

Kristoffer Smith  
East View  
High Street  
Kirk Yetholm  
Roxburghshire  
TD5 8PH

3<sup>rd</sup> January 2021

Clerk of the Local Review Body  
Council Head Quarters  
Newtown St Boswells  
Roxburghshire  
TD6 0SA

Dear Ms McGeoch

**Reference: 20/00018/RRREF**

Thank you for your email dated 22<sup>nd</sup> December and providing me with the opportunity to make this statement to the LRB, ahead of the hearing in connection with the above appeal.

The sentence "Disputed height measurements which were provided to demonstrate the relationship of the proposed house with the neighbouring house to the north." has been used multiple times, in various correspondence of late. You will note from my submission dated 7<sup>th</sup> September 2020, I have not undertaken a level survey nor have I provided any heights, therefore, I am not in the truest sense of the word, in a position to dispute the dimensions provided on the section drawing. My submissions have been made by me as a neighbour, not as an expert witness; therefore it is not for me to conduct an accurate measured survey. Rather, my previous submission questioned the accuracy of the submission based on, firstly, the difficulties in conducting accurate level surveys and the experience required to conduct such an exercise and secondly, the anomalies and inaccuracies in submissions, the inability to provide the information requested and the clandestine site preparation operation that has taken place. I know not of any professional or regulated practice that would produce a drawing, based on measurements taken by an unqualified and inexperienced individual, without knowledge of the measurement instruments used, and then present that information without any interrogation or check. This is worsened further by the fact the measurements were taken by the applicant, producing a clear conflict of interest.

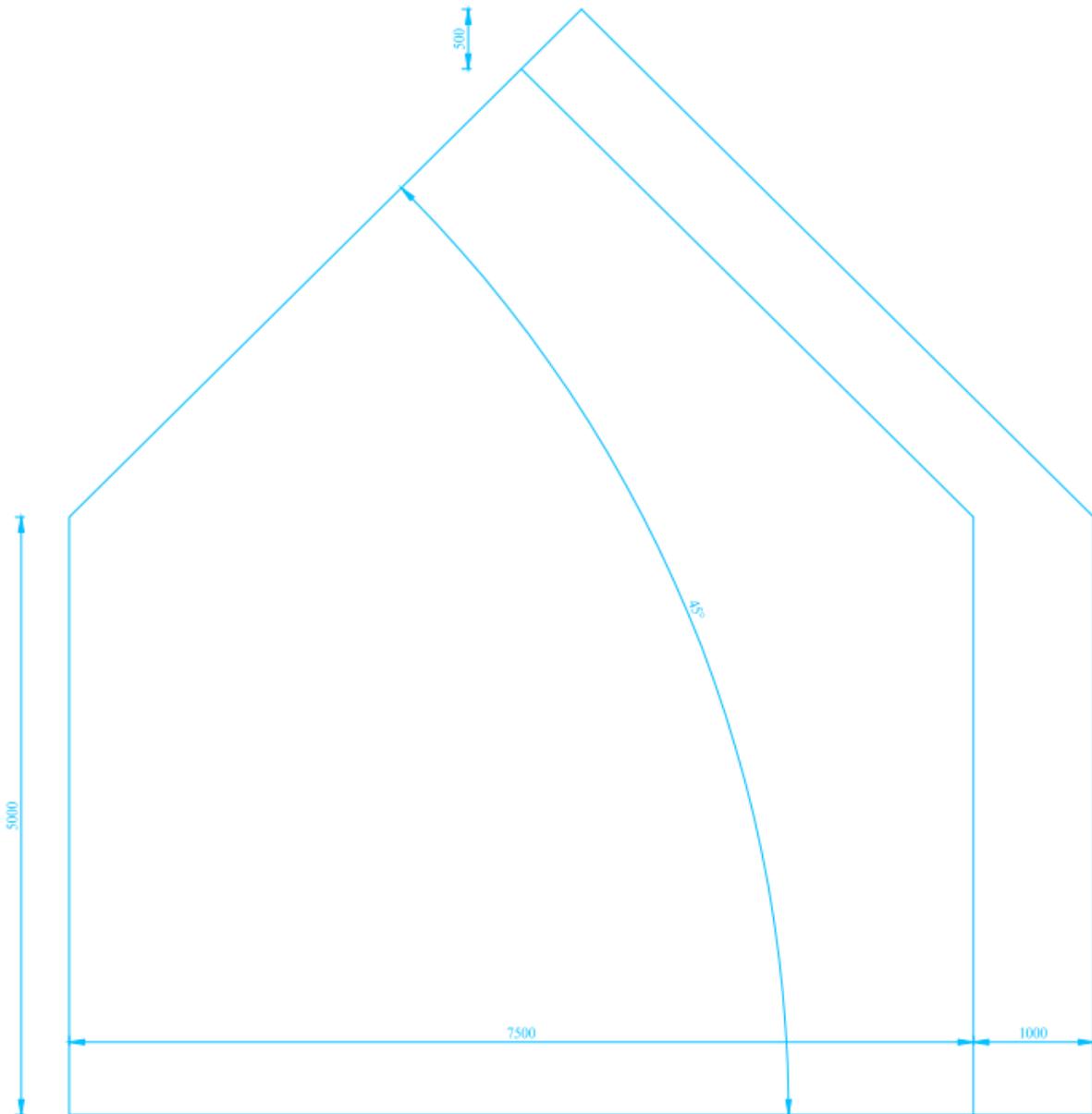
As I have stated previously, I have concerns about the accuracy of measurements undertaken at Burnsyde. The south gable has a large garage built off it, hampering access to the east most corner. Without having the owner's consent to access the property, I fail to see how it could possibly be measured accurately. It may have been possible to estimate the half way point and measure to it, but that would simply be a guestimate at best.

For the above and the purposes of determining other building dimensions, one presumes the section drawing provided has probably been made with the assistance of mapping software. The foremost mapping software, Promap, uses UKMap to provide" a highly detailed and feature rich mapping layer. It accurately locates buildings, garages, property boundaries, roads, tress and a multitude of other features."... "UKMap has a target accuracy of +/- 1m."<sup>1</sup> Suppose one then uses a building

---

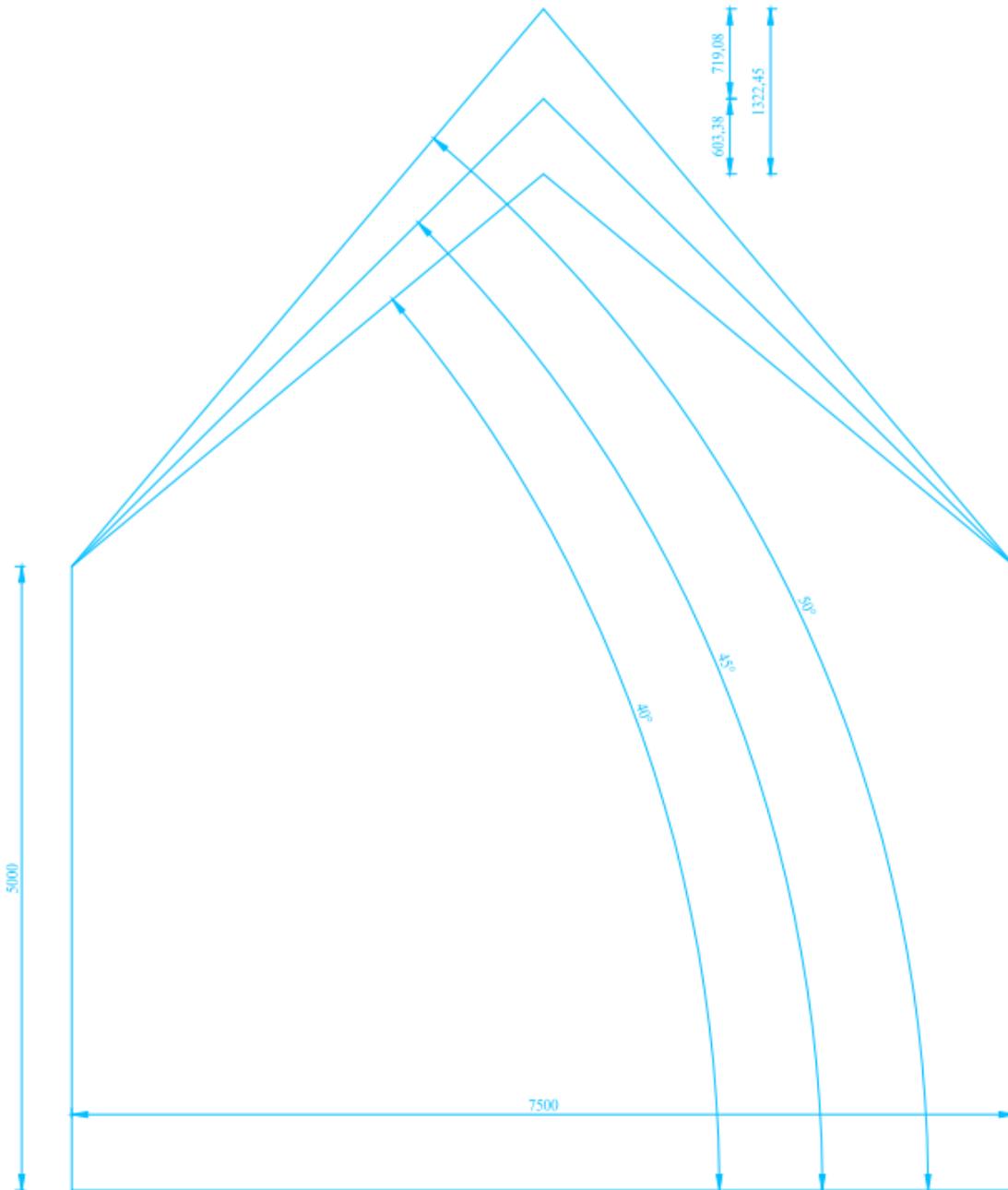
<sup>1</sup> [https://www.promap.co.uk/help/index.html?types\\_of\\_map\\_layers\\_available.htm](https://www.promap.co.uk/help/index.html?types_of_map_layers_available.htm)

width, taken from the mapping software, and plots against it the height of the eaves and assumes the roof pitch, a ridge height can be calculated. If, however, that building width is inaccurate, +/-1m, there is potential for significant error in the ridge height calculation, Figure 1.



**Figure 1: Effect on ridge height from inaccurate building measurement.**

In addition to the above, without actually measuring the pitch of a roof, then it is impossible to know their true pitch and impossible to calculate the ridge height with any degree of accuracy or certainty. Perhaps with the exception of Clifton Cottage, there is nothing confirming any other roof has had their pitch measured. Therefore, ridge heights shown in the submission are no more than conjecture. It's true the majority of rooves locally vary between 40° and 50° but without measurement, there is potential for a significant margin of error, Figure 2.



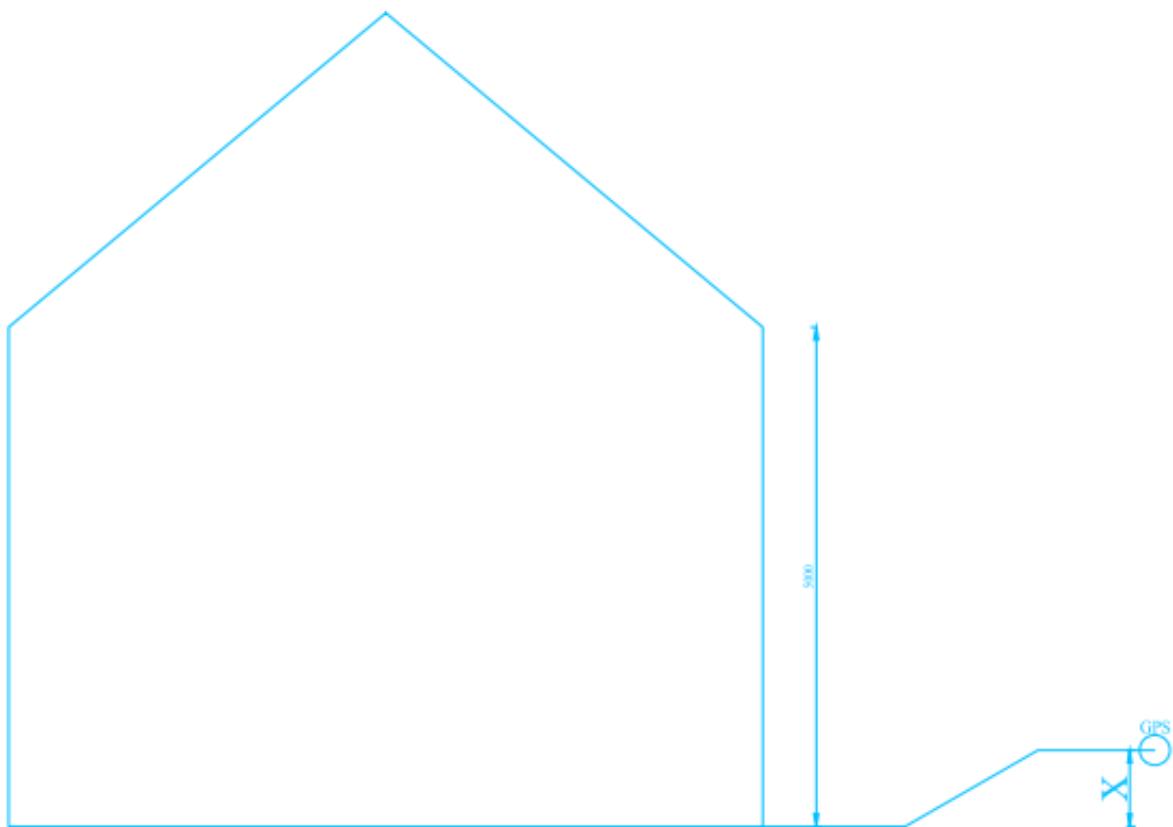
**Figure 2: Effect on ridge height from inaccurate pitch measurement.**

I understand elevation (height above sea level) measurements for various eaves heights were recorded by GPS. The instrument used is unknown. One presumes it was an easily obtainable, off the shelf recreational type product rather than a highly accurate, specialised receiver from the likes of Leica. The accuracy of such recreational products vary considerably but leading manufacturer Garmin state a possible accuracy within +/-25-50ft.<sup>2</sup> Apps are available to work with smart phones such as My Altitude and these claim to have an elevation accuracy within +/- 10-20m. Accuracy for all these types of products is greatly affected by weather conditions, buildings and other features which means there is no consistent inaccuracy. For example, next to a building accuracy may be out

<sup>2</sup> <https://support.garmin.com/en-IN/?faq=tdu65LfVI08mM85HAPoPTA>

by 20m, a measurement taken away from a building may be out by only 1m. With such a potential range of inaccuracy it's easy to see how relying solely on basic GPS/GNSS, particularly from recreational products, to produce accurate and detailed drawings can lead to serious and significant errors. For comparison, a Leica GS16 system, as you may find a professional using, has a vertical accuracy of +/-15mm.<sup>3</sup>

The location at which GPS measurements were taken also raises some concern. There is no plan of where GPS readings have been taken so it is impossible to know how they correlate to any physical measurement undertaken. It is noted in the applicant's representation dated 28<sup>th</sup> Aug that the property to the north had the eaves measurement taken and then that measurement was plotted against a GPS elevation reading taken on the nearby public road. This is poor practice and if this is representative of the way in which other measurements have been taken and plotted, it causes grave concern for the accuracy of the information. Figure 3 demonstrates the significant potential for error by the unknown size X.



**Figure 3: Poor practice in correlating physical measurement to GPS elevations.**

The measurement of land and buildings is typically the preserve of a Chartered Surveyor, a qualified and experienced professional regulated by the RICS. As the applicant's Technician is an Associate with RICS, it would seem logical for the survey, used to produce the section, to have been carried out in accordance with the RICS guidance note *Measured surveys of land, buildings and utilities, 3rd edition*. The majority of the document is applicable to the measurement which should have been undertaken in this case, however, a few key points worthy of note are:

<sup>3</sup> <https://leica-geosystems.com/en-gb/products/gnss-systems/smart-antennas/leica-viva-gs16>

*1.13 Competence of survey staff. The surveyor is responsible for ensuring that his/her staff are qualified, competent, appropriately insured and trained to do the tasks for which they are engaged. Relevant qualifications can include professional and technical membership of RICS, relevant national or regional licences and membership of other equivalent professional bodies.*

*1.14 Calibration and checking of equipment. The surveyor is responsible for ensuring all equipment is calibrated/verified and checked prior to use and maintained as such throughout the period of survey works, as well as ensuring it is fit for the survey purpose required.*

*2.1 Survey accuracy. The surveyor is required to eliminate all systematic errors (biases) and gross errors (mistakes) from his/her work and survey outputs. Where possible the surveyor should ensure there is sufficient redundancy in his/her survey observations (control and/or survey detail) to enable survey accuracy to be proven by measurement and analysis of the distribution and size of random errors.*

*2.6 Survey control network. The surveyor shall establish survey control points that shall be linked together by a network of observations to realise the survey grid on the ground. This network shall include all types of observations required to establish plan and height control and provide sufficient redundancy in observations to allow proof of accuracy*

*Recommended good practice. Due to the increasing need to relate surveys to national and global coordinate grids and height datums it is recommended that all surveys are linked by direct observation to the relevant national coordinate reference system and regional/international geodetic reference frame. When establishing the relationship between a local grid and national grid via Global Navigation Satellite Systems observations it is recommended that clients and surveyors refer to the RICS guidance note Guidelines for the use of GNSS in land surveying and mapping (2010).*

Had the survey and drawing been produced in accordance with the RICS document, one would have full confidence in it and the data would have been capable of interrogation. As it is, being presented with a drawing which in no way meets the brief of the LRB, does not conform to any sort of standard and has had little to no professional input, justifiably raises questions with regards its accuracy.

I look forward to the hearing on the 18<sup>th</sup> January and would be happy to answer any questions the LRB may have on this or the site video.

Yours sincerely

Kristoffer Smith