

**Casper LiDAR 2015**

**LiDAR Correction Response**

 May 09, 2016

**Summary**

This document cites specific examples and responses to CompassData’s Quality Assurance document titled “City of Casper LiDAR Report\_v1.pdf”. The intent of this document is to explain various QC calls from CompassData’s review of the Casper LiDAR dataset collected and processed by Sanborn. Responses by Sanborn outlines causes of the error, actions took to correct the errors, or calls that were deemed within specification and did not require corrections of any kind.

**Data Format**

Missing Metadata:

CompassData noted metadata was not provided per lift as the USGS v1.2 document requires. This issue has been addressed, and metadata was provided for each lift in the recent May 4th delivery.

**Project Data**

LAS Classification 10, Rail:

CompassData noted Class 10 was identified as “rail” instead of “ignored ground”. Sanborn believes this is due to CompassData’s Quality Check software that has identified the description of this class as “rail” instead of “ignored ground”. All points classified as Class 10 are indeed “ignored ground” and should be considered as such. Due to the naming convention error in the QC vendor’s software, a correction is not necessary in the LiDAR data itself.

**Absolute Accuracy**

Missing NVA & VVA Checkpoints:

Though CompassData noted the absent NVA and VVA LiDAR checkpoints within the Relative Accuracy section of their QA report, Sanborn’s contract Scope of Work specifically states “Sanborn’s Scope of Work does not include USGS survey checkpoints or accuracy report”. **It should be renowned that any “QC failure” comment within the CompassData QA report pertaining to checkpoints and their accuracy report(s) do not pertain to Sanborn’s deliverables.**

**LiDAR Acceptance Criteria**

Bare Earth Classification:

As per Criteria outlined by CompassData, 98% of structure points and 95% of vegetation points are to be removed from the bare earth classification/DEM; and “as a results of the 15% visual inspection, it is recommended to “Pass” this phase of the review”. Though CompassData recommends to accept and “Pass” this part of the review, CompassData also noted that “additional editing is required in the mass points (bare earth) data set”. Sanborn agrees that while the data set may contain some vegetation points in the bare earth class, 95% of vegetation was removed from the data and meets Criteria. However, to aid the process of removing more vegetation and decks present in the bare earth, a redefined auto-filter was applied to the entire dataset of Casper – automatically correcting these patches of vegetation and decks within the edit calls made by CompassData. Sanborn also provided a 2nd round of manual QC to the entire dataset after this automated filter was applied.

CompassData reviewed 15% of the LiDAR manually, and found errors in the bare earth classification, river breaklines, and noted seamline errors within the DEM’s. Please see the table below for detailed information about edit calls from CompassData and the responses from Sanborn.

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| --- | --- | --- | --- | --- |
| **QC Shape file** | **Edit Call** | **Number of Calls** | **Cause of Error** | **Actions took to Correct** |
| Editing-QC-ALL.shp | Vegetation/Decks/Missing Ground/Structure | 469 | Auto-filter did not originally perform correctly; artifacts were missed during 1st round of manual QC | A re-vamped auto-filter was created and applied to the entire dataset; 2nd round of manual QC was performed on entire dataset |
| Editing-QC-ALL.shp | Flight line | 12 | Minor relative swath anomalies occurred during/after calibration phase | None – all visual flight line errors occur periodically and are much below the required interswath requirements of ±16cm per USGS v1.2 specifications. Differences between swaths in these 12 areas are measured between ±2cm and ±3.5cm and do not compromise the integrity of the dataset |
| Rivers\_QC.shp | None assigned by CompassData; Sanborn assumes tinning within the breaklines/DEMs | 19 | A section of the river that drops rapidly. Due to this, minor tinning may occur. This is typical in areas of waterfalls and/or complexity of the river bank | None – minor tinning errors occur due to the nature of the fast flowing/dropping river and waterfalls. No correction needed |
| Rivers\_QC.shp | None assigned by CompassData; Sanborn assumes tinning within the breaklines/DEMs | 4 | Irregular elevations in vertices and/or bare earth point inside river breakline | The vertices in question had the correct elevation applied; ground points within river breakline were reclassified to Class 9 (water) |
| Seams-and-Question\_Area\_QC.shp | None assigned by CompassData; Sanborn assumes seamlines are present | 4 | Software malfunction; DEMs were originally exported with astray edges along some tile boundaries | All DEMs were exported and seams are not present in May 4th delivery |