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Using LiDAR Data to Support Letters of Map Amendment (LOMAs):

When an Elevation Certificate May Not Be Needed
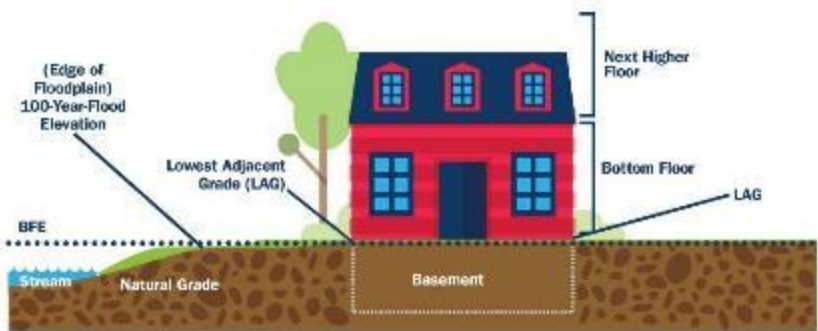
Presented by:
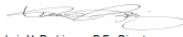**Andrew N. Brown, CFM**

FEMA

NORTH WIND
A CIRI COMPANY

Michael Baker
INTERNATIONAL

LOMA: Letter of Map Amendment

- A letter from FEMA stating that an existing structure or parcel of land that has <u>not</u> been elevated by fill would not be inundated by the 1-percent-annual-chance flood

- FEMA removes subject from the Special Flood Hazard Area (SFHA) and removes federal requirement for flood insurance

- Lender can still require flood insurance

Submitting a Standard LOMA

Required documents:

- Copy of effective FIRM panel showing property accurately plotted
- Tax Assessors map
- Copy of recorded deed or plat
- Elevation Form
  - In lieu of certificate
- Property Information Form

Fill is defined as material from any source (including the subject property) placed that raises the ground to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. Fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in a Special Flood Hazard Area (SFHA) is considered natural grade.

Has fill been placed on your property to raise ground that was previously below the BFE? ☐ Yes ☐ No   If yes, when was fill placed? ____ / ____ month/year

Will fill be placed on your property to raise ground that is below the BFE? ☐ Yes* ☐ No   If yes, when will fill be placed? ____ / ____ month/year

* If yes, Endangered Species Act (ESA) compliance must be documented to FEMA prior to issuance of the CLOMR-F determination (please refer page 4 to the MT-1 instructions).

1. Street Address of the Property (if request is for multiple structures or units, please attach additional sheet referencing each address and enter street names below):

2. Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed):

3. Are you requesting that a flood zone determination be completed for (check one):
   ☐ Structures on the property? What are the dates of construction? _____ (MM/YYYY)
   ☐ A portion of land within the bounds of the property? (A certified metes and bounds description and map of the area to be removed, certified by a licensed land surveyor or registered professional engineer, are **required**. For the preferred format of metes and bounds descriptions, please refer to the MT-1 Form 1 Instructions.)
   ☐ The entire legally recorded property?

4. Is this request for a (check one):
   ☐ Single structure
   ☐ Single lot
   ☐ Multiple structures (How many structures are involved in your request? List the number: _____)
   ☐ Multiple lots (How many lots are involved in your request? List the number: _____)

FEMA responds within 60 days – after notification that ALL information has been received.

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LiDAR LOMA
Program Standard # 627

Letter of Map Amendment (LOMA)	Program Standard	For Letters of Map Amendment (LOMAs), submitters may use elevation data (typically LiDAR) to document the lowest adjacent grade for a structure or lowest lot elevation for a parcel of land that complies with the USGS National Geospatial Program LiDAR Base Specification Quality Level 3 (QL3) or better and is provided by a federal, state or local government agency.

Light Detection and Ranging (LiDAR)

- Remote sensing technology
- Efficiently creates accurate topographic data
- Large Scale

New February 2018 Program Standard

- Modeled after Minnesota
- Allows applicants to submit a LiDAR exhibit to meet the elevation requirements for LOMA
- Assist with removals in areas where structures are definitely above BFE by elevation. Where comparison in close, certified elevations required.

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# LiDAR LOMA: Updated Standard SID 199

Original:

- LOMC submittals must include certifications by a licensed professional authorized to certify the data under state law

Updated:

- LOMC submittals must include certifications by a licensed professional authorized to certify the data under state law, except when LiDAR is provided to satisfy the lowest adjacent grade (LAG) requirements for LOMAs.

USGS LiDAR Base Specification
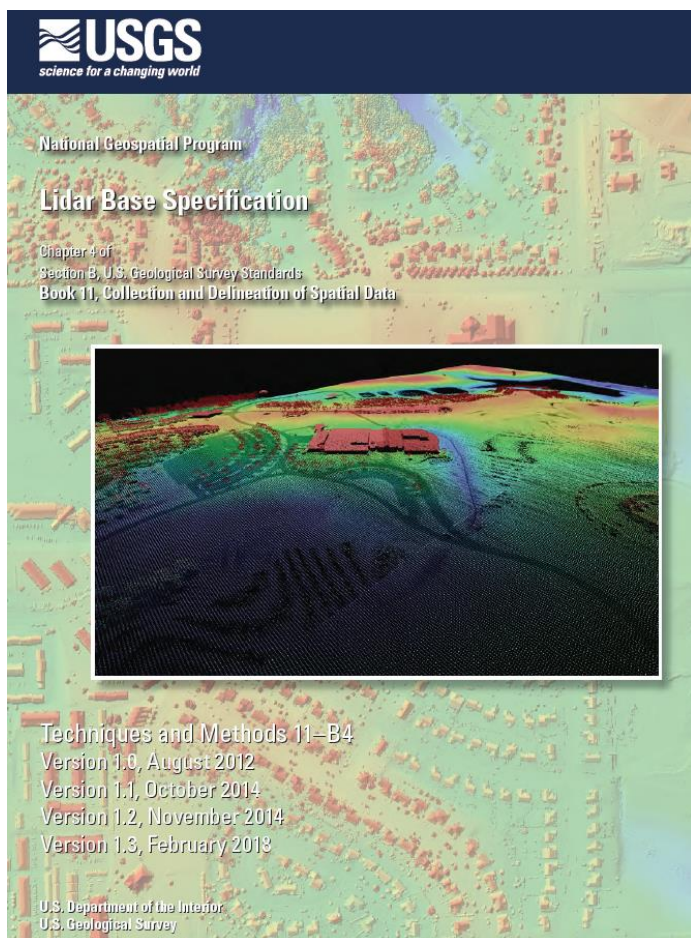
- Quality Level 3 was selected

  - to help ensure the LiDAR data is accurate without being so restrictive that most existing data sets cannot be used

  - As to not invalidate much LiDAR purchased by FEMA previously

https://pubs.usgs.gov/tm/11b4/pdf/tm11-B4.pdf

What Submitters Need to Know: LiDAR Exclusions

- **Requests involving fill (LOMR-F)**

- **Conditional requests (CLOMR-F and CLOMA)**

- **Requests involving subjects mapped in the regulatory floodway (LOMR-FW)**

- **Requests involving Coastal High Hazard Areas (Flood Zone V)**

- **Requests involving Zones AO, AR, or A99 Zones**

- **Requests involving PVs as identified through LOMC process**

- **Requests involving physical changes to the flooding source / SFHA that require revision to the FIRM (218 Special Responses)**

- **eLOMA requests**

- **Requests to supersede LOMCs based on certified elevation data**

What Submitters Need to Know: Exhibit Requirements

- **The applicant requesting that a LOMA determination be evaluated based on LiDAR data must submit an exhibit that displays either:**
  - an overlay of the LiDAR contour elevations
  - an overlay of the LiDAR point elevations
  - either of which must be with an accurate aerial image of the structure/property in question.

- **Exhibit must also contain:**
  - Vertical Datum
  - Address or Tax Parcel Number for PIQ, and PIQ clearly identified
  - Name & Organization of map creator (with contact info)
  - Date LiDAR was collected
  - Source of the LiDAR data
  - LiDAR accuracy information (Accuracy Report)
  - Location of the data archive or metadata file (must be available for independent verification through a publicly available website or metadata)
    - LiDAR must be publicly available & accessed free of charge on web
    - Data owner must be a Federal, State, Local or Tribal Government entity
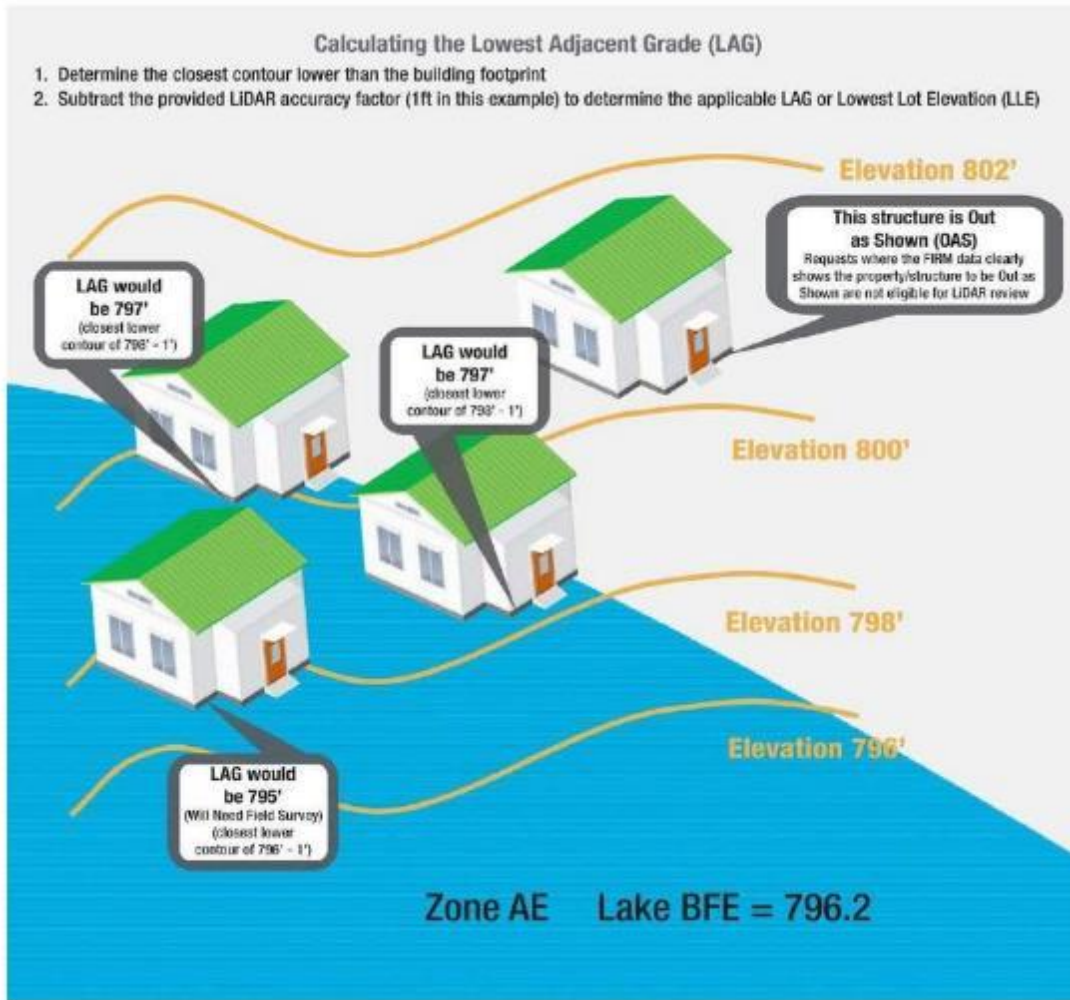
- Identify the lowest contour immediately adjacent to the subject but not going through it

- Subtract ½ the contour interval or 1 foot (whichever is greater) from this identified contour to get LAG / LLE

- Compare to BFE

- Non-removal = request elevations

Point Cloud Exhibits

- The analyst will identify the lowest point immediately adjacent to the structure or on the property

- Subtract two feet to determine the LAG or the LLE.

- Compare to BFE

- Non-removal = request elevations

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Pierce County, Washington

**LiDAR Completeness
&
Accuracy Report**

December, 2017

Data collected for:
Oregon Department of Geology and Mineral Industries

800 NE Oregon Street
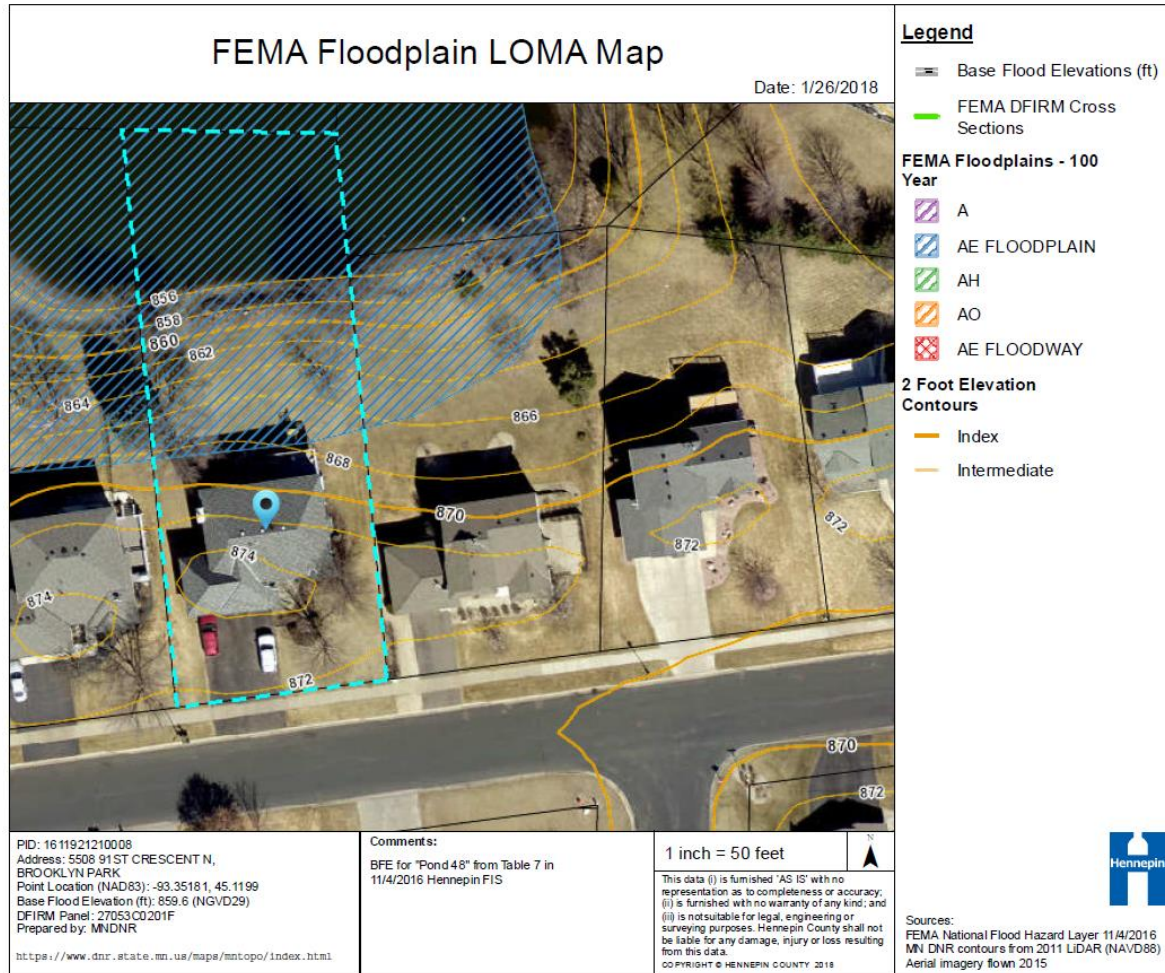Suite 965
Portland, OR 97232

**Omaha COE
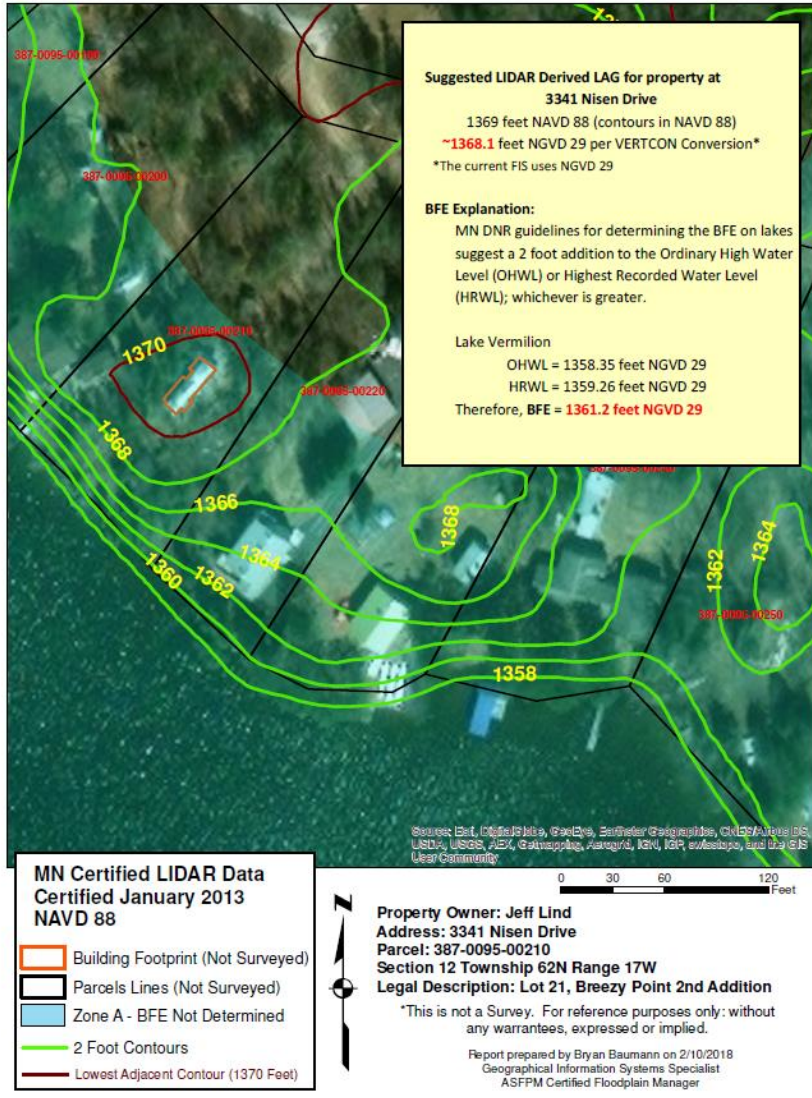Colorado Watersheds**

**LiDAR Mapping Report
State of Colorado**

Exhibit Sample

LiDAR LOMA Report

Suggested LIDAR Derived LAG for property at
3341 Nisen Drive
1369 feet NAVD 88 (contours in NAVD 88)
~1368.1 feet NGVD 29 per VERTCON Conversion*
*The current FIS uses NGVD 29

BFE Explanation:
MN DNR guidelines for determining the BFE on lakes suggest a 2 foot addition to the Ordinary High Water Level (OHWL) or Highest Recorded Water Level (HRWL); whichever is greater.

Lake Vermilion
OHWL = 1358.35 feet NGVD 29
HRWL = 1359.26 feet NGVD 29
Therefore, **BFE = 1361.2 feet NGVD 29**

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0   30   60   120 Feet

MN Certified LIDAR Data
Certified January 2013
NAVD 88

☐ Building Footprint (Not Surveyed)
☐ Parcels Lines (Not Surveyed)
☐ Zone A - BFE Not Determined
— 2 Foot Contours
— Lowest Adjacent Contour (1370 Feet)

Property Owner: Jeff Lind
Address: 3341 Nisen Drive
Parcel: 387-0095-00210
Section 12 Township 62N Range 17W
Legal Description: Lot 21, Breezy Point 2nd Addition

*This is not a Survey. For reference purposes only: without any warrantees, expressed or implied.

Report prepared by Bryan Baumann on 2/10/2018
Geographical Information Systems Specialist
ASFPM Certified Floodplain Manager

Certification of Minnesota LiDAR Data Quality

Project Area: Arrowhead Region

Counties covered: Carlton, Cook, Lake and St. Louis.

Date of acquisition: April 12 to June 2, 2011

Horizontal Positional Accuracy: All these data products were acquired at 2400 meters above mean terrain (AMT) and have a horizontal accuracy of 0.40 meters, with a nominal point spacing of 1.5 meters.

Vertical Positional Accuracy: Accuracy of the dataset was verified by a second set of ground control points provided and tested by the State of Minnesota. The Consolidated Vertical Accuracy (CVA) of the TIN as tested by the State of Minnesota of all land cover categories covering the 5 land classes as defined by ASPRS and NDEP were used in this evaluation. The vertical RMSE, the 95% confidence level and sample count per acquisition delivery block as tested by the State of Minnesota is as follows: Block 1, 0.081m (RMSE), 0.158m (95%), 379 points; Block 2, 0.124m (RMSE), 0.243m (95%), 92 points; Block 3, 0.124m (RMSE), 0.243m (95%), 109 points; Block 4, 0.137m (RMSE), 0.269 (95%), 201 points; Block 5, 0.091m (RMSE), 0.179m (95%), 226 points. Block 1 encompasses the City of Duluth and the North Shore of Lake Superior to Cook County. Block 2 is the northern portion of St. Louis County and northwest Lake County. Block 3 is all of Cook County and the eastern and southwestern portion of Lake County except the North Shore. Block 4 is all of Carlton County and the southern portion of St. Louis County and western portion of Lake County. Block 5 is the central portion of St. Louis County.

This is to certify that the work summarized above was completed in accordance with sound and accepted surveying practices and meets the accuracy requirements in the USGS's Lidar Guidelines and Base Specifications.

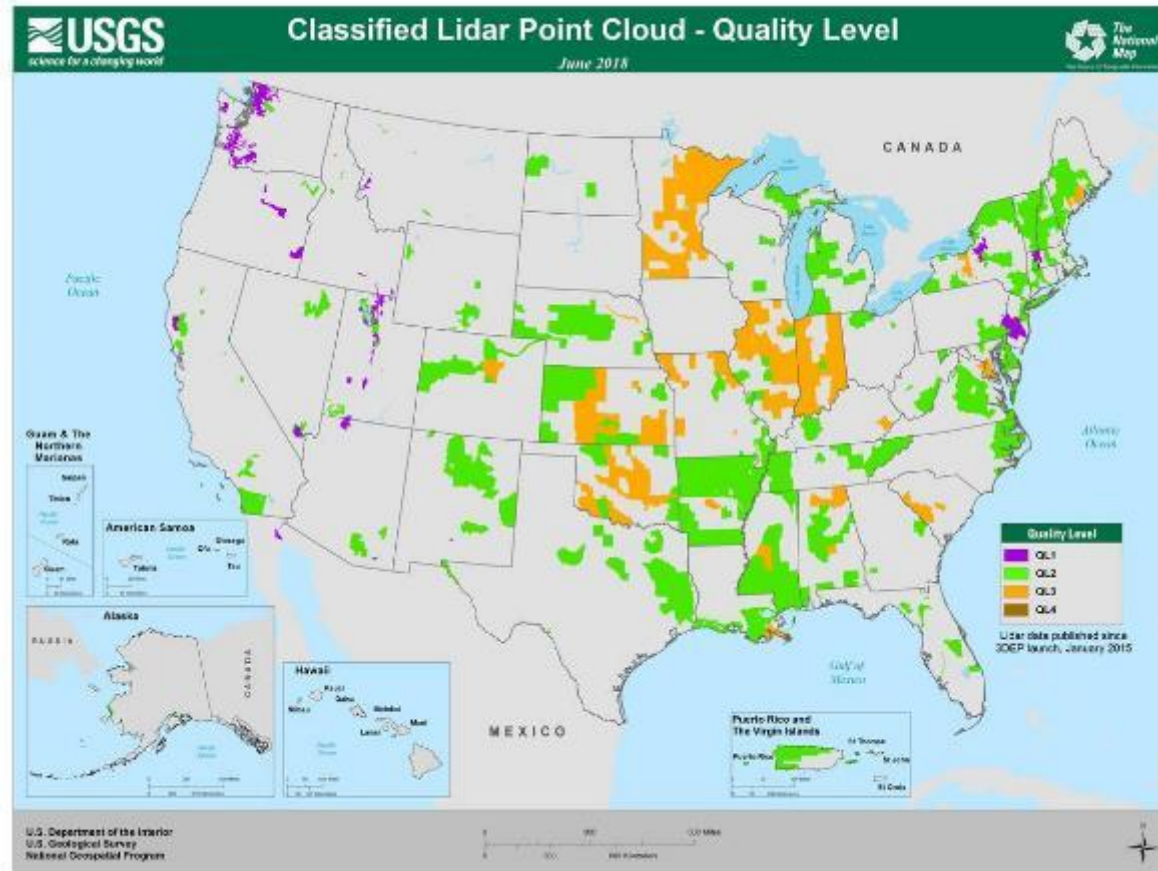Peter Jenkins, PLS, CFedS
MN PLS # 22683

Photogrammetric Unit Supervisor

Minnesota Department of Transportation

Resource: USGS 3D Elevation Program (3DEP)

https://www.usgs.gov/media/images/lidar-point-cloud-lpc-3dep-quality-level

Example of Determination Document

This determination is based on LiDAR topographic data showing the elevation of the subject. The elevation data that was used is not certified by a Licensed Land Surveyor or Professional Engineer, but meets or exceeds FEMA requirements. This determination is subject to change if more detailed data becomes available.

Questions?