Central Michigan - Emmet LiDAR - Michigan 2015

Metadata also available as - [Questions & Answers] - [Parseable text] - [XML]

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: State of Michigan (SOM)
Publication_Date: 2015
Title: Central Michigan - Emmet LiDAR - Michigan 2015
Edition: 1.0
Geospatial_Data_Presentation_Form: raster digital data
Publication_Information:
Publication_Place: Michigan
Publisher: State of Michigan
Online_Linkage: http://www.michigan.gov
Description:
Abstract:
This metadata record describes the hydro-flattened bare earth digital elevation model (DEM) derived from the classified LiDAR data for the 2015 Michigan LiDAR project covering approximately 494 square miles, in which its extents cover Emmet County.
Lidar_Information:
Lidar_Collection_Information:
Lidar_Specification: USGS Base Specification 1.0, QL2 meeting 24.5cm FVA
Lidar_Sensor: Leica ALS80
Lidar_Maximum_Returns: 4
Lidar_Nominal_Pulse_Spacing: 0.65
Lidar_Nominal_Pulse_Density: 1.67
Lidar_Aggregate_Nominal_Pulse_Density: 2.2
Lidar_Aggregate_Nominal_Pulse_Spacing: 0.71
Lidar_Flight_Height: 2250
Lidar_Flight_Speed: 135
Lidar_Scan_Angle: 32
Lidar_Scan_Frequency: 64
Lidar_Pulse_Rate: 167

Lidar_Pulse_Duration: 10
Lidar_Pulse_Width: 3
Lidar_Central_Wavelength: 1064
Lidar_Multiple_Pulses_In_Air: 1
Lidar_Beam_Divergence: 0.3
Lidar_Swath_Width: 1222
Lidar_Swath_Overlap: 30
Lidar_Coordinate_Reference_System_Name:
NAD_1983_2011_State_Plane_Michigan_Central_FIPS_2112_Ft_Intl
Lidar_Geoid: NGS Geoid12a
Lidar_Accuracy_Information:
Lidar_Calculated_Horizontal_Accuracy: 1.0
Lidar_Raw_Fundamental_Vertical_Accuracy: 0.080
Lidar_Classified_Fundamental_Vertical_Accuracy: 0.080
Lidar_Classified_Consolidated_Vertical_Accuracy: 0.139
Lidar_Supplemental_Vertical_Accuracy:
Lidar_Supplemental_Vertical_Accuracy_Type: LowVeg
Lidar_Supplemental_Vertical_Accuracy_Value: 0.133
Lidar_Supplemental_Vertical_Accuracy:
Lidar_Supplemental_Vertical_Accuracy_Type: MedVeg
Lidar_Supplemental_Vertical_Accuracy_Value: 0.143
Lidar_Supplemental_Vertical_Accuracy:
Lidar_Supplemental_Vertical_Accuracy_Type: HighVeg
Lidar_Supplemental_Vertical_Accuracy_Value: 0.179
Lidar_LAS_Information:
Lidar_LAS_Version: 1.2
Lidar_LAS_Point_Record_Format: 1
Lidar_LAS_Witheld_Point_Identifier:
Withheld (ignore) points were identified in these files using class 10.
Lidar_LAS_Overage_Point_Identifier:
Swath "overage" points were identified in these files by classifying to class 11.
Lidar_LAS_Radiometric_Resolution: 10
Lidar_LAS_Classification:
Lidar_LAS_Class_Code: 1
Lidar_LAS_Class_Description: Unclassified
Lidar_LAS_Classification:
Lidar_LAS_Class_Code: 2
Lidar_LAS_Class_Description: Bare-earth
Lidar_LAS_Classification:
Lidar_LAS_Class_Code: 7
Lidar_LAS_Class_Description: All noise
Lidar_LAS_Classification:
Lidar_LAS_Class_Code: 9
Lidar_LAS_Class_Description: Water
Lidar_LAS_Classification:
Lidar_LAS_Class_Code: 10
Lidar_LAS_Class_Description: Ignored Ground (Breakline Proximity)
Lidar_LAS_Classification:
Lidar_LAS_Class_Code: 11
Lidar_LAS_Class_Description: Withheld (overlap)

Purpose:
To acquire detailed surface elevation data for use in conservation planning, design, research, floodplain mapping, dam safety assessments, and hydrologic modeling. LAS and bare earth DEM data products are suitable for 1 foot contour generation. USGS LiDAR Base Specification 1.0, QL2. 24.5 cm FVA.
Supplemental_Information:
Project Projection, Datums and Units. Projection - State Plane Michigan Central. Horizontal datum - North American Datum of 1983 (NAD83 (2011)). Vertical datum - North American Vertical Datum of 1988 (NAVD88) using the latest geoid (Geoid12a) for converting ellipsoidal heights to orthometric heights. Units - intl feet
Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20150501
Ending_Date: 20150505
Currentness_Reference: ground condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: Unknown
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -85.120864
East_Bounding_Coordinate: -84.729138
North_Bounding_Coordinate: 45.789573
South_Bounding_Coordinate: 45.269605
Left_Bounding_Coordinate: 770000
Right_Bounding_Coordinate: 805000
Top_Bounding_Coordinate: 4220000
Bottom_Bounding_Coordinate: 4141400
Keywords:
Theme:
Theme_Keyword_Thesaurus: MI
Theme_Keyword: LiDAR
Theme_Keyword: mapping
Theme_Keyword: point cloud
Theme_Keyword: Ground points
Theme_Keyword: Unclassified points
Theme_Keyword: Water points
Theme_Keyword: Overlap points
Theme_Keyword: ALS80
Theme_Keyword: Intensity return
Theme_Keyword: LAS
Theme_Keyword: Digital Elevation Model (DEM)
Theme_Keyword: Digital Terrain Model (DTM)
Theme_Keyword: Digital Surface Model (DSM)
Theme_Keyword: IMG
Theme_Keyword: Grid
Theme_Keyword: Bare Earth
Theme_Keyword: First Return
Theme_Keyword: Contour
Place:

Place_Keyword_Thesaurus: MI
Place_Keyword: Michigan
Place_Keyword: Emmet
Place_Keyword: United States
Temporal:
Temporal_Keyword_Thesaurus: none
Temporal_Keyword: 2015
Access_Constraints:
This data may be used by the requested party for stated purposes and should not be re-distributed.
Use_Constraints:
This data is for planning purposes only and should not be used for legal or cadastral purposes. Any conclusions drawn from analysis of this information are not the responsibility of Sanborn Map Company. Users should be aware that temporal changes may have occurred since this dataset was collected and some parts of this dataset may no longer represent actual surface conditions. Users should not use these data for critical applications without a full awareness of its limitations.

Contact: State of Michigan
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Everett Root
Contact_Organization: State of Michigan
Contact_Position: Manager, Geodata Services Section
Contact_Address:
Address_Type: mailing address
Address: 111 S. Capitol Ave
City: Lansing
State_or_Province: MI
Postal_Code: 48933
Country: U.S.A.
Address: 10th Floor Romney
Contact_Voice_Telephone: 517-335-7180
Contact_Electronic_Mail_Address: `roote@michigan.gov`
Hours_of_Service: 8:00 AM - 5:00 PM
Native_Data_Set_Environment: Microsoft Windows 7; ESRI ArcCatalog 9.3.1.1850
Security_Information:
Security_Classification_System: unknown
Security_Classification: Unclassified
Security_Handling_Description: unknown

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Michigan Area 3:

The LiDAR surface was evaluated using a collection of 20 GPS surveyed checkpoints for the FVA report. The DEM was compared to this checkpoint class yielding much

better result than was required for the project.

Area 3 FVA Control Accuracy Report (feet)

--------- Report Disclaimer ---------

This report does not guarantee accuracy. The report only reflects one statistical representation of the control points, LIDAR data and surface used. This report does not replace a through quality control process.

--------- Report Summary --------- Average dz 0.072 Minimum dz -0.101 Maximum dz 0.377 Average magnitude 0.094 Root mean square 0.136 Std deviation 0.118

Attribute accuracy is tested after the LiDAR processing stage. After classification of the LiDAR data, DEMs are created using the bare earth points. The FVA, SVA, and CVA reports are generated from the comparison of the DEM and the ground control collected within the project area.

The DEM surface was evaluated using a collection of 20 GPS surveyed checkpoints for the FVA report. The DEM was compared to this checkpoint class yielding much better result than was required for the project.

Area 3 FVA Control Accuracy Report (feet)

--------- Report Disclaimer ---------

This report does not guarantee accuracy. The report only reflects one statistical representation of the control points, LIDAR data and surface used. This report does not replace a through quality control process.

--------- Report Summary --------- Average dz 0.072 Minimum dz -0.101 Maximum dz 0.377 Average magnitude 0.094 Root mean square 0.136 Std deviation 0.118

Attribute accuracy is tested after the LiDAR processing stage. After classification of the LiDAR data, DEMs are created using the bare earth points. The SVA report is generated from the comparison of the DEM and the ground control collected within the project area. This report includes the SVA class of Low Veg.

The DEM was evaluated using a collection of 20 GPS surveyed checkpoints. The DEM was compared to this checkpoint class yielding much better result than was required for the project.

Emmet County SVA Control Accuracy Report (feet)

--------- Report Disclaimer ---------

This report does not guarantee accuracy. The report only reflects one statistical representation of the control points, LIDAR data and surface used. This report does not replace a through quality control process.

--------- Report Summary --------- Average dz 0.210 Minimum dz 0.020 Maximum dz 0.504 Average magnitude 0.210 Root mean square 0.254 Std deviation 0.147

Attribute accuracy is tested after the LiDAR processing stage. After classification of the LiDAR data, DEMs are created using the bare earth points. The SVA report is generated from the comparison of the DEM and the ground control collected within the project area. This report includes the SVA class of Medium Veg.

The DEM was evaluated using a collection of 20 GPS surveyed checkpoints. The DEM was compared to this checkpoint class yielding much better result than was required for the project.

Area 3 SVA Control Accuracy Report (feet)

--------- Report Disclaimer ---------

This report does not guarantee accuracy. The report only reflects one statistical representation of the control points, LIDAR data and surface used. This report does not replace a through quality control process.

--------- Report Summary --------- AAverage dz 0.259 Minimum dz -0.060 Maximum dz 0.713 Average magnitude 0.265 Root mean square 0.305 Std deviation 0.164

Attribute accuracy is tested after the LiDAR processing stage. After classification of the LiDAR data, DEMs are created using the bare earth points. The SVA report is generated from the comparison of the DEM and the ground control collected within the project area. This report includes the SVA class of High Veg.

The DEM was evaluated using a collection of 21 GPS surveyed checkpoints. The DEM was compared to this checkpoint class yielding much better result than was required for the project.

Area 3 SVA Control Accuracy Report (feet)

--------- Report Disclaimer ---------

This report does not guarantee accuracy. The report only reflects one statistical representation of the control points, LIDAR data and surface used. This report does not replace a through quality control process.

--------- Report Summary --------- Average dz 0.071 Minimum dz -0.638 Maximum dz 0.588 Average magnitude 0.213 Root mean square 0.273 Std deviation 0.270

Attribute accuracy is tested after the LiDAR processing stage. After classification of the LiDAR data, DEMs are created using the bare earth points. The CVA report is generated from the comparison of the DEM and the ground control collected within the project area.

The DEM was evaluated using a collection of 81 GPS surveyed checkpoints. The DEM was compared to all checkpoint classes yielding much better result than was required for the project.

Area 3 CVA Control Accuracy Report (feet)

--------- Report Disclaimer ---------

This report does not guarantee accuracy. The report only reflects one statistical representation of the control points, LIDAR data and surface used. This report does not replace a through quality control process.

--------- Report Summary --------- Average dz 0.152 Minimum dz -0.638 Maximum dz 0.713 Average magnitude 0.196 Root mean square 0.250 Std deviation 0.200

Logical_Consistency_Report:

LiDAR data is collected within the project area and processed. After the DEMs were created, the dataset was verified against control. Control was collected in 5 areas. Area 3 includes Emmet and Mackinac. Accuracy results are reported for area 3.

Completeness_Report:

LiDAR data is collected for the project area. Post processing of the simultaneously acquired GPS/INS is performed and applied to the laser returns to output a point cloud in the specified project coordinate system and datums. The point cloud data is then subjected to automated classification routines to assign all points in the point cloud to ground, water, overlap and unclassified point classes. Anomalous laser returns that occur infrequently are removed entirely from the data set. Once clean bare earth points are established, DEMs are created using bare earth points and hydro features. The DEM surface is then compared to the survey checkpoints. These accuracies must pass the Fundamental Vertical Accuracy, Supplemental Vertical Accuracy, and Consolidated Vertical Accuracy specifications.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

Horizontal positional accuracy for Emmet LiDAR is dependent upon the quality of the GPS/INS solution, sensor calibration and ground conditions at the time of data capture. The standard system results for horizontal accuracy meet or exceed the project specified 1.0 meter RMSE.

Quantitative_Horizontal_Positional_Accuracy_Assessment:

Horizontal_Positional_Accuracy_Value: 1.0

Horizontal_Positional_Accuracy_Explanation:

Emmet County, this value is computed by comparing ground control to a DEM derived from the classified LiDAR data and represents the RMSE of residuals on controls within the project area.

Vertical_Positional_Accuracy:

Vertical_Positional_Accuracy_Report:

For the DEM data derived from the classified point cloud, the FVA, SVA, and

CVA were computed. The vertical accuracy was tested with independent survey check points located in various terrain types within Emmet County. These check points were not used in the calibration or post processing of the lidar point cloud data. The survey check points were distributed throughout the block area. Specifications for this project require that the FVA be 24.5 cm or better @ 95 percent confidence level.

Quantitative_Vertical_Positional_Accuracy_Assessment:

Vertical_Positional_Accuracy_Value:

0.041m RMSE, or 0.080FVA @ 95 percent confidence level in open terrain using RMSEz x 1.9600

Vertical_Positional_Accuracy_Explanation:

The FVA was tested using 20 independent survey check points located in flat terrain types within Area 3. The survey checkpoints were distributed throughout the block area. The 20 independent check points were surveyed using static GPS base stations collecting point location for 20 minute intervals. Elevations were measured for the x,y,z location of each check point. Elevations interpolated from the DEM surface were then compared to the elevation values of the surveyed control. The RMSE was computed to be 0.041 m. AccuracyZ has been tested to meet 12.5 cm Fundamental Vertical Accuracy at 95 Percent confidence level using RMSE(z) x 1.9600 as defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASRPS Guidelines.

Quantitative_Vertical_Positional_Accuracy_Assessment:

Vertical_Positional_Accuracy_Value:

0.076m RMSE, or 0.139m CVA @ 95th Percentile using all FVA and SVA class checkpoints (CVA)

Vertical_Positional_Accuracy_Explanation:

The CVA was tested using 81 independent survey check points located in various terrain types within Area 3. The survey checkpoints were distributed throughout the block area. The 81 independent check points contained all FVA and SVA class points and were surveyed using static GPS base stations collecting point location for 20 minute intervals. Elevations were measured for the x,y,z location of each check point. Elevations interpolated from the DEM surface were then compared to the elevation values of the surveyed control. The RMSE was computed to be 0.076m, or 0.139m @ 95th Percentile defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASRPS Guidelines.

Quantitative_Vertical_Positional_Accuracy_Assessment:

Vertical_Positional_Accuracy_Value: 0.077m RMSE, or 0.133m SVA @ 95th Percentile

Vertical_Positional_Accuracy_Explanation:

The SVA was tested using 20 independent survey check points located in low vegetation terrain types within Area 3. The survey checkpoints were distributed throughout the block area. The 20 independent check points were surveyed using static GPS base stations collecting point location for 20 minute intervals. Elevations were measured for the x,y,z location of each check point. Elevations interpolated from the DEM surface were then compared to the elevation values of the surveyed control. The RMSE was computed to be 0.077m, or 0.133m @ 95th Percentile

defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASRPS Guidelines.

Quantitative_Vertical_Positional_Accuracy_Assessment:

Vertical_Positional_Accuracy_Value: 0.093m RMSE, or 0.143m SVA @ 95th Percentile

Vertical_Positional_Accuracy_Explanation:

The SVA was tested using 20 independent survey check points located in medium vegetation terrain types within Area 3. The survey checkpoints were distributed throughout the block area. The 20 independent check points were surveyed using static GPS base stations collecting point location for 20 minute intervals. Elevations were measured for the x,y,z location of each check point. Elevations interpolated from the DEM surface were then compared to the elevation values of the surveyed control. The RMSE was computed to be 0.093m, or 0.143m @ 95th Percentile defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASRPS Guidelines.

Quantitative_Vertical_Positional_Accuracy_Assessment:

Vertical_Positional_Accuracy_Value: 0.083m RMSE, or 0.179m SVA @ 95th Percentile

Vertical_Positional_Accuracy_Explanation:

The SVA was tested using 21 independent survey check points located in high vegetation terrain types within Area 3. The survey checkpoints were distributed throughout the block area. The 21 independent check points were surveyed using static GPS base stations collecting point location for 20 minute intervals. Elevations were measured for the x,y,z location of each check point. Elevations interpolated from the DEM surface were then compared to the elevation values of the surveyed control. The RMSE was computed to be 0.083m, or 0.179m @ 95th Percentile defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASRPS Guidelines.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Sanborn Map Company Inc.

Publication_Date: Unpublished Material

Title: LiDAR Data

Edition: 1.0

Geospatial_Data_Presentation_Form: Remote sensing image

Publication_Information:

Publication_Place: None

Publisher: None

Type_of_Source_Media: disc

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2015

Source_Currentness_Reference: ground condition

Source_Citation_Abbreviation: LIDAR and GPS_RAW
Source_Contribution:
Aerial LiDAR and GPS/IMU data are recorded for the defined project area at an altitude, flight speed, scanner swath width and scanner pulse frequency to achieve the design goals of the project.
Source_Information:
Source_Citation:
Citation_Information:
Originator: Sanborn Map Company Inc.
Publication_Date: 2010
Title: Ground control
Edition: 1.0
Geospatial_Data_Presentation_Form: tabular digital data
Publication_Information:
Publication_Place: None
Publisher: None
Type_of_Source_Media: disc
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015
Source_Currentness_Reference: Ground condition
Source_Citation_Abbreviation: CONT
Source_Contribution:
Targeted ground control is used to create a digital control file and control report as well as QC check of LiDAR accuracy. Predefined points (NGS when available) within the project area are targeted.
Source_Information:
Source_Citation:
Citation_Information:
Originator: Sanborn Map Company Inc.
Publication_Date: Unpublished material
Title: Post processed GPS/INS
Edition: 1.0
Geospatial_Data_Presentation_Form: Tabular digital data
Source_Scale_Denominator: 1200
Type_of_Source_Media: disk
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015
Source_Currentness_Reference: Ground condition
Source_Citation_Abbreviation: GPS
Source_Contribution:
Post processed GPS/INS is applied to the lidar point data to georeference each point in the project coordinate system
Source_Information:
Source_Citation:
Citation_Information:
Originator: Sanborn Map Company Inc.
Publication_Date: Unpublished material

Title: Post processed lidar
Edition: 1.0
Geospatial_Data_Presentation_Form: Point digital data
Source_Scale_Denominator: 1200
Type_of_Source_Media: Disk
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: LAS
Source_Contribution:
The post processed lidar data has been projected and oriented in the specified coordinate system as an un-classified point cloud.
Source_Information:
Source_Citation:
Citation_Information:
Originator: Sanborn Map Company Inc.
Publication_Date: Unpublished material
Title: Classified lidar
Edition: 1.0
Geospatial_Data_Presentation_Form: Point digital data
Source_Scale_Denominator: 1200
Type_of_Source_Media: disk
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: LAS
Source_Contribution:
The classified lidar point cloud is used to derive various data products such as, but not limited to, bare earth gridded DEM, triangulated irregular networks (TIN), contours, digital surface models (DSM). The output format is fully compliant LAS v1.2 or v1.3, Point Record Format 1
Source_Information:
Source_Citation:
Citation_Information:
Originator: State of Michigan
Publication_Date: Unpublished Material
Title: Tile Definition
Edition: 1.0
Geospatial_Data_Presentation_Form: raster digital data
Source_Scale_Denominator: 1200
Type_of_Source_Media: disk
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: TLDEF

Source_Contribution:
The tile definition defines discreet non-overlapping rectangular areas used as cut lines to break up the large classified lidar dataset into smaller, more manageable data tiles. Each tile is 2500ft by 2500ft in dimension.

Process_Step:
Process_Description:
At selected locations throughout the site, accurate GPS coordinates and elevations are surveyed and the points are marked with targets.
Source_Used_Citation_Abbreviation: None
Process_Date: 2015
Source_Produced_Citation_Abbreviation: CONT

Process_Step:
Process_Description:
New LiDAR data is captured for the project area using a Leica ALS80 w/MPiA LiDAR instrument an integrated IPAS20 GPS/INS system mounted within a Aero Commander twin engine airplane.
Source_Used_Citation_Abbreviation: None
Process_Date: 2015
Source_Produced_Citation_Abbreviation: LIDAR, GPS_RAW

Process_Step:
Process_Description:
The airborne GPS data is post-processed in Intertial Explorer software and LEICA CloudPro software to determine the LiDAR sensor's angle and orientation in the terrain (project) coordinate system and datums during the survey.
Source_Used_Citation_Abbreviation: GPS_RAW
Process_Date: 2015
Source_Produced_Citation_Abbreviation: GPS_SOL

Process_Step:
Process_Description:
The post processed GPS/INS solution is applied to the raw lidar data to orient and project the data points into the project area reference system as an unclassified point cloud.
Source_Used_Citation_Abbreviation: LIDAR, GPS_SOL
Process_Date: 2015
Source_Produced_Citation_Abbreviation: LAS

Process_Step:
Process_Description:
The georeferenced lidar data is then classified and edited in Terrasolid Terrascan software. Data is classified to produce: Class 1: unclassified, Class 2: ground, Class 7: low point, Class 9: water, Class 10: ignored ground, Class 11: withheld.
Source_Used_Citation_Abbreviation: CONT, GPS_SOL, LIDAR
Process_Date: 2015
Source_Produced_Citation_Abbreviation: LAS

Process_Step:
Process_Description:
The bare earth points of the processed lidar data are then output to a DEM tile format. The DEM is compared to the ground control and elevation differences between the surface and surveyed elevation are recorded in tabular form. Vertical accuracy statistics are then developed to produce vertical RMSE and

overall accuracy estimates and reports.
Source_Used_Citation_Abbreviation: CONT, LIDAR
Process_Date: 2015
Source_Produced_Citation_Abbreviation: None

Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Point

Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1983
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137.000000
Denominator_of_Flattening_Ratio: 298.257222101004
Planar:
Map_Projection:
Map_Projection_Name: Lambert Conformal Conic
Lambert_Conformal_Conic:
Standard_Parallel: 44.1833333333333
Standard_Parallel: 45.7
Longitude_of_Central_Meridian: -84.3666666666667
Latitude_of_Projection_Origin: 43.3166666666667
False_Easting: 19685039.3700787
False_Northing: 0
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 2
Ordinate_Resolution: 2
Planar_Distance_Units: international feet
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Datum_Name: North American Vertical Datum of 1988(GEOID12a)
Altitude_Resolution: 0.1
Altitude_Distance_Units: feet
Altitude_Encoding_Method:
Explicit elevation coordinate included with horizontal coordinates

---

Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Everett Root
Contact_Organization: State of Michigan

Contact_Position: Manager, Geodata Services Section
Contact_Address:
Address_Type: mailing address
Address: 111 S. Capitol Ave
City: Lansing
State_or_Province: MI
Postal_Code: 48933
Country: U.S.A.
Address: 10th Floor Romney
Contact_Voice_Telephone: 517-335-7180
Contact_Electronic_Mail_Address: `roote@michigan.gov`
Hours_of_Service: 8:00 AM - 5:00 PM
Resource_Description: Michigan 2015 LiDAR project
Distribution_Liability:
The State of Michigan Geographic Information Systems digital data have been tested and their documentation carefully reviewed. However, the State of Michigan and its representatives make no warranty or representation, either expressed or implied, with respect to the digital data and their documentation, their quality, performance, merchantability, or fitness for a particular purpose. The digital data are distributed on "as is" basis, and the user assumes all risk to their quality, the results obtained from their use, and the performance of the data. In no event will the State of Michigan or its representatives be liable for any direct, indirect, special, incidental or consequential damages resulting from and defect in the State of Michigan or in their documentation. This disclaimer of warranty is exclusive and in lieu of all others, oral or written, express or implied. No agent or employee is authorized to make any modification, extension, or addition to this warranty.
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: LAS
Format_Version_Number: 1.2
Transfer_Size: 2000
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: http://www.michigan.gov
Access_Instructions: unknown
Offline_Option:
Offline_Media: 5 - 1/2 inch hard drive
Recording_Format: LAS
Fees: unknown
Ordering_Instructions: State of Michigan
Turnaround: unknown
Available_Time_Period:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2015

Metadata_Reference_Information:

Metadata_Date: 2015
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Kris Andersen
Contact_Organization: Sanborn Map Co
Contact_Position: Project Manager
Contact_Address:
Address_Type: mailing address
Address: 1935 Jamboree Dr
City: Colorado Springs
State_or_Province: CO
Postal_Code: 80920
Country: U.S.A.
Contact_Voice_Telephone: 719.264.5490
Contact_Electronic_Mail_Address: kandersen@sanborn.com
Hours_of_Service: 8:00 AM - 5:00 PM
Metadata_Standard_Name: FGDC CSDGM
Metadata_Standard_Version: FGDC-STD-001-1998

Entity_and_Attribute_Information:
Overview_Description:
Entity_and_Attribute_Detail_Citation: USGS Base Specification 1.0, QL2 meeting 24.5cm FVA
Entity_and_Attribute_Overview:
Bare Earth only

Classes: 2 - Bare-Earth Ground

Generated by mp version 2.9.33 on Wed Sep 14 09:54:02 2016