Massachusetts Historic Preservation Conference 2017

Available on the App Store

ANDROID APP ON Google play

Download our conference app!

(1) Go to the AppStore or Google Play.
(2) Find and install:

CrowdCompass AttendeeHub

(3) Open the app. (4) Search for our event:

2017 MA Historic Preservation Conference

Session 1D

(9:45-11:30am)

What's Buzzing? Drones for Historic Preservation

Jack Glassman

Historical Architect, NPS

Benjamin Haavik

Team Leader of Property Care, HNE

Kelly Streeter

Structural Engineer and Partner, Vertical Access LLC

Tim Sturgeon

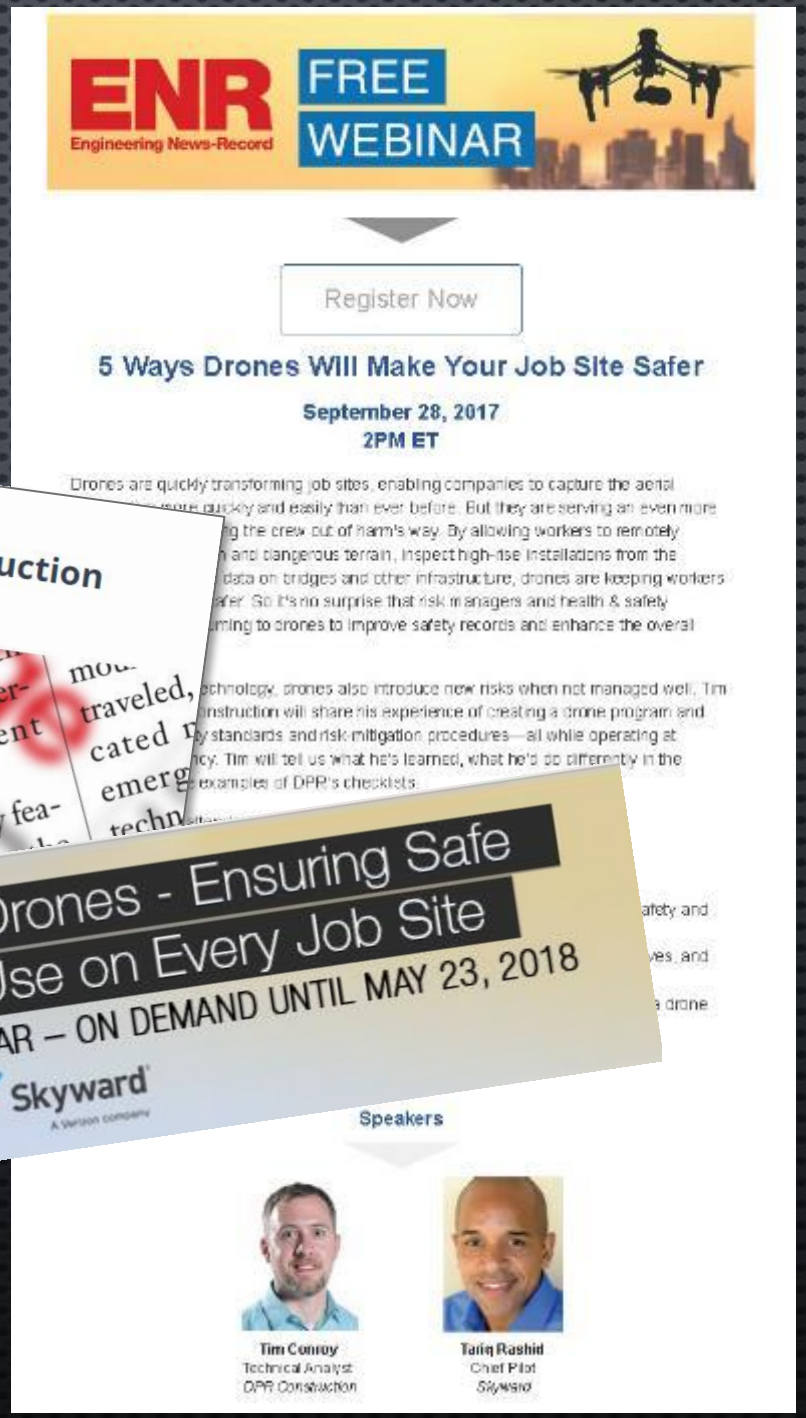
Researcher, Entrepreneur, Pilot, QuadcopterDigital LLC

What's Buzzing? Drones for Preservation

Friday September 22, 2017, 9:45–11:30 AM
Massachusetts Historic Preservation Conference
UMass Lowell Inn & Conference Center

- Jack Glassman AIA, NPS/NER (moderator)
- Tim Sturgeon, PhD, QuadcopterDigital
- Ben Haavik, Historic New England
- Kelly Streeter PE, Vertical Access LLC

Growing interest in drones for construction…



In the government, cautionary tales…

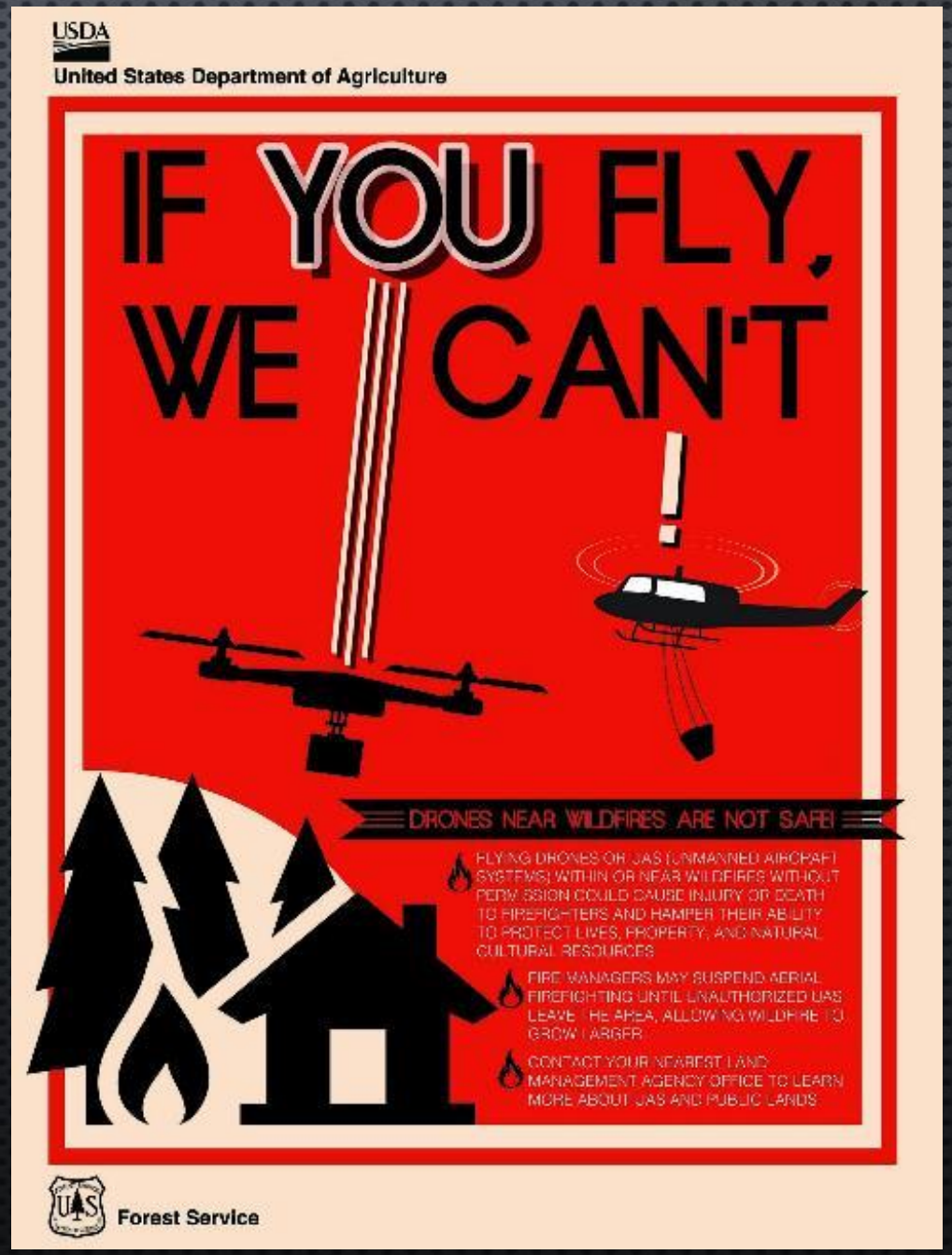
"…to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." "National Park Service Organic Act," 1916

Public use of UAS allowed in national parks prior to June 2014

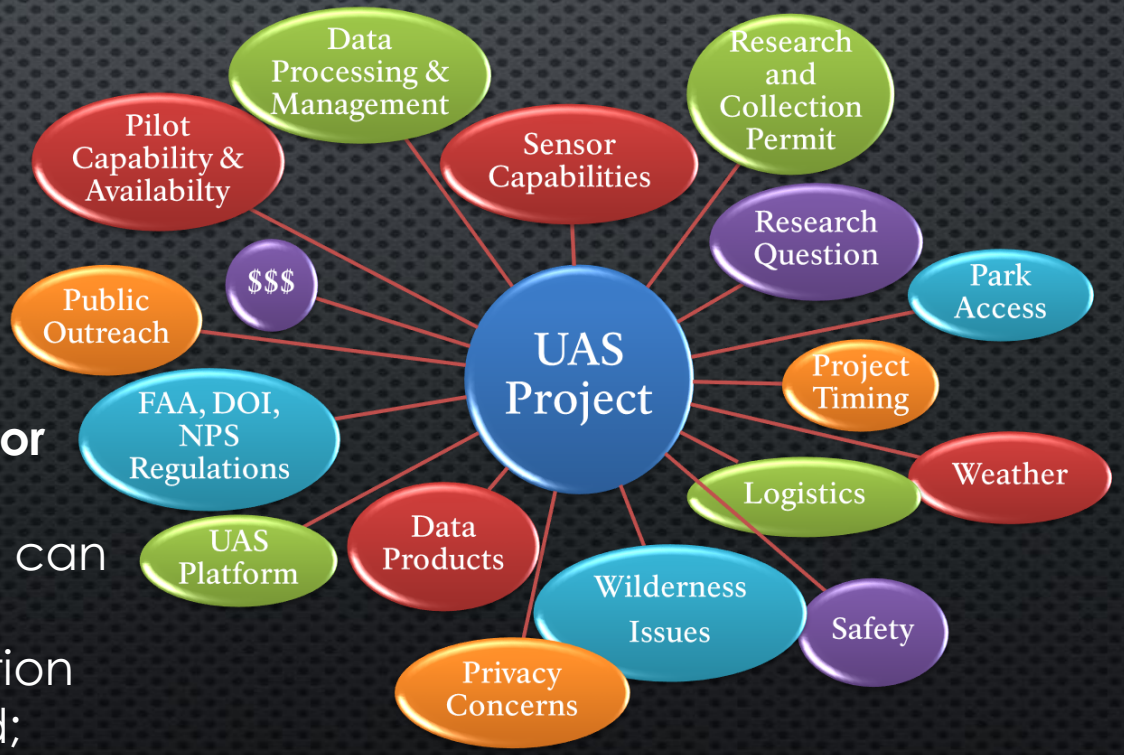
- YouTube videos galore…
- "Tipping point":
  - A drone lands on Lincoln's head at Mount Rushmore
  - Another crashes into Yellowstone's Grand Prismatic Spring
  - Wildlife harassment of Zion's Bighorn Sheep

U.S. Department of Agriculture

- Interference with operations



The use of UAS (**Unmanned Aircraft Systems**) significantly expands government agencies' ability to obtain remote data critical to fulfilling diverse mission objectives. However, this use raises distinct **privacy**, **civil rights**, and **civil liberties** concerns that must be addressed…



U.S. Department of the Interior

- Privacy Act of 1974
- UAS-collected information can include "PII"
- Data retention, dissemination
- Administrative use defined; operator use requirements

SCIENCESHOT

PHOTO BY MICHAEL MOORE, WOODS HOLE OCEANOGRAPHIC INSTITUTION; ACQUIRED UNDER NATIONAL MARINE FISHERIES SERVICE PERMIT 17355-01 AND NOAA CLASS G FLIGHT AUTHORIZATION 2015-ESA-4-NOAA)

Drones give whales a breathalyzer test

Some Uses of Unmanned Aerial Vehicles (UAVs) for Historic Preservation

Tim Sturgeon
Owner, QuadcopterDigital LLC
Haverhill, MA | 978-457-2663

What's Buzzing? Drones for Preservation
Friday September 22 | 9:45–11:30 AM
2017 Massachusetts Historic Preservation Conference
UMass Lowell Inn & Conference Center

QuadcopterDigital LLC
Aerial Mapping and Photography
www.quadcopterdigital.com

Some Historic Preservation Applications

- Marketing and promotion (video)
- Inspection and repair planning & assessment (photo)
- Mapping (grades, orthomosaics, and volume measurements)
- Documentation of structures
  - 3D building reconstruction (modeling)
  - Documenting and sharing dimensional information on structures and building features
  - Management of exterior photo libraries

QuadcopterDigital LLC
Aerial Mapping and Photography

What are UAVs?

Cheap, easy to use

Expensive, difficult to use

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

Use Case:

Historic New England's Cogswell's Grant property in Essex, MA

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

A new point of view

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

Close inspection

Repair planning

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

Close inspection

Repair assessment

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

Mapping and Modeling

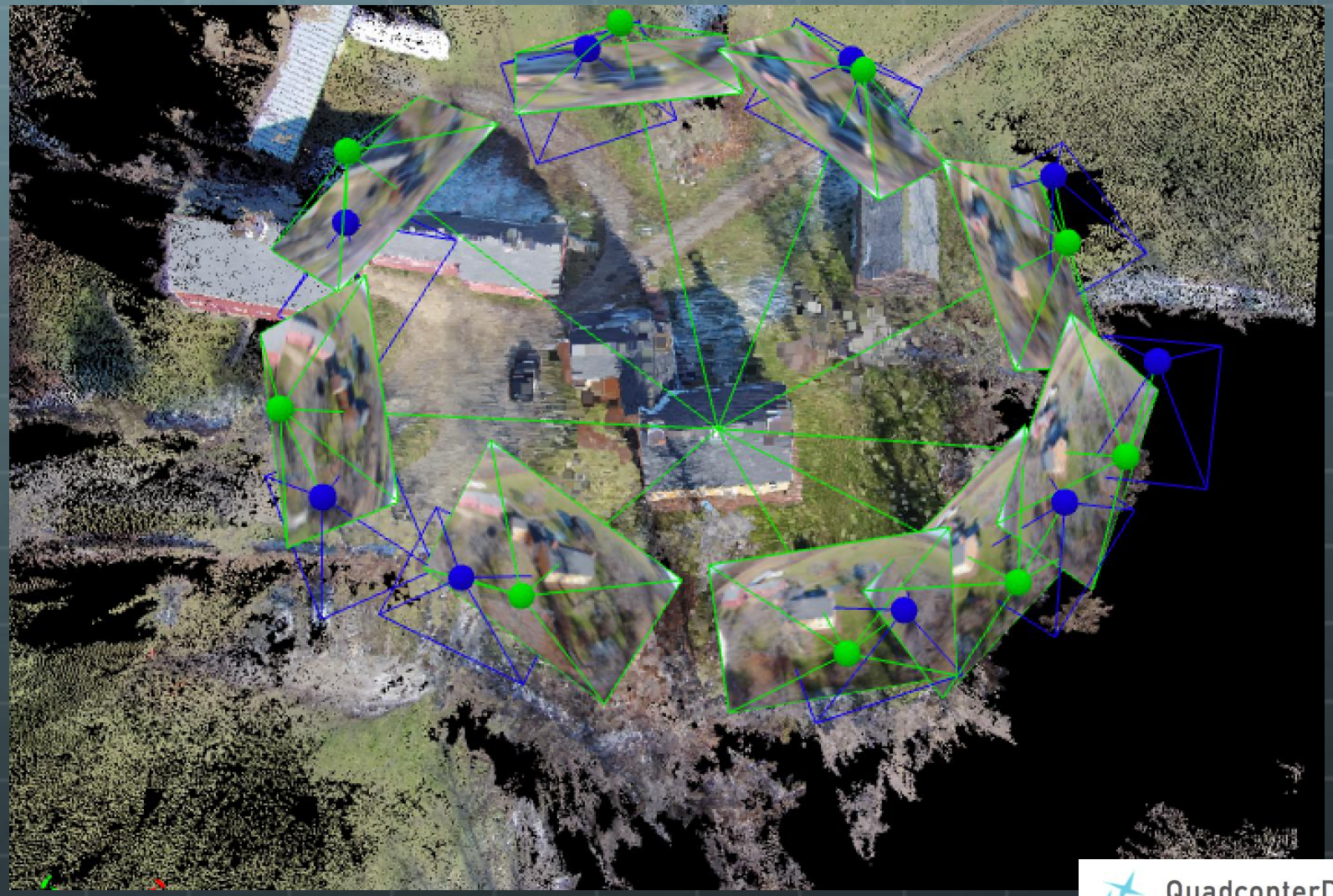
- Technology: close range photogrammetry
- Inputs: still photos with sufficient overlap
- UAV serves as camera platform
- Some applications
  - Orthomosaics (2D, mainly construction applications)
  - Grade mapping (3D, mainly construction applications)
  - 3D building reconstruction
  - Documentation of grades, structures, conditions, and dimensions on a specific date in time and over time

    SPECIFIC HISTORIC PRESERVATION APPLICATIONS

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

Photogrammetry

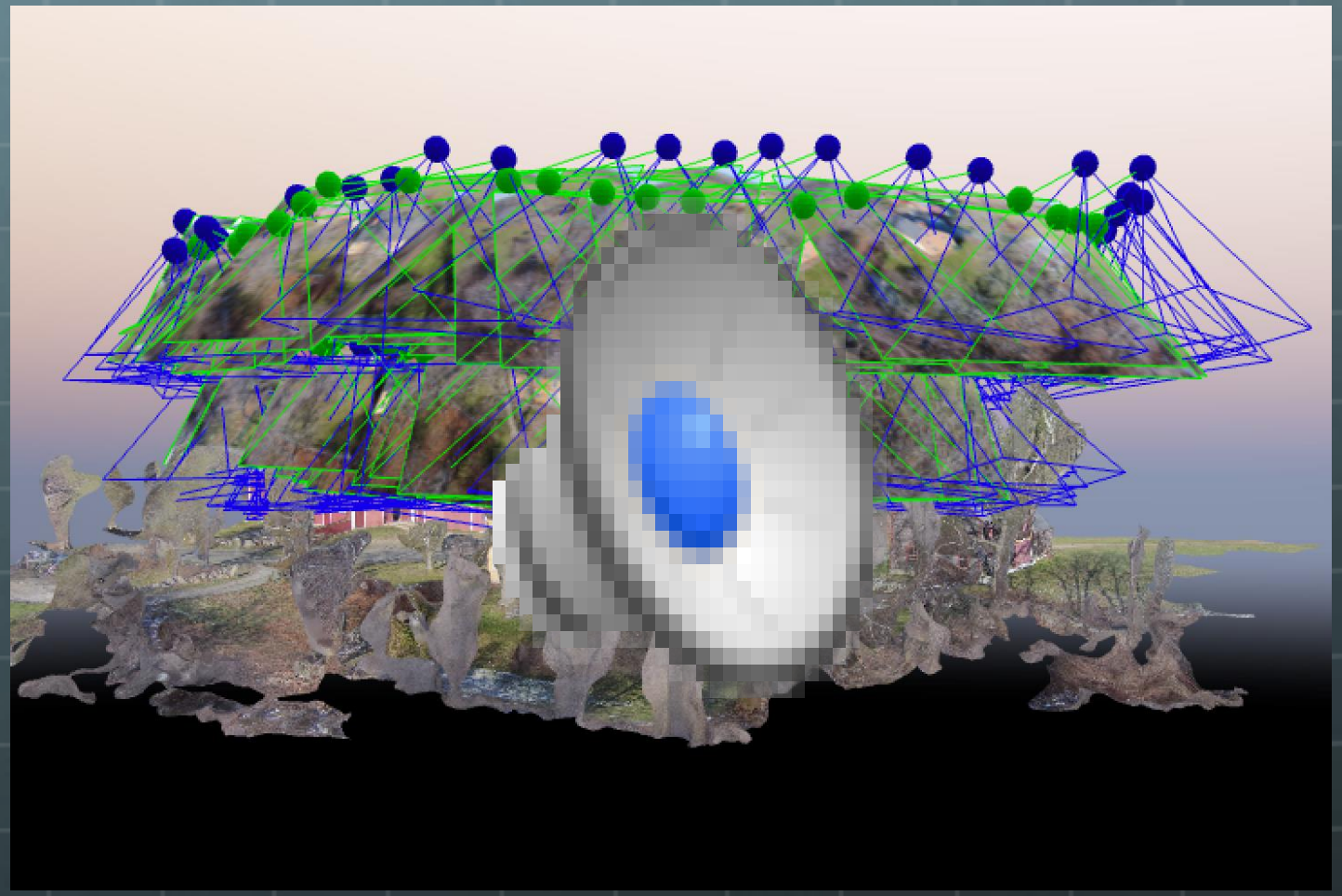


QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

3D Reconstruction

Making the model



QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

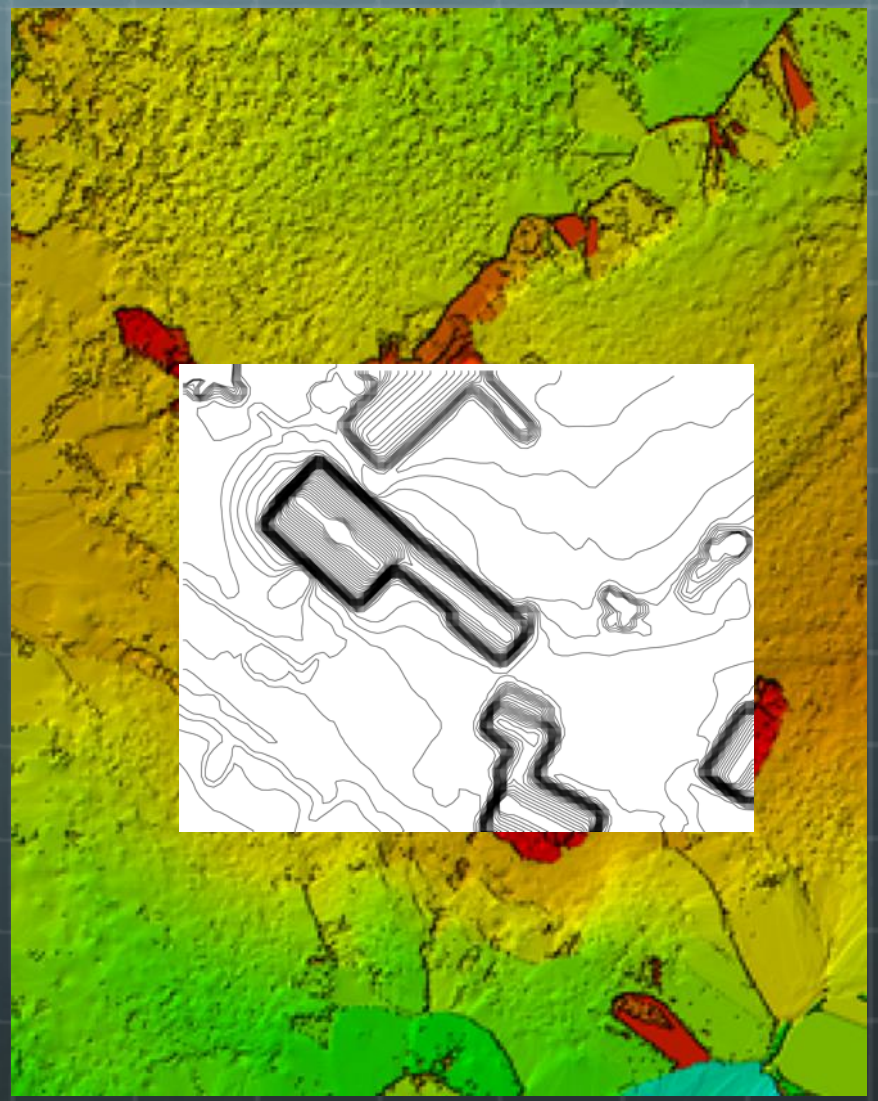
Orthomosaics

KML – Google Earth Tile

QuadcopterDigital LLC
Aerial Mapping and Photography

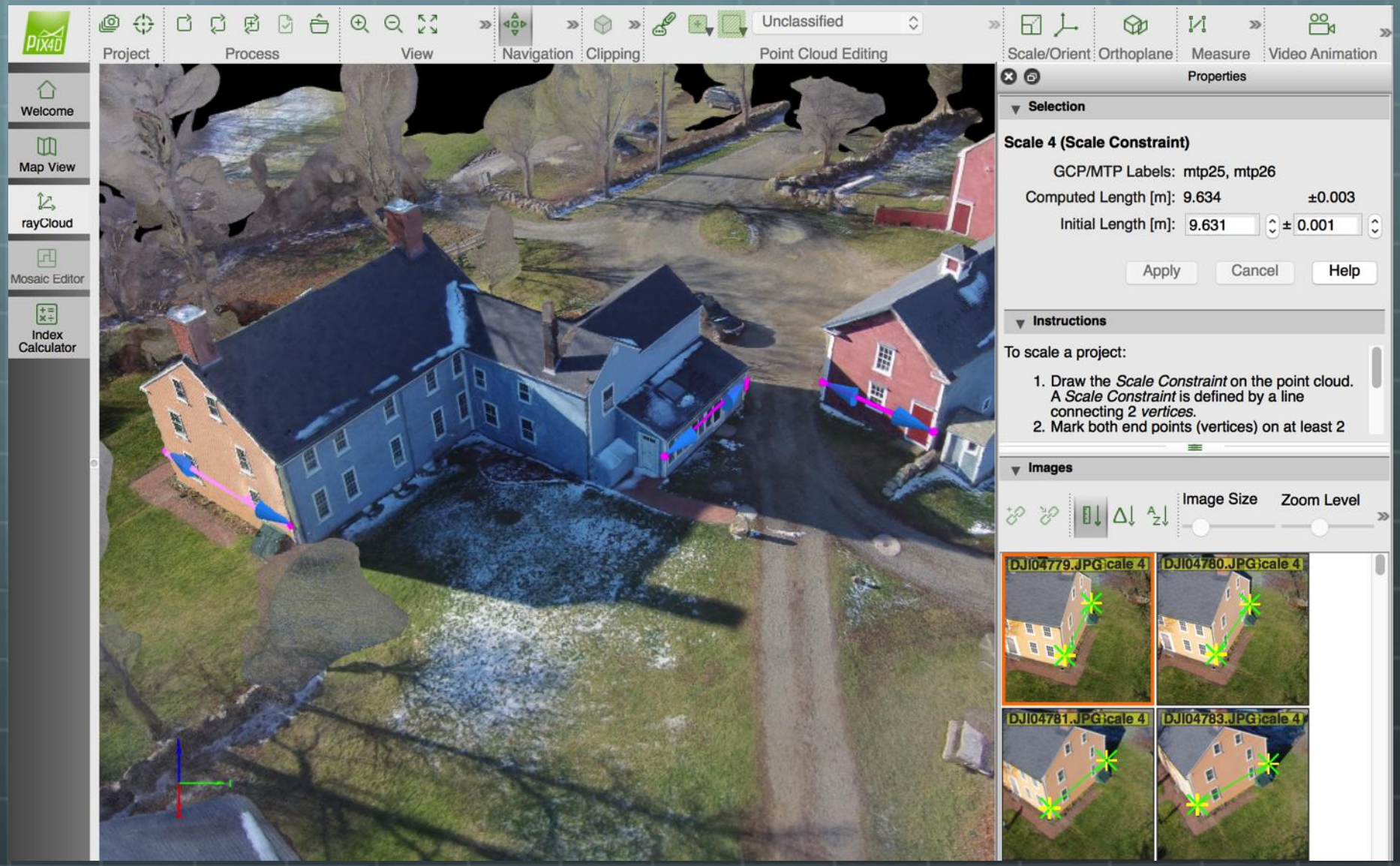
Go to:
https://skfb.ly/LLNq

Grades (existing)



QuadcopterDigital LLC
Aerial Mapping and Photography

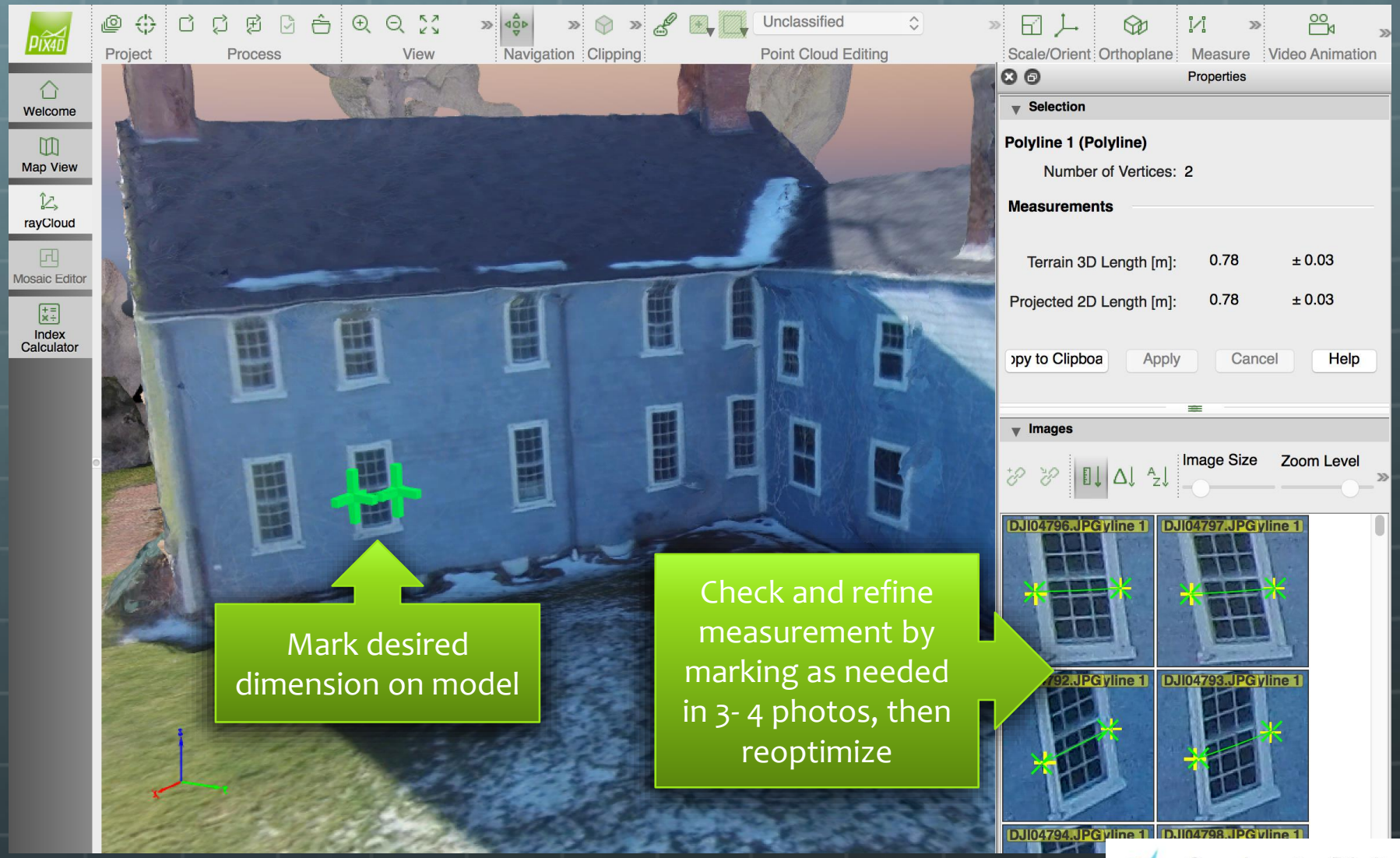
3D Reconstruction – Scaling the model



QuadcopterDigital LLC
Aerial Mapping and Photography

Collecting dimensional data

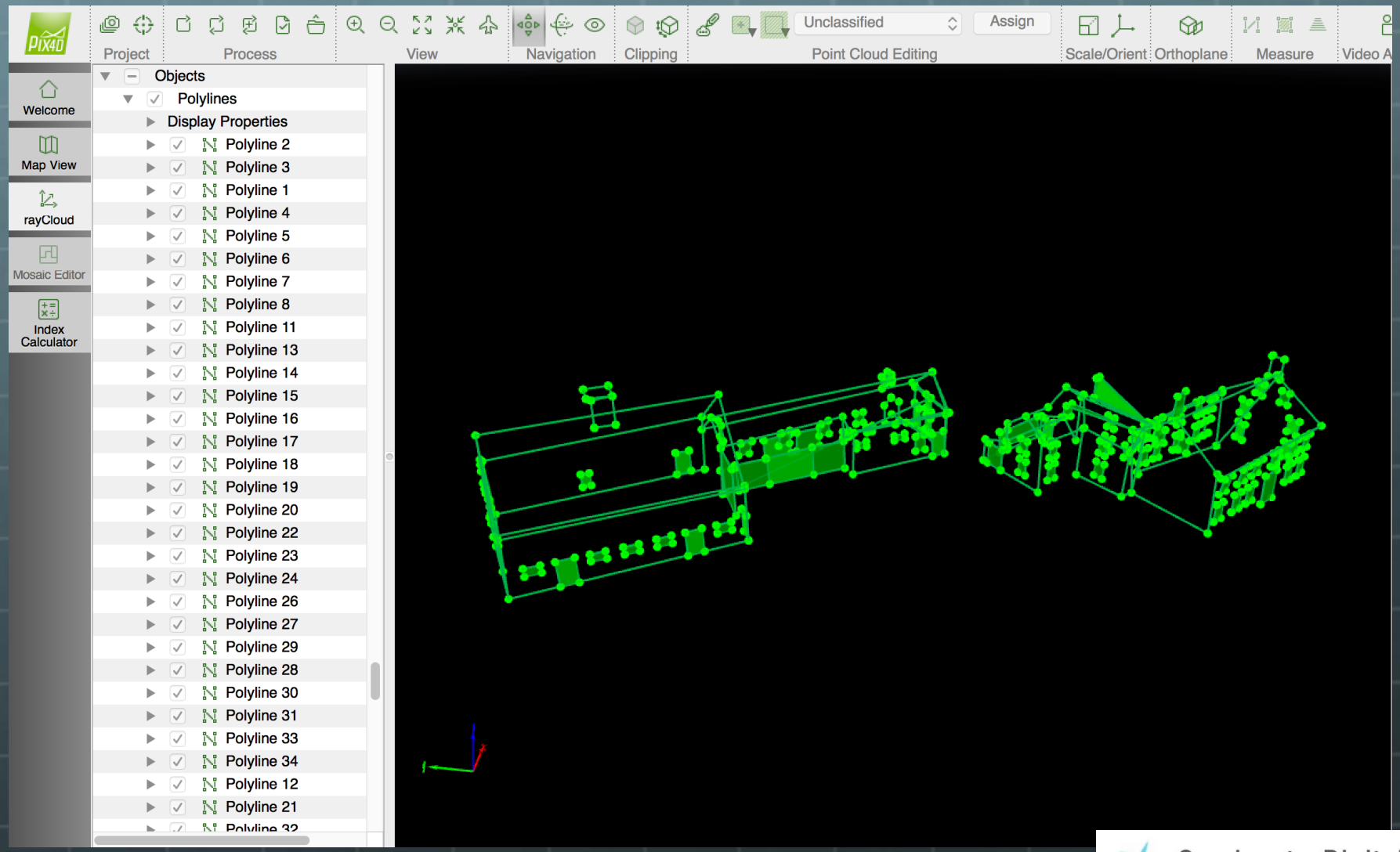
Polyline result = .78 meters = 30.708” = 2’6$^{3/4}$” (2’ 7$^{3/4}$” actual)



QuadcopterDigital LLC
Aerial Mapping and Photography

Sharing dimensional data

Facades and features



QuadcopterDigital LLC
Aerial Mapping and Photography

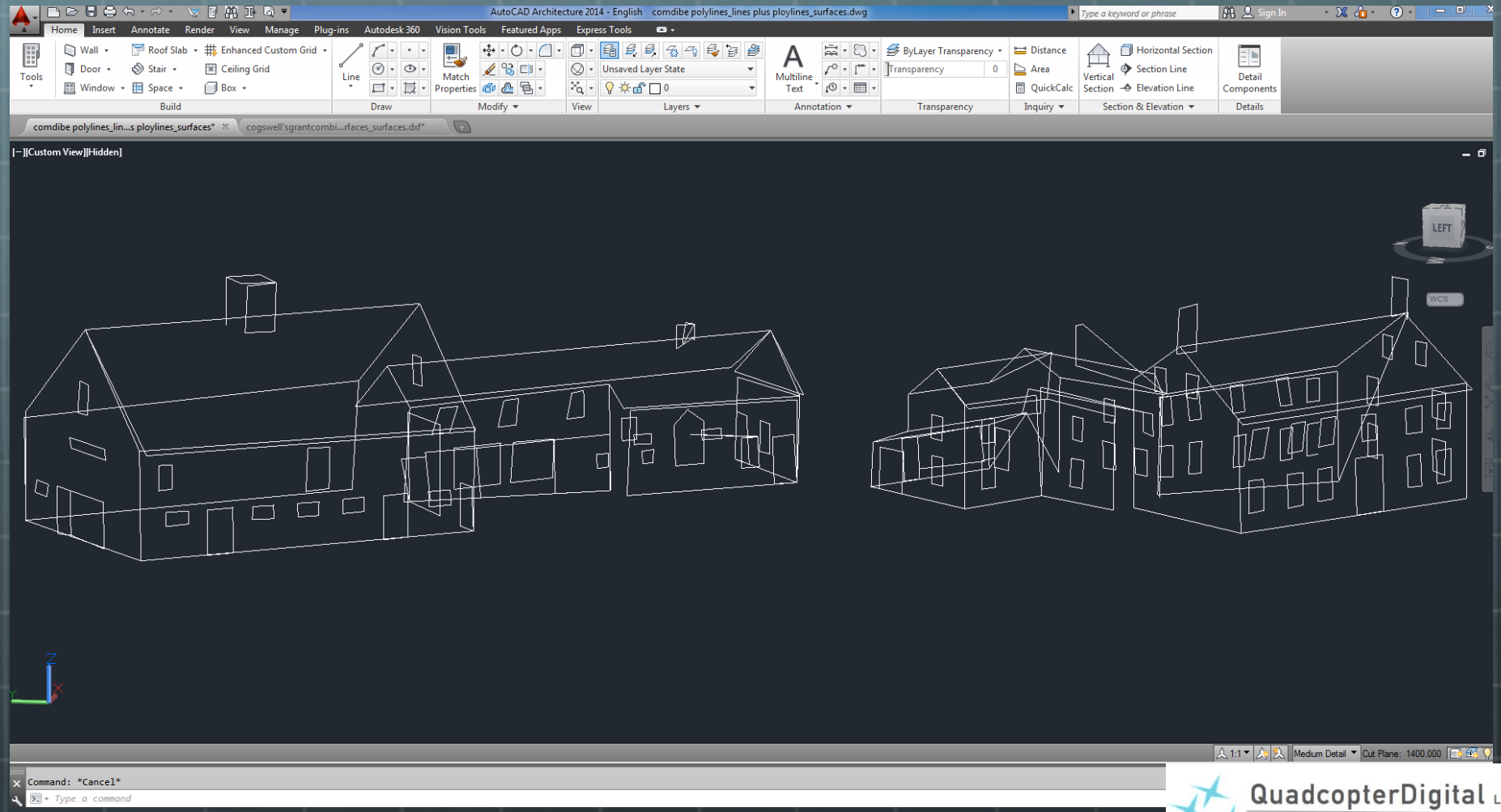
Sharing dimensional data

3D Digitized objects		
Polyline, Surface, Volume (mesh)		
File format	**Software**	**Use**
.shp	Global Mapper ArcGIS Quantum GIS	Visualization Editing
.dxf	Global Mapper ArcGIS Quantum GIS AutoCAD	Visualization Editing
.kml	Google Earth	Visualization
.dgn	MicroStation	Visualization Editing

QuadcopterDigital LLC
Aerial Mapping and Photography

Sharing dimensional data

AutoCAD example

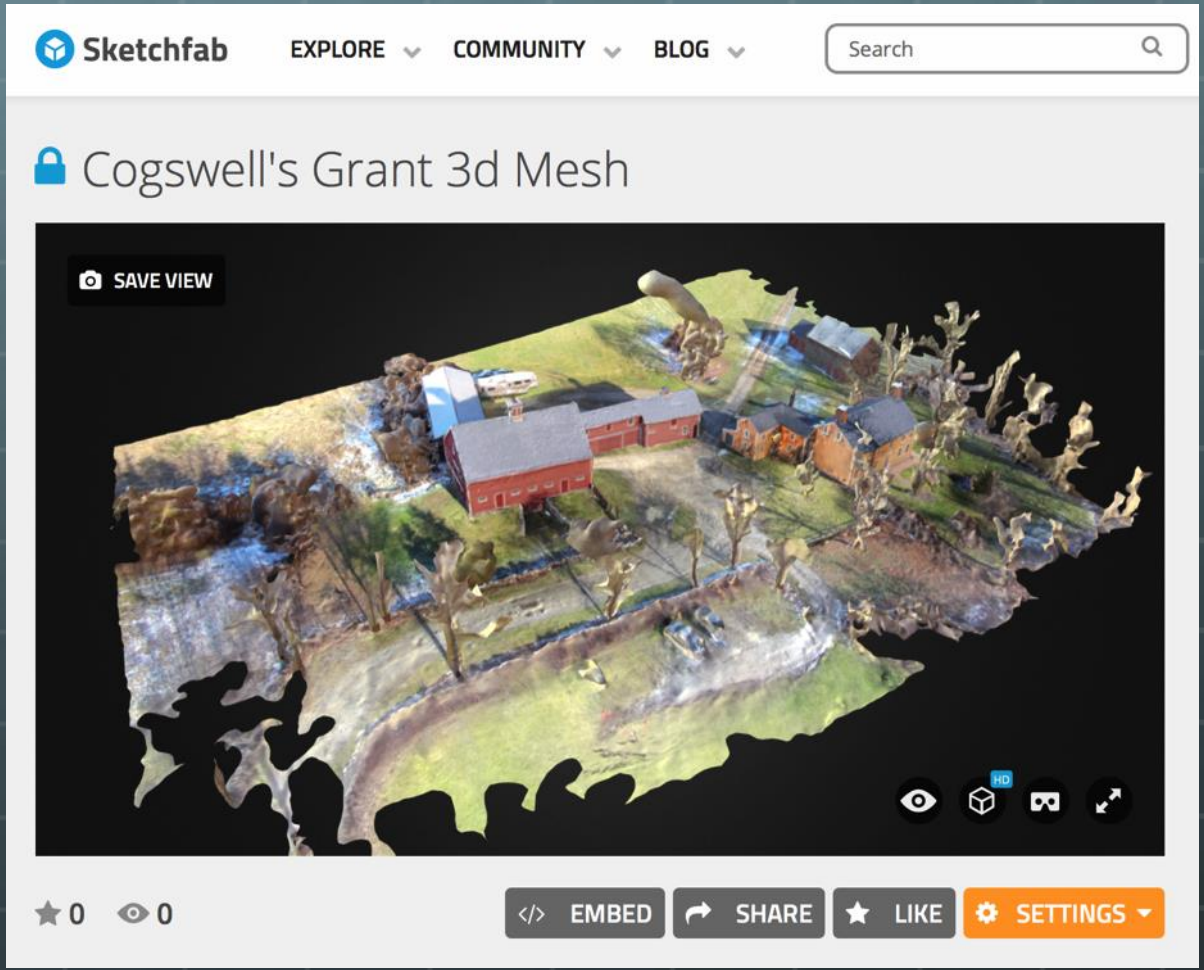


QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

3D Reconstruction

Sharing an interactive and annotated model



Go to https://skfb.ly/LLNq

QuadcopterDigital LLC
Aerial Mapping and Photography

Managing exterior photos (BIM)

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

Summary

(documentation of historic structures)

- Collect and organize close-range aerial video and photos
- Quickly and accurately capture and document grades and relationships between structures
- Create, annotate, and share nice looking 3D models with accurate colors and textures
- Document and measure building dimensions and features
- Share dimensional data with external applications

QuadcopterDigital LLC
Aerial Mapping and Photography

Go to:
https://skfb.ly/LLNq

Final points

- Hardware and software is improving daily
  - UAVs (cost, ease of use, flight time, stability, geolocation)
  - Cameras and gimbals (cost, resolution, stability, thermal imaging)
  - Software (mapping, photogrammetry, 3D modeling, and archiving)
- Additional applications
  - Vertical orthoplanes for systematic visual inspection of building facades
  - Volumetric and area measurements of structures, stockpiles, and irregular areas (e.g. driveways)
  - And many more to come…
- Field is in its infancy!

QuadcopterDigital LLC
Aerial Mapping and Photography

Historic New England

Conditions Assessments, Scope Development and Construction Documentation

HISTORIC NEW ENGLAND

Defining the past. Shaping the future.

Historic New England

We serve the public by preserving and presenting New England heritage

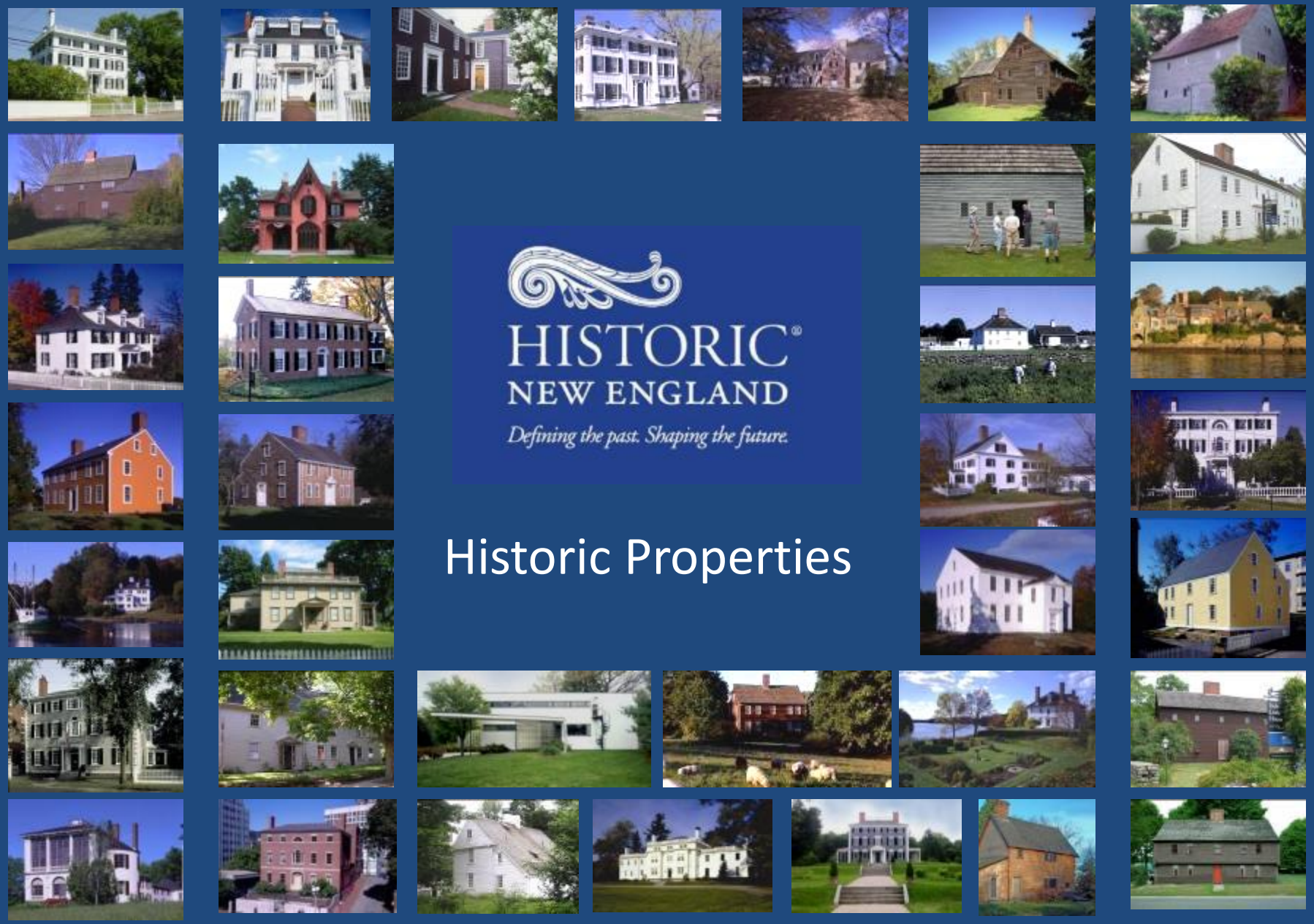
Collections

Archives and Publications

Educational Programs

Preservation Services

Historic Properties



HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

Historic Properties

Buildings

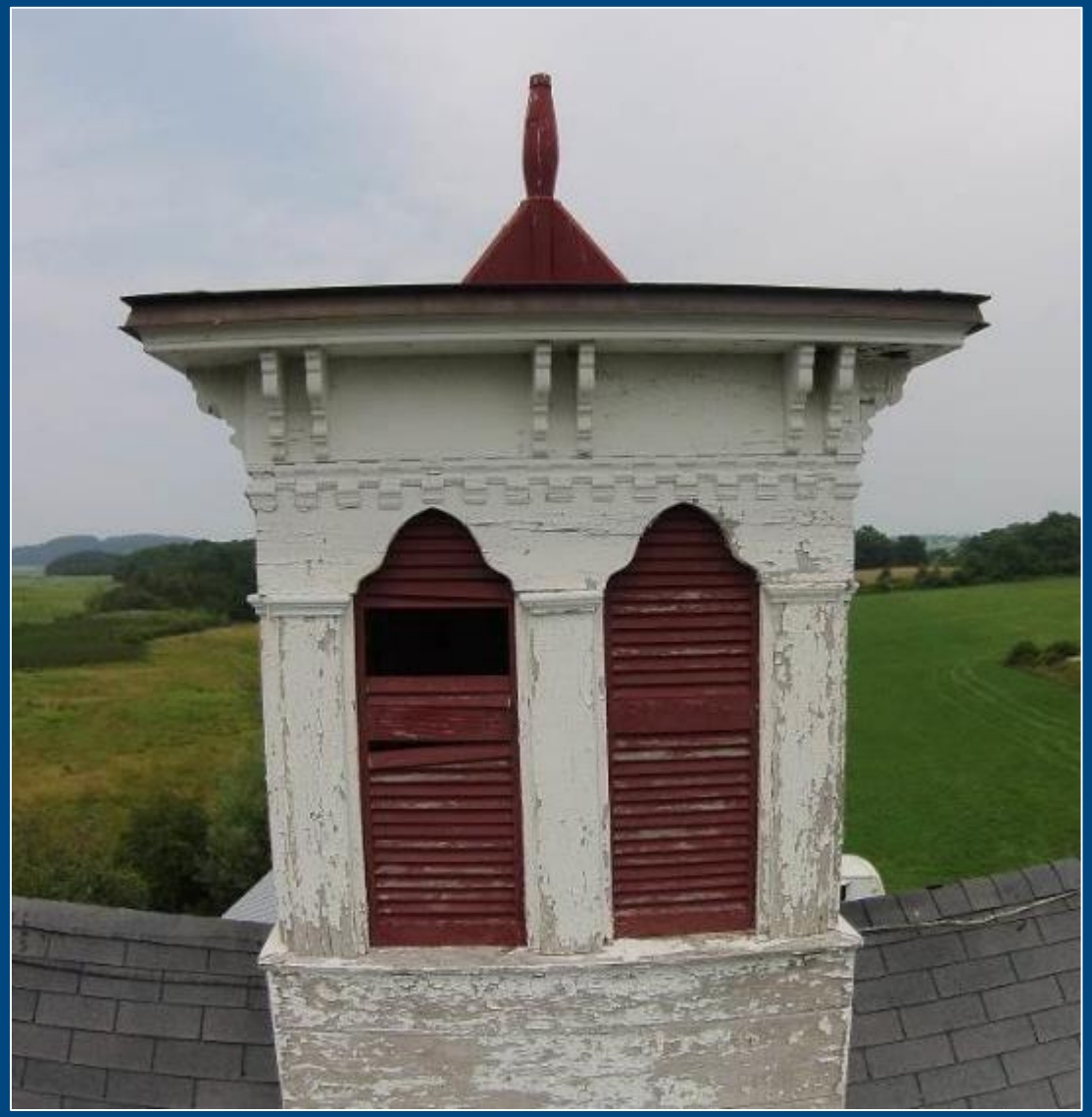
Landscapes

What is Property Care?

Preservation and maintenance of the 36 historic buildings and landscapes owned and operated by Historic New England

Cogswell’s Grant, 1728

Scope Development



Scope Development

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

Spencer-Peirce-Little Farm, 1690

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

Assessment

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

Assessment:

HISTORIC NEW ENGLAND

Defining the past. Shaping the future.

Assessment

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

Eustis Estate, 1878

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

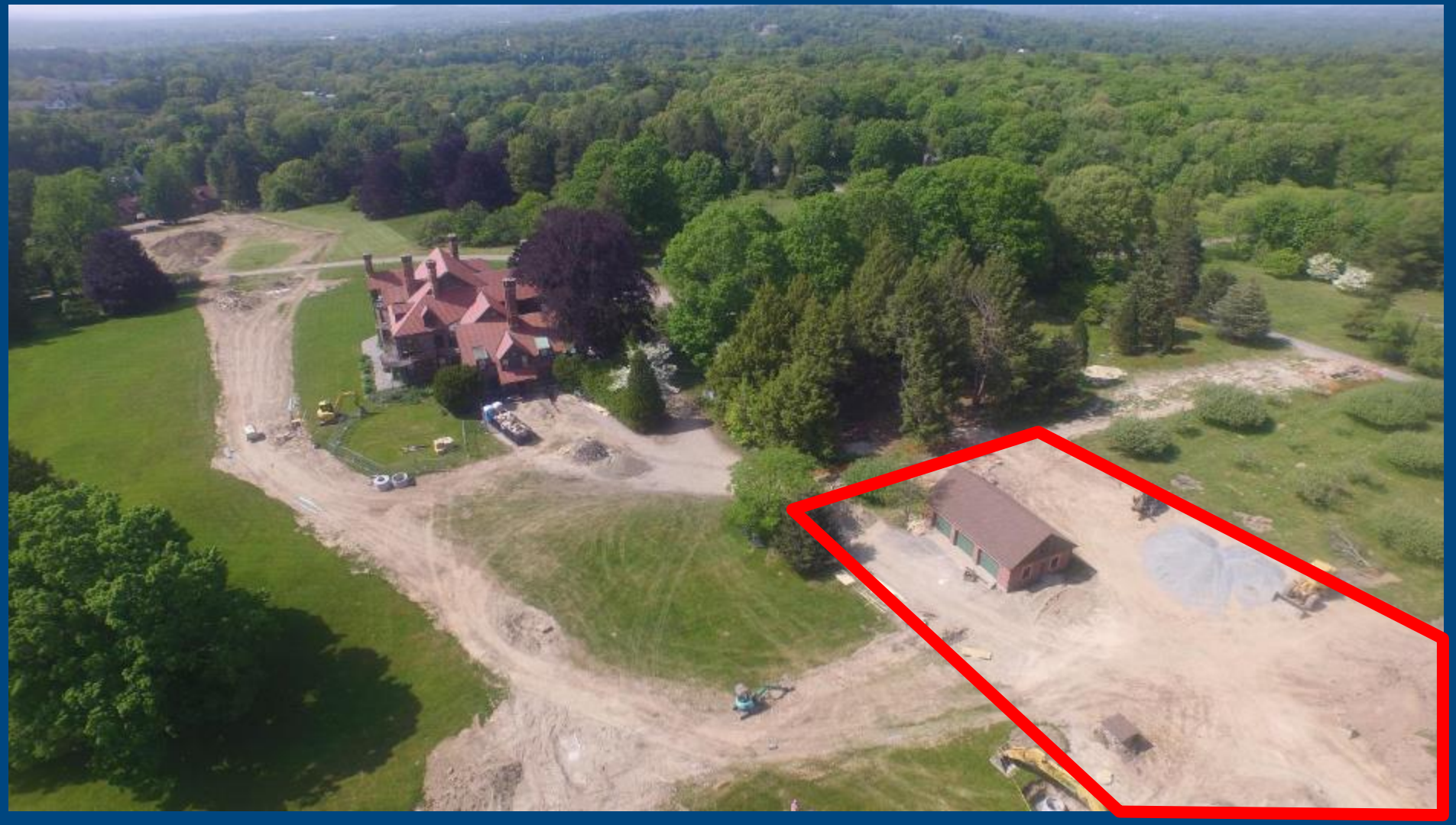
Infrastructure Documentation

HISTORIC NEW ENGLAND

Defining the past. Shaping the future.

Septic Field

HISTORIC NEW ENGLAND
Defining the past. Shaping the future.

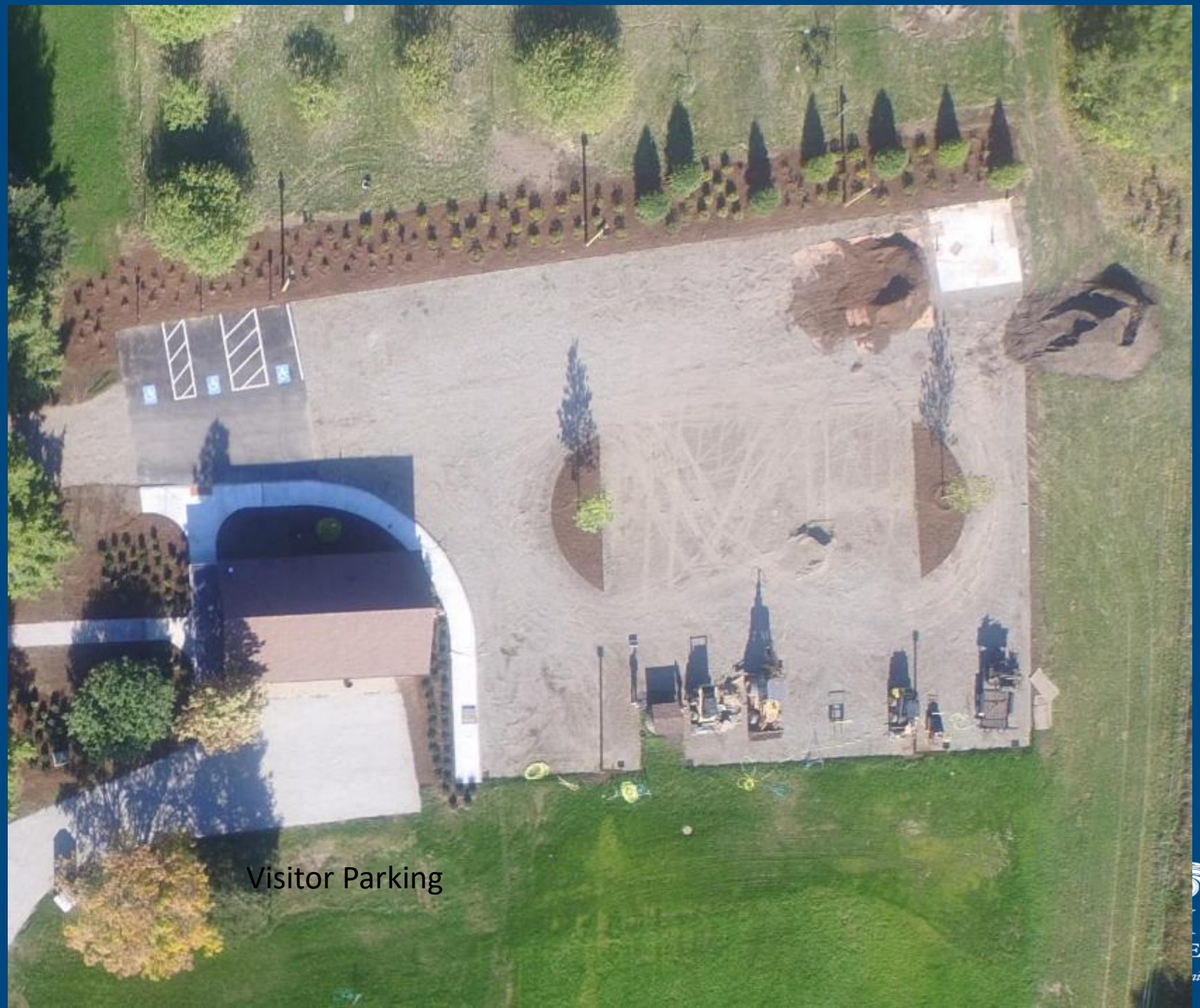


Visitor Parking

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

Visitor Parking

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.



Visitor Parking

HISTORIC NEW ENGLAND
Defining the past. Shaping the future.

Visitor Parking

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

Septic Field

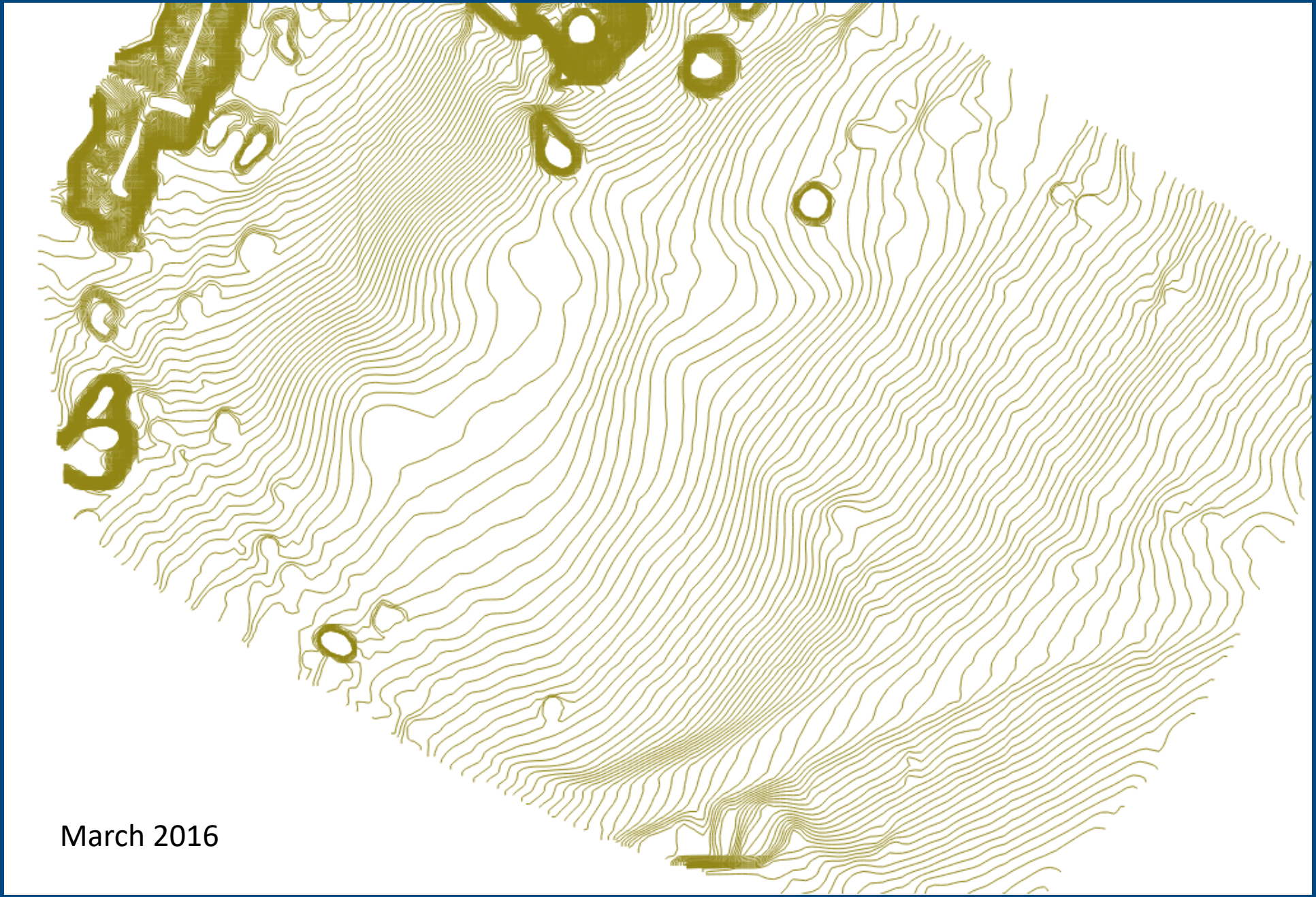
HISTORIC NEW ENGLAND
Defining the past. Shaping the future.

Septic Field

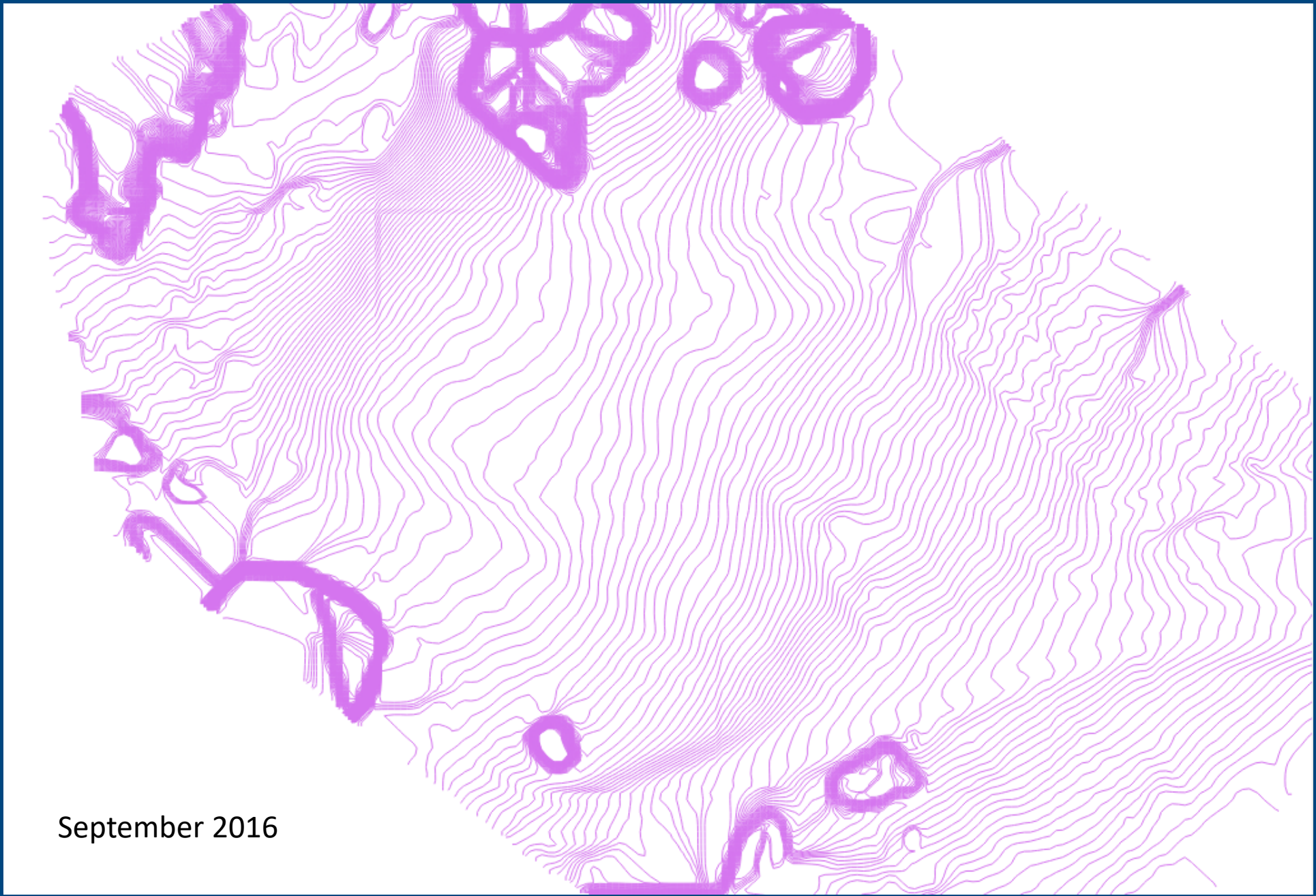
HISTORIC NEW ENGLAND
Defining the past. Shaping the future.

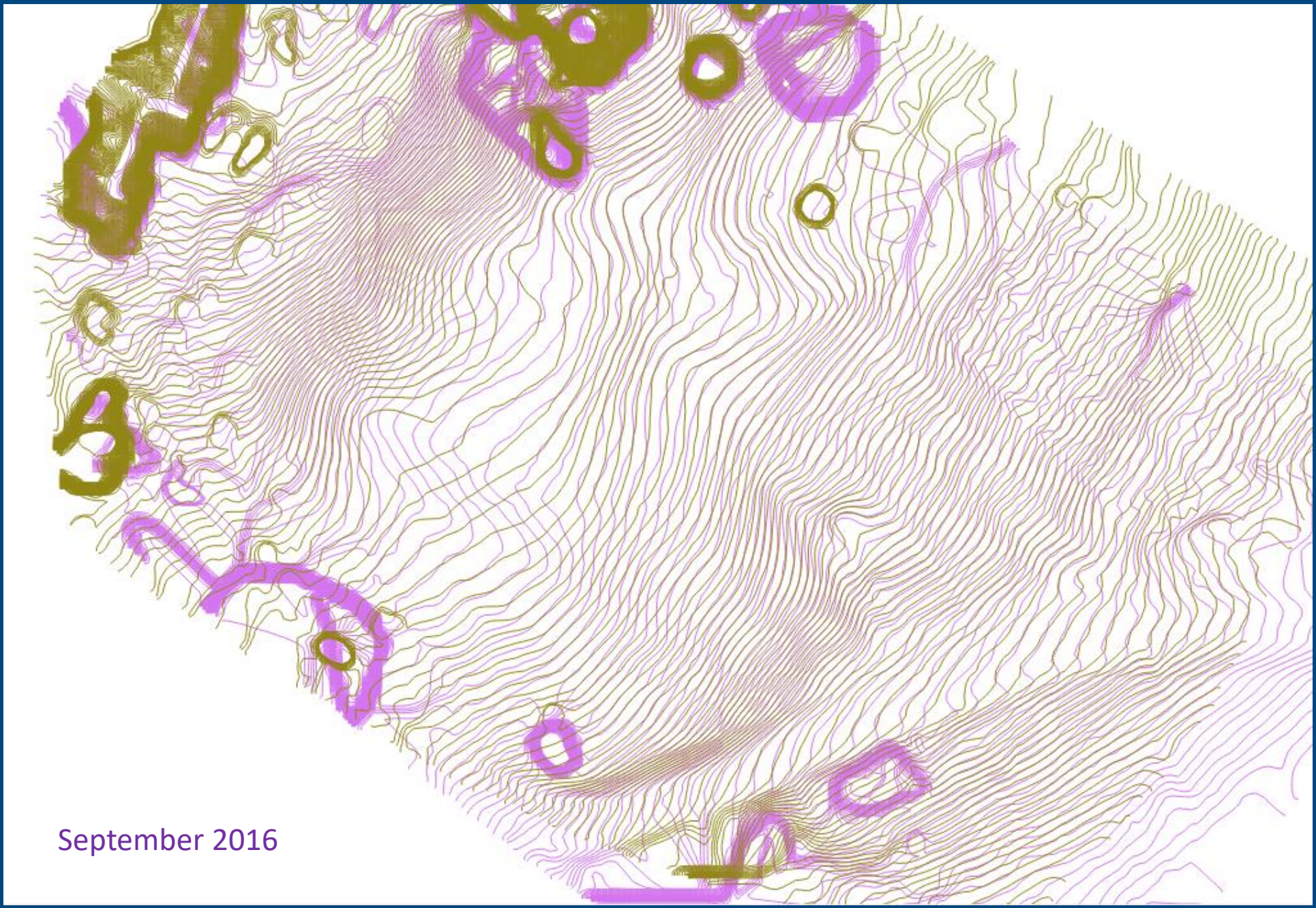
Septic Field

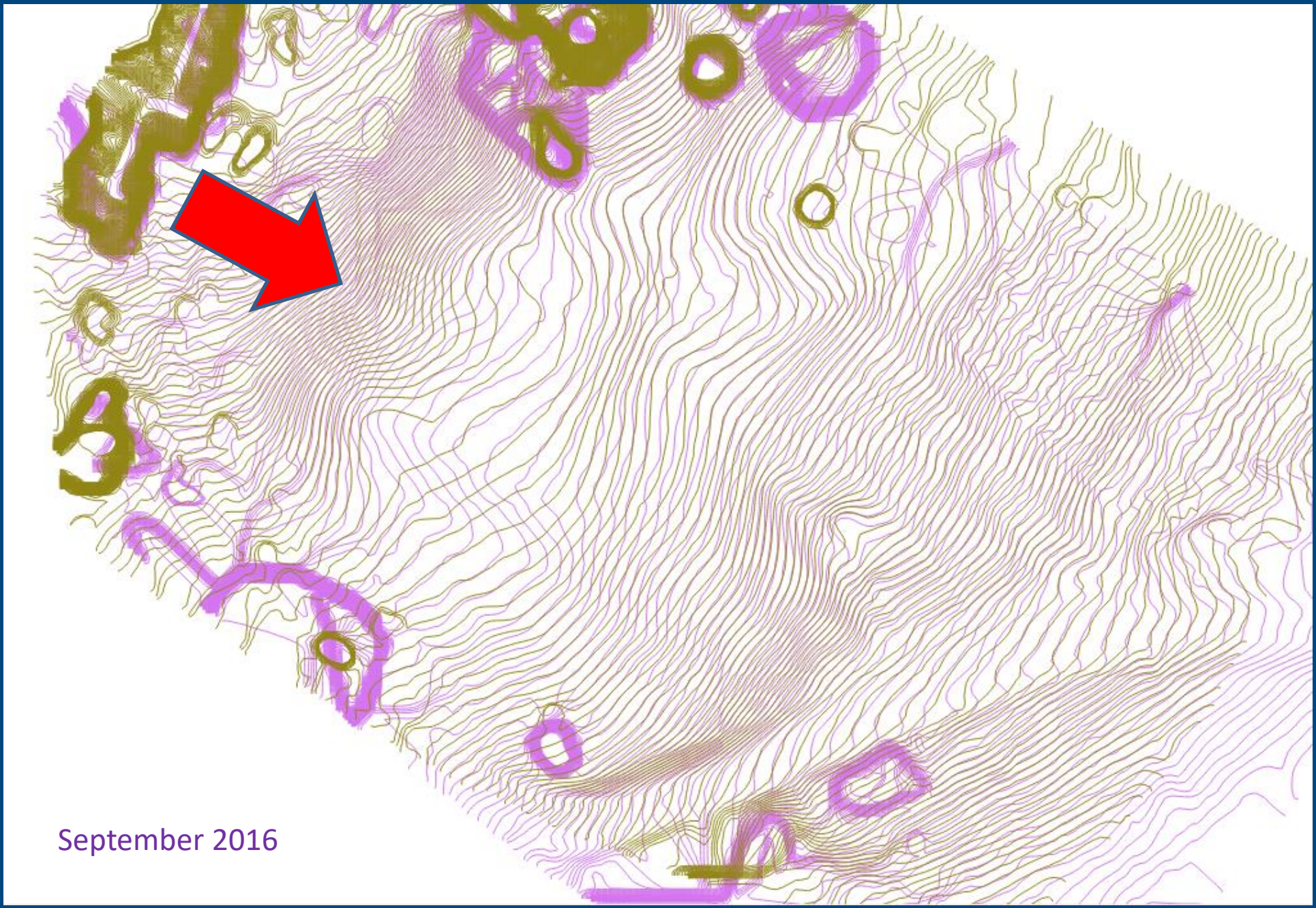
HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

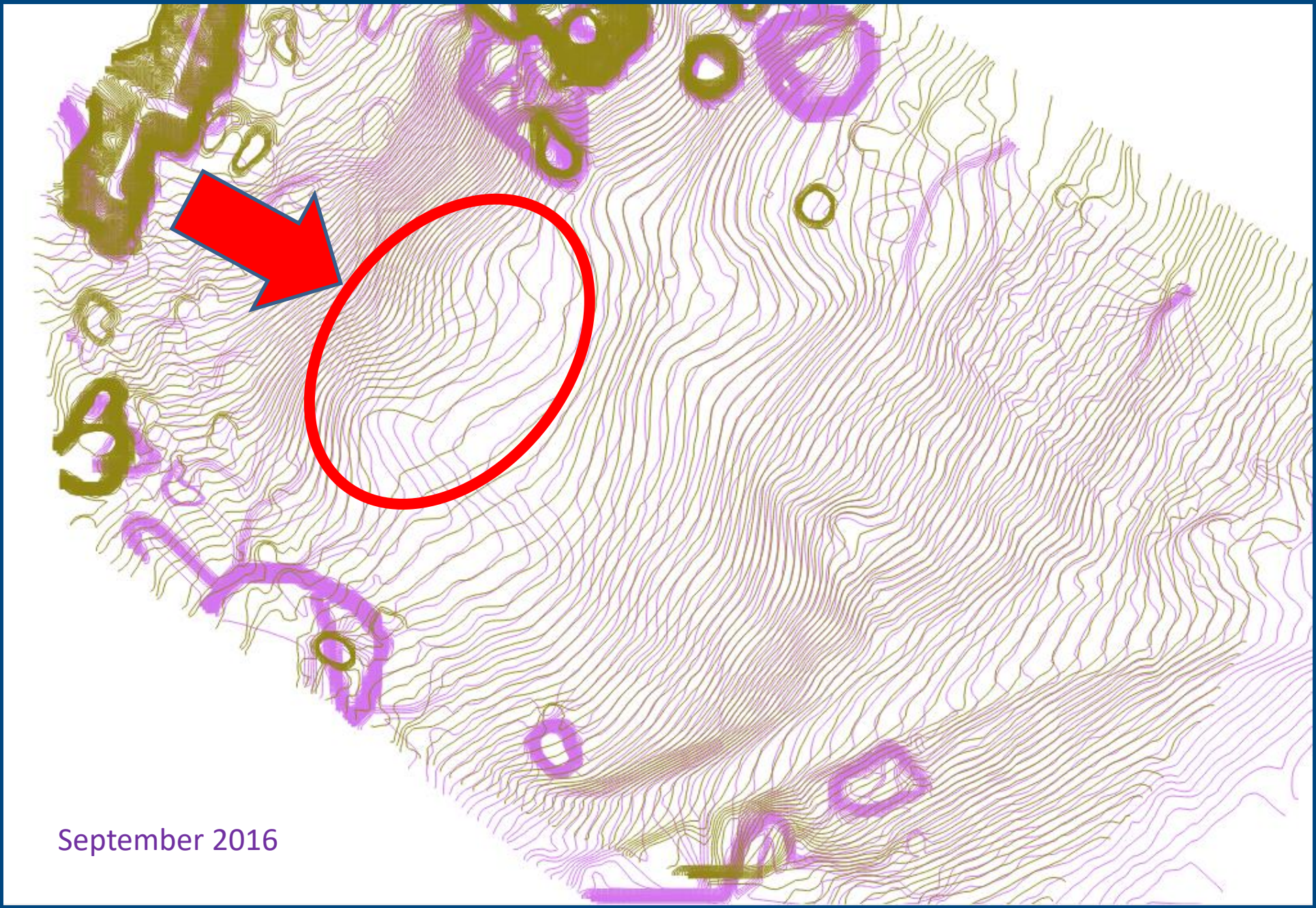


March 2016


September 2016

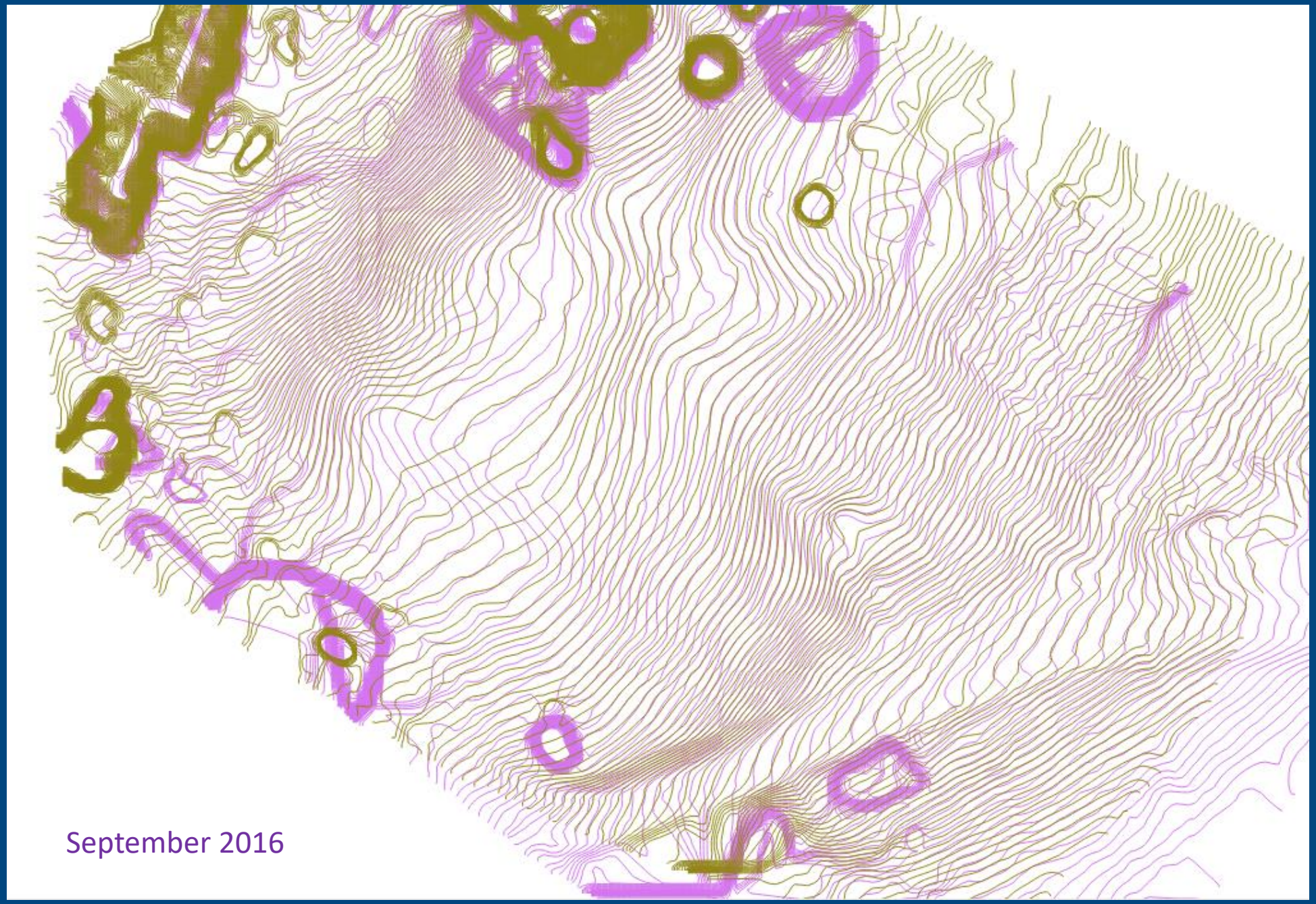

September 2016

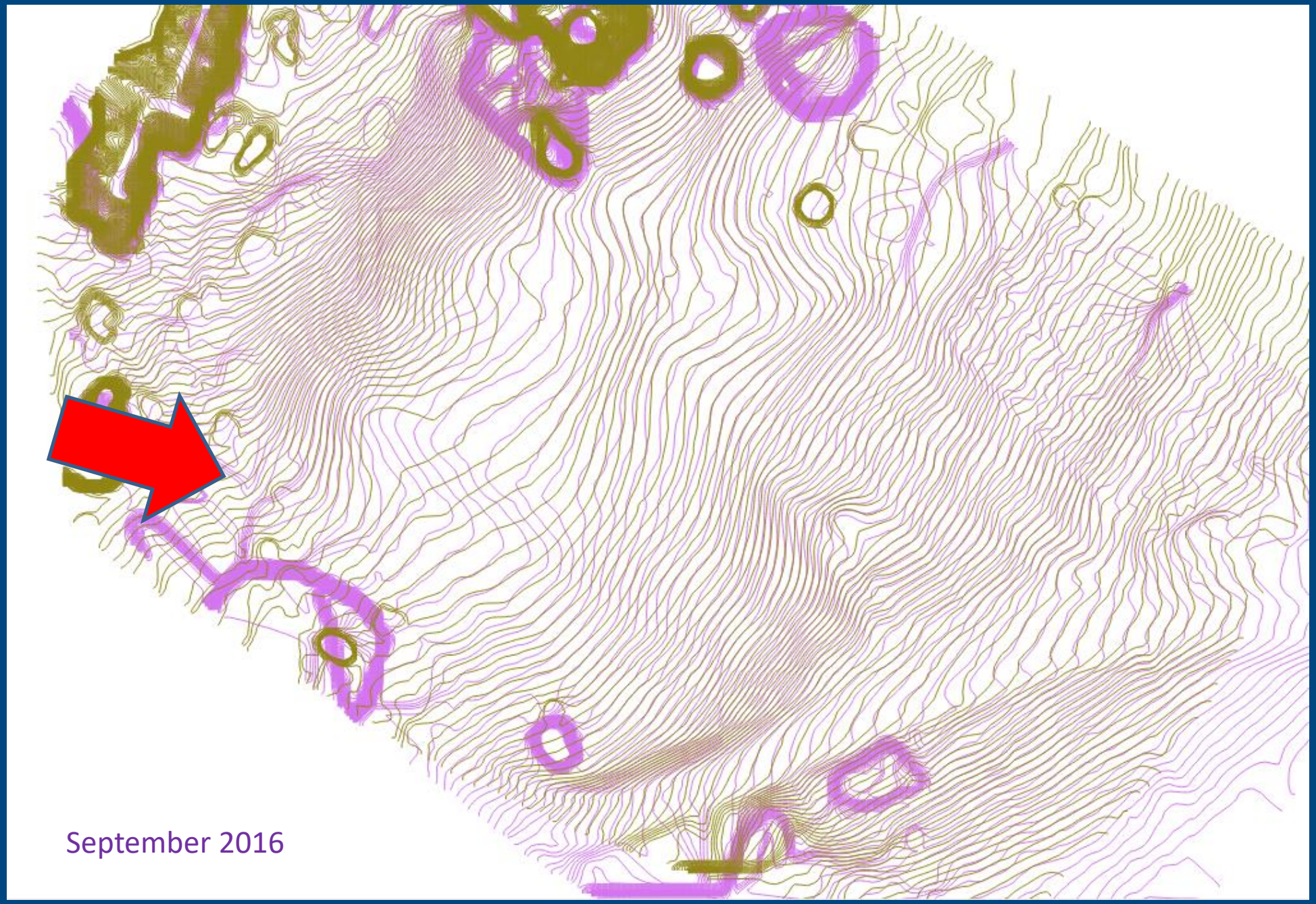

September 2016

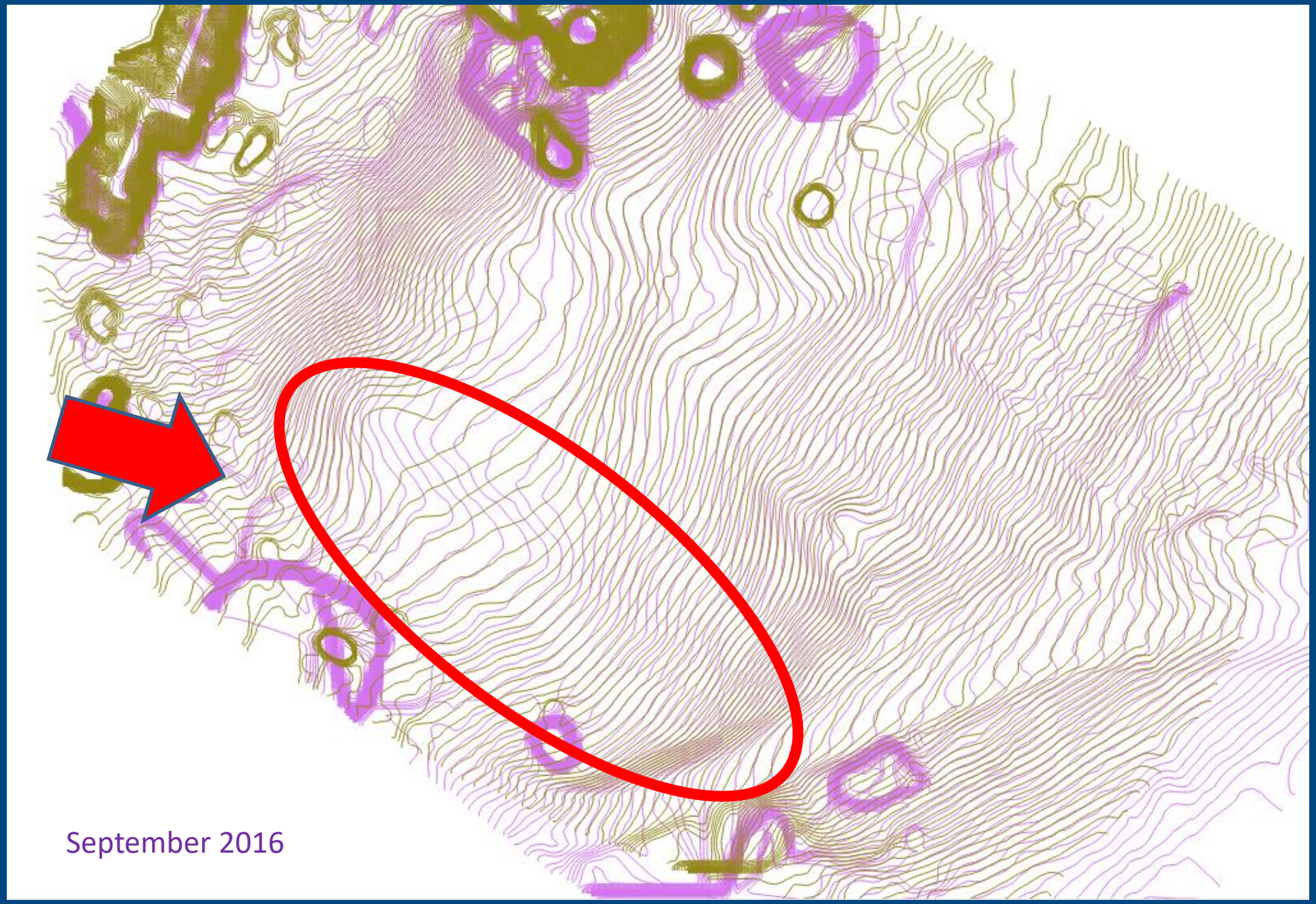

September 2016


March 2016
October 2016


March 2016
October 2016

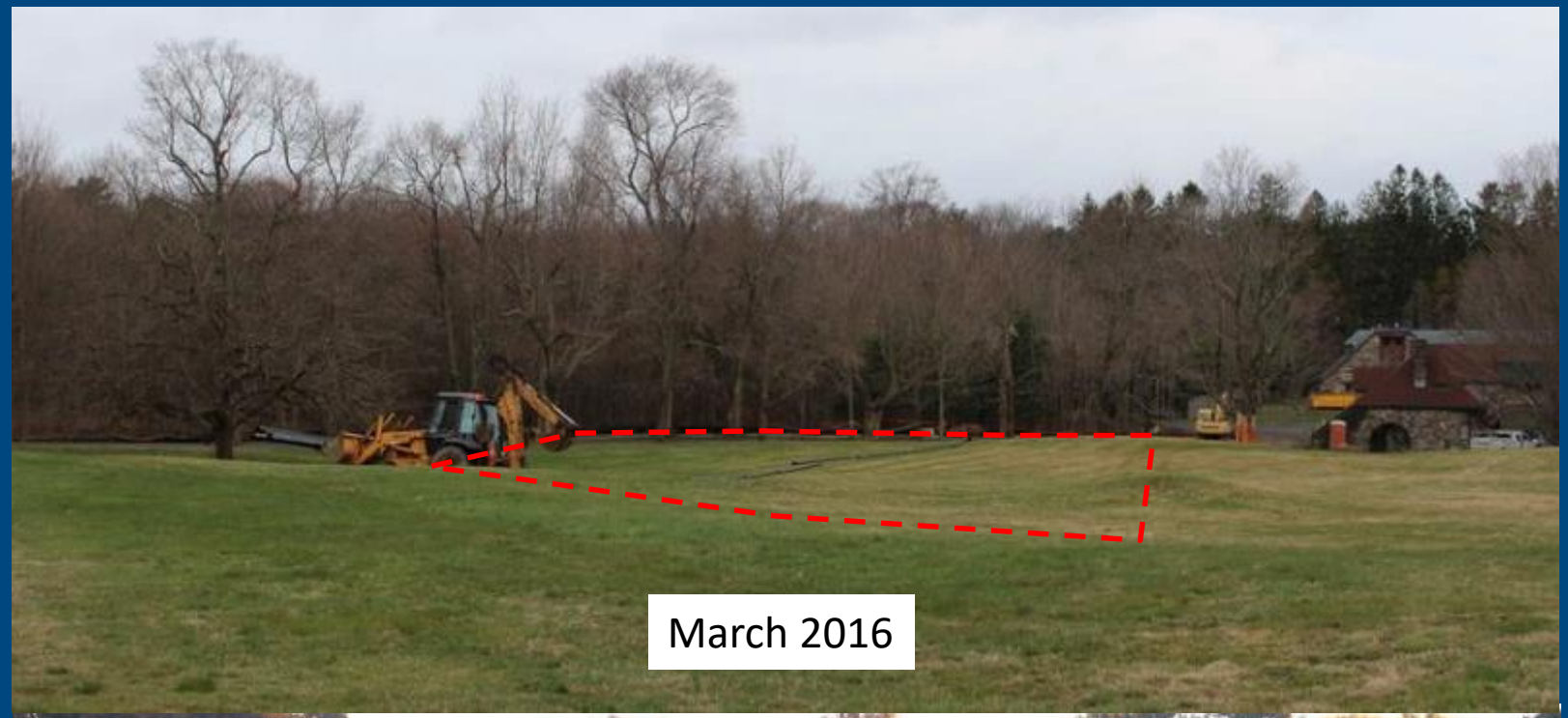

September 2016


September 2016


September 2016


March 2016


October 2016


March 2016


October 2016

Benjamin Haavik
Team Leader, Property Care
Historic New England
bhaavik@historicnewengland.org

historicnewengland.org

HISTORIC®
NEW ENGLAND
Defining the past. Shaping the future.

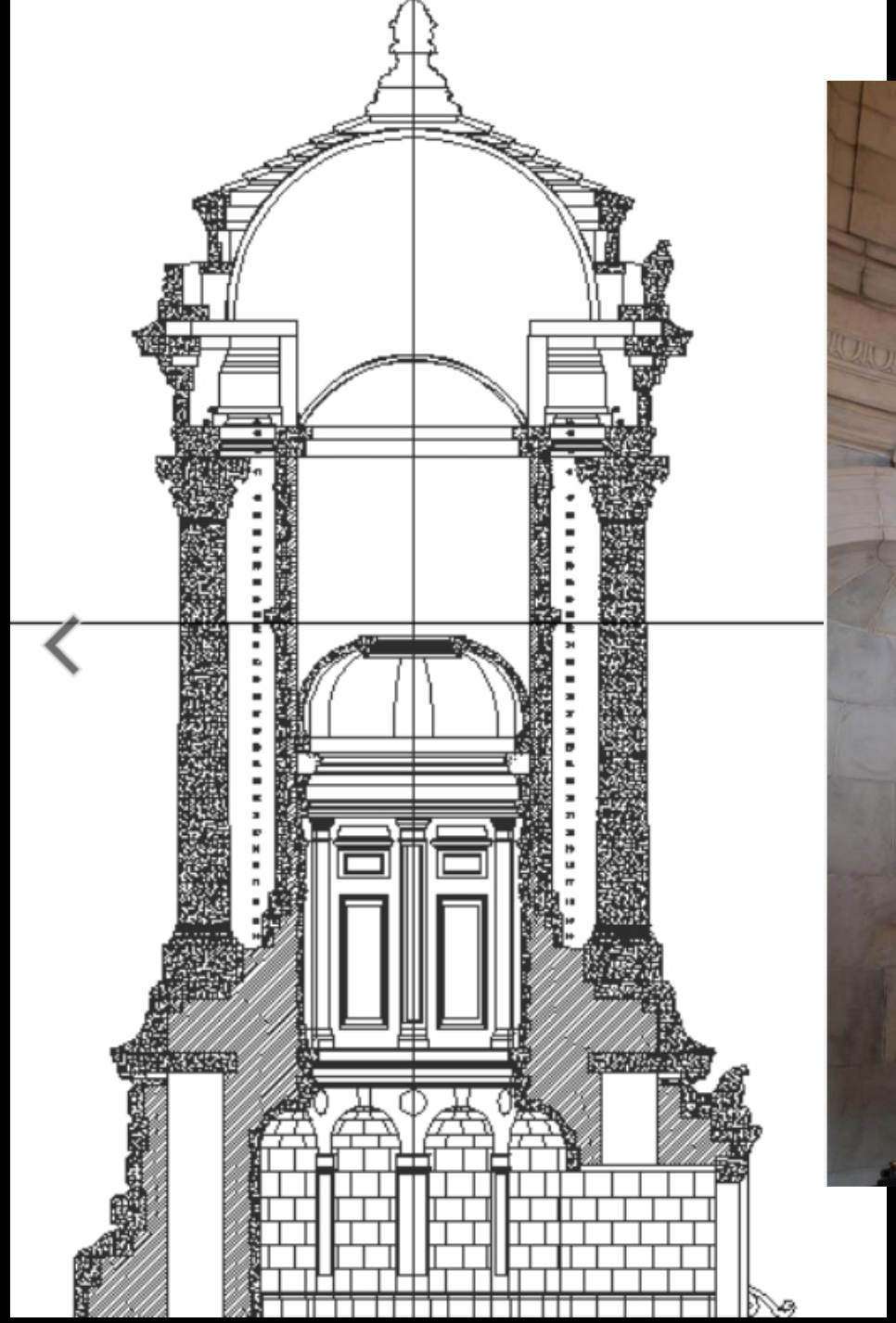
VERTICAL ACCESS LLC INTEREST IN DRONES

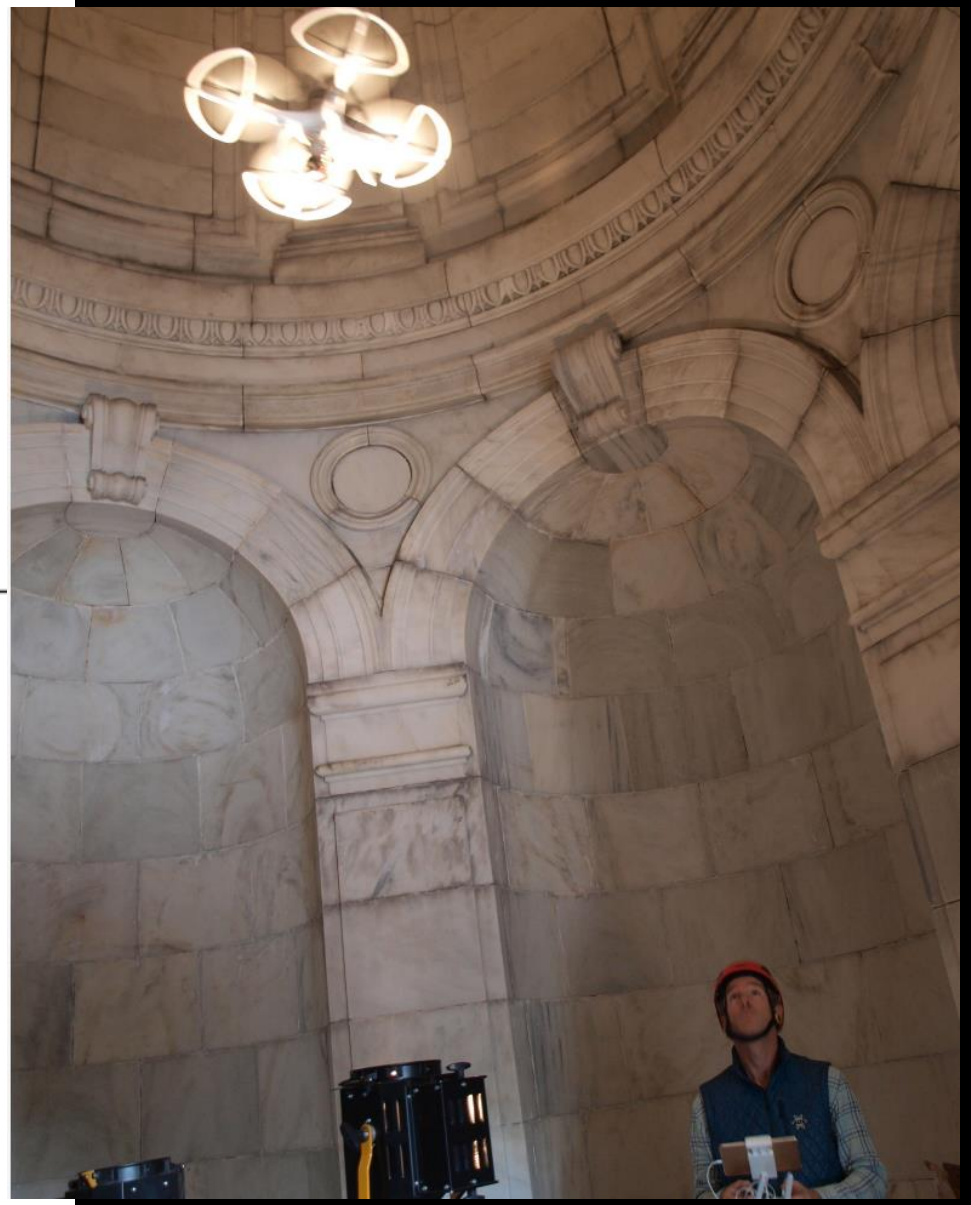
- Flying light lines for rigging
- Close visual inspection of inaccessible areas: finials, etc.
- Initial inspection to select hands-on inspection areas (façade ordinance inspections)
- Creation of 2D or 3D drawings using photogrammetry or laser scanning

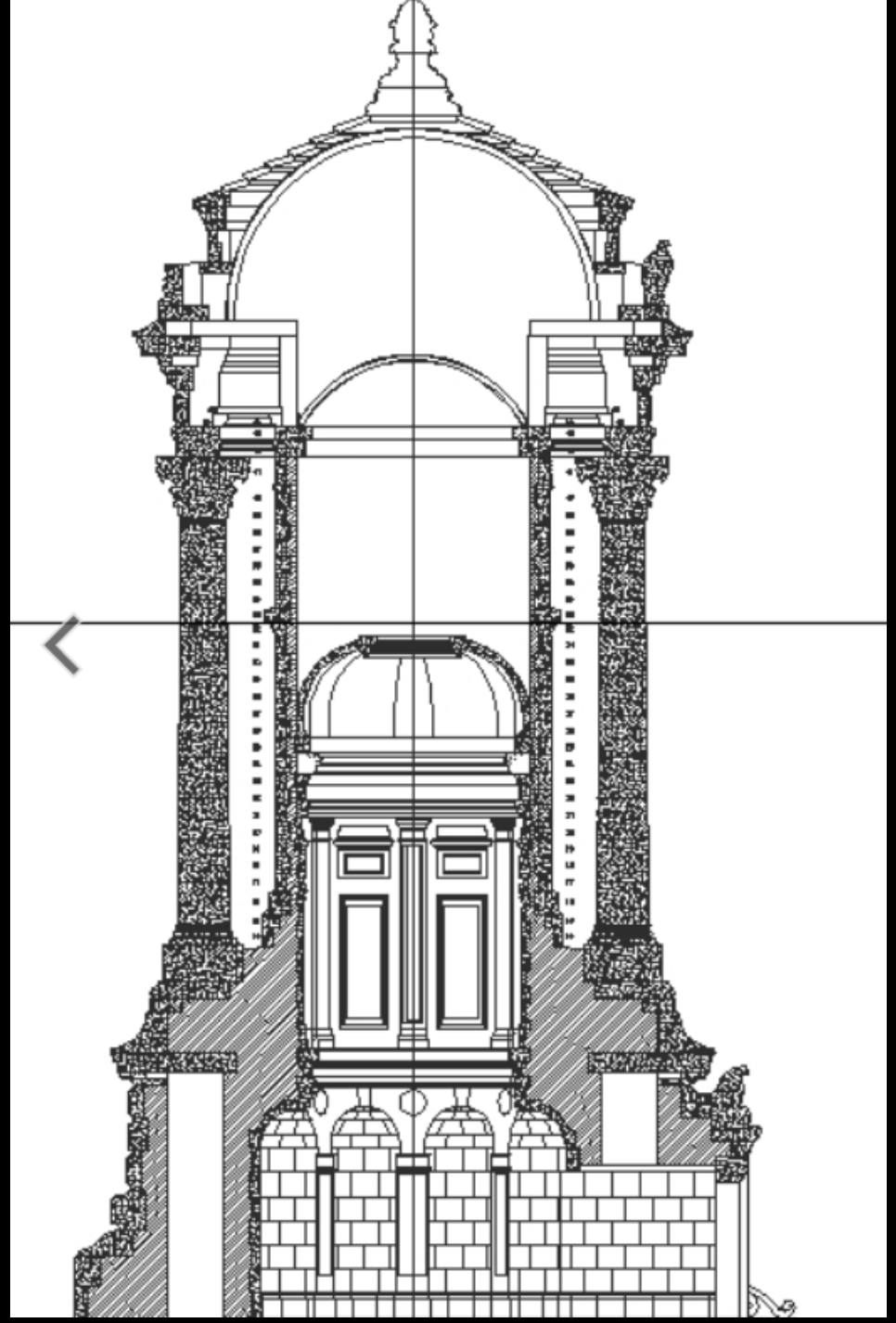

Baltimore
Washington
ericksburg
NO
DRONE
ZONE

Vertical Access LLC Interest in Drones

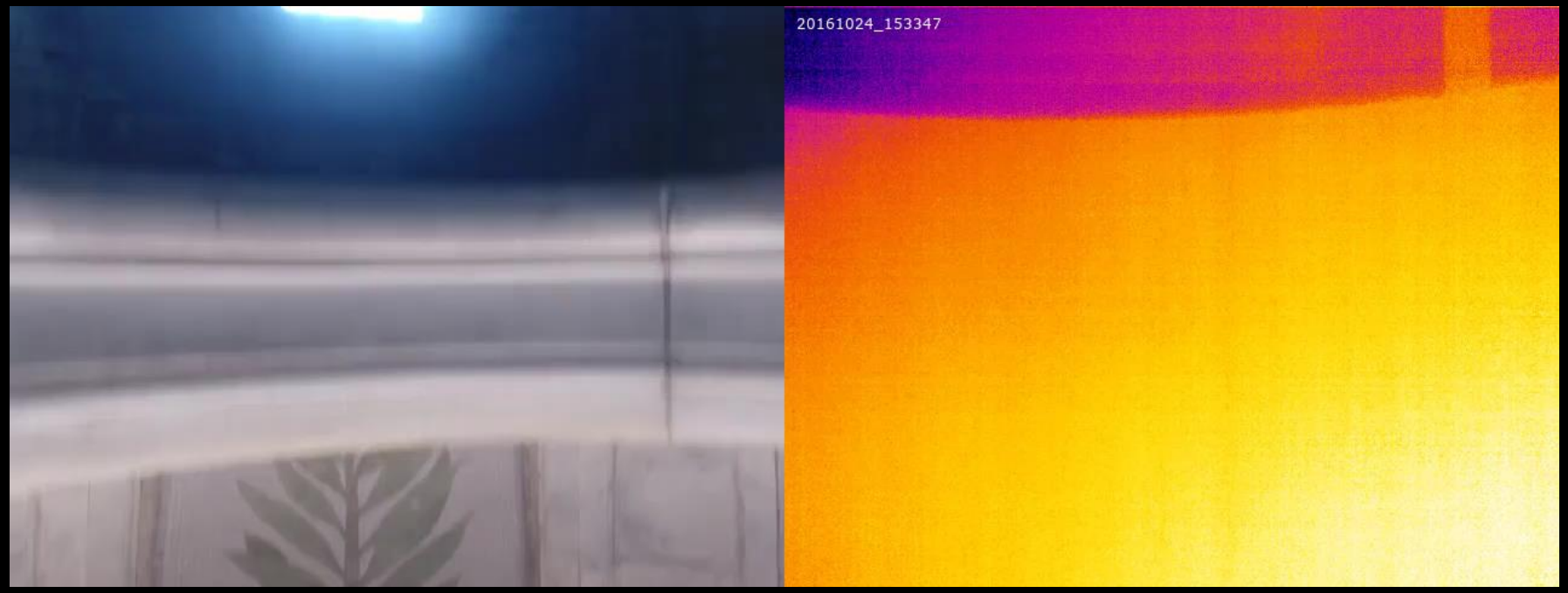
- Flying light lines for rigging
- Close visual inspection of inaccessible areas: finials, etc.
- Initial inspection to select hands-on inspection areas (façade ordinance inspections)
- Creation of 2D or 3D drawings using photogrammetry or laser scanning







INFRARED THERMOGRAPHY USING DRONES

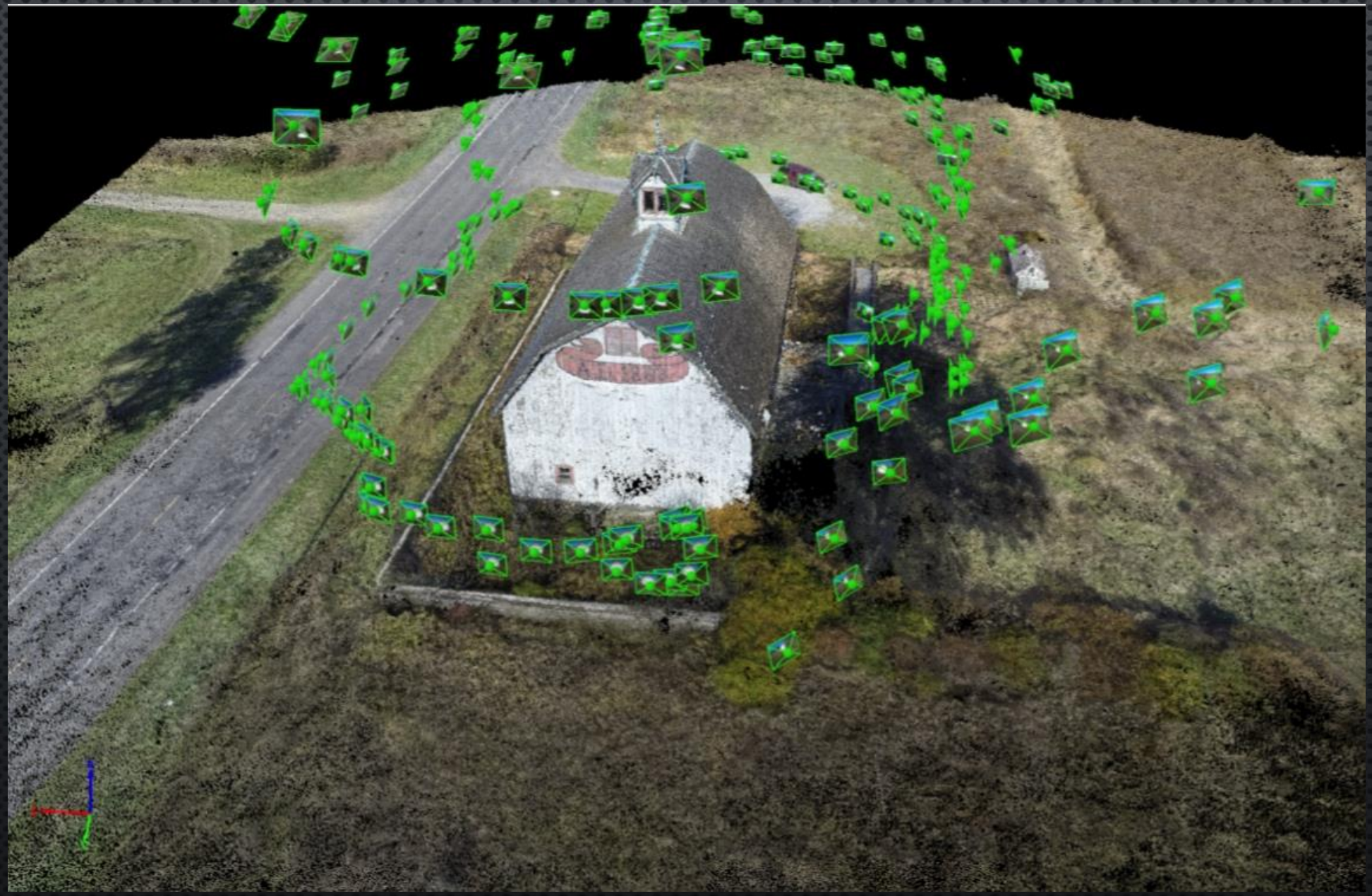


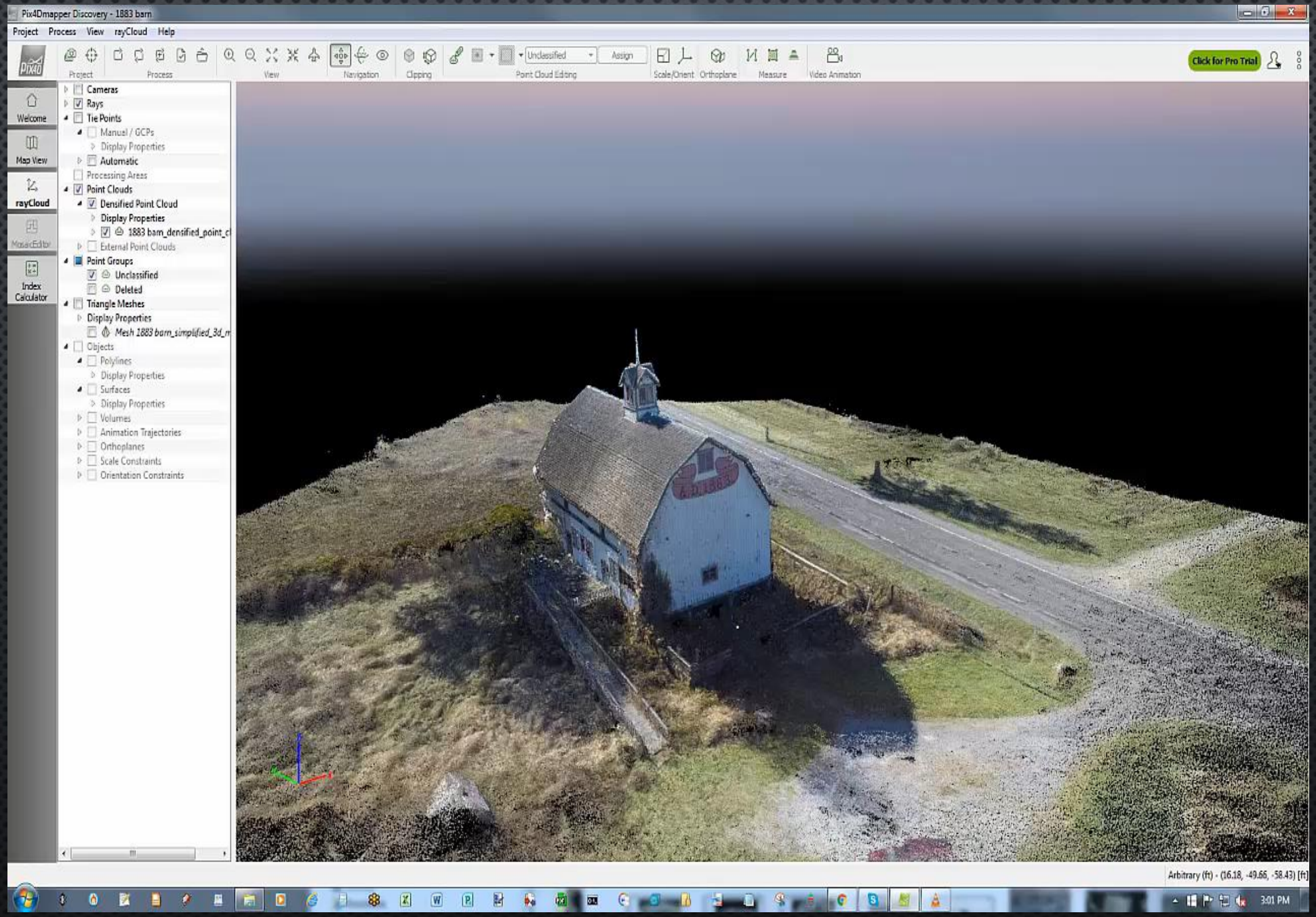
Vertical Access LLC Interest in Drones

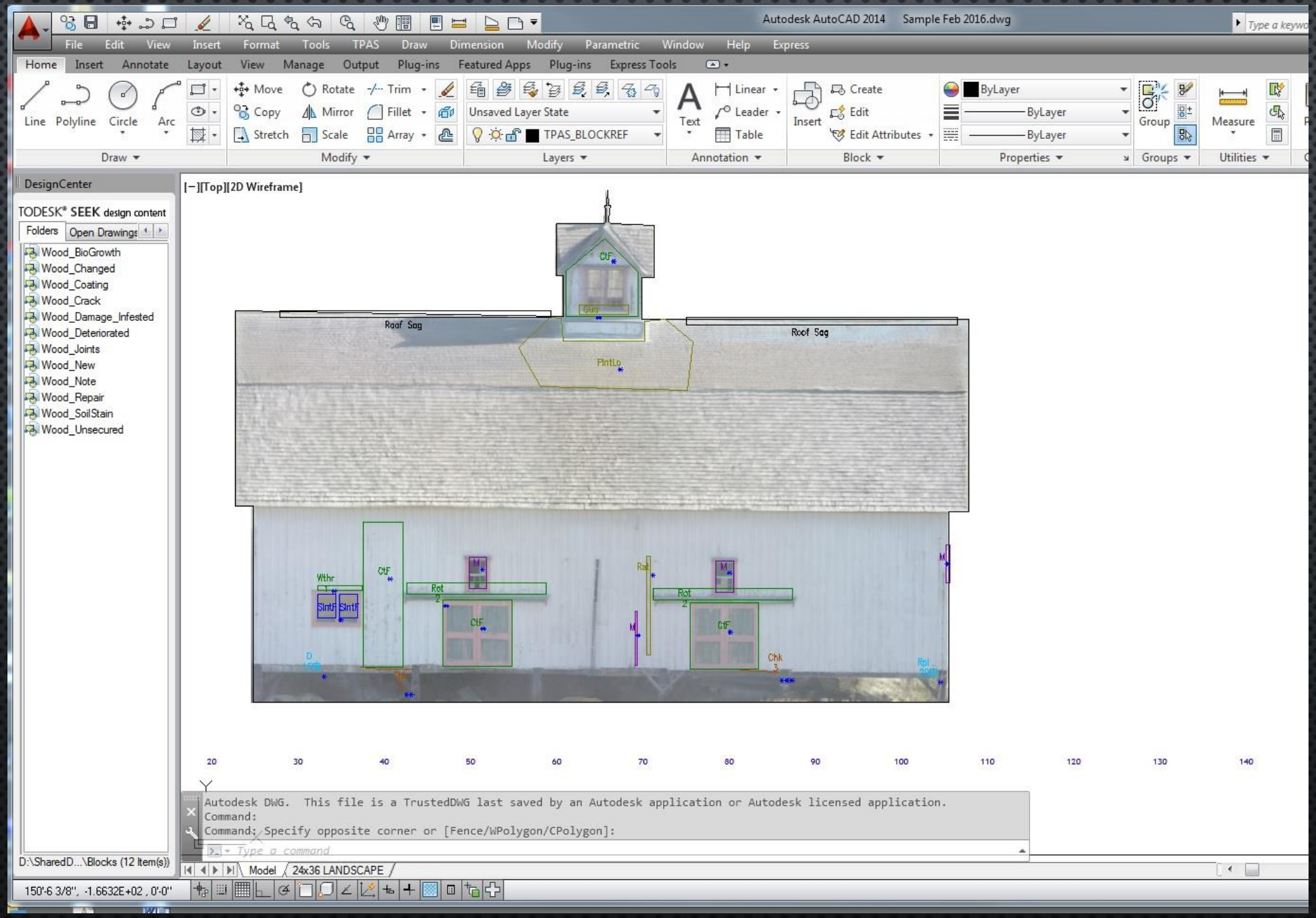
- Flying light lines for rigging
- Close visual inspection of inaccessible areas: finials, etc.
- Initial inspection to select hands-on inspection areas (façade ordinance inspections)
- Creation of 2D or 3D drawings using photogrammetry or laser scanning

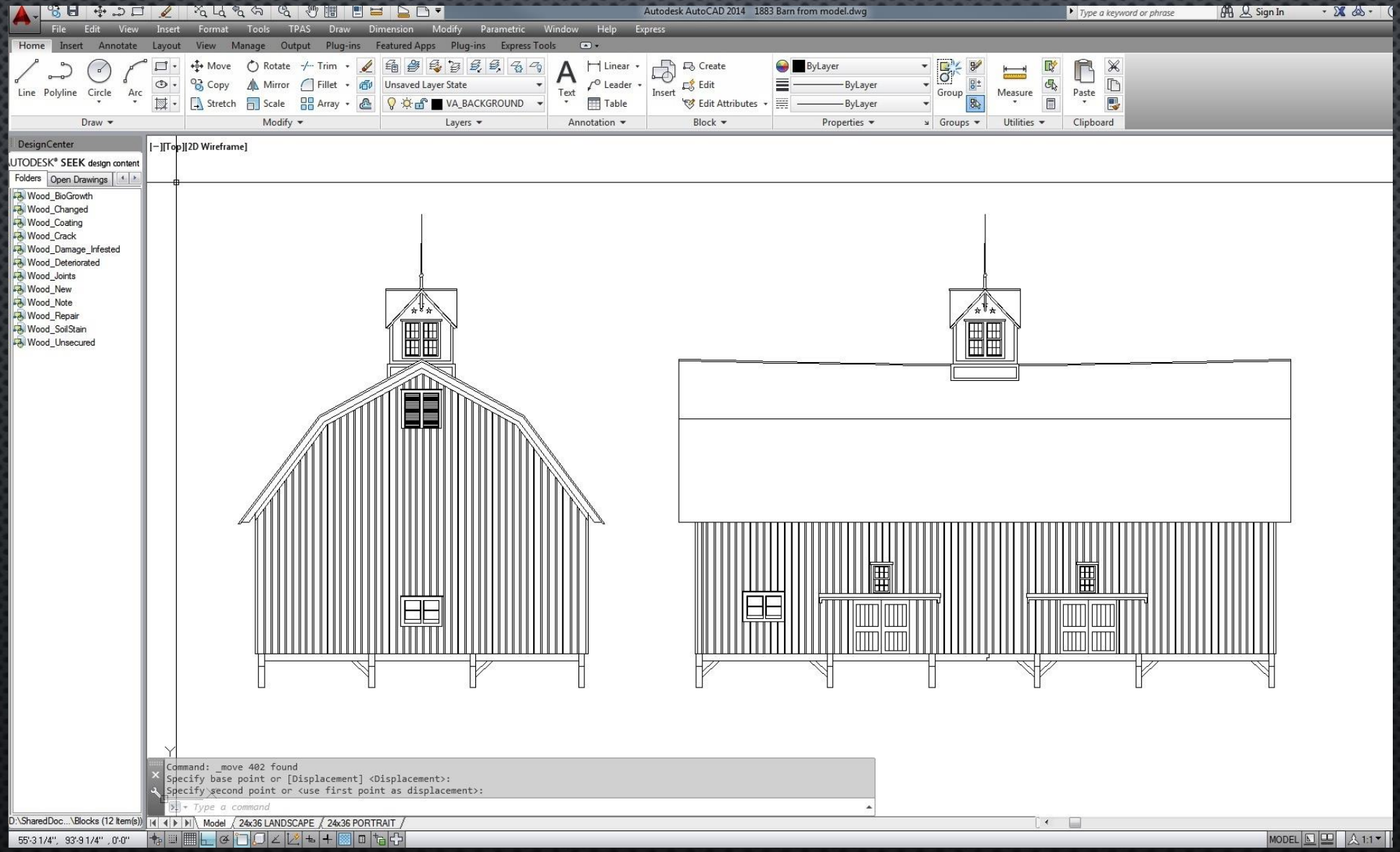
Vertical Access LLC Interest in Drones

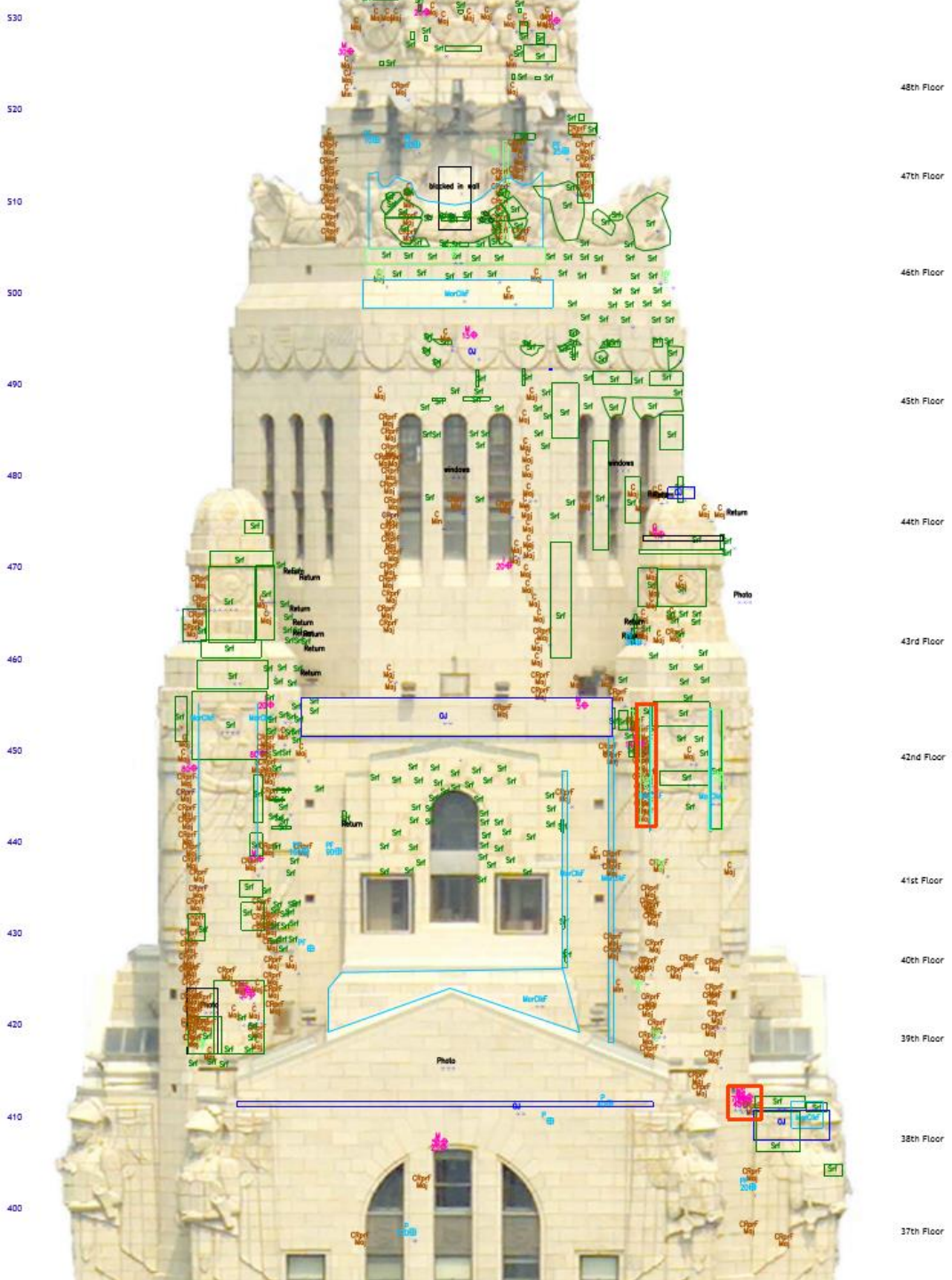
- Flying light lines for rigging
- Close visual inspection of inaccessible areas: finials, etc.
- Initial inspection to select hands-on inspection areas (façade ordinance inspections)
- Creation of 2D or 3D drawings using photogrammetry or laser scanning




Pix4Dmapper Discovery - 1883 barn
Project
Process
View
rayCloud
Help
Project
Process
View
Navigation
Clipping
Unclassified
Assign
Point Cloud Editing
Scale/Orient
Orthoplane
Measure
Video Animation
Click for Pro Trial
Welcome
Map View
rayCloud
MosaicEditor
Index Calculator
Cameras
Rays
Tie Points
Manual / GCPs
Display Properties
Automatic
Processing Areas
Point Clouds
Densified Point Cloud
Display Properties
1883 barn_densified_point_c
External Point Clouds
Point Groups
Unclassified
Deleted
Triangle Meshes
Display Properties
Mesh 1883 barn_simplified_3d_m
Objects
Polylines
Display Properties
Surfaces
Display Properties
Volumes
Animation Trajectories
Orthoplanes
Scale Constraints
Orientation Constraints
Arbitrary (ft) - (16.18, -49.66, -58.43) [ft]
3:01 PM


Autodesk AutoCAD 2014 Sample Feb 2016.dwg
File Edit View Insert Format Tools TPAS Draw Dimension Modify Parametric Window Help Express
Home Insert Annotate Layout View Manage Output Plug-ins Featured Apps Plug-ins Express Tools
Line Polyline Circle Arc
Move Rotate Trim
Copy Mirror Fillet
Stretch Scale Array
Unsaved Layer State
TPAS_BLOCKREF
Text Linear Leader Table
Insert Create Edit Edit Attributes
ByLayer
Group Measure
Draw Modify Layers Annotation Block Properties Groups Utilities
DesignCenter
TODESK® SEEK design content
Folders Open Drawings
Wood_BioGrowth
Wood_Changed
Wood_Coating
Wood_Crack
Wood_Damage_Infested
Wood_Deteriorated
Wood_Joints
Wood_New
Wood_Note
Wood_Repair
Wood_SoilStain
Wood_Unsecured
D:\SharedD...\Blocks (12 Item(s))
[−][Top][2D Wireframe]
Roof Sag
Roof Sag
Autodesk DWG. This file is a TrustedDWG last saved by an Autodesk application or Autodesk licensed application.
Command:
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Type a command
Model 24x36 LANDSCAPE
150'-6 3/8", -1.6632E+02 , 0'-0"


Autodesk AutoCAD 2014 1883 Barn from model.dwg
File Edit View Insert Format Tools TPAS Draw Dimension Modify Parametric Window Help Express
Home Insert Annotate Layout View Manage Output Plug-ins Featured Apps Plug-ins Express Tools
Line Polyline Circle Arc
Move Rotate Trim
Copy Mirror Fillet
Stretch Scale Array
Unsaved Layer State
VA_BACKGROUND
Text
Linear
Leader
Table
Insert
Create
Edit
Edit Attributes
ByLayer
ByLayer
ByLayer
Group
Measure
Paste
Draw
Modify
Layers
Annotation
Block
Properties
Groups
Utilities
Clipboard
DesignCenter
AUTODESK® SEEK design content
Folders
Open Drawings
Wood_BioGrowth
Wood_Changed
Wood_Coating
Wood_Crack
Wood_Damage_Infested
Wood_Deteriorated
Wood_Joints
Wood_New
Wood_Note
Wood_Repair
Wood_SoilStain
Wood_Unsecured
[−][Top][2D Wireframe]
Command: _move 402 found
Specify base point or [Displacement] <Displacement>:
Specify second point or <use first point as displacement>:
Type a command
Model
24x36 LANDSCAPE
24x36 PORTRAIT
MODEL



*Background image created using conventional photogrammetry

KEY TO SYMBOLS
Each TPAS annotation is comprised of a graphical symbol and text label. Four types of graphical symbols are used: --Target symbols depict faults having discrete locations, such as spalls or patch repairs. --Box symbols are rectangular symbols delineating conditions that span an area too large to be effectively represented with target symbols. --Polyline symbols depict cracks and specific joint conditions. --Picture Link symbols indicate the location of survey photographs. Text labels include a code describing the type of conditon, and if applicable, a severity code and Picture Link.
This target symbol indicates a 20 square inch spall, which was removed during the survey and photographed: — Fault Code: R; Severity: 20; Target Symbol; Picture Link
This box symbol indicates an area of biological soiling, which was not photographed: — Bio
This polyline indicates a crack system following a joint path, 3/16 inch wide, which was photographed: — CJ 3

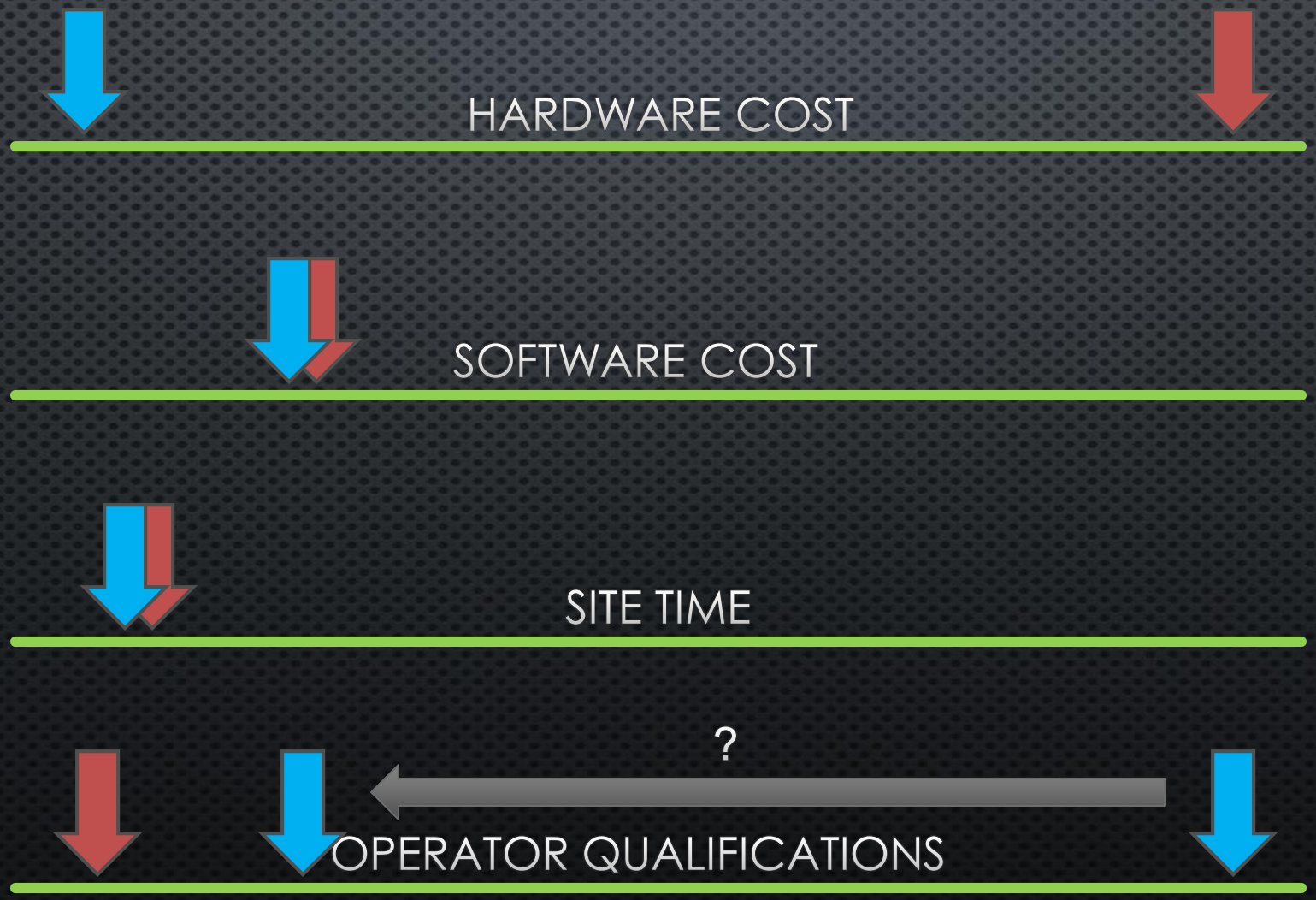
KEY TO SURVEY CODES: TERRA COTTA					
Condition	Symbol	Fault Type		Severity	Amount
Cracks		C	Crack	Min Hairline	Length in lin.ft.
		CJ	Crack system: Joints	Maj Wider than hairline	
		CRprF	Crack Repair Failed		
Displacement		Hor	Horizontal displacement	Disp.: 1/8" increments	Number of units
		Vrt	Vertical displacement	1 0 to 1/8"	
		HV	Horiz. & Vert. disp.	2 1/8" to 1/4"	
Joints Failed		OJ	Open Joints	Not applicable	Percentage
Prev. Repairs	N/A	MorClkF	Mortar Caulked Failed	Not applicable	Percentage
		PF	Patch Failed		Area in sq. in.
Major Spalls		B	Bonded	Size of spall in square inches	Not applicable
		I	Incipient		
		M	Missing		
		MS	Missing + Steel		
		R	Removed		
		RS	Removed + Steel		
Minor Spalls		Srf	Surface Loss	Not applicable	Area in sq. in.

KEY TO SURVEY CODES: BRICK					
Condition	Symbol	Fault Type		Severity	Amount
Cracks		C	Crack	Width: 1/16" increments	Length in lin.ft.
		CJ	Crack system: Joints	0 Hairline	
		CU	Crack system: Units	.5 Hairline to 1/32"	
		CUJ	Crack sys.: Units & Joints	1 1/32" to 1/16"	
		CRprF	Crack Repair Failed	2 1/16" to 1/8"	
Displacement		Hor	Horizontal displacement	Disp.: 1/8" increments	Number of units
		Vrt	Vertical displacement	1 0 to 1/8"	
		HV	Horiz. & Vert. disp.	2 1/8" to 1/4"	
Fe Element		Fe	Ferrous element	Not applicable	Not applicable
Joints Failed		MorClkF	Mortar Caulked Failed	Not applicable	Percentage
		MorF	Mortar Failed		Percentage
		MorM	Mortar Missing		Length in lin. ft.
		MorR	Mortar Removed		Length in lin. ft.
		SlntF	Sealant Failed		Length in lin. ft.

As of March 2017:

- 37,000 Remote Pilot Certificates
- 770,000 Registered Drone Hobbyists

DRONE-BASED PHOTOGRAMMETRY VS. TERRESTRIAL LASER SCAN



Regulations: Section 333

Enacted 2012

Section 333 Exemption: Conditions and Limitations

Some degree of pilot license required

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

Section 333 Exemption: Conditions and Limitations

Distance from "non-participating" entities

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:

a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and

b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

PART 107

Announced in June 2016.
Effective August 2016.

FAA News

Federal Aviation Administration, Washington, DC 20591

June 21, 2016

SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107)

Operational Limitations	• Unmanned aircraft must weigh less than 55 lbs. (25 kg). • Visual line-of-sight (VLOS) only; the unmanned aircraft must remain within VLOS of the remote pilot in command and the person manipulating the flight controls of the small UAS. Alternatively, the unmanned aircraft must remain within VLOS of the visual observer. • At all times the small unmanned aircraft must remain close enough to the remote pilot in command and the person manipulating the flight controls of the small UAS for those people to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses. • Small unmanned aircraft may not operate over any persons not directly participating in the operation, not under a covered structure, and not inside a covered stationary vehicle. • Daylight-only operations, or civil twilight (30 minutes before official sunrise to 30 minutes after official sunset, local time) with appropriate anti-collision lighting. • Must yield right of way to other aircraft. • May use visual observer (VO) but not required. • First-person view camera cannot satisfy "see-and-avoid" requirement but can be used as long as requirement is satisfied in other ways. • Maximum groundspeed of 100 mph (87 knots). • Maximum altitude of 400 feet above ground level (AGL) or, if higher than 400 feet AGL, remain within 400 feet of a structure. • Minimum weather visibility of 3 miles from control station. • Operations in Class B, C, D and E airspace are allowed with the required ATC permission. • Operations in Class G airspace are allowed without ATC permission. • No person may act as a remote pilot in command or VO for more than one unmanned aircraft operation at one time. • No operations from a moving aircraft. • No operations from a moving vehicle unless the operation is over a sparsely populated area. • No careless or reckless operations. • No carriage of hazardous materials.

	• Requires preflight inspection by the remote pilot in command. • A person may not operate a small unmanned aircraft if he or she knows or has reason to know of any physical or mental condition that would interfere with the safe operation of a small UAS. • Foreign-registered small unmar operate under part 107 if they s part 375. • External load operations are all carried by the unmanned aircra does not adversely affect the fli controllability of the aircraft. • Transportation of property for c provided that- o The aircraft, including its at cargo weigh less than 55 o The flight is conducted with from a moving vehicle or o The flight occurs wholly wit does not involve transpor another place in Hawaii t Hawaii; (2) the District of in the District of Columbia possession of the United the same territory or poss • Most of the restrictions discuss applicant demonstrates that his be conducted under the terms c
Remote Pilot in Command Certification and Responsibilities	• Establishes a remote pilot in co • A person operating a small UA pilot airman certificate with a sn the direct supervision of a perso pilot certificate (remote pilot in c • To qualify for a remote pilot cer o Demonstrate aeronautical k ▪ Passing an initial a an FAA-approved k ▪ Hold a part 61 pilot pilot, complete a fli 24 months, and cor training course pro o Be vetted by the Transporta o Be at least 16 years old. • Part 61 pilot certificate holders remote pilot certificate immedia application for a permanent certificate. Other applicants will obtain a temporary remote pilot certificate upon successful completion of TSA security vetting. The FAA anticipates that it will be able to issue a temporary remote pilot certificate within 10 business days after receiving a completed remote pilot certificate application. • Until international standards are developed, foreign-

- Establishes a remote pilot in command position.
- A person operating a small UAS must either hold a remote pilot airman certificate with a small UAS rating or be under the direct supervision of a person who does hold a remote pilot certificate (remote pilot in command).
- To qualify for a remote pilot certificate, a person must:
  - Demonstrate aeronautical knowledge by either:
    - Passing an initial aeronautical knowledge test at an FAA-approved knowledge testing center; or
    - Hold a part 61 pilot certificate other than student pilot, complete a flight review within the previous 24 months, and complete a small UAS online training course provided by the FAA.
  - Be vetted by the Transportation Security Administration.
  - Be at least 16 years old.
- Part 61 pilot certificate holders may obtain a temporary remote pilot certificate immediately upon submission of their application for a permanent certificate. Other applicants will obtain a temporary remote pilot certificate upon successful completion of TSA security vetting. The FAA anticipates that it will be able to issue a temporary remote pilot certificate within 10 business days after receiving a completed remote pilot certificate application.

FAA News

Federal Aviation Administration, Washington, DC 20591

June 21, 2016

SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107)

Operational Limitations	• Unmanned aircraft must weigh less than 55 lbs. (25 kg). • Visual line-of-sight (VLOS) only; the unmanned aircraft must remain within VLOS of the remote pilot in command and the person manipulating the flight controls of the small UAS. Alternatively, the unmanned aircraft must remain within VLOS of the visual observer. • At all times the small unmanned aircraft must remain close enough to the remote pilot in command and the person manipulating the flight controls of the small UAS for those people to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses. • Small unmanned aircraft may not operate over any persons not directly participating in the operation, not under a covered structure, and not inside a covered stationary vehicle. • Daylight-only operations, or civil twilight (30 minutes before official sunrise to 30 minutes after official sunset, local time) with appropriate anti-collision lighting. • Must yield right of way to other aircraft. • May use visual observer (VO) but not required. • First-person view camera cannot satisfy "see-and-avoid" • Maximum groundspeed of 100 mph (87 knots). • Maximum altitude of 400 feet above ground level (AGL) or, if higher than 400 feet AGL, remain within 400 feet of a structure. • Operations in Class B, C, D and E airspace are allowed with the required ATC permission. • Operations in Class G airspace are allowed without ATC permission. • No person may act as a remote pilot in command or VO for more than one unmanned aircraft operation at one time. • No operations from a moving aircraft. • No operations from a moving vehicle unless the operation is over a sparsely populated area. • No careless or reckless operations. • No carriage of hazardous materials.

FAA News

Federal Aviation Administration, Washington, DC 20591

June 21, 2016

SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107)

Operational Limitations	• Unmanned aircraft must weigh less than 55 lbs. (25 kg). • Visual line-of-sight (VLOS) only; the unmanned aircraft must remain within VLOS of the remote pilot in command and the person manipulating the flight controls of the small UAS. Alternatively, the unmanned aircraft must remain within VLOS of the visual observer. • At all times the small unmanned aircraft must remain close enough to the remote pilot in command and the person manipulating the flight controls of the small UAS for those people to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses. • Small unmanned aircraft may not operate over any persons not directly participating in the operation, not under a cov veh • Day offi with • Mu • Ma • Firs req satisfied in other ways. • Maximum groundspeed of 100 mph (87 knots). • Maximum altitude of 400 feet above ground level (AGL) or, if higher than 400 feet AGL, remain within 400 feet of a structure. • Minimum weather visibility of 3 miles from control station. • Operations in Class B, C, D and E airspace are allowed with the required ATC permission. • Operations in Class G airspace are allowed without ATC permission. • No person may act as a remote pilot in command or VO for more than one unmanned aircraft operation at one time. • No operations from a moving aircraft. • No operations from a moving vehicle unless the operation is over a sparsely populated area. • No careless or reckless operations. • No carriage of hazardous materials.

Small unmanned aircraft may not operate over any persons not directly participating in the operation, not under a covered structure, and not inside a covered stationary vehicle.

Daylight-only operations, or civil twilight (30 minutes before

Waivers to Certain Small UAS Operating Rules

The small UAS rule (14 CFR part 107) includes the option to apply for a certificate of waiver, which allows for a small UAS operation to deviate from certain operating rules if the FAA finds that the proposed operation can be performed safely.

- Waivable sections of part 107
- Operation from a moving vehicle or aircraft (§ 107.25)*
- Daylight operation (§ 107.29)
- Visual line of sight aircraft operation (§ 107.31)*
- Visual observer (§ 107.33)
- Operation of multiple small unmanned aircraft systems (§ 107.35)
- Yielding the right of way (§ 107.37(a))
- Operation over people (§ 107.39)
- Operation in certain airspace (§ 107.41)
- Operating limitations for small unmanned aircraft (§ 107.51)

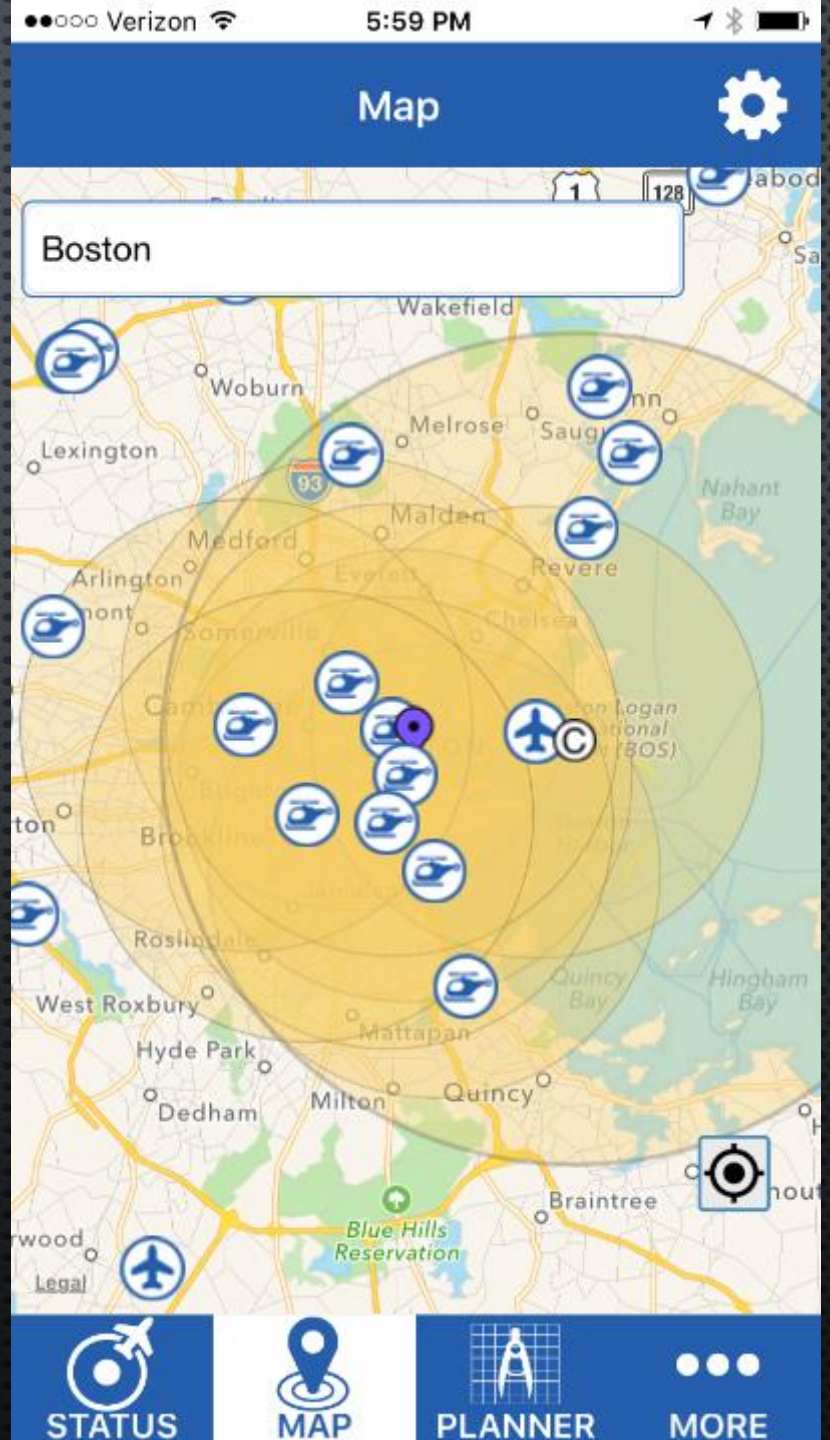
*No waiver of this provision will be issued to allow the carriage of property of another by aircraft for compensation or hire.

Applicants should submit their waiver requests to the FAA as early as possible. Processing time depends on the complexity of the request; however the agency strives to respond within 90 days.

Certificates of waiver may include specific special provisions designed to ensure that the small UAS operation provides an equivalent level of safety as part 107.

- Standard special provisions for part 107 waivers (coming soon)

FAA'S "B4UFLY" APP




NEW ORLEANS CLASS B
LAKE PONTCHARTRAIN
CAUTION: Be prepared for loss of horizontal reference at low altitude over lake during hazy conditions and at night.
Aircraft transiting the flyway shall obtain approval from MSY Tower or Approach Control.
NO SVFR
LOUIS ARMSTRONG NEW ORLEANS INTL (MSY)
NEW ORLEANS
NEW ORLEANS TERMINAL AREA
Pilots are encouraged to use the New Orleans Terminal Area Chart for flights at or below 70
LAKE BORGNE
HIGH VOLUME OF HELICOPTER AND SEAPLANE TRAFFIC
A-381
NOTICE
Alert Area Does Not Exist Within Class B/C/D/E (sfc) Airspace
NEW ORLEANS TERMINAL AREA
Pilots are encouraged to use the New Orleans VFR Terminal Area Chart for flights at or below 7000
LAKE SALVADOR
NEW ORLEANS NAS JRB CALLENDER (NBG)
HARVEY
114.1 Ch 88 HRV
LAKEFRONT (NEW)
NEW ORLEANS RCO
ST. CHARLES
DOWNTOWN (7N4)
OBJECTIONABLE
Whitehall
Romeville
Edgard
Lucy
Convent
Lagan
Kraemer
Choctaw
Bayou Boeuf
Paradis
Raceland
Mathews
Gheens
Lockport
Chacahoula
Thibodaux
Lacombe
SLIDELL
Shell Beach
Delacroix
Venet
Reggio
Phoenix
Lafitte
Barataria
Bayou Gauche
Bayou Cane
Lake Fields
Lake Cataouatche
Lake Maurepas
Port Vincent
French Settlement
GONZALES
LOUISIANA RGNL (L39)
ST. JOHN THE BAPTIST PARISH (LL8)
THIBODAUX (L83)
BIG BRANCH MARSH NATIONAL WILDLIFE REFUGE
BAYOU SAUVAGE NATIONAL WILDLIFE REFUGE
Greenes Ditch
EXAM
70
30

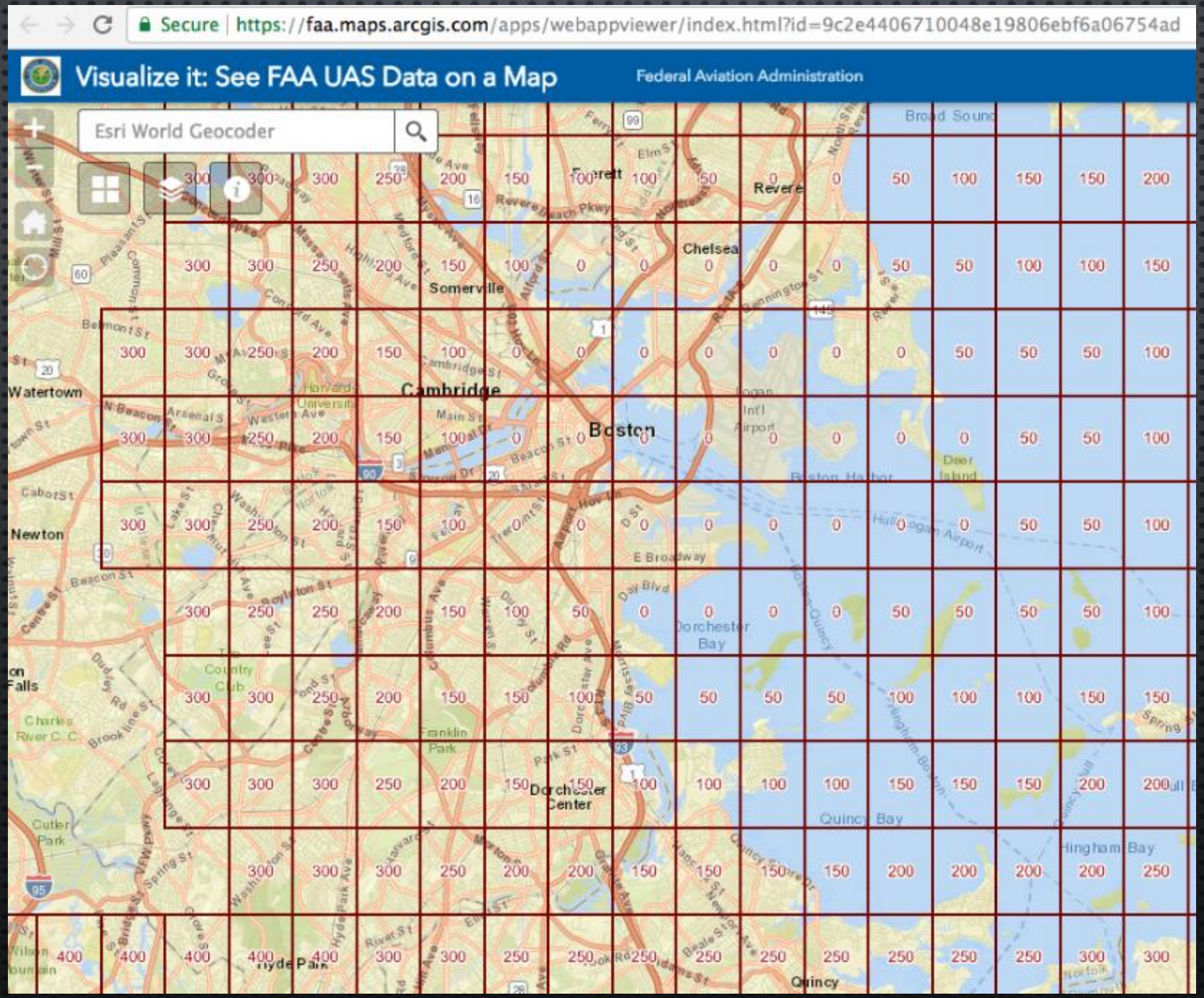
COMING SOON…

LAANC – 2017/2018

Low Altitude Authorization and Notification Capability

UTM – 2019?

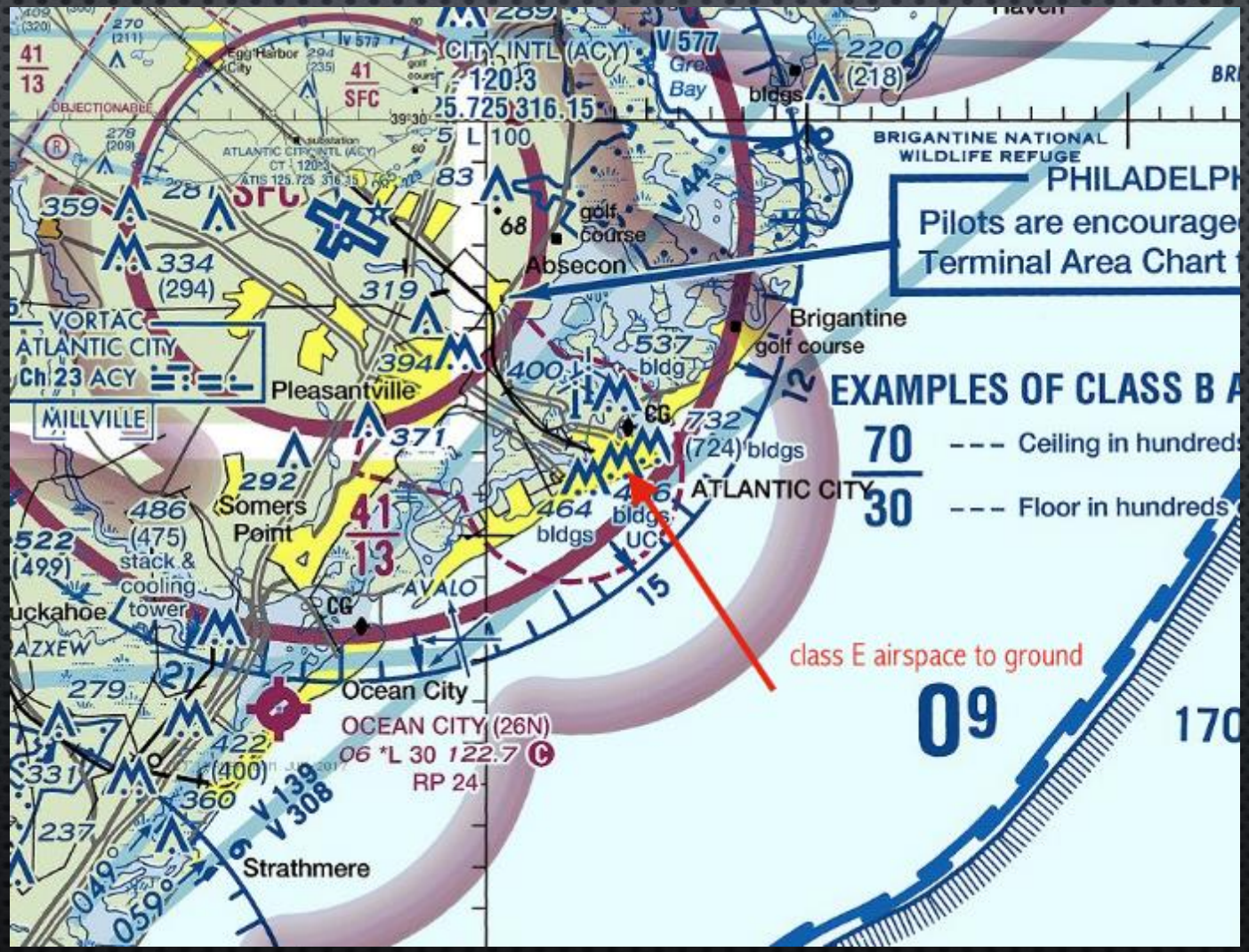
Unmanned Aerial Vehicle Traffic Management System


Secure | https://faa.maps.arcgis.com/apps/webappviewer/index.html?id=9c2e4406710048e19806ebf6a06754ad
Visualize it: See FAA UAS Data on a Map
Federal Aviation Administration
Esri World Geocoder
Everett
Revere
Chelsea
Somerville
Cambridge
Watertown
Boston
Newton
Dorchester Center
Quincy
Hyde Park
Quincy Bay
Dorchester Bay
Hingham Bay
Boston Harbor
Deer Island
Franklin Park
Cutler Park
Charles River C. C.
Country Club
Harvard University
Logan Int'l Airport
Hull Lookout
Broad Sound

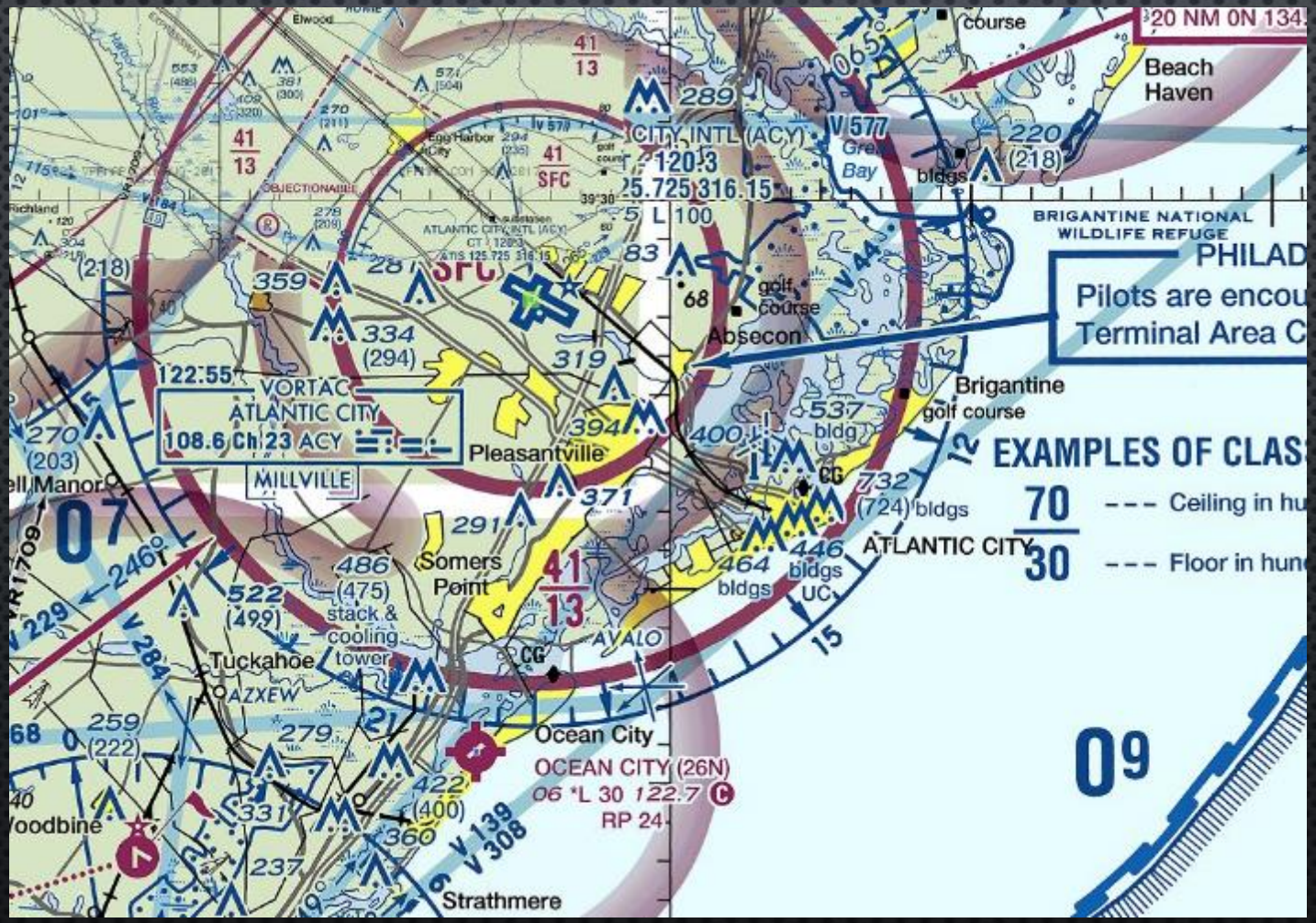
THE AIRSPACE AUTHORIZATION AND PART 107 WAIVER PROCESS

- Common
- Running list of waivers granted: https://www.faa.gov/uas/request_waiver/waivers_granted/
- Airspace Authorization: short-term (<6 months)
- Airspace waiver: long-term (>6 months)
- FAA is "striving" to review applications within 90 days.

AIRSPACE MAPS CAN CHANGE!



AIRSPACE MAPS CAN CHANGE!



dronecenter.bard.edu

Center for the Study of the Drone

at Bard College

About | Features | Interviews | Roundup | Need to Know | Publications | Multimedia Portals

SUPPORT OUR WORK • SUBSCRIBE • BARD STUDENT OPPORTUNITIES

ROUNDUP

Weekly Roundup 4/17/17

April 17, 2017

April 10, 2017 – April 16, 2017 If you would like to receive the Weekly Roundup in your inbox, please subscribe at the bottom of the page. News A drone strike in the Sinai reportedly killed one person. According to al-Jazeera,…

Read more →

SEARCH THE CSD

Search …

REPORTS

How Flying a Drone Could Send You to the Slammer Even When the FAA Says It's OK

Jonathan Vanian
Mar 28, 2017

You may want to think twice about where you fly a drone the next time you travel across the U.S.

Although the Federal Aviation Administration is in charge of regulating drones—as it regulates conventional airplanes—numerous states and local governments have been enacting their own drone rules. In some cases, these local drone laws conflict with the FAA's drone rules, resulting in hefty fines and even jail time even though the pilot may not be violating federal laws.

Small Unmanned Aircraft Systems and the National Park Service

Current Status

On June 19, 2014, National Park Service Director Jonathon B. Jarvis signed Policy Memorandum 14–05, *Unmanned Aircraft – Interim Policy*. Its purpose was "to ensure that the use of unmanned aircraft is addressed in a consistent manner by the NPS before a significant level of such use occurs within the National Park System." Each superintendent was directed "to use the authority under 36 CFR 1.5 to close units of the National Park System to launching, landing, or operating unmanned aircraft…" This policy is still in place and the public may not use unmanned aircraft in the national parks.

FUTURE REGULATIONS

Many of the commercial applications envisioned for UAS, such as express package delivery, remote monitoring of utilities and infrastructure, and imagery collection and analysis to support precision agriculture, most likely will not be viable without development of technological capabilities that allow for the complete integration of UAS in the national airspace. These include technologies to enable drones to sense and avoid other air traffic; manage low-altitude airspace and detect and prevent unauthorized use of airspace; mitigate risks to persons and property on the ground; provide secure command and control linkages between drone aircraft and their operators; and enable automated operations. There are also issues related to operator training and operator

UNMANNED AIRCRAFT OPERATIONS IN DOMESTIC AIRSPACE: U.S. POLICY PERSPECTIVES AND THE REGULATORY LANDSCAPE

CONGRESSIONAL RESEARCH SERVICE

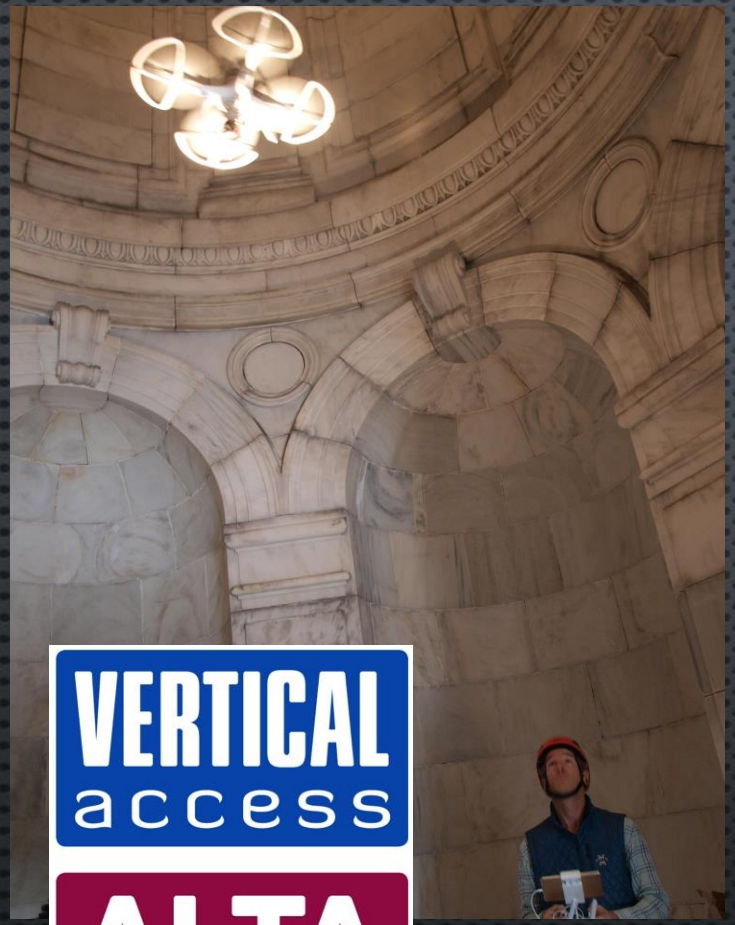
JANUARY 27, 2106

Chipotle burrito drone delivery begins at Virginia Tech

POSTED 3:38 PM, SEPTEMBER 17, 2016, BY CNN WIRE, *UPDATED AT 03:48PM, SEPTEMBER 17, 2016*

THE SILVER LINING IN THE CONSUMER BOOM IS THAT IT FORCED THE REGULATORS TO ACCELERATE MAKING COMMERCIAL USE OF DRONES LEGAL

- Chris Anderson,
CEO 3D Robotics



VERTICAL access

ALTA access

tpas™

Kelly Streeter kelly@vertical-access.com
Kristen Olson kristen@vertical-access.com

www.vertical-access.com
www.alta-access.com
@vertical_access

Thanks for your attention!