



NSF Cerro Tololo Inter-American Observatory  
 NSF Community Science and Data Center  
 International Gemini Observatory  
 NSF Kitt Peak National Observatory  
 NSF-DOE Vera C. Rubin Observatory

# Statement of Work

## HBF-X Cooling System Replacement

### Engineering Design Services

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NSF NOIRLab, the U.S. National Science Foundation center for ground-based optical-infrared astronomy, operates the International Gemini Observatory (a facility of NSF, NRC-Canada, ANID-Chile, MCTIC-Brazil, MINCYT-Argentina, and KASI-Republic of Korea), NSF Kitt Peak National Observatory (KPNO), NSF Cerro Tololo Inter-American Observatory (CTIO), the Community Science and Data Center (CSDC), and NSF-DOE Vera C. Rubin Observatory (in cooperation with DOE's SLAC National Accelerator Laboratory). It is managed by the Association of Universities for Research in Astronomy (AURA) under a cooperative agreement with NSF and is headquartered in Tucson, Arizona.

The scientific community is honored to have the opportunity to conduct astronomical research on I'oligam Du'ag (Kitt Peak) in Arizona, on Maunakea in Hawai'i, and on Cerro Tololo and Cerro Pachón in Chile. We recognize and acknowledge the very significant cultural role and reverence of I'oligam Du'ag (Kitt Peak) to the Tohono O'odham Nation, and Maunakea to the Kanaka Maoli (Native Hawaiians) community.

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## Change Record, Access, and Distribution

Once approved, any changes to this document must be requested through the [DMG](#). Authors or Document/Process owners should provide document access and permissions through the [DMG](#).

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## 1. Project Introduction and Summary

NOIRLab's Hilo Base Facility Expansion (HBF-X), completed in 2008, is supported by a split system air conditioning unit that is currently oversized and utilizes obsolete R22 refrigerant. The outdoor equipment shows significant signs of decay, and the system has reached a point where replacement is necessary for continued operations.

Upon conducting an assessment of the existing system in October 2025, it was decided to replace the existing condensers and AHUs with multiple fan coils.

The proposed HVAC solution is thought to include, but is not limited to, the following scope of construction:

- Demo out two (2) existing condensers and two (2) AHUs with four (4) 10-ton condensers and four (4) 10-ton fan coils, respectively. Two fan coils shall replace each AHU.
- Enlarge the existing access hatch so that it is large enough to install or remove new, smaller fan coils as a complete unit.
- Demo out one (1) existing 1.5-ton split system in the backup electrical room.
- Replace with one (1) 1.5-ton split system.
- Install additional liquid and suction refrigerant lines to all new systems as necessary. The size of lines shall match the system's requirements to maintain correct gas return velocity.
- Install new building HVAC control systems providing best practice monitoring, logging, and control, including equipment power logging.

This Statement of Work (SOW) describes architectural and engineering services necessary for the full duration of the proposed design, bid, and build project, including, but not limited to:

- Concept Validation, Conceptual Design, and Schematic Design
- Design Development and Construction Documents
- Permit and Contractor Solicitation Services
- Construction Administration, Coordination, and Observation
- Construction Closeout and Certification

The SOW includes but is not limited to necessary architectural, mechanical, plumbing, civil, structural, and electrical engineering design services, as well as necessary project administration services to successfully meet performance requirements on schedule and on budget with the least amount of project risk and with the least amount of disruption to normal operations.

## General Site Conditions

### **NOIRLab Hilo Base Facility – 670 N. A'ohoku Place, Hilo, Hawai'i**

1. The facility is owned by the National Science Foundation (NSF). NOIRLab is the national center for ground-based nighttime astronomy in the United States and manages several internationally-renowned observatories. NOIRLab is operated by the Association of Universities for Research in Astronomy (AURA) under cooperative agreement with the NSF.
2. Regular working hours are from 8:00 AM to 5:00 PM. In order to reduce disruption to NOIRLab employees, noisy activities and heavy vehicular traffic must be coordinated with the facilities team as much as possible.

## Codes and Standards

1. Contractor(s) shall comply with the requirements of all applicable provisions of the latest edition of the International Code Council publications (IBC, IMC, IPC, IECC, NEC, ADA, etc.), as well as all other applicable State and National Codes, local jurisdiction and requirements, electrical and utility codes, safety regulations, and industry standards.
2. Contractor(s) and personnel shall be licensed/certified in the State of Hawaii in the disciplines of any work to be performed (i.e., electrical, etc.).
3. As a federally-owned facility located on the University of Hawaii (UH) campus, the UH is the Authority Having Jurisdiction (AHJ) for any work done at the NOIRLab Hilo Base Facility (HBF).

## 2. Scope of Work

The scope of work includes the following tasks:

### **2.1. Conceptual Design**

- A. Review and evaluate existing NOIRLab site assessments and HVAC recommendation reports.
- B. Perform initial site survey(s) to ascertain and understand the needs of the project.
- C. Collaborate with NOIRLab and key shareholders to document agreed architectural and engineering performance requirements for the project spaces and occupants.
- D. Perform a code review to identify issues that may significantly impact the direction of the project considering performance, cost, schedule, and risk.
- E. Develop conceptual design(s) that best meet the needs of NOIRLab considering performance, impact on ongoing operations, cost, schedule, and risk.

- F. Develop preliminary floor plans and section views of the scope of work including room names, numbers, and space usage (office, assembly, special use, etc.)
- G. Develop preliminary conceptual construction cost and construction timeline.
- H. Submit Conceptual Design Review documentation demonstrating proposed solution meets design requirements on schedule, and on budget with the least risk and disruption to normal operations.
- I. Perform a Conceptual Design Review for NOIRLab and stakeholders.
- J. Respond and close out NOIRLab request for clarification to Review.
- K. Await Notice To Proceed from NOIRLab to the next phase of the project.

## 2.2. Schematic Design

- A. Develop a schematic design that meets design requirements on schedule and budget with the least risk and disruption to normal operations.
- B. The design shall clearly define requirements for all spaces including, but not limited to, office areas, assembly areas, IT areas, special lab areas, document storage areas, utility areas, etc.
- C. The design shall schematically describe design solutions for all spaces, including demo work and proposed new work.
- D. The design shall schematically describe calculations justifying the sizing and selection of the proposed HVAC equipment.
- E. The design shall implement Build America, Buy America Act (BABA)-compliant products. If no compliant products are available on the market, documentation of product research is required.
- F. The design shall schematically describe the phasing of the work in a manner having the least impact on occupants.
- G. The design shall schematically estimate the construction cost.
- H. The design shall schematically estimate the construction schedule.
- I. Submit for NOIRLab review the Schematic Design Documentation.
- J. Perform a Schematic Design Review for NOIRLab and stakeholders.
- K. Respond and close out NOIRLab request for clarification.
- L. Await Notice To Proceed from NOIRLab to the next phase of the project.

## 2.3. Design Development

- A. Develop Design Development submittals that meet design requirements on schedule and budget with the least risk and disruption to normal operations.
- B. Perform a Design Development Review for NOIRLab and stakeholders.

- C. Respond and close out NOIRLab request for clarification.
- D. Await Notice To Proceed from NOIRLab to the next phase of the project.

## 2.4. Construction Documents

- A. Develop Construction Documents that meet design requirements on schedule and budget with the least risk and disruption to normal operations. Construction Documents are intended to be used for permit application and contractor solicitation.
- B. Submit 60% submittals for review, coordination, and approval by NOIRLab.
- C. Submit 90% submittals for review, coordination, and approval by NOIRLab.
- D. Submit Final for Approval submittals for review, coordination, and approval by NOIRLab.
- E. Release to NOIRLab Construction Documents for Permit and Contractor Solicitation.
- F. Release to NOIRLab Construction Documents for Bidding of Contractors.
- G. Await Notice To Proceed from NOIRLab to the next phase of the project.

## 2.5. Permit Solicitation

- A. Determine whether or not a permit is required by the AHJ.
  - a. If required, submit Construction Documents for permitting to the AHJ.
  - b. Clarify and resolve any and all permitting issues with AHJ in consultation with NOIRLab.
  - c. Provide NOIRLab with an approved building permit.
- B. Await Notice To Proceed from NOIRLab to the next phase of the project.

## 2.6. Contractor Solicitation

- A. Submit Permit Documents for Bid Solicitation to NOIRLab.
- B. Assist NOIRLab in identifying potential contractors and suppliers and develop their interest in bidding on the project to ensure a competitive bidding environment. NOIRLab shall investigate potential bidders and suppliers to determine their ability to meet project requirements.
- C. Assist NOIRLab and the CO in establishing and implementing procedures for the bidding process including the distribution of bid documents, the issuance of addenda, the holding of pre-bid conferences, the receipt of bids, and the bidding schedule.
- D. Assist NOIRLab in establishing bidding procedures.
- E. Assist NOIRLab with the distribution of all bid documents to contractors and maintain accurate records of distribution activities.

- F. Assist NOIRLab in scheduling, organizing, and conducting pre-bid conferences in a manner consistent with the bid schedule.
- G. Assist NOIRLab in performing a contractor pre-bid Site Visit
- H. Assist NOIRLab in evaluating bids received.
- I. Assist NOIRLab in the preparation of construction contract documents.
- J. Await Notice To Proceed from NOIRLab to the next project phase.

## 2.7. Construction Phase

- A. **Regular Coordination Meetings:** The A&E firm, in consultation with NOIRLab and the General Contractor, shall organize and conduct all meetings with contractors, consultants, and NOIRLab. The meetings shall include a review of project management, project schedule, and project technical issues.
- B. **Job Site Meetings:** The A&E firm, in consultation with NOIRLab and the General Contractor, shall organize and conduct meetings as necessary at the job site to discuss job progress, problem resolution, code compliance, and decision-making. The A&E firm shall prepare and distribute accurate meeting minutes within three (3) business days after the meeting, or sooner if time-critical.
- C. **Submittal Review:** The A&E firm, in consultation with NOIRLab, shall establish and implement procedures for processing and approving shop drawings, product data, samples, and other submittals from the contractors (e.g. contracts, specifications, schedules, correspondence, meeting minutes, catalog data, directives, change orders, etc.). In addition, the A&E firm shall coordinate the processing and approval of all submittals with the Contractor. The A&E firm, in consultation with NOIRLab, shall establish and maintain a submittal log to ensure contractor compliance with contract documents.
- D. **Maintaining On-going Operations:** The A&E firm, in consultation with NOIRLab, shall assist NOIRLab in providing administration, management, and related services necessary to coordinate construction activities of the contractors with the occupants to allow ongoing operations to proceed with minimum disruption and risk.
- E. **Construction Observation:** The A&E firm, in consultation with NOIRLab, shall observe construction progress and report deviations from the schedule and or cost that may negatively impact project completion. The A&E firm, in consultation with NOIRLab, shall work with contractors to develop and implement corrective actions necessary to meet project completion.
- F. **Control Construction Quality:** The A&E firm shall observe all work in progress to ensure the quality of the work and compliance with the contract documents. The A&E

firm, in coordination with NOIRLab, shall document and report all deficiencies and make recommendations for corrective actions.

- G. **Process Applications for Payment:** NOIRLab, in collaboration with the A&E firm, shall develop and implement a procedure for the review and processing of contractor payment applications.
- H. **Process Change Orders:** NOIRLab CO, Technical Representative (TR), and the A&E firm shall develop and implement a system for the review and processing of change orders. ALL change orders require the written approval of CO and TR.
- I. **Coordinate Inspections and Testing:** The A&E firm, in coordination with TR, shall coordinate the selection of independent inspection and testing agencies, review inspection and testing reports, and make recommendations regarding the results of inspections and testing activities.
- J. **Quality Control:** The A&E firm shall keep NOIRLab informed about the progress and quality of the portion of work completed and report to NOIRLab in a timely fashion any defects or known deviations from the Contract Documents that may negatively impact the most recent construction schedule submitted by the Contractor, or any defects and deficiencies observed in the Work.
- K. **Develop Close-Out Program:** The A&E firm, in consultation with NOIRLab, shall develop a detailed program of close-out activities in compliance with the contract documents. The program shall include a close-out schedule, inspections, testing, start-up procedures, warranty processing, and occupancy.
- L. **Punch List and Final Inspections:** The A&E firm, with input from NOIRLab, shall prepare a list of deficiencies (punch list) and coordinate all corrective actions of contractors. The A&E firm, in consultation with NOIRLab, shall verify substantial completion and final inspections.
- M. **Coordinate Construction Close-Out:** The A&E firm shall assist NOIRLab in coordinating close-out activities, including, but not limited to, the completion of deficiencies, receipt of final submittals, resolution of all change orders, and recommendations for payment of retainage.
- N. **Certificates:** The A&E firm, upon completion of the Project, shall certify to the best of their professional knowledge that the building conforms to the approved plans, specifications, and shop drawings.

## 3. Reporting and Meeting Requirements

### 3.1 Milestone Meetings

A&E firm, at a minimum, shall prepare, present, and perform these milestone reviews and walkthroughs:

- A. Conceptual Design Review
- B. Schematic Design Review
- C. Design Development Review
- D. Construction Document 60% Coordination Review
- E. Construction Documents 90% Coordination Review
- F. Contractors Pre-Bid On-site Walkthrough
- G. Construction Owner Architect Contractor (as required)
- H. Construction On-site Observation (as required)
- I. Construction On-site Close-out

### 3.2 Regular Coordination Meetings

A&E firm shall lead regular coordination meetings with NOIRLab TR and others as required at a mutually agreed frequency and when needed.

## 4. Acceptance

Acceptance of the work shall be based on the following criteria:

- Completion of all tasks outlined in the Scope of Work
- Delivery of all specified submittals

## 5. Bid Breakdown

Please break the bids down into the following line items:

- **Overall Engineering Design Cost Estimate:** Any costs and/or fees associated with engineering design and development.
- **Labor Costs:** Detailed listing of labor costs required for the project.
- **Change Order Costs:** Any costs and/or fees associated with implementing a change order.

- **Administrative Costs:** Any overhead costs and administrative fees associated with the project.
- **Timeline:** Proposed timeline for the project, including any phases or milestones.
- **Payment Schedule:** The A&E firm's proposed payment schedule, outlining when and how payments will be made throughout the project.

For further details on how bids are evaluated, please refer to the *Bid Proposal Comparison* document linked below in [Appendix A - Applicable Reference Documents](#).

## 6. Document Delivery Requirements

A&E firm shall provide NOIRLab with all documents generated in support of the project including meeting minutes, review meetings, permit documentation and construction documentation, submittal comments, contractor site meetings, and calculations performed in support of the design choices. A Master Schedule must also be submitted within twenty (20) days of NTP. The final cost-loaded schedule is due no later than sixty (60) days from NTP and shall reflect all critical activities and milestones. Updates are required monthly or as directed by the Owner.

Documentation shall be provided in the following formats:

- PDF File Format
- Native File Format (MS Office, Google Docs, AutoCAD 2D, etc.)

A&E firm shall upload all project digital files to an agreed cloud storage space.

## 7. Change Orders

All change orders shall be reviewed by NOIRLab for approval. NOIRLab CO, TR, and A&E firm shall develop and implement a system for the review and processing of change orders. All change orders require written approval from the CO and TR.

## 8. Applications for Payment




Monthly applications for payment shall be submitted using AIA G702 and G703 forms or an approved equivalent. Payment for off-site stored materials will be permitted only upon submission of documentation showing proof of ownership, insurance, detailed inventory, and bonding of the storage facility. The Owner reserves the right to reject any unsupported claim for payment.

## 9. Confidentiality

All information and data related to this project shall be treated as confidential and shall not be disclosed to any third parties without prior written consent.

## Appendixes

### Appendix A. Applicable Reference Documents

Document Number / Link / Identifiers	Document Title
 250296_Gemini_Recommendation_...	NOIRLab HBF-X HVAC Assessment Report
 build-america-buy-america-factshee...	Build America, Buy America (BABA) Fact Sheet and FAQs
 HBF-X HVAC Bid Proposal Comparison	HBF-X HVAC Bid Proposal Comparison Template

### Appendix B. List of Acronyms

Acronym	Full Form
AHJ	Authority Having Jurisdiction
AURA	Association of Universities for Research in Astronomy
BABA	Build America, Buy America Act
BMS	Building Management System
CO	Contracts Officer
HBF-X	Hilo Base Facility Expansion
NOIRLab	National Optical-Infrared Astronomy Research Laboratory
NSF	National Science Foundation
NTP	Notice to Proceed
PM	Project Manager
RFP	Request for Proposal
SOW	Statement of Work
TR	Technical Representative
UH	University of Hawaii