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21597/2018/Expanded Project/NOI/Public Hearing Comments

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November 30, 2018

Nantucket Conservation Commission
2 Bathing Beach Road
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Via Electronic Mail and U.S. Mail

Subject: Response to Comments from the November 19, 2018 Hearing on the Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project (DEP File No. SE 48-3115)

Dear Commission Members:

On behalf of the Sconset Beach Preservation Fund ("SBPF"), Epsilon Associates, Inc. ("Epsilon") submits responses to questions and comments raised Commissioners and the public during the November 19, 2018 Public Hearing, see Attachment 1. We also provide a comparison of the Existing Project and the Expanded Project to highlight the similarities between the two projects, see Attachment 2.

SBPF believes that we have provided all of the information requested by the Commission and responded to concerns expressed by the Commission and the public. We look forward to hearing any final comments from the Commission and the interested public at the December 3, 2018 Public Hearing, and we hope to be in a position to close the Public Hearing after you have had a chance to review the information attached hereto.

Please contact me at (978) 897-7100 or via email at ddunk@epsilonassociates.com with questions of comments regarding this matter.

Sincerely,
EPSILON ASSOCIATES, INC.

Dwight R. Dunk, LPD, PWS, BCES
Principal

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encl.: Attachment 1 – Comments and Responses from the November 19, 2018 Nantucket Conservation Commission Public Hearing

Attachment 2 – Comparison of Permit Decisions for the Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project

Attachment 1

Comments and Responses from the November 19, 2018
Nantucket Conservation Commission Public Hearing

Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project
(DEP File No. SE48-3115)
Comments and Responses from the November 19, 2018
Nantucket Conservation Commission Public Hearing

Eligibility for Protection

Q: What is justification for protecting the southern-most lots? The bluff is vegetated in this area.

A: Protection of southern lots (from 59-67) can prevent the Bluff Walk which is open and in place from closure. The Bluff Walk is closed north of 67 Baxter Road. The Bluff Walk is used by many hundreds of walkers per day through spring, summer and fall and can be considered to be infrastructure. In addition, the homes adjacent to this segment of the bluff are all qualifying pre-1978 homes. The toe of the bluff has been eroding in this southern segment for 5+ years with erosion moving from north to south over time. Erosion at the toe began on the southern-most lot (59 Baxter Road) during the March 2018 storms. The vegetated face of the bluff has substantially slid in front 63, 65, and 67 Baxter Road, and is partially sliding in front of 61 Baxter Road. The shoreline in this area, based on Woods Hole Group ("WHG") profiles 89.2 to 90[1], show significant shoreline loss and erosion for the five-year period of September 2013 – September 2018.

Q. Regarding gap lots for the whole project (existing and proposed), gap lots appear to account for 50% of the area. How many gap lots are there? There is concern about the number of gap lots. Acknowledge need for a continuous structure.

A: The Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project ("Expanded Project") area (59 – 85 and 107 – 119 Baxter Road) is comprised of 21 lots on the east side of Baxter Road. Only two (2) of these lots are considered "gap lots".

All seven (7) lots from 107 to119 Baxter Road are eligible for protection in order to avoid the loss of Baxter Road infrastructure and eligible pre-1978 homes. Three (3) lots support pre-1978 homes which provide an additional rationale for eligibility for protection; and protection of the other four (4) lots is needed to protect public infrastructure.

Of the remaining 14 lots from 85 to 59 Baxter, there is only one (1) vacant lot, 85 Baxter Road. This lot is eligible for protection to protect public infrastructure and as a "gap lot" to install a continuous system. Eleven (11) of the thirteen (13) homes on these lots qualify under both the State and local by-law criteria for protecting pre-1978 homes. The other two (2) are eligible under the State criteria but potentially ineligible under the local. These two homes can be considered to be "gap lots" and eligible for protection to construct a continuous system.

Note, the Existing Project consists of three (3) lots with pre-1978 homes and 5 vacant lots. None are considered to be "gap lots" because protection in front of the vacant lots is required to protect the Baxter Road infrastructure.

Q. **At the southern-most end, the returns abut the dune and deflection off the geotube system might affect the dunes beyond the proposed expanded project limit. How does this project protect against erosion of those dunes?**

A: Continued natural retreat of the shoreline and bluff adjacent to the Expanded Project limit from continued erosion means that a gap can be expected to appear overtime where the returns end. This gap is not the result of accelerated erosion; it is simply caused by the fact that erosion will continue to move landward where there is no protection. We suggest that a system of coir rolls like what was just recently approved for the Existing Project, be built into the OOC for this Expanded Project and be installed in these gaps as they occur.

Erosion Rate and Sand Mitigation

Q: **How are the sand erosion rate and mitigation volumes calculated? Why are they based on length-weighted averages? What if future rates of erosion on the bluff are different than they have been historically? How does design and template management account for an increased rate of erosion? How does design and template management account for different rates of erosion on different locations along the template?**

Q. **How does the proposal address future massive erosion rates? The Project needs to be flexible; it seems that the Project will place a structure in front of a natural contributor and we won't know the impacts down-drift?**

A: The Expanded Project design and the proposed Template Sand Replenishment Protocol ("Adaptive Protocol"), are based on the Massachusetts Department of Environmental Protection ("MassDEP") Regulations and Massachusetts Office of Coastal Zone Management ("CZM") Policy and rely on long-term historic erosion rates, or contribution rates, to determine the future sediment mitigation volume and rate. The Applicant has followed the procedures established by MassDEP and CZM to determine sand mitigation volume. That rate is calculated based on the project specific long-term rate of erosion and the height of the bank. This results in different erosion and mitigation volumes in different segments of the bluff. This information was collected for different segments and then using weighted averaging a volume (i.e. cubic yards/linear foot/year) is derived. The weighted average for the entire 3,800 feet of the project area is 8.8 cy/lf. The weighted average for the current 950 foot project is 12 cy/lf.

Sand is placed on the face of the geotubes so it can be washed off and contribute to the littoral drift system. The proposed Adaptive Protocol mitigation measure provides a substantial volume of sediment to the system to maintain down-drift landforms. Results of

monitoring to date for the Existing Project demonstrate down-drift Coastal Beaches are maintaining their historic size and not harmed by the Project[1].

Q. There seems to be a big gap in the Applicant's proposed mitigation volume and what Applied Coastal has been saying.

A: Applied Coastal has not used the methodology for calculating an erosion rate or sand mitigation volume that is consistent with MassDEP Regulations and the CZM Policy, and as required and used in other similar projects. It is unclear what methodology Applied Coastal is using in their analysis and they have not provided a specific proposed Coastal Bank erosion rate or sand contribution volume. The Applicant has followed the MassDEP Regulations and the CZM Policy in their calculations. Further, the Applicant has calculated the pre-construction project site-specific Coastal Bank erosion rates based on a 23 year record (1994 – 2017) for the northern portion of the Expanded Project and a 14 year record (2003 – 2017) for the southern portion. Both of these time periods include the erosion event that occurred in 2012-2013.

Q. **What are the pros and cons of the Adaptive Sand Mitigation system proposed? Why is the Applicant proposing this?**

A. The Adaptive Protocol template management accounts for different annual sediment loss off the face of the template and adjusts for "big years" and below average years of sand loss by re-covering exposed geotubes after erosion events throughout the year. This approach accounts for varying erosion rates from year-to-year. Because the Adaptive Proposal calls for "re-filling" the sand template to 22 cy/lf for each storm season, it assures that a substantial volume of sand is available each year.

The typical method of sand mitigation calls for a specific amount of sand to be delivered each year regardless of whether it is an above or below average year of sand loss. After a "big year" there may not be as much sand available in the template using the standard method as there would be following the Adaptive Protocol.

The Adaptive Protocol is a practical approach to make sure that an adequate volume of sand is being contributed off the template over time because the required monitoring provides data every year showing how much sand was contributed from the template the previous year, and how much sand was contributed from nearby unprotected bluff areas the previous year. The Adaptive Protocol does not rely solely on the historic rate of erosion of the bluff as does the standard mitigation approach used by MassDEP and CZM.

Storing excess sand on top of the template for re-covering exposed tubes makes adequate sand volume is available for use wherever erosion occurs along the face of the template.

Q. Isn't it simpler to require a specific amount of sand mitigation each year regardless of the rate of erosion and sand contribution?

A. The traditional method is an annual contribution based on the calculation method we have described above and elsewhere in the NOI and hearings. That amount is 8.8 cy/lf for the approximately 3,800 lf project. We are prepared to provide this annual amount as an alternative to the Adaptive Protocol approach if the Commission prefers. Further, we would be willing to include a template of 22 cy/lf as part of the initial construction. However, in future years if more than 8.8 cy/lf washes away in a given year, as was the case last year for example where the existing template contributed 20 cy/lf, then the balance in the template would decline since only 8.8 cy/lf would be added. In below average years, less than 8.8 cy/lf might wash away in which case the template would increase in size when the set 8.8 cy/lf amount is placed on the template.

Q: Is there is a cut off to the amount of sand nourishment per linear foot?

A: There is no cut-off. The Adaptive Protocol calls for having a stockpile of 22 cy/lf on the template (in front of the tubes and on top of the tubes) before the start of each storm season. Sand from atop the template will be used to re-cover exposed tubes after erosion events. Should more sand be required during the storm season more sand will be imported to the Project site to ensure exposed tubes can be re-covered.

Q: The twice-a-day high-tide cycle picks up sand on the beach; if there is no sand on the template, there is nothing to be carried into the system.

A: The toe of the geotube system is approximately 70 to 75 feet landward of the mean high tide line (el. +3 feet). Therefore, during most days the water and waves do not reach the template therefore there is no interaction between the normal tide elevations and the template. There are a number of occasions during the year during intense storms, when wave run-up extends up to the toe of the geotube system, and sand can be carried off the face of the template, as designed. In longer storms there are a few occasions when the geotubes are exposed and no more sand is available to be washed away during that storm event. Data from the project shows that this occasional shortfall is offset by other occasions when sand is contributed more quickly and more readily than it is from the erosion of unprotected bluff. Further, as described by the Applicant's coastal scientists and engineers, the timing of the contribution of sand from the geotubes does not have a material impact on the availability of downdrift material. Further, the data from regular beach surveys has shown no evidence of impact of the project on downdrift beaches.

Q. Some commissioners continue to be concerned that the timing of nourishment, and the time periods when the geotubes are exposed may negatively impact neighboring beaches by depriving them of adequate sand.

A. The Applicant's coastal scientists and engineers demonstrated how the littoral drift system is affected by many factors and the precise timing of sand contribution is not a material factor. Annual volume is the determining factor. Further, the post-erosion event re-covering of the geotubes provides numerous additional volumes of sand available for subsequent storms during the year. More precise timing is not a practical option. In addition, the appropriate standard is "best available measures" which either the typical annual deliver or Adaptive Protocol meet.

Q. The Commission will never know how much would have been contributed from the bluff if the geotube protection were not in place.

A. While it is not possible to know what erosion rate may be for this segment of the bluff in the future if it were not being protected, we do have 25 years of detailed data and decades of additional data showing the rate of erosion over the past 100 years. The MassDEP Regulations and CZM Policy rely on long-term historic erosion rates, or contribution rates, to determine the future sediment mitigation volume and rate. The Applicant has followed the procedures established by the MassDEP and CZM to determine sand mitigation volume.

Q. Is the calculation of the erosion rate for the southern portion of the project based on too long a term? Would a shorter-term rate be more appropriate?

A: Consistent with the MassDEP Regulations and the CZM Policy, the Applicant has calculated pre-construction project site specific Coastal Bank erosion rates based on a 23 year record for the northern portion of the Expanded Project and a 14 year record for the southern portion. Both of these time periods include the significant erosion event that occurred in 2012-2013.[2] Using a short-term rate is considered less accurate since it can be skewed by short term events. As an example, if one were to select either a particularly big year or small year and then extrapolate from the data for that short term period only one would get a highly inaccurate result – either too high or too low depending on whether a high or low year is selected.

Additionally, review of the Existing Project by Milone and MacBroom, Inc. (letter dated November 12, 2013 and referenced in the OOC SE48-2824) confirmed the use site specific data to determine bank erosion and mitigation sand volume. The author also indicated that an adaptive mitigation program may be warranted because future conditions may warrant lower sand mitigation volumes or a higher sand mitigation volumes in any given year.

Q: With this design a large portion of sand on the template is not available because it is on top of the template.

A: The sand atop the template is essentially a sand stockpile, for use to re-cover exposed geotubes quickly after storm events. Thus, it is available throughout the storm season (and year) to periodically replace sand in front of the geotubes so that sand remains available to the littoral drift system throughout the year.

Impact of Project on Interest of Coastal Beach and Habitat

Q: The NOI identifies up to 67,000 SF of beach alteration. How are the functions of beach being maintained? How can it respond?

A: As depicted on the Expanded Project drawings, the lower two (2) rows of geotubes are buried beneath the beach surface, and the geotubes are located about 70 feet to 75 feet landward from the mean high-water line, therefore a significant amount of beach remains available to respond to tidal and wave action.

The MassDEP Regulations acknowledge that coastal engineering structures are likely to be constructed on Coastal Beach and allow for that in 310 CMR 10.27(3).[3] The Existing Project is placed on the back of the beach, as is the proposed Expanded Project. There is no other place to construct it without excavating into the bluff itself. The Expanded Project was designed to minimize adverse effects on nearby coastal beaches and the proposed Adaptive Protocol sand management program is a "best available measure" to minimize adverse effects on nearby coastal beaches, in compliance with the MassDEP Regulations. The municipal Bylaw regulations are no more stringent related to the stated concern.

Q: Will plastic fibers from the geotubes enter the environment? What impact might those have?

A: This topic is beyond the scope of the Wetlands Protection Act and the Nantucket Wetlands Protection Bylaw. Further, the study of microplastics in ocean environments is still in its infancy.

In further response to this question, we contacted manufacturers of geotextile tubes, and the product anticipated for this application is a high tensile strength woven polypropylene. Geotextiles made of polypropylene have a life expectancy of more than 200 years.[4] In addition to the existing Project, a longer-term application of similar geotubes in NJ has had no fabric failures since it was installed more than 20 years ago[5].

Q: What is the Bank Swallow breeding season? Arrival and departure dates?

A: The dates provided by Dr. Kennedy (letter dated July 3, 2017 previously submitted to the Commission) are based on his more than 95 surveys along the east coast of Nantucket.

Bank Swallows were observed mid-May to mid-August during 44 of those surveys. He concluded that conducting work between mid-August through March would avoid any interference with Bank Swallows on the Sconset coast.

Q: Does the project effect seal habitat? Seals are protected by the Marie Mammal Protection Act ("MMPA").

A: No, the geotube system will not interfere with "seal habitat" because it is located well above mean high water and the all work will occur above mean high water. Also, sufficient beach width will remain to accommodate seals that may pull up on shore. Further, the MMPA is not within the jurisdiction of the Commission and the Project site is not estimated habitat for any seal species protected by the Massachusetts Endangered Species Act.

OTHER ISSUES

Q: How will existing stairs down the bluff be handled?

A: Existing stairs will be retained. People using the stairs will need to walk along the top of the template to the ramps and the ends to reach the beach.

Q: Has the Commission granted a waiver for a CES in front of substantially improved, post-1978 house or empty lot?

A: Yes, for the Existing Project (DEP File No. SE48-2824). The waiver was granted to protect pre-1978 houses and public infrastructure. Empty lots are located between the top of the bluff and the roadway, thus by definition some empty lots (gap lots) are protected as a means to protect the public infrastructure.

End Notes

[1] See Tables 2 and 3 in the Southeast Nantucket Beach Monitoring - September 2018 - 77th Survey Report, dated October 2018.

[2] Standard practice is to use the CZM shoreline change maps to determined long-term erosion rates. Along the Sconset shoreline that long-term data (approximately 165 years) yields less than a 1 foot per year of shoreline loss. That erosion rate was rejected, and the project specific erosion during the periods 1994 – 2017 were used as the more representative erosion rates for calculating sand mitigation volume.

[3] 310 CMR 10.27(3) reads as follows (underline added for emphasis):

"*… Any project on a coastal beach, except any project permitted under 310 CMR 10.30(3)(a), shall not have an adverse effect by increasing erosion, decreasing the volume or changing the form of any such coastal beach or an adjacent or downdrift coastal beach.*"

Recall the proposed expansion project is submitted and reviewable pursuant to 310 CMR 10.30(3)(a) for Coastal Banks which reads as follows:

"*(3) No new bulkhead, revetment, seawall, groin or other coastal engineering structure shall be permitted on such a coastal bank except that such a coastal engineering structure shall be permitted when required to prevent storm damage to buildings constructed prior to the effective date of 310 CMR 10.21 through 10.37 or constructed pursuant to a Notice of Intent filed prior to the effective date of 310 CMR 10.21 through 10.37 (August 10, 1978), including reconstructions of such buildings subsequent to the effective date of 310 CMR 10.21 through 10.37, provided that the following requirements are met: (a) a coastal engineering structure or a modification thereto shall be designed and constructed so as to minimize, using best available measures, adverse effects on adjacent or nearby coastal beaches due to changes in wave action, and …*"

[4] Ivy, N, & B. Garner. 2016. *Quality control and quality assurance for geotextiles* in Geotextiles: from Design to Applications, pp 565-575. Woodhead Publishing, Elsevier Ltd.

[5] Email correspondence with Mr. Peter Kaye, PK Environmental, LLC (November 26, 2018)

Attachment 2

Comparison of Permit Decisions for the Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project

Comparison of Permit Decisions for the Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project (DEP File No. SE48-3115) to the Previously Approved Baxter Road and Sconset Bluff Storm Damage Prevention Project (DEP File SE48-2824)

The pending Notice of Intent (DEP File No. SE48-3115) seeks an Order of Conditions ("OOC") from the Nantucket Conservation Commission ("Commission") that is substantially similar to the decisions that were already made by the Commission when it issued the OOC for the Existing Project (DEP File No. SE48-2824). This document is provided to assist the Commission evaluate the information provided during the Public Hearing process to identify the substantive decisions that need to be made for the Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project ("Expanded Project"), as compared to determinations that were made previously for the Existing Project. These determinations are substantially the same for both the Wetlands Protection Act ("WPA") and the Nantucket Wetlands Protection Bylaw ("Bylaw").

Table 1 on the following page compares the Expanded and Existing Project relative to project purpose, design, mitigation and monitoring. As shown, there is little difference between the Existing Project and the extension of this geotube system to the north and south, i.e. the Expanded Project.

Table 2 on page 3 compares permitting decisions by the Commission, again comparing the decisions made for the Existing Project to those needed to authorize the Expended Project. This comparison is based on the OOC for SE48-2824 and the draft findings of Findings of Fact / Special Conditions submitted to the Commission on November 16, 2018.

Table 1. A Summary Comparison of the Existing and Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project

PROJECT ELEMENT	EXISTING PROJECT	EXPANDED PROJECT
Project Purpose :	+/- 950 feet to protect 2 homes and public infrastructure (fronting 5 vacant lots to protect public infrastructure; gap lots from a pre-1978 house perspective).	+/- 2,900 feet to protect 21 lots - 16 homes and 5 vacant lots (to protect public infrastructure) or "gap lots" per the state definition[1].
Geotube System Design:		
Geotube Layout	Four tier geotube configuration covered by sand template.	Same design. Difference is lowest geotube set at elevation -3 feet MLW instead of 0 feet MLW
Geotube Returns	Sloped returns that tie into adjacent Coastal Bank at a shallow angle.	Same design.
Return Extensions	Coir rolls approved November 28, 2018.	Add Special Condition to install coir roll return extensions when appropriate.
Sand Template Management:	Place sand on template at a rate of 22 cy/lf/yr and use that sand stockpile to recover exposed tubes after erosion events. Import sand during storm season as needed to replenish stockpile.	Fill template to 22 cy/lf before each storm season and use that sand stockpile to recover exposed tubes after erosion events. Import sand during storm season as needed to replenish stockpile.
Monitoring:	Extensive monitoring program: ▪ Shoreline change quarterly; ▪ Bathymetric Survey semi-annually; ▪ underwater video semi-annually; ▪ post-storm inspections; ▪ template survey annually.	Extensive program with minor modifications[2]: ▪ Shoreline change semi-annually; ▪ Bathymetric Survey annually; ▪ Underwater video once every 3 year; ▪ Post storm inspections ▪ Template survey annually
Reporting:	Annual Report and interim reports to the Commission	Same

Notes:

1. Per the Nantucket Bylaw 14 homes are eligible as pre-1978 structures, 2 are non-eligible structures but can be protected as "gap lots", and 5 are vacant lots eligible for protection to protect public infrastructure from damage.
2. Correspondence from Greg Berman, Woods Hole Sea Grant | Cape Cod Cooperative Extension to Jeff Carlson (Natural Resources Coordinator, Town of Nantucket) dated April 7, 2017 Regarding the Independent Review of the 2016 Annual Report, noted the following:
   - Shoreline Monitoring – The requested reduction to 2 profiles per year is reasonable based on the collected data so far as well as more consistent with MassDEP guidance. (pg. 4)
   - Wetland Well Monitoring – If the data from 2001-2007 shows similar dry levels as this project the well monitoring could be discontinued. (pg. 5)
   - Beach Invertebrate Monitoring – The invertebrate monitoring could be discontinued as no impacts to the few species have been observed. (pg. 5)
   - Underwater Video Monitoring – Video monitoring likely is not needed yearly. (pg. 6)

Table 2. A Summary Comparison of the Permitting Decisions for the Existing and Expanded Baxter Road and Sconset Bluff Storm Damage Prevention Project

EXISTING PROJECT	EXPANDED PROJECT
Findings of Fact:	
Contains 18 Findings of Fact.	All Findings are the same, except those that do not apply: ▪ No. 15 that referred to the Emergency Project; ▪ No. 16 that referred to maintaining the 3 tier system; ▪ Nos. 17 c. – e. that referred to the Emergency Project and SOC; ▪ Nos. 17 f which is modified (16.c) to remove reference to the Emergency Project.
Special Conditions:	
OOC included 40 Special Conditions, Nos. 19 - 59	32 preliminary Special Conditions were submitted for review, Nos. 1 – 32.
Conditions 20., 21., 22., 24., 25., 29., 30., 31., 34., 35., 36., 37., 39., 40., 42., 43., 48., 49., 52., 54., 55., 57., 58., and 59.	Remain essentially the same, minor changes to reflect the Expanded Project and renumbered in preliminary OOC submitted for consideration by the Commission on November 16, 2018.
The following 10 of 40 conditions are modified as summarized below:	
No. 19 - Project Description.	No 1. - Modified to describe Expanded Project Description.
No. 26 - Relative to 4th tier of geotube.	No. 7 – Modified to address restoration of beach with sand excavated to install geotubes.
No. 27 - Relative to beach monitoring.	No. 8 – Modified to reflect proposed changes to monitoring frequencies.
No. 28 - Bathymetric profiles.	No. 9 – Modified annual profile. .
No 32 - Sand mitigation volume.	No 13 – Modified to condition the adaptive sand template management protocol.
No. 33 - Storage of sand on beach.	Deleted. Not proposed. Sand ramps provide excess sand storage.
No. 41 - Addresses term of approval, states date until which expansion NOI can be filed and conditions applications for modifications.	No. 20 – Modified to deleted reference to January 2018 for any requests for an expanded project and modifies allowed modifications to include changed site conditions in addition to emergencies.
No. 45 - Refers to partial Certificate of Compliance ("COC").	No. 23 – Modified to address COC for SE48-2824 in relation to COC for SE48-3115.
No. 48 – Refers to quarterly surveys regarding retreat.	No. 24 – Modified to remove reference to quarterly surveys.
No. 53 - Success Criteria.	No. 27 – Modified only to refer to adaptive sand mitigation (27.a.)
The following conditions are deleted because they are not applicable to the Expanded Project:	
Nos. 23., 38., 46., 47., 50., & 51.	
The following conditions are deleted because they have been met / completed:	
Nos. 44. & 56.	