

PROGRAMMATIC AGREEMENT
AMONG
THE NATIONAL SCIENCE FOUNDATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND
THE WEST VIRGINIA STATE HISTORIC PRESERVATION OFFICER
REGARDING
POTENTIAL CHANGES TO
GREEN BANK OBSERVATORY OPERATIONS
IN GREEN BANK, WEST VIRGINIA

WHEREAS, Green Bank Observatory is a federal facility owned and funded by the National Science Foundation (NSF), a federal agency, and as of the date of this Programmatic Agreement (PA), Associated Universities, Inc. (AUI) receives funding from NSF via a Cooperative Agreement to operate and maintain Green Bank Observatory for the benefit of research communities;

WHEREAS, NSF relies on formal processes within the scientific community (e.g., decadal surveys, senior-level reviews, and other advisory committees subject to the Federal Advisory Committee Act), to provide input on science priorities. The Portfolio Review Committee, a subcommittee of the NSF Mathematical and Physical Sciences Advisory Committee composed solely of external members of the scientific community, was charged with recommending a balanced portfolio to maximize the science recommended by National Academy of Sciences surveys of the field, which are carried out every decade (NASEM, 2016). To enable NSF to better address decadal survey science, the resulting Portfolio Review Committee Report (NSF AST, 2012), released in August 2012, recommended divestment of the 100-meter Robert C. Byrd Green Bank Telescope (GBT), which is a key component of the Observatory, and subsequent reports by the Astronomy and Astrophysics Advisory Committee and the National Academies' mid-decadal survey recommended that the divestment recommendations of the Portfolio Review Report be carried out expeditiously in order to maintain scientific program balance;

WHEREAS, such divestment would be achieved through significant reduction in NSF's contribution to the funding of Green Bank Observatory, and, based on the input NSF received from the scientific community and during National Environmental Policy Act (42 U.S.C. § 4321, *et seq.*) (NEPA) public scoping, NSF developed preliminary alternatives to address changes to operations from reduced NSF funding for Green Bank Observatory and is analyzing these alternatives via a Draft Environmental Impact Statement (EIS) and Final EIS;

WHEREAS, alternatives evaluated include Collaboration with Interested Parties for Continued Science- and Education-focused Operations with Reduced NSF Funding (Alternative A in the Draft EIS, and NSF's Preferred Alternative), Collaboration with Interested Parties for Operation as a Technology and Education Park (Alternative B in the Draft EIS), Mothballing of Facilities, defined as suspending operations in a manner that would permit operations to resume efficiently at some time in the future (Alternative C in the Draft EIS), and Demolition and Site Restoration (Alternative D in the Draft EIS);

WHEREAS, NSF has identified its Preferred Alternative as "Collaboration with Interested Parties for Continued Science- and Education-focused Operations with Reduced NSF Funding" (Alternative A in the Draft EIS), because this would reduce the funding required from NSF and allow for continued benefits to the scientific and educational communities by having new operations partners contribute funding that compensates for the reduction from NSF;

WHEREAS, the proposed decision regarding the potential changes to operations at Green Bank Observatory with reduced NSF funding is considered a federal undertaking and triggers compliance with

Sections 106 and 110(f) (54 United States Code [U.S.C.] Sections [§] 306108 and 306107) of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 300101, *et seq.*) (NHPA), and the NHPA's implementing regulations, "Protection of Historic Properties" (Title 36 *Code of Federal Regulations* [C.F.R.] Part 800);

WHEREAS, Green Bank Observatory contains the Reber Radio Telescope, which was listed in the National Register of Historic Places (NRHP) in 1972 under Criteria A and B for its nationally significant association with the origins of radio astronomy and for its association with Grote Reber; the Reber Radio Telescope, which was constructed in 1937, was moved to Green Bank Observatory in 1959–1960 to be displayed at the entrance to the Observatory, at which time some elements of the structure, including deteriorated wood pieces, were replaced; the Reber Radio Telescope was designated a National Historic Landmark (NHL) in 1986;

WHEREAS, NSF has determined that Green Bank Observatory is eligible for listing in the NRHP as a historic district with 44 contributing resources, including four telescopes that are individually eligible for listing in the NRHP: the Interferometer Range (which includes the Howard E. Tatel Telescope, two other nearly identical telescopes, and two control buildings), the 40-foot telescope (which includes an associated control building), the 43-meter (also referred to as the "140-foot") telescope (which includes a maintenance structure), and the GBT (see Attachment A for a table of evaluated resources with identification of those that are contributing); NSF's determination of eligibility was based on an evaluation of all resources built prior to 1969 within the Green Bank Observatory boundary, as well as the GBT due to its exceptional contribution to radio astronomy;

WHEREAS, NSF has conducted its Section 106 consultation process concurrently with, but separate from, its NEPA review process;

WHEREAS, under Alternatives A, B, and C as identified in the Draft EIS, some historic properties (contributing resources to the NRHP-eligible historic district and individually eligible historic properties) would be retained and some contributing resources could be demolished and/or safe abandoned (removal of a building or facility from service without demolishing it, with no intention that the building or facility would be brought back to operational status), depending on the needs of any collaborator(s) and/or in order to reduce costs of maintaining and operating the facilities; under Alternative D as identified in the Draft EIS, all contributing resources, with the exception of the Reber Radio Telescope, would be demolished; in addition, under Alternatives A, B, and C, NSF may retain or transfer ownership of Green Bank Observatory, depending, in part, on the needs of any new collaborator(s), which could be a federal or a non-federal entity or entities;

WHEREAS, on December 2, 2016, NSF formally initiated Section 106 consultation with the West Virginia State Historic Preservation Officer (SHPO) and established the area of potential effects (APE) as defined at 36 C.F.R. 800.16(d), included as Attachment B, and the SHPO agreed with the APE in a letter dated December 22, 2016;

WHEREAS, on December 12, 2016, NSF initiated Section 106 consultation with the following Native American tribes: Absentee Shawnee Tribe, Cayuga Nation, Cherokee Nation, Delaware Tribe of Indians, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Oneida Indian Nation, Oneida Nation, Onondaga Nation, Seneca Nation of Indians, Seneca-Cayuga Nation, St. Regis Mohawk Tribe, Shawnee Tribe, Tonawanda Band of Seneca, Tuscarora Nation, and United Keetoowah Band of Cherokee Indians in Oklahoma; NSF provided follow-up telephone calls and emails on December 29, 2016; Delaware Nation received an invitation letter on August 7, 2017 and responded on August 24, 2017 that it would be a consulting party; the Eastern Band of Cherokee Indians responded via email that the

proposed action would occur outside the traditional aboriginal territory of the Cherokee and referred the proposed action to the Shawnee; no other responses were received;

WHEREAS, the SHPO concurred with the determinations of individual NRHP-eligibility for four telescopes at Green Bank Observatory on December 22, 2016; further, based on 48 Historic Property Inventory forms completed and submitted by NSF on May 18, 2017, the SHPO concurred with the determination of Green Bank Observatory as eligible for listing on the NRHP as a historic district with 44 contributing resources on June 12, 2017;

WHEREAS, additional Consulting Parties identified for this undertaking and invited to participate include: Karen O'Neil, Daryl and Deana White, Grayg Ralphsnyder, Pocahontas County Landmarks Commission, Preservation Alliance of West Virginia, and Pocahontas County Historical Society;

WHEREAS, the public has had the opportunity to participate in the Section 106 process through the *Notice of Intent to Prepare an Environmental Impact Statement and Initiate Section 106 Consultation for Proposed Changes to Green Bank Observatory Operations, Green Bank, West Virginia and Notice of Public Scoping Meetings and Comment Period*, published on October 19, 2016, as well as during the public scoping meeting on November 9, 2016, and the public meeting on the Draft EIS on November 30, 2017, which included a presentation on the Section 106 process and an explanation that any public comments on historic properties would be considered during both the NEPA and the Section 106 reviews;

WHEREAS, the *Proposed Changes to Green Bank Observatory Operations: Historic Properties Assessment of Effects* (CH2M HILL, 2017) was prepared on behalf of NSF and provided to the SHPO and the other Consulting Parties on October 31, 2017; adverse effects identified include those that would occur if eligible historic properties were demolished or safe abandoned, as well as in the case NSF transfers ownership to a non-federal entity, since the federal consultation process under Section 106 would no longer be applicable to future actions by such a new owner; in the case that NSF transfers ownership to a federal entity for continued operations, the transfer would not have an adverse effect, since the Section 106 consultation process would be applicable to future actions by such a new owner;

WHEREAS, on December 4, 2017, the SHPO concurred that the undertaking would have an adverse effect on historic properties within Green Bank Observatory and requested continued consultation on measures to avoid, minimize, and/or mitigate the adverse effect;

WHEREAS, in accordance with 36 C.F.R. 800.6(a)(1)(i)(C), NSF has provided the Advisory Council on Historic Preservation (ACHP) the required documentation and invited it to participate in the Section 106 consultation process; the ACHP notified NSF that it would participate in the consultation via a letter dated December 22, 2017;

WHEREAS, in accordance with 36 C.F.R. 800.10, *Special requirements for protecting National Historic Landmarks*, NSF has provided the National Park Service (NPS) with information about the undertaking and how it relates to the NHL Reber Radio Telescope and invited participation in the Section 106 consultation process; the NPS notified NSF that it would participate in the consultation during a teleconference on March 16, 2018;

WHEREAS, NSF recognizes that continued operation of Green Bank Observatory can occur only if a collaborator(s) comes forward with viable plans to provide additional non-NSF funding in support of continued operations; therefore, in order to cover a range of possible outcomes, this PA addresses the potential effects of all alternatives currently being evaluated under the NEPA review;

WHEREAS, given that implementation of the alternatives described above could result in a range of potential outcomes depending on the needs of the collaborator(s), this PA has been prepared in

compliance with 36 C.F.R. 800.14(b)(1)(ii) to determine appropriate measures to cover the range of potential outcomes, including demolition or safe abandonment of some contributing resources and transfer of ownership;

WHEREAS, technical terms related to the NHPA are included in Attachment C, "References and Definitions," along with references for citations in the PA and links to those references;

WHEREAS, NSF has consulted with the SHPO, the ACHP, the NPS, and the other Consulting Parties on ways to avoid, minimize, and/or mitigate the adverse effects that the proposed undertaking could have on historic properties, including the NHL, pursuant to the regulations implementing Section 106 of the NHPA, 36 C.F.R. Part 800;

WHEREAS, the SHPO, the ACHP, the NPS, and the other Consulting Parties participated in the development of this PA; NSF, the SHPO and ACHP are Signatories herein; the NPS and other Consulting Parties have been asked to execute this PA as Concurring Parties;

NOW, THEREFORE, NSF, the SHPO, and the ACHP agree that NSF will ensure that, if the Preferred Alternative (*Collaboration with Interested Parties for Continued Science- and Education-focused Operations with Reduced NSF Funding*) or one of the other Alternatives is selected, the following Stipulations are implemented to address adverse effects of the proposed undertaking on historic properties and agree that these Stipulations will govern the undertaking and all of its parts.

STIPULATIONS

NSF will ensure that the following measures are carried out:

The following Stipulations address adverse effects to historic properties associated with: continued operation of Green Bank Observatory under federal ownership (Stipulation I.A.) and demolition (partial or full), safe abandonment, or transfer to a non-federal entity (Stipulation I.B.)

I. Preservation Provisions

A. To the extent that Green Bank Observatory operations continue under NSF or new federal ownership:

1. **Avoidance of Adverse Effects.** NSF will make every effort to avoid adverse effects on historic properties by encouraging any collaborator(s) with operational responsibilities or new federal owner(s) to use as many historic properties as practicable, provided that such use facilitates continued operations.
2. **Preservation of the Reber Radio Telescope.** Provided that NSF continues to own Green Bank Observatory, NSF will ensure that any new collaborator(s) with operational responsibilities continue a program of cyclical maintenance to preserve the structural integrity and historic fabric of the NHL Reber Radio Telescope and that any telescope parts that need replacement in the future shall, to the extent feasible, be replaced in kind provided that NSF has sufficient resources available to reasonably carry-out such preservation activities. NSF will require that any new collaborator(s) submit a condition update on the NHL Reber Radio Telescope every two years. If long-term preservation of the NHL Reber Radio Telescope in place as set forth herein is

determined by NSF not to be feasible, NSF will consult with the NPS and SHPO on possible relocation of the NHL Reber Radio telescope. As part of that consultation, NSF will provide, in writing, the status of the NHL and the reason why long-term preservation is not feasible. NSF will encourage any new federal owner to preserve the NHL Reber Radio Telescope in accordance with this Stipulation.

3. **Preservation of the Jansky Replica Antenna, Ewen-Purcell Horn, and Calibration Horn.** Provided that NSF continues to own Green Bank Observatory, NSF will ensure that any new collaborator(s) with operational responsibilities continue a program of cyclical maintenance to preserve the structural integrity and historic fabric of the Jansky Replica Antenna, Ewen-Purcell Horn, and Calibration Horn, and that any parts that need replacement in the future shall, to the extent feasible, be replaced in kind provided that NSF has sufficient resources available to reasonably carry-out such preservation activities. NSF will require that any new collaborator(s) submit a condition update on the Jansky Replica Antenna, Ewen-Purcell Horn, and Calibration Horn to NSF every two years. NSF will encourage any new federal owner to preserve the Jansky Replica Antenna, Ewen-Purcell Horn, and Calibration Horn in accordance with this Stipulation.
4. **Consultation on Preservation Principles and Management Strategies.** As soon as practicable following selection of a new collaborator, NSF will consult with the SHPO and any new collaborator(s) with operational responsibilities to discuss the development and implementation of preservation principles and management strategies that permit continued science- and education-focused operations at Green Bank Observatory while preserving its historic integrity. The consultation would include consideration of modifications to instruments or buildings that may be needed to accommodate the operational needs of the facility.
5. **Training.** NSF will ensure that the key facility staff of any new collaborator with operational responsibilities receive an initial, one-time historic preservation awareness training to encourage awareness of the historic significance of Green Bank Observatory and to minimize the potential for adverse effects to historic properties. Such training, which will be funded by NSF, will be administered by a qualified historic preservation professional who is familiar with and knowledgeable about the Green Bank Observatory, and will occur within 180 days (or as soon as practicable thereafter) of the selection of the new collaborator. The training will be based on the Preservation Principles and Strategies that result from implementation of Stipulation I.A.4. NSF will provide the SHPO an opportunity to comment on the content of such training and to participate in the training..
6. **Mothballing in Accordance with Historic Preservation Standards.** In the event NSF identifies the need to temporarily mothball historic properties with the intent that operations would resume in the near future, NSF will follow the guidance in the NPS Preservation Brief 31, "*Mothballing Historic Buildings*" and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring*

and Reconstructing Historic Buildings, as appropriate, with implementation of the following measures:

- a. All exterior elevations of the building or structure will be photographed, including at least one context photo. Archival-quality digital photographs will be produced in accordance with professional standards as set forth in the NRHP Photograph Policy Factsheet (dated 5/15/2013).
- b. To avoid an adverse effect caused by demolition by neglect, a cyclical maintenance plan that includes repairs as needed will be prepared and implemented.
- c. NSF will submit a condition update on any of the properties subject to this Stipulation to the SHPO every two years, for the duration of time there are mothballed properties at Green Bank Observatory.

B. To the extent that demolition (partial or full), safe abandonment, or transfer to a non-federal entity occurs:

1. **Preservation of the Reber Radio Telescope.** Prior to a change in disposition of the Reber Radio Telescope (or as soon as practicable thereafter), NSF will consult with the NPS, the SHPO, and any new collaborator with operational responsibilities on preservation principles and management strategies regarding the long-term preservation of the NHL Reber Radio Telescope. Should long-term preservation in place not be feasible or desirable, NSF will consult with the NPS and the SHPO on possible relocation of the Reber Radio Telescope, either onsite or offsite. If relocation to a suitable location is not feasible, then NSF will consider appropriate documentation for the Reber Radio Telescope, in consultation with the NPS and the SHPO. Such documentation would occur before any demolition or dismantling of the telescope.
2. **Documentation Required for the NRHP-Eligible Historic District.** Prior to a change in disposition (whether it be demolition, safe abandonment, or transfer to a non-federal entity) of any eligible property, NSF will ensure, in addition to the Historic Property Inventory Forms previously provided to the SHPO, that the following documentation occurs:
 - a. NSF will prepare appropriate and reasonable documentation (similar in level of effort to a National Register nomination form prepared in accordance with the National Register Bulletin, "Guidelines for Completing National Register of Historic Places Form" and consistent with Part 2 of the West Virginia National Register and Architecture/History Survey Manual) of the historic property. NSF will develop an approach to the documentation in the form of an outline of a report and will consult with the SHPO on the approach and outline. The documentation will include a discussion of the significance of the National Radio Quiet Zone in contributing to the setting of Green Bank Observatory and to the

important research accomplished there, as well as other locations on site such as the Drake Lounge where certain influential ideas in astronomy germinated.

- b. NSF will survey those buildings and structures built after 1969 that were not previously surveyed, including the 20-meter telescope, and will evaluate them for NRHP eligibility under Criterion Consideration G (a property achieving significance within the past 50 years if it is of exceptional importance). Historic Property Inventory Forms will be prepared for each resource. They will be evaluated for individual significance and as contributing elements to the Green Bank Observatory Historic District. NSF will submit the Historic Property Inventory Forms to the SHPO and request concurrence on the eligibility determinations.

3. Effort to Reuse or Donate Historically Significant Equipment and Artifacts.

In the event that NSF issues a final agency decision regarding changes to operations at Green Bank Observatory in which demolition, transfer, or mothballing of historic properties occurs, NSF will, prior to a change in disposition of the historic properties (or as soon as practicable thereafter), identify any historically significant equipment and artifacts associated with historic properties that will not be repurposed for further scientific or educational use, and if feasible, NSF will:

- a. Contact relevant scientific/educational institutions for possible reuse of the equipment and artifacts; or
- b. Contact an appropriate museum to determine if any of the equipment and/or artifacts can be donated to the museum's collection.

4. Consultation on Preservation Principles and Management Strategies. Prior to transfer to a non-federal entity (or as soon thereafter as practicable), NSF will consult with the SHPO and the new owner to discuss the development and implementation of preservation principles and management strategies that permit continued science- and education-focused operations at Green Bank Observatory while preserving its historic integrity.

5. Training. NSF will ensure that the key facility staff of any new owner will receive an initial, one-time historic preservation awareness training to encourage awareness of the historic significance of Green Bank Observatory and to minimize the potential for adverse effects to historic properties. Such training, which will be funded by NSF, will be administered by a qualified historic preservation professional who is familiar with and knowledgeable about the Green Bank Observatory, and will occur within 180 days (or as soon as practicable thereafter) of the transfer. The training will be based on the Preservation Principles and Strategies that result from implementation of Stipulation I.B.4. NSF will provide the SHPO an opportunity to comment on the content of such training and to participate in the training.

II. DELAYED TRANSFER OF OWNERSHIP

In the event NSF issues an award to a collaborator(s) to manage and operate Green Bank Observatory, and NSF plans to transfer ownership of Green Bank Observatory to a non-federal collaborator(s), Stipulation I.A. shall apply prior to the transfer, until reasonably practicable, at which point only Stipulation I.B. shall apply.

III. NEW FEDERAL OWNERSHIP AND SECTION 106

Should NSF transfer ownership to a new federal entity for continued operations, that entity would be required to comply with the NHPA for future undertakings and this PA would expire upon such a transfer, as stated in Section XII. A new federal entity, however, may elect to enter into a new PA that adopts the provisions of this PA in whole or in part.

IV. UNANTICIPATED EFFECTS

If unanticipated effects on historic properties occur during implementation of the undertaking, NSF will, in compliance with 36 C.F.R. § 800.13(b)(3), determine actions that it can take to resolve potential adverse effects and notify via phone and email the SHPO and other Consulting Parties, as appropriate, within two business days of NSF's awareness of the effects. The notification will describe the eligibility of the property and proposed actions to resolve any adverse effects. The SHPO and other Consulting Parties will respond with any comments within two business days of the notification by phone or email. NSF will take into account the Consulting Parties' recommendations regarding NRHP eligibility and proposed actions, and then carry out appropriate actions. NSF will provide the SHPO and other Consulting Parties, as appropriate, with a report of the actions when they are completed. This Stipulation shall not apply if NSF is no longer the owner of Green Bank Observatory.

V. POST-AGREEMENT DISCOVERIES

If NSF continues to own Green Bank Observatory and it is managed by a collaborator(s), all unanticipated discoveries of historic properties and human or burial remains within the APE revealed during any activity associated with implementation of the proposed undertaking will be addressed in the following manner:

- A. The contractor/collaborator(s) carrying out any such activities will promptly notify NSF, who will notify the SHPO of the discovery.
- B. If NSF determines, in consultation with the SHPO, that the discovery is eligible for listing in the NRHP, NSF will initiate consultation with the Consulting Parties to draft a plan with measures that will avoid, minimize, and/or mitigate adverse effects. If agreement is reached regarding such a plan, NSF will implement the plan. If the discovery is made during demolition activities (if any), demolition in the affected area must cease until the discovery process in this Stipulation has been concluded either through a finding that the property is not eligible for listing in the NRHP or through finalization of the plan referenced herein.
- C. If the Consulting Parties cannot reach agreement regarding the development of a treatment or mitigation plan, then the matter will be referred to the ACHP for guidance. NSF will address the ACHP's guidance in reaching a final decision regarding implementation of the plan.
- D. If any previously unidentified human or burial remains are discovered during implementation of the undertaking, the contractor/collaborator(s) will immediately cease any demolition work and adhere to applicable state and federal laws regarding the treatment of human or burial remains.

VI. RESPONSE TO EMERGENCY

- A. In the event NSF proposes an emergency undertaking as an essential and immediate response to a disaster or emergency declared by the President, or the Governor of West Virginia, or in response to another immediate threat to life or property, NSF shall notify the SHPO via telephone and email within two business days of commencing the emergency undertaking.
- B. NSF shall include a summary of all emergency undertakings in the status report required in Stipulation VII.
- C. This Stipulation applies only to undertakings that are implemented within 30 calendar days after the disaster or emergency has been formally declared by the appropriate authority. NSF may request an extension of the period of applicability from the ACHP prior to the expiration of the 30 calendar days.
- D. Immediate rescue and salvage operations conducted to preserve life or property are exempt from the provisions of Section 106 and this PA.

VII. REPORTING

- A. To keep the public and Consulting Parties apprised of the status of the implementation of the Stipulations in this PA, NSF will maintain a status report on the NSF Division of Astronomical Sciences website with relevant information, including any planned demolitions.
- B. Meetings or conference calls regarding the undertaking and/or implementation of the Stipulations in this PA may be requested at any time by the Signatories for the duration of this PA.
- C. If Green Bank Observatory is transferred out of NSF ownership, the terms of this Stipulation shall not apply after transfer.

VIII. DISPUTE RESOLUTION

A. Signatories

In the event one of the Signatories objects to the manner in which any term of this PA is implemented, the following dispute resolution process will be followed:

1. The objecting Signatory will notify all other Signatories to this PA, in writing, of the objection or disagreement, request written comments on the objection or disagreement within ten (10) business days following receipt of such notification, and then proceed to consult with the Signatories to resolve the objection. If at any time during consultation, NSF determines that the objection or disagreement cannot be resolved through consultation, NSF will forward all documentation relevant to the dispute to the SHPO, or if the objection is raised by the SHPO, NSF will forward all documentation relevant to the dispute to the ACHP. Within 30 calendar days after receipt of all pertinent documentation, the SHPO or, as appropriate, the ACHP, will provide NSF with comments and recommendations, which NSF will take into account in reaching a final decision

regarding the dispute. Any comment provided by the SHPO or, as appropriate, the ACHP, will be understood to pertain only to the subject of the dispute. All other actions under this PA that are not the subject of the dispute will remain unchanged.

2. Unless all Signatories agree that the dispute warrants a cessation of work, neither NSF nor its collaborator(s) will be required to cease work on the proposed undertaking while the dispute is being reviewed.

B. Continued Participation by the Public and Concurring Parties

At any time during the implementation of the Stipulations set forth in this PA, any member of the public, including any Consulting Party who has decided not to sign this PA as a Concurring Party, and any Concurring Party may continue to participate in the Section 106 consultation process as follows:

1. Any member of the public may raise an objection to NSF pertaining to the treatment of an historic property associated with implementation of the proposed undertaking, provided that title to Green Bank Observatory is retained by NSF. In the event such an objection is raised, NSF will consult with the SHPO regarding the objection, and following such consultation, will provide the objecting member of the public with a decision on the objection.
2. Any Concurring Party may raise an objection to NSF and the SHPO pertaining to the treatment of an historic property associated with implementation of the proposed undertaking. In the event such an objection is raised, NSF and the SHPO will consult regarding how to resolve the objection. If NSF and the SHPO are unable to resolve the objection, they will consult with the ACHP. NSF will consider any recommendation on the objection provided by the ACHP before making a final decision on the matter. NSF will communicate such a final decision to the objecting Concurring Party and the SHPO.

If an objection is made pursuant to either Stipulation VIII.B.1. or VIII.B.2., NSF, in consultation with the SHPO, will determine whether the objection warrants a cessation of work (if any) on the proposed undertaking while the objection is being reviewed.

- C. This Stipulation shall not apply if NSF is no longer the owner of Green Bank Observatory.

IX. PROFESSIONAL QUALIFICATIONS

All work carried out pursuant to this PA will be developed and/or implemented by or under the direct supervision of a person or persons meeting or exceeding the minimum professional qualifications, appropriate to the affected resource(s), listed in the *Secretary of the Interior's Professional Qualification Standards* (36 CFR Part 61, Appendix A) and amended in 1992.

X. ELECTRONIC COPIES

NSF will provide the SHPO, ACHP, and each Consulting Party with one legible, full-color, electronic copy of the fully executed PA and its Attachments no more than 30 calendar days after execution. If the electronic copy is too large to send via email, NSF will provide each Consulting Party with a copy of the executed PA via a CD, or in any reasonable medium available.

XI. AMENDMENT

Any Signatory may request that this PA be amended by informing NSF in writing of the reason for the request and the proposed amendment language. After receiving the request, NSF will notify all

Consulting Parties of the proposed amendment and consult to reach agreement. The amendment will be effective on the date a copy signed by all the Signatories is filed by NSF with the ACHP.

XII. EXPIRATION

If NSF retains ownership of Green Bank Observatory, this PA will expire ten years from the Effective Date of this PA as defined in Stipulation XV., herein. If ownership of Green Bank Observatory is transferred to a non-federal entity, upon completion of the terms in Stipulation I.B. this PA shall expire. If ownership of Green Bank Observatory is transferred to a federal entity, this PA shall expire upon transfer. Prior to such expiration date, NSF may consult with the SHPO and ACHP to reconsider the terms of this PA and amend it in accordance with Stipulation XI. If unresolved issues remain within two years of the expiration date of this PA, NSF will, at that time, consult with the SHPO and ACHP regarding the progress of implementation of this PA and consider the appropriateness of developing a subsequent agreement or amendment to the PA.

XIII. COMPLIANCE WITH APPLICABLE LAW AND ANTI-DEFICIENCY ACT PROVISION

This PA will be carried out consistent with all applicable federal and state laws. No provision of this PA will be implemented in a manner that would violate the Anti-Deficiency Act. NSF shall make reasonable and good faith efforts to secure the necessary funds to implement this PA in its entirety. All obligations on the part of NSF will be subject to the availability and allocation of appropriated funds for such purposes. Nothing in this PA may be construed to obligate NSF to any current or future expenditure of resources in advance of the availability of appropriations. Should NSF be unable to fulfill the terms of this PA due to funding constraints or priorities, NSF will immediately notify and consult with the SHPO and ACHP to determine whether to amend or terminate this PA pending the availability of resources.

XIV. TERMINATION

If any Signatory to this PA determines that the terms of this PA will not or cannot be carried out, that Signatory will immediately consult with the other Signatories to develop an amendment to this PA pursuant to Section XI., above. If this PA is not amended following that consultation, then it may be terminated by any Signatory through written notice to the other Signatories. Within 30 calendar days following any such termination and prior to work continuing on the undertaking, NSF will notify the SHPO and ACHP whether it will initiate consultation to execute a new PA under 36 C.F.R. § 800.14(b)(1)(ii) or request and consider the comments of the ACHP under 36 C.F.R. § 800.7 and proceed accordingly.

XV. EFFECTIVE DATE

This PA will be executed in counterparts, with a separate page for each Signatory, and NSF will ensure that each Signatory is provided with a fully executed copy. This PA will become effective upon obtaining the signatures of NSF, the SHPO, and the ACHP.

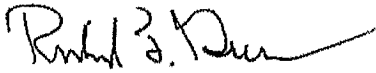
Execution of this PA by NSF, the SHPO, and the ACHP evidences that NSF has taken into account the effects of this proposed undertaking on historic properties and has afforded the ACHP an opportunity to comment on the proposed undertaking.

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Signatory:

National Science Foundation



Richard F. Green, Ph.D., Division Director
Division of Astronomical Sciences

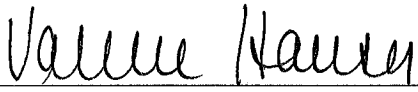
Date 3 Aug, 2018

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Signatory:

Advisory Council on Historic Preservation



John M. Fowler, Executive Director

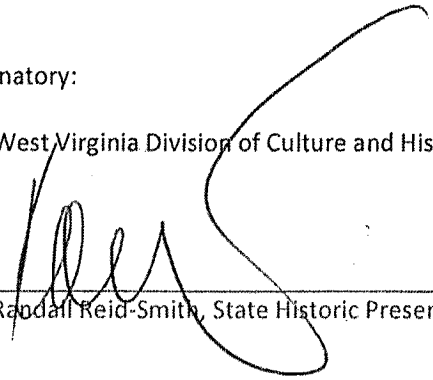
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Signatory:

West Virginia Division of Culture and History's State Historic Preservation Office



Randal Reid-Smith, State Historic Preservation Officer

Date

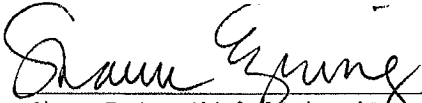
August 2, 2018

CONCURRING PARTY SIGNATURE PAGE

PROGRAMMATIC AGREEMENT
AMONG
THE NATIONAL SCIENCE FOUNDATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND
THE WEST VIRGINIA STATE HISTORIC PRESERVATION OFFICER
REGARDING
POTENTIAL CHANGES TO
GREEN BANK OBSERVATORY OPERATIONS
IN GREEN BANK, WEST VIRGINIA

Concurring Party:

National Park Service



Shaun Eyring, Chief of Cultural Resources
Northeast Regional Office

Date

8.2.13

CONCURRING PARTY SIGNATURE PAGE

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IN GREEN BANK, WEST VIRGINIA

Concurring Party:

Green Bank Observatory



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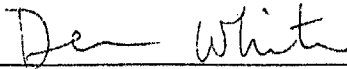
Date _____

Karen O'Neil, Ph.D., Director

CONCURRING PARTY SIGNATURE PAGE

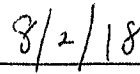
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Concurring Party:



Deana White

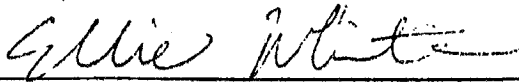
Date



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Concurring Party:



Ellie White

Date

8/2/2018

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Concurring Party:

CITIZEN SCIENTIST

Grayg Ralphsnyder

W grayg Ralphsnyder

Date


2018 AUG 01

CONCURRING PARTY SIGNATURE PAGE

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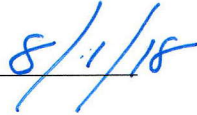
Concurring Party:

Pocahontas County Landmarks Commission



Robert Sheets

Date



Attachment A

Evaluated Resources

Evaluated Architectural Resources at Green Bank Observatory

| HPI Site Number | Resource Type | Resource Name | NRHP Status |
|-----------------|--------------------------------|---|--|
| PH-0907 | Administrative/ Operational | Karl Guthe Jansky Laboratory | Eligible as a contributing resource to the GBO Historic District |
| PH-0908 | Administrative/ Operational | Cafeteria Building and Residence | Eligible as a contributing resource to the GBO Historic District |
| PH-0909 | Administrative/ Operational | Warehouse | Eligible as a contributing resource to the GBO Historic District |
| PH-0910 | Other | Water Tower | Eligible as a contributing resource to the GBO Historic District |
| PH-0911 | Administrative/ Operational | Works Area Building | Eligible as a contributing resource to the GBO Historic District |
| PH-0912 | Administrative/ Operational | Telescope Mechanics Office (formerly Cable Storage Warehouse) | Eligible as a contributing resource to the GBO Historic District |
| PH-0913 | Administrative/ Operational | Millimeter Array Experiment Building | Eligible as a contributing resource to the GBO Historic District |
| PH-0914 | Administrative/ Operational | Outdoor Test Building | Eligible as a contributing resource to the GBO Historic District |
| PH-0915 | Administrative/ Operational | Laser Lab (formerly 300' Telescope Control Building) | Eligible as a contributing resource to the GBO Historic District |
| PH-0916 | Other | Airstrip | Eligible as a contributing resource to the GBO Historic District |
| PH-0917 | Other | Recreation Area | Eligible as a contributing resource to the GBO Historic District |
| PH-0918 | Other/Storage | Barn | Not eligible/non-contributing |
| PH-0919 | Other/Storage | Barn | Not eligible/non-contributing |
| PH-0920 | Other/Storage | Barn | Not eligible/non-contributing |
| PH-0921 | Vacant | Slaven Hollow Orchard Cellar Building | Not eligible/non-contributing |
| PH-0922 | Residential | Redwood House; Director's House (House 1) | Eligible as a contributing resource to the GBO Historic District |

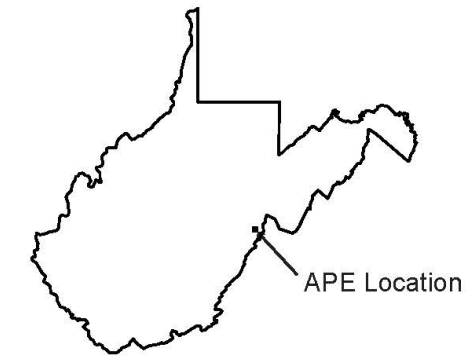
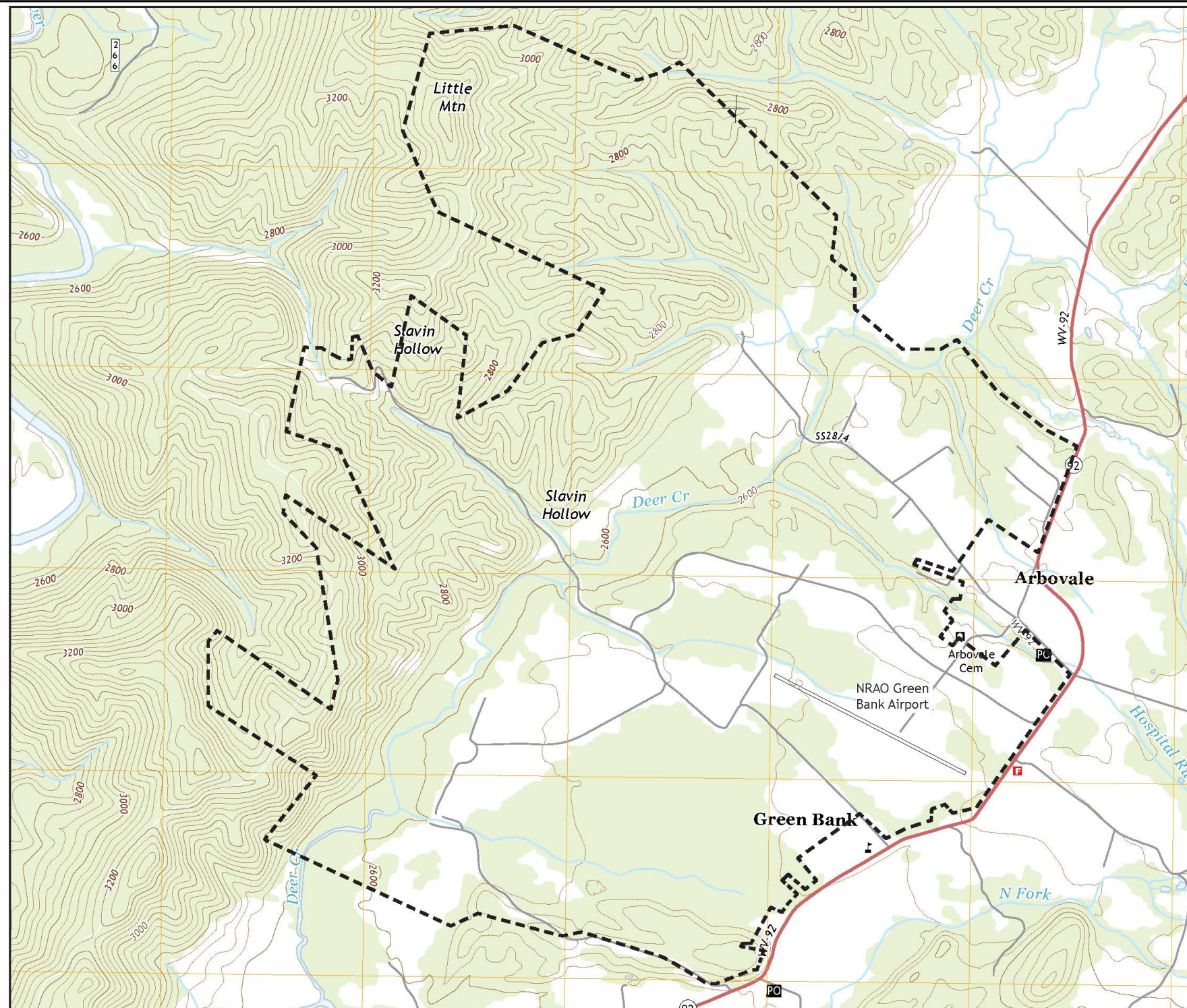
GBO = Green Bank Observatory
 HPI = Historic Property Inventory
 NHL = National Historic Landmark
 NRHP = National Register of Historic Places

| HPI Site Number | Resource Type | Resource Name | NRHP Status |
|------------------------|----------------------|---|--|
| PH-0923 | Residential | House 2 (Rabbit Patch) - 2 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0924 | Residential | House 3 (Rabbit Patch) - 3 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0925 | Residential | House 4 (Rabbit Patch) - 4 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0926 | Residential | House 5 (Rabbit Patch) - 5 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0927 | Residential | House 6 (Rabbit Patch) - 6 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0928 | Residential | House 7 (Rabbit Patch) - 7 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0929 | Residential | House 8 (Rabbit Patch) - 8 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0930 | Residential | House 9 (Rabbit Patch) - 9 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0931 | Residential | House 10 (Rabbit Patch) - 10 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0932 | Residential | House 11 (Rabbit Patch) - 11 Rabbit Patch | Eligible as a contributing resource to the GBO Historic District |
| PH-0933 | Residential | House 14 - 14 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0934 | Residential | House 16 - 16 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0935 | Residential | House 19 - 19 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0936 | Residential | House 21 - 21 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0937 | Residential | House 23 - 23 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |

| HPI Site Number | Resource Type | Resource Name | NRHP Status |
|-----------------|--|--|--|
| PH-0938 | Residential | House No. 24 - 24 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0939 | Residential | Shinnaberry House - 20 Route 28 | Eligible as a contributing resource to the GBO Historic District |
| PH-0940 | Residential | Nut Bin | Eligible as a contributing resource to the GBO Historic District |
| PH-0331 Updated | Residential | Riley House (15) - 15 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0941 | Residential | Hill House (17) - 17 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0942 | Residential | Tracy House (No. 18) - 18 Hannah Run Road | Eligible as a contributing resource to the GBO Historic District |
| PH-0943 | Vacant | Beard House | Eligible as a contributing resource to the GBO Historic District |
| PH-0944 | Residential | Hannah House | Eligible as a contributing resource to the GBO Historic District |
| PH-0945 | Telescope/ Instrument (no longer in active use) | Calibration Horn | Eligible as a contributing resource to the GBO Historic District |
| PH-0946 | Telescope/ Instrument (display) | Karl Guthe Jansky Replica Antenna | Eligible as a contributing resource to the GBO Historic District |
| PH-0947 | Telescope/ Instrument (display) | Ewen-Purcell Horn | Eligible as a contributing resource to the GBO Historic District |
| PH-0948 | Telescope/ Instrument (no longer in active use) | Interferometer Range: Includes Howard E. Tatel (85'-1) Telescope and 85'-1 control building; 85'-2 Telescope; 85'-3 Telescope; and the Interferometer Control Building | Individually eligible under Criterion A; contributes to the GBO Historic District |
| PH-0949 | Telescope/ Instrument | 40-foot Telescope and 40-foot Telescope Control Building | Individually eligible under Criterion A; contributes to the GBO Historic District |
| PH-0950 | Telescope/ Instrument | 140-foot Telescope (43-meter Telescope) | Individually eligible under Criteria A and C; contributes to the GBO Historic District |
| PH-0951 | Telescope/ Instrument | 45-foot Telescope | Eligible as a contributing resource to the GBO Historic District |

| HPI Site Number | Resource Type | Resource Name | NRHP Status |
|-----------------|------------------------------------|---|---|
| PH-0952 | Telescope/ Instrument | Robert C. Byrd Green Bank Telescope (GBT) | Individually eligible under Criteria A and C and Criterion Consideration G; contributes to the GBO Historic District |
| PH-0953 | Telescope/ Instrument (display) | Reber Radio Telescope | Listed in the NRHP in 1972; named a NHL in 1986; contributes to the GBO Historic District |

Attachment B
Area of Potential Effects Map



LEGEND
 [Dashed Line] Area of Potential Effects (APE)



FIGURE 1
Area of Potential Effects (APE)
 Green Bank Observatory
 Pocahontas County
 Green Bank, West Virginia

Source: USGS, Green Bank Quadrangle, 2014
 ES1119141044236AC area_potential_effects_greenbank.ai 03-09-17 dash

Attachment C

References and Definitions

PA References:

- Proposed Changes to Green Bank Observatory Operations: Historic Properties Assessment of Effects* (CH2M HILL, 2017).
https://www.nsf.gov/mps/ast/env_impact_reviews/greenbank/section106/NSF_transmittal_of_historic_assess_of_effects_report_to_SHPO.pdf
- Park, Sharon C. 1993. *Preservation Brief 31: Mothballing Historic Buildings*, U.S. Department of the Interior, National Park Service. September. <https://www.nps.gov/tps/how-to-preserve/briefs/31-mothballing.htm>
- Grimmer, Anne E. 2017. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings*. U.S. Department of the Interior, National Park Service, Technical Preservation Services, Washington, D.C. <https://www.nps.gov/tps/standards/treatment-guidelines-2017.pdf>
- National Academies of Sciences, Engineering, and Medicine (NASEM). 2016. *New Worlds, New Horizons: A Midterm Assessment*. Washington, DC: The National Academies Press.
<https://doi.org/10.17226/23560>
- National Science Foundation (NSF) Division of Astronomical Sciences (AST). 2012. *Advancing Astronomy in the Coming Decade: Opportunities and Challenges* (Portfolio Review Committee Report). Prepared by the Portfolio Review Committee. August 14.
https://www.nsf.gov/mps/ast/portfolioreview/reports/ast_portfolio_review_report.pdf
- U.S. Department of the Interior, National Park Service. 2013. *Photograph Policy Factsheet*. Updated May 2013.
<https://www.nps.gov/Nr/publications/bulletins/photopolicy/index.htm>

PA Definitions:

Adverse Effect: a change to the characteristics that qualify a historic property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(a)).

Area of Potential Effects (APE): the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)). It is important to understand that the effects pertain to the effects on physical historic properties (eligible for or listed in the National Register of Historic Places [NRHP]) in a specific area.

Concurring Party: Any consulting party that has been invited by the federal agency (NSF) to concur in the PA. Concurring parties have the same rights with regard to seeking amendment or termination of the PA as other signatories. The refusal of any party invited to concur in the PA does not invalidate the document (36 CFR 800.16(d)).

Consultation: the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process (36 CFR 800.16(f)).

Consulting Party: Section 106 term that refers to organizations and/or individuals with a demonstrated interest in the undertaking due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties. The participation of consulting parties is subject to approval by the federal agency (in this case, NSF). Consulting parties are actively informed of and able to participate in the Section 106 process, including consultation meetings. The views of consulting parties are actively sought by NSF during the Section 106 consultation process. (36 CFR 800.2(c)(5))

Effect: an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP (36 CFR 800.16(i)).

Historic Property: Any resource, such as a building, structure, or historic district, included in or eligible for inclusion in the NRHP, maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria (36 CFR 800.16(l)).

Signatory: Signatories include the federal agency (NSF), PR SHPO, and ACHP, and they have the sole authority to execute, amend, or terminate the PA (36 CFR 800.6(c)(1)).

Programmatic Agreement (PA): A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program or complex undertaking. For this undertaking, a PA is used to document the ways in which adverse effects are addressed because the result of the 2017 solicitation for new collaborators is undetermined and the needs of any new collaborator(s) are unknown (36 CFR 800.14(b)).

Undertaking: A project, activity, or program funded in whole or in part by a federal agency (36 CFR 800.16(y)).