	0.34	0.001	0.002	0.002	0.013	63.4	80.2	6.586	38.292
04/07/2010	5870278.790	531364.415	568.335	3.65	0.036	0.084	0.091	-0.032	66.8	-19.3	0.025	-0.009	0.27	-0.005	0.003	0.006	0.012	149.0	64.1	21.513	44.273
13/09/2010	5870278.780	531364.410	568.335	3.84	0.026	0.079	0.083	-0.032	71.8	-21.0	0.022	-0.008	0.19	-0.010	-0.005	0.011	0.000	206.6	0.0	-57.516	0.000
22/11/2010	5870278.788	531364.414	568.306	4.03	0.034	0.083	0.090	-0.061	67.7	-34.2	0.022	-0.015	0.19	0.008	0.004	0.009	-0.029	26.6	-72.9	46.670	-151.318

Displacement Graphs - Hub 06-15
By trail, NW unnamed Rd. N. Dixon St.









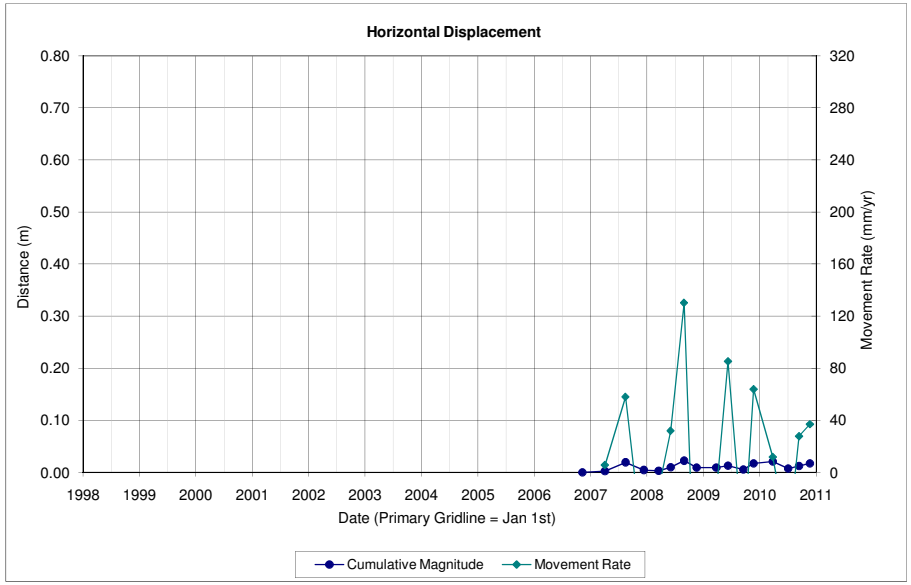
Survey and Displacement Data - Hub 06-16

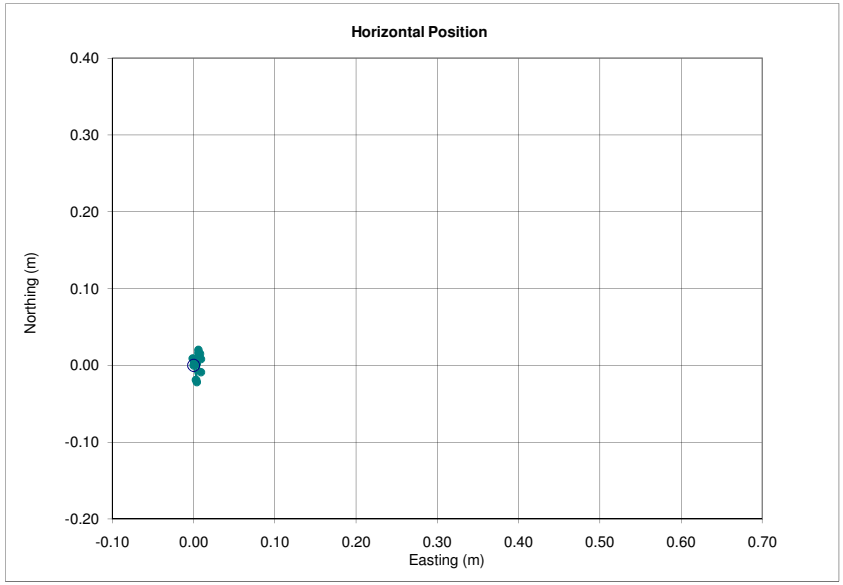
By end trail, NW unnamed road N. Dixon St.

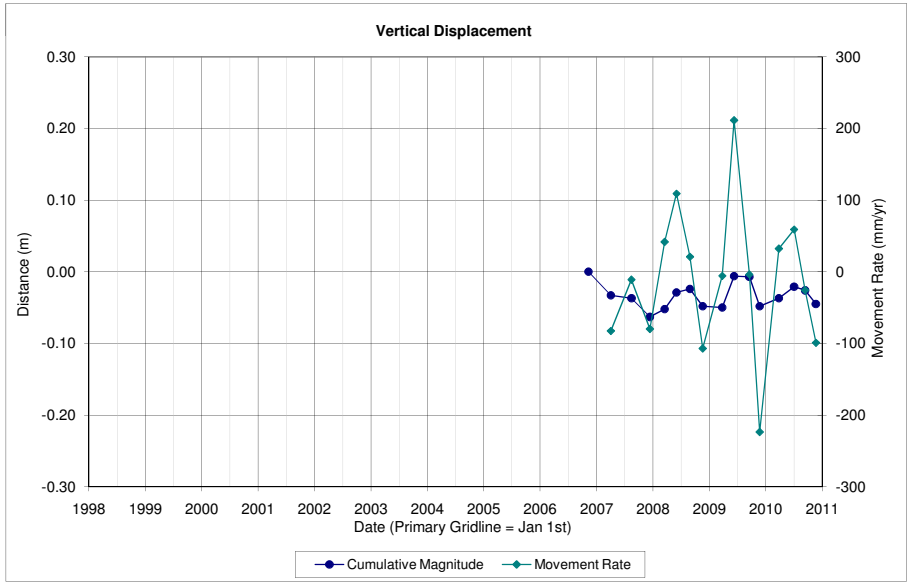
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870345.023	531228.061	572.222	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5870345.025	531228.062	572.189	0.40	0.002	0.001	0.002	-0.033	26.6	-86.1	0.006	-0.083	0.40	0.002	0.001	0.002	-0.033	26.6	-86.1	5.594	-82.557
16/08/2007	5870345.004	531228.064	572.185	0.76	-0.019	0.003	0.019	-0.037	171.0	-62.5	0.025	-0.048	0.36	-0.021	0.002	0.021	-0.004	174.6	-10.7	57.932	-10.985
13/12/2007	5870345.025	531228.065	572.159	1.09	0.002	0.004	0.004	-0.063	63.4	-85.9	0.004	-0.058	0.33	0.021	0.001	0.021	-0.026	2.7	-51.0	-64.529	-79.803
18/03/2008	5870345.026	531228.062	572.170	1.35	0.003	0.001	0.003	-0.052	18.4	-86.5	0.002	-0.038	0.26	0.001	-0.003	0.003	0.011	288.4	74.0	-12.031	41.852
03/06/2008	5870345.032	531228.065	572.193	1.56	0.009	0.004	0.010	-0.029	24.0	-71.2	0.006	-0.019	0.21	0.006	0.003	0.007	0.023	26.6	73.7	31.820	109.101
29/08/2008	5870345.001	531228.065	572.198	1.80	-0.022	0.004	0.022	-0.024	169.7	-47.0	0.012	-0.013	0.24	-0.031	0.000	0.031	0.005	180.0	9.2	130.147	20.991
19/11/2008	5870345.032	531228.060	572.174	2.03	0.009	-0.001	0.009	-0.048	353.7	-79.3	0.004	-0.024	0.22	0.031	-0.005	0.031	-0.024	350.8	-37.4	-139.867	-106.902
26/03/2009	5870345.031	531228.065	572.172	2.37	0.008	0.004	0.009	-0.050	26.6	-79.9	0.004	-0.021	0.35	-0.001	0.005	0.005	-0.002	101.3	-21.4	-14.665	-5.752
10/06/2009	5870345.014	531228.070	572.216	2.58	-0.009	0.009	0.013	-0.006	135.0	-25.2	0.005	-0.002	0.21	-0.017	0.005	0.018	0.044	163.6	68.1	85.161	211.461
17/09/2009	5870345.028	531228.063	572.215	2.85	0.005	0.002	0.005	-0.007	21.8	-52.4	0.002	-0.002	0.27	0.014	-0.007	0.016	-0.001	333.4	-3.7	-57.748	-3.689
23/11/2009	5870345.039	531228.067	572.174	3.04	0.016	0.006	0.017	-0.048	20.6	-70.4	0.006	-0.016	0.18	0.011	0.004	0.012	-0.041	20.0	-74.1	63.808	-223.511
27/03/2010	5870345.043	531228.067	572.185	3.38	0.020	0.006	0.021	-0.037	16.7	-60.6	0.006	-0.011	0.34	0.004	0.000	0.004	0.011	0.0	70.0	11.782	32.401
04/07/2010	5870345.029	531228.065	572.201	3.65	0.006	0.004	0.007	-0.021	33.7	-71.0	0.002	-0.006	0.27	-0.014	-0.002	0.014	0.016	188.1	48.5	-52.176	59.030
13/09/2010	5870345.031	531228.070	572.196	3.84	0.008	0.009	0.012	-0.026	48.4	-65.1	0.003	-0.007	0.19	0.002	0.005	0.005	-0.005	68.2	-42.9	27.703	-25.722
22/11/2010	5870345.038	531228.069	572.177	4.03	0.015	0.008	0.017	-0.045	28.1	-69.3	0.004	-0.011	0.19	0.007	-0.001	0.007	-0.019	351.9	-69.6	36.896	-99.139

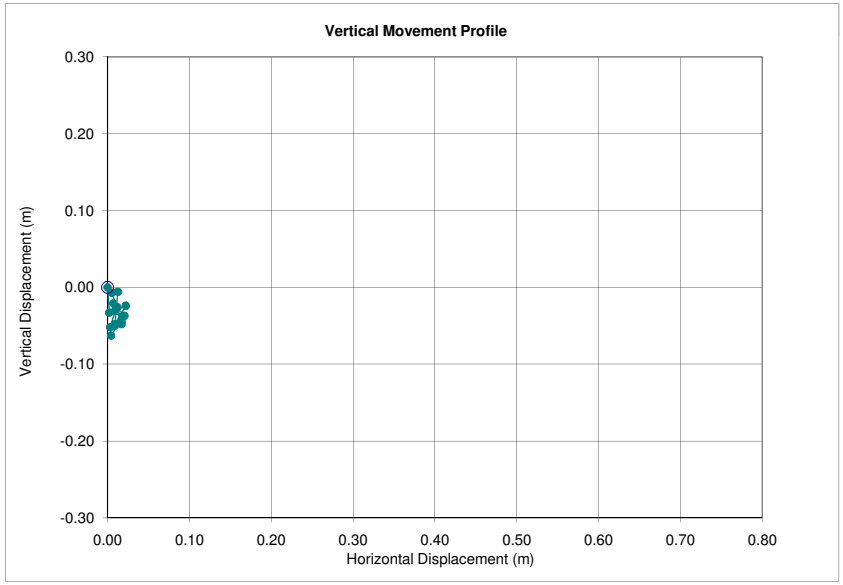
Displacement Graphs - Hub 06-16

By end trail, NW unnamed road N. Dixon St.







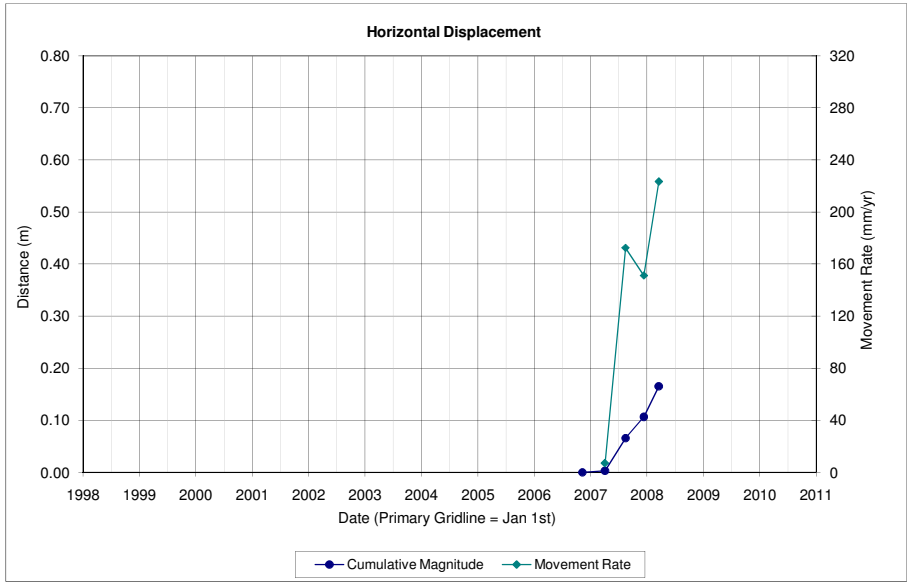


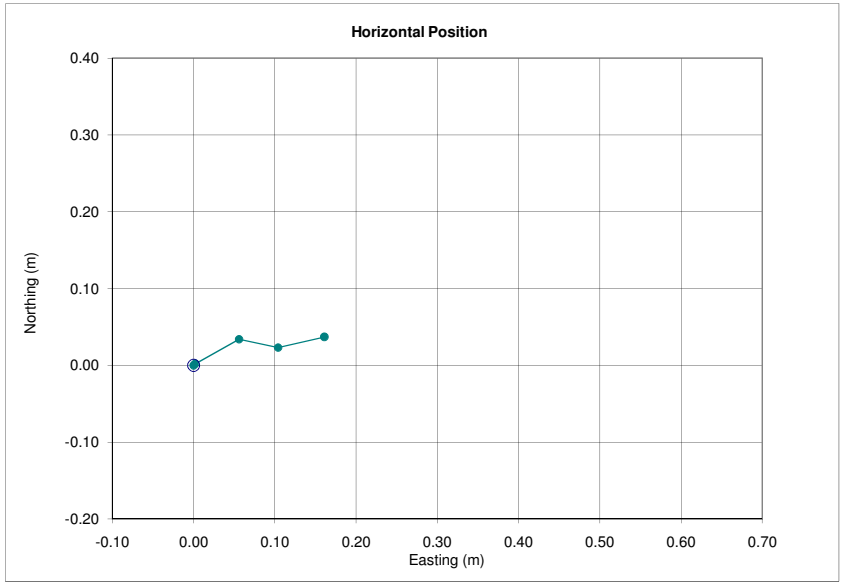
Survey and Displacement Data - Hub 06-17

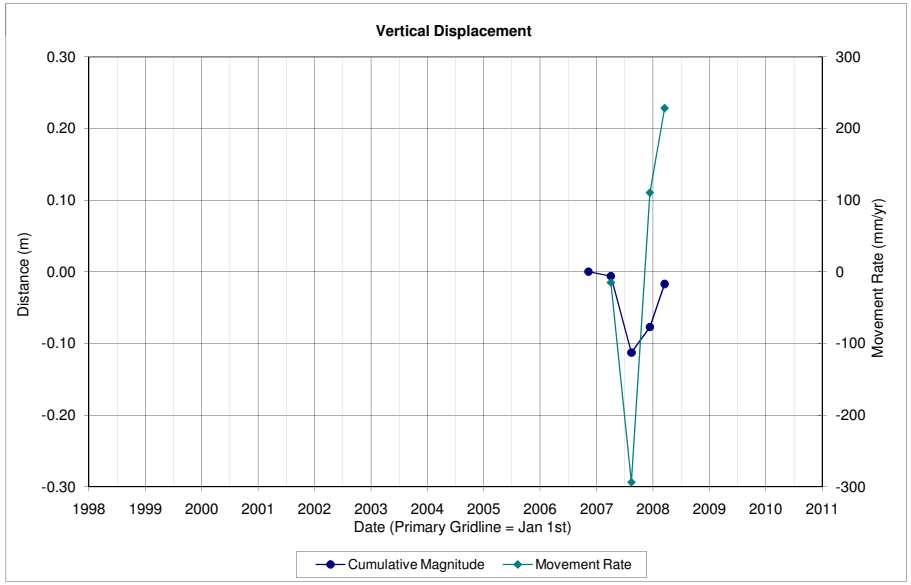
In clearing, NW of end Findlay Road

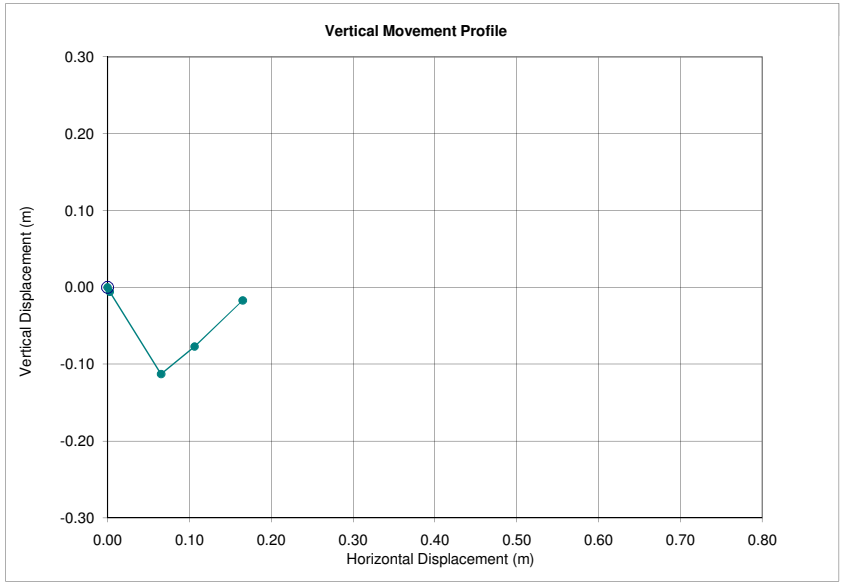
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870085.686	531136.829	595.126	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5870085.688	531136.831	595.120	0.40	0.002	0.002	0.003	-0.006	45.0	-64.8	0.007	-0.015	0.40	0.002	0.002	0.003	-0.006	45.0	-64.8	7.076	-15.010
16/08/2007	5870085.720	531136.885	595.013	0.76	0.034	0.056	0.066	-0.113	58.7	-59.9	0.086	-0.148	0.36	0.032	0.054	0.063	-0.107	59.3	-59.6	172.380	-293.848
13/12/2007	5870085.709	531136.933	595.049	1.09	0.023	0.104	0.107	-0.077	77.5	-35.9	0.098	-0.071	0.33	-0.011	0.048	0.049	0.036	102.9	36.2	151.147	110.496
18/03/2008	5870085.723	531136.990	595.109	1.35	0.037	0.161	0.165	-0.017	77.1	-5.9	0.122	-0.013	0.26	0.014	0.057	0.059	0.060	76.2	45.6	223.313	228.281

Displacement Graphs - Hub 06-17
In clearing, NW of end Findlay Road









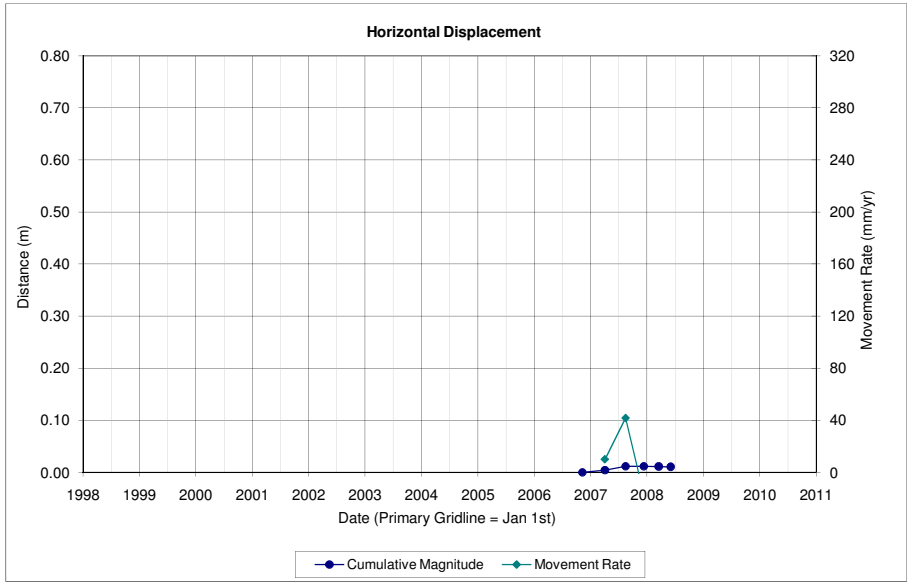
Survey and Displacement Data - Hub 06-18

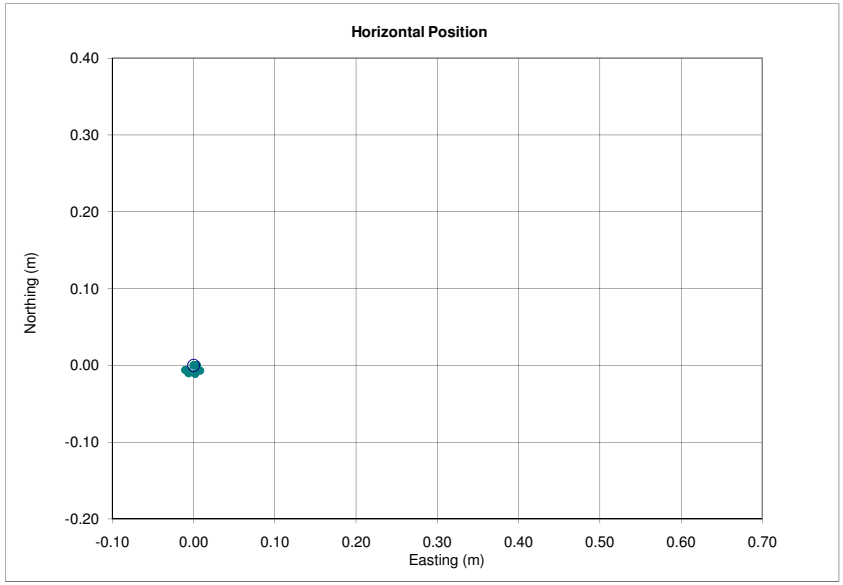
On upper bench by trail, off end Findlay Road

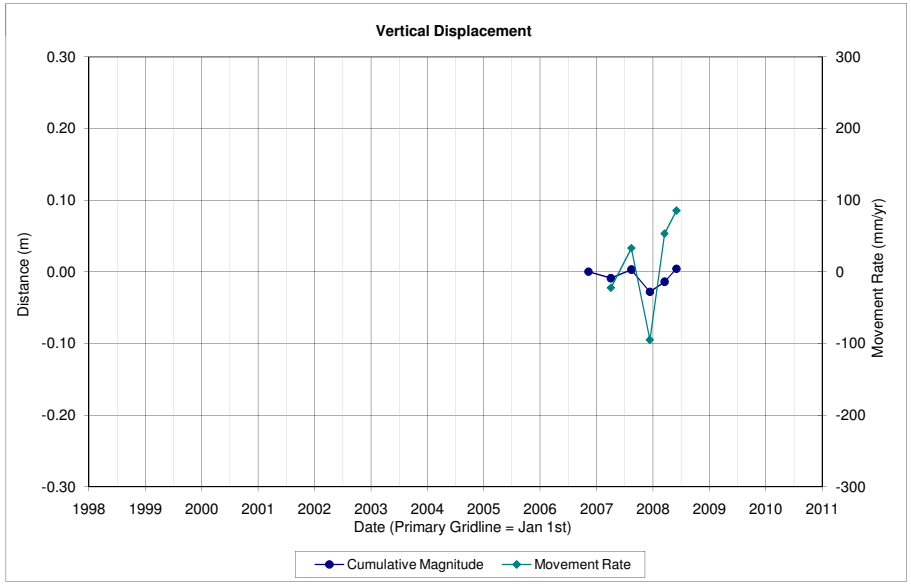
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870000.421	530856.972	632.066	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5870000.421	530856.976	632.057	0.40	0.000	0.004	0.004	-0.009	90.0	-66.0	0.010	-0.023	0.40	0.000	0.004	0.004	-0.009	90.0	-66.0	10.007	-22.515
16/08/2007	5870000.415	530856.962	632.069	0.76	-0.006	-0.010	0.012	0.003	239.0	14.4	0.015	0.004	0.36	-0.006	-0.014	0.015	0.012	246.8	38.2	41.829	32.955
13/12/2007	5870000.411	530856.966	632.038	1.09	-0.010	-0.006	0.012	-0.028	211.0	-67.4	0.011	-0.026	0.33	-0.004	0.004	0.006	-0.031	135.0	-79.7	-17.363	-95.149
18/03/2008	5870000.410	530856.974	632.052	1.35	-0.011	0.002	0.011	-0.014	169.7	-51.4	0.008	-0.010	0.26	-0.001	0.008	0.008	0.014	97.1	60.1	-30.674	53.266
03/06/2008	5870000.414	530856.980	632.070	1.56	-0.007	0.008	0.011	0.004	131.2	20.6	0.007	0.003	0.21	0.004	0.006	0.007	0.018	56.3	68.2	-34.206	85.383

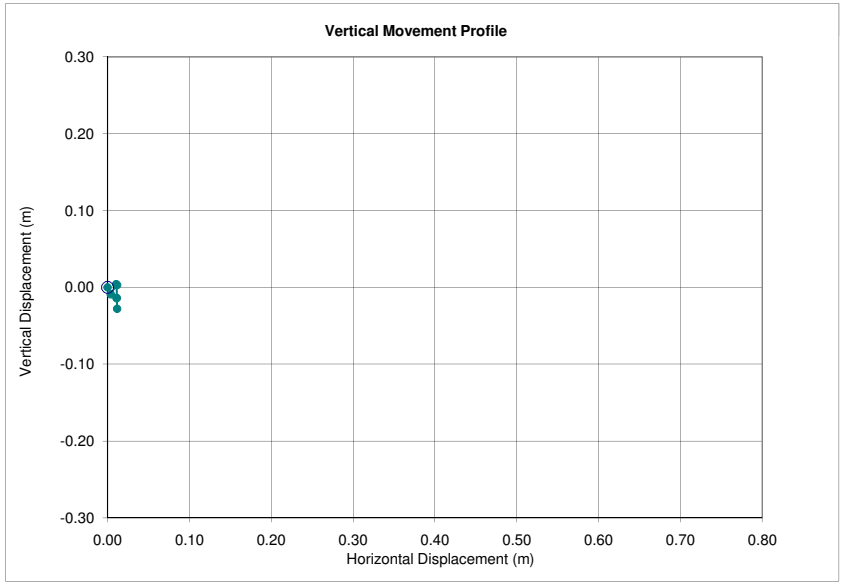
Displacement Graphs - Hub 06-18

On upper bench by trail, off end Findlay Road









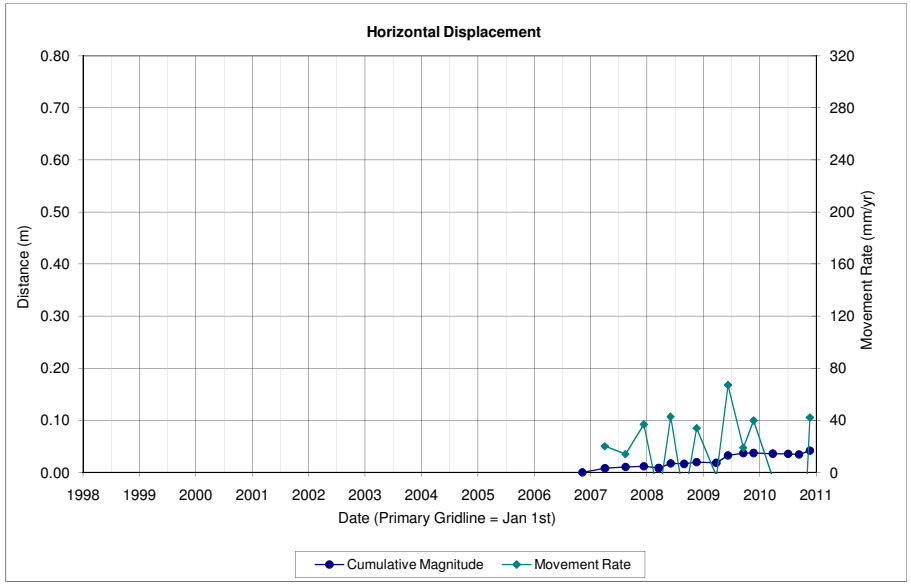
Survey and Displacement Data - Hub 06-19

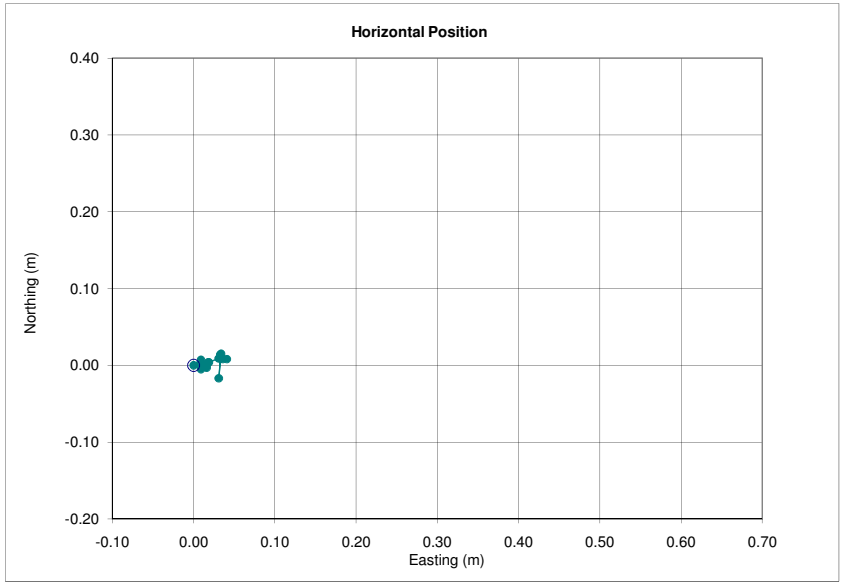
West side Abbott Dr.100m south last house

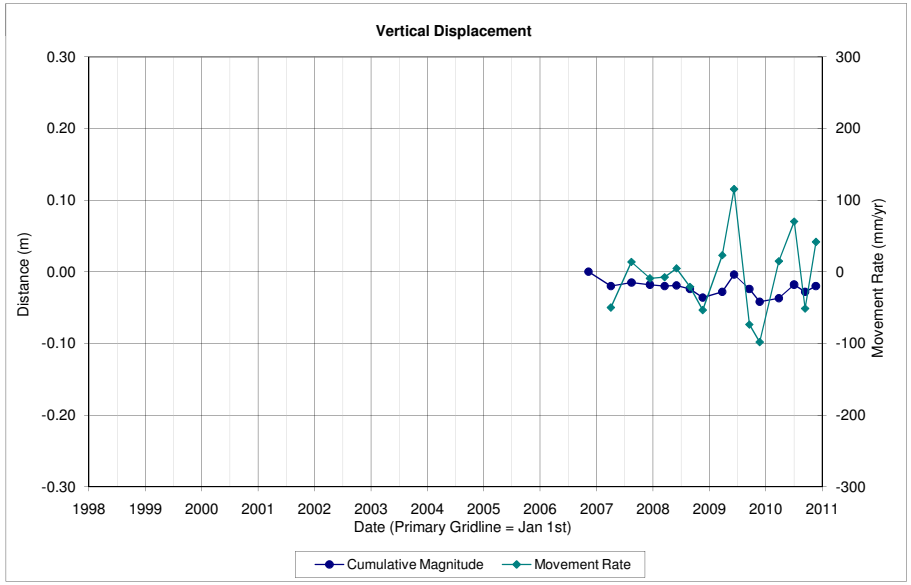
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869508.279	531106.114	585.415	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869508.279	531106.122	585.395	0.40	0.000	0.008	0.008	-0.020	90.0	-68.2	0.020	-0.050	0.40	0.000	0.008	0.008	-0.020	90.0	-68.2	20.014	-50.034
16/08/2007	5869508.274	531106.123	585.400	0.76	-0.005	0.009	0.010	-0.015	119.1	-55.5	0.013	-0.020	0.36	-0.005	0.001	0.005	0.005	168.7	44.4	14.003	13.731
13/12/2007	5869508.286	531106.123	585.397	1.09	0.007	0.009	0.011	-0.018	52.1	-57.6	0.010	-0.017	0.33	0.012	0.000	0.012	-0.003	0.0	-14.0	36.832	-9.208
18/03/2008	5869508.281	531106.122	585.395	1.35	0.002	0.008	0.008	-0.020	76.0	-67.6	0.006	-0.015	0.26	-0.005	-0.001	0.005	-0.002	191.3	-21.4	-19.400	-7.609
03/06/2008	5869508.281	531106.131	585.396	1.56	0.002	0.017	0.017	-0.019	83.3	-48.0	0.011	-0.012	0.21	0.000	0.009	0.009	0.001	90.0	6.3	42.692	4.744
29/08/2008	5869508.276	531106.130	585.391	1.80	-0.003	0.016	0.016	-0.024	100.6	-55.9	0.009	-0.013	0.24	-0.005	-0.001	0.005	-0.005	191.3	-44.4	-21.407	-20.991
19/11/2008	5869508.283	531106.133	585.379	2.03	0.004	0.019	0.019	-0.036	78.1	-61.7	0.010	-0.018	0.22	0.007	0.003	0.008	-0.012	23.2	-57.6	33.923	-53.451
26/03/2009	5869508.283	531106.132	585.387	2.37	0.004	0.018	0.018	-0.028	77.5	-56.6	0.008	-0.012	0.35	0.000	-0.001	0.001	0.008	270.0	82.9	-2.876	23.008
10/06/2009	5869508.288	531106.145	585.411	2.58	0.009	0.031	0.032	-0.004	73.8	-7.1	0.013	-0.002	0.21	0.005	0.013	0.014	0.024	69.0	59.9	66.939	115.342
17/09/2009	5869508.287	531106.150	585.391	2.85	0.008	0.036	0.037	-0.024	77.5	-33.1	0.013	-0.008	0.27	-0.001	0.005	0.005	-0.020	101.3	-75.7	18.812	-73.788
23/11/2009	5869508.294	531106.148	585.373	3.04	0.015	0.034	0.037	-0.042	66.2	-48.5	0.012	-0.014	0.18	0.007	-0.002	0.007	-0.018	344.1	-68.0	39.687	-98.127
27/03/2010	5869508.293	531106.147	585.378	3.38	0.014	0.033	0.036	-0.037	67.0	-45.9	0.011	-0.011	0.34	-0.001	-0.001	0.001	0.005	225.0	74.2	-4.166	14.728
04/07/2010	5869508.262	531106.145	585.397	3.65	-0.017	0.031	0.035	-0.018	118.7	-27.0	0.010	-0.005	0.27	-0.031	-0.002	0.031	0.019	183.7	31.5	-114.609	70.098
13/09/2010	5869508.288	531106.147	585.387	3.84	0.009	0.033	0.034	-0.028	74.7	-39.3	0.009	-0.007	0.19	0.026	0.002	0.026	-0.010	4.4	-21.0	-134.149	-51.444
22/11/2010	5869508.287	531106.155	585.395	4.03	0.008	0.041	0.042	-0.020	79.0	-25.6	0.010	-0.005	0.19	-0.001	0.008	0.008	0.008	97.1	44.8	42.068	41.743

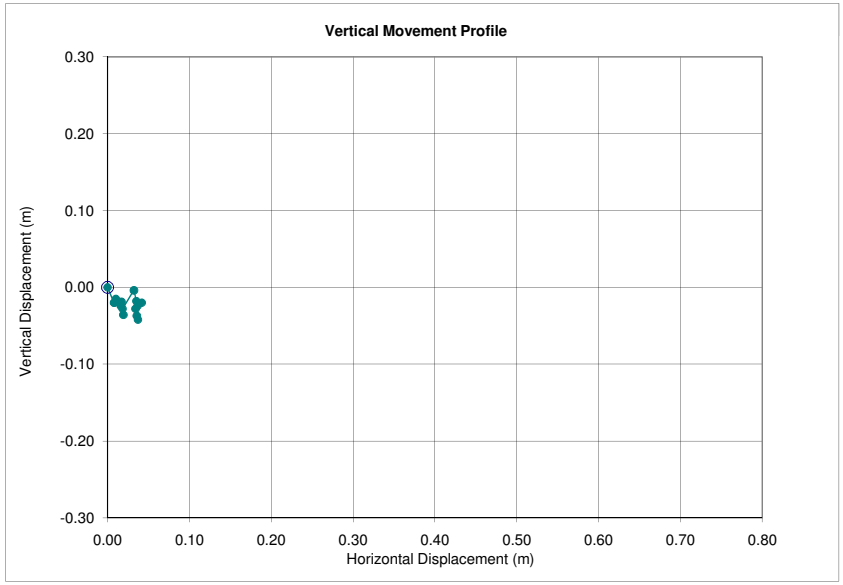
Displacement Graphs - Hub 06-19

West side Abbott Dr.100m south last house









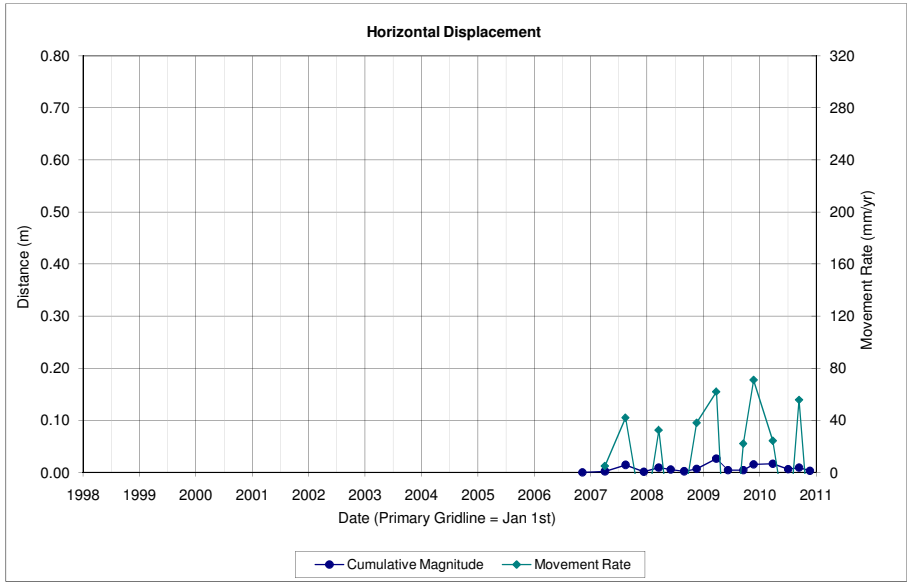
Survey and Displacement Data - Hub 06-20

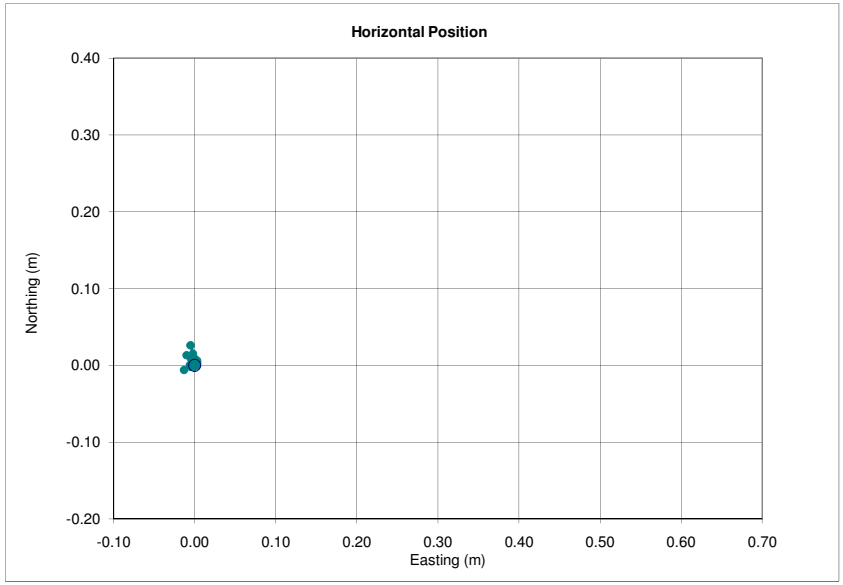
End of trail, by BH 16,off end Abbott Drive

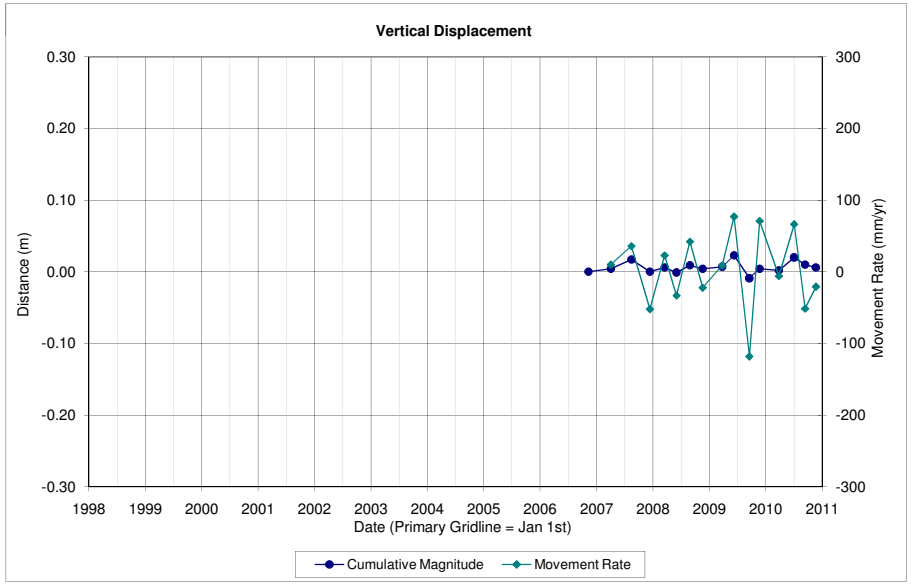
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869533.109	530619.695	661.719	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869533.111	530619.695	661.723	0.40	0.002	0.000	0.002	0.004	0.0	63.4	0.005	0.010	0.40	0.002	0.000	0.002	0.004	0.0	63.4	5.003	10.007
16/08/2007	5869533.103	530619.682	661.736	0.76	-0.006	-0.013	0.014	0.017	245.2	49.9	0.019	0.022	0.36	-0.008	-0.013	0.015	0.013	238.4	40.4	41.920	35.701
13/12/2007	5869533.109	530619.694	661.719	1.09	0.000	-0.001	0.001	0.000	270.0	0.0	0.001	0.000	0.33	0.006	0.012	0.013	-0.017	63.4	-51.7	-41.179	-52.179
18/03/2008	5869533.117	530619.691	661.725	1.35	0.008	-0.004	0.009	0.006	333.4	33.9	0.007	0.004	0.26	0.008	-0.003	0.009	0.006	339.4	35.1	32.507	22.828
03/06/2008	5869533.107	530619.690	661.718	1.56	-0.002	-0.005	0.005	-0.001	248.2	-10.5	0.003	-0.001	0.21	-0.010	-0.001	0.010	-0.007	185.7	-34.9	-47.672	-33.205
29/08/2008	5869533.107	530619.695	661.728	1.80	-0.002	0.000	0.002	0.009	180.0	77.5	0.001	0.005	0.24	0.000	0.005	0.005	0.010	90.0	63.4	-20.991	41.983
19/11/2008	5869533.115	530619.698	661.723	2.03	0.006	0.003	0.007	0.004	26.6	30.8	0.003	0.002	0.22	0.008	0.003	0.009	-0.005	20.6	-30.3	38.057	-22.271
26/03/2009	5869533.135	530619.690	661.726	2.37	0.026	-0.005	0.026	0.007	349.1	14.8	0.011	0.003	0.35	0.020	-0.008	0.022	0.003	338.2	7.9	61.951	8.628
10/06/2009	5869533.112	530619.692	661.742	2.58	0.003	-0.003	0.004	0.023	315.0	79.5	0.002	0.009	0.21	-0.023	0.002	0.023	0.016	175.0	34.7	-110.953	76.895
17/09/2009	5869533.112	530619.698	661.710	2.85	0.003	0.003	0.004	-0.009	45.0	-64.8	0.001	-0.003	0.27	0.000	0.006	0.006	-0.032	90.0	-79.4	22.136	-118.061
23/11/2009	5869533.124	530619.693	661.723	3.04	0.015	-0.002	0.015	0.004	352.4	14.8	0.005	0.001	0.18	0.012	-0.005	0.013	0.013	337.4	45.0	70.869	70.869
27/03/2010	5869533.122	530619.685	661.721	3.38	0.013	-0.010	0.016	0.002	322.4	7.0	0.005	0.001	0.34	-0.002	-0.008	0.008	-0.002	256.0	-13.6	24.290	-5.891
04/07/2010	5869533.109	530619.689	661.739	3.65	0.000	-0.006	0.006	0.020	270.0	73.3	0.002	0.005	0.27	-0.013	0.004	0.014	0.018	162.9	52.9	-50.181	66.409
13/09/2010	5869533.118	530619.695	661.729	3.84	0.009	0.000	0.009	0.010	0.0	48.0	0.002	0.003	0.19	0.009	0.006	0.011	-0.010	33.7	-42.8	55.645	-51.444
22/11/2010	5869533.109	530619.698	661.725	4.03	0.000	0.003	0.003	0.006	90.0	63.4	0.001	0.001	0.19	-0.009	0.003	0.009	-0.004	161.6	-22.9	-49.501	-20.871

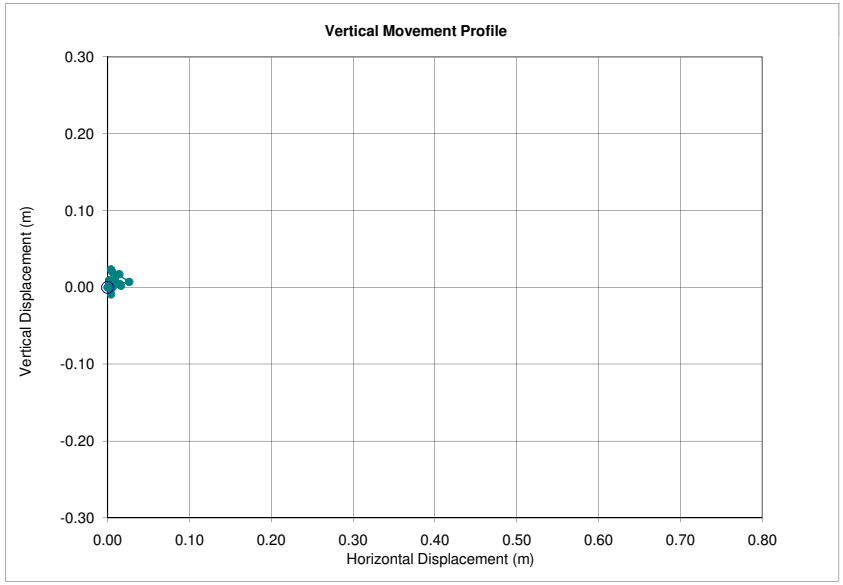
Displacement Graphs - Hub 06-20

End of trail, by BH 16,off end Abbott Drive









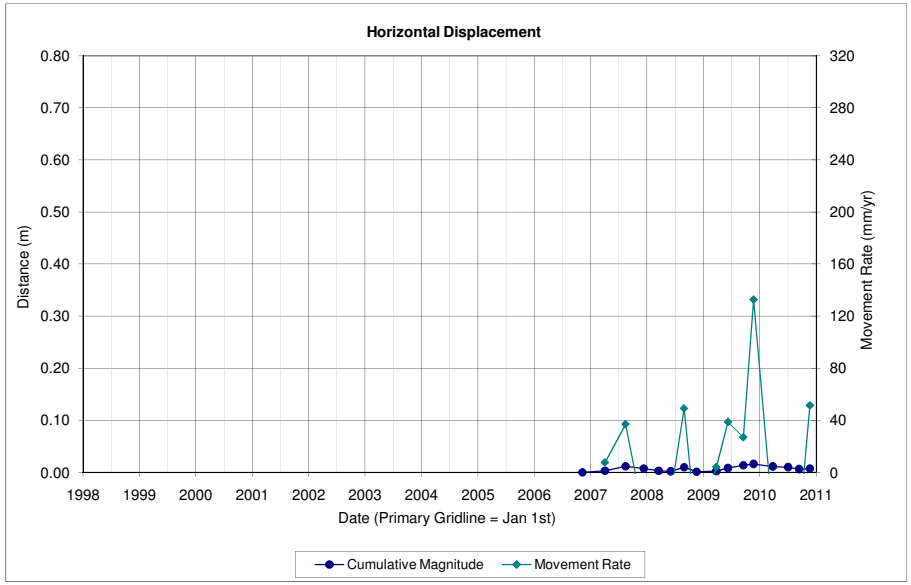
Survey and Displacement Data - Hub 06-21

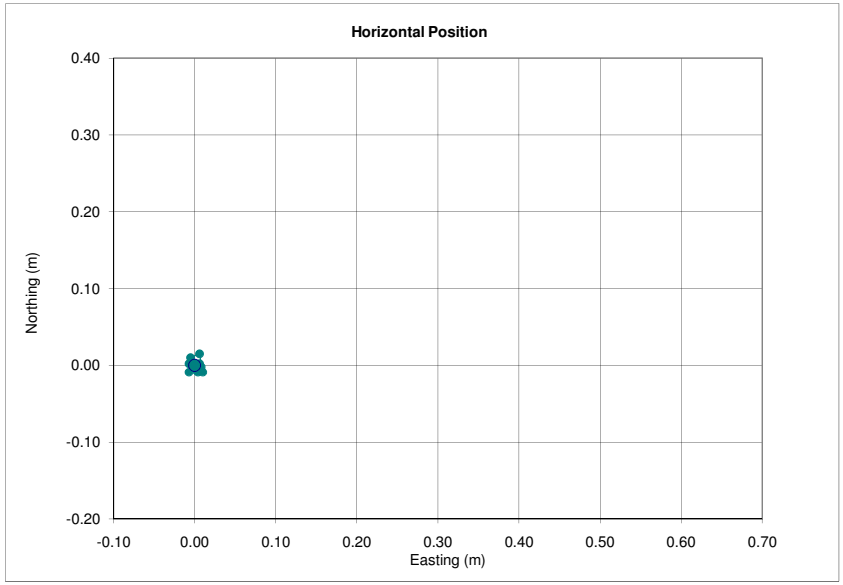
100m past gate, off end Abbott Drive

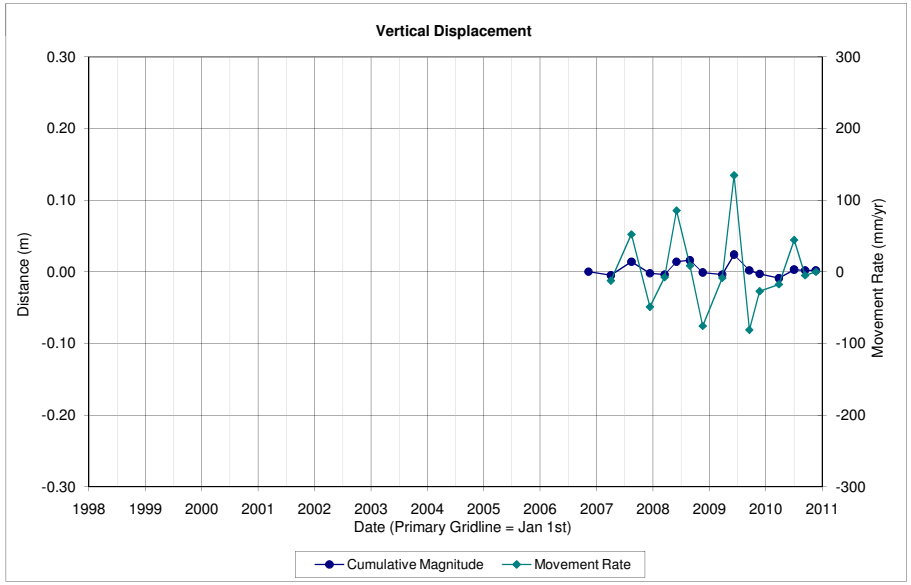
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869034.916	531260.448	620.924	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
05/04/2007	5869034.916	531260.451	620.919	0.40	0.000	0.003	0.003	-0.005	90.0	-59.0	0.008	-0.013	0.40	0.000	0.003	0.003	-0.005	90.0	-59.0	7.505	-12.509
16/08/2007	5869034.907	531260.441	620.938	0.76	-0.009	-0.007	0.011	0.014	217.9	50.8	0.015	0.018	0.36	-0.009	-0.010	0.013	0.019	228.0	54.7	36.947	52.179
13/12/2007	5869034.918	531260.441	620.922	1.09	0.002	-0.007	0.007	-0.002	285.9	-15.4	0.007	-0.002	0.33	0.011	0.000	0.011	-0.016	0.0	-55.5	-33.763	-49.109
18/03/2008	5869034.916	531260.445	620.920	1.35	0.000	-0.003	0.003	-0.004	270.0	-53.1	0.002	-0.003	0.26	-0.002	0.004	0.004	-0.002	116.6	-24.1	-17.015	-7.609
03/06/2008	5869034.918	531260.448	620.938	1.56	0.002	0.000	0.002	0.014	0.0	81.9	0.001	0.009	0.21	0.002	0.003	0.004	0.018	56.3	78.7	-17.103	85.383
29/08/2008	5869034.907	531260.452	620.940	1.80	-0.009	0.004	0.010	0.016	156.0	58.4	0.005	0.009	0.24	-0.011	0.004	0.012	0.002	160.0	9.7	49.140	8.397
19/11/2008	5869034.917	531260.448	620.923	2.03	0.001	0.000	0.001	-0.001	0.0	-45.0	0.000	0.000	0.22	0.010	-0.004	0.011	-0.017	338.2	-57.6	-47.974	-75.723
26/03/2009	5869034.918	531260.449	620.920	2.37	0.002	0.001	0.002	-0.004	26.6	-60.8	0.001	-0.002	0.35	0.001	0.001	0.001	-0.003	45.0	-64.8	4.067	-8.628
10/06/2009	5869034.914	531260.456	620.948	2.58	-0.002	0.008	0.008	0.024	104.0	71.0	0.003	0.009	0.21	-0.004	0.007	0.008	0.028	119.7	73.9	38.747	134.566
17/09/2009	5869034.907	531260.458	620.926	2.85	-0.009	0.010	0.013	0.002	132.0	8.5	0.005	0.001	0.27	-0.007	0.002	0.007	-0.022	164.1	-71.7	26.859	-81.167
23/11/2009	5869034.931	531260.454	620.921	3.04	0.015	0.006	0.016	-0.003	21.8	-10.5	0.005	-0.001	0.18	0.024	-0.004	0.024	-0.005	350.5	-11.6	132.641	-27.257
27/03/2010	5869034.926	531260.443	620.915	3.38	0.010	-0.005	0.011	-0.009	333.4	-38.8	0.003	-0.003	0.34	-0.005	-0.011	0.012	-0.006	245.6	-26.4	-35.591	-17.673
04/07/2010	5869034.910	531260.456	620.927	3.65	-0.006	0.008	0.010	0.003	126.9	16.7	0.003	0.001	0.27	-0.016	0.013	0.021	0.012	140.9	30.2	-76.059	44.273
13/09/2010	5869034.918	531260.454	620.926	3.84	0.002	0.006	0.006	0.002	71.6	17.5	0.002	0.001	0.19	0.008	-0.002	0.008	-0.001	346.0	-6.9	-42.422	-5.144
22/11/2010	5869034.909	531260.450	620.926	4.03	-0.007	0.002	0.007	0.002	164.1	15.4	0.002	0.000	0.19	-0.009	-0.004	0.010	0.000	204.0	0.0	51.390	0.000

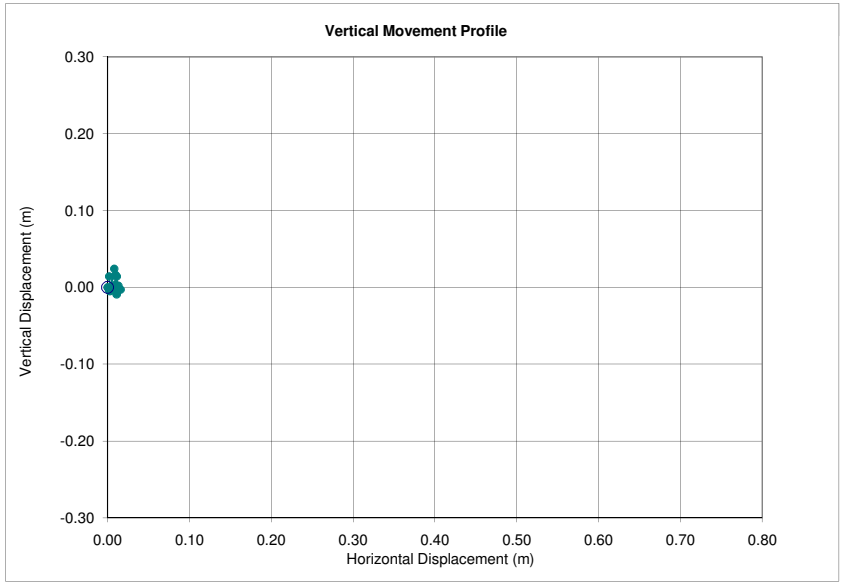
Displacement Graphs - Hub 06-21

100m past gate, off end Abbott Drive







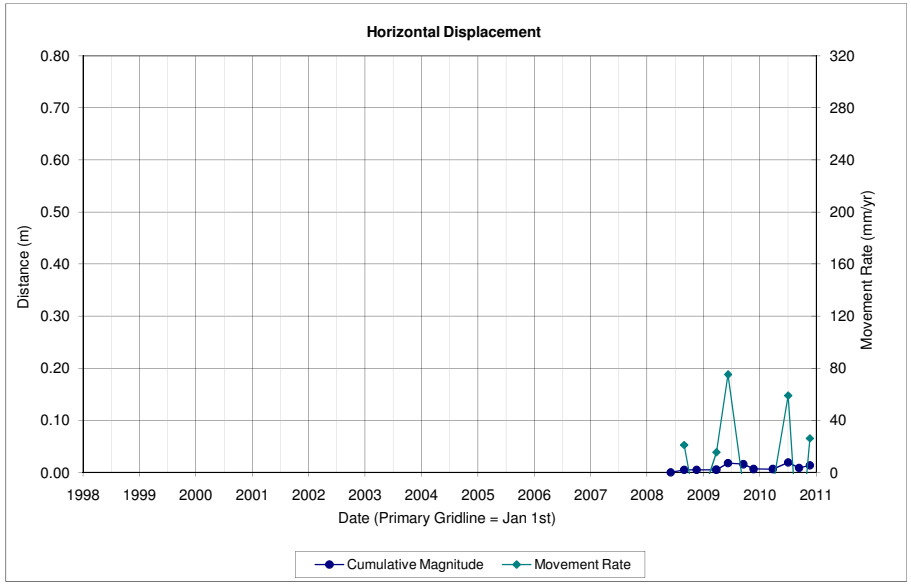


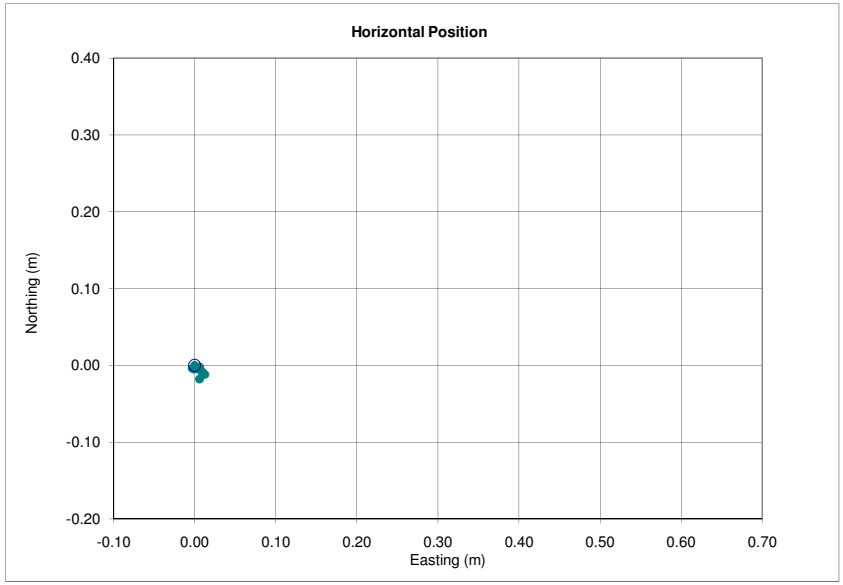
Survey and Displacement Data - Hub 08-01

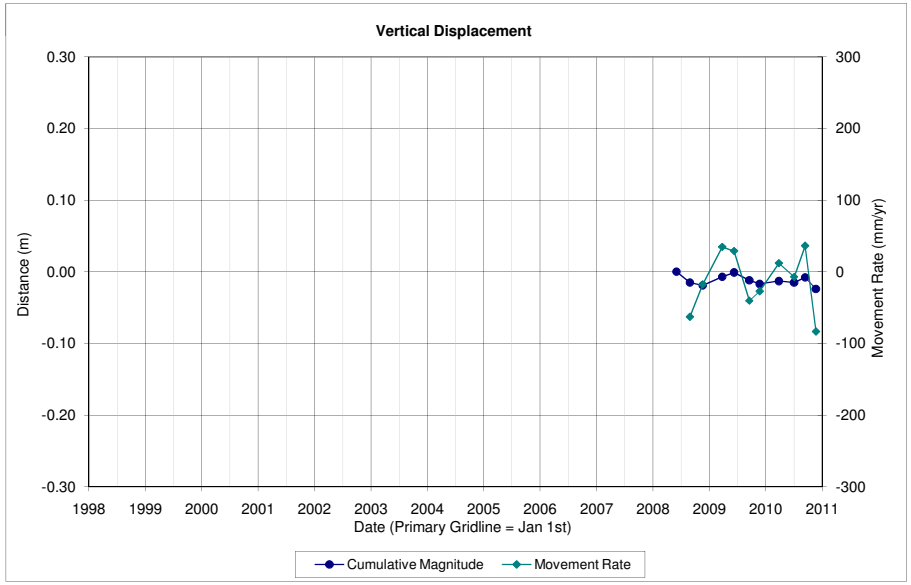
Replacement for 06-17

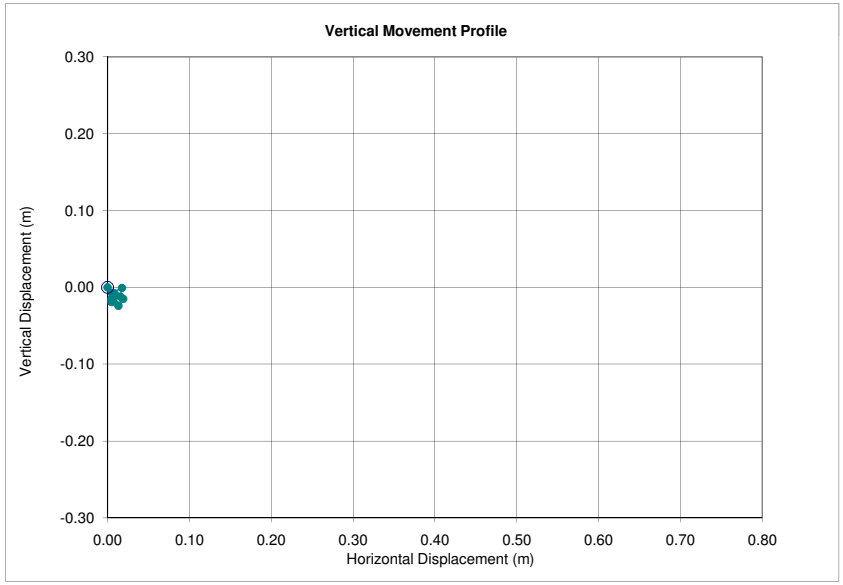
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
03/06/2008	5870076.380	531129.361	595.426	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
29/08/2008	5870076.376	531129.358	595.411	0.24	-0.004	-0.003	0.005	-0.015	216.9	-71.6	0.021	-0.063	0.24	-0.004	-0.003	0.005	-0.015	216.9	-71.6	20.991	-62.974
19/11/2008	5870076.377	531129.365	595.407	0.46	-0.003	0.004	0.005	-0.019	126.9	-75.3	0.011	-0.041	0.22	0.001	0.007	0.007	-0.004	81.9	-29.5	-31.496	-17.817
26/03/2009	5870076.375	531129.360	595.419	0.81	-0.005	-0.001	0.005	-0.007	191.3	-53.9	0.006	-0.009	0.35	-0.002	-0.005	0.005	0.012	248.2	65.8	15.488	34.512
10/06/2009	5870076.368	531129.374	595.425	1.02	-0.012	0.013	0.018	-0.001	132.7	-3.2	0.017	-0.001	0.21	-0.007	0.014	0.016	0.006	116.6	21.0	75.225	28.836
17/09/2009	5870076.368	531129.371	595.414	1.29	-0.012	0.010	0.016	-0.012	140.2	-37.5	0.012	-0.009	0.27	0.000	-0.003	0.003	-0.011	270.0	-74.7	-11.068	-40.583
23/11/2009	5870076.375	531129.365	595.409	1.47	-0.005	0.004	0.006	-0.017	141.3	-69.4	0.004	-0.012	0.18	0.007	-0.006	0.009	-0.005	319.4	-28.5	-50.260	-27.257
27/03/2010	5870076.378	531129.367	595.413	1.81	-0.002	0.006	0.006	-0.013	108.4	-64.1	0.003	-0.007	0.34	0.003	0.002	0.004	0.004	33.7	48.0	-10.620	11.782
04/07/2010	5870076.362	531129.367	595.411	2.08	-0.018	0.006	0.019	-0.015	161.6	-38.3	0.009	-0.007	0.27	-0.016	0.000	0.016	-0.002	180.0	-7.1	59.030	-7.379
13/09/2010	5870076.375	531129.368	595.418	2.28	-0.005	0.007	0.009	-0.008	125.5	-42.9	0.004	-0.004	0.19	0.013	0.001	0.013	0.007	4.4	28.2	-67.074	36.011
22/11/2010	5870076.371	531129.371	595.402	2.47	-0.009	0.010	0.013	-0.024	132.0	-60.7	0.005	-0.010	0.19	-0.004	0.003	0.005	-0.016	143.1	-72.6	26.089	-83.486

Displacement Graphs - Hub 08-01
Replacement for 06-17









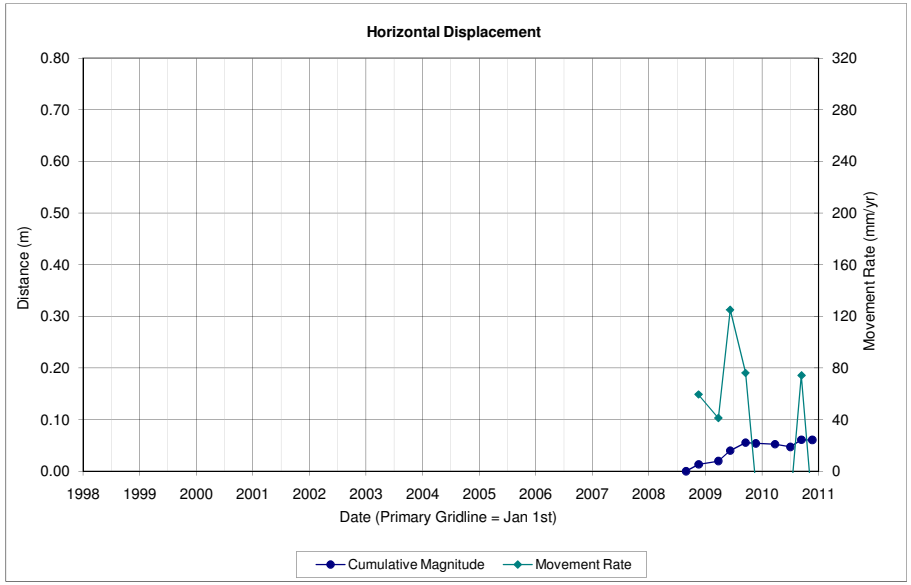
Survey and Displacement Data - Hub 08-02

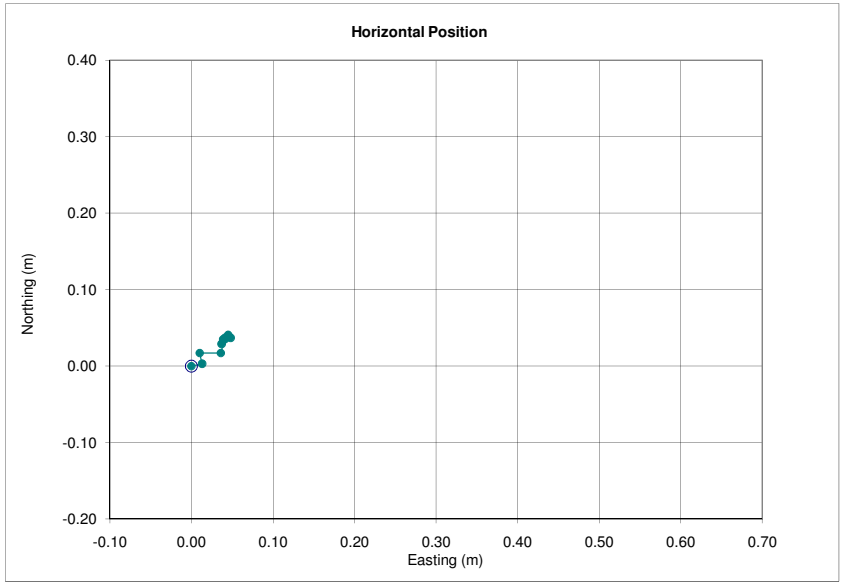
Very near 98-04

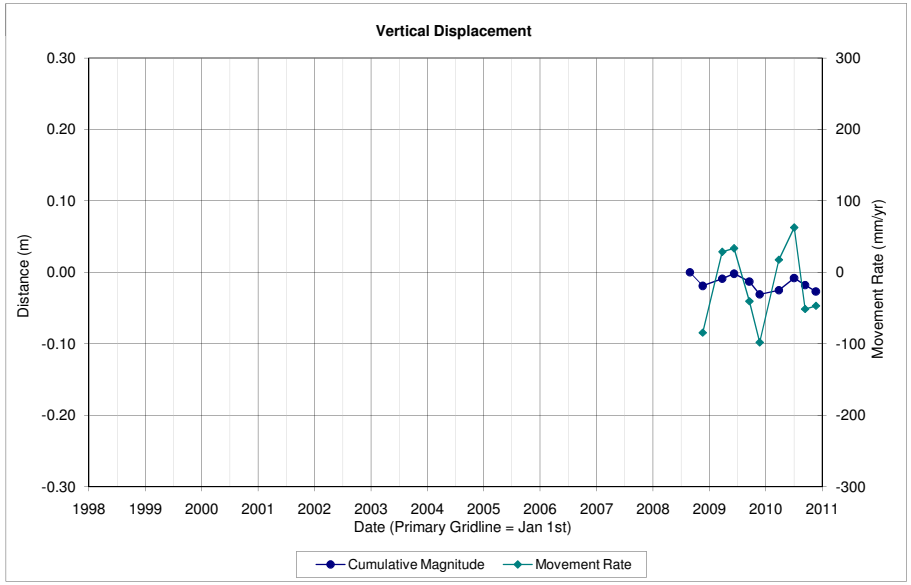
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	m/yr	m/yr
29/08/2008	5870332.611	531627.128	557.121	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
19/11/2008	5870332.614	531627.141	557.102	0.22	0.003	0.013	0.013	-0.019	77.0	-54.9	0.059	-0.085	0.22	0.003	0.013	0.013	-0.019	77.0	-54.9	59.427	-84.631
26/03/2009	5870332.628	531627.138	557.112	0.57	0.017	0.010	0.020	-0.009	30.5	-24.5	0.034	-0.016	0.35	0.014	-0.003	0.014	0.010	347.9	34.9	41.178	28.760
10/06/2009	5870332.628	531627.164	557.119	0.78	0.017	0.036	0.040	-0.002	64.7	-2.9	0.051	-0.003	0.21	0.000	0.026	0.026	0.007	90.0	15.1	124.954	33.641
17/09/2009	5870332.648	531627.169	557.108	1.05	0.037	0.041	0.055	-0.013	47.9	-13.2	0.053	-0.012	0.27	0.020	0.005	0.021	-0.011	14.0	-28.1	76.059	-40.583
23/11/2009	5870332.646	531627.169	557.090	1.23	0.035	0.041	0.054	-0.031	49.5	-29.9	0.044	-0.025	0.18	-0.002	0.000	0.002	-0.018	180.0	-83.7	-10.903	-98.127
27/03/2010	5870332.646	531627.167	557.096	1.57	0.035	0.039	0.052	-0.025	48.1	-25.5	0.033	-0.016	0.34	0.000	-0.002	0.002	0.006	270.0	71.6	-5.891	17.673
04/07/2010	5870332.640	531627.165	557.113	1.85	0.029	0.037	0.047	-0.008	51.9	-9.7	0.025	-0.004	0.27	-0.006	-0.002	0.006	0.017	198.4	69.6	-23.334	62.720
13/09/2010	5870332.652	531627.173	557.103	2.04	0.041	0.045	0.061	-0.018	47.7	-16.5	0.030	-0.009	0.19	0.012	0.008	0.014	-0.010	33.7	-34.7	74.193	-51.444
22/11/2010	5870332.648	531627.176	557.094	2.23	0.037	0.048	0.061	-0.027	52.4	-24.0	0.027	-0.012	0.19	-0.004	0.003	0.005	-0.009	143.1	-60.9	-26.089	-46.961

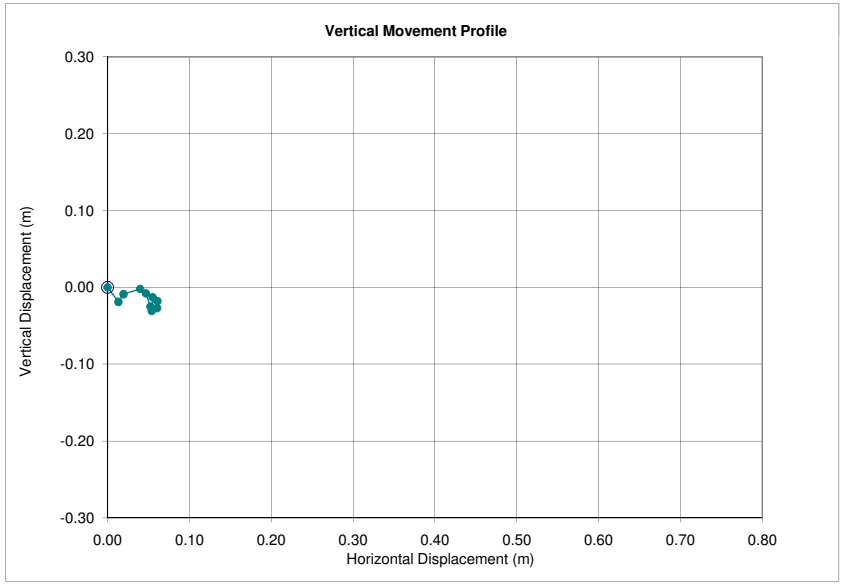
Displacement Graphs - Hub 08-02

Very near 98-04







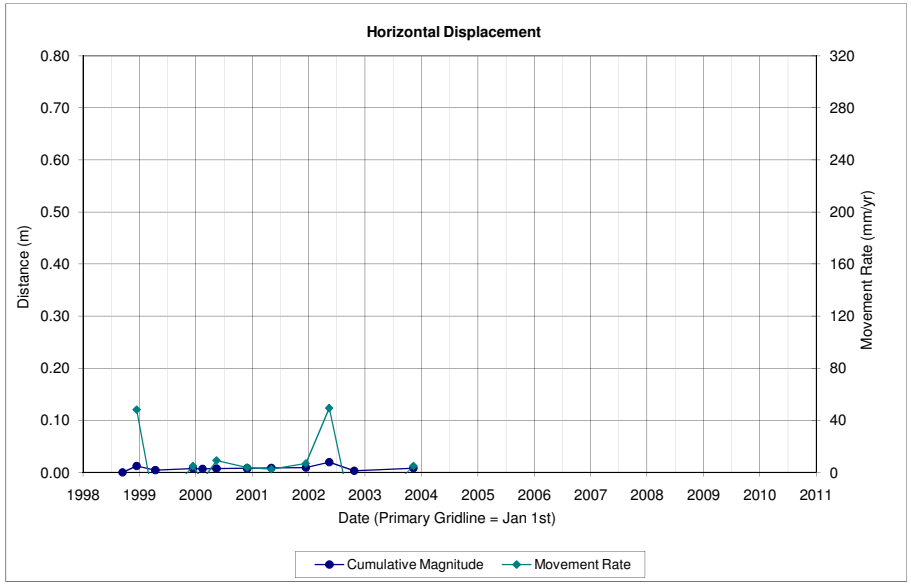


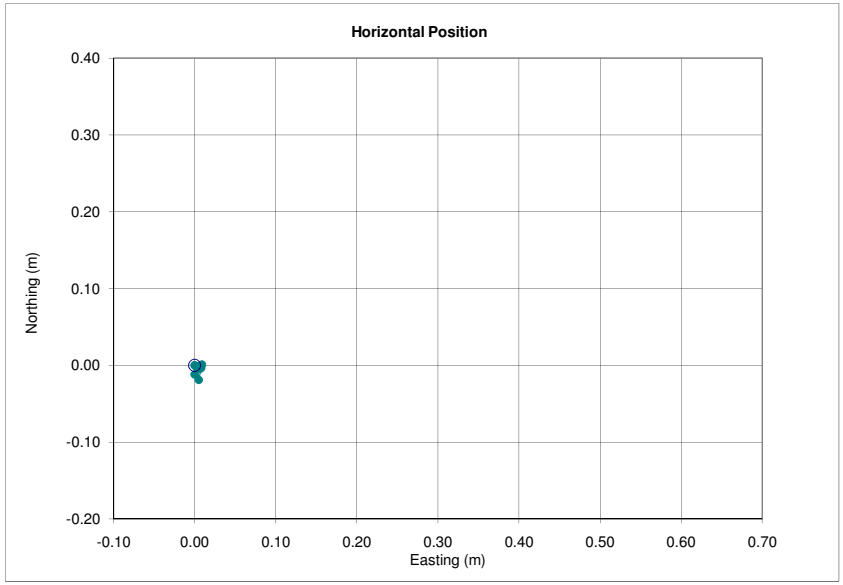
Survey and Displacement Data - Hub 98-26

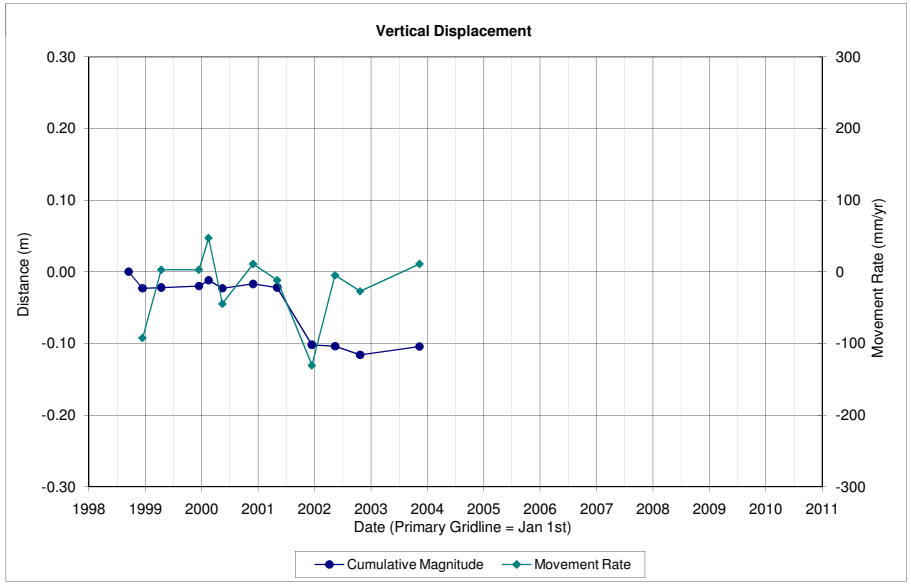
Benchmark - Near Quesnel Airport

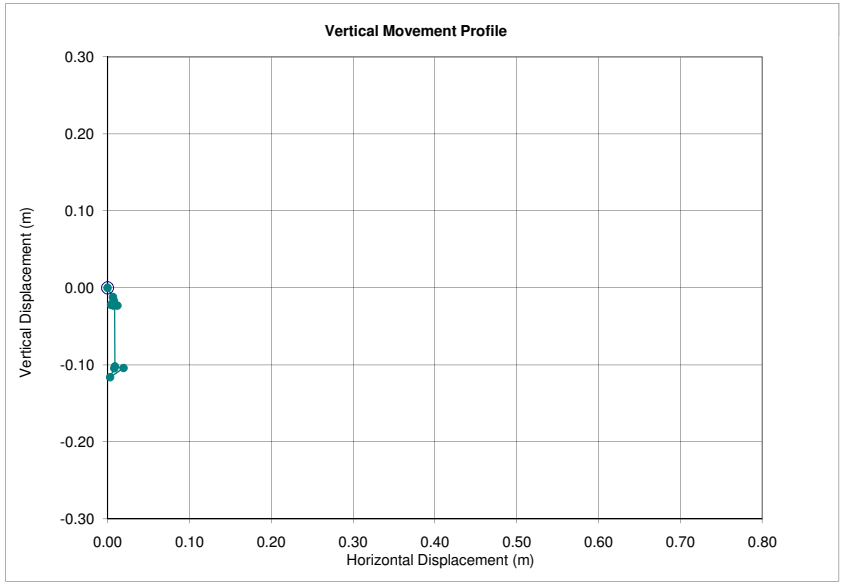
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5873887.634	533765.361	545.429	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5873887.622	533765.361	545.406	0.25	-0.012	0.000	0.012	-0.023	180.0	-62.4	0.048	-0.092	0.25	-0.012	0.000	0.012	-0.023	180.0	-62.4	48.165	-92.316
15/04/1999	5873887.631	533765.364	545.407	0.58	-0.003	0.003	0.004	-0.022	135.0	-79.1	0.007	-0.038	0.33	0.009	0.003	0.009	0.001	18.4	6.0	-28.637	3.019
15/12/1999	5873887.630	533765.367	545.409	1.25	-0.004	0.006	0.007	-0.020	123.7	-70.2	0.006	-0.016	0.67	-0.001	0.003	0.003	0.002	108.4	32.3	4.734	2.994
15/02/2000	5873887.631	533765.367	545.417	1.42	-0.003	0.006	0.007	-0.012	116.6	-60.8	0.005	-0.008	0.17	0.001	0.000	0.001	0.008	0.0	82.9	-5.891	47.129
15/05/2000	5873887.633	533765.368	545.406	1.66	-0.001	0.007	0.007	-0.023	98.1	-72.9	0.004	-0.014	0.25	0.002	0.001	0.002	-0.011	26.6	-78.5	9.075	-44.642
30/11/2000	5873887.631	533765.368	545.412	2.21	-0.003	0.007	0.008	-0.017	113.2	-65.9	0.003	-0.008	0.54	-0.002	0.000	0.002	0.006	180.0	71.6	3.671	11.013
05/05/2001	5873887.631	533765.369	545.407	2.64	-0.003	0.008	0.009	-0.022	110.6	-68.8	0.003	-0.008	0.43	0.000	0.001	0.001	-0.005	90.0	-78.7	2.341	-11.707
15/12/2001	5873887.635	533765.370	545.327	3.25	0.001	0.009	0.009	-0.102	83.7	-84.9	0.003	-0.031	0.61	0.004	0.001	0.004	-0.080	14.0	-87.0	6.723	-130.446
15/05/2002	5873887.615	533765.366	545.325	3.66	-0.019	0.005	0.020	-0.104	165.3	-79.3	0.005	-0.028	0.41	-0.020	-0.004	0.020	-0.002	191.3	-5.6	49.336	-4.838
24/10/2002	5873887.633	533765.364	545.313	4.11	-0.001	0.003	0.003	-0.116	108.4	-88.4	0.001	-0.028	0.44	0.018	-0.002	0.018	-0.012	353.7	-33.5	-40.833	-27.056
12/11/2003	5873887.630	533765.368	545.325	5.16	-0.004	0.007	0.008	-0.104	121.2	-85.5	0.002	-0.020	1.05	-0.003	0.004	0.005	0.012	129.0	66.2	4.869	11.062

Displacement Graphs - Hub 98-26
Benchmark - Near Quesnel Airport







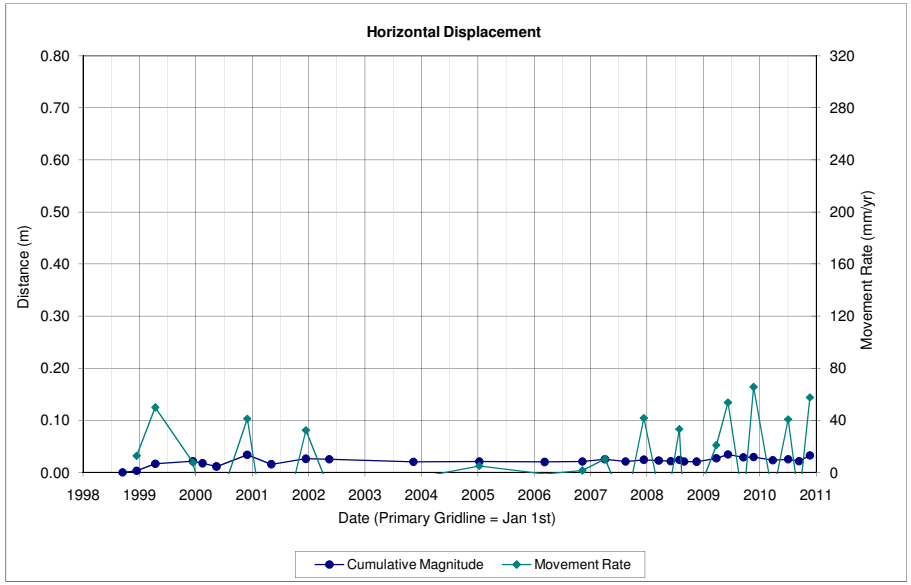


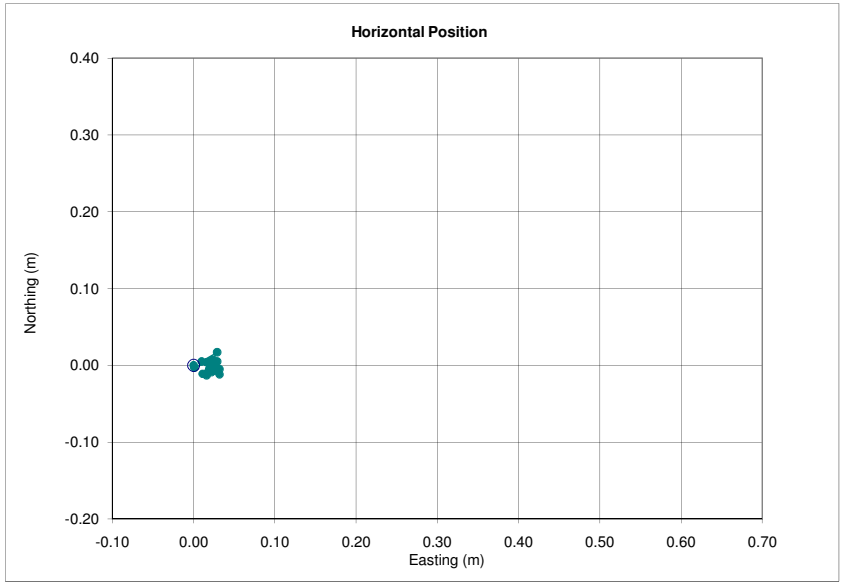
Survey and Displacement Data - Hub 98-23

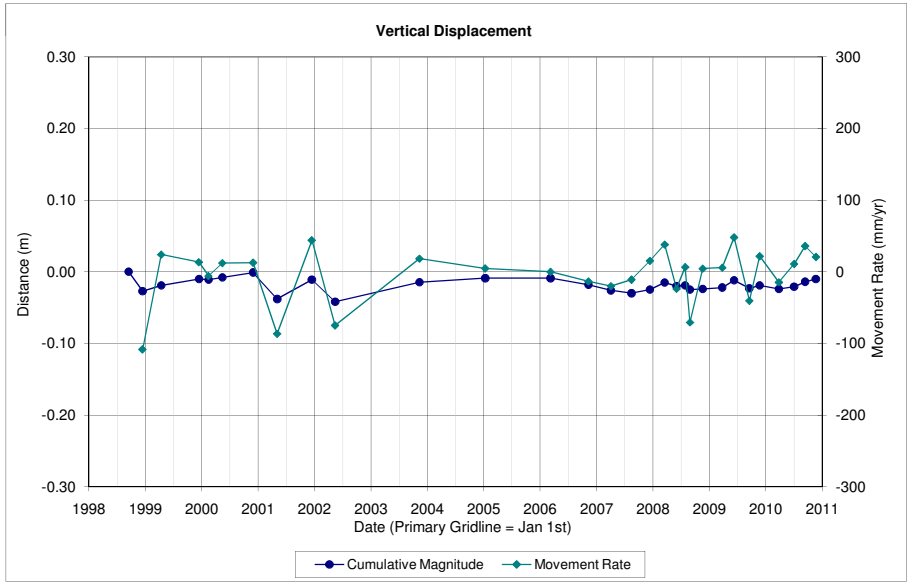
Benchmark - Doherty Dr.

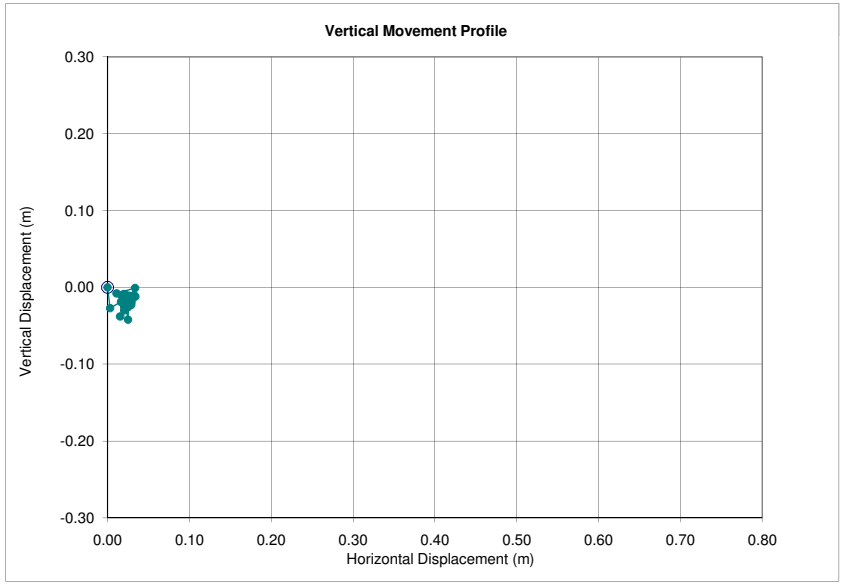
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869134.064	532888.607	475.384	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5869134.061	532888.608	475.357	0.25	-0.003	0.001	0.003	-0.027	161.6	-83.3	0.013	-0.108	0.25	-0.003	0.001	0.003	-0.027	161.6	-83.3	12.693	-108.371
15/04/1999	5869134.068	532888.623	475.365	0.58	0.004	0.016	0.016	-0.019	76.0	-49.0	0.028	-0.033	0.33	0.007	0.015	0.017	0.008	65.0	25.8	49.967	24.149
15/12/1999	5869134.069	532888.628	475.374	1.25	0.005	0.021	0.022	-0.010	76.6	-24.9	0.017	-0.008	0.67	0.001	0.005	0.005	0.009	78.7	60.5	7.633	13.472
15/02/2000	5869134.068	532888.624	475.373	1.42	0.004	0.017	0.017	-0.011	76.8	-32.2	0.012	-0.008	0.17	-0.001	-0.004	0.004	-0.001	256.0	-13.6	-24.290	-5.891
15/05/2000	5869134.069	532888.617	475.376	1.66	0.005	0.010	0.011	-0.008	63.4	-35.6	0.007	-0.005	0.25	0.001	-0.007	0.007	0.003	278.1	23.0	-28.697	12.175
30/11/2000	5869134.081	532888.636	475.383	2.21	0.017	0.029	0.034	-0.001	59.6	-1.7	0.015	0.000	0.54	0.012	0.019	0.022	0.007	57.7	17.3	41.246	12.848
05/05/2001	5869134.053	532888.618	475.346	2.64	-0.011	0.011	0.016	-0.038	135.0	-67.7	0.006	-0.014	0.43	-0.028	-0.018	0.033	-0.037	212.7	-48.0	-77.936	-86.630
15/12/2001	5869134.066	532888.633	475.373	3.25	0.002	0.026	0.026	-0.011	85.6	-22.9	0.008	-0.003	0.61	0.013	0.015	0.020	0.027	49.1	53.7	32.366	44.026
15/05/2002	5869134.071	532888.631	475.342	3.66	0.007	0.024	0.025	-0.042	73.7	-59.2	0.007	-0.011	0.41	0.005	-0.002	0.005	-0.031	338.2	-80.1	-13.026	-74.985
12/11/2003	5869134.065	532888.627	475.369	5.16	0.001	0.020	0.020	-0.015	87.7	-35.7	0.004	-0.003	1.49	-0.006	-0.004	0.007	0.027	211.2	75.2	-4.836	18.349
11/01/2005	5869134.059	532888.627	475.375	6.32	-0.005	0.020	0.021	-0.009	104.0	-23.6	0.003	-0.001	1.17	-0.006	0.000	0.006	0.006	182.5	43.7	4.995	4.776
10/03/2006	5869134.058	532888.626	475.375	7.48	-0.006	0.019	0.020	-0.009	107.5	-24.3	0.003	-0.001	1.16	-0.001	-0.001	0.001	0.000	225.0	0.0	-1.221	0.000
10/11/2006	5869134.058	532888.627	475.366	8.15	-0.006	0.020	0.021	-0.018	106.7	-40.8	0.003	-0.002	0.67	0.000	0.001	0.001	-0.009	90.0	-83.7	1.491	-13.417
05/04/2007	5869134.057	532888.631	475.358	8.55	-0.007	0.024	0.025	-0.026	106.3	-46.1	0.003	-0.003	0.40	-0.001	0.004	0.004	-0.008	104.0	-62.7	10.315	-20.014
16/08/2007	5869134.051	532888.623	475.354	8.92	-0.013	0.016	0.021	-0.030	129.1	-55.5	0.002	-0.003	0.36	-0.006	-0.008	0.010	-0.004	233.1	-21.8	-27.462	-10.985
13/12/2007	5869134.062	532888.631	475.359	9.24	-0.002	0.024	0.024	-0.025	94.8	-46.1	0.003	-0.003	0.33	0.011	0.008	0.014	0.005	36.0	20.2	41.747	15.347
18/03/2008	5869134.059	532888.629	475.369	9.51	-0.005	0.022	0.023	-0.015	102.8	-33.6	0.002	-0.002	0.26	-0.003	-0.002	0.004	0.010	213.7	70.2	-13.718	38.047
03/06/2008	5869134.060	532888.628	475.364	9.72	-0.004	0.021	0.021	-0.020	100.8	-43.1	0.002	-0.002	0.21	0.001	-0.001	0.001	-0.005	315.0	-74.2	-6.708	-23.718
29/07/2008	5869134.055	532888.629	475.365	9.87	-0.009	0.022	0.024	-0.019	112.2	-38.6	0.002	-0.002	0.15	-0.005	0.001	0.005	0.001	168.7	11.1	33.257	6.522
29/08/2008	5869134.056	532888.626	475.359	9.95	-0.008	0.019	0.021	-0.025	112.8	-50.5	0.002	-0.003	0.08	0.001	-0.003	0.003	-0.006	288.4	-62.2	-37.259	-70.694
19/11/2008	5869134.060	532888.627	475.360	10.18	-0.004	0.020	0.020	-0.024	101.3	-49.6	0.002	-0.002	0.22	0.004	0.001	0.004	0.001	14.0	13.6	-18.365	4.454
26/03/2009	5869134.062	532888.634	475.362	10.53	-0.002	0.027	0.027	-0.022	94.2	-39.1	0.003	-0.002	0.35	0.002	0.007	0.007	0.002	74.1	15.4	20.937	5.752
10/06/2009	5869134.052	532888.639	475.372	10.74	-0.012	0.032	0.034	-0.012	110.6	-19.3	0.003	-0.001	0.21	-0.010	0.005	0.011	0.010	153.4	41.8	53.732	48.059
17/09/2009	5869134.057	532888.635	475.361	11.01	-0.007	0.028	0.029	-0.023	104.0	-38.6	0.003	-0.002	0.27	0.005	-0.004	0.006	-0.011	321.3	-59.8	-23.624	-40.583
23/11/2009	5869134.069	532888.636	475.365	11.19	0.005	0.029	0.029	-0.019	80.2	-32.8	0.003	-0.002	0.18	0.012	0.001	0.012	0.004	4.8	18.4	65.645	21.806
27/03/2010	5869134.068	532888.630	475.360	11.53	0.004	0.023	0.023	-0.024	80.1	-45.8	0.002	-0.002	0.34	-0.001	-0.006	0.006	-0.005	260.5	-39.4	-17.917	-14.728
04/07/2010	5869134.057	532888.631	475.363	11.80	-0.007	0.024	0.025	-0.021	106.3	-40.0	0.002	-0.002	0.27	-0.011	0.001	0.011	0.003	174.8	15.2	40.751	11.068
13/09/2010	5869134.060	532888.628	475.370	11.99	-0.004	0.021	0.021	-0.014	100.8	-33.2	0.002	-0.001	0.19	0.003	-0.003	0.004	0.007	315.0	58.8	-21.826	36.011
22/11/2010	5869134.059	532888.639	475.374	12.19	-0.005	0.032	0.032	-0.010	98.9	-17.2	0.003	-0.001	0.19	-0.001	0.011	0.011	0.004	95.2	19.9	57.633	20.871

Displacement Graphs - Hub 98-23
Benchmark - Doherty Dr.









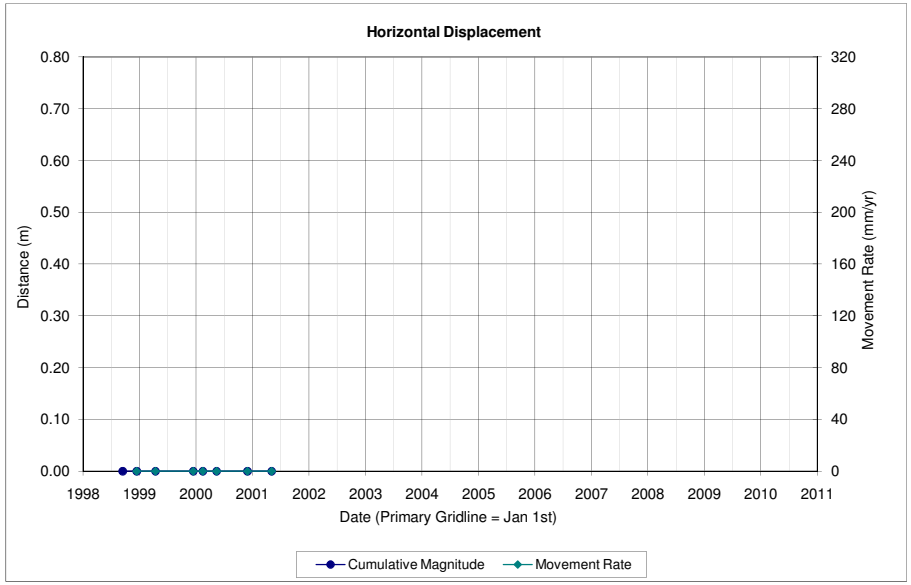
Survey and Displacement Data - Hub 98-28

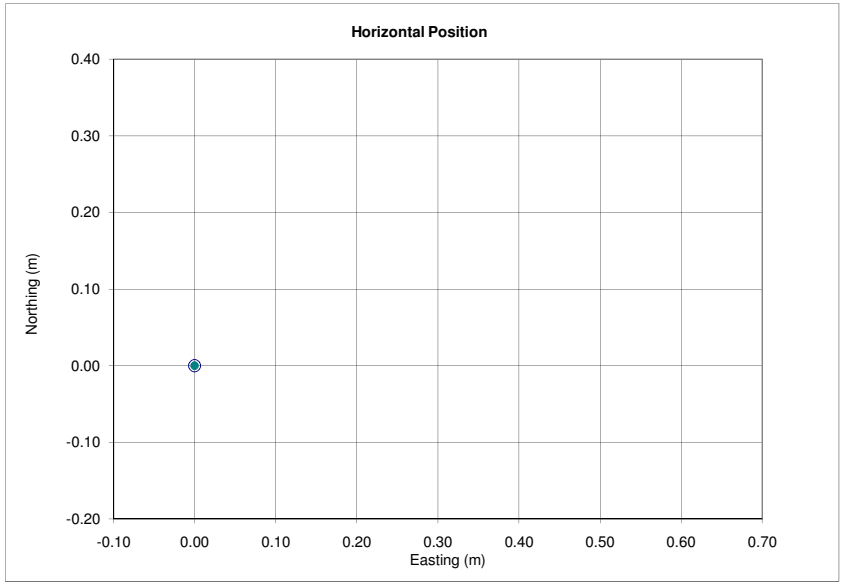
Benchmark - Red Bluff Pump Station

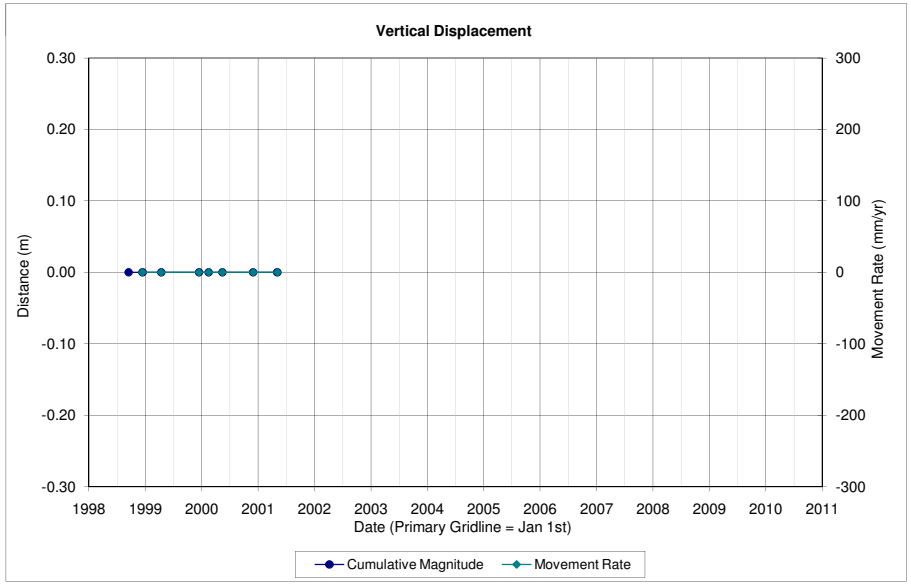
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870190.608	537039.418	595.773	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/12/1998	5870190.608	537039.418	595.773	0.25	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.25	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
15/04/1999	5870190.608	537039.418	595.773	0.58	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.33	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
15/12/1999	5870190.608	537039.418	595.773	1.25	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.67	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
15/02/2000	5870190.608	537039.418	595.773	1.42	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.17	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
15/05/2000	5870190.608	537039.418	595.773	1.66	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.25	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
30/11/2000	5870190.608	537039.418	595.773	2.21	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.54	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
05/05/2001	5870190.608	537039.418	595.773	2.64	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.43	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000

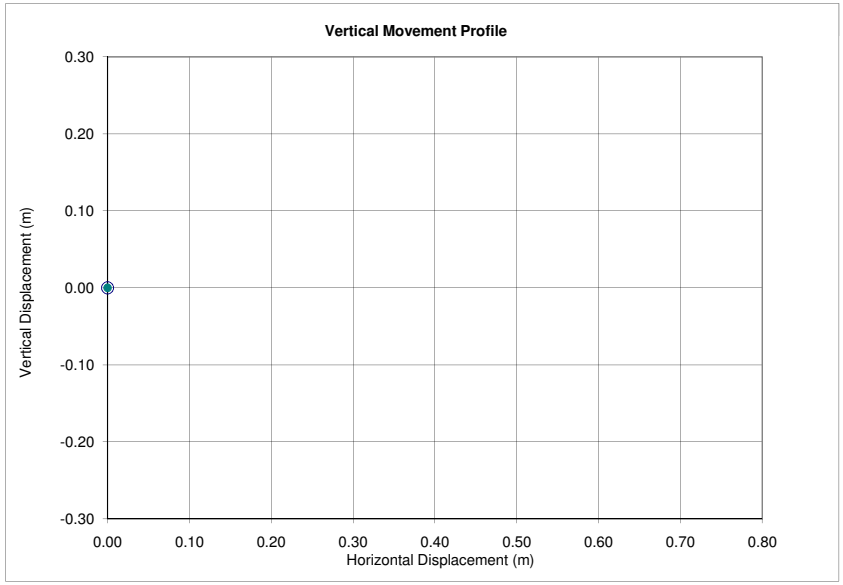
Displacement Graphs - Hub 98-28

Benchmark - Red Bluff Pump Station









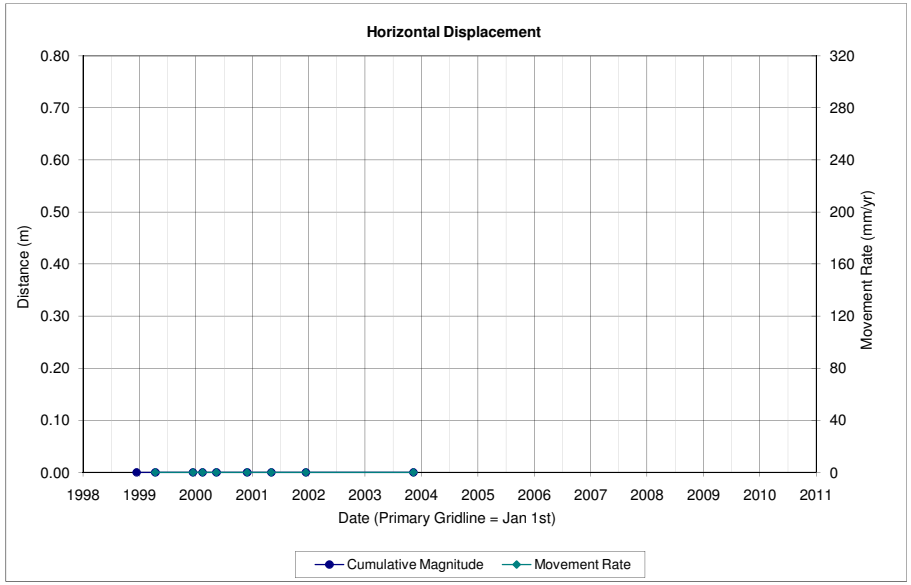
Survey and Displacement Data - Hub 82C256

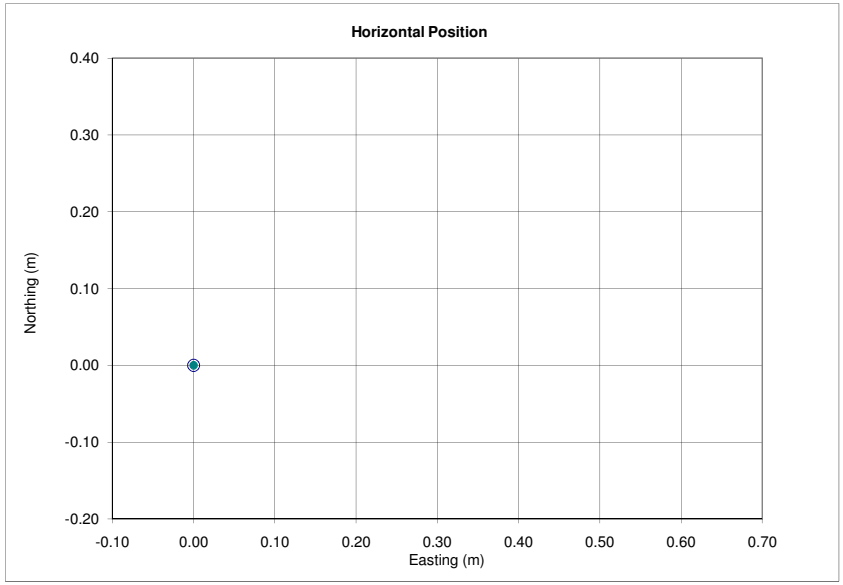
Benchmark - Gov't Monument at Quesnel Airport

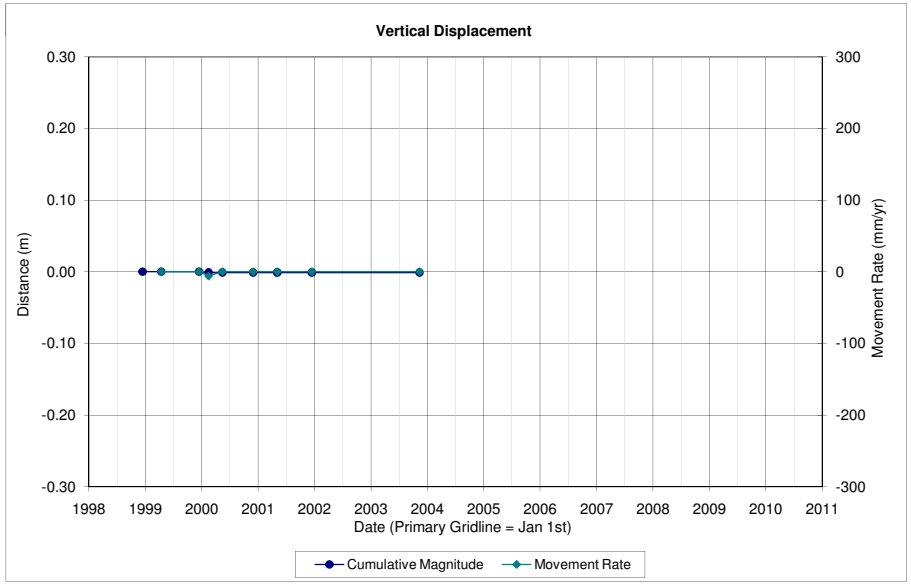
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/1998	5875411.453	533109.702	542.947	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
15/04/1999	5875411.453	533109.702	542.947	0.33	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.33	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
15/12/1999	5875411.453	533109.702	542.947	1.00	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.67	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
15/02/2000	5875411.453	533109.702	542.946	1.17	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	-0.001	0.17	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	-5.891
15/05/2000	5875411.453	533109.702	542.946	1.42	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	-0.001	0.25	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
30/11/2000	5875411.453	533109.702	542.946	1.96	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	-0.001	0.54	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
05/05/2001	5875411.453	533109.702	542.946	2.39	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	0.000	0.43	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
15/12/2001	5875411.453	533109.702	542.946	3.00	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	0.000	0.61	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
12/11/2003	5875411.453	533109.702	542.946	4.91	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	0.000	1.91	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000

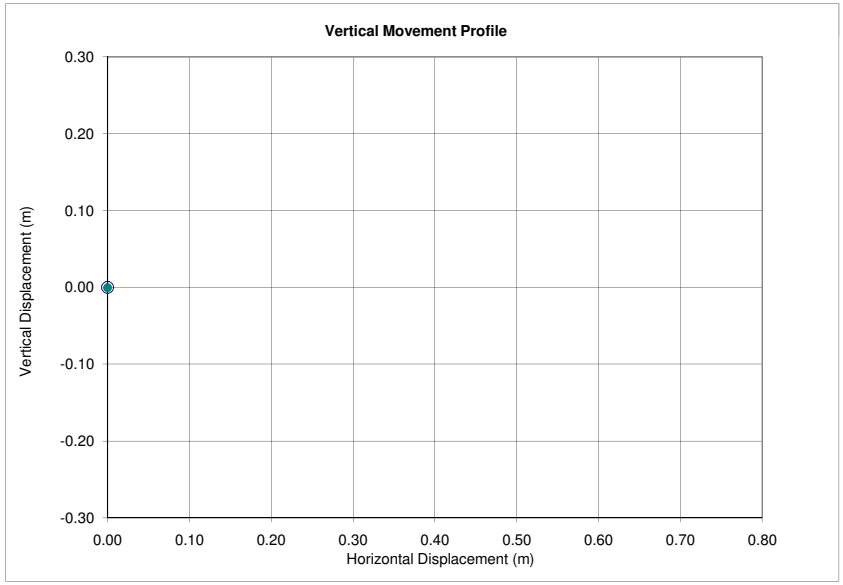
Displacement Graphs - Hub 82C256

Benchmark - Gov't Monument at Quesnel Airport







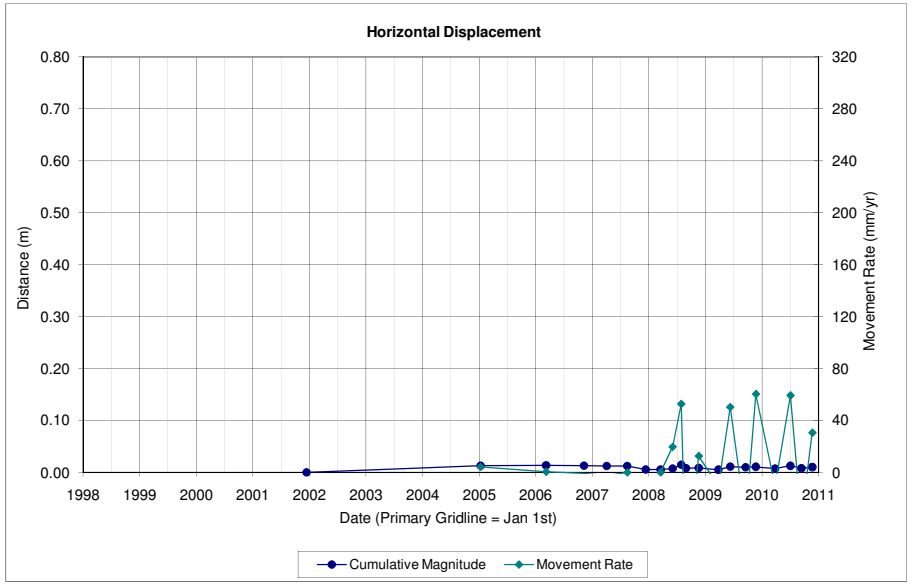


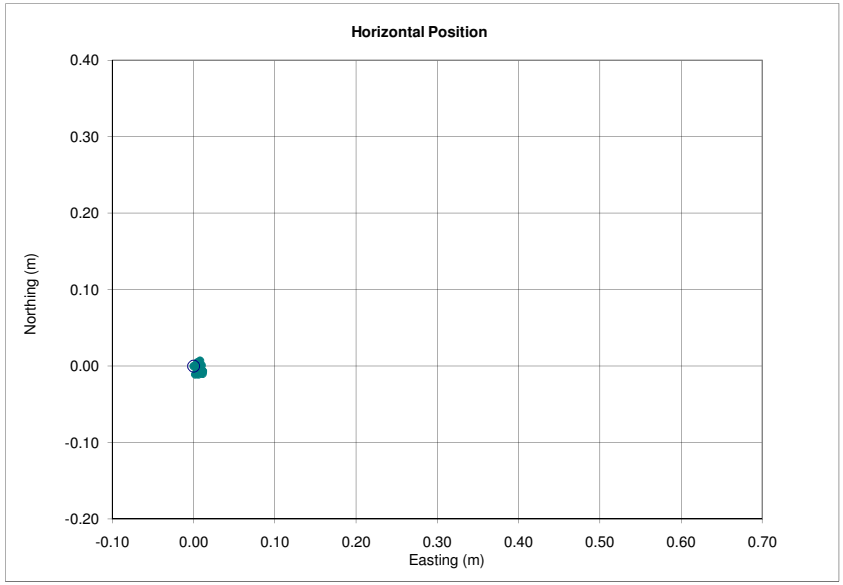
Survey and Displacement Data - Hub 01-38

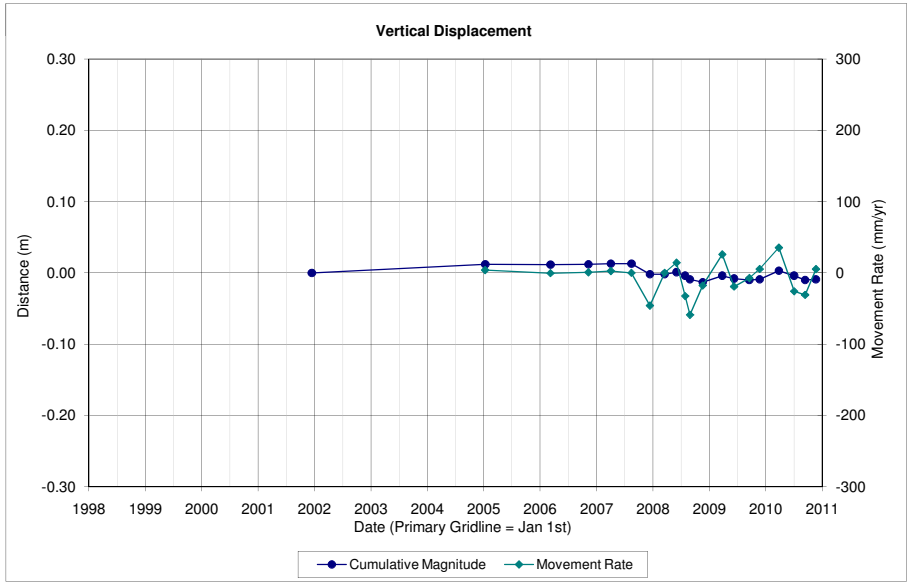
Benchmark - Quesnel No. 1 Station

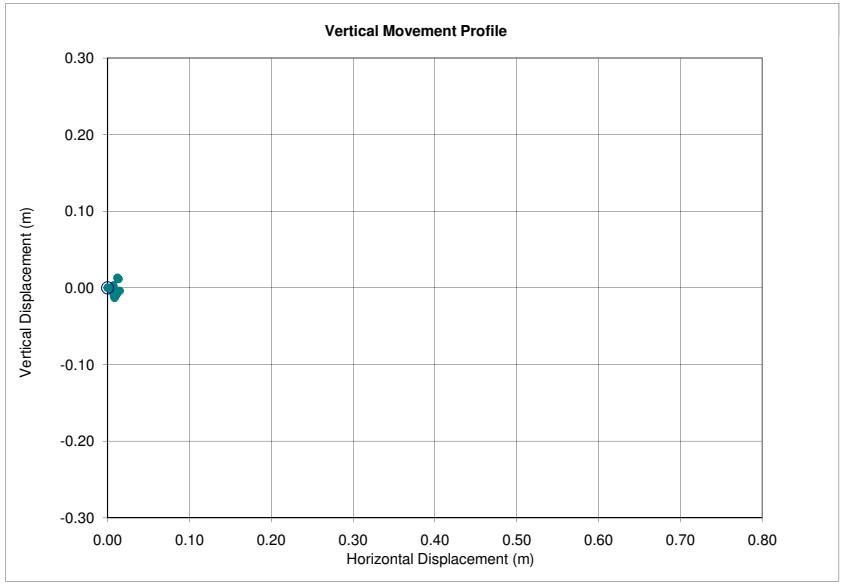
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5870193.015	537018.228	596.514	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
11/01/2005	5870193.008	537018.239	596.526	3.07	-0.007	0.011	0.013	0.012	122.5	42.6	0.004	0.004	3.07	-0.007	0.011	0.013	0.012	122.5	42.6	4.241	3.903
10/03/2006	5870193.008	537018.239	596.526	4.23	-0.007	0.011	0.013	0.011	120.8	40.9	0.003	0.003	1.16	0.000	0.000	0.000	0.000	63.4	-48.2	0.386	-0.432
10/11/2006	5870193.008	537018.239	596.526	4.90	-0.007	0.011	0.013	0.012	122.5	42.6	0.003	0.002	0.67	0.000	0.000	0.000	0.000	243.4	48.2	-0.667	0.745
05/04/2007	5870193.008	537018.238	596.527	5.30	-0.007	0.010	0.012	0.013	125.0	46.8	0.002	0.002	0.40	0.000	-0.001	0.001	0.001	270.0	45.0	-2.502	2.502
16/08/2007	5870193.008	537018.238	596.527	5.67	-0.007	0.010	0.012	0.013	125.0	46.8	0.002	0.002	0.36	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
13/12/2007	5870193.013	537018.233	596.512	5.99	-0.002	0.005	0.005	-0.002	111.8	-20.4	0.001	0.000	0.33	0.005	-0.005	0.007	-0.015	315.0	-64.8	-21.703	-46.040
18/03/2008	5870193.013	537018.233	596.512	6.26	-0.002	0.005	0.005	-0.002	111.8	-20.4	0.001	0.000	0.26	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
03/06/2008	5870193.009	537018.232	596.515	6.47	-0.006	0.004	0.007	0.001	146.3	7.9	0.001	0.000	0.21	-0.004	-0.001	0.004	0.003	194.0	36.0	19.558	14.231
29/07/2008	5870193.005	537018.239	596.510	6.62	-0.010	0.011	0.015	-0.004	132.3	-15.1	0.002	-0.001	0.15	-0.004	0.007	0.008	-0.005	119.7	-31.8	52.585	-32.612
29/08/2008	5870193.010	537018.234	596.505	6.70	-0.005	0.006	0.008	-0.009	129.8	-49.0	0.001	-0.001	0.08	0.005	-0.005	0.007	-0.005	315.0	-35.3	-83.313	-58.911
19/11/2008	5870193.012	537018.236	596.501	6.93	-0.003	0.008	0.009	-0.013	110.6	-56.7	0.001	-0.002	0.22	0.002	0.002	0.003	-0.004	45.0	-54.7	12.599	-17.817
26/03/2009	5870193.014	537018.233	596.510	7.28	-0.001	0.005	0.005	-0.004	101.3	-38.1	0.001	-0.001	0.35	0.002	-0.003	0.004	0.009	303.7	68.2	-10.370	25.884
10/06/2009	5870193.004	537018.230	596.506	7.49	-0.011	0.002	0.011	-0.008	169.7	-35.6	0.001	-0.001	0.21	-0.010	-0.003	0.010	-0.004	196.7	-21.0	50.175	-19.224
17/09/2009	5870193.011	537018.237	596.504	7.76	-0.004	0.009	0.010	-0.010	114.0	-45.4	0.001	-0.001	0.27	0.007	0.007	0.010	-0.002	45.0	-11.4	-36.523	-7.379
23/11/2009	5870193.022	537018.236	596.505	7.94	0.007	0.008	0.011	-0.009	48.8	-40.3	0.001	-0.001	0.18	0.011	-0.001	0.011	0.001	354.8	5.2	60.214	5.451
27/03/2010	5870193.020	537018.233	596.517	8.28	0.005	0.005	0.007	0.003	45.0	23.0	0.001	0.000	0.34	-0.002	-0.003	0.004	0.012	236.3	73.3	-10.620	35.347
04/07/2010	5870193.004	537018.234	596.510	8.55	-0.011	0.006	0.013	-0.004	151.4	-17.7	0.001	0.000	0.27	-0.016	0.001	0.016	-0.007	176.4	-23.6	59.145	-25.826
13/09/2010	5870193.011	537018.235	596.504	8.74	-0.004	0.007	0.008	-0.010	119.7	-51.1	0.001	-0.001	0.19	0.007	0.001	0.007	-0.006	8.1	-40.3	-36.376	-30.866
22/11/2010	5870193.016	537018.238	596.505	8.94	0.001	0.010	0.010	-0.009	84.3	-41.8	0.001	-0.001	0.19	0.005	0.003	0.006	0.001	31.0	9.7	30.425	5.218

Displacement Graphs - Hub 01-38
Benchmark - Quesnel No. 1 Station









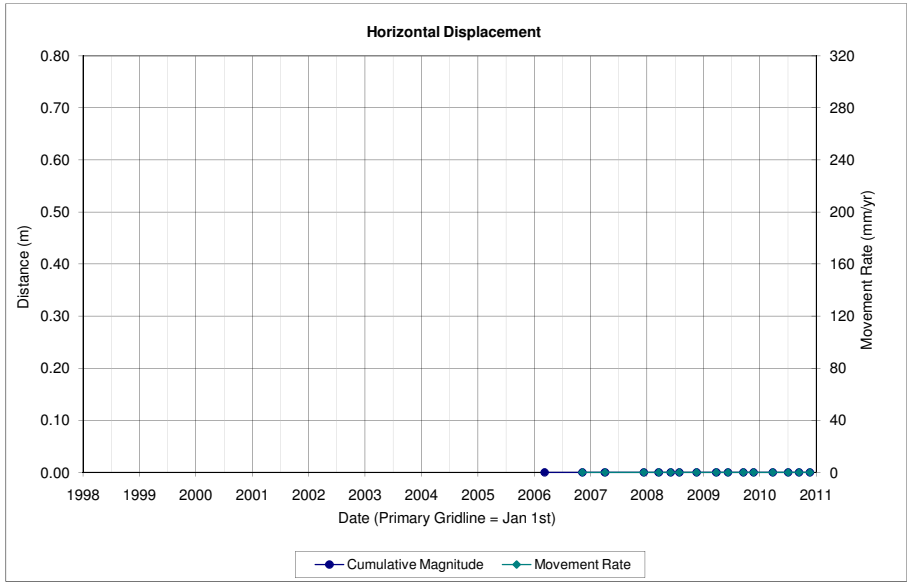
Survey and Displacement Data - Hub WaterTank

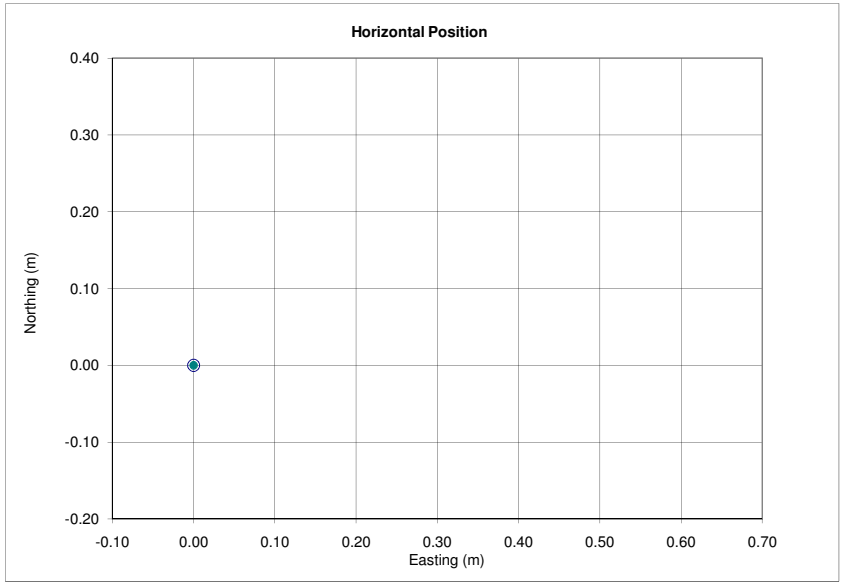
Benchmark - Water Tank

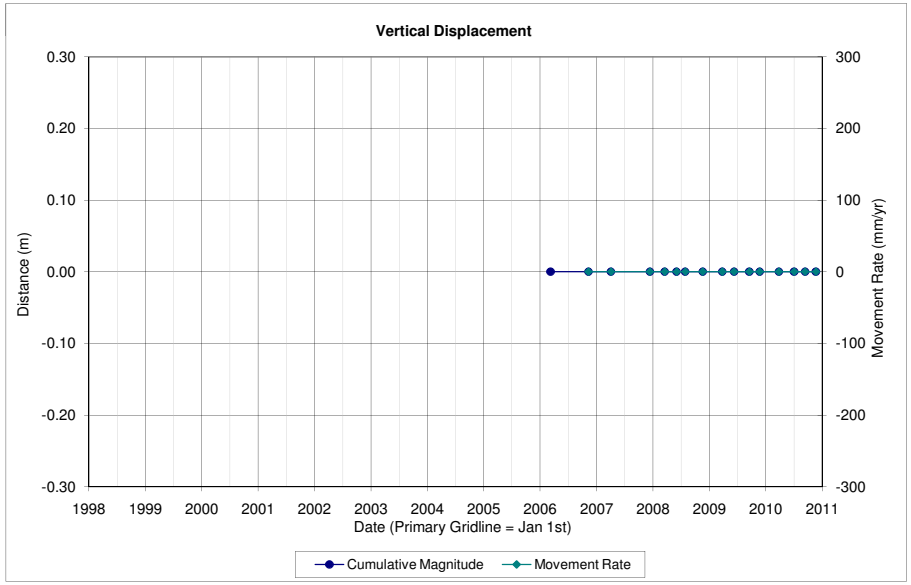
Date	Surveyed Position			Total Change in Position							Overal Rates (m/yr)		Incremental Change in Position							Incremental Rates	
	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/03/2006	5872728.745	532867.388	527.263	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0		
10/11/2006	5872728.745	532867.388	527.263	0.67	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.67	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
05/04/2007	5872728.745	532867.388	527.263	1.07	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.40	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
13/12/2007	5872728.745	532867.388	527.263	1.76	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.69	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
18/03/2008	5872728.745	532867.388	527.263	2.02	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.26	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
03/06/2008	5872728.745	532867.388	527.263	2.23	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.21	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
29/07/2008	5872728.745	532867.388	527.263	2.39	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.15	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
19/11/2008	5872728.745	532867.388	527.263	2.70	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.31	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
26/03/2009	5872728.745	532867.388	527.263	3.04	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.35	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
10/06/2009	5872728.745	532867.388	527.263	3.25	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.21	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
17/09/2009	5872728.745	532867.388	527.263	3.52	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.27	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
23/11/2009	5872728.745	532867.388	527.263	3.71	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.18	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
27/03/2010	5872728.745	532867.388	527.263	4.05	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.34	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
04/07/2010	5872728.745	532867.388	527.263	4.32	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.27	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
13/09/2010	5872728.745	532867.388	527.263	4.51	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.19	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
22/11/2010	5872728.745	532867.388	527.263	4.70	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.19	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000

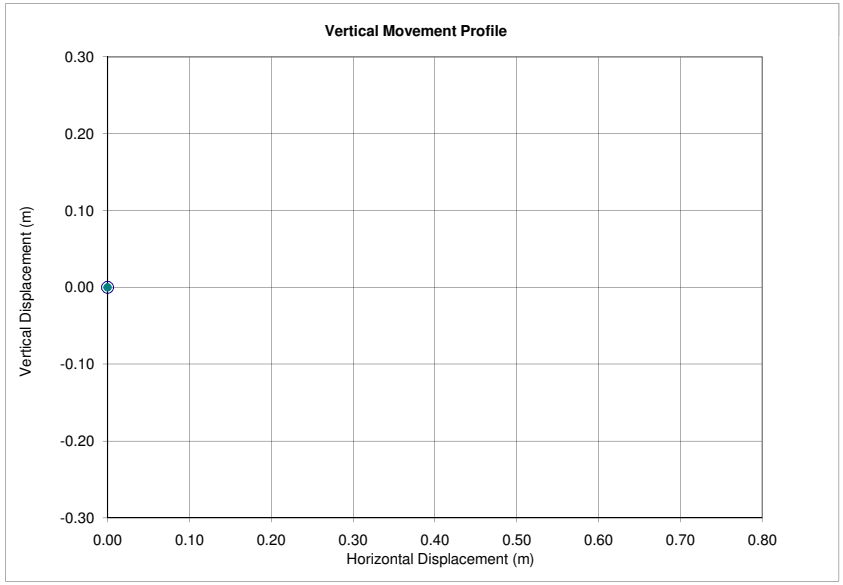
Displacement Graphs - Hub WaterTank

Benchmark - Water Tank









Appendix B

Slope Inclinometers - Summary Table

APPENDIX B - Slope Inclinometer Status

SI	Location	Initital Reading Date	Status	Displacement
SI-1	Avery Lane	November 2000	Blocked at 40m between Apr-June 2008	23mm*
SI-2	Avery Lane	November 2000	Blocked at 41m between Nov. 04-Apr. 05	86mm*
SI-3	Abbott Dr. & Bettcher St.	November 2000	Blocked at 39m between May-Nov. 2002	61mm*
SI-4	Voyager School	November 2000	Blocked at 51m between May-Nov. 2002	59mm*
SI-5	Abbott Dr. (near Flamingo)	October 2000	Blocked at 35m between Dec. 03-June 04	13mm*
SI-6	Dixon St.	November 2000	Blocked at 78m between Nov 01-May 02	83mm*
SI-7	Pierce Cres.	November 2000	Blocked at 68m between May-Nov. 2002	73mm*
SI-8	Pinchbeck St.	June 2005	Active - no movement (SI not deep enough)	0mm
SI-9	Patchett St.	April 2005	Blocked at 65m between Nov. 08-Apr. 09	110mm*
SI-10	Dawson St.	April 2005	Blocked at 21m between June 05-May 06	12mm*
SI-11	Picard Ave.	May 2005	Active - no movement (SI not deep enough)	0mm
SI-12	Panagrot Ave. (east end)	April 2005	Blocked at 63m between Mar.-May 2007	47mm*
SI-13	Lewis Dr. (at Sikh Temple)	April 2005	Blocked at 13m between June-Sept. 2008	72mm*
SI-14	Findlay Rd.	November 2006	Blocked at 20m between Nov. 08-Apr. 09	62mm*
SI-15	Panagrot Ave. (west end)	November 2006	Blocked at 18m between Apr.-June 09	56mm*

* Displacements are reported from last reading before SI blocked

Appendix C

Piezometers - Summary Table and Groundwater Elevation Plots

APPENDIX C - Piezometer Status

Standpipe Piezometers				
Piezometer	**Location**	**Installation Date**	**Depth (screen)**	**Status**
BH2	Avery Lane	November 2001	54.2 to 60.2m	Active
BH2a	Bettcher St.	August 2003	86.9-88.4m	Active
BH2b	Bettcher St.	August 2003	47.4-48.2m	Active
BH2c	Bettcher St.	August 2003	25.3-25.9m	Active
BH3a	Flamingo St.	July 2003	50.0-50.6m	Active
BH4c	Flamingo St.	July 2003	22.9-23.5m	Active
BH4	Voyager School	December 2001	39.6-39.9m	Damaged and plugged
BH6a	Dixon St.	December 2001	44.0-45.2m	Damaged - sheared at 26.8m
BH6b	Dixon St.	December 2001	26.4-27.8m	Active

Standpipe Piezometers with Vibrating Wires				
Piezometer	**Location**	**Installation Date**	**Depth (tip)**	**Status**
BH3b	Flamingo St.	August 2003	40.0m	Connected to PW1 datalogger
BH3c	Flamingo St.	August 2003	31.0m	Connected to PW1 datalogger
BH4a	Flamingo St.	July 2003	40.0m	Connected to PW1 datalogger
BH4b	Flamingo St.	July 2003	23.0m	Connected to PW1 datalogger

Vibrating Wire Piezometers				
Piezometer	**Location**	**Installation Date**	**Depth (tip)**	**Status**
BH3	Abbott Dr.	November 2001	37.5m	Connected to PW2 datalogger
BH4	Voyager School	December 2001	49.0m	Connected to a minilogger
BH7a	Pierce Cres.	July 2005	27.0m	Connected to BH7 datalogger
BH7b	Pierce Cres.	July 2005	64.9m	Connected to BH7 datalogger
BH8a	Pinchbeck St.	June 2005	13.1m	Connected to BH8 datalogger
BH8b	Pinchbeck St.	June 2005	13.0m	Connected to BH8 datalogger
BH8c	Pinchbeck St.	June 2005	28.0m	Connected to BH8 datalogger
BH8d	Pinchbeck St.	June 2005	56.2m	Connected to BH8 datalogger
BH9a	Patchett St.	June 2005	15.1m	Connected to BH9 datalogger
BH9b	Patchett St.	June 2005	30.6m	Connected to BH9 datalogger
BH9c	Patchett St.	June 2005	50.1m	Connected to BH9 datalogger
BH10a	Dawson St.	July 2005	11.6m	Connected to BH10 datalogger
BH10b	Dawson St.	July 2005	20.4m	Connected to BH10 datalogger
BH10c	Dawson St.	July 2005	48.6m	Connected to BH10 datalogger
BH11a	Picard Ave.	June 2005	14.3m	Connected to BH11 datalogger
BH11b	Picard Ave.	June 2005	32.0m	Connected to BH11 datalogger
BH11c	Picard Ave.	June 2005	50.3m	Connected to BH11 datalogger
BH12a	Panagrot Ave. (east end)	June 2005	18.0m	Connected to PW4 datalogger
BH12b	Panagrot Ave. (east end)	June 2005	22.9m	Connected to PW4 datalogger
BH12c	Panagrot Ave. (east end)	June 2005	26.5m	Connected to PW4 datalogger VW tip above phreatic surface
BH12d	Panagrot Ave. (east end)	June 2005	54.9m	Connected to PW4 datalogger
BH13a	Lewis Dr. (at Sikh Temple)	July 2005	51.m	Connected to BH13 datalogger
BH13b	Lewis Dr. (at Sikh Temple)	July 2005	14.4m	Connected to BH13 datalogger
BH14a	Findlay Rd.	June 2006	20.1m	Connected to BH14 datalogger
BH14b	Findlay Rd.	June 2006	65.9m	Connected to BH14 datalogger
BH14c	Findlay Rd.	June 2006	98.7m	Connected to BH14 datalogger
BH15a	Panagrot Ave. (west end)	July 2006	8.8m	Connected to BH15 datalogger
BH15b	Panagrot Ave. (west end)	July 2006	63.3m	Connected to BH15 datalogger

Vibrating Wire Piezometers cont.				
BH15c	Panagrot Ave. (west end)	July 2006	83.2m	Connected to BH15 datalogger
BH16a	Diatomite Mine	October 2006	42.7m	Connected to BH16 datalogger
BH16b	Diatomite Mine	October 2006	85.5m	Connected to BH16 datalogger
BH16c	Diatomite Mine	October 2006	139.1m	Connected to BH16 datalogger
BH16d	Diatomite Mine	October 2006	214.9m	Connected to BH16 datalogger Piezometer not working
BH17a	Adams St.	July 2007	37.7m	Connected to PW5 datalogger
BH17b	Adams St.	July 2007	57.4m	Connected to PW5 datalogger
BH18a	Adams St.	July 2007	38.2m	Connected to PW5 datalogger
BH18b	Adams St.	July 2007	60.1m	Connected to PW5 datalogger Not currently giving readings
BH19a	Panagrot Ave. (east end)	July 2007	16.5m	Connected to PW4 datalogger
BH19b	Panagrot Ave. (east end)	July 2007	22.3m	Connected to PW4 datalogger
BH20	Panagrot Ave. (east end)	July 2007	21.4m	Connected to PW4 datalogger
BH21a	Crane St.	July 2007	12.6m	Connected to HD4 datalogger
BH21b	Crane St.	July 2007	21.3m	Connected to HD4 datalogger
BH22	Crane St.	July 2007	18.3m	Connected to HD4 datalogger
BH23a	Baity Ave.	July 2007	22.4m	Connected to HD1 datalogger
BH23b	Baity Ave.	July 2007	33.1m	Connected to HD1 datalogger
BH24	Baity Ave.	July 2007	22.9m	Connected to HD1 datalogger VW tip above phreatic surface
BH25a	Baity Ave.	July 2007	16.8m	Connected to HD1 datalogger
BH25b	Baity Ave.	July 2007	30.2m	Connected to HD1 datalogger Piezometer not working

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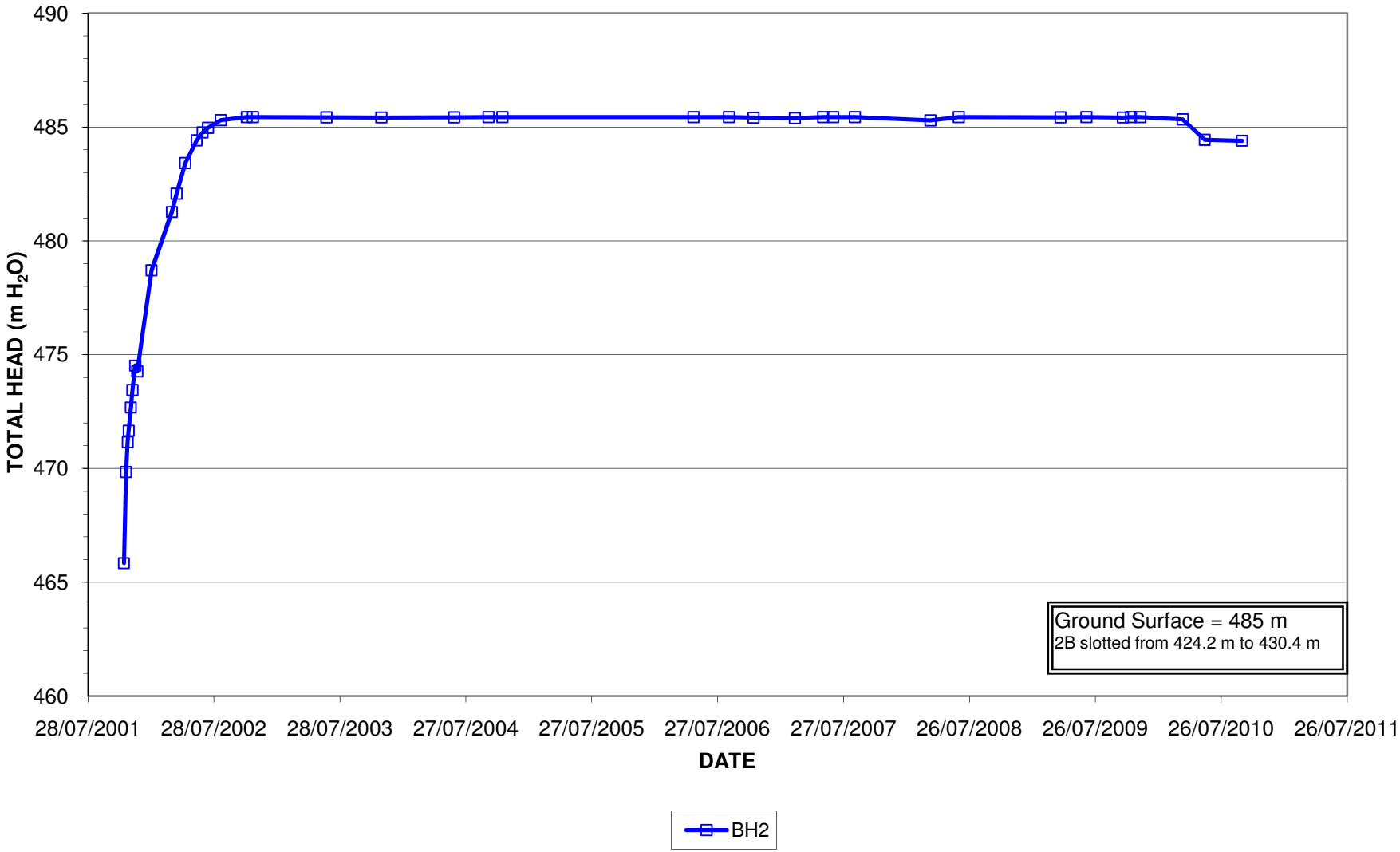
Groundwater Monitoring
TOTAL HEAD - BH2 STANDPIPE



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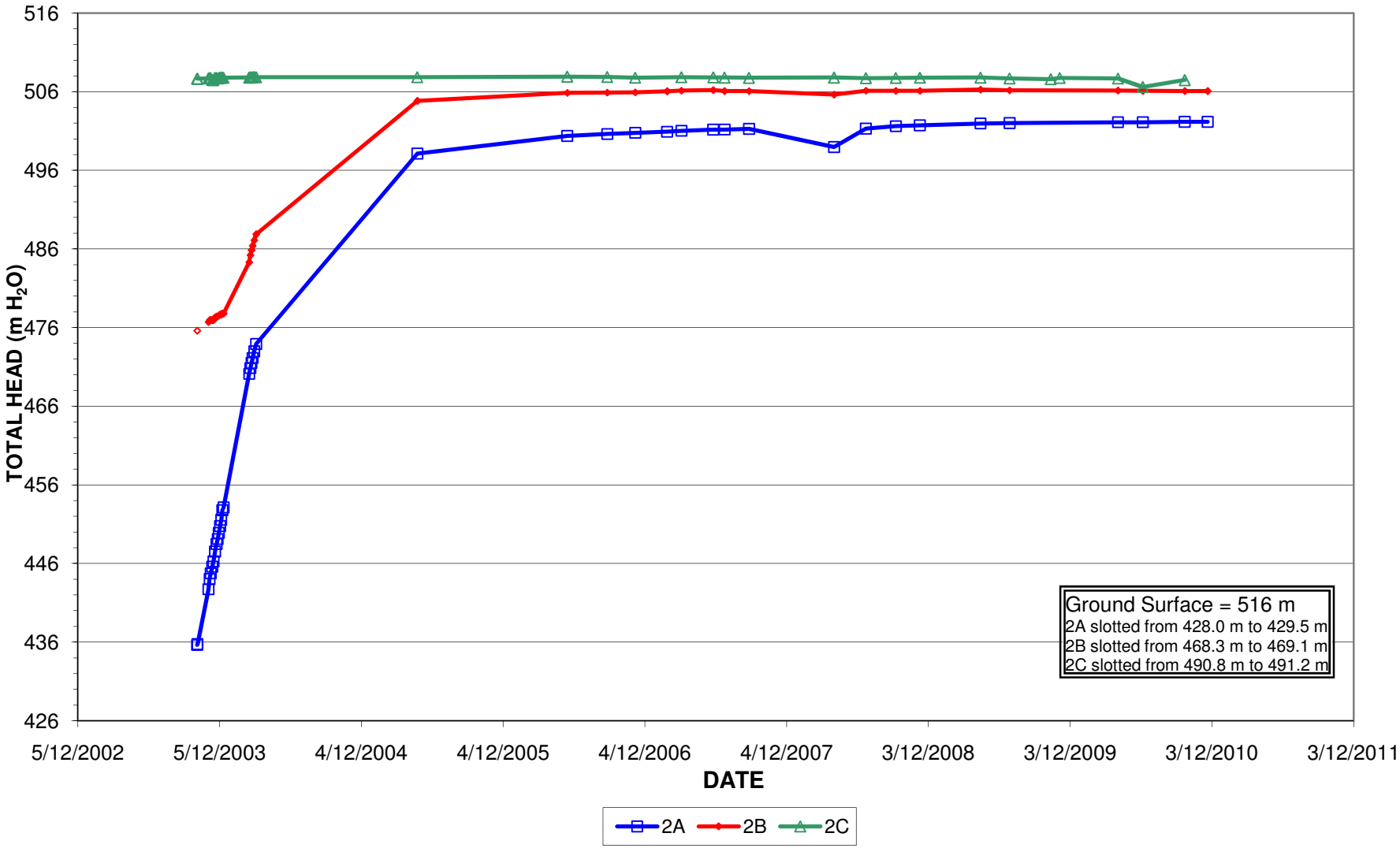
Groundwater Monitoring
TOTAL HEAD - BH2A, B, C STANDPIPES



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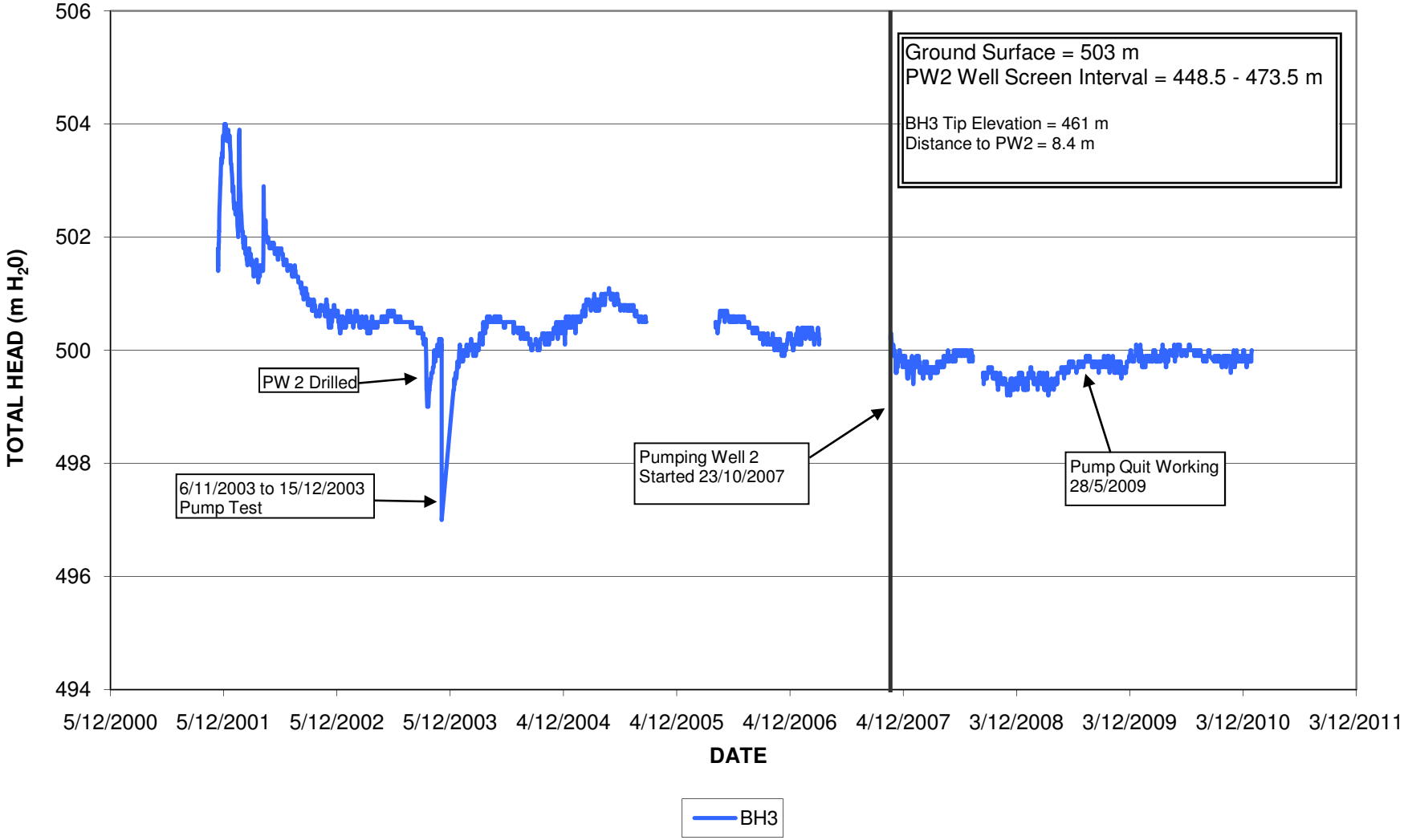
Groundwater Monitoring
TOTAL HEAD - BH3 (near Pumping Well 2)



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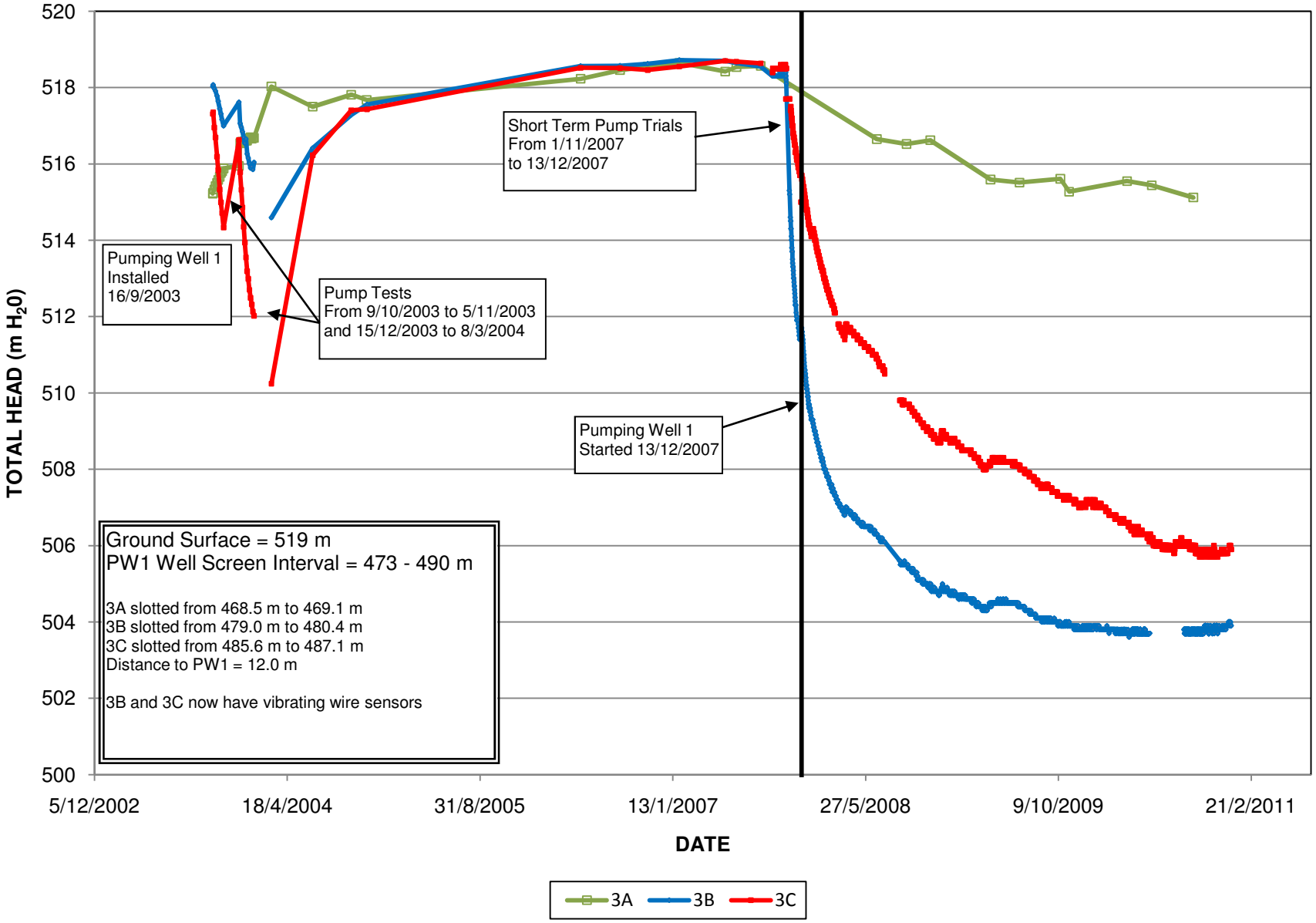
Groundwater Monitoring
TOTAL HEAD - BH3A, B and C STANDPIPES (near Pumping Well 1)



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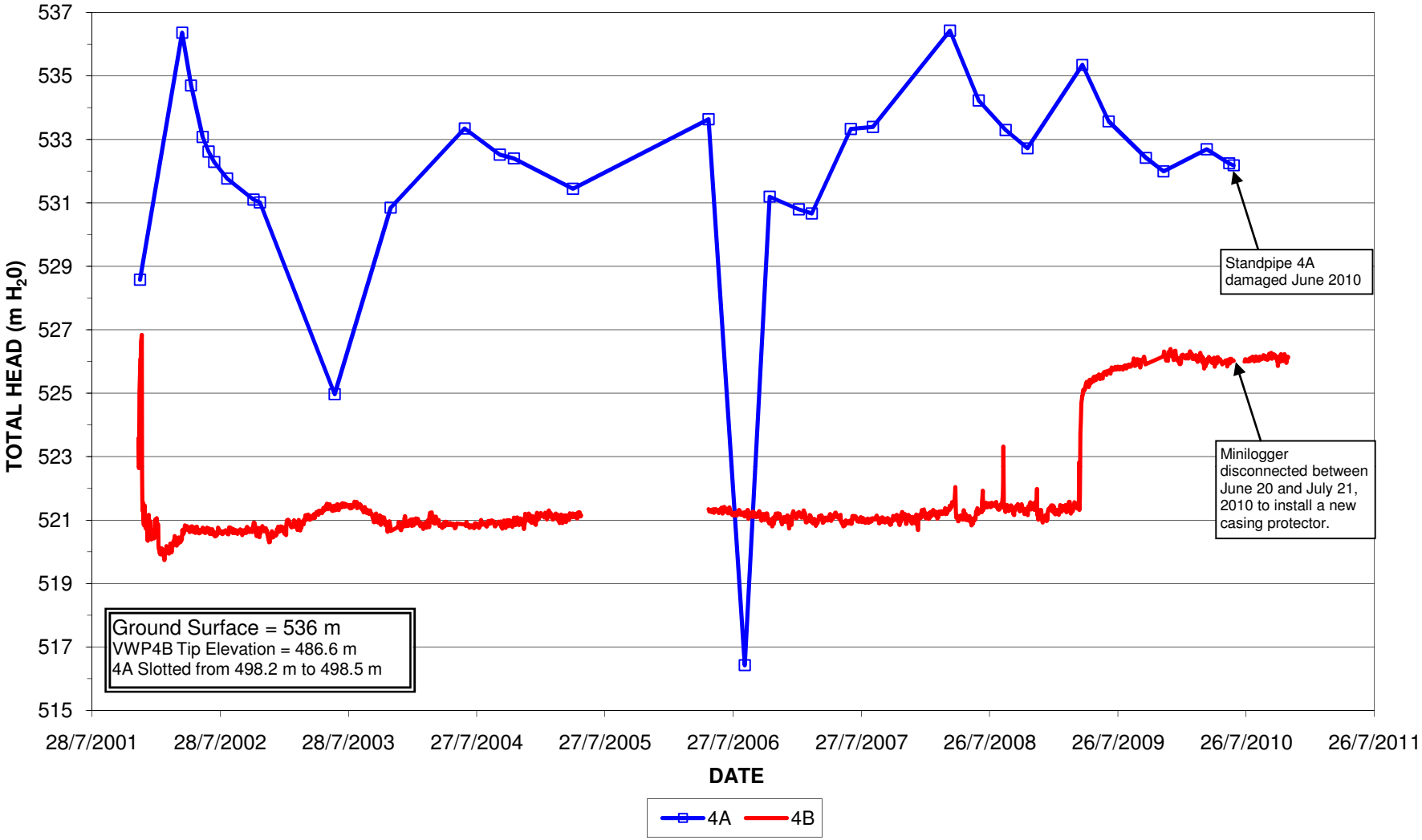
Groundwater Monitoring
TOTAL HEAD - BH4A STANDPIPE / VWP 4B



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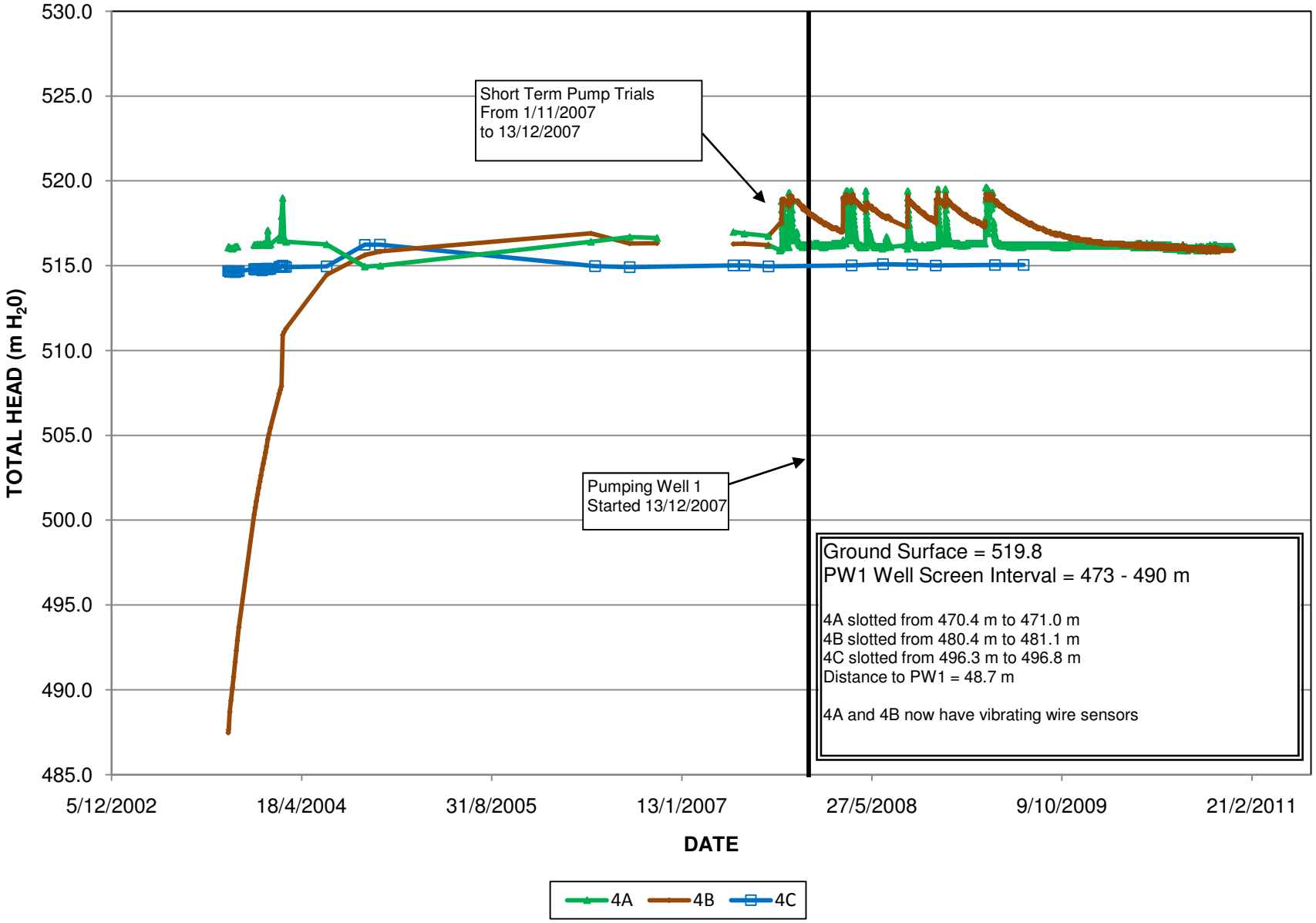
Groundwater Monitoring
TOTAL HEAD - BH4A, B and C STANDPIPES (near Pumping Well 1)



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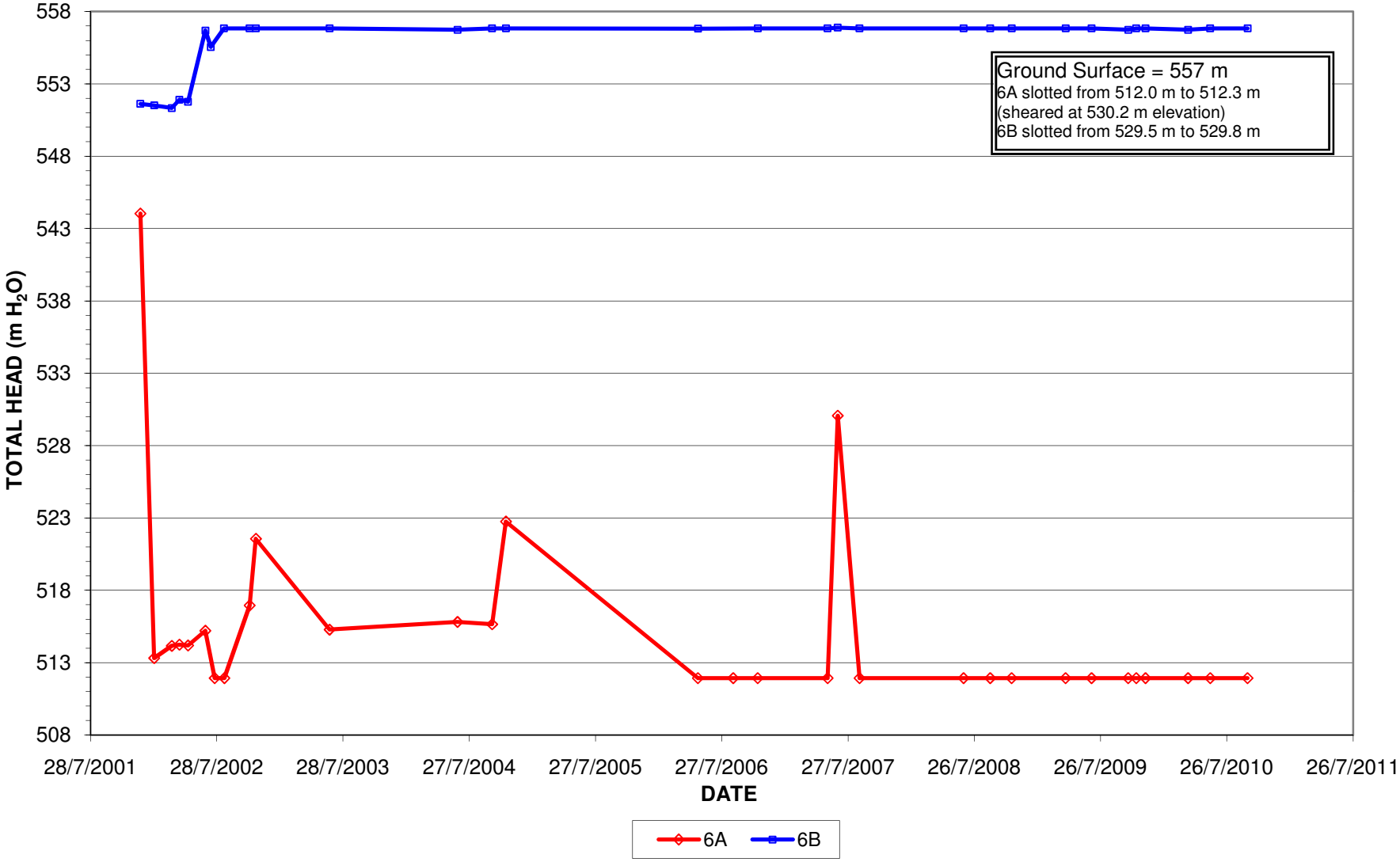
Groundwater Monitoring
TOTAL HEAD - BH6 STANDPIPES



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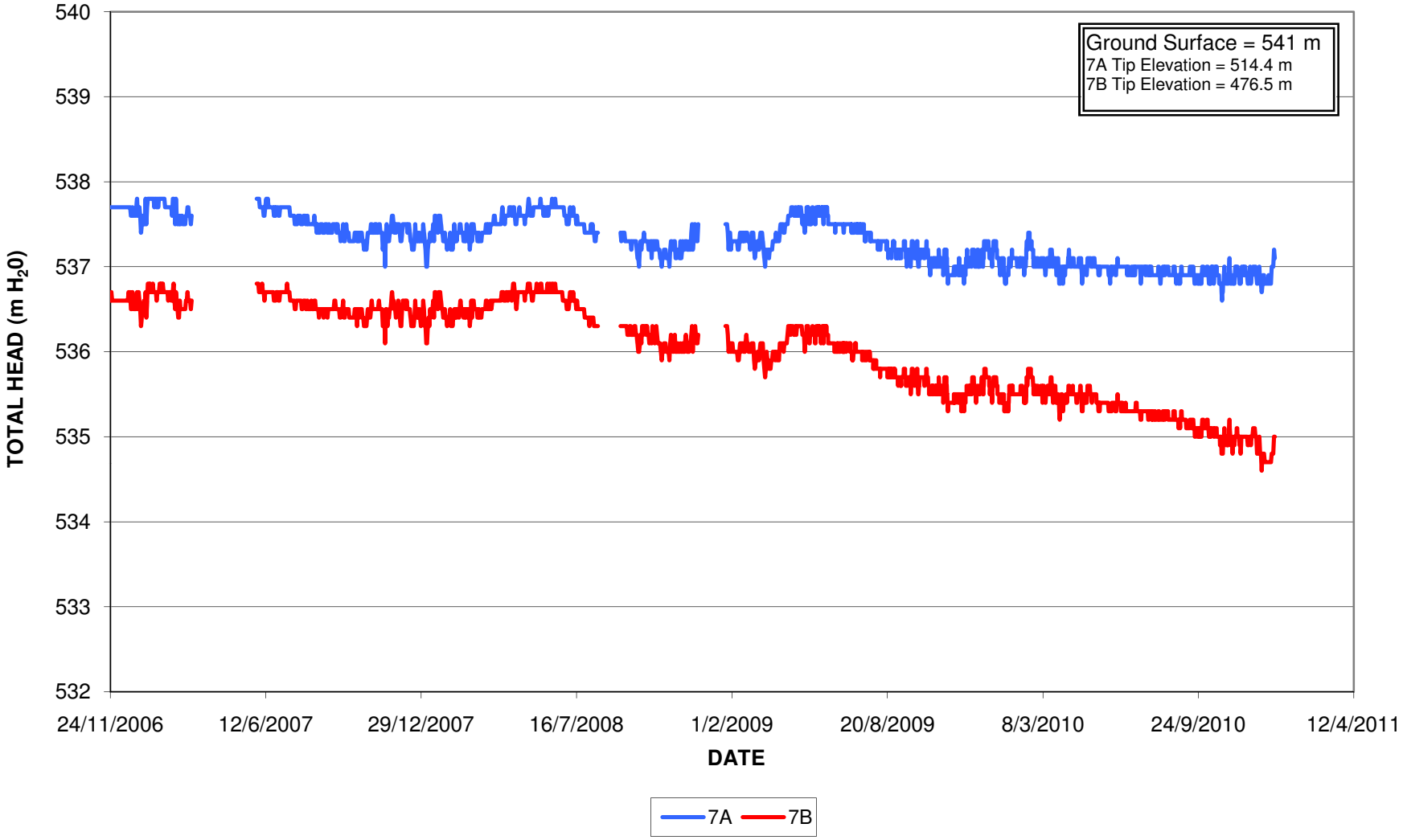
Groundwater Monitoring
TOTAL HEAD - VWP7



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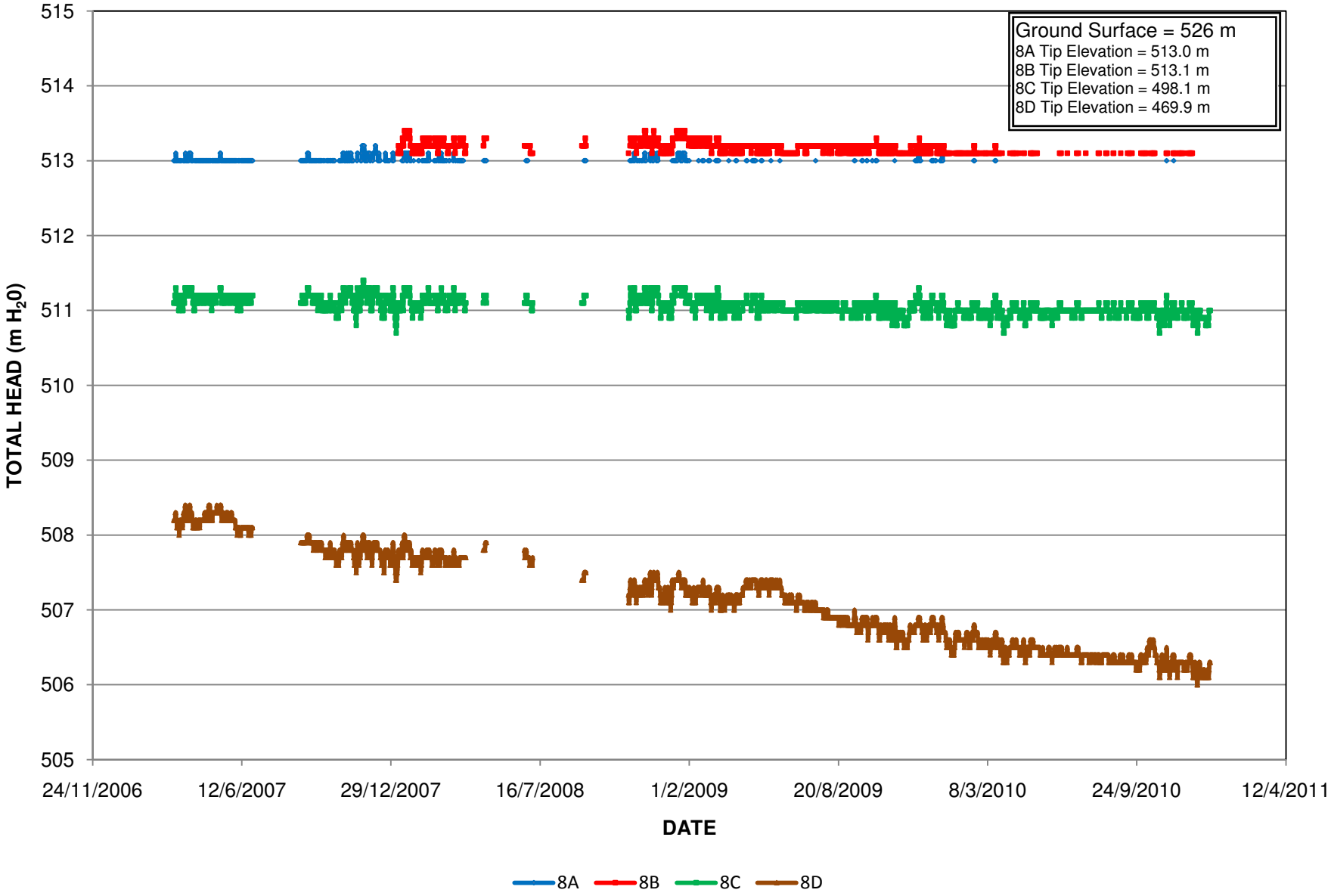
Groundwater Monitoring
TOTAL HEAD - VWP8



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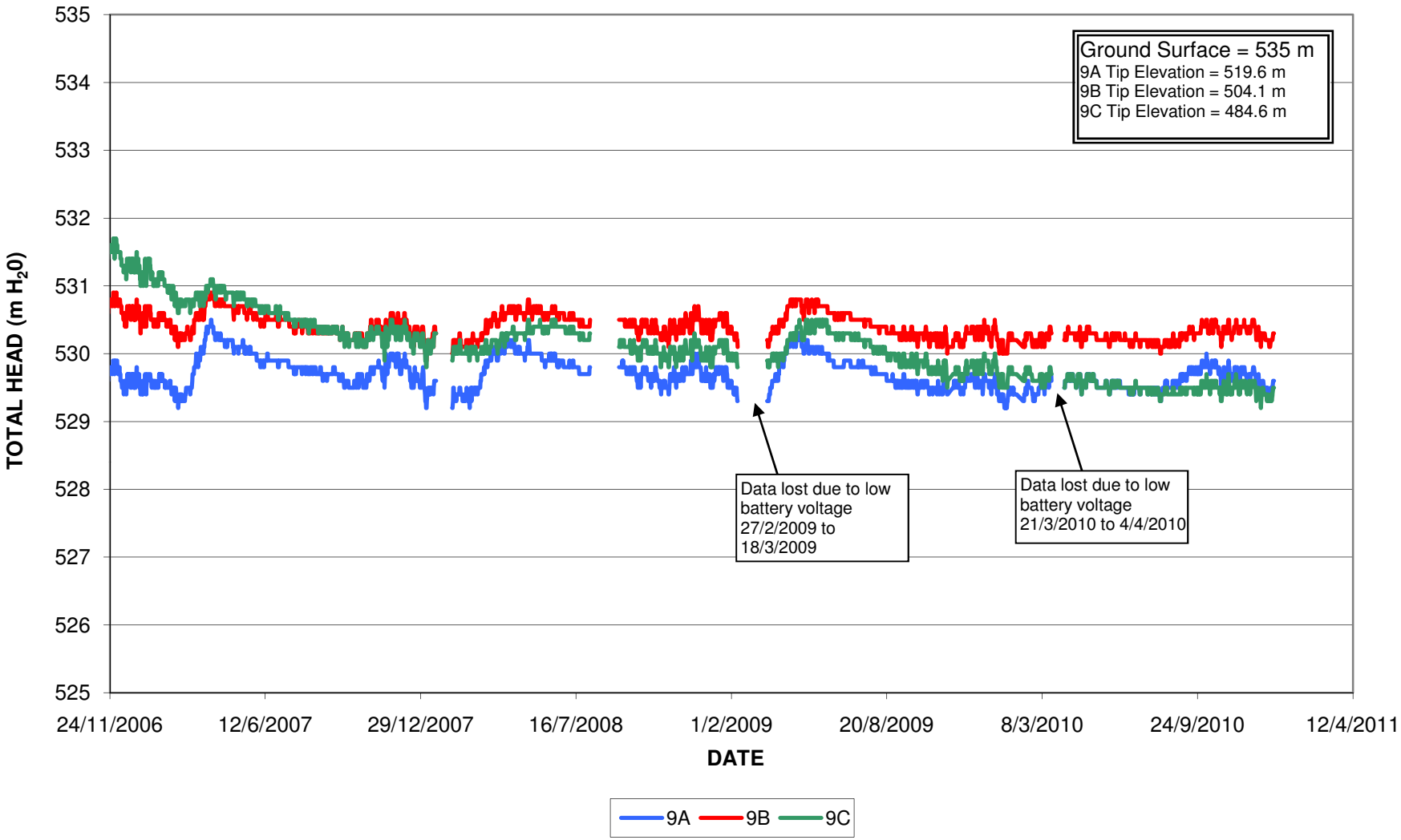
Groundwater Monitoring
TOTAL HEAD - VWP9



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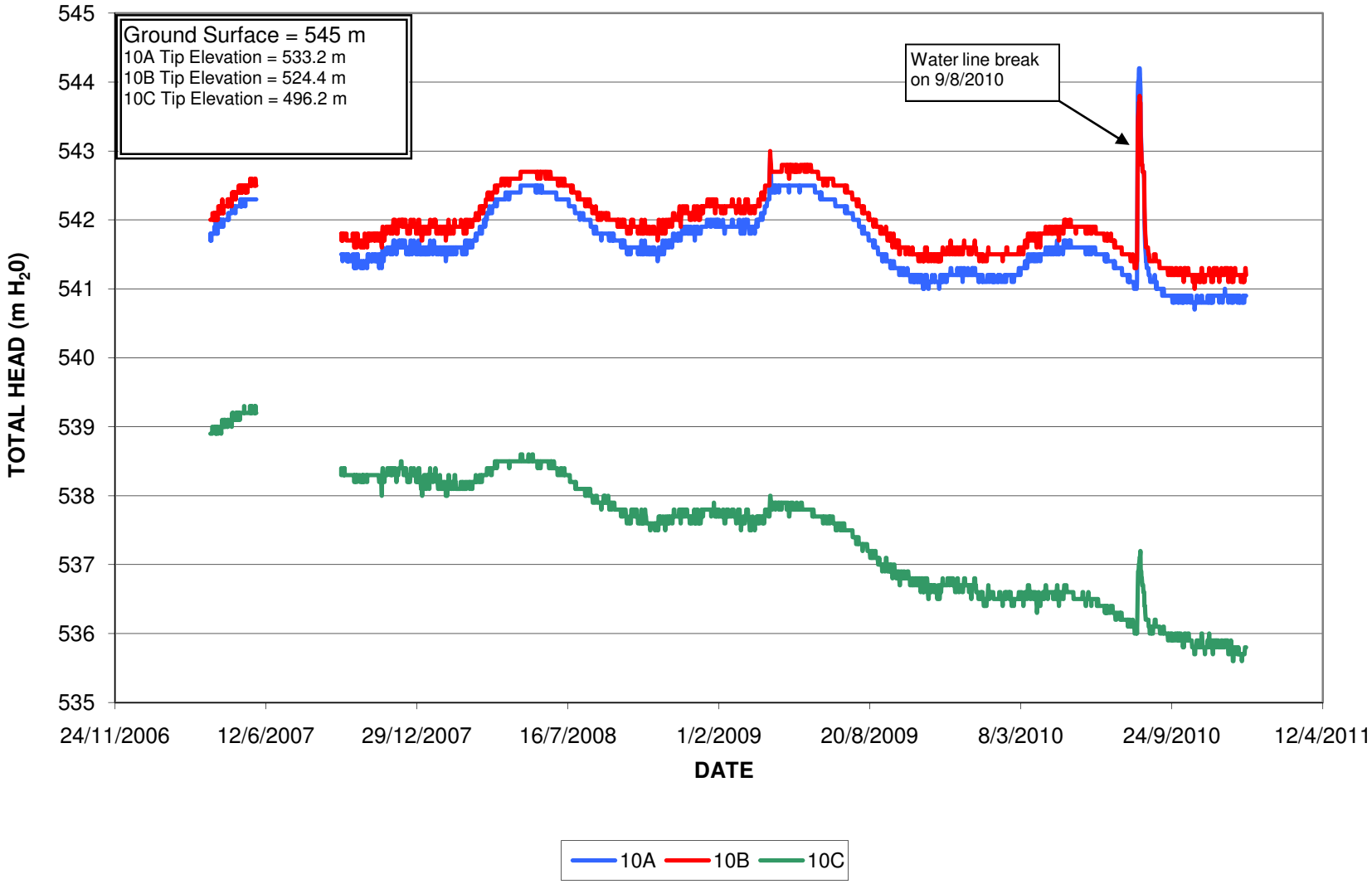
Groundwater Monitoring
TOTAL HEAD - VWP10



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Groundwater Monitoring
TOTAL HEAD - VWP11

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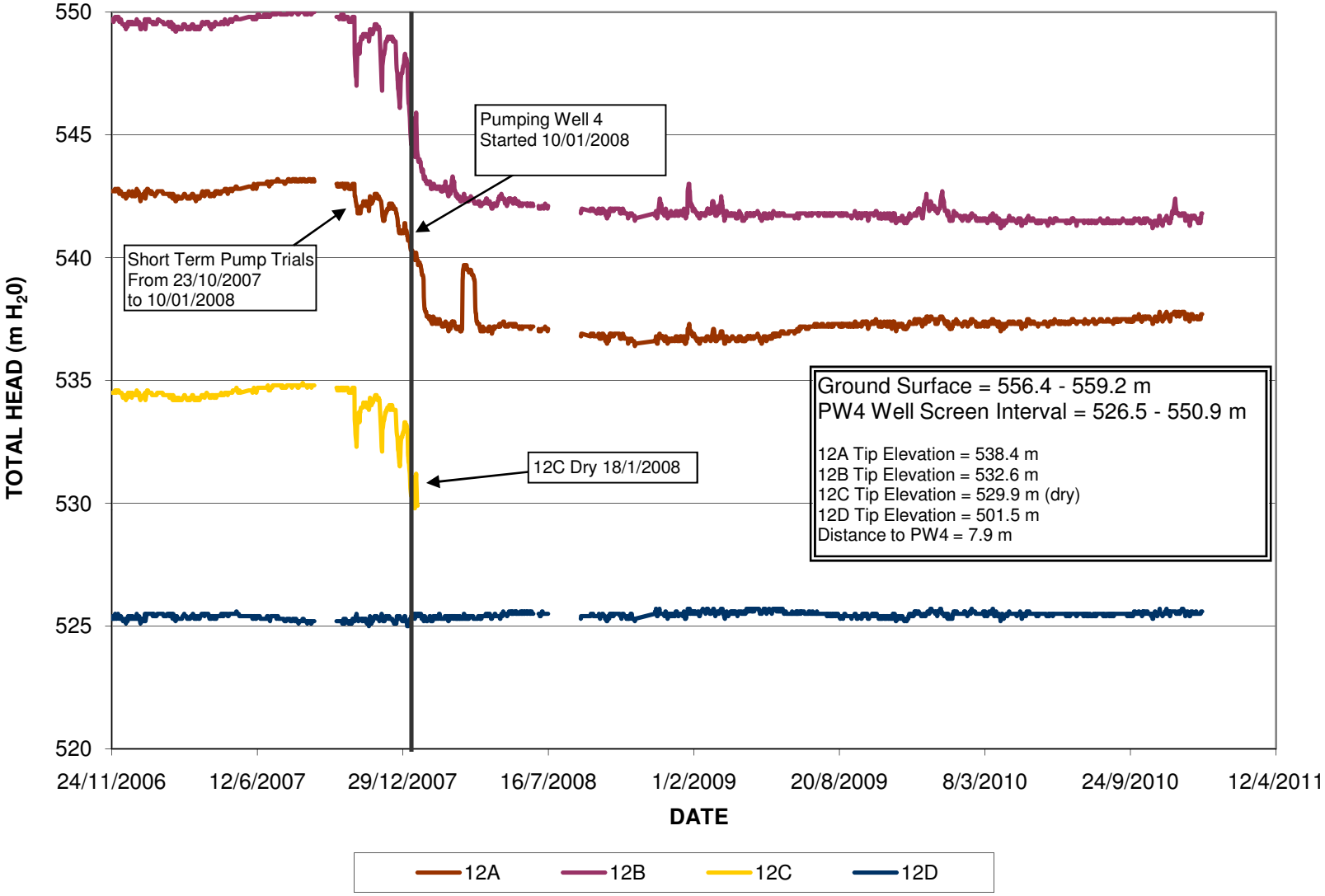
Groundwater Monitoring
TOTAL HEAD - VWP12 (near Pumping Well 4)



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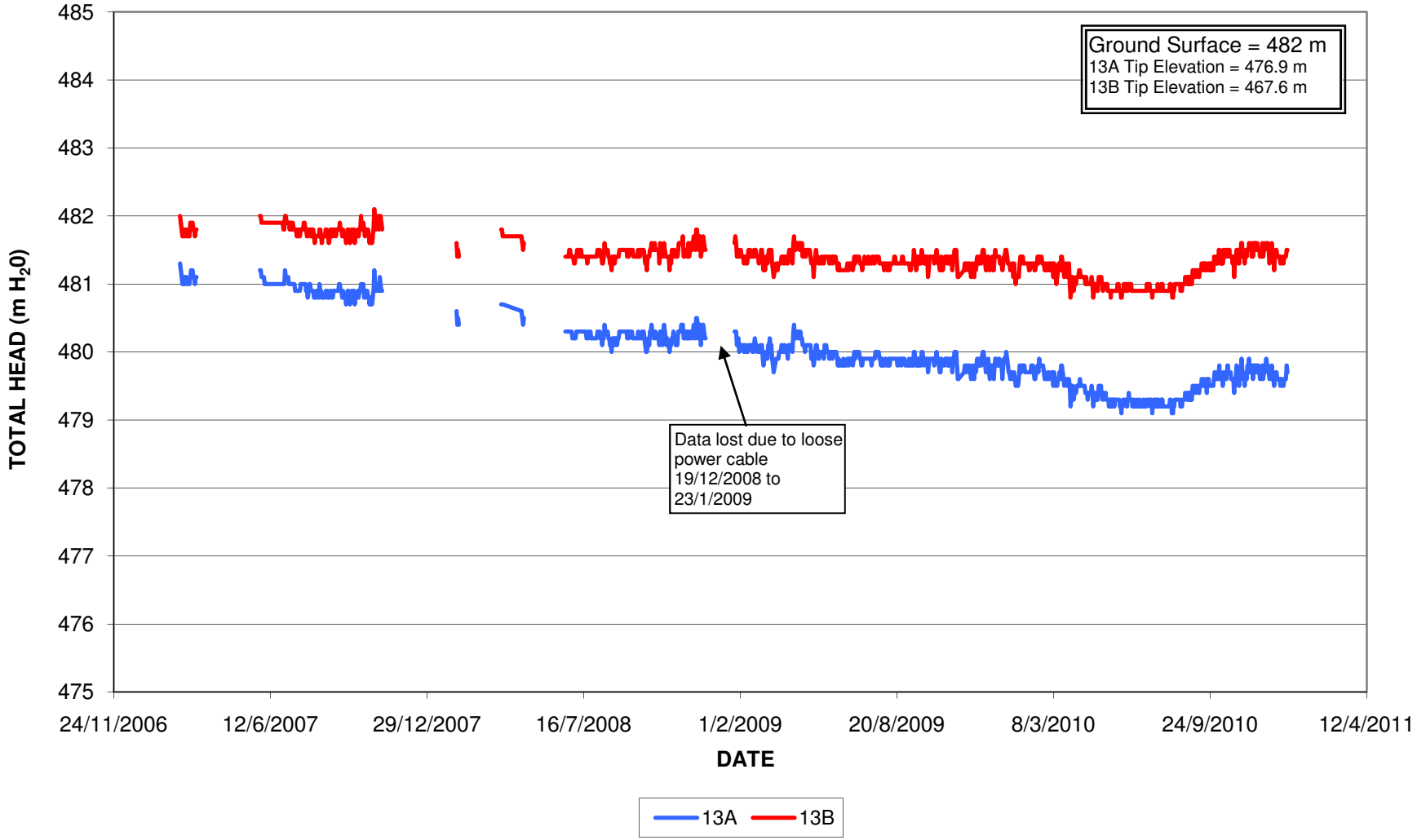
Groundwater Monitoring
TOTAL HEAD - VWP13



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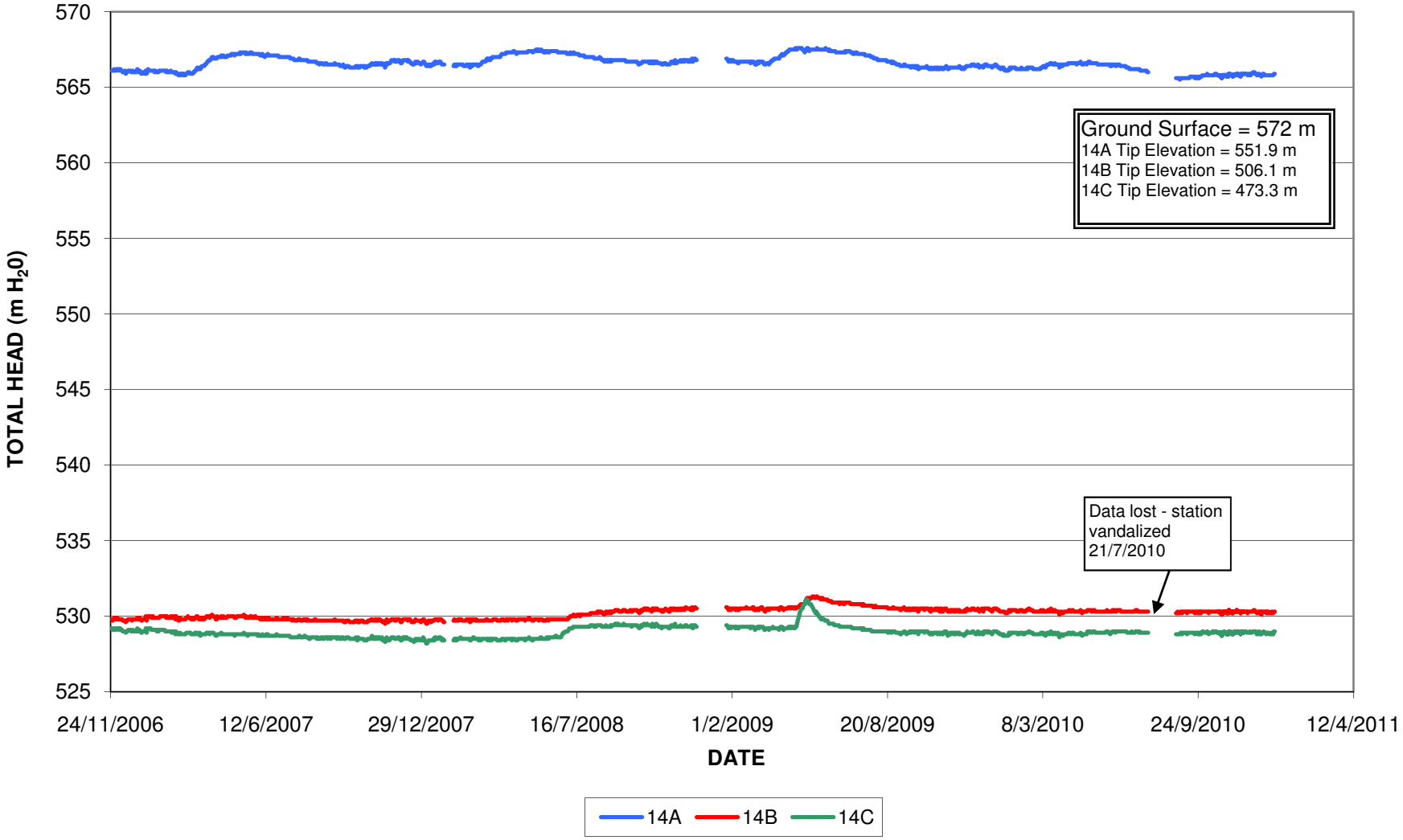
Groundwater Monitoring
TOTAL HEAD - VWP14



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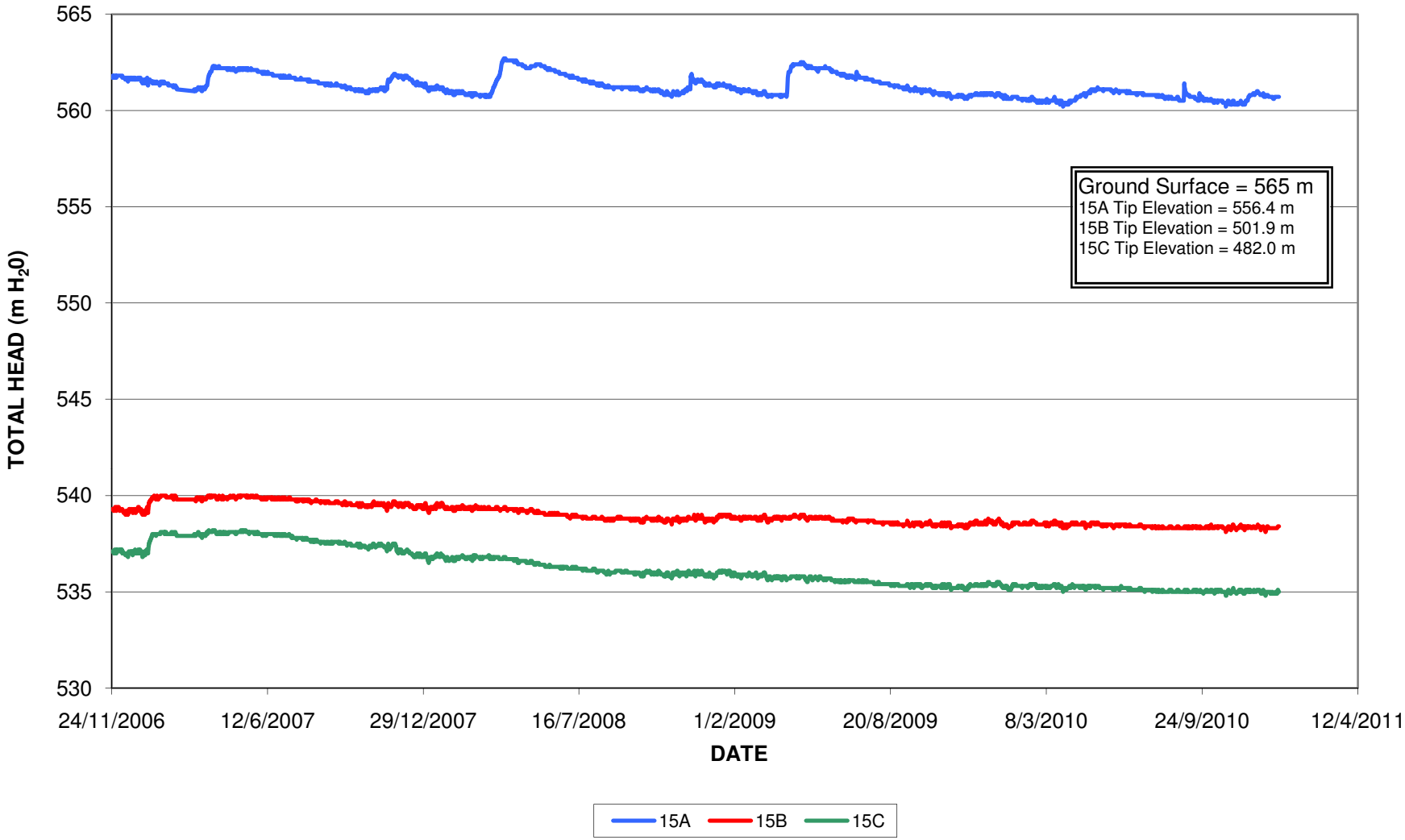
Groundwater Monitoring
TOTAL HEAD - VWP15



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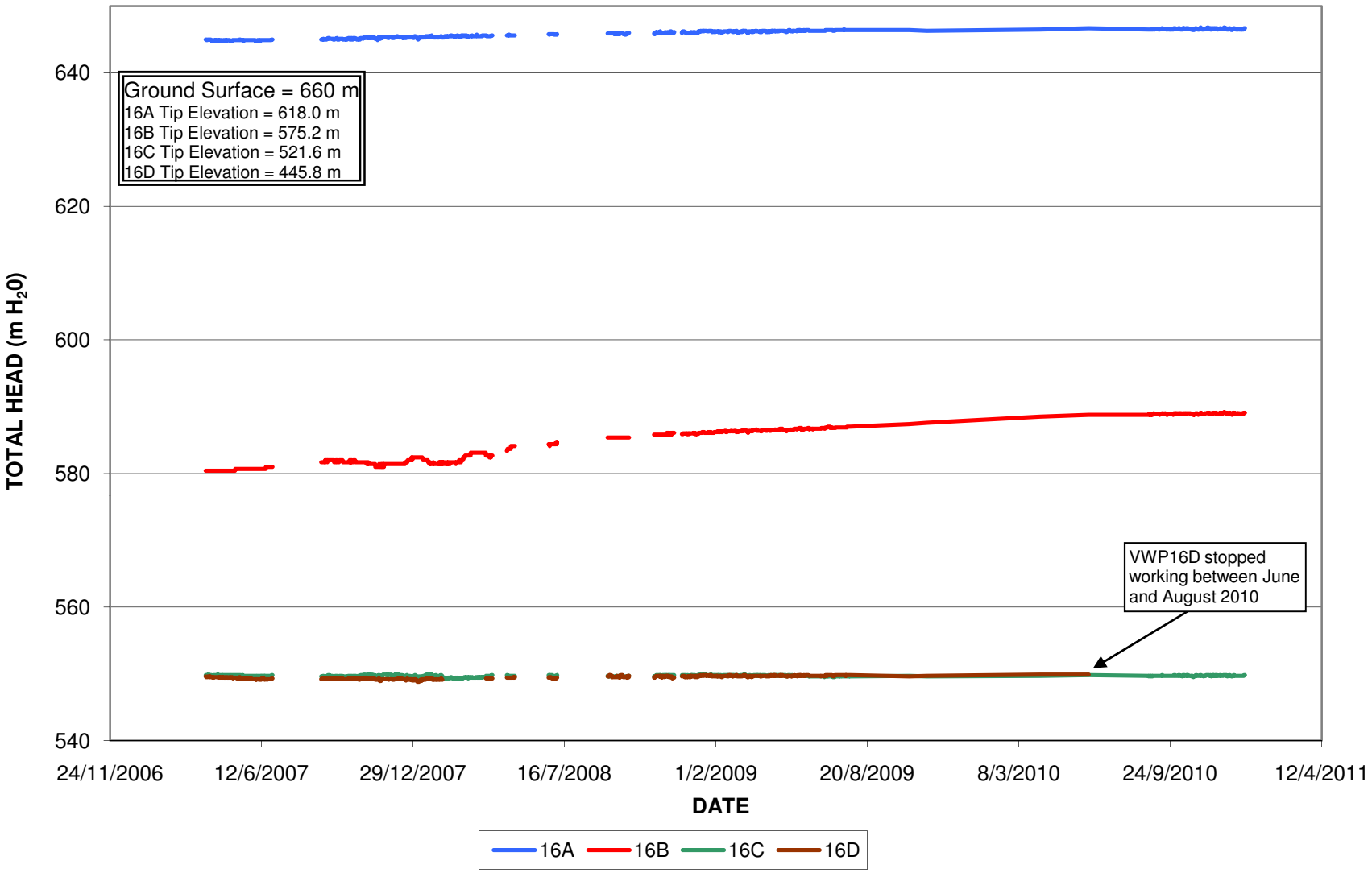
Groundwater Monitoring
TOTAL HEAD - VWP16



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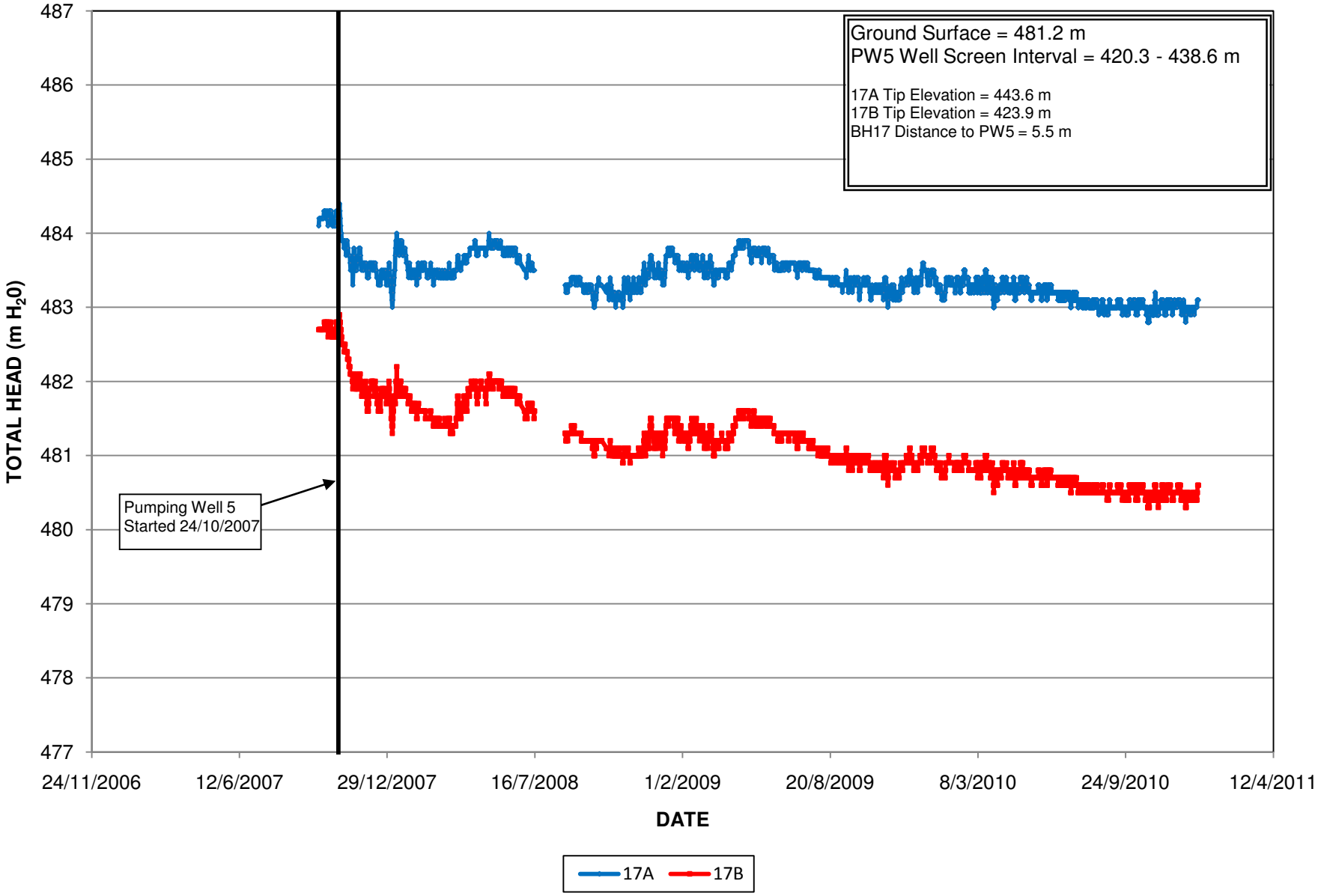
Groundwater Monitoring
TOTAL HEAD - VWP17 (near Pumping Well 5)



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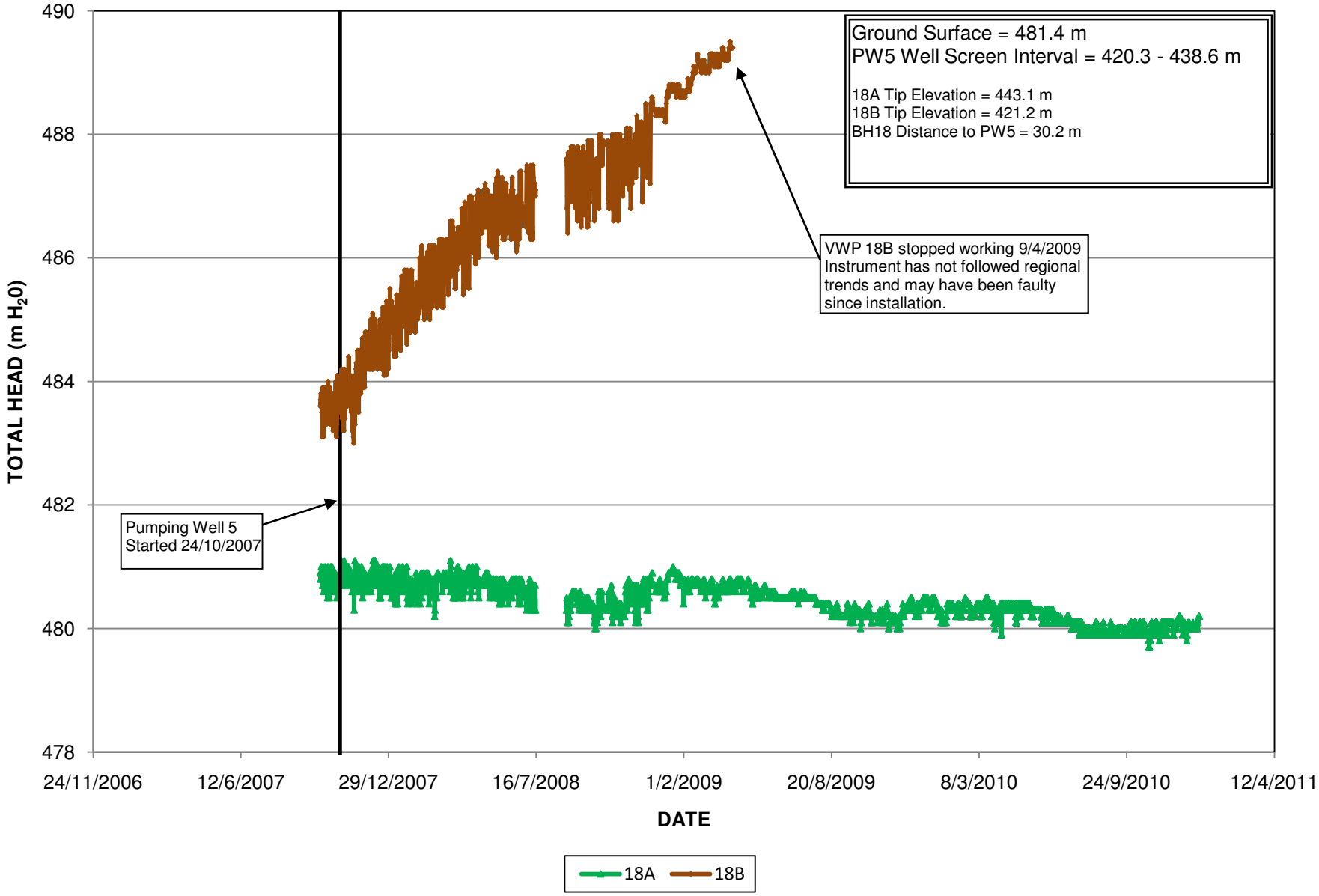
Groundwater Monitoring
TOTAL HEAD - VWP18 (near Pumping Well 5)



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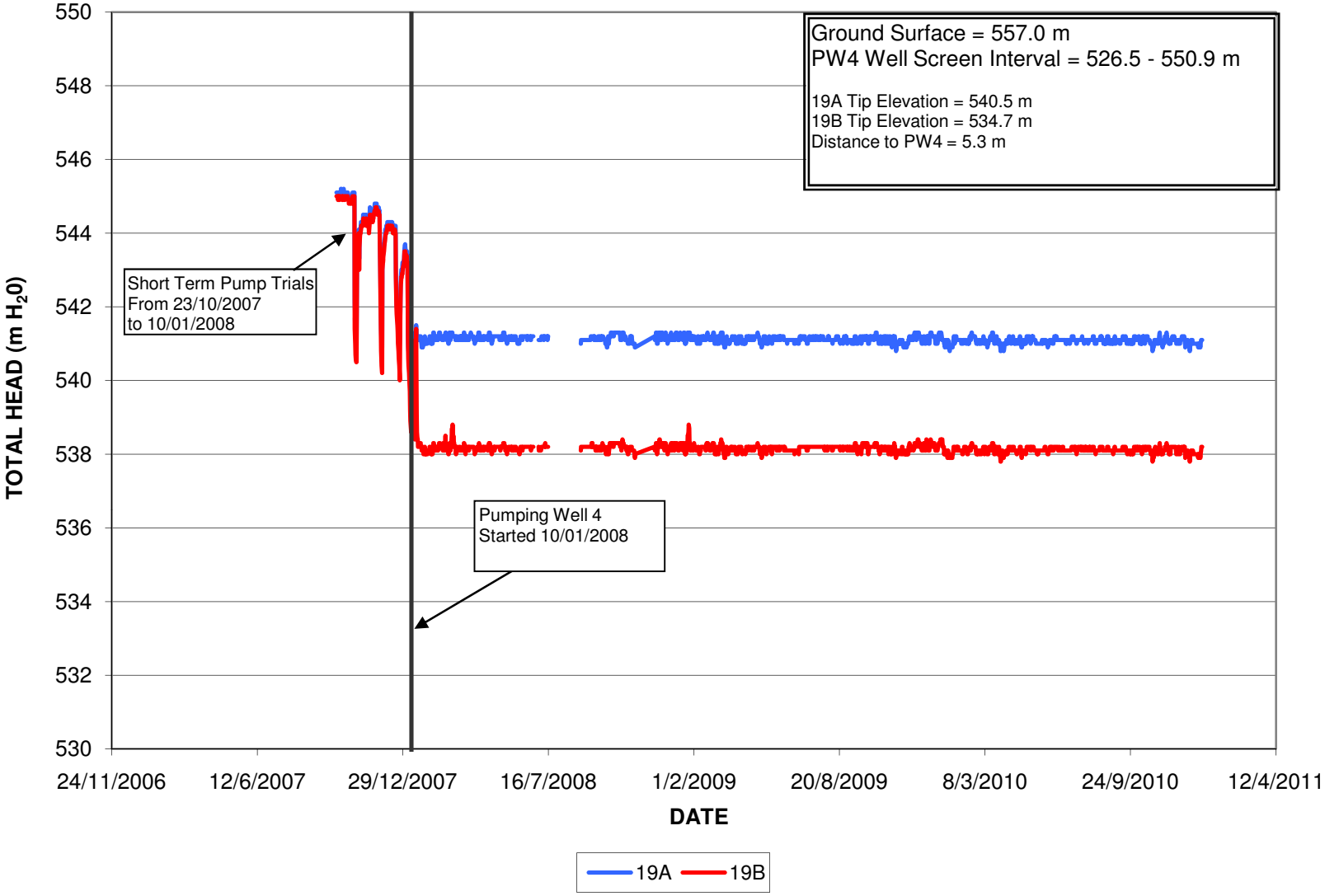
Groundwater Monitoring
TOTAL HEAD - VWP19 (near Pumping Well 4)



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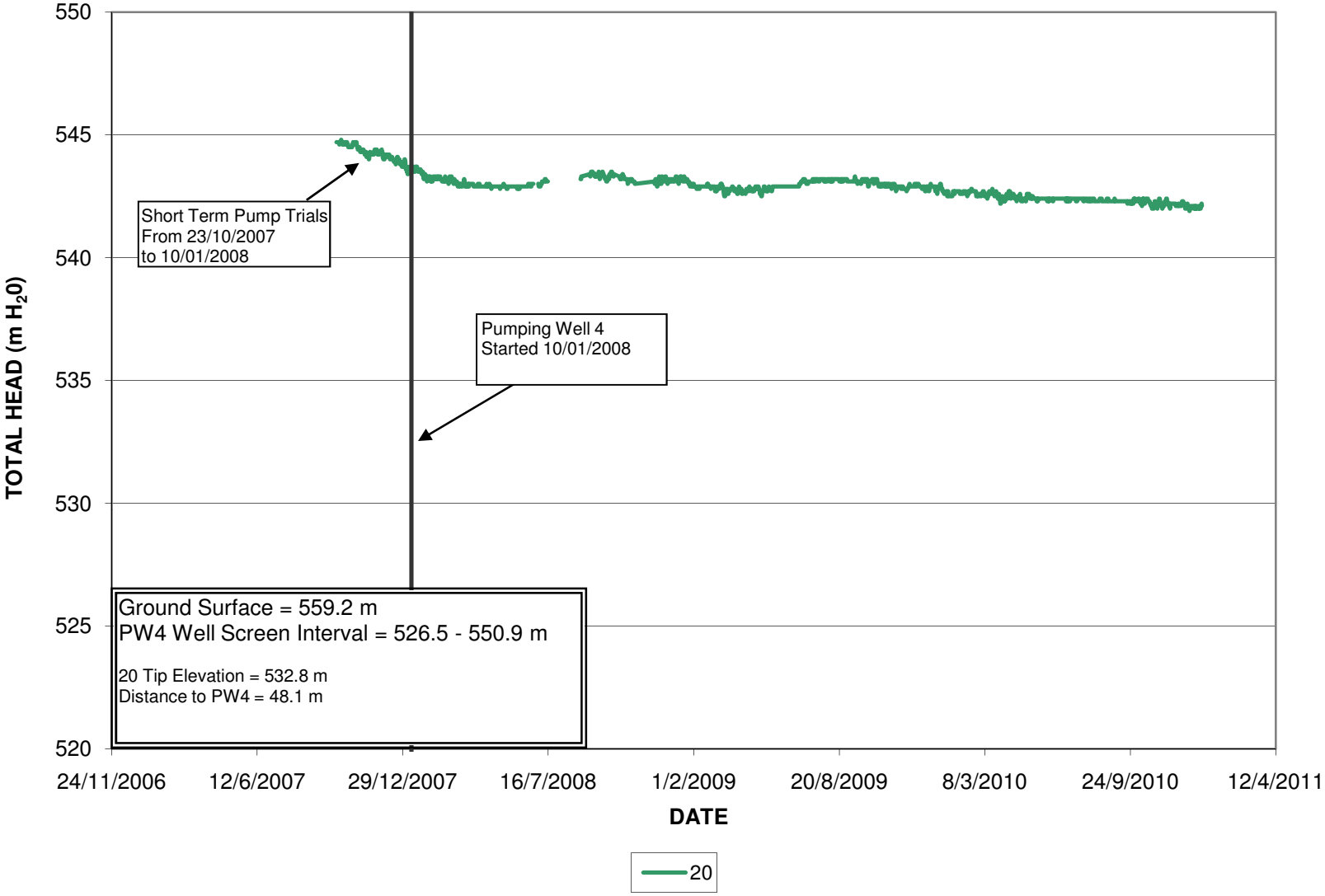
Groundwater Monitoring
TOTAL HEAD - VWP20 (near Pumping Well 4)



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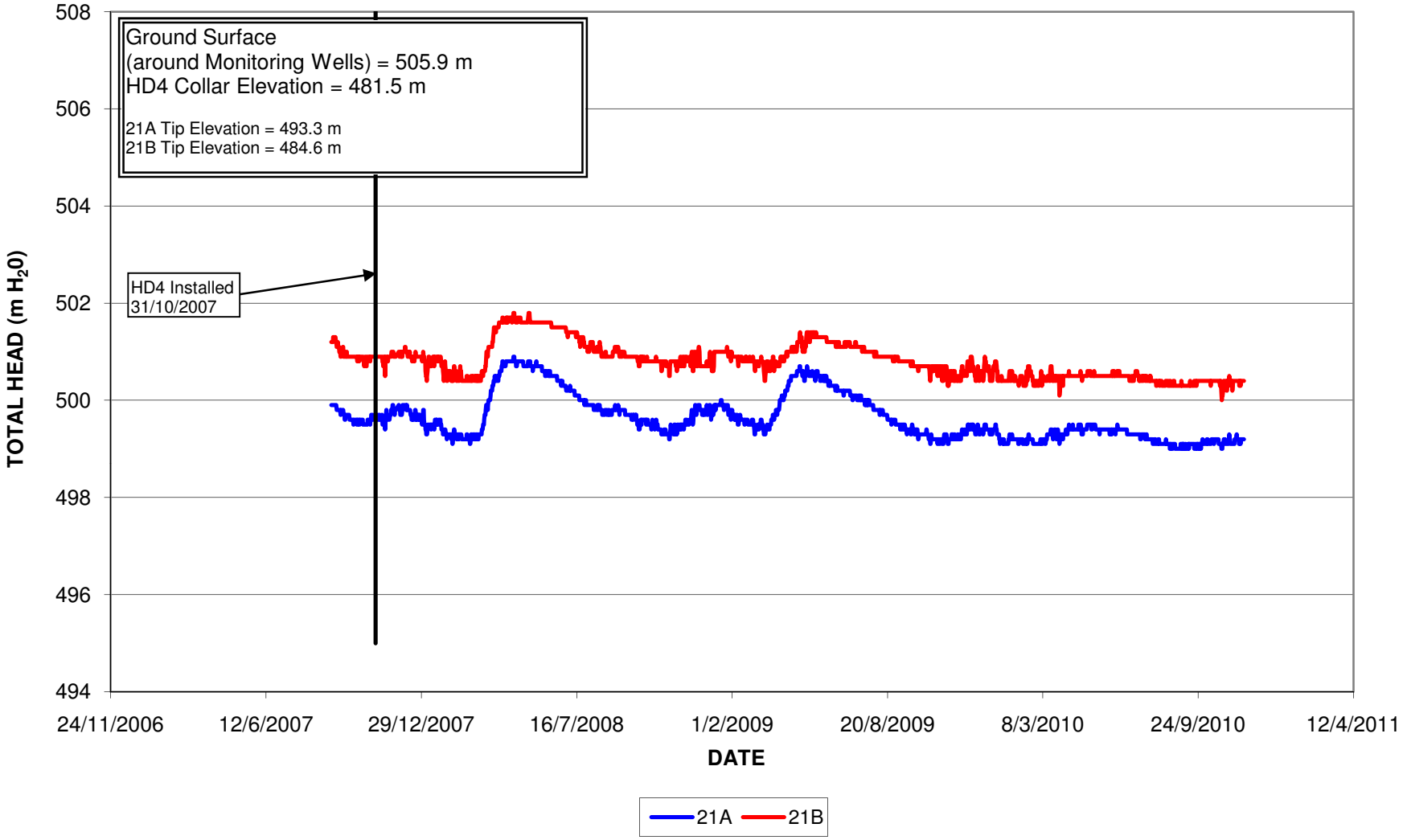
Groundwater Monitoring
TOTAL HEAD - VWP21 (near Horizontal Drain 4)



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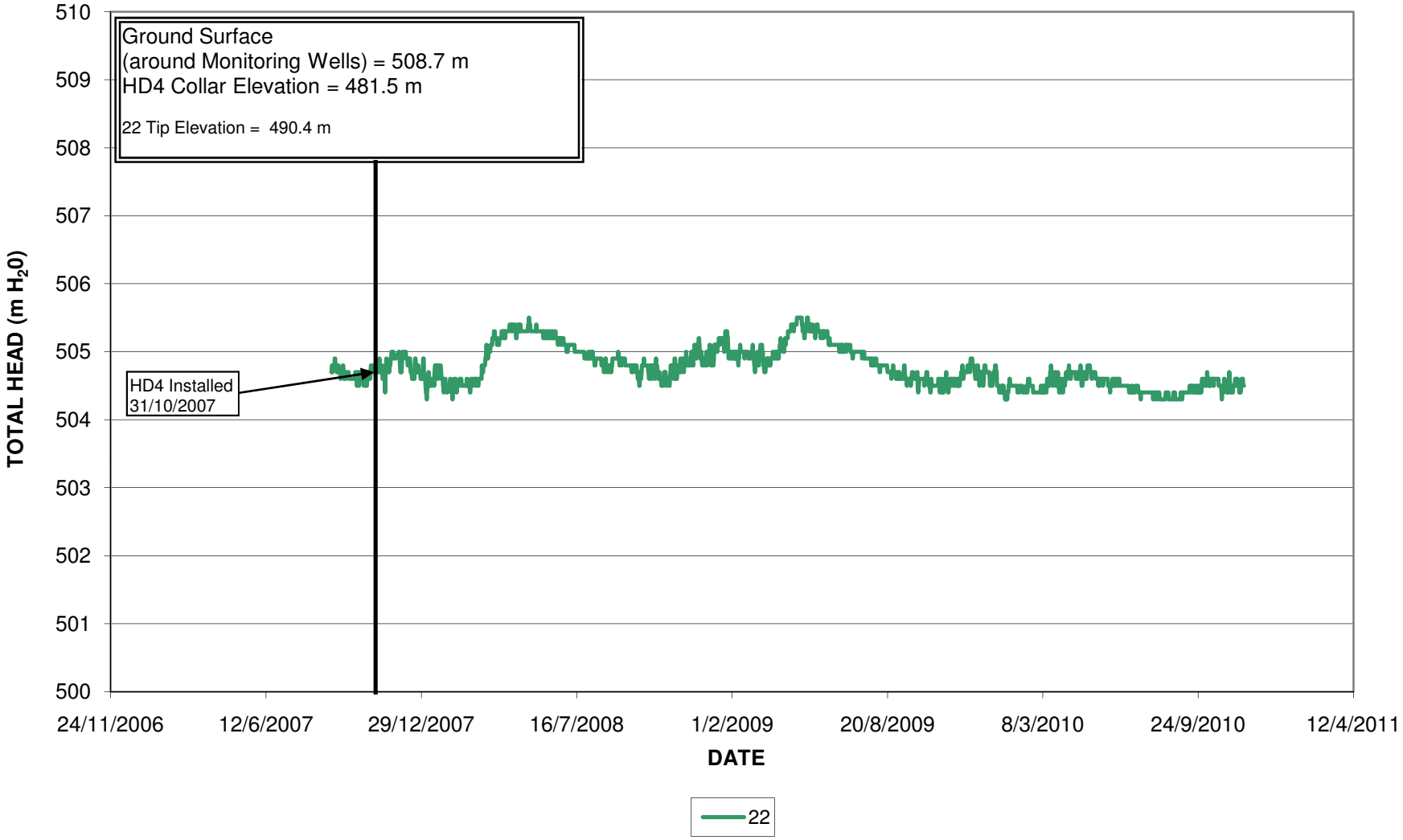
Groundwater Monitoring
TOTAL HEAD - VWP22 (near Horizontal Drain 4)



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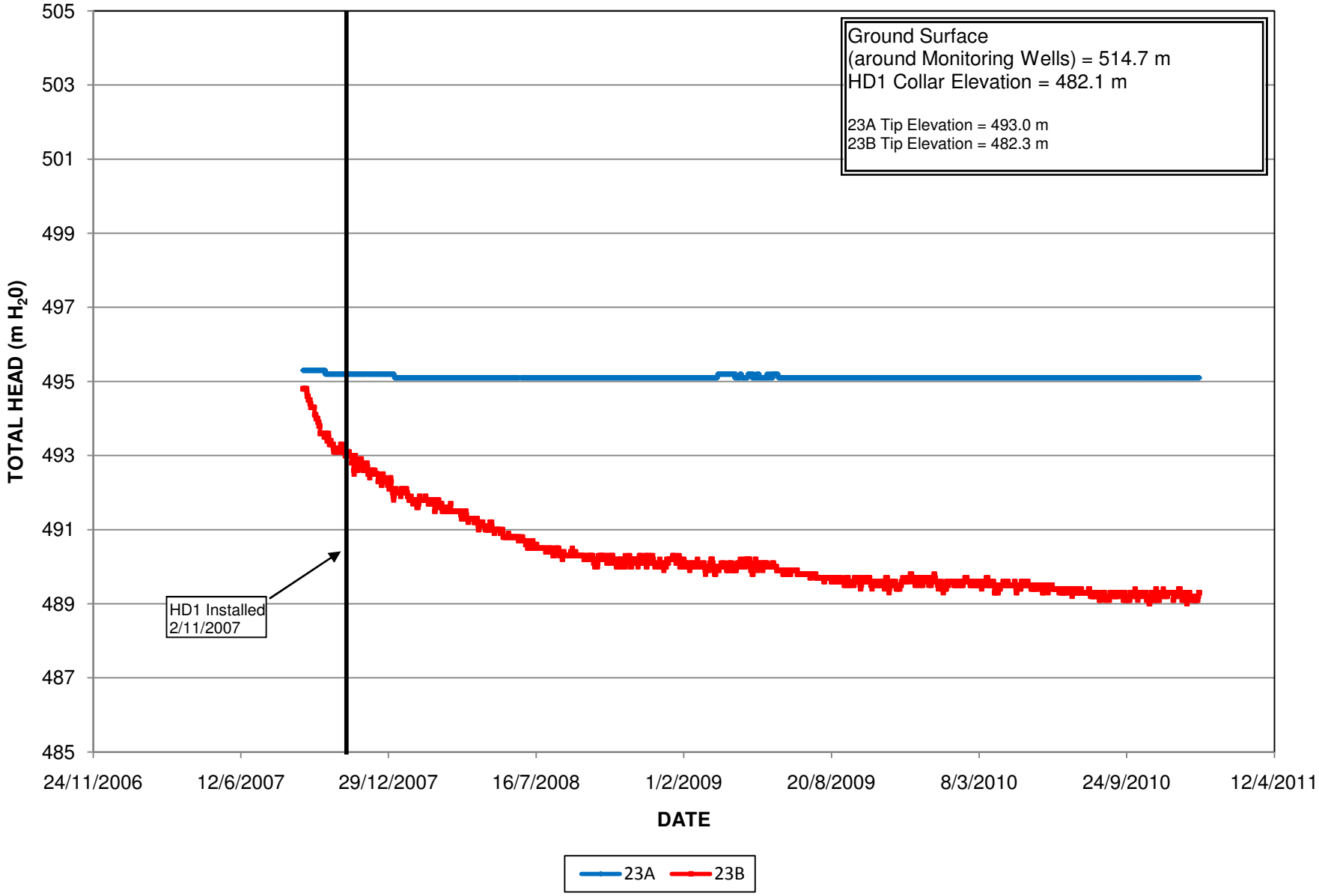
Groundwater Monitoring
TOTAL HEAD - VWP23 (near Horizontal Drain 1)



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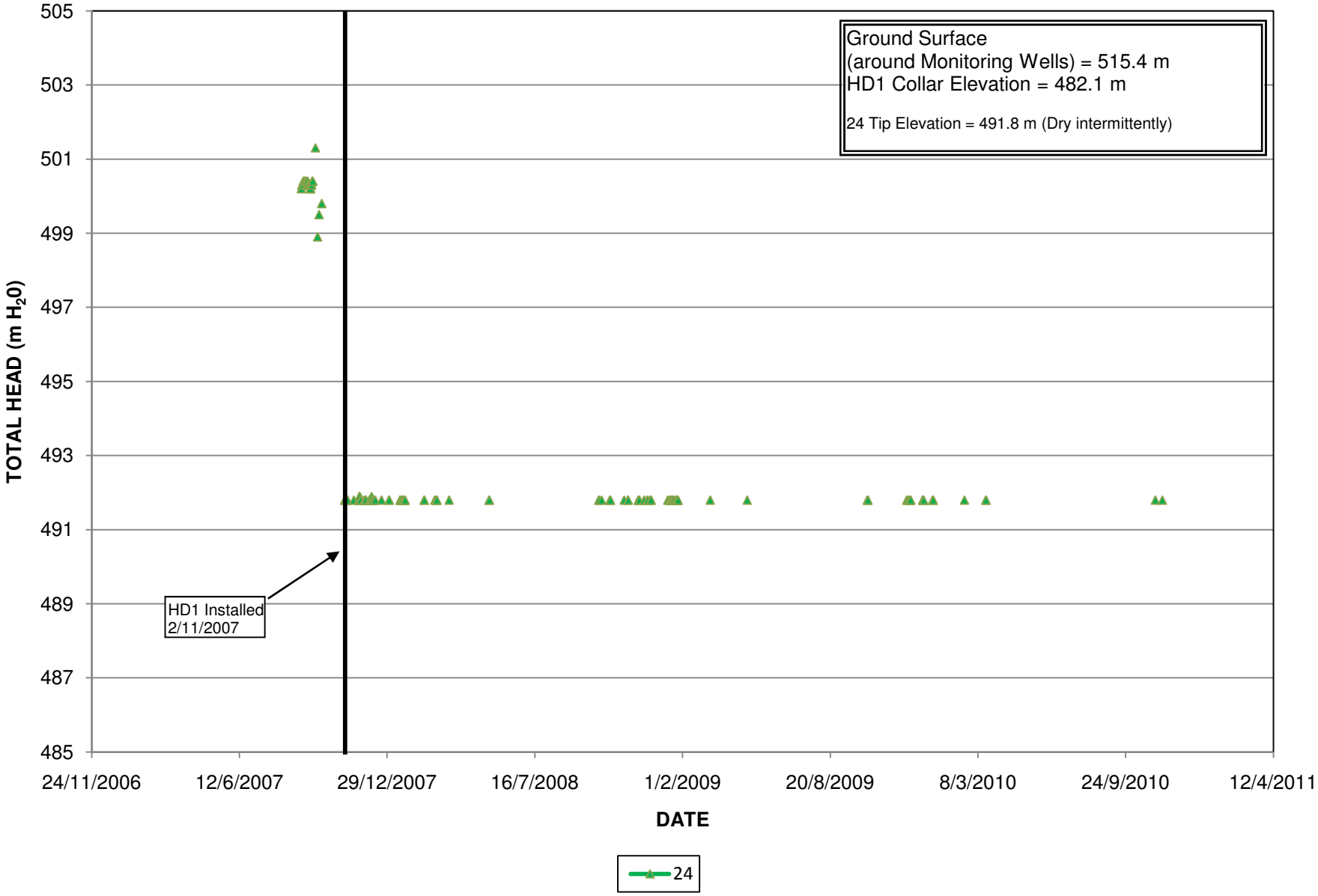
Groundwater Monitoring
TOTAL HEAD - VWP24 (near Horizontal Drain 1)



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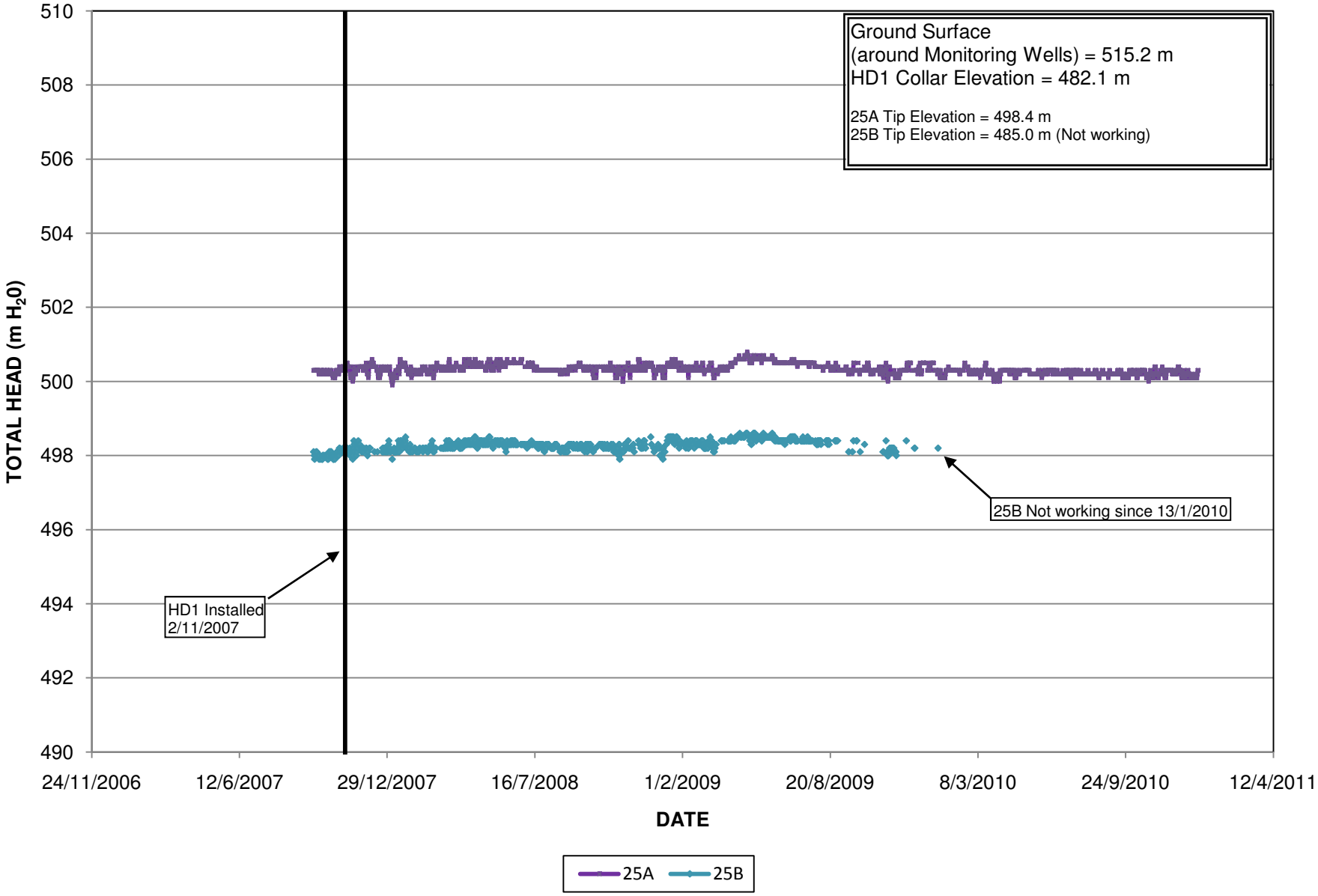
Groundwater Monitoring
TOTAL HEAD - VWP25 (near Horizontal Drain 1)



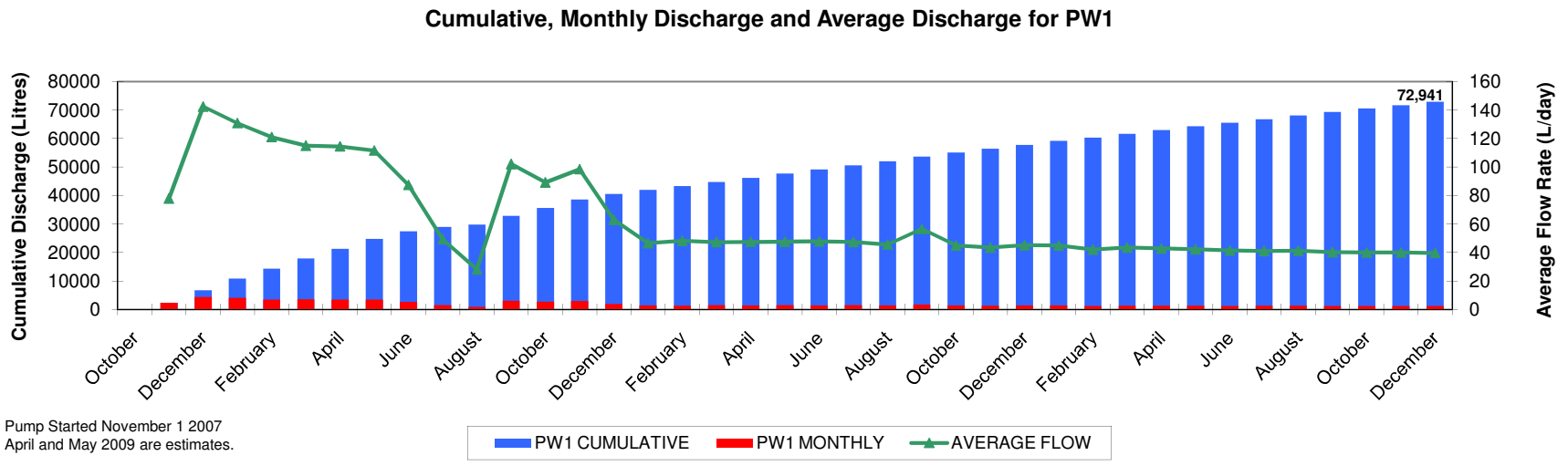
Appendix D

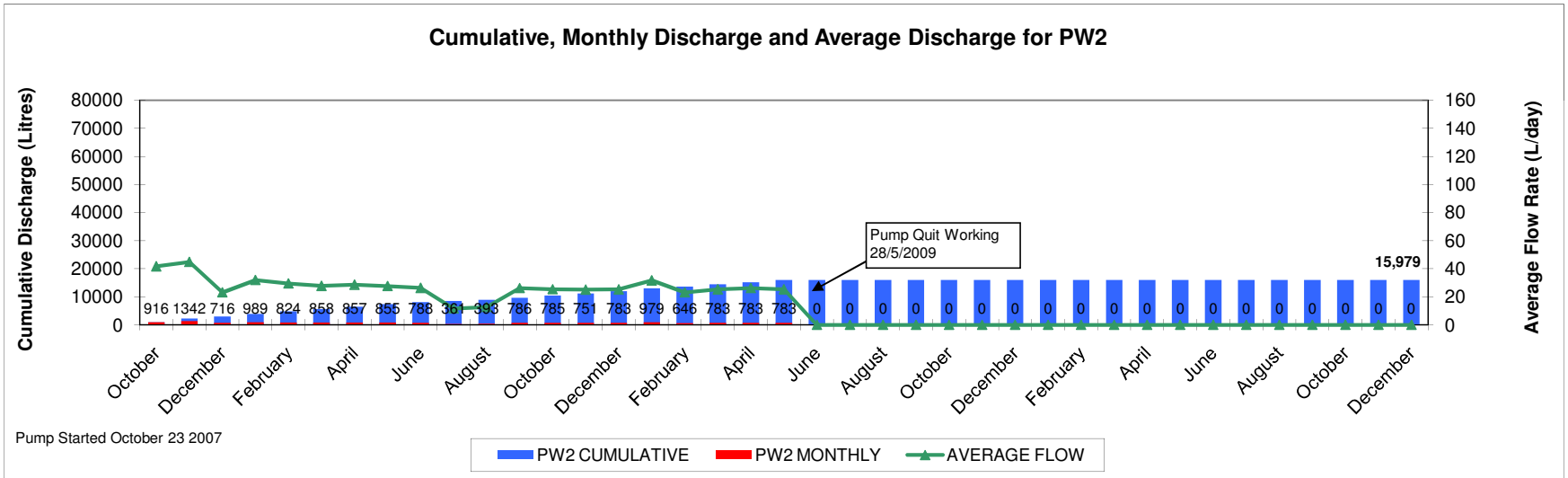
Pumping Wells - Summary Table and Production Charts

APPENDIX D - Pumping Well Status

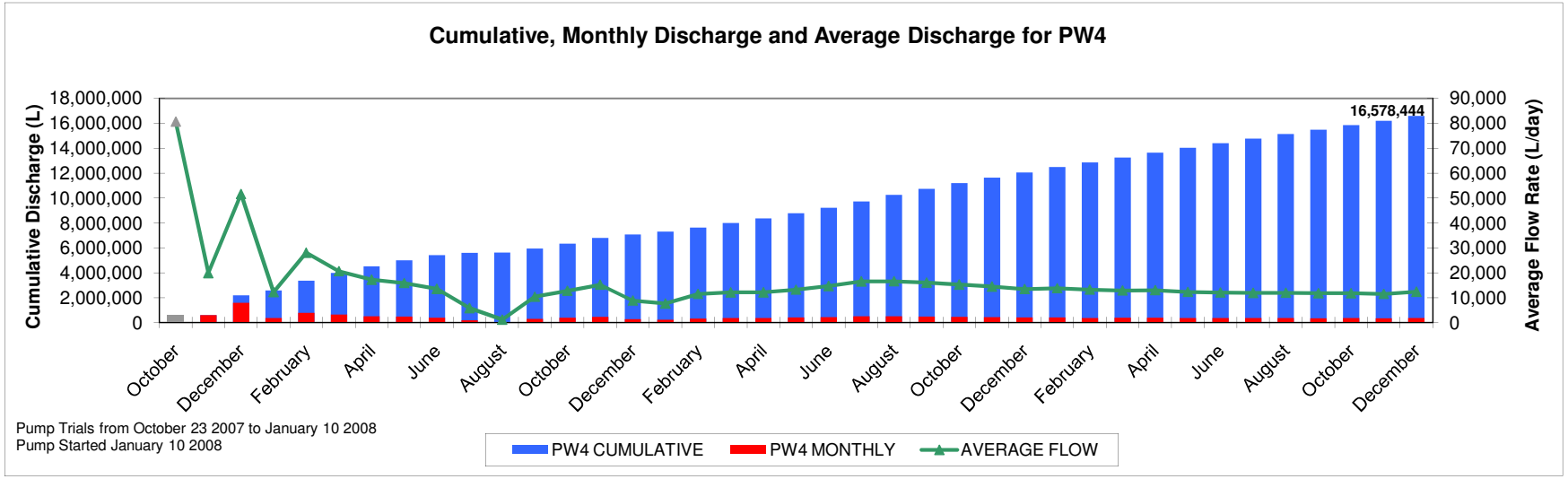
Well	Location	Installation Date	Depth (Screen)	Depth (Pump)	Depth (VW tip)	Monitoring Wells	Status
PW1	Flamingo St.	September 2003	29.9-47.5m	45.0m	44.3m	BH3bc, BH4ab	Active - water controls at 39.5m and 43.0m
PW2	Abbott Dr.	September 2003	30.0-55.0m	43.0m	42.4m	BH3	Inactive - pump not working
PW4	Panagrot Ave. (east end)	June 2007	6.1-30.5m	29.0m	28.3m	BH12, BH19, BH20	Active - pump controlled by ammeter
PW5	Adam St.	June 2007	42.7-61.0m	58.5m	57.9m	BH17, BH18	Active - water controls at 55.3m and 57.4m

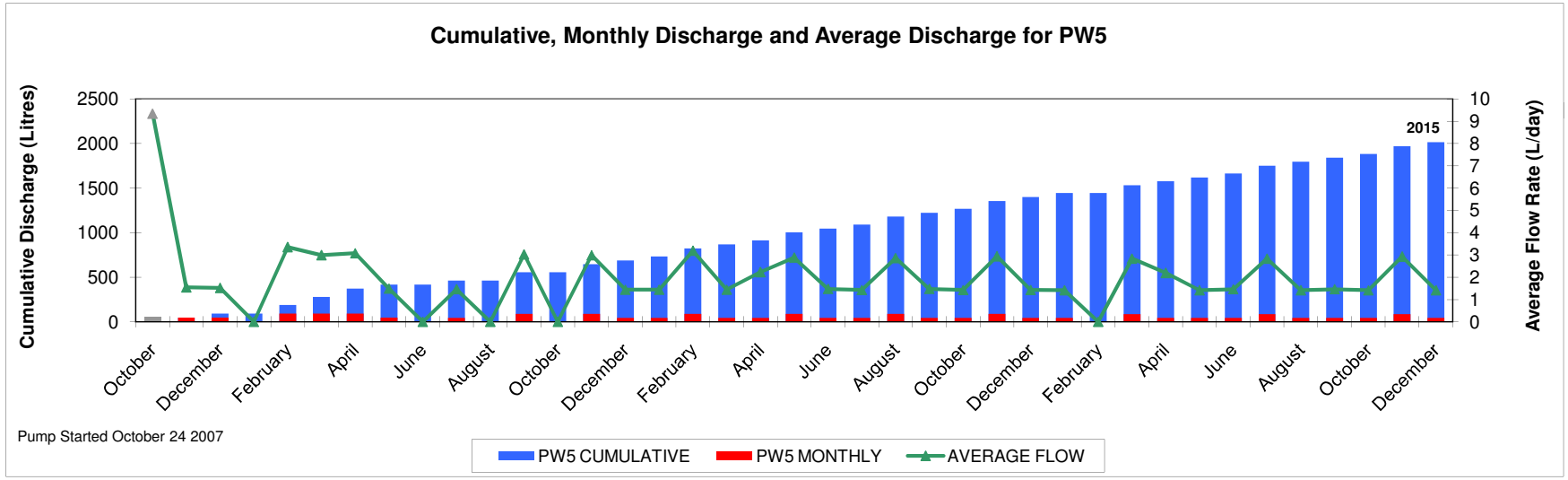
Pumping Well Flow vs. Time





Pumping Well Flow vs. Time





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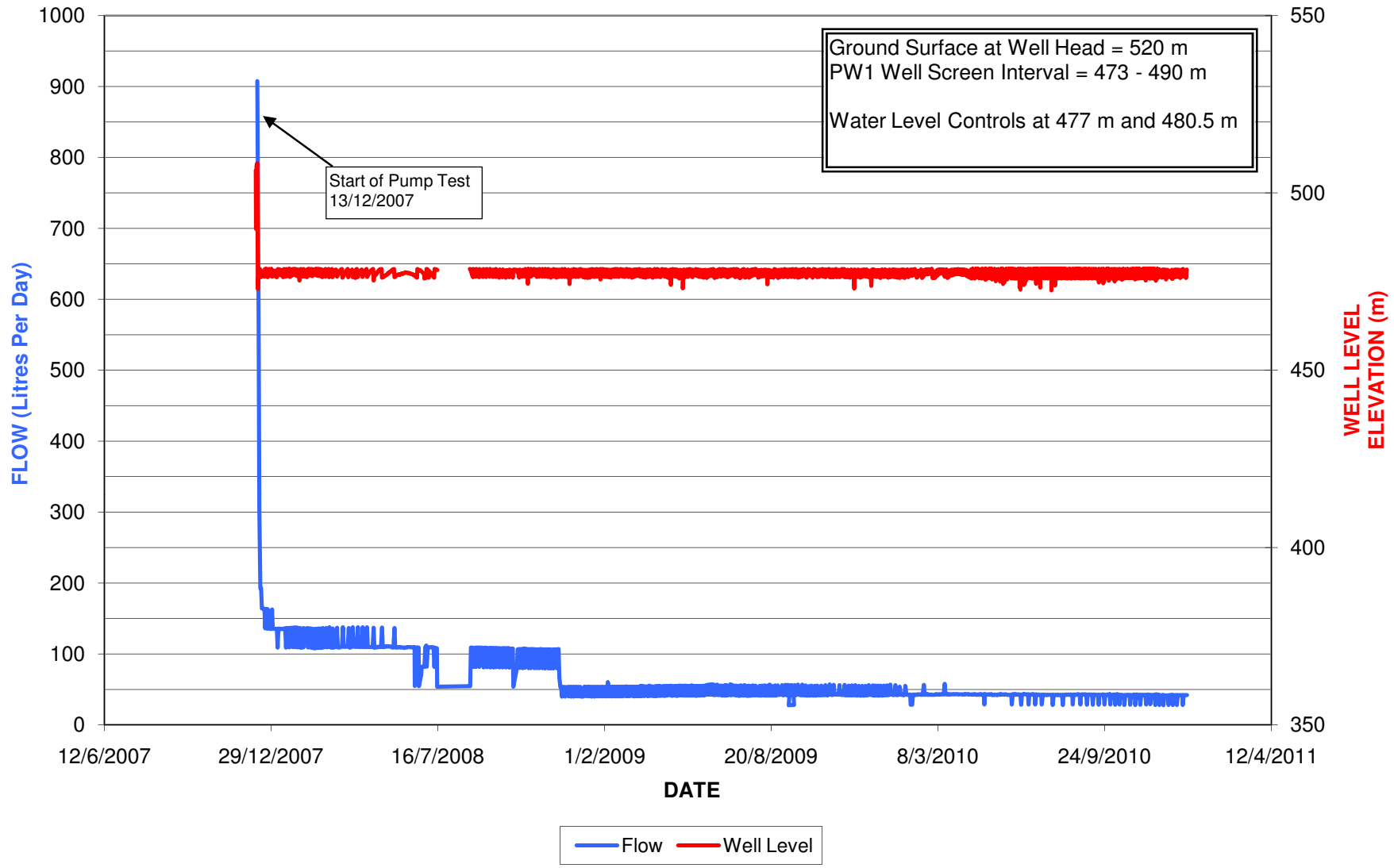
Test Well Monitoring
PW1 - TOTAL DAILY FLOW AND WELL LEVEL



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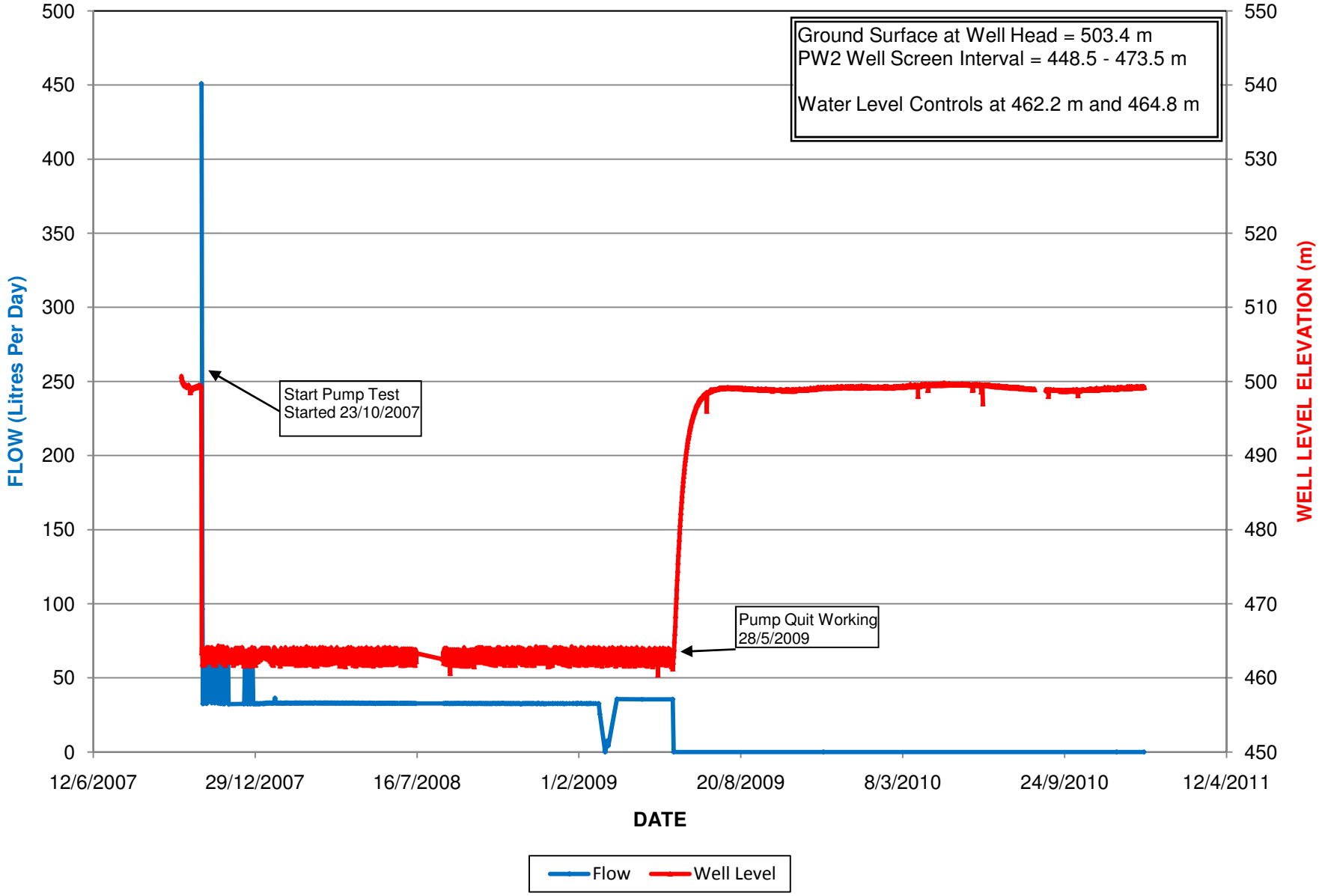
Test Well Monitoring
PW2 - TOTAL DAILY FLOW AND WELL LEVEL



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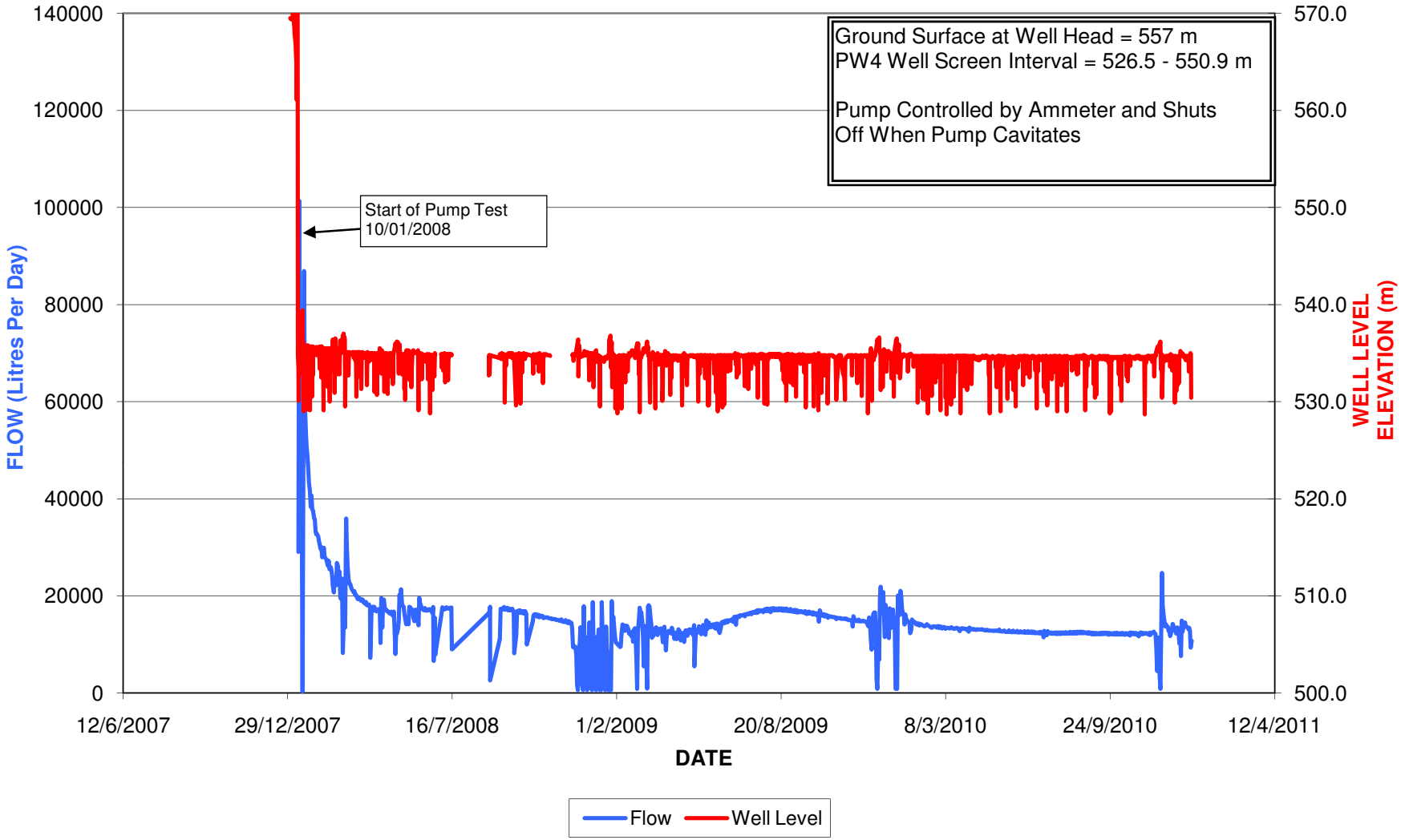
Test Well Monitoring
PW4 - TOTAL DAILY FLOW AND WELL LEVEL



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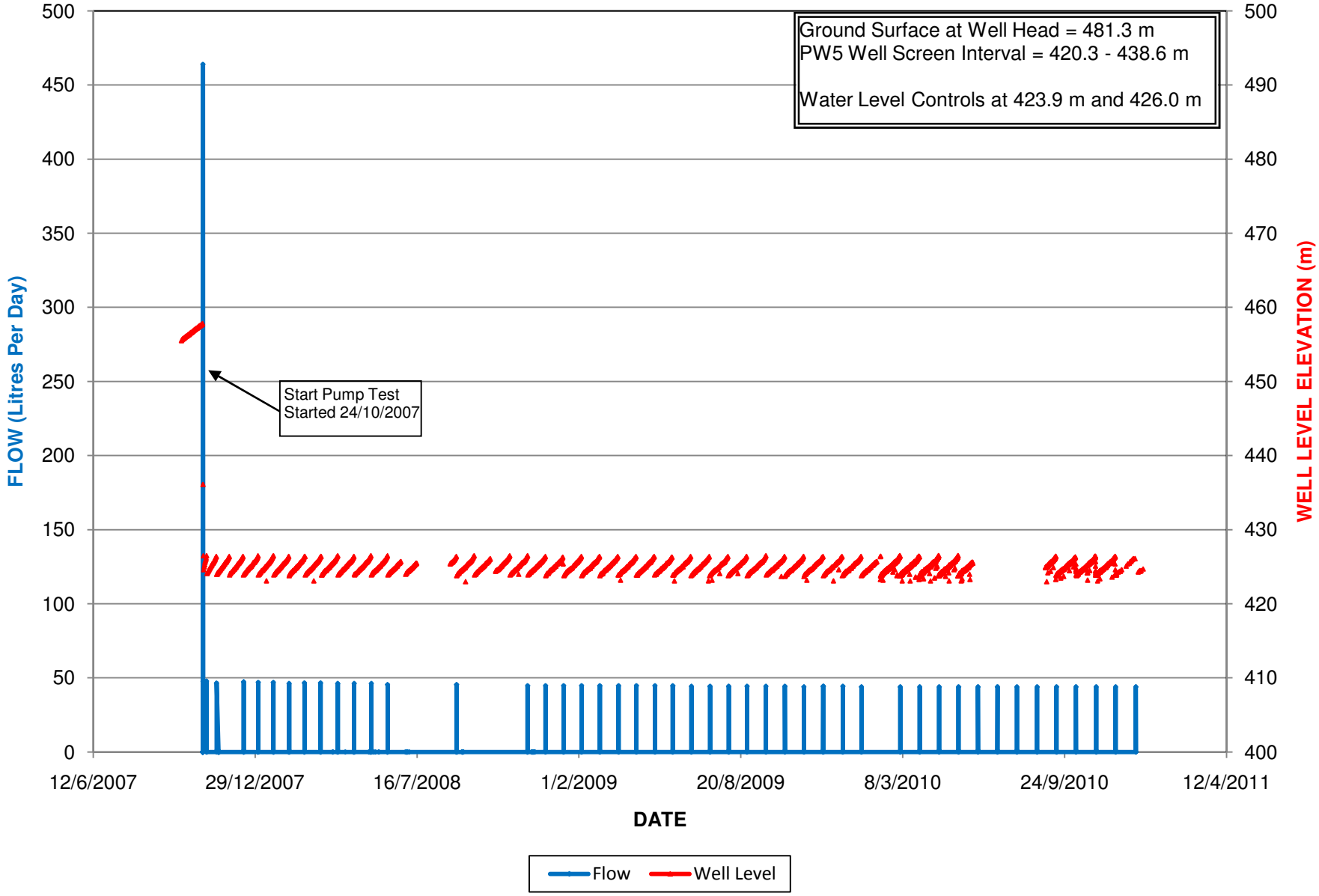
Test Well Monitoring
PW5 - TOTAL DAILY FLOW AND WELL LEVEL



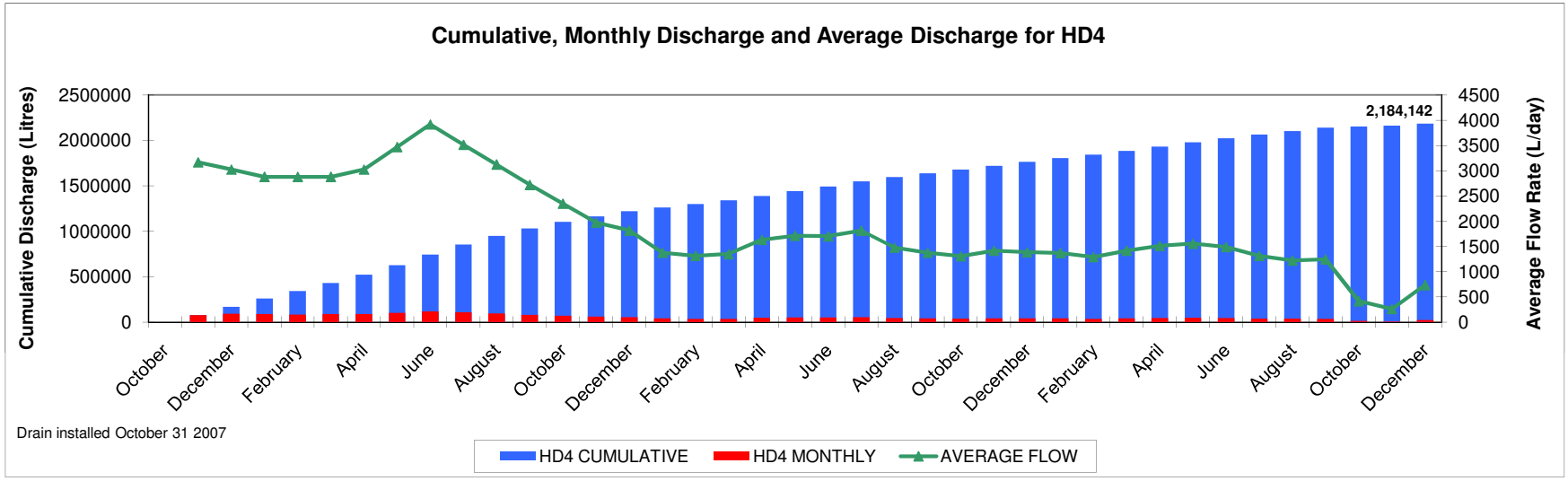
Appendix E

Horizontal Drains - Summary Table and Production Chart

APPENDIX E - Horizontal Drain Status

HD	Location	Installation Date	Length (total/slotted)	Azimuth	Inclination	Monitoring Wells	Status
HD1a	Lewis Dr. (at Sikh Temple)	November 2007	64.0m/57.9m	271	+2°	BH23, BH24, BH25	Active - dry
HD1b	Lewis Dr. (at Sikh Temple)	November 2007	48.8m/42.7m	241	+1°	BH23, BH24, BH26	Active - dry
HD4a	Adam St.	October 2007	135.6m/129.5m	271	+2°	BH21, BH22	Active
HD4b	Adam St.	November 2007	45.7m/39.6m	271	-2°	BH21, BH22	Active

Horizontal Drain Flow vs. Time



Appendix F

Historical Precipitation Data Charts for the Quesnel Area
Figures F1 to F4

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Figure F1 - Total Monthly Precipitation
(Environment Canada-Quesnel AWOS Station)

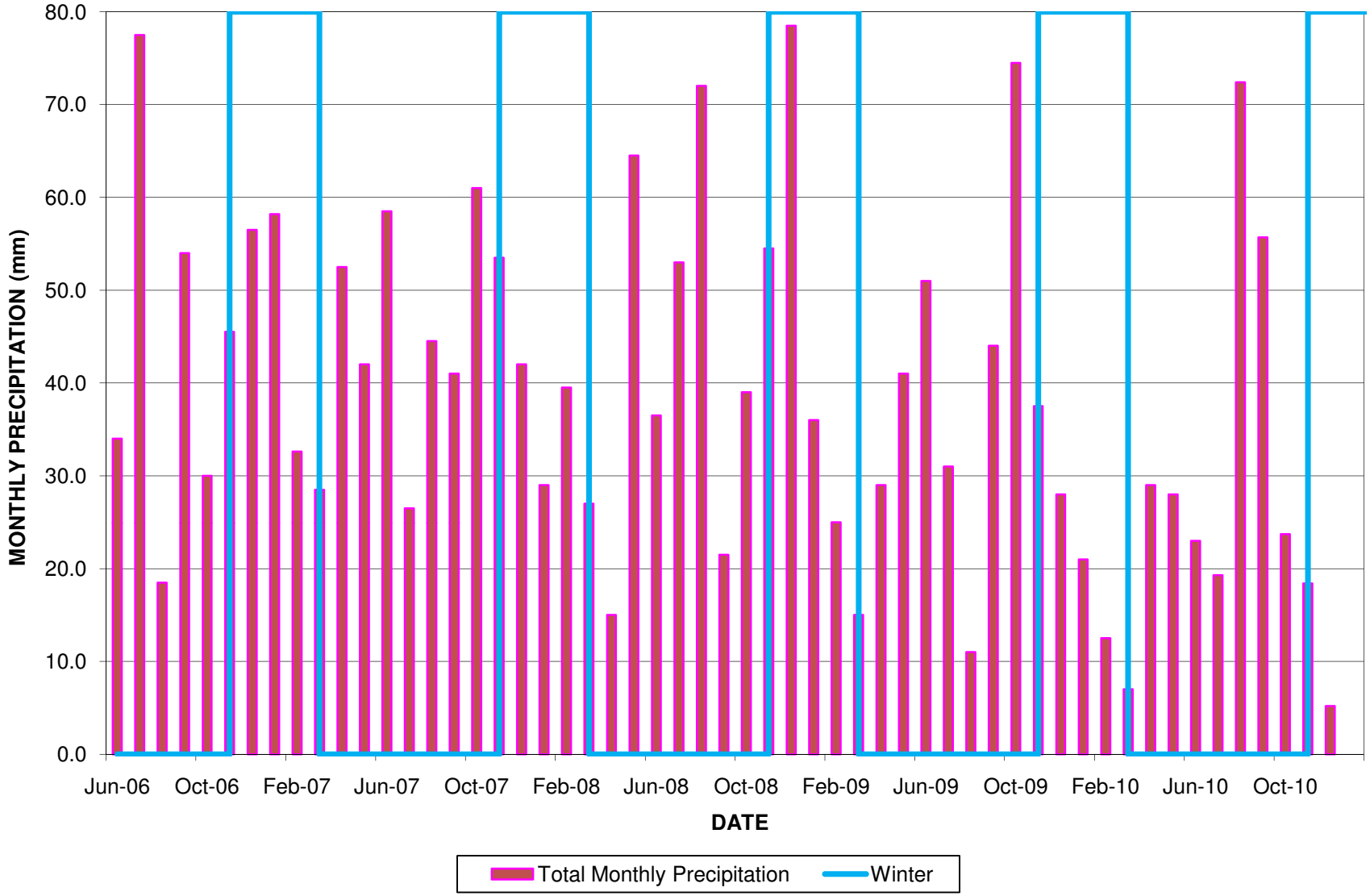

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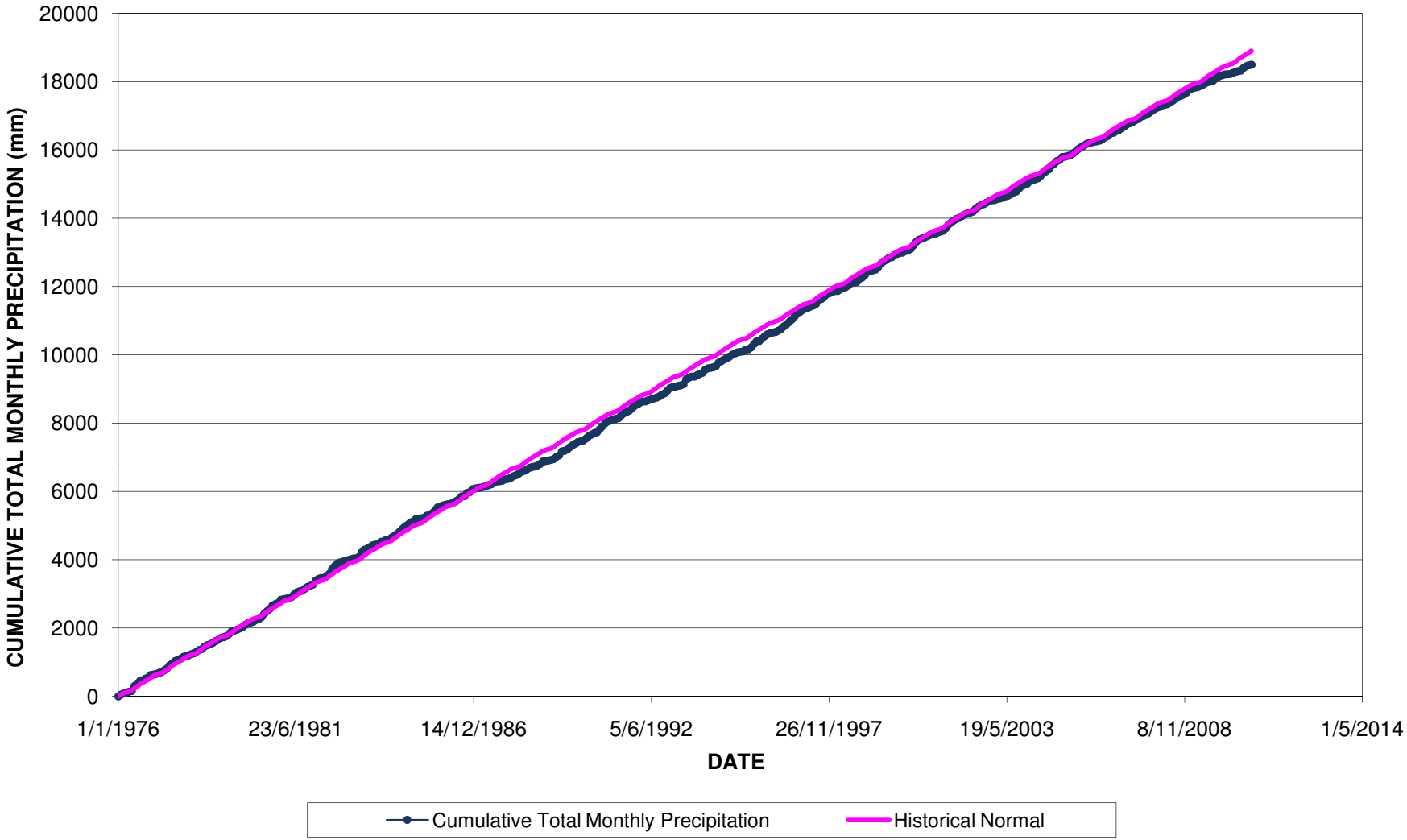
Figure F2 - Cumulative Total Monthly Precipitation (Environment Canada-Quesnel AWOS Station)



West Quesnel Land Stability Program

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Figure F3 - Total Monthly Precipitation - 1976 to 2010
(Environment Canada - Quesnel AWOS)

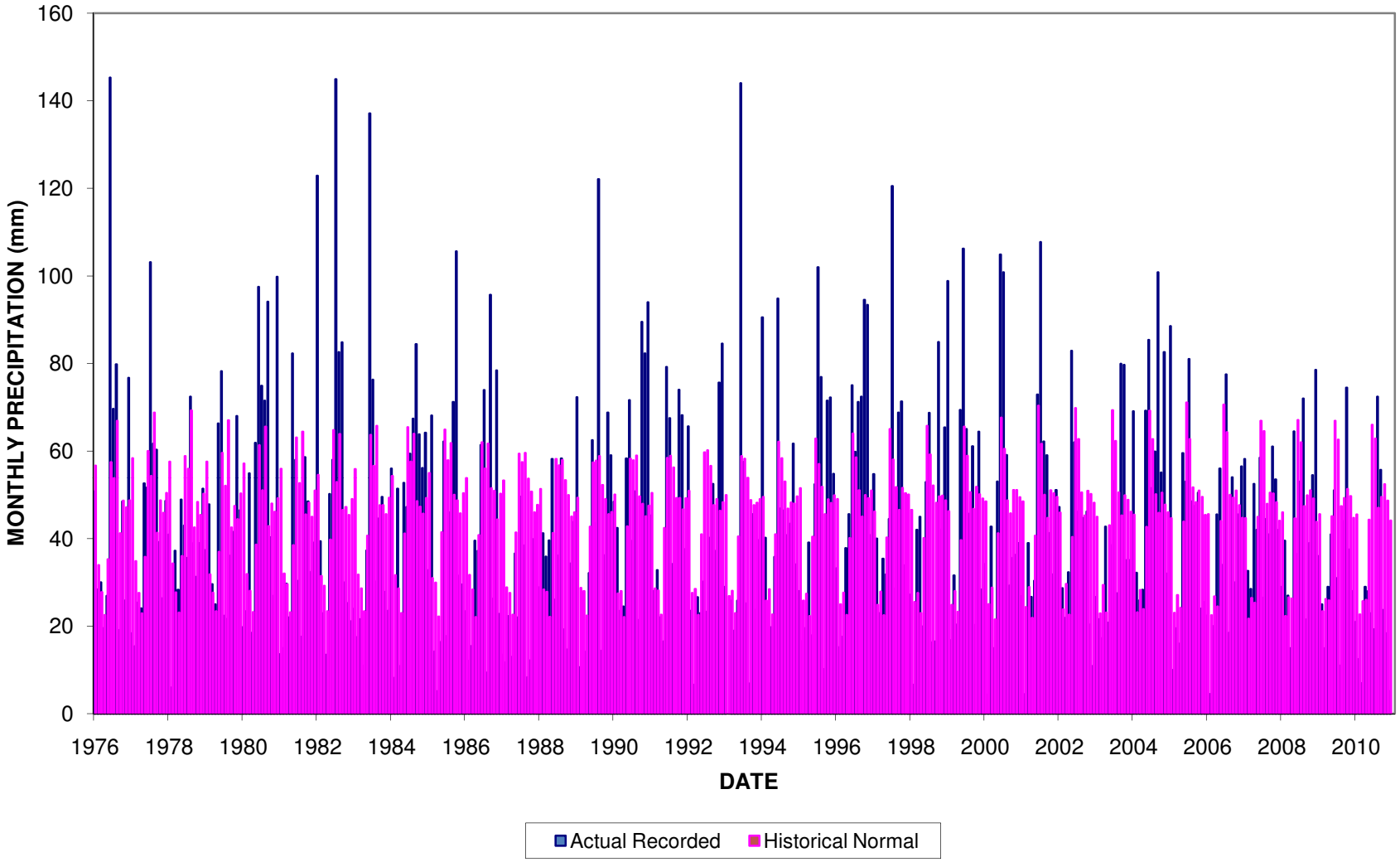

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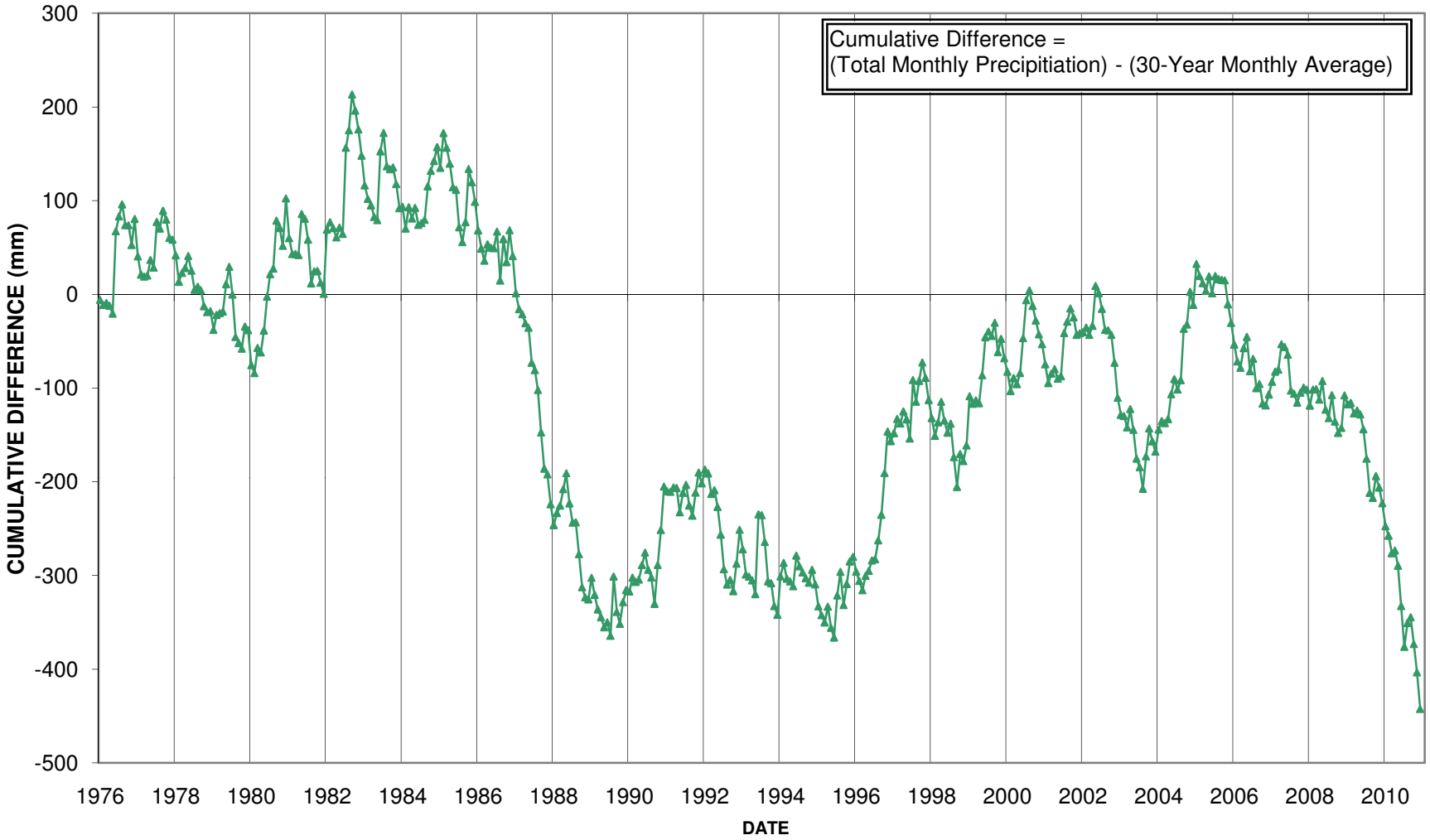
Figure F4 - Total Monthly Precipitation - Cumulative Difference - 1976 to 2010
(Environment Canada - Quesnel AWOS)



Appendix G

Data Comparison Charts
Figures G1 to G8

Figure G1 - Total Monthly Precipitation (Quesnel AWOS) vs. Groundwater Elevation

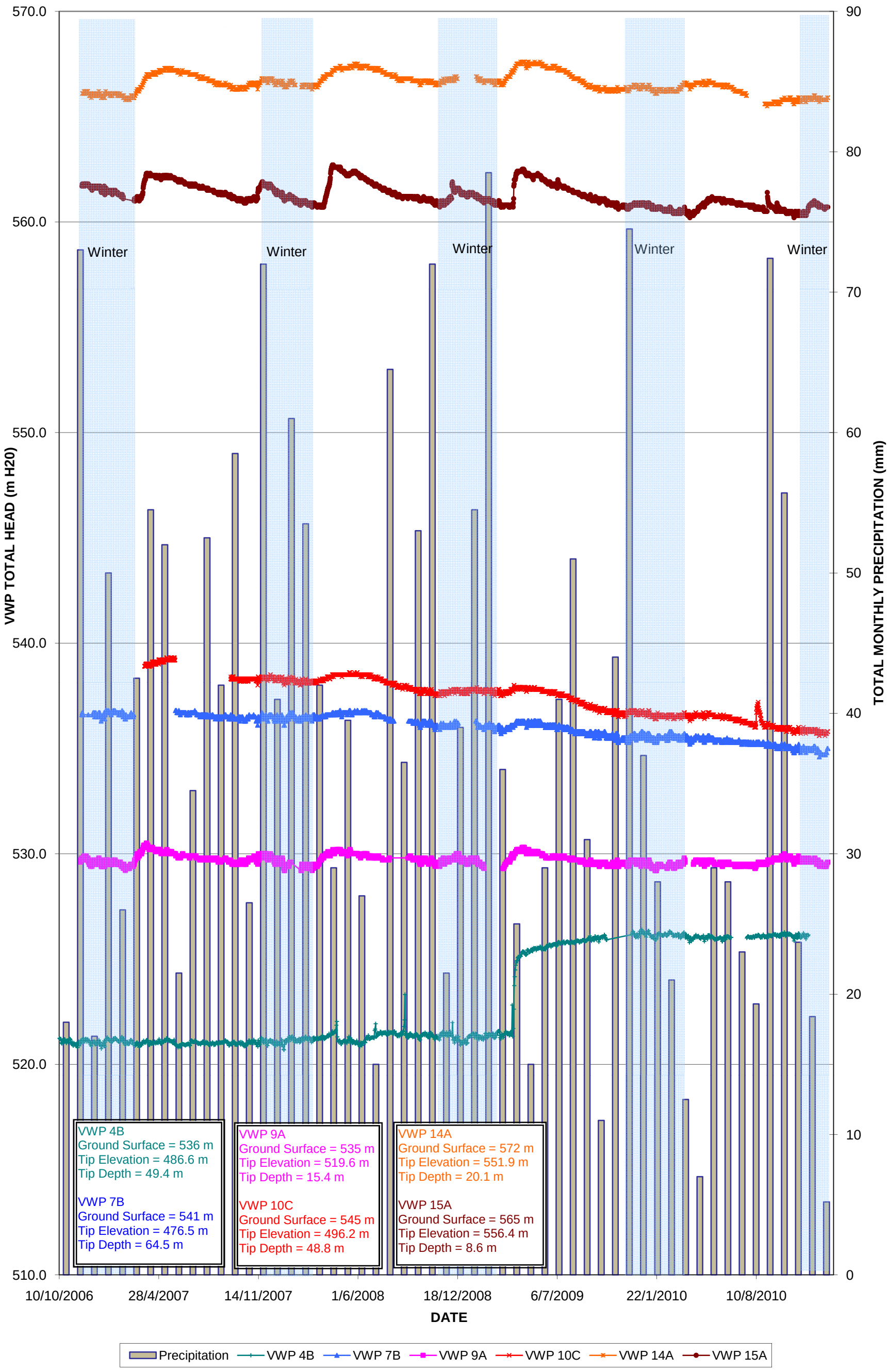


Figure G2 - Cumulative Total Daily Precipitation (Quesnel AWOS) vs. Groundwater Elevation

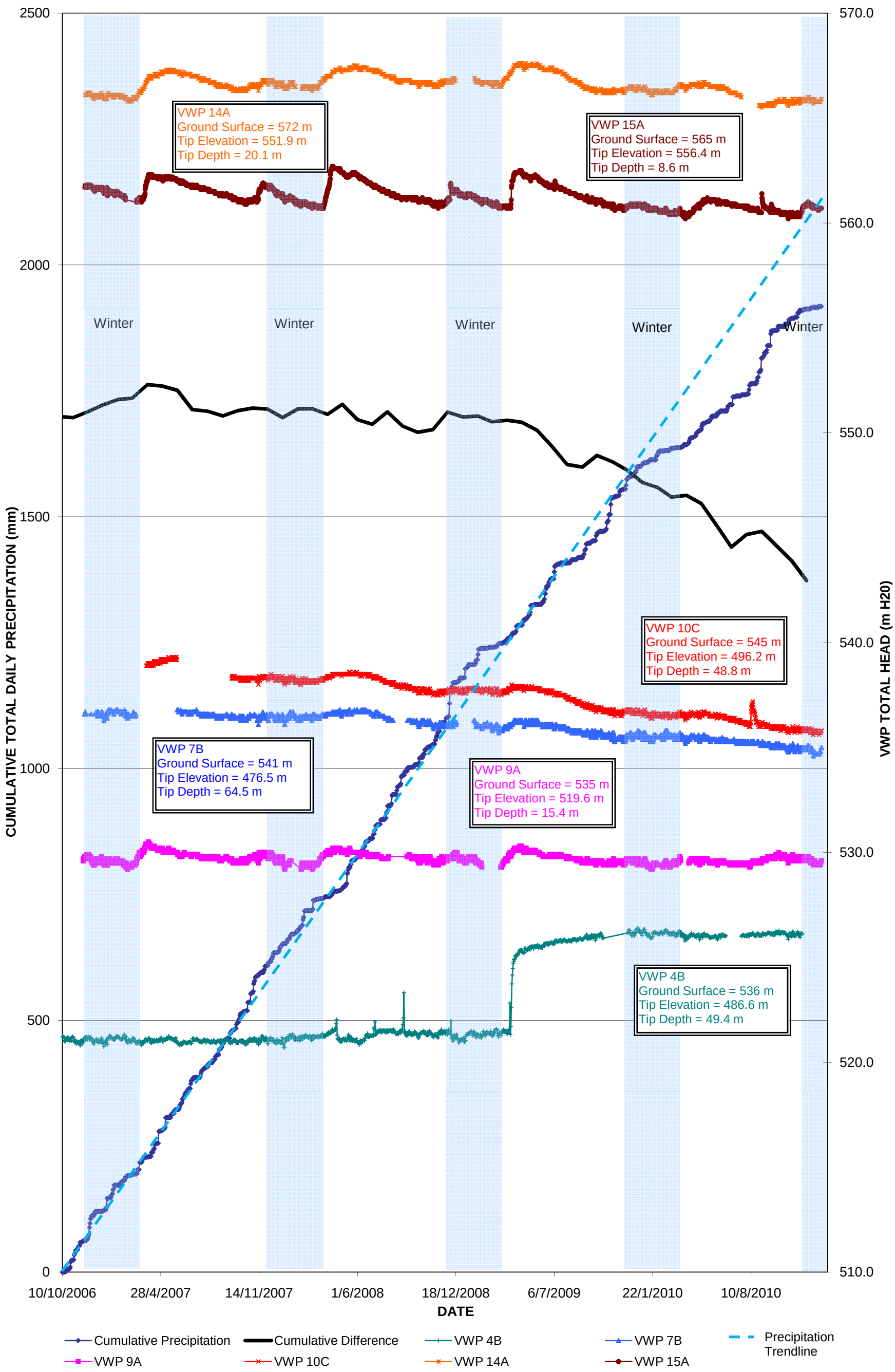


Figure G3 - Incremental Ground Movement Rate vs. Total Monthly Precipitation (Quesnel AWOS)

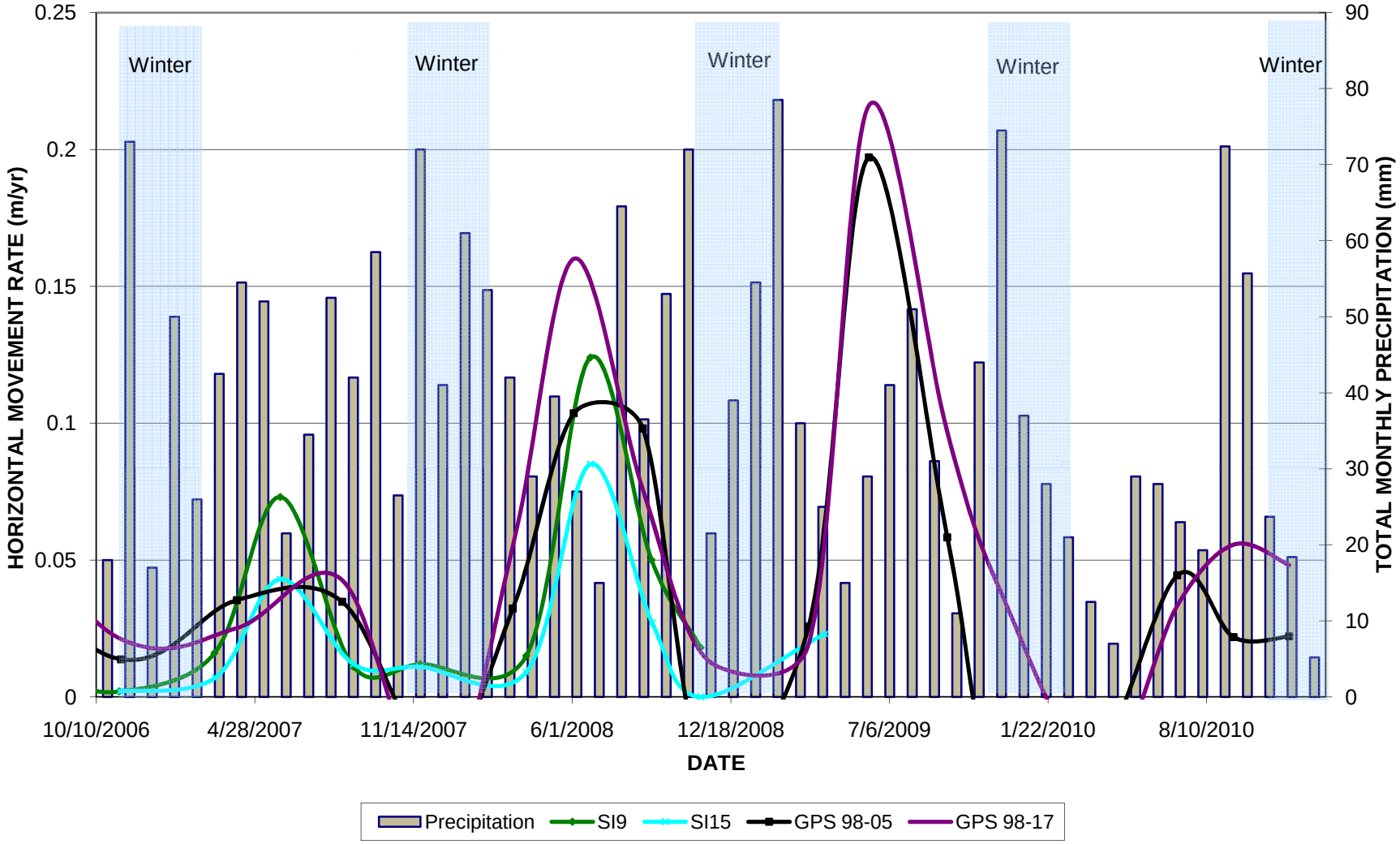


Figure G4 - Incremental Ground Movement Rate vs. Total Seasonal Precipitation (Quesnel AWOS)

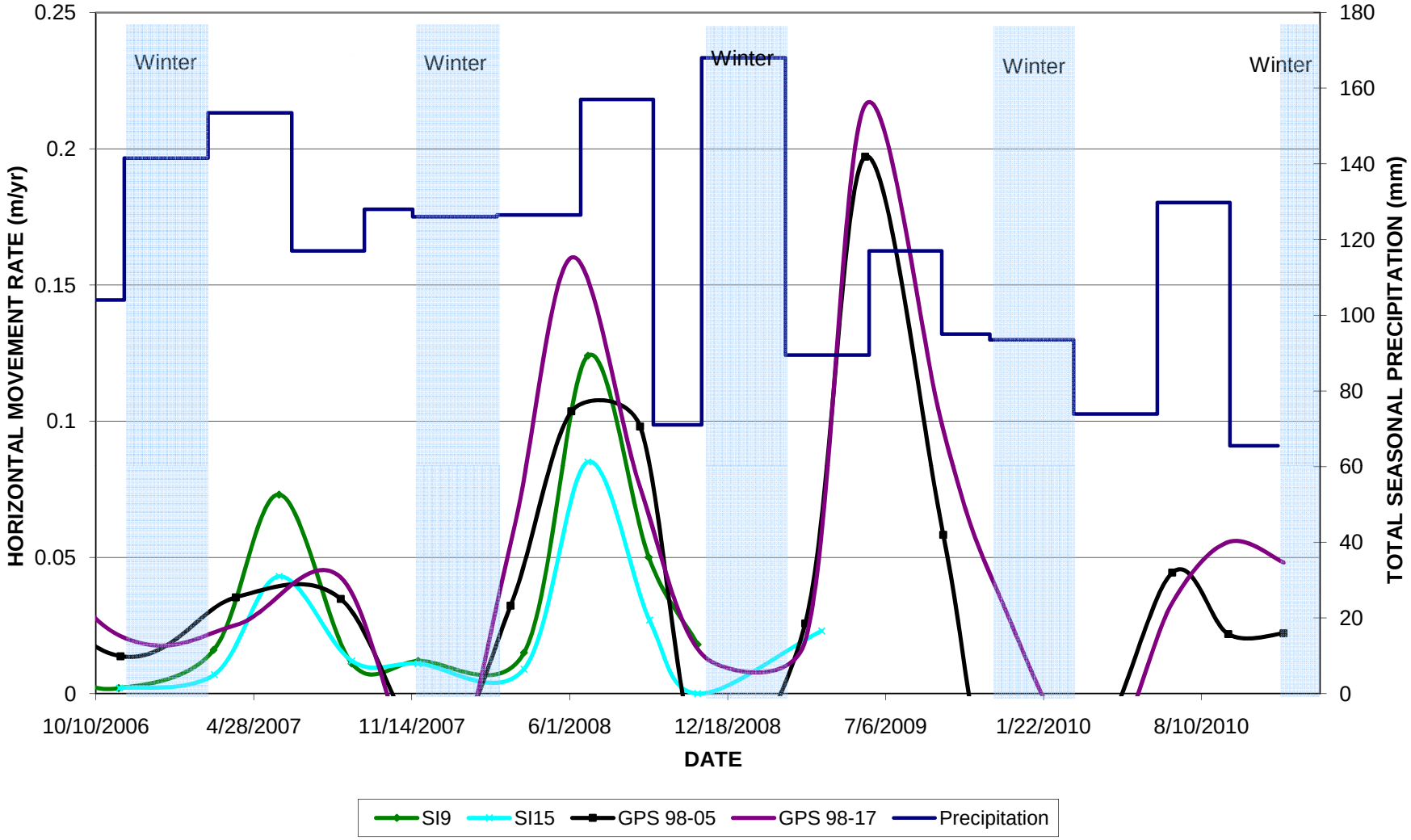


Figure G5 - Cumulative Ground Movement vs. Total Monthly Precipitation (Quesnel AWOS)

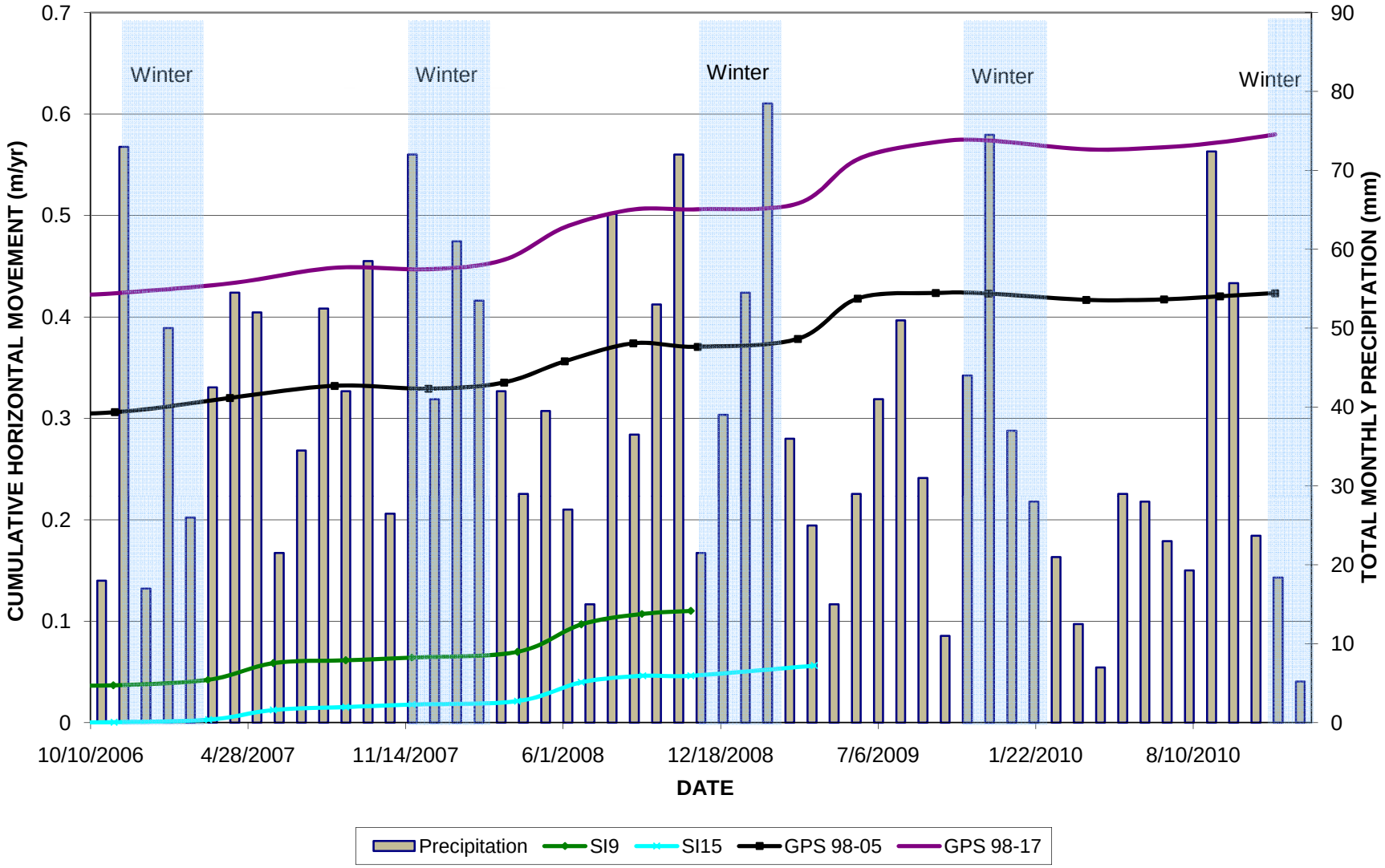


Figure G6 - Incremental Ground Movement Rate vs.
Cumulative Difference - Total Monthly Precipitation (Quesnel AWOS)

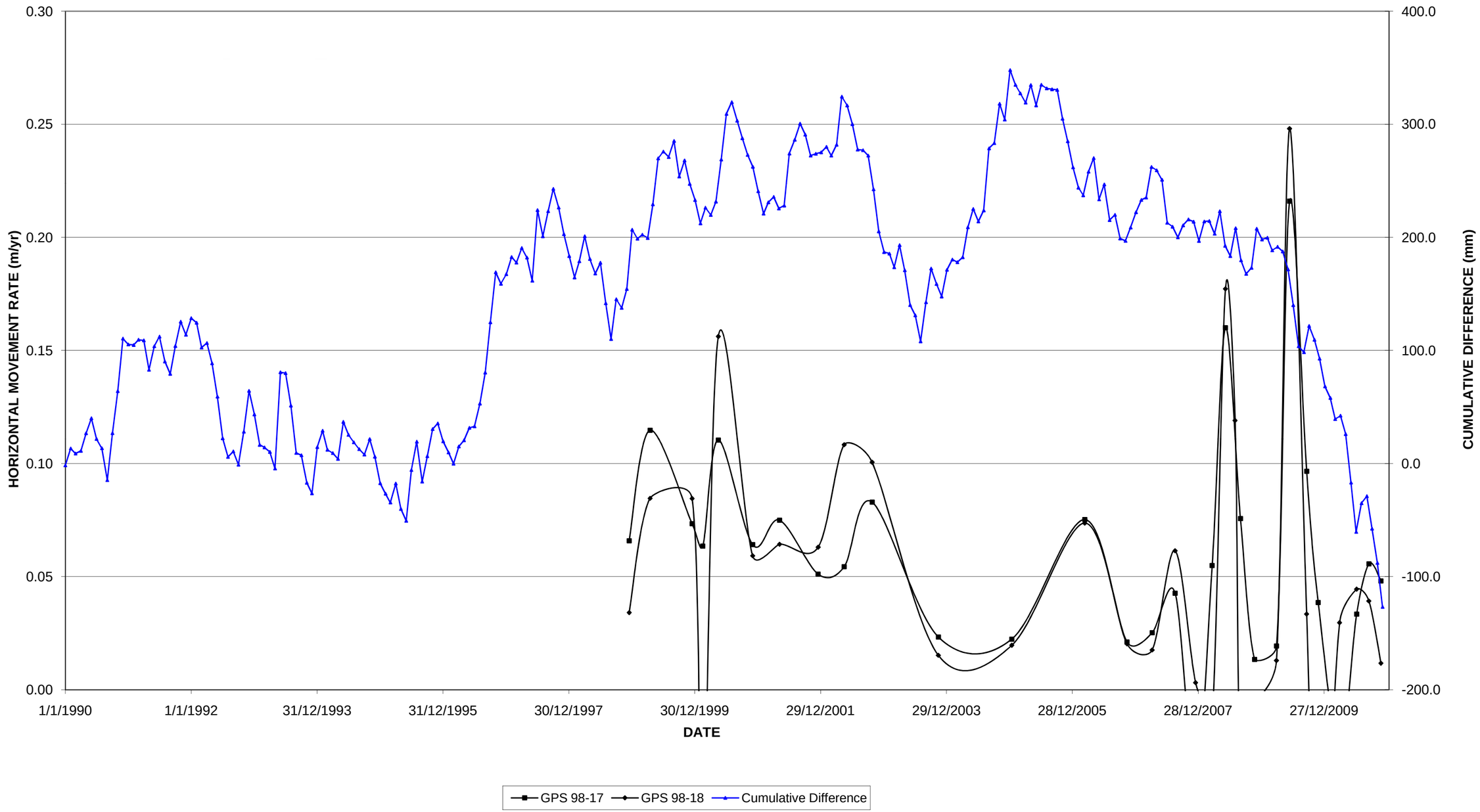


Figure G7 - Incremental Ground Movement Rate vs. Groundwater Elevation

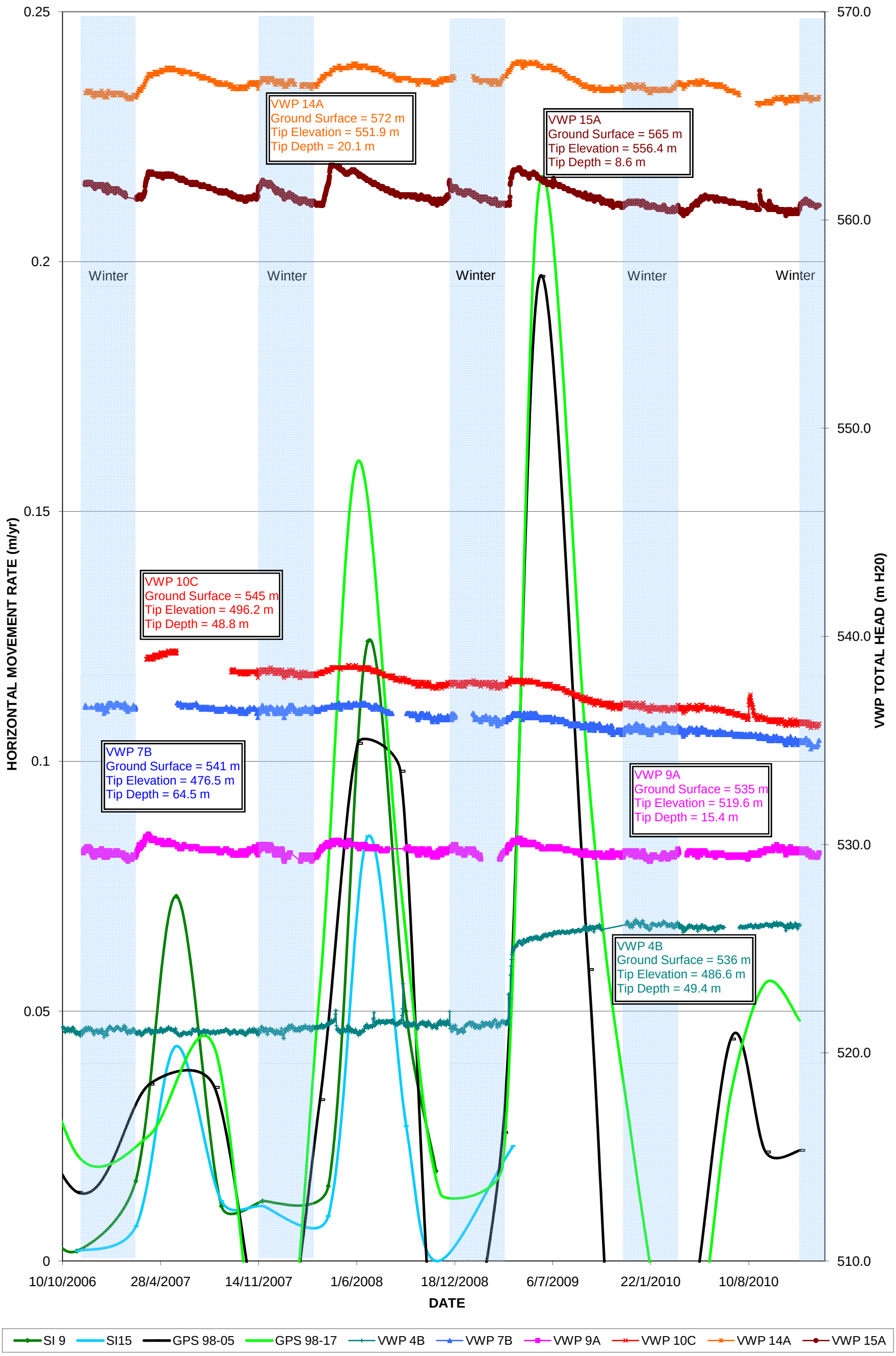


Figure G8 - Cumulative Ground Movement vs. Groundwater Elevation