

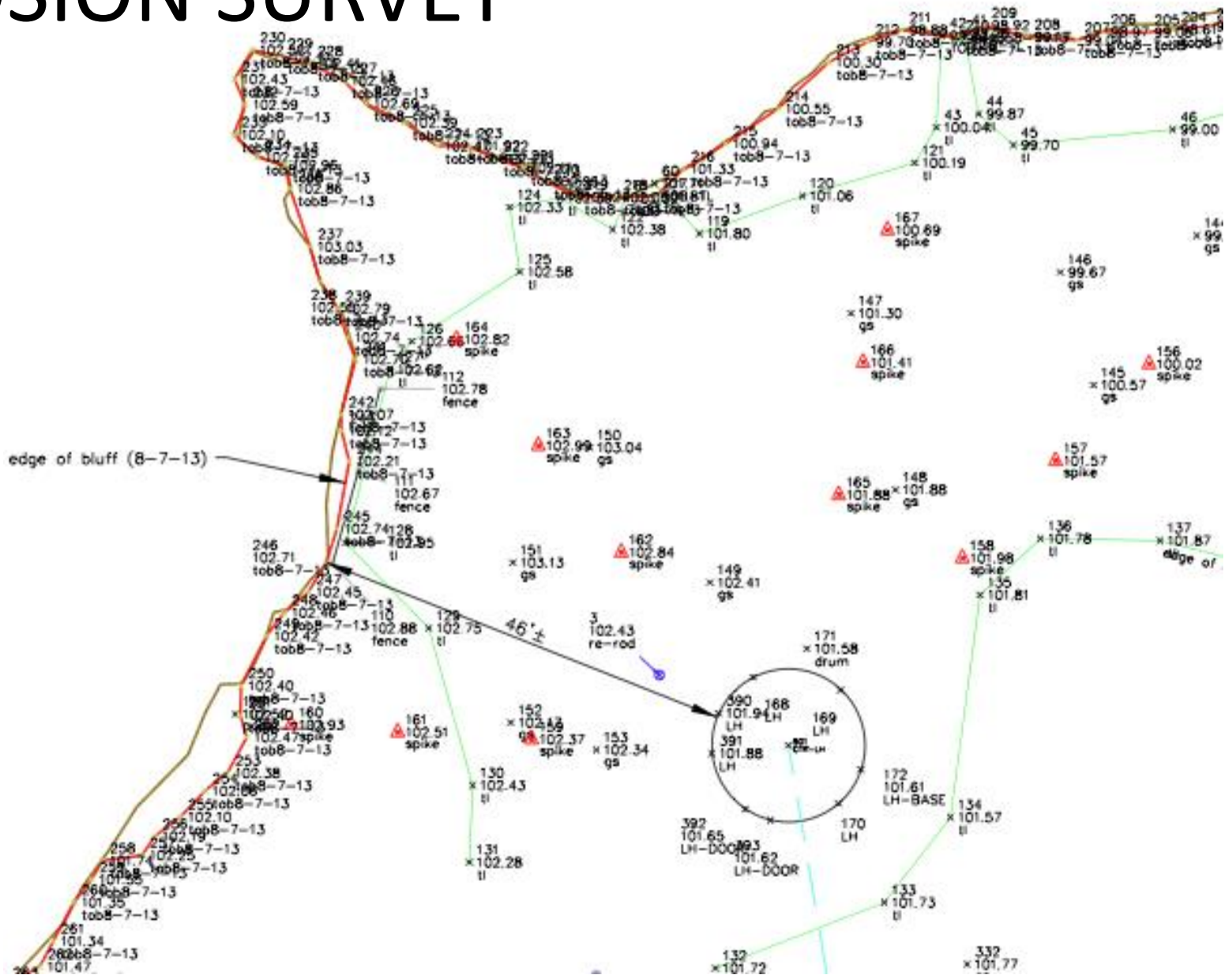
# Gay Head Light Relocation Project

Informational Presentation For  
The Martha's Vineyard Commission  
August 7, 2014

# Cliff Erosion



# EROSION SURVEY





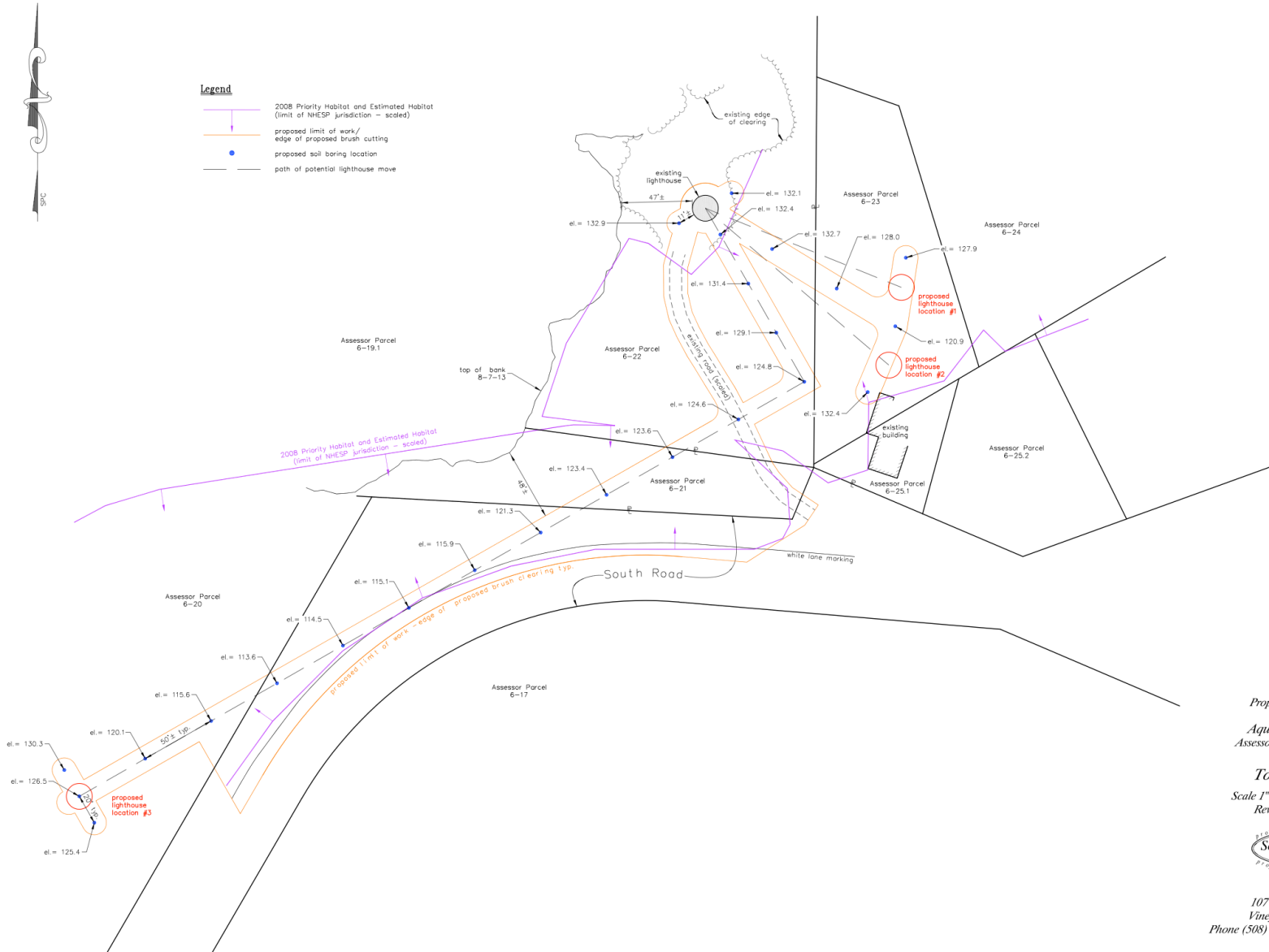
# RELOCATION SITES



# Relocation Criteria

- **Suitability**
  - Navigation aid status: Does it have the elevation and required visibility at sea to qualify?
- **Sensibility**
  - Aesthetic quality: Does it look like a place where a lighthouse would be located?
- **Sustainability**
  - Life expectancy: Does the geology predict security from erosion for 80-100 years?
- **Accessibility**
  - Easy Access: Is it accessible for both the public and the moving equipment?

# BORING LOCATIONS



Proposed Soil Borings Plan  
 in  
 Aquinnah, Massachusetts  
 Assessor Parcel 6-22, 20, 21 & 23  
 prepared for  
 Town of Aquinnah  
 Scale 1"=30' September 30, 2013  
 Revised October 21, 2013



P.O. Box 4458  
 107 Beach Road, Suite 202  
 Vineyard Haven, MA 02568  
 Phone (508) 693-9933 Fax (508) 693-4933



# Geotechnical Borings





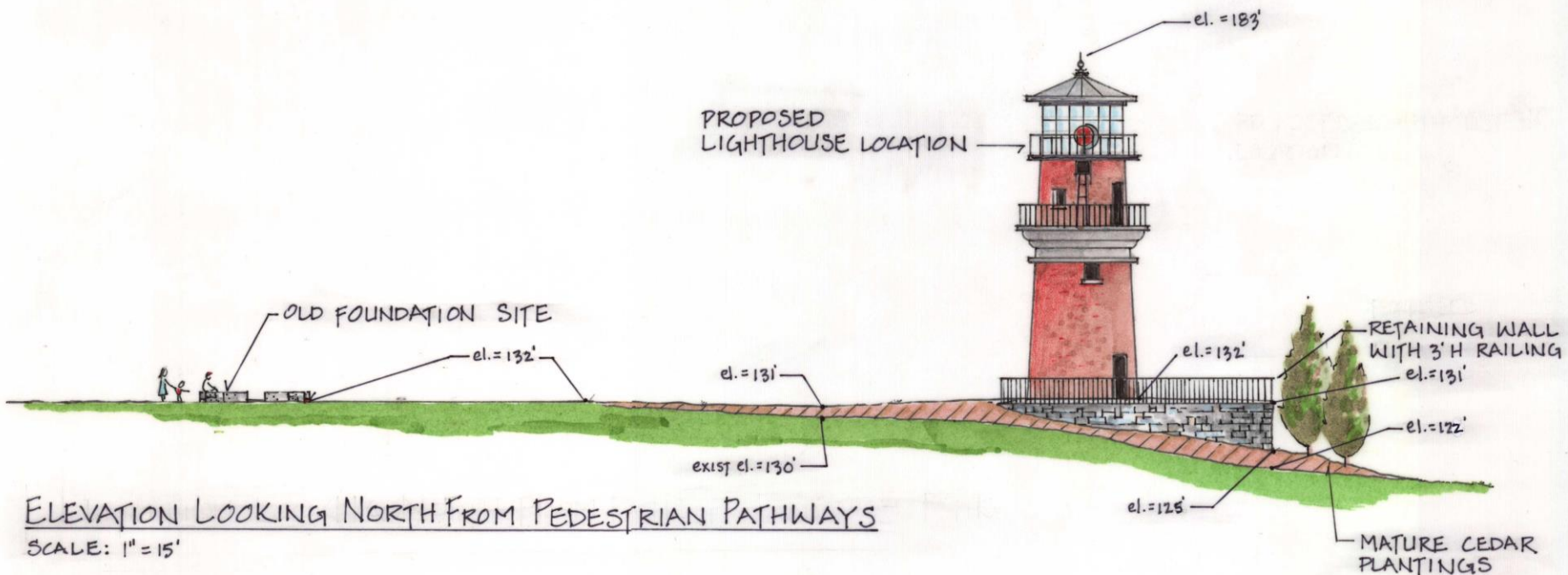
# Relocation Site 1



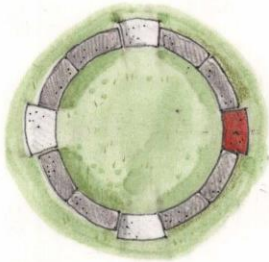


# Original Foundation









PLAN DETAIL OF  
OLD FOUNDATION SITE



EXISTING CLIFF  
EDGE

OLD LIGHTHOUSE  
FOUNDATION SITE

EXISTING & NEW  
SPLIT RAIL FENCE

PROPOSED  
LIGHTHOUSE  
LOCATION

GRANITE  
RETAINING WALL

PROPOSED PATH  
TO CLIFFS  
OVERLOOK

MATURE  
CEDAR  
PLANTINGS

ADA COMPLIANT  
PEDESTRIAN PATHWAY  
WITH DEDICATED ADA  
PARKING

SITE PLAN

SCALE: 1" = 30'

AQUINNAH CIRCLE



## Site Evaluation under Selection Criteria

- 1) Sensibility- Light would look appropriate at Site #1 located on a ridge. Also maintains a similar orientation to surroundings at the Aquinnah Circle.
- 2) Suitability- Geotechnical soil tests indicate better load bearing subsoil characteristics at this location. Meets the USCG requirement for navigational purposes in both elevation and position as it is little changed from current position as viewed by mariners. – Also maintains “day mark” or visibility from all angles from the water.
- 3) Sustainability- Analysis of core samples indicate that this site is on a stable geologic formation which should be resistant to future erosion for a minimum of 140 years or more according to historic erosion rates.
- 4) Accessibility- Will maintain same access as it is now. This site would also have contiguous open space on the top of the Cliff at the former Light location for events public and private for the use of the Town ,the tribe and the general public.

Based on the Committees criteria Site #1 is the most favorable relocation site. This is also the preferred site of the National Park Service, the Wampanoag Tribe and the Mass Historical Commission because it would be less impactful to the environment and natural vegetation of Cliff Area and may be less sensitive archaeologically.

Cost- The overall cost of relocation to this site would approximately \$900,000 less than other alternative site.



## **Consultants and Advisors to the Save the Gay Head Lighthouse Committee**

Principal Local Advisor - Kent Healey PhD Geotechnical Engineering MIT

Consulting Hydrologist- Patrick Williams  
Principal Geologist at Williams Assoc. San Diego, Ca.  
Degrees: Cal Tech and Columbia Univ.

Consulting Geologist – Byron Stone, PH.D  
Research Geologist – U.S. Dept.. of Interior Office of U.S. Geologic Survey  
Head Geologist in Charge of Mass Quaternary Geology Project

Consulting Civil /Structural Engineer and Surveyor- George Sourati  
Principal of Sourati Engineering  
Vineyard Haven, MA

Consulting Landscape Architect – Michael Van Valkenburgh  
Principal MVV Assoc.  
American Academy of Arts & Sciences Fellow



# United States Department of the Interior

U.S. GEOLOGICAL SURVEY

2 June, 2014

Gay Head Lighthouse Relocation Committee  
Town of Aquinnah  
65 State Road  
Aquinnah, Massachusetts 02535

Dear GHLRC members,

As an advisor to your committee, I participated in collection of field borings at the Gay Head lighthouse relocation sites 1 and 2, January, 2014, and I reviewed the final geotechnical report (Geologic Earth Exploration, Inc., 2014). Using historical maps and images I compiled a map in a geographic information system showing erosion positions of the Gay Head bluff top 1870-2014. I reviewed the results of this analysis and the characteristics of Cretaceous to late Quaternary-age deposits beneath the lighthouse bluffs at your committee meeting on April 14, 2014. On the basis of previous geologic and engineering studies and these recent investigations, I am able to offer a professional opinion on the suitability and sustainability of the two potential relocation sites, as previously explained in email communications to the Committee:

“Geologic features differ between the two sites. Site 1 is bounded by subsurface sandy materials that host perennial ground-water springs. The red clay of the ‘buttress’ zone beneath the lighthouse seems to be a somewhat conformable zone in the sandy section to the north, but it is strongly disconformable against the older glacial sand and gravel zone to the south. The red clay continues to the top of the bluff and to the core holes around the lighthouse and site 1. It probably acts as an aquitard, forcing ground water to divide and flow on either side of the lighthouse at different altitudes. Site 2 also contains red clay in the shallow subsurface at the top. Only a small bed of red clay is exposed at the base of the bluffs near site 2. This site is not near surface swamps as at site 1. Springs emerge north of site 2, but no evidence of surface springs occurs in Devil’s Den to the south. It appears that each site can be expected to remain uneroded for at least 100 years, based on the projected historical erosion rates along the local front of the bluff at each site.”

Thank you for your invitation to participate. I look forward to continued geologic and hydrogeologic studies of the bluffs and surrounding areas in Aquinnah and the lands of the Wampanoag Tribe.

Byron D. Stone, Ph.D.

[bdstone@usgs.gov](mailto:bdstone@usgs.gov)

Eastern Geology and Paleoclimate Science Center

U.S. Geological Survey

101 Pitkin St.

East Hartford, CT 06108

860.291.6755 office

Enclosures

Cc: Randall Orndorff, USGS, EG&PSC, Reston, VA





March 3, 2014

Kuweeqâhsunumuw,

The Wampanoag Tribe of Gay Head (Aquinnah) and the WTGH (A) Tribal Historic Preservation Department (THPD) offer this letter of support of the Save the Gay Head Lighthouse Committee in their effort to receive ownership of the Gay Head Lighthouse.

The Gay Head Lighthouse is unique; in history, location, cultural context to the Tribe. The Light has sat prominently atop the Cliffs since it was built and the Aquinnah Wampanoag have always had a relationship to the Light; whether it be lifesaving under its beam in the deep of winter, tribal members serving in the Coast Guard at the Light or welcoming tourists over the last 150 years.

The Gay Head Lighthouse has the distinction of having a Native American lighthouse keeper, Charles W. Vanderhoop and assistant keeper, Max Attaquin. They welcomed hundreds of visitors over the summer months. According to the U.S. Coast Guard web page, "A keeper at the Gay Head, Massachusetts, light station, for example, wrote that he preferred to hire Native Americans for their reliability." This loyalty extends up to the present with tribal members, including the descendants of Keeper Vanderhoop serving as assistant keepers and continuing to preserve this very special part of our history.

The Light is situated on the edge of the Gay Head Cliffs; a traditional cultural property to the Aquinnah Wampanoag held in trust by the United States government for the use of the Tribe, a National Natural Landmark, and a recognized geological record of millions of years. The THPD has and will continue to work with state and federal agencies and the Town of Aquinnah to consult, evaluate options and monitor field work in order to protect the Cliffs as the Town moves forward in this process.

The THPD therefore endorses and supports the Town of Aquinnah's application for ownership of the Gay Head Lighthouse and by doing so, preserves the Light for future generations.

Signed on behalf of Bettina M. Washington, WTGH (A) Tribal Historic Preservation Officer:

Ahahpây,  
(Humbly,)

Tobias J. Vanderhoop  
Tribal Chairman  
Chairman, Cultural & Historic Commission