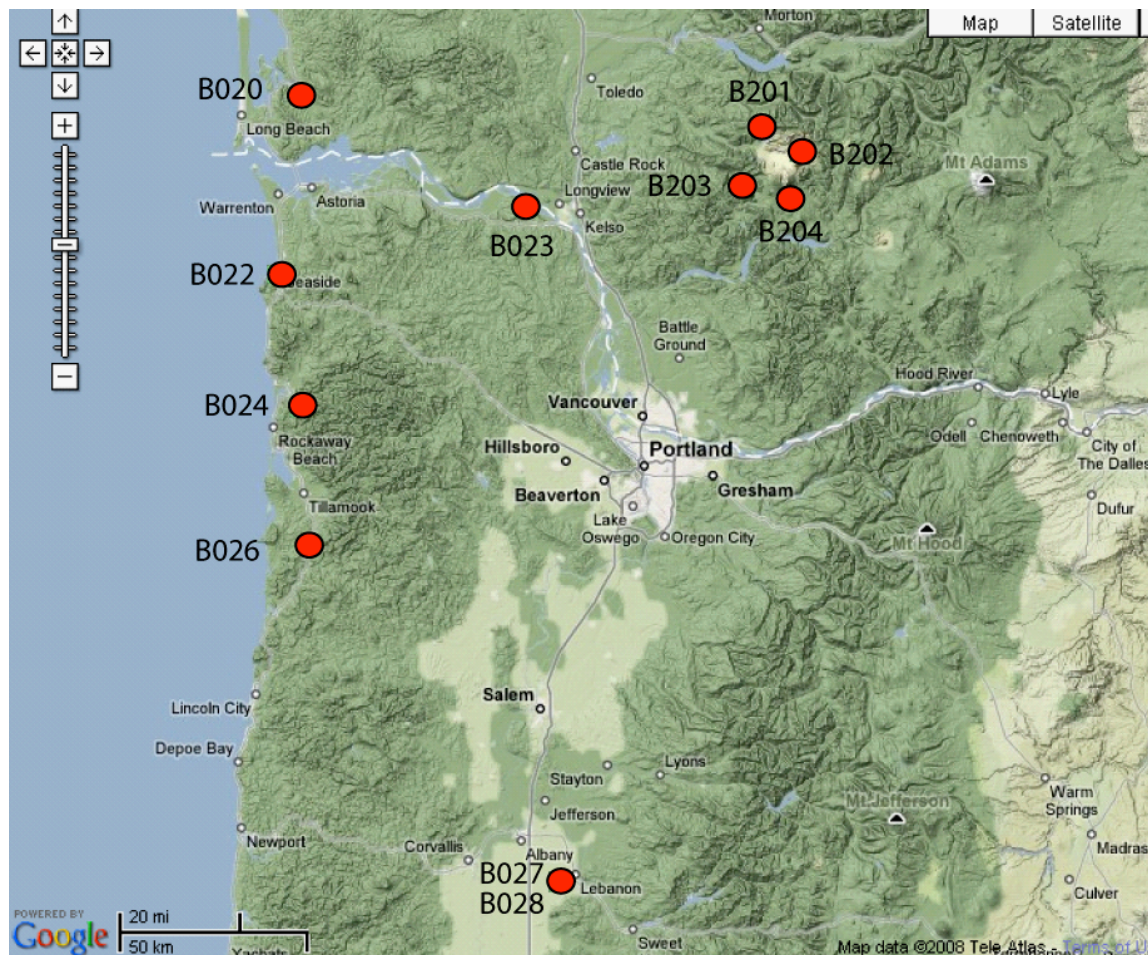


Station Notes for B027, lester027bor2007

Latitude:	44.497333 (WGS 84)
Longitude:	-122.962167 (WGS 84)
Elevation:	216 m / 709 ft
Install Depth:	234.09 m / ft 768
Orientations:	CH0= 316.3, CH1= 256.3, CH2= 196.3, CH3= 166.3
Install Date:	April 11, 2007
GTSM Technologies #:	US37
Executive Process Software:	Version 1.14
Logger Software:	Version 2.02.2
Home Page:	http://pboweb.unavco.org/stations/?checkkey=B027
Notes Last Updated:	January 21, 2020

Install depth is from the top of the casing to the bottom of the strainmeter.

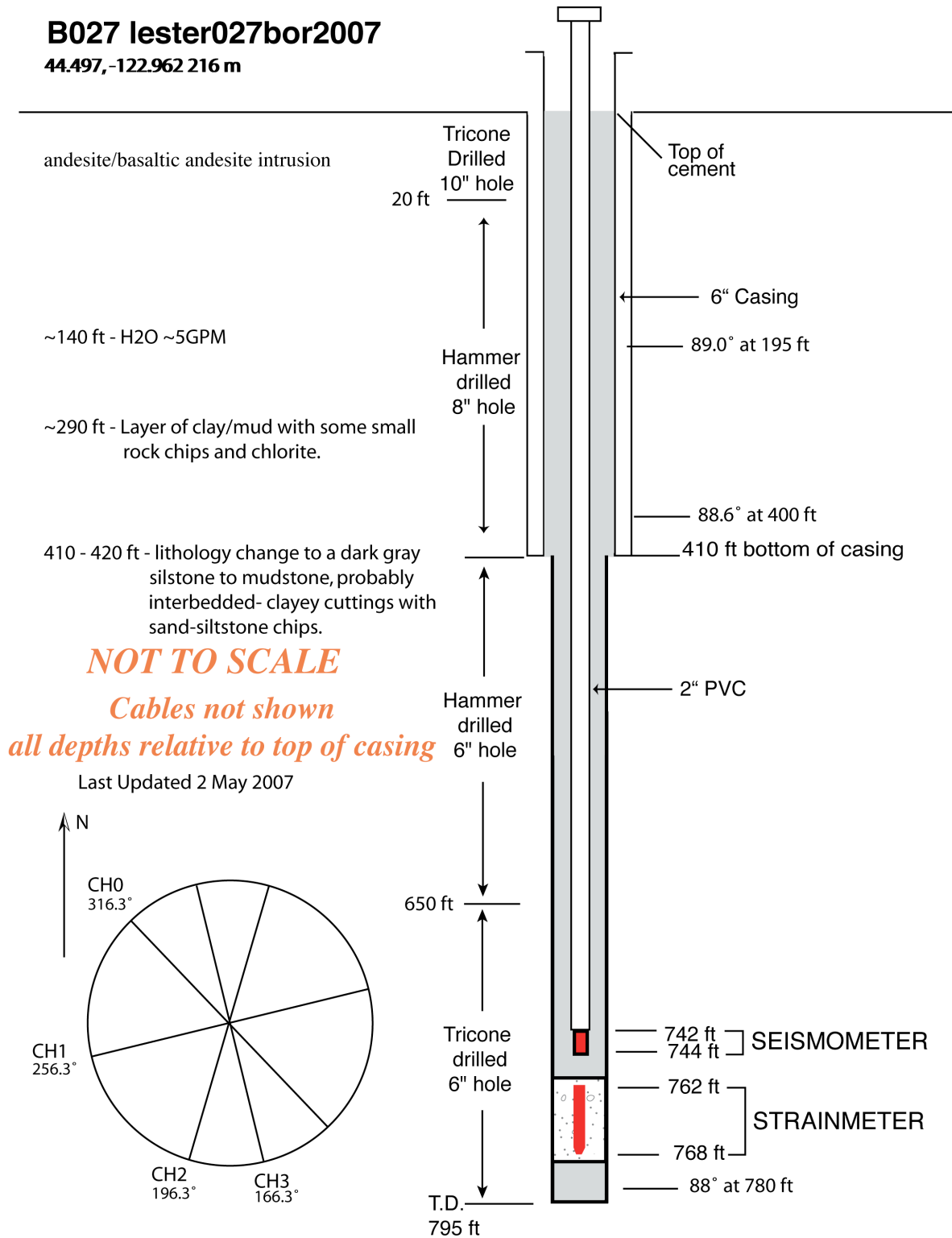
Orientations are in degrees East of North.



Portland strainmeter network and surrounding area, June, 2008

B027 lester027bor2007

44.497, -122.962 216 m



Instrument	Units	Bottle/ASCII Scale Factor	SEED Scale Factor
Pore Pressure	Hecto Pascals	N/A	N/A
GTSM Barometer	Kilopascals	1.0	0.0001
Rain Gauge	Millimeters/hour	N/A	N/A
Down hole Temperature Sensor	Degrees Celsius	1.0	0.0001
Logger Temperature Sensor	Degrees Celsius	1.0	0.0001
Setra Barometer	Hecto Pascals	Not installed at this time	

1. Installation notes

11 April 2007 – The B028 borehole had been drilled to 794.75 feet and the bottom of the hole was hard. It was decided to bring the bottom of the hole up to ~775 feet using two 3 section dump baler runs due to the side wall between 774-791 feet being extremely rough. From the ATV and caliper data it appears that a button came off the drill bit the first time the hole was drilled and carved out a cork screw pattern in the side wall. The log data for that section looked fine but the engineers wanted to avoid a rough surface that could mask any fractures. The rock above 775 feet was very consistent so the target depth for US37 tomorrow between 771 and 764 feet.

12 April 2007 – Installed US37 at B027 Lester 1 in Lebanon, OR. The strainmeter was lowered using a combination of capstan and sandline (testing a new capstan setup with sandline as a backup). Masterflow 1341 cable grout was used. It was mixed for 10 minutes prior to pouring, using 1.7 gallons of water per sack. Strainmeter reached target depth of 768 feet 67 minutes after mixing.

16 April 2007 – Hole was cemented up. While cementing up the hole there was a failure of a joint of the 2 inch pvc pipe. The pipe came out of the bore hole several feet and filled with cement. It will not be possible to install a pore pressure sensor at this site. The hole was cemented to surface. No Q330 was installed as AC power was set up at the time.

2. General Information

- This station is part of a cluster that contains B028
- Sensitivities of all EH channels corrected on March 4, 2010.

3. Strainmeter Maintenance

- It appears the GTSM logger at B027 may have shut down or powered off ungracefully on April 12, 2007. On April 13, 2007 there were problems booting the system. It was determined the error messages were coming from /usr/local/bin/logger-startup.sh. Moving files from /data/Day/tmp to /home/gtms21/tmp and rebooting didn't fix the problem. The problem file was B027US370710222_20.tar. Confirmed that the /data/Min directory was not there. Upon reboot, GTSM logger came up without spewing error messages. The system recreated the /data/Min directory at reboot. After waiting a minute, saw a Min tar file was properly created. Appears problem solved. GTSM logger was then powered off so the crew could bury the strain data cable and proceed with the rest of the installation. No data was recorded during this time
- April 16, 2007 – Hole was cemented up.
- April 24, 2007 – Tim Dittman visited B027 at ~16:00 PST. The strainmeter was in safe shut down mode. The BSM power box was rebooted and the strainmeter restarted. The

strainmeter's batteries were at 12.29V, and the Intuicom radio and fiber optic modem were off. The main battery bank was at 11.19V. The solar charge controller was in solid green mode indicating batteries were charged. The breakers and the charge controller went were reset over to charging mode. Voltages on batteries climbed slowly (cloudy afternoon) to 11.34V by the time the engineers left ~20 minutes later.

- April 27, 2007 – Liz Van Boskirk and Mike Gottlieb visited the site from 10:00 – 12:00 PST to check on the continuing power problems. When they arrived the strainmeter was running, with its 2 batteries showing 13 V and climbing. The solar batteries were cycling relative to the LVD, from 11 to 11.7 V, charging when not loaded and draining when loaded. They verified that the batteries and solar panels were wired correctly and in working condition, then switched out the solar charge/load controller. After this switch, the batteries began charging while under load, reaching a voltage of 12 V by the time they left the site.
- May 7, 2007 – Wade Johnson visited the site to check out the power issues the site was having. The strainmeter batteries were at 13.4 V and the primary batteries were at 12.56 V. When he shut down the breaker to the strainmeter its batteries dropped down to 13.2 V and held steady. The primary batteries jumped up to 12.76V and began climbing indicating that they were charging. The light on the solar charge controller did appear to be broken. He also checked the solar panels, and they were in good working order.
- May 9, 2007 – Wade Johnson and Warren returned to work on the power problem. They adjusted the temporary solar panels so they had a better angle towards the sun. This increased the charging amps from 14 to 19 amps. They also diagnosed a bad battery on the strainmeter. They moved one of the batteries from the primary side over to the strainmeter. When they left, the primary and strainmeter batteries were charging.
- May 22, 2007 – Sara Venator and an electrician went to Lester 2 to prepare it for AC power. The electrician ran wires from an outside conduit into the enclosure and made an outlet inside the enclosure. It's ready to go when we can get a power drop.
- October 25, 2007 UTC – Mick Gladwin visited the site.
19:00 – Onsite.
Temporary solar (three panels) supplying 6 batteries (4 on main and two on GTSM). The shutdown relay on the main battery supply was switching at about once per second when the sun emerged. The main battery bank was at about 11.5V when the sun was out. Mick moved one battery onto the GTSM supply to increase capacity if any charging occurred. All batteries have had their lifetimes shortened by prolonged undercharging. There were no options for improving site without additional power panels.
20:30 – Offsite.
- November 5, 2007 – Tim Dittmann visited the site. The site had been running on temporary solar, which has left the site down for some time due to lack of sun in the PNW. He pulled out the solar panels and solar regulator, added an AC charge controller and trip-lite surge protector. He plugged into the new AC duplex and restarted GTSM at 17:46.
- December 16, 2007 – Chuck Kurnik visited the site from 23:46 – 23:52 UTC. A marmot and Q330 still need to be installed at this site.
- March 20, 2008 UTC - Emily Sneider and Elizabeth Van Boskirk visited B027 to add a Marmot and Quanterra Q330. Both the Marmot and Quanterra had been programmed earlier by Wade Johnson.
22:30 - Arrive on site and begin wiring the Marmot, Q330, and Seismometer into the power board.

23:00 - The Marmot and Q330 are ready to go. Call Wade and Warren to make sure they the Marmot and Q330 can be reached.

- December 3, 2008 – Wade Johnson replaced the fiber optic modem.
- March 27, 2009 – Logger software upgraded to 2.02.2
- October 21, 2009 – Marmot was rebooted.
- August 20, 2010 – B028 was visited to get the VSAT back online.
- September 12, 2011 – The yogi antenna at the site was loose enough on the pole so that it could rotate with little force. The pole itself could rotate as well. It was most likely moved by strong gusts of wind. The antenna was moved until a receive strength between 85-95 was reached. The antenna was tightened to the pole, and the pole against the enclosure was fastened with silicone adhesive where it is bolted to the hut. The reflected power at B028 was 13 or 22, varying with different days logged into the radio. The cable ends were terminated, adding new connectors. The reflected power is now 7 or 8.
- January 25, 2012 – Liz visited the site to try and get the strainmeters back online. The power was off to all equipment at the site. The GTSM was off and the batteries were at 11.6 Volts. She plugged in the laptop to observe the charge light and see if she needed to reset a breaker. She located the breaker on a pole up the hill between the two sites, which was labeled PBO upper and lower. After resetting the breaker, there was still no power to either site. She went down to the farmhouse to see if the power was on. The son was staying in a guesthouse while his parents were on vacation. His power worked, but informed her there was a windstorm and part of it snapped. There is a metal piece hanging from the pole, the power company will be contacted for repairs. All hornet nests were removed from enclosures and power boxes.
- February 1, 2012 – Liz met with the electrician, who confirmed what she had told the power company, that there is no power at the drop. Liz called Consumer Power (note: Liz called Consumer Power over a week ago to report the broken fuse and power outage and was told they had visited the site and there was nothing for them to fix). A representative arrived at 10:30 local time. She showed him a fuse that broke on the line during the storm and where the power drop is. He replaced the fuse and drove up the hill to check the power drop and lines. At 17:00 local time Liz visit the site to make sure all equipment was on. She noticed that the reset button on the GTSM power box does not press in, but the strainmeter was on. She left with both sites recording data.
- March 31, 2012 – Removed yellow jacket nest and brush.
- October 17, 2012 – On arrival Liz noticed that the gravel road to the site had been removed and a large cement pad had been recently poured (a day ago). They plan on placing a double-wide home here and moving the horse fence back. In doing this they had exposed and caught the power pvc pipe (see DIMS). They will re-bury the line. No power issue at the site. The VSAT receive rate was at 68% when Liz arrived at the site. She re-pointed the dish, with the highest receive rate she could find being 84%. After adjusting for the cross-pole test, the receive rate was at 79% and the transmit was at 75%. Next She re-pointed the antenna for the EB-6 radio link between the sites. She adjusted it up to 84%, but after leaving the site it was either bumped or over-adjusted.
- October 24, 2012 – The antenna at both sites were re-pointed. The master radio read a 29% connection. Both had high reflective powers. The cable and connectors should be replaced. When Liz left site comms had not improved. The site came back on-line a few days later, but data flow from B027 was still sluggish.

- November 8, 2013 – Driving into the site (from afar) Liz could see both sites and picked a visual mid-point for antenna pointing. First She visited the lower site, which is the radio slave site and has the VSAT. She cannot ping the radio up the hill. She logged onto the EB-6 and the reflected power was 8. The yagi antenna was adjusted to the visual mid-point. The uphill site was visited next. She first pointed the antenna to the visual mid-point. After logging on to the master EB-6 I she continued to adjust the antenna until she could log into the slave site and reached maximum signal strength, which was 75%. She watched the signal strength for a few minutes to make sure it was consistent. The reflected power is 9. The lower site antenna was adjusted to find a stronger signal strength, but 70-75 % was the max. She can ping all equipment at both sites from the lower site. Data flow will be monitored.
- November 13, 2013 – Liz visited the site. The reflected power is high (41). The LMR cable, connectors, and yagi antenna need to be replaced.
- November 21, 2013 – Replaced cable, all connectors, and yagi antenna. The reflected power was still at 41. Need to replace the EB-6.
- January 9, 2013 – Replaced EB-5. The Reflected power drops to 6, and the transmit was at 88%. The metal on the back of the old radio was warped. Site experiences high temperatures in the summer, and high moisture in the winter.
- January 10, 2013 – A MetPack was connect to the Marmot at ~15:00 Pacific Time.
- January 11, 2013 – Sealed hole for MetPack in enclosure.
- April 30, 2013 – Mike visited the site and swapped 6 batteries with 10, adjusted the GTSM Chops and Quads, filled out the site Word document, and strapped all equipment to the equipment rack.
- May 14, 2013 – While Liz was on-site diatomaceous earth was added, photos taken, and yellow jacket nests removed. Desiccants were added to the GTSM.
- June 16, 2017 – GTSM power box was from site install. It was never replaced with a modified power box during early O&M. Power box was swapped. Replaced GTSM desiccants and container.
- June 19, 2017 – Reviewed logger settings and corrected for new power box. Disabled pressure pot and set to 85.92 in strain_logger.conf.
- October 10, 2017 – Q330 was giving error messages. Could log on remotely, but there was no seismic data flow. Replaced Q330.
- December 21, 2017 – Visited site to power cycle marmot.
- January 18, 2018 – Could not connect remotely to Marmot. Last site visit the marmot was power cycle, but that only allowed for a short term remote connection before dropping. Installed new marmot.
- March 13, 2018 – Site lost power. Called landowner for clues to decreasing power at site. Informed that the cows have completely rubbed the power meter off the pole and it is lying on the ground. Land moved cattle from the field for safety. Contacted the power company. They fix the power company portion. The landowner will put a fence up around the meter.

- May 15, 2018 – Removed Setra to be placed at another BSM site. Site now only has a metPack.
- December 16, 2019 – Upgraded 256MB CF card to 8GB. Updated settings for 8 GB. Investigated coms outage. EB6 looked ok on this end. Hhigh reflected power on B028 radio.