



REQUEST FOR PROPOSAL
("RFP")

CONTRACT #N00060004C

FOR

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.
("AURA")

"HBF-X COOLING SYSTEM REPLACEMENT ENGINEERING DESIGN SERVICES"

BIDS / PROPOSALS MUST BE RECEIVED BY:

JULY 13, 2026, 5:00 PM MST

PREPARED BY:

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01 JUNE 2026



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CONTRACT #N00060004C



ANNOUNCEMENT OF OPPORTUNITY

The Association of Universities for Research in Astronomy, Inc. ("AURA") / Central Administrative Services ("CAS") Contracts Office, on behalf of the National Optical-Infrared Astronomy Research Laboratory ("NOIRLab"), is soliciting Request for Proposals ("RFP") from qualified Contractors / Bidders to provide "Hilo Base Facility-X ("HBF-X") Cooling System Replacement Engineering Design Services."

The formal "Announcement of Opportunity" and pertinent Request for Proposal Documentation ("RFP Documentation") can be found on the "AURA Bid Opportunities" webpage: <https://www.aura-astronomy.org/bid-opportunities/>.

Moving forward, all announcements and / or amendments related to this RFP shall be posted on the "AURA Bid Opportunities" webpage. It is the Contractor's / Bidder's responsibility to check the webpage and obtain copies of announcements and / or amendments related to this RFP.

If your organization is interested in submitting a Bid / Proposal, complete submittal packages must be received no later than **JULY 13, 2026, at 5:00 PM MST**.

Please follow the Bidder's Instructions carefully. Any Bid /Proposal submittals that do not follow the Bidder's Instructions may be summarily rejected.



RFP SCHEDULE

RFP RELEASE DATE	June 22, 2026
LOI DUE DATE	June 26, 2026
OPTIONAL BIDDER'S CONFERENCE CALL	June 29, 2026
OPTIONAL SITE VISIT	July 06, 2026
RFP CLOSE DATE	July 13, 2026
BID / PROPOSAL EVALUATIONS	Week of July 13, 2026
ANTICIPATED AWARD DATE	Week of July 20, 2026



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

Author: Mei Starns

NOIR-01-PMD-SOW-0001319

Version and Revision: 1.0

Release Date: 2026-04-21

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Latest Version and Revision	1.0
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[Benjamin White] NOIRLab Head of Facilities Operations	2026-04-24



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](#).

Content Change Table

Version and Revision	Change Date	Description	Change Owner
1.0	2026-03-03	Document initial draft	Mei Starns
	2026-04-22	Request for document approval via Google Docs Approval Workflow	Angelica Junco - DMG
	2026-04-24	Approval process completed	Angelica Junco - 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



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BIDS / PROPOSALS MUST BE RECEIVED BY:

JULY 13, 2026, 5:00 PM MST

PREPARED BY:

AURA / CAS
BRITTANY OCHS, CONTRACTS OFFICER
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01 JUNE 2026

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INTRODUCTION

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.

AURA is soliciting Bids / Proposals for "HBF-X COOLING SYSTEM REPLACEMENT ENGINEERING DESIGN SERVICES."

See the set of Documents released with this RFP for background information on this facility.

SECTION I. BIDDER'S INSTRUCTIONS

ARTICLE 1. DEFINITIONS

- 1.1. All definitions set forth in the General Provisions of the Sample / Draft Contract, attachments and appendices are applicable to these Bidder Instructions.
- 1.2. The Request for Proposal Documents ("RFP Documents") consist of the following:
 - a. Statement of Work
 - b. Requirements Document
 - c. Bidder's Instructions (this Document)
 - I. Bidder's Quote
 - II. Representations and Certifications
 - d. Bidder's Form, Budget Spreadsheet Template and Budget Justification Template
 - e. Amendment(s) issued prior to receipt of Bids / Proposals (if any)

f. Sample / Draft Contract

- 1.3. "Amendments" means the written or graphic instruments issued prior to the execution of the Contract which modify or interpret the RFP Documents, including specifications, by additions, deletions, clarifications or corrections, answers to questions posted on the webpage.
- 1.4. "Contract Documents" consist of the following:
 - a. Contract between AURA and the Contractor
 - b. Representations and Certifications
 - c. Terms and Conditions
 - d. Statement of Work
 - e. Drawings
 - f. Specifications
 - g. Photos of Area of Work
 - h. Amendments and all modifications incorporated in the Documents before their execution
- 1.5. "AURA" means the Association of Universities for Research in Astronomy, Inc., an Arizona non-profit corporation. The term "AURA" includes its authorized representatives. AURA operates the Gemini Observatory and is engaged in managing, operating, and maintaining observatories and related activities for research in the field of astronomy.
- 1.6. "NSF" means the National Science Foundation, an agency of the United States of America created under the National Science Foundation Act of 1950. The term "Foundation" includes its authorized representatives.
- 1.7. "Bidder" means the person, authorized representative(s), or organization submitting a Bid / Proposal, and if awarded, shall perform the Work described in the Contract as the "Contractor."
- 1.8. "Contractor" means the person, authorized representative(s) or organization responsible for the completion of the Work. If a proposal is submitted on behalf of multiple parties, the term "Contractor," shall apply to the party or parties responsible for completion of the Work.
- 1.9. "Work" means those tasks, requirements, and obligations described in the Statement of Work as included in the Contract Documents.
- 1.10. "Subcontractor" means a person or organization who / that has a direct agreement with the Contractor to furnish labor and / or materials at the site of the work. The term also includes lower tier Contractors of a Subcontractor, but it does not include suppliers who / that furnish materials not worked to a special design according to the drawings and specifications. Nothing contained in the Contract shall be deemed or construed to create any contractual relation between AURA and any Subcontractor as defined above.
- 1.11. "Closing Date" means the specified date and time by when all RFP Documents must be received by AURA.

ARTICLE 2. BID PROCEDURES

- 2.1. Bid / Proposal must be submitted in accordance with these RFP Instructions. Any Bid / Proposal not submitted according or part of a Bid / Proposal not conforming to the specified formats shall be cause to reject the entire Bid / Proposal.
- 2.2. Letter of Intent (“LOI”): Bidder is encouraged, but not required, to submit a LOI as outlined in Section IV.
- 2.3. Completion of “Bidder’s Bid Documents:” Bidder must complete in its entirety the Bidder’s Form in Section II, as well as the accompanying Bidder’s Budget and Justification Spreadsheet to show a breakdown of the cost components to enable AURA to complete a cost analysis of Bidder’s Bid / Proposal.
- 2.4. Prices
 - a. Prices quoted in the Bid(s) / Proposal(s) shall include all federal, state, and local taxes due to tax exempt status.
 - b. Prices quoted in the Bid(s) / Proposal(s) shall include furnishing of all transportation, materials, equipment, tools, supplies, labor, and services necessary or proper for performance and completion of the Work, except such as may be otherwise expressly provided for in the RFB Documents.
 - c. All costs must be expressed in US Dollars (\$ USD).
- 2.5. In the event of discrepancy between the prices quoted in the RFP in words and those quoted in figures, the words shall control.
- 2.6. Bids / Proposals shall be submitted in an electronic version as a PDF (pdf), not later than the scheduled Closing Date. Budgets, schedules, requirement matrix and WBS may be in spreadsheet format. Bids / Proposals must be no longer than 40 pages. Appendices are not included in the page limit. Bids shall be doubled spaced, single column printing using no smaller than 10-point type, with no smaller than 0.75” margins. All graphics, tables and drawings must be high resolution and legible with text no smaller than 8-point font.
- 2.7. A Bid / Proposal may be deemed non-compliant if the entire RFP submission package has not been received by the Closing Date. Bids must be submitted via e-mail to:

Brittany Ochs, Contracts Officer
Email: bochs@aura-atronomy.org
- 2.8. Bidders may withdraw Bid / Proposal, by written request, to bochs@aura-atronomy.org at any time prior to the Closing Date. If a Bidder submitted a Letter of Intent and later determines that it will not submit a Bid / Proposal, notice of such is requested by AURA.

- 2.9. Bidder's Bids / Proposals shall be valid for one hundred eighty (180) days beginning with the Closing Date.
- 2.10. Unless otherwise provided for in any addendum to these Bidder's Instructions, no Bidder may withdraw, modify or cancel its Bid / Proposal for a period of one hundred twenty (180) days after the time designated for receipt of Bids.
- 2.11. Bidders shall not submit "contingent bids" where the work that is being bid on is contingent on the completion of an instrument that is not owned by AURA / NSF. Bids / Proposals received with contingency clauses will be deemed unresponsive.
- 2.12. No other forms of submission of Bids / Proposals will be considered. No other forms of submission for modifications to Bids / Proposals will be considered. Modifications to Bids / Proposals submitted may be made electronically, if the modified Bid / Proposal Documents are delivered to AURA in accordance with the rules set forth in Article 2 above on or before the 5:00 PM MST on the Closing Date.

ARTICLE 3. COMMUNICATION AND QUESTIONS

- 3.1. Any questions or requests for clarification of this proposal must be directed to the Contracts Officer, at bochs@aura-astronomy.org. Questions must be submitted by email and must be received at least five (5) business days before the Closing Date. All questions and responses from any Offeror will be provided to all parties via the "AURA Bid Opportunities" webpage. Any question not conforming to this format will be disregarded.
- 3.2. Clarification or direction by other persons at AURA / CAS and NOIRLab is not permitted during the RFP process.

ARTICLE 4. REVIEW OF DOCUMENTS

- 4.1. AURA reserves the right to make additions, deletions, or modifications to the RFP Documents in writing by amendment at any time prior to the closing date. If, in the opinion of the Contracts Officer ("CO"), any such change causes an increase in the time required for submission of Bids, the CO may, at her sole discretion, adjust the closing date and time accordingly Date in the form of an amendment posted on the "AURA Bid Opportunities" webpage.
- 4.2. The Bidder shall examine the RFP Documents carefully. Any request for interpretation or correction of any ambiguity, inconsistency, or error that the Bidder discovers must be made no later than five (5) days prior to the Closing Date.
- 4.3. All interpretations and corrections shall be issued in writing by the AURA CO in the form of an amendment posted on the "AURA Bid Opportunities" webpage. The Bidder shall not rely on

any interpretation or correction given by any other method.

- 4.4. Prior to receipt of Bids / Proposals, addenda, if required, will be posted on the “AURA Bid Opportunities” webpage.
- 4.5. The failure of any Bidder to receive or examine any form, instrument, amendment or other Document, or failure to acquaint itself with existing conditions shall not relieve the Bidder from obligations and responsibilities with respect to its Bids / Proposals or to the Contract award. The submission of a Bid / Proposal shall be taken as prima facie evidence of compliance with this section.

ARTICLE 5. REPRESENTATIONS

- 5.1. Bidder, by submitting a Bid / Proposal, represents that it is familiar with existing conditions under which the Work will be performed, including, but not limited to, environmental, cultural and operational requirements.
- 5.2.
 - a. The Bidder, by submitting its Bid / Proposals, represents that it has read and understands the RFP Documents, and by submitting a Bid / Proposal acknowledges acceptance of all of the Terms and Conditions of the RFP Documents as defined in 1.2 of these Bidder Instructions.
 - b. Any exceptions to the Contract Documents shall be stated on the Contractor’s Letterhead and submitted with its Bid / Proposal with clear and concise justification(s). The Contractor is required to provide alternative wording for consideration by the AURA.
 - c. The Bidder, by submitting a Bid / Proposal, certifies that the Contract Documents, including the General Provisions, the Terms and Conditions and SOW have been reviewed and accepted by the contracts representative of The Bidder’s organization, or that the Bidder has noted such exception(s) to the Contract with its Bid / Proposal.
- 5.2. Bidder shall submit a resolution giving evidence of its qualification of corporate signature authority.

ARTICLE 6. ALTERNATE PROVISIONS

- 6.1. Each Bidder represents that its Bid / Proposal is based upon the Specifications, Terms and Conditions, materials and equipment described in the RFP Documents, unless substitutions have been expressly permitted.
- 6.2. A Bid / Proposal containing an alternate provision(s) shall be accompanied by full and complete justification and technical description of the alternate provisions(s) along with a detailed cost analysis of the differences between the alternate and original provisions. AURA

reserves the right to request such other additional information as may be required for approval either before or after receipt of Bids / Proposals.

- 6.3. Failure to provide justification or technical descriptions for approval purposes may be cause to reject the Bid / Proposal.

ARTICLE 7. COMPLETION TIME

- 7.1. Bidder shall specify in its Bid / Proposal the time required to complete the work described. The time of performance shall be dated from receipt of a Contract, and all costs included in the Bid / Proposal shall be for the Work to be completed within that period.

ARTICLE 8. EVALUATION OF PROPOSAL

- 8.1. AURA reserves the right to hold any or all Bids / Proposals for a period of up to one hundred eighty (180) calendar days.
- 8.2. AURA shall have the right to take up to one hundred eighty (180) calendar days to evaluate the Bids / Proposals submitted and to award Contract(s).
- 8.3. Bids / Proposals will be opened and evaluated privately by AURA after the Closing Date.
- 8.4. Bids / Proposals will be evaluated according to the Source Selection Plan on the following major factors:
 - a. Technical Criteria
 - b. Price
 - c. Schedule
 - d. References
 - e. Experience
- 8.5. All Bid / Proposal Documents received will be considered confidential and will not be released except as needed to complete the evaluation and selection process.
- 8.6. The award of the Contract(s), if any, made by AURA, will be made to the Bidder(s) that presents the best value. AURA reserves the right to determine, at its sole and exclusive discretion, which Bid / Proposal, if any, best meets the "best value" requirement and whether it is in the best interests of AURA to accept the Bid / Proposal. Therefore, Bidder shall ensure that all requested information is included in its Bid/ Proposal.

ARTICLE 9. REJECTION OF PROPOSALS

- 9.1. AURA reserves the right to accept or reject any or all Bids / Proposals or any combination thereof, to withhold an award for any reason it may determine, or to waive any irregularities or informalities in the Bids / Proposals or in the submission of Bids / Proposals.

9.2. All submitted Bids / Proposals shall become the sole and exclusive property of AURA.

ARTICLE 10. DUTY OF BIDDER TO CHECK THE “AURA BID OPPORTUNITIES” WEBPAGE

10.1 AURA has established the “AURA Bid Opportunities” webpage: <https://www.aura-astronomy.org/bid-opportunities/> to display AURA Bid Opportunities. The “AURA Bid Opportunities” webpage will display all pending RFBs, RFPs, etc. issued by the AURA Contracts Office as well as any amendments issued to such RFBs, RFPs, etc.

It shall be the Bidder’s obligation to check the “AURA Bid Opportunities” webpage to view and obtain copies of amendments and announcements related to the RFP they intend to bid on.

ARTICLE 11. FORM OF CONTRACT

11.1 A Sample / Draft Contract and the Terms and Conditions incorporated by reference into said Contract may be found on the “AURA Bid Opportunities” webpage: <https://www.aura-astronomy.org/bid-opportunities/>. The final form of Contract presented to the Contractor selected to perform the work may vary from the Sample / Draft Contract attached hereto, depending on the Bid / Proposal Documents submitted by Contractor and other facts and circumstances deemed relevant by AURA.

ARTICLE 12. LAW

12.1 The laws of the state of Arizona shall govern the interpretation of these Bid / Proposal and Contract Documents.

SECTION II. OPTIONAL BIDDER’S CONFERENCE CALL

The Bidder’s conference is scheduled for **June 29, 2026**. The conference will be held virtually.

Bidders should notify the AURA Contracts Officer at bochs@aura-astronomy.org prior to the meeting date, to provide confirmation of their attendance. Connection details will be sent directly to those wanting to participate.

Microsoft Teams meeting

Join: <https://teams.microsoft.com/meet/259896525403841?p=ygeFLO6flCV7XE7Nvg>

Meeting ID: 259 896 525 403 841

Passcode: LY62nV22

[Need help?](#) | [System reference](#)

Dial in by phone

[+1 213-493-7443,458606127#](tel:+12134937443458606127) United States, Los Angeles

[Find a local number](#)

Phone conference ID: 458 606 127#

Join on a video conferencing device

Tenant key: teams@aura.onpexip.com

Video ID: 115 090 191 9

[More info](#)

For organizers: [Meeting options](#) | [Reset dial-in PIN](#)



[Org help](#)

SECTION III. LETTER OF INTENT

A non-mandatory Letter of Intent ("LOI") is due by **June 26, 2026, 5:00 PM MST**.

The letter shall contain the following information:

- a. Bidder's Legal Name / Address
- b. Technical Point of Contact
- c. Business Point of Contact
- d. List of key personnel including:
- e. The PI(s)
 - Project Manager and all senior personnel expected to be involved in the project.
 - List of the proposed project team member organizations including all potential subcontractors, collaborators, and partnering institutions and their roles in the project.
- f. A maximum of 500 words synopsis of the project to include the following:

- The team’s relative knowledge and experience in HVAC services.
- The infrastructure and ability (Technical Management, and organizational support) of the organization(s) building the proposed instrument including known and potential contractors.

SECTION IV. BIDDER’S FORM

Please complete “6. BIDDER’S FORM_2026.06.01,” located within your Bidder’s Documents and submit it with your Bid / Proposal.

AURA
THE ASSOCIATION OF AMERICAN REGISTERED PROFESSIONAL ENGINEERS, INC.
1000 N. CENTRAL EXPRESS
DALLAS, TX 75208

BIDDER FORM

NAME: [Redacted]
ADDRESS: [Redacted]
PHONE: [Redacted]

IF COMPLETE AND ACCURATE TO THE BEST OF YOUR KNOWLEDGE, PLEASE PRINT OR TYPE THE FOLLOWING INFORMATION:

1. Bidder's name and address as shown on the Bidder's Form.
2. Bidder's name and address as shown on the Bidder's Form.
3. Bidder's name and address as shown on the Bidder's Form.

ITEM	QUANTITY	UNIT PRICE	TOTAL PRICE
[Redacted]	[Redacted]	[Redacted]	[Redacted]

SECTION V. BIDDER’S BUDGET AND JUSTIFICATION SPREADSHEET

Please complete “7. BUDGET & JUSTIFICATION SPREADSHEET_2026.06.01,” located within your Bidder’s Documents and submit it with your Bid / Proposal.

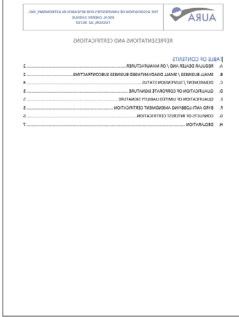
AURA
THE ASSOCIATION OF AMERICAN REGISTERED PROFESSIONAL ENGINEERS, INC.
1000 N. CENTRAL EXPRESS
DALLAS, TX 75208

BIDDER'S BUDGET AND JUSTIFICATION SPREADSHEET

ITEM	QUANTITY	UNIT PRICE	TOTAL PRICE
[Redacted]	[Redacted]	[Redacted]	[Redacted]


SECTION VI. BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

Please complete “8. BIDDER'S REPRESENTATIONS & CERTS_2026.06.01,” located within your Bidder’s Documents and submit it with your Bid / Proposal.



DOCUMENT ACCEPTANCE AND RELEASE

This is a managed Document. To identify changes, each page contains a release number and a page number. This Document is authorized for release once all signatures have been obtained.

PREPARED:	 Brittany Ochs AURA / CAS, Contracts Officer	Date:	06/22/2026
APPROVED:	 Mei Starns NOIRLab, Program / Project Associate II	Date:	
APPROVED:	 Benjamin White NOIRLab, Interim Head of Facilities Operations	Date:	

DOCUMENT VERSION CONTROL

VERSION	DATE	DESCRIPTION	OWNER NAME
01	June 01, 2026	"HBF-X COOLING SYSTEM REPLACEMENT ENGINEERING DESIGN SERVICES"	Brittany Ochs



BIDDER'S FORM

DATE:	[INSERT DATE]
TO:	AURA / CAS BRITTANY OCHS, CONTRACTS OFFICER CONTRACTS OFFICE 950 N. CHERRY AVENUE P. O. BOX 26732 TUCSON, AZ 85726-6732
FROM:	[INSERT LEGAL NAME OF CORPORATION, FIRM, OR INDIVIDUAL BIDDING] [INSERT BUSINESS ADDRESS]

In compliance with AURA's Request for Proposal (RFP), the Bidder hereby proposes to furnish all labor, materials, equipment, and supplies in accordance with the Specifications, pertinent Contract Documents and Statement of Work.	
SIGNATURE	[PLEASE SIGN ON BEHALF OF CORPORATION, FIRM, OR INDIVIDUAL BIDDING]

1. Bidder's Bid / Proposal submittal shall include the following:
 - a. A Cover Sheet including a.) RFP number; b.) RFP title; c.) Bidder's name / address; d.) DUNS number; e.) technical and administrative Points of Contact; f.) Teamed Organizations (if any); and g.) any other pertinent information
 - b. An abstract summarizing the proposed effort
 - c. The actual Bid / Proposal, as outlined in the Statement of Work
 - d. Bidder's Bid Form
 - e. Bidder's Budget Spreadsheet and Budget Justification
 - f. Other relevant information.

2. The Bidder hereby specifies, in accordance with Article 7, Completion Time, of Bidder Instructions (Section I), that work shall be completed within [INSERT NUMBER] calendar days after receipt of the Contract.

3. In accordance with the above completion schedule and enclosed specifications, the Bidder hereby proposes to accomplish the work described above for a total of: [INSERT \$] DOLLARS (\$)
 - a. This amount includes all applicable federal, state and city taxes.

MILESTONE PAYMENT SCHEDULE

The final cost-loaded schedule is due no later than sixty (60) days from the Notice to Proceed ("NTP") and shall reflect all critical activities and milestones. Updates are required monthly or as directed by NOIRLab.

Bidder shall provide a Milestone Payment Schedule. Milestone Payments shall be based on verifiable deliverables identified in Bidder's preliminary Project Schedule. Sum of Milestone Payments shall equal full Contract Cost.

MILESTONE	MONTH	VALUE (\$ OR %)	CUMMULATIVE VALUE
[INSERT]	[INSERT]	[INSERT]	[INSERT]
[INSERT]	[INSERT]	[INSERT]	[INSERT]



BIDDER'S BUDGET AND JUSTIFICATION SPREADSHEET

DATE:	[INSERT DATE]
TO:	AURA / CAS BRITTANY OCHS, CONTRACTS OFFICER CONTRACTS OFFICE 950 N. CHERRY AVENUE P. O. BOX 26732 TUCSON, AZ 85726-6732
FROM:	[INSERT LEGAL NAME OF CORPORATION, FIRM, OR INDIVIDUAL BIDDING] [INSERT BUSINESS ADDRESS]

Please break the Bids / Proposals 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 proposed milestone payment schedule, outlining when and how payments will be made throughout the project.

TIME AND MATERIALS BREAKDOWN	
RAW MATERIALS LIST:	[LIST RAW MATERIALS]
RAW MATERIALS PRICES:	[ITEMIZE RAW MATERIAL PRICING]
LABOR / ACTIVITIES:	[LIST LABOR / ACTIVITIES & COMPLETION TIME BY ACTIVITY]
LABOR / ACTIVITIES RATE:	[PROVIDE LABOR / ACTIVITIES RATES]
JUSTIFICATION	[JUSTIFY MATERIAL COSTS AND LABOR RATES]

Bids / Proposals will be assessed using the following tool / template, "HBF-X HVAC Bid Proposal Comparison Template."

Bid Proposal				
REQ NO :		SHEET NO : 1 OF 1		
DESCRIPTION OF SOW: HBF-X Cooling System Replacement Engineering Design Services				
BIDDER				
Quote Date				
BID Currency		USD	USD	USD
Item	Description	Total Cost	Total Cost	Total Cost
1	Project Management and Project Administration			
2	Conceptual Design			
3	Schematic Design			
4	Design Development			
5	Construction Documents			
6	Permit Solicitation			
7	Construction Phase			
8	Project Expenses and Fees			
9	Overhead and Profit			
10	Professional Cost Estimate Subconsultant			
11	Structural Subconsultant			
12	Electrician - Subconsultant			
14	Bid Quaranty Cost			
15	Performance Bond Cost			
16	Payment Bond			
17	Taxes			
TOTAL QUOTED COSTS				
Total Hours				
Estimated Duration of ED and Construction (days)				
BUDGET VALUE (FROM REQUISITION)				
Link to Proposal				



REPRESENTATIONS AND CERTIFICATIONS

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DATE:	[INSERT DATE]
TO:	AURA / CAS BRITTANY OCHS, CONTRACTS OFFICER CONTRACTS OFFICE 950 N. CHERRY AVENUE P. O. BOX 26732 TUCSON, AZ 85726-6732
FROM:	[INSERT LEGAL NAME OF CORPORATION, FIRM, OR INDIVIDUAL BIDDING] [INSERT BUSINESS ADDRESS]
DUNS #	[INSERT NUMBER]
FEDERAL EMPLOYEE ID #	[INSERT NUMBER]
SOCIAL SECURITY #	[INSERT NUMBER]
SAMS REGISTRATION	<input type="checkbox"/> YES <input type="checkbox"/> NO (CHECK ONE)

**BY CHECKING THE APPROPRIATE BOXES AND / OR SIGNING, THE CONTRACTOR / BIDDER
MAKES THE FOLLOWING REPRESENTATIONS AND CERTIFICATIONS:**

A. REGULAR DEALER AND / OR MANUFACTURER

The Contractor / Bidder is (Check all that apply):

- A Regular Dealer / Distributor of the item(s) offered
- A Regular Manufacturer of the item(s) offered

B. SMALL BUSINESS / SMALL DISADVANTAGED BUSINESS SUBCONTRACTING

Pursuant to the terms of our Agreement with the Government and applicable Federal Procurement Regulations 1-1.701, AURA is required to maintain a Small Business and Small Disadvantaged Business Subcontracting Program. The Contractor / Bidder, is therefore requested to check the appropriate blocks below:

Business Size (Check one):

- Small A domestic concern that is independently owned and operated, is not dominant in the field of its operations, qualifies under the criteria covering annual receipts set forth in Section 3 of the Small Business Act and does not employ more than 500 employees.
- Large A domestic concern which, including domestic and foreign divisions and affiliates, normally employs 500 or more persons, is independently or publicly owned or controlled and operated, and which may be a division of another domestic or foreign concern.

Business Size (Check all that apply):

Minority 51% of business or stock is owned by one or more socially and economically disadvantaged individuals and whose management and daily business operations are controlled by one more of such individuals.

Socially and economically disadvantaged individuals including Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans and other minorities, or any other individual found to be disadvantaged pursuant to Section 8(a) of the Small Business Act.

Native Americans include American Indians, Eskimos, Aleuts, and native Hawaiians. Asian-Pacific Americans includes U. S. citizens whose origins are Guam, the U. S. Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, and Taiwan.

Woman-Owned For assistance in determining your business size and socially and economically disadvantaged status, contact the nearest office of the Small Business Administration.

A business that is at least 51% owned, controlled, and operated by a woman or women.

Note: "Controlled" is defined as exercising the power to make policy decisions. "Operated" is defined as actively involved in the day-to-day management.

Non-Profit A business or organization that has received non-profit status under IRS Regulation 501(c)(3).

Public An agency of the Federal or State Government Sector or municipality.

Sheltered A sheltered workshop or other equivalent business basically employing the handicapped.

Handicapped A business that is owned, controlled, and operated by a handicapped person(s).

Foreign A concern which is not incorporated in the United States or an unincorporated concern having its principal place of business outside the United States.

Business Status for IRS Reporting Requirements (Check one):

Corporation A business entity that is registered with a state in the United States as a corporation, including non-profit corporations but excluding professional corporations.

Other An individual, or other business entity that is not a registered corporation. This includes corporations, independent contractors, partnerships, and the

like.

DUNS #	[INSERT NUMBER]
FEDERAL EMPLOYEE ID #	[INSERT NUMBER]
SOCIAL SECURITY #	[INSERT NUMBER]
SAMS REGISTRATION	<input type="checkbox"/> YES <input type="checkbox"/> NO (CHECK ONE)

WARNING: Failure to provide this information may require that we withhold 20% of your payments and may result in fines imposed by the IRS.

C. DEBARMENT / SUSPENSION STATUS

Contractor certifies to the best of its knowledge and belief that it and its principals:

- a. are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from a covered transaction by any Federal department or agency;
- b. have not within a three year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state or local) transaction or contract under a public transaction; violation of Federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- c. are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, State, or local) with commission of any of the offenses enumerated in paragraph b of this certification; and
- d. have not within a three-year period preceding this proposal for bid had one or more public transactions (Federal, state, or local) terminated for cause or default.

The Contractor agrees to provide immediate notice to the AURA Contracting Officer in the event of being suspended, debarred, or declared ineligible by any department or Federal Agency, or upon receipt of a notice of proposed debarment that is received after the submission of the bid or offer, but prior to the award of the purchase order or contract.

CERTIFICATION

Contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, contractor understands and agrees that the provisions of 31 U.S.C. A3801 et seq., apply to this certification and disclosure, if any.

[INSERT NAME AND TITLE]

[SIGNATURE OF AUTHORIZED REPRESENTATIVE AND DATE]

D. QUALIFICATION OF CORPORATE SIGNATURE

To be completed if Contractor is a corporation.

[INSERT CORPORATION NAME] incorporated in the state (country) of [INSERT STATE AND COUNTRY], RESOLVE THAT: [INSERT NAME AND TITLE] of this corporation is hereby authorized, empowered and directed, for and on behalf of this corporation and its corporate name, to make and execute bids, offers and contracts binding upon this corporation for supplies and services required or rendered by this corporation in the course of this business in an amount up to: [INSERT ALFA DOLLAR AMOUNT] DOLLARS (\$[INSERT NUMERICAL DOLLAR AMOUNT]).

CERTIFICATION

I hereby certify that I am a duly elected and qualified [INSERT TITLE], of the corporation, that the foregoing is a true and correct statement of a resolution adopted at a meeting of the Board of Directors of said corporation, and that the foregoing resolution is in full force and effect and has not been repealed, amended, or canceled.

IN WITNESS WHEREOF I have hereunto set my hand on behalf of said corporation.

[INSERT NAME AND TITLE]

[SIGNATURE OF AUTHORIZED REPRESENTATIVE AND DATE]

E. QUALIFICATION OF LIMITED LIABILITY SIGNATURE

To be completed if Contractor is a limited liability company.

[INSERT LIMITED LIABILITY NAME] organized in the state (country) of [INSERT STATE AND COUNTRY], RESOLVE THAT: [INSERT NAME AND TITLE], of this limited liability company is hereby authorized, empowered and directed, for and on behalf of this corporation and this limited liability company and its limited liability name, to make and execute bids, offers and contracts binding upon this limited liability company for supplies and services required or rendered by this limited liability company in the course of this business in an amount up to: [INSERT ALFA DOLLAR AMOUNT] DOLLARS (\$[INSERT NUMERICAL DOLLAR AMOUNT]).

[INSERT NAME AND TITLE]

[SIGNATURE OF AUTHORIZED REPRESENTATIVE AND DATE]

F. BYRD ANTI-LOBBYING AMENDMENT CERTIFICATION

Contractor certifies, to the best of its knowledge and belief that:

- a. No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of congress, or an employee of a Member of congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.
- b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure of Lobbying Activities," in accordance with its instructions to the [as amended by "Government wide Guidance for New Restrictions on Lobbying, "61 Fed. Reg. 1413 (1/19/96). Note Language in paragraph (2) herein has been modified in accordance with Section 10 of the lobbying disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S. C. 1601 et seq.)].
- c. Contractor shall require that the language of this certification be included in the award documents for all sub-awards at all tiers including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure or failure.

CERTIFICATION

To be signed if Bid or offer exceeds \$100,000.00.

Contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, contractor understands and agrees that the provisions of 31 U.S.C. A3801 et seq., apply to this certification and disclosure, if any.

[INSERT NAME AND TITLE]

[SIGNATURE OF AUTHORIZED REPRESENTATIVE AND DATE]

G. CONFLICTS OF INTEREST CERTIFICATION

- a. Contractor warrants that to the best of its knowledge and belief, and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of the work under a proposed contract and the prospective contractor's organizational, financial, contractual, or other interest are such that:
 - I. Award of the Contract may result in or be the result of an unfair competitive advantage;
 - II. The Contractor's objectivity in performing the contract work may be impaired; or
 - III. That the Contractor has disclosed all relevant information and requested AURA to make a determination with respect to this Contract.
- b. Contractor agrees that if, after award, it discovers an organization conflict of interest with respect to this Contract, it shall make an immediate and full disclosure in writing to the AURA Contracts Officer which shall include a description of the action which the Contractor has taken or intends to take to eliminate or neutralize the conflict. The AURA Contracts Officer may, however, terminate the contract for the convenience of AURA, if it would be in the best interests of AURA to do so.
- c. In the event the Contractor was aware of an organization conflict of interest before the award of this contract and intentionally did not disclose the conflict to the AURA Contracts Officer, the AURA Contracts Officer may terminate the Contract for default.
- d. Contractor shall require a conflict of interest disclosure or representation from subcontractors and consultants who may be able to influence the advice or assistance rendered to AURA and shall include any necessary provisions to eliminate or neutralize conflicts of interest in such consultant agreements or subcontracts involving performance of work under this Contract.

Contractor declares under penalty of perjury that all statements and information contained in this document and any accompanying documents are true and correct, with full knowledge that all statements made in this document and any accompanying documents are subject to investigation and that any false or dishonest answer to any question may be grounds for disqualification from this solicitation or termination of any award and expose me and the represented organization to both civil and criminal liability.

[INSERT NAME AND TITLE]

[SIGNATURE OF AUTHORIZED REPRESENTATIVE AND DATE]

H. DECLARATION

Contractor declares under penalty of perjury that all statements and information contained in this document and any accompanying documents are true and correct, with full knowledge that all statements made in this document and accompanying documents are subject to investigation and that any false or dishonest answer to any question may be grounds for disqualification from this solicitation and expose me and the represented organization to both civil and criminal liability.

[INSERT NAME AND TITLE]

[SIGNATURE OF AUTHORIZED REPRESENTATIVE AND DATE]

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.

TERMS AND CONDITIONS

- 1. DEFINITIONS.....2**
- 2. COMMUNICATION..... 2**
- 3. TECHNICAL DIRECTION.....2**
- 4. VENDOR AGREEMENTS2**
 - 4.1 LABOR DISPUTES..... 2*
 - 4.2 ASSIGNMENT 2*
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ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.
GENERAL PROVISIONS FOR A VENDOR AGREEMENT

1. DEFINITIONS

- (a) "AURA" refers to the Association of Universities for Research in Astronomy, Inc., an Arizona Corporation.
- (b) "NSF" refers to the National Science Foundation.
- (c) "Work Locations" are, collectively, any and all locations at which the Work will be performed by Vendor or any of its sub-vendors or suppliers, including, but not limited to, design and drafting facilities, fabrication and machine shops, welding facilities, painting and coating facilities, assembly facilities, packaging facilities, and all other locations at which the Work will be performed.
- (d) "SACO" refers to the Sub-Award and Contracts Officer.
- (e) "Vendor Agreement" is broadly defined to include a contract between AURA with a dealer, distributor, merchant, professional firm, consulting firm, or other business that: (i) offers and sells goods and/or services (including professional services) to businesses.; (ii) offers and sells similar goods and/or services to many purchasers; and (iii) offers and sells goods and/or services which are otherwise ancillary to the operation of a federal program. The term, "Vendor Agreement," includes and refers to a "Professional Services Agreement" or to a "Professional Services Agreement award," if applicable; the term, "Vendor Agreement" may be used in lieu of the term, "Professional Services Agreement" or the term, "Professional Services Agreement award."
- (f) "Vendor" includes and refers to a dealer, distributor, merchant, professional firm, consulting firm, or other business that: (i) offers and sells goods and/or services (including professional services) to businesses.; (ii) offers and sells similar goods and/or services to many purchasers; and (iii) offers and sells goods and/or services which are otherwise ancillary to the operation of a federal program. Use of the term, "Vendor" includes and refers to the Vendor entity (if any) and a Vendor's authorized representatives.

2. COMMUNICATION

All communication concerning administration of this vendor agreement must be furnished solely to the SACO at the address indicated in this vendor agreement. Communication of a technical nature only may be directed to the Technical Representative designated in the vendor agreement.

3. TECHNICAL DIRECTION

The Technical Representative identified by the SACO is authorized to provide technical information required by the Vendor, but is not authorized to direct Vendor to do anything that will affect the price or schedule of the Work. If the Technical Representative gives the Vendor any direction that will result in a price or schedule change, the Vendor shall not implement the direction, but shall instead contact the SACO and request guidance on how to proceed.

4. VENDOR AGREEMENTS

4.1 LABOR DISPUTES

If the Vendor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Vendor Agreement, the Vendor shall immediately give notice, including all relevant information, to AURA. This provision shall be included in all subcontracts issued by Vendor related to the Work.

4.2 ASSIGNMENT

AURA may assign its rights under this Vendor Agreement to either the National Science Foundation or to an organization succeeding it as the operator of the AURA. Vendor shall not assign or delegate its rights/responsibilities under this vendor agreement without prior written permission from AURA, and any assignment without such permission shall be void. Any assignment with AURA's permission shall not relieve vendor of responsibility for successful performance of the Work. Vendor may not subcontract any portion of the Work – not including purchases of commercially available items – without prior written permission from AURA.

5. INTELLECTUAL PROPERTY

5.1 COPYRIGHTABLE MATERIAL

- (a) The term "Subject Writing" refers to any copyrightable material which is produced by Vendor in the course of performing the Work under this vendor agreement or which otherwise arises out of the Work and which is either delivered to AURA or is distributed to any persons other than Vendor's personnel and agents. Subject Writings include such items as reports, books, journal articles, software, databases, sound recordings, photographs, artwork, and videotapes.
- (b) Except as otherwise specified in this Vendor Agreement, the Vendor may own or permit others to own the copyright in all Subject Writings. Vendor agrees that if it or anyone else does own copyright in a Subject Writing, then for each Subject Writing: AURA, and any subsequent organization operating AURA, shall have nonexclusive, nontransferable, irrevocable,

royalty-free license to exercise throughout the world all rights provided by copyright for research purposes. These licenses, however, will not include the right to sell copies of the copyrighted works to the public.

(c) Vendor agrees to acquire, through written agreement or an employment relationship, the ability to comply with the requirements of the preceding paragraphs. The Vendor further agrees that any transfer of copyright or any other rights to a Subject Writing, by it or anyone whom it has allowed to own such rights, will be made subject to the requirements of this section.

(d) Any and all Information furnished to Vendor by or on behalf of AURA shall remain the sole property of AURA and shall be used by Vendor only in connection with Vendor's performance of Work under this Vendor Agreement. Vendor shall not, without the prior express written consent of AURA, disclose or reveal such Information or any portion thereof to any person not employed by Vendor in performance under this Vendor Agreement (except designated authorized representatives of AURA) or utilize such Information for any purpose other than such performance; provided, however, that such restriction on disclosure shall not apply to Information which: (1) was or becomes part of the public domain otherwise than through any act or omission on the part of Vendor; (2) was already in the possession of the Vendor at the time of its receipt of such Information without any restrictions on disclosure; or (3) was acquired by Vendor from a third party (other than from a representative of AURA) without any undertaking of confidentiality imposed on or by the disclosing party. Vendor shall take all precautions reasonably desirable and necessary to safeguard the Information and comply with the provisions of the preceding sentence. Upon the earlier of termination of this Vendor Agreement for any reason, or as requested by AURA at any time, Vendor shall promptly deliver all Information to AURA that has been provided to Vendor by or on behalf of AURA.

(e) Subject to the provisions of Section 5.2, below, Vendor may retain the entire right, title, and interest of any and all Information first developed, acquired, or produced by Vendor related to the Work or this Vendor Agreement; provided, however, that with respect to any Information in, which Vendor retains title: (1) AURA, or any organization that succeeds it as the Managing Organization, shall have a non-exclusive, non-transferable, irrevocable, paid-up license to use or have used on their behalf, for all purposes throughout the world, and (2) each of the Parties shall have a non-exclusive, non-transferable, irrevocable, paid-up license to use or have used on their behalf such Information throughout the world for research purposes. AURA, any organization that succeeds it as the Managing Organization, may translate, duplicate, reproduce, distribute and disclose in any manner and for any purpose all of such Information.

(f) Proprietary information acquired, developed or produced by Vendor prior to the date of this Vendor Agreement that was not acquired, developed or produced by Vendor for any purposes related to this project, shall not be deemed to be "Information" under this Vendor Agreement. To the extent that Vendor incorporates any Proprietary Information into the Work, Vendor hereby grants AURA a non-exclusive, non-transferable, irrevocable, paid-up license to use or have used on their behalf, for all purposes, such Proprietary Information throughout the world. Information shall only be considered "Proprietary Information" if it is clearly marked as such by Vendor. Unless otherwise specified in this Vendor Agreement, AURA, any organization that succeeds it as the Managing Organization, may translate, duplicate, reproduce, distribute and disclose in any manner and for any purpose all of such Proprietary Information.

5.2 PATENT INFRINGEMENT, USE AND CONSENT

(a) Vendor warrants that the Work and Vendor's performance under this Vendor Agreement shall not infringe any valid United States or foreign patents, trademarks or copyrights, except where such infringement arises solely from a process or product specified by AURA under this Vendor Agreement unless Vendor or its subcontractors have information that use of such process or product will or may cause an infringement and fail to promptly notify AURA of such infringement. Vendor shall report to the SACO, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this Vendor Agreement of which the Vendor has knowledge. In the event of any claim or suit against AURA on account of any alleged patent or copyright infringement arising out of the performance of the Work or out of the use of any supplies furnished or Work performed hereunder, Vendor shall furnish to AURA, when requested by the SACO, all evidence and information in possession of the Vendor pertaining to such suit or claim.

(b) The Government of the United States has given its authorization and consent for all use and manufacture of any invention described in and covered by a patent of the United States in the performance of this Vendor Agreement or any part hereof or any amendment hereto or any sub-contract hereunder (including any lower-tier subcontract).

(c) Vendor shall pay all royalties and license fees related to this Vendor Agreement.

5.3 PATENT RIGHTS (APRIL, 1992)

(a) Definitions.

1. INVENTION means any invention or discovery, which is or may be patentable or otherwise protectable under Title 35 of the USC, to any novel variety of plant, which is or may be protected under the Plant Variety Protection Act (7 USC §§2321 et seq.).

2. SUBJECT INVENTION means any invention of the vendor conceived or first actually reduced to practice in the performance of Work under this sub-award.

3. PRACTICAL APPLICATION means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to

establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

4. MADE when used in relation to any invention means the conception or first actual reduction to practice of such invention.

5. NON-PROFIT ORGANIZATION means a domestic university or other institution of higher education or an organization of the type described in Section 501(c)(3) of the Internal Revenue Code of 1954 (26 USC §501(c)) and exempt from taxation under Section 501(a) of the Internal Revenue Code (26 USC §501(a)) or any domestic non-profit scientific or educational organization qualified under a State non-profit organization statute.

6. NSF means the National Science Foundation, an agency of the federal government of the United States of America.

(b) Allocation of Principal Rights. The Vendor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this Patent Rights clause and 35 USC §203. With respect to any subject invention in which the vendor retains title, the Federal Government shall have a non-exclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the U. S. the subject invention throughout the world. With respect to any subject invention in which the Vendor retains title, AURA shall have a non-exclusive, nontransferable, irrevocable, paid-up license to practice or have practiced on their behalf the subject invention throughout the world for research purposes.

(c) Invention Disclosure, Election of Title and Filing of Patent Applications by Vendor.

1. The Vendor will disclose each subject invention to NSF within two months after the inventor discloses it in writing to Vendor personnel responsible for the administration of patent matters. The disclosure to NSF shall be in the form of a written report and shall identify the vendor agreement under which the invention was made, and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding of the nature, purpose, operation, and, to the extent known, the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to NSF, the Vendor will promptly notify NSF of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the Vendor.

2. The Vendor will elect in writing whether or not to retain title to any such invention by notifying NSF within two years of disclosure to NSF. However, in any case where publication, on sale, or public use has initiated the one-year statutory period wherein valid patent protection can still be obtained in the U. S., the period for election of title may be shortened by NSF to a date that is no more than 60 days prior to the end of the statutory period.

3. The Vendor will file its initial patent application on an invention to which it elects to retain title within one year after election of title or, if earlier, prior to the end of any statutory period wherein valid patent protection can be obtained in the U. S. after a publication, on sale, or public use. The Vendor will file patent applications in additional countries or international patent offices within either ten months of the corresponding initial patent application, or six months from the date when permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications when such filing has been prohibited by a Secrecy Order.

4. Requests for extension of the time for disclosure to NSF, election, and filing under subparagraphs 1, 2, and 3, may, at the discretion of NSF, be granted.

(d) Conditions When the Government May Obtain Title. The Vendor will convey to NSF, upon written request, title to any subject invention:

1. if the Vendor fails to disclose or elect the subject invention within the times specified in paragraph c. above, or elects not to retain title; provided that NSF may only request title within 60 days after learning of the failure of the Vendor to disclose or elect within the specified times;

2. in those countries in which the Vendor fails to file patent applications within the times specified in paragraph (c) 1 above, but prior to its receipt of the written request of NSF, the Vendor shall continue to retain title in that country; or

3. in any country in which the Vendor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in a reexamination or opposition proceeding on, a patent on a subject invention.

(e) Minimum Rights to Vendor.

1. The Vendor will retain a non-exclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the Vendor fails to disclose the subject invention within the times specified in paragraph c. above. The Vendor's license extends to its domestic subsidiaries and affiliates, if any, within the corporate structure of which the Vendor is a party and includes the right to grant sublicenses of the same scope to the extent the Vendor was legally obligated to do so at the time the Vendor Agreement was awarded. The license is transferable only with the approval of NSF except when transferred to the successor of that part of the Vendor's business to which the invention pertains.

2. The Vendor's domestic license may be revoked or modified by NSF to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR §404. This license will not be revoked in that field of use or the geographical areas in which the Vendor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at

discretion of NSF to the extent the Vendor, its licensees, or its domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

3. Before revocation or modification of the license, NSF will furnish the Vendor a written notice of its intention to revoke or modify the license, and the Vendor will be allowed thirty days (or such other time as may be authorized by NSF for good cause shown by the vendor) after the notice to show cause why the license should not be revoked or modified. The Vendor has the right to appeal, in accordance with applicable regulations in 37 CFR §404 concerning the licensing of Government-owned inventions, any decision concerning the revocation or modification of its license.

(f) Vendor Action to Protect Government's Interest.

1. The Vendor agrees to execute or to have executed and promptly deliver to NSF all instruments necessary to: (i) establish or confirm the rights the Government has throughout the world in those subject inventions for which the Vendor retains title; and (ii) convey title to NSF when requested under paragraph d. above, and to enable the Government to obtain patent protection throughout the world in that subject invention.

2. The Vendor agrees to require, by written agreement, its employees, other than clerical and non-technical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the Vendor each subject invention made under this Vendor Agreement in order that the Vendor can comply with the disclosure provisions of paragraph c. above, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. The disclosure format should require, as a minimum, the information requested by paragraph c. 1. above. The Vendor shall instruct such employees through the employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U. S. or foreign statutory bars.

3. The Vendor will notify NSF of any decision not to continue prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than 30 days before the expiration of the response period required by the relevant patent office.

4. The Vendor agrees to include, within the specification of any U. S. patent application and any patent issuing thereon covering a subject invention, the following statement: "This invention was made with Government support under (identify the vendor agreement) awarded by the National Science Foundation. The Government has certain rights in this invention. "

5. The Vendor or its representative will complete, execute and forward to NSF a confirmation of a License to the U. S. Government and the page of a United States patent application that contains the Federal support clause within two months of filing any domestic or foreign patent application.

(g) Subcontracts. The Vendor will include this Patent Rights clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental or research work. The subcontractor will retain all rights provided for the Vendor in this Patent Rights clause, and the Vendor will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(h) Reporting on Utilization of Subject Inventions. The Vendor agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Vendor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Vendor and such other data and information as NSF may reasonably specify. The Vendor also agrees to provide additional reports in connection with any march-in proceeding undertaken by NSF in accordance with paragraph j. of this Patent Rights clause. As required by 35 USC §202(c)(5), NSF agrees it will not disclose such information to persons outside the Government without the permission of the Vendor.

(i) Preference for United States Industry. Notwithstanding any other provision of this Patent Rights clause, the Vendor agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject invention in the U. S. unless such person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the U. S. However, in individual cases, the requirement for such an agreement may be waived by NSF upon a showing by the Vendor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the U. S. or that under the circumstances domestic manufacture is not commercially feasible.

(j) March-in Rights. The vendor agrees that with respect to any subject invention in which it has acquired title, NSF has the right in accordance with procedures at 37 CFR §401. 6 and NSF regulations at 45 CFR §650. 13 to require the Vendor, an assignee or exclusive licensee of a subject invention to grant a non-exclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances and if the Vendor, assignee, or exclusive licensee refuses such a request, NSF has the right to grant such a license itself if NSF determines that:

1. such action is necessary because the Vendor or assignee has not taken or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use;

2. such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Vendor, assignee, or their licensees;
 3. such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Vendor, assignee, or licensee; or
 4. such action is necessary because the agreement required by paragraph i. of this Patent Rights clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the U. S. is in breach of such agreement.
- (k) Special Provisions for Contracts with Non-profit Organizations. If the Vendor is a non-profit organization, it agrees that:
1. rights to a subject invention in the U. S. may not be assigned without the approval of NSF, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the Vendor;
 2. the Vendor will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when NSF deems it appropriate) when the subject invention is assigned in accordance with 35 USC §202(e) and 37 CFR §401. 10;
 3. the balance of any royalties or income earned by the Vendor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, will be utilized for the support of scientific or engineering research or education; and
 4. it will make efforts that are reasonable under the circumstances to attract licensees of subject inventions that are small business firms and that it will give preference to a small business firm if the vendor determines that the small business firm has a plan or proposal for marketing the invention which, if executed, is equally likely to bring the invention to practical application as any plans or proposals from applicants that are not small business firms; provided that the vendor is also satisfied that the small business firm has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the Vendor. However, the Vendor agrees that the Secretary of Commerce may review the Vendor's licensing program and decisions regarding small business applicants, and the Vendor will negotiate changes to its licensing policies, procedures or practices with the Secretary when the Secretary's review discloses that the Vendor could take reasonable steps to implement more effectively the requirements of this paragraph k. 4.
- (l) Communications. All communications required by this Patent Rights clause should be sent to:

Patent Assistant
Office of the General Counsel
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

6. COMPUTATION OF TIME

Except as expressly provided otherwise in this Vendor Agreement, references to "days" or "weeks" or "months" shall mean calendar days, weeks or months, respectively, and time periods specified in this Vendor Agreement shall be measured in calendar days, weeks and months. Whenever the date for the exercise of any right, privilege, remedy or the discharge of any duty under this Vendor Agreement falls upon a Saturday, Sunday or any public or legal holiday, the party having the right, privilege, remedy or duty shall have the time extended until 5:00 p.m., MST on the next succeeding day that is not a Saturday, Sunday or holiday.

7. U. S. STATUTORY REQUIREMENTS

7.1 APPLICABLE FEDERAL STANDARDS AND REQUIREMENTS

a. By signing this Agreement, the Vendor certifies that it will comply with all applicable clauses from the Cooperative Agreement (CA) AST 0809409, the CA General Conditions, the Federal Standards and Requirements set forth in NSF Financial and Administrative Terms and Conditions dated October 10, 2010; OMB Circulars A-110; A-21 and A-133 as incorporated herein.

b. The Vendor shall ensure that the following articles of the Financial and Administrative Terms and Conditions dated October 10, 2010, if applicable, are appropriately addressed and flow down to all subcontractors: Articles 5, 7, 9, 10, 11, 12, 17, 18, 21, 22, 23, 24, 25, 26, 27, 30, 31, 32, 33, 34, 35, 36, 37, 38, 42, 43, 44, 45, 46 and 47. These articles may be found at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=cafatc1010.

7.2 EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

(a) This Section 7.2 is applicable if the amount of this Vendor Agreement exceeds \$100,000. Vendor agrees that the SACO, the Director of the NSF, and the Comptroller General of the United States, or any of their duly authorized representatives, shall, until the expiration of three (3) years after final payment under this Vendor Agreement, have access to and the right to examine any directly pertinent books, documents, papers, and other records of the Vendor involving transactions related to this Vendor Agreement. Vendor further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that the SACO, the Director of the NSF, and the Comptroller General of the United States, or any of their duly authorized representatives, shall, until the expiration of three (3) years after final payment under the subcontract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor involving transactions related to the subcontract. The term "subcontract" as used here excludes: (1) purchase orders and subcontracts not exceeding \$100,000; and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public. Such periods of access and examination, for records which relate to: (i) litigation or settlement of claims arising from the performance of this Vendor Agreement; or (ii) costs and expenses of this Vendor Agreement as to which exception has been taken by the Comptroller General of the United States, or any duly authorized representative from the General Accounting Office of the United States, shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

(b) Financial records, supporting documents, statistical records, and other records pertinent to this Sub-award shall be retained by the Vendor for a period of three (3) years after final payment under this Vendor Agreement, or for such longer periods, if any, as is required by applicable statutes or by other provisions of this Vendor Agreement. Records that relate to audits, appeals, litigation, or settlement of claims arising out of the performance of the Work under this Vendor Agreement shall be retained until such audits, appeals, litigation, or claims have been disposed of. Records relating to intellectual property shall be retained by the Vendor for three (3) years after final payment under this Vendor Agreement. Unless court action or audit proceedings have been initiated, Vendor may substitute microfilm copies of original records.

(c) The SACO, the Director of the NSF, and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any pertinent books, documents, papers, and records of Vendor, to make audits, examinations, excerpts and transcripts of all direct and indirect costs of whatever nature claimed and reimbursed under this Vendor Agreement. Further, any negotiated subcontract in excess of \$100,000 made by Vendor shall include a provision to the effect that the SACO, the Vendor, the Director of the NSF, and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to pertinent records for similar purposes.

(d) In the event that this clause is or may not be enforceable as a result of Vendor or any of its subcontractors being foreign entities not located within the United States, Vendor shall cooperate to effect the intent of this Vendor Agreement by permitting an auditing agency of the Government of any foreign nation having jurisdiction over Vendor or such subcontractor to exercise all rights provided the Director of the NSF and the Comptroller General of the United States under this Section 7.2.

7.3 EQUAL OPPORTUNITY

During the performance of this Vendor Agreement, Vendor agrees as follows:

(a) Vendor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin.

(b) Vendor shall take affirmative action to ensure that applicants are employed, and the employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (1) employment, (2) upgrading, (3) demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship.

(c) Vendor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by AURA that explain this clause.

(d) Vendor shall, in all solicitations or advertisement for employees placed by, or on behalf of Vendor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(e) Vendor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other vendor agreement or understanding, the notices to be provided by AURA advising the labor union or workers' representative of Vendor's commitments under this clause, and the union shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(f) Vendor shall comply with Executive Order 11246, as amended, by E.O. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity", and as supplemented by regulation at 41 CFR part 60, "Office of Federal Contract Compliance Program, Equal Employment Opportunity, Department of Labor".

(g) Vendor shall furnish to the National Science Foundation all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. Standard Form 100 (EEO-1), or any successor form, is the prescribed form to be filed within 30 days following the date of the Vendor Agreement, unless filed within 12 months preceding the date of the Vendor Agreement.

(h) Vendor shall permit access to its books, records and accounts by the NSF or the Office of Federal Contract Compliance Programs (OFCCP) for the purposes of investigation to ascertain Vendor's compliance with the applicable rules, regulations, and orders.

(i) If the OFCCP determines that Vendor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, the Vendor Agreement may be canceled, terminated, or suspended in whole or in part and the Vendor may be declared ineligible for further Government contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Vendor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(j) Vendor shall include the terms and conditions of this Section 7.3 in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(k) Vendor shall take such action with respect to any subcontract or purchase order as the NSF may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if Vendor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, Vendor may request the United States to enter into the litigation process to protect the interests of the United States.

(l) Notwithstanding any other clause in this Vendor Agreement, disputes related to this Section 7.3 will be governed by the procedures in 41 CFR 60-1.1.

7.4 CLEAN AIR AND WATER

(a) This clause is applicable only to Work conducted within the United States. Vendor agrees as follows: (1) To comply with all the requirements of Section 114 of the Clean Air Act, as amended (41 USC 7414, Et. Seq.) and Section 308 of the Clean Water Act (33 USC 1318, as amended by P.L. 92-500), relating to inspection, monitoring, entry, reports and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued there under before the award of this Vendor Agreement; (2) That no portion of the Work required by this Vendor Agreement will be performed in a facility listed on the Environmental Protection Agency list of violating facilities on the date when this Vendor Agreement was awarded, unless and until the EPA eliminates the name of such facility or facilities from such listing; (3) To use its best efforts to comply with Clean Air Standards and Clean Water Standards at the facilities in which the Vendor Agreement is being performed; and (4) To insert the substance of the provisions of this clause into any non-exempt subcontract, including this clause 7.4 (a)(4).

(b) The terms used in this Section 7.4 have the following meanings: (1) The term "Air Act" means the Clean Air Act, (42 USC 7401 Et. Seq.); (2) The term "Water Act" means Clean Water Act, (33 USC 1251 Et. Seq.); and (3) The term "Clean Air Standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in Section 110(d) of the Air Act (42 USC 7410(d)), an approved implementation procedure or plan under Section 111(c) or Section 111(d), respectively, of the Air Act (42 USC 7411(c) or (d)), or an approved implementation procedure under Section 111 (d) of the Air Act (42 USC 7412(d)); (4) The term "Clean Water Standards" means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by Section 402 of the Water Act (33 USC 1842), or by a local government to ensure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 USC 1317); (5) The term "compliance" means compliance with Clean Air Standards or Clean Water Standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency, or an air or water pollution control agency in accordance with the requirements of the Air Act or Water Act and related regulations; (6) The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by the Vendor or a subcontractor utilized in the performance of the Vendor Agreement or any subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location shall be deemed to be a facility except when the Administrator, or a designee, of the Environmental Protection Agency, determines that independent facilities are co-located in one geographical area.

7.5 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT – OVERTIME COMPENSATION (Mar 1986)

Any subcontract made by Vendor to the extent that it is of a character specified in the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333) (the Act), is subject to the following terms and all other applicable provisions and exceptions of the Act and the regulations of the Secretary of Labor.

(a) Neither Vendor, nor any subcontractor contracting for any part of the Work which may require or involve the employment of laborers or mechanics (see Federal Acquisition Regulation (FAR) 22.300), shall require or permit any such laborers or mechanics in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than 1 1/2 times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(b) In the event of any violation of the provisions set forth in paragraph 7.5(a), Vendor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such Vendor and subcontractors shall be liable to AURA for

liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions set forth in paragraph 7.5 (a) in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in paragraph 7.5(a).

(c) AURA may, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld, from any moneys payable on account of work performed by Vendor or subcontractors under the Vendor Agreement or any other Federal vendor agreement with the Vendor, or any other Federally assisted Vendor Agreement subject to the Contract Work Hours and Safety Standards Act which is held by AURA, such sums as may be determined to be necessary to satisfy any liabilities of Vendor or any subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph 7.5 (b).

(d) Vendor or its subcontractors shall maintain payrolls and basic payroll records during the course of the Work and shall preserve them for a period of three (3) years from the completion of the Vendor Agreement for all laborers and mechanics working on the Vendor Agreement. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Nothing in this paragraph shall require the duplication of records required to be maintained for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act. The records to be maintained under this paragraph 7.5 (d) shall be made available by Vendor or subcontractor for inspection, copying or transcription of authorized representatives of AURA and the Department of Labor. Vendor or its subcontractors shall permit such representatives to interview employees during working hours on the job.

(e) Vendor and its subcontractors shall insert in any subcontracts the provisions set forth in paragraphs 7.5 (a) through 7.5 (d) and also a clause requiring the subcontractor to include these provisions in any lower tier subcontract. Vendor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the provisions set forth in paragraphs 7.5 (a) through 7.5 (d).

7.6 DEBARMENT

No part of the Work shall be subcontracted to parties listed on the General Services Administration's List of Parties Excluded from Federal Procurement or Nonprocurement Programs in accordance with E.O.s 12549 and 12689, "Debarment and Suspension." By signing this Vendor Agreement or performing the Work the Vendor certifies that neither it nor any of its principle employees is on this debarred list. Vendor shall require a similar certification from all firms awarded subcontracts over \$25,000.

7.7 BYRD ANTI-LOBBYING AMENDMENT

By signing this Vendor Agreement, subcontractor certifies that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of AURA, any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining this contract or any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to AURA.

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.

CONTRACT No.

This contract (the “Contract”) is entered into between the **Association of Universities for Research in Astronomy, Inc.**, an Arizona non-profit corporation (hereinafter “AURA”) and **[Insert Name]**, having its principal place of business in **[city, state]** (hereinafter “Contractor”), and shall be effective as of the **[Effective Date]**.

RECITALS

WHEREAS, AURA performs scientific research and manages federally supported research facilities for certain federal agencies, including but, not limited to, the U.S. National Science Foundation (“NSF”), U.S. Department of Energy (“DOE”), and National Aeronautics and Space Administration (“NASA”);

WHEREAS, in furtherance of AURA’s work on behalf of one or more federal agencies, AURA requires certain supplies, services, or both, which are described in this Contract; and

WHEREAS, Contractor has the capability and desire to furnish such supplies and/or services to AURA in a manner consistent with the statement of work, applicable industry professional and/or technical standards, and all applicable laws.

NOW, THEREFORE, in consideration of the mutual promises contained herein and intending to be legally bound hereby, the Parties agree as follows:

Article 1 Purpose

The purpose of this Contract is for AURA to acquire from Contractor **[insert brief description of the purpose of the contract]**.

Article 2 Contract Format

1. **Contract Terms and Structure.** This Contract is comprised of the terms and conditions set forth in the body of the Contract as supplemented by the Appendices attached hereto, all of which are incorporated herein by reference. **Appendix 1** sets forth the Statement of Work and Technical Specifications (hereinafter “SOW”). **Appendix 2** sets forth additional terms and conditions required by prime contracts between AURA and one or more federal agencies.
2. **Most Restrictive Terms Govern.** To the extent that terms related to a particular subject matter are applied in a more restrictive manner in any particular section of this Contract, or by incorporation of federal requirements by reference, the most restrictive terms shall apply. Any questions regarding any perceived conflict of terms shall be promptly brought to the attention of

AURA's designated Contracts Officer.

3. Irreconcilable Conflict. In the event of an irreconcilable conflict between the provisions of any of the documents that make up this contract, the terms of a document that appears higher on the numbered list immediately below shall control over the terms of a document that is lower on the list.

1. Main Documents (this document, including Terms and Conditions as applicable)
2. Statement of Work
3. All specifications

Article 3
Scope of Work

1. Contractor's Obligation. Contractor shall perform all work and furnish to AURA all deliverables set forth in the SOW, **Appendix 1**. Contractor shall perform such work and prepare such deliverables in accordance with industry standards of skill, professionalism, diligence, and care. Contractor shall perform all such work in a manner consistent with all requirements of this Contract, including all federal requirements incorporated by reference herein.

2. Licenses and Permits. Contractor hereby certifies that it has, and shall maintain throughout the term of this Contract, all licenses necessary to the performance of the work described in Appendix 1. Contractor shall obtain all permits (if any) necessary to perform the work described in Appendix 1. Upon request by AURA, Contractor shall promptly provide proof of such license and permits.

3. Key Personnel. Key personnel (if any) are listed in **Appendix 1**. Contractor shall not remove or replace key personnel without prior approval of AURA. Any proposed substitute key person shall have materially equivalent qualifications and skills to the person for whom substitution is requested. In the event Contractor is able to demonstrate that a proposed substitute meets such standards, AURA shall not unreasonably deny substitution.

4. Period of Performance/. The period of performance for this Contract shall be as follows:

[Deliverable / Phase of Work] Item	[Delivery / Completion] Date
[insert brief description]	

OPTION Milestone Payment

5. Milestone Payment Schedule. Contractor shall be paid in accordance with the Milestone Payment Schedule as set forth below . Each Milestone Payment shall be due and payable only to the extent it is supported by the completion of the corresponding individual Milestones. Each Milestone does not represent the cost of the Work included in such Milestone; accordingly, the

Milestone Payments do not represent an actual measure of the progress of the Work. For the avoidance of doubt, any dates set forth in the table below for the achievement of a Milestone are indicative only and shall not affect Contractor’s right to invoice or receive payment for a Milestone Payment for the achievement of the corresponding Milestone in any particular month.

Milestone Event	Date	Amount
1.		
2.		
3.		
4.		
5.		

OPTION Cost Plus Formula

6. A cost-plus-incentive fee (CPIF) contract is a cost-reimbursement contract that provides for an initially negotiated fee to be adjusted later by a formula based on the relationship of total allowable costs to total target costs. The “incentive” is the additional fee and motivates the contractor to manage project cost and performance.” A CPIF contract does not have a ceiling associated with it. (a price ceiling is usually associated with a fixed price incentive contract).

Example Formula (to be negotiated with Contractor): If there is a Target Cost of \$100K and a fixed fee of \$10K and a 50/50 over/under share ratio. (this can be 70/30 or 60/40 or 80/20 and note that the Contractors share is always expressed first) If the contractors Actual Cost is below Target Cost, they will get 50% of the underrun added to Target fee. If their cost is over, they will get 50% of the overrun deducted from target fee.

The agreed upon formula for this Contract shall be [insert]

**Article 4
Payment**

1. Invoices. Subrecipient shall submit invoices to AURA on a XXXX basis. Invoices shall provide detail commensurate with the Budget and shall include any supporting documentation that is reasonably prescribed by AURA. The final invoice must be submitted no later than sixty (60) days after the end of the final period of performance. Invoices shall be submitted to:

[Name of AURA Official]
[Address]

[Phone]
[Email]

An email copy of the invoice shall be sent to: ContractsInvoice@aura-astronomy.org

OPTION: Fixed Price Agreement (Supplies):

This Contract is a firm-fixed-price supply contract. Payment shall be made in the amount of [insert] upon Contractor's delivery of the supplies described in **Appendix 1**. AURA shall make final payment within thirty (30) days of delivery of supplies meeting the requirements of the SOW.

OPTION: Fixed Price Agreement (Services):

This Contract is a firm-fixed-price service contract. Payment shall be made in the amount of [insert] upon Contractor's completion of the work described in **Appendix 1**. Any authorized progress payments shall be in accordance with, and only in accordance with, a schedule reduced to writing in **Appendix 1**. Subject to AURA's right to reject nonconforming work, AURA shall make payment upon completion of the work, within thirty (30) days of receipt of a proper invoice.

OPTION: Cost Reimbursement with No Fee (Services):

1. **Cost Reimbursement Contract.** This Contract is a reimbursement contract with no fee. Payment shall be made in accordance with Contractor's approved budget (the "Budget") through monthly reimbursement of actual "allowable costs" incurred in performance of the work described in **Appendix 1**. Contractor's Budget is set forth in **Appendix 1**. Subject to AURA's right to reject nonconforming work, AURA shall make payment within thirty (30) days of receipt of a proper invoice.
2. **Allowable Costs.** Allowable costs shall be limited to those costs that are consistent with (i) the federal cost principles set forth at [2 C.F.R. Part 200, Subpart E / 48 C.F.R. Part 31], (ii) Contractor's approved Budget, and (iii) any other terms and conditions of this Contract limiting allowability of costs.
3. **No Profit/Fee.** There shall be no profit/fee paid under this Contract. Contractor acknowledges that reimbursement of allowable costs of performance, as set forth in this Article 4 (Payment) constitutes adequate consideration for performance of the work hereunder.
4. **Maximum Contract Payment.** The maximum payment authorized under this Contract is [insert] (hereinafter "Maximum Contract Price"). Upon reaching seventy-five (75) percent of the Maximum Contract Price in total invoicing, Contractor shall alert AURA's designated Contracts Officer to that fact. If AURA's Contracts Officer has any doubt regarding whether the full SOW can be accomplished within the Maximum Contract Price, AURA may, in its sole discretion: (i) reduce the scope of work to ensure maximum value is obtained within the authorized contract amount, or (ii) increase the Maximum Contract Price by amendment to the Budget. The Contractor is not obliged to continue work beyond the target cost unless or until the contract funding is increased.

OPTION: Cost-Plus-Fixed-Fee Reimbursement (Services): (or Cost-Plus Incentive Fee)

1. Cost Reimbursement Contract. This Contract is a cost-plus-fixed-fee contract (or Cost-Plus Incentive Fee). Payment shall be made in accordance with Contractor's approved budget (the "Budget") through monthly reimbursement of actual "allowable costs" incurred in performance of the work described in **Appendix 1**, plus a portion of the agreed fee, as set forth in the schedule reduced to writing in **Article 3**. Contractor's Budget is set forth as **Appendix 1**. Subject to AURA's right to reject nonconforming work, AURA shall make payment within thirty (30) days of receipt of a proper invoice.

2. Allowable Costs. Allowable costs shall be limited to those costs that are consistent with (i) the federal cost principles set forth at [2 C.F.R. Part 200, Subpart E / 48 C.F.R. Part 31], (ii) Contractor's approved Budget, and (iii) any other terms and conditions of this Contract limiting allowability of costs.

3. Maximum Contract Payment. The maximum payment authorized under this Contract is [insert] (hereinafter "Maximum Contract Price"). Upon reaching seventy-five (75) percent of the Maximum Contract Price in total invoicing, Contractor shall alert AURA's designated Contracts Officer to that fact. If AURA's Contracts Officer has any doubt regarding whether the full SOW can be accomplished within the Maximum Contract Price, AURA may, in its sole discretion: (i) reduce the scope of work to ensure maximum value is obtained within the authorized contract amount, or (ii) increase the Maximum Contract Price by amendment to the Budget. The Contractor is not obliged to continue work beyond the target cost unless or until the contract funding is increased.

4. Cost-Plus Incentive Fee. A cost-plus incentive fee contract will provide for an initially negotiated fee to be adjusted later by an agreed upon formula based on the relationship of total allowable costs to total target costs. This contract type specifies a target cost, a target fee, minimum and maximum fees, and a fee adjustment formula. After contract performance, the fee payable to the Contractor will be determined in accordance with the formula. The formula provides, within limits, for increases in fee above target fee when total allowable costs are less than target costs, and decreases in fee below target fee when total allowable costs exceed target costs. When total allowable cost is greater than or less than the range of costs within which the fee-adjustment formula operates, the Contractor will be paid total allowable costs, plus the minimum or maximum fee. This formula will be stated above in **Article 3**.

OPTION: Time and Materials (Services):

1. Time and Materials Contract. This Contract is a time and materials contract. Payment for personnel effort shall be made monthly at the rates set forth below. Payment for materials and supporting commercial services shall be "at cost" with no markup and shall be limited to "allowable costs."

2. Invoicing and Payment. Monthly, Contractor shall provide a detailed statement of effort with its invoices, indicating, at a minimum, number of hours worked per day per individual whose effort is covered by the invoice with corresponding daily descriptions of work accomplished by each such individual. Invoices shall further provide an itemized list of costs of

materials and supporting commercial services for which reimbursement is sought. Subject to AURA's right to reject nonconforming work, AURA shall make payment within thirty (30) days of receipt of a proper invoice.

3. Allowable Material Costs. Allowable costs of materials and supporting commercial services shall be limited to those costs that are consistent with (i) the federal cost principles set forth at [2 C.F.R. Part 200, Subpart E / 48 C.F.R. Part 31], and (ii) any other terms and conditions of this Contract limiting allowability of costs. Unless otherwise set forth in **Appendix 1** or agreed in writing in advance by AURA and Contractor, such costs shall be limited to no more than \$5,000 / \$10,000 in any one-month period.

4. Maximum Contract Payment. The maximum payment authorized under this Contract is [insert] (hereinafter "Maximum Contract Price"). Upon reaching seventy-five (75 percent of the Maximum Contract Price in total invoicing, Contractor shall alert AURA's designated Contracts Officer to that fact. If AURA's Contracts Officer has any doubt regarding whether the full SOW can be accomplished within the Maximum Contract Price, AURA may, in its sole discretion: (i) reduce the scope of work to ensure maximum value is obtained within the authorized contract amount, or (ii) increase the Maximum Contract Price by amendment to the Budget. The Contractor is not obliged to continue work beyond the target cost unless or until the contract funding is increased.

5. Time and Materials Rate Schedule.

[insert]

Article 5 Term

This Contract shall commence on the effective date set forth above and shall continue through the end of the period of performance or final delivery date set forth in Article 3, Section 4 (Period of Performance), as applicable. AURA shall have the unilateral right (but not obligation) to extend the period of performance or final delivery date, prospectively or retroactively, as necessary to accommodate delays by Contractor.

OPTIONAL LANGUAGE: Option Periods for Service Contracts:

[Designate paragraph above as "1. Base Period."]

2. Option Periods. AURA shall have the unilateral right to extend the term of this Contract up to a total performance period of [insert]. AURA may exercise its right to extend the Contract in multiple increments. Rates paid/applicable budgets during options periods shall be as agreed by the Parties and designated in **Appendix 1**. If no rate or budget has been negotiated for an option period, Contractor and AURA shall cooperate in good faith to set reasonable rates/budget commensurate with the rates/budget agreed for the base period, taking into account the nature of the work required during the option period.

Article 6
AURA Contracts Officer

1. Contracts Officer Designation. AURA's designated Contracts Officer for this Contract is:

Name: [insert]
Email: [insert]
Phone: [insert]

2. Authority of Contracts Officer. The Contracts Officer is AURA's primary representative for oversight and administration of this Contract. The Contracts Officer is the only person authorized to approve changes to this Contract.

3. Technical Representatives. The Contracts Officer may designate, by written notification to Contractor, one or more Technical Representatives to provide technical direction to Contractor in the course of performing its obligations under this Contract. The Technical Representative has no authority to amend this Contract. Direction by the Technical Representative is only valid if it: (i) is consistent with the SOW, (ii) does not constitute a new assignment of work or material change to agreed performance obligations, *and* (iii) does not create any additional cost of contract performance beyond that contemplated for the agreed SOW. In the event that Contractor believes that any direction provided by the Technical Representative may constitute additional work or a change to the agreed Contract terms, Contractor shall promptly notify the Contracts Officer.

Article 7
Contractor's Project Manager

Contractor shall designate an individual to serve as Contractor's Project Manager. The Project Manager shall be responsive to communications from AURA's Contracts Officer. The Project Manager shall be sufficiently senior within Contractor's organization and knowledgeable about the type of work and/or deliverables covered by the SOW to facilitate efficient administrative coordination with AURA.

Article 8
Changes

1. Change to SOW. AURA shall have the unilateral right, through its Contracts Officer, to direct, in writing, changes to the SOW, **Appendix 1**. If such change will impact the cost of performance by Contractor, Contractor shall promptly so notify AURA, and the Parties shall cooperate in good faith to negotiate a reasonable increase in the contract price. Any such price adjustment shall be commensurate with the scope and complexity of additional work or modified work.

2. Contractor's Obligation to Proceed. If the Parties cannot promptly agree on upon an appropriate price adjustment, AURA shall have the right to require Contractor to nonetheless proceed promptly with the work as modified, and Contractor shall be entitled to payment of an additional amount equal to its actual incremental increased cost of performance while the Parties continue to negotiate final payment amount. Alternatively, upon failure to promptly agree to a price adjustment, in its sole discretion, AURA shall have the right to (i) direct Contractor to proceed with the SOW as originally stated and (ii) identify an alternate means by which to accomplish the additional work (including engaging an alternate contractor for the additional work).

Article 9 Delays

1. Delay. Contractor shall promptly notify AURA of any expected delay in performance or delivery and shall cooperate in good faith with AURA to modify the performance or delivery schedule in such a manner as to minimize impact to AURA operations.

2. Remedies for Delay. In the event of material impact to AURA operations, AURA shall have the right to reduce the contract price by an amount commensurate to the cost impact to AURA caused by the delay. Further, in the event that AURA cannot reasonably endure the delay in performance, AURA may terminate the Contract.

OPTIONAL LANGUAGE: Liquidated Damages:

3. Liquidated Damages.

- (a) Notwithstanding the remedies set forth above, the Parties agree that AURA shall be entitled to liquidated damages in the sum of [\$] per calendar [day/week] of [late delivery / performance of any phase of work].
- (b) Lateness shall be measured against the delivery/performance schedule set forth in Article 2, Section 4 (Delivery Schedule/Period of Performance). In calculating days for purposes of liquidated damages: (i) each day shall be counted as commencing after midnight of the previous day, (ii) each partial day shall count as a full day, (iii) the due date shall not be counted, and (iv) the day of actual completion/delivery shall be counted. Delayed performance excused in writing by AURA's Contracts Officer shall not be considered late.
- (c) The Parties acknowledge and agree that the sum set forth in this clause was set based upon the nature of work under this Contract and fairly represents an estimate of foreseeable damages to AURA as a result of late delivery/performance.
- (d) If AURA invokes this liquidated damages remedy, the amount calculated hereunder shall be deemed to fully compensate AURA for actual costs incurred as a result of the late delivery/performance for which it was invoked. AURA shall be

entitled to offset any payments due Contractor by the amount of applicable liquidated damages.

Article 10
AURA Facility Access and Use

1. Contractor Access to Facilities. Contractor shall be granted access to AURA facilities to the extent necessary to efficiently accomplish its obligations under this Contract. Matters of access shall be coordinated via AURA’s Contracts Officer and Technical Representative(s). Access may be limited when necessary to ensure Contractor’s work not interfere with other activities of AURA or its research partners. In the event that other AURA or research partner activities are an impediment to efficient performance of this Contract, AURA and Contractor shall cooperate in good faith to adjust the performance or delivery schedule accordingly.
2. Facility Rules. Contractor and Contractor’s personnel shall, at all times, obey all rules applicable to conduct within AURA facilities and shall comply with the reasonable direction of facility managers. In the event any such rules or direction becomes an impediment to efficient performance of this Contract, Contractor shall promptly bring the matter to the attention of AURA’s Contracts Officer.
3. Bodily Injury and Property Damage. If the SOW calls for performance of work on AURA premises, Contractor shall indemnify AURA for any (i) bodily injury to Contractor’s personnel or third parties relating to Contractor’s activities on AURA premises, and (ii) property damage arising out of Contractor’s activities on AURA premises.
4. Damage to AURA Facilities or Equipment. If the SOW calls for performance of work on AURA premises or work with AURA equipment, Contractor shall be responsible for all damage to facilities, equipment, or other property caused by Contractor or its personnel, subcontractors, or agents. Contractor shall promptly notify AURA’s Contracts Officer of any such damage and shall reimburse AURA for the cost of repair.
5. Survival. The rights and obligations of Sections 3 (Bodily Injury and Property Damage) and 4 (Damage to AURA Facilities or Equipment) in this Article 10 (AURA Facility Access and Use) shall survive the expiration or termination of this Contract.

Article 11
Insurance

1. Insurance. Contractor shall at its own cost and expense, obtain and maintain the following insurance coverage with insurers maintaining a rating of at least A-VII or better by A.M. Best and licensed to be in business in the State where work and the goods or services are being performed by Contractor:

Insurance Type	Minimum Limits	Minimum Coverage
Workers	Statutory	Pursuant to the laws, rules, and regulations of the

Compensation		jurisdictions in which any employee or agent of Contractor performs work under this contract, purchase order or other agreement.
Employers Liability	\$1 Million USD each accident or disease	Coverage for suits by Contractor employees that fall outside WC statutes.
Business Auto, if applicable	\$2 Million USD combined single limit each accident	Coverage for any auto used in performance of this agreement for bodily injury and property damage.
Commercial General Liability	\$5 Million USD Per Occurrence and Aggregate	Coverage for premises, operations, products and completed operations, contractual liability, bodily injury, property damage and personal injury and advertising injury.

2. Contractual Liability Coverage. If the SOW calls for performance of work on AURA premises, Contractor shall ensure that its Commercial General Liability insurance coverage includes coverage for “contractual liabilities.”

3. Professional Liability Coverage. If the work covered under this Contract entails activities for which professional liability coverage is customarily acquired (*e.g.*, errors and omission or malpractice coverage), Contractor shall maintain such coverage at customary limits, but in no case less than \$1 million per claim and \$3 million annual aggregate.

4. Proof of Insurance and Tail Coverage. Upon execution of this agreement, annually and upon written request by AURA, Contractor shall promptly provide AURA with a certificate of insurance evidencing the insurance coverage required herein and name Association of Universities for Research in Astronomy, Inc. its subsidiaries and affiliates as additional insureds. Contractor shall ensure continuing coverage for liabilities that may be asserted in relation to activities under this Contract for a period of three (3) years from the end of the term of this Contract. Furthermore, in no way shall Contractor’s liability be limited to that which is recoverable by insurance.

5. Self-Insurance Accepted. Contractor may meet its obligations under this Article 11 (Insurance) by providing AURA with satisfactory proof of the pertinent coverages through a comprehensive program of self-insurance.

6. Survival. The rights and obligations of this Article 11 (Insurance) shall survive the expiration or termination of this Contract.

Article 12 Termination

1. Termination Without Cause. AURA shall have the right to terminate performance under this Contract without cause upon thirty (30) days’ written notice to Contractor.

2. Termination for Cause. Upon material breach by Contractor, AURA shall have the right

to terminate this Contract for cause in accordance with this section. In the event of material breach by Contractor, AURA shall notify Contractor in writing of the circumstances constituting the material breach. Contractor shall be afforded ten (10) calendar days after receipt of such notice to cure its breach. If Contractor fails to cure its breach within that time, AURA may proceed with termination of the Contract for cause by written notice, which may then be immediately effective. Material breach shall include, but not be limited to:

- (a) Contractor's failure to meet required performance standards as described herein or in the SOW;
- (b) Contractor's loss of any license necessary to perform the Contract;
- (c) Contractor's failure to meet the insurance requirements of this Contract;
- (d) Debarment, suspension, or exclusion of Contractor or its key personnel from participation in federal contracts or awards;
- (e) A material change in Contractor's financial condition that reasonably indicates Contractor will be unable to perform its obligations under this Contract; or
- (f) Contractor's failure to comply with federal standards or requirements incorporated into this contract by reference.

3. Contractor's Obligations Upon Termination. Regardless of the reason for which this Contract is terminated, Contractor shall cease all work in progress and shall cancel, to the maximum extent possible without creating risk of loss of work already performed, all related obligations to third-parties. In ceasing work in progress, Contractor shall safeguard the work accomplished. If so directed by AURA, Contractor shall turn over all work in progress in a manner calculated to facilitate AURA's taking over of the work directly or through a replacement contractor.

4. Contractor's Right to Payment Upon Termination. Upon termination without cause, AURA shall pay Contractor for work performed to the date of termination, plus reasonable termination costs such as subcontract winddown costs where subcontracts are not immediately cancellable. Upon termination for cause, the Parties shall negotiate final payment as appropriate, taking into account the basis for termination and any liabilities of Contractor to AURA under the circumstances.

5. Suspension or Termination of Contract for Loss of Federal Support. Notwithstanding any other term of this Contract, AURA shall have the right to immediately suspend or terminate performance of this Contract in the event (i) federal funds available to fund the Contract are suspended or terminated or (ii) the project in furtherance of which the contracted work is needed is suspended or terminated. In such event, Contractor's right to payment shall be as set forth above for termination without cause.

6. Survival. The rights and obligations of this Article 12 (Termination) shall survive the

expiration or termination of this Contract.

Article 13 Relationship of the Parties

Contractor's relationship to AURA is that of an independent contractor. None of the provisions of this Contract are intended to create, nor shall be construed to create any relationship between or among the Parties other than that of independent entities. Neither of the Parties shall be construed to be the agent, partner, co-venturer, employee nor representative of the other Party.

Article 14 Access to Records

Contractor shall provide reasonable access to records related to performance of this Contract to AURA, the federal agency providing the funds for this Contract, NSF, and the federal General Accountability Office.

Article 15 Confidential Information

If the work required under this Contract will require Contractor to have access to the proprietary or confidential information of AURA, Contractor shall execute a nondisclosure agreement ("NDA") in substantially the same form as that provided in **Appendix 4**.

Article 16 Warranty

1. Contractor warrants that the equipment and parts delivered to AURA hereunder meet and satisfies all of AURA's requirements set forth in the Statement of Work (**Appendix 1**).
2. Contractor warrants that the equipment delivered to AURA hereunder, including all hardware and software will, upon completion of the contract, be free from defects in material or workmanship for one year after delivery and installation. Further, Contractor warrants all labor related to the installation of the systems for a period of five years after installation. Products that are not manufactured by Contractor, but that are purchased by Contractor will be subject to the warranty provisions provided by the equipment manufacturer of such product(s), unless Contractor notifies AURA of any additional warranty provisions in writing. The obligation of Contractor under this warranty is the repair or replacement of any defective or malfunctioning parts with new or refurbished parts. If Contractor fails to replace or repair such parts, AURA's remedy shall be a refund of the price charged by the manufacturer of the part (whether that be Contractor or a third party) to its dealers for such parts as are proven to be defective. To obtain service under this warranty, AURA must bring the malfunction to the attention of Contractor or one of its authorized dealers during the one-year warranty period.
3. Contractor warrants that its performance of the work, including the selection of the

equipment to meet AURA's needs and the labor performed in the installation of said equipment, will be carried out with that standard of care, skill, and diligence normally provided by a professional organization in the performance of similar services. Contractor further warrants that the performance of subcontractors at any tier, or any other person assigned by it under this Agreement, shall be in accordance with sound practice and professional standards of its trade and the requirements of this Contract. If any portion of the services supplied fails to comply with this warranty, and Contractor is so notified in writing within one (1) calendar year after completion of this Agreement, Contractor will correctly perform such portion of the services at its own expense or, at AURA's option, will refund the amount of the compensation paid for such portion.

Article 17
Collaboration and Information Sharing in Performance

1. To the extent that the work under this Contract impacts AURA's information technology or other technical systems, Contractor shall keep AURA's Technical Representative apprised of its activities through close coordination and regular updates. Such coordination shall be used to ensure Contractor is able to efficiently perform the work and to ensure that AURA is promptly apprised of any activities or events that may negatively impact AURA's systems or may interfere with other work of AURA.

Article 18
Information Security

1. To the extent that the work under this Contract impacts AURA's information technology or other technical systems, Contractor shall keep AURA's Technical Representative apprised of its activities through close coordination and regular updates. AURA's Information Technology Network is to be used for AURA business purposes and to serve the interests of the corporation.

Article 19
Warranty of No Infringement

1. Contractor represents and warrants that none of the services performed under this Contract, nor any supplies, equipment, instruments, or other deliverables provided under this Contract, will, in any way whatsoever, infringe, or constitute misappropriation of, any right of any third party, including, any copyrights, mask work rights, patent rights, trademark rights, trade secret rights or confidentiality rights.

Article 20
Patent and Copyright Indemnity

1. Contractor shall indemnify AURA and the Government (and their officers, agents, and employees) against all liability, including costs, for infringement of any copyright or patent arising out of, or resulting from, the manufacture or delivery of supplies, the performance of services, or the construction, alteration, modification, or repair of real property, equipment, software, or instruments, under this Contract. AURA shall promptly notify Contractor if AURA

becomes aware of any such claim or the potential for any such claim.

Article 21
Section 889 Compliance

1. Contractor is prohibited, in performance of this Contract, from providing AURA any equipment, service or system that uses, as a substantial component, covered telecommunications equipment or services. "Covered telecommunications equipment" is defined at Section 889 of Public Law 115-232 (Aug. 13, 2018) and 2 C.F.R. § 200.216 to include the equipment and services of Huawei Technology Company and ZTE Corporation as well as that of certain other entities and affiliates. If Contractor determines, during the term of this Contract or during a period extending for one (1) year after the end of the term, that it failed to comply with this prohibition, it shall promptly notify AURA and replace the noncompliant equipment or service with compliant equipment or services at no additional cost to AURA. Contractor hereby acknowledges that it was placed on notice of this obligation in the course of the contract negotiation and award process.

Article 22
NSF Rights in Data Clause

1. Notwithstanding any other term in this Contract to the contrary (if any), Contractor shall grant to NSF an irrevocable, worldwide, nonexclusive, royalty-free license to use, display, disclose, reproduce or modify (and to permit others to use, display, disclose, reproduce or modify), for any purpose whatsoever, the following items (which may constitute data or copyrightable works) to the extent delivered under this Contract:

- (a) Preventative maintenance guides;
- (b) Preventative maintenance histories;
- (c) Operating manuals and similar plans;
- (d) Facility and instrument drawings (including design, shop and as-built drawings), designs and specifications;
- (e) Schematics;
- (f) Warranty data;
- (g) Schedules;
- (h) Software and manuals developed under this Contract;
- (i) Inventories;

- (j) Document indices;
- (k) Contracts and vendor agreements;
- (l) Operations reports;
- (m) Memoranda with third parties; and
- (n) Safety manuals.

Contractor shall include a clause materially similar to this clause in all subcontracts under this Contract.

Article 23 Licenses Relating to Contract Work Product

Option: AURA Ownership of Work Product (AURA Paying for Development, Ownership):

1. AURA Ownership of Contract Work Product.

(b) All right, title, and interest in Contractor's work product under this Contract (including, but not limited to, copyrights and patent rights) shall be the property of AURA. Contractor shall assign, and hereby does assign, all right, title, and interest in all work product resulting from this Contract (including, but not limited to, copyrights and patent rights) to AURA.

(c) Contractor shall deliver to AURA the work product for which it is engaged under this Contract (including, for software, source code and operating code), as well as copies of all technical data related to such work product (including, but not limited to technical manuals). AURA shall have the right to require delivery of software code developed under this Contract and any technical data developed under this Contract for a period extending for three (3) years after the end of the term of the Contract.

(d) Contractor shall ensure that all of Contractor's employees and subcontractors performing work in furtherance of this Contract have executed written assignments of rights in any patentable inventions or copyrightable works that they may be involved in creating in the course of their work under this Contract, such that Contractor possesses sufficient rights to meet its obligations under this Section (AURA Ownership of Contract Work Product).

Option: Broad AURA and Government License in Work Product with Ownership Retained by Contractor (AURA Paying for Development, License):

1. AURA and Government Licenses Relating to Contract Work Product.

(a) Contractor has been engaged to perform work for AURA relating to technical systems, in particular by developing or creating software or hardware, or modifications or repairs to software or hardware.

(b) Contractor shall, and hereby does, grant to AURA and the Government: (i) an irrevocable, worldwide, nonexclusive, royalty-free license to practice (and to authorize others to practice) any patentable invention first made in the performance of this Contract; and (ii) an irrevocable, worldwide, nonexclusive, royalty-free license to use, display, disclose, reproduce or modify (and to permit others to use, display, disclose, reproduce or modify) for any purpose whatsoever any copyrightable work first made in the performance of this Contract.

(c) Contractor shall deliver to AURA the work product for which it is engaged under this Contract (including, for software, source code and operating code), as well as copies of all technical data related to such work product (including, but not limited to technical manuals). AURA shall have the right to require delivery of software code developed under this Contract and any technical data developed under this Contract for a period extending for three (3) years after the end of the term of the Contract.

(d) Contractor shall ensure that all of Contractor's employees and subcontractors performing work in furtherance of this Contract have executed written assignments of rights in any patentable inventions or copyrightable works that they may be involved in creating in the course of their work under this Contract, such that Contractor possesses sufficient rights to meet its obligations under this Section (AURA and Government Licenses Relating to Contract Work Product).

Option: Bayh Dole "Flow Down" – Contractor Ownership with AURA and Government Rights in Inventions (NSF Funded "Development"):

1. AURA and Government Licenses Relating to Contract Work Product.

(a) Contractor has been engaged to perform work for AURA relating to technical systems, in particular by developing or creating software or hardware, or modifications or repairs to software or hardware.

(b) Contractor shall, and hereby does, grant to AURA and the Government an irrevocable, worldwide, nonexclusive, royalty-free license to use, display, disclose, reproduce or modify (and to permit others to use, display, disclose, reproduce or modify) for any purpose whatsoever any copyrightable work first made in the performance of this Contract.

(c) This Contract is supported by funds made available from [insert federal funding agency name] and constitutes a "funding agreement" for purpose of the Bayh Dole Act, 35 U.S.C. § 200 *et seq.*, and its implementing regulations at 37 C.F.R. Part 401. As such:

(i) The "standard patent rights clause" set forth at 37 C.F.R. § 401.14 is hereby incorporated by reference as if restated in full text herein. Throughout such clause, "Federal agency" and "agency" are changed to "AURA and/or [insert funding agency name]."

(ii) Contractor affirms that it has reviewed the standard patent rights clause and will promptly make any disclosures to AURA and the government that are required thereunder. Further, to the extent failure to make any disclosure results in relinquishment or forfeiture of any rights, Contractor agrees to cooperate in good faith with AURA and the government to convey required rights, and/or provide evidence of conveyance of such rights, to the government.

(iii) Contractor further agrees that, notwithstanding any clause to the contrary in this Contract, the government is an intended beneficiary of the standard patent rights clause and shall have the right to directly enforce it vis-a-vis Contractor.

(d) Contractor shall deliver to AURA the work product for which it is engaged under this Contract (including, for software, source code and operating code), as well as copies of all technical data related to such work product (including, but not limited to technical manuals). AURA shall have the right to require delivery of software code developed under this Contract and any technical data developed under this Contract for a period extending for three (3) years after the end of the term of the Contract.

(e) Contractor shall ensure that all of Contractor's employees and subcontractors performing work in furtherance of this Contract have executed written assignments of rights in any patentable inventions or copyrightable works that they may be involved in creating in the course of their work under this Contract, such that Contractor possesses sufficient rights to meet its obligations under this Section (AURA and Government Licenses Relating to Contract Work Product).

Option: AURA Acceptance of Standard Commercial Software License (Routine Commercial Software Purchase, Never Used in Contract to Develop of Software):

1. Contractor's Commercial License. Contractor's standard user license for the software under this Contract is attached as **Appendix 2A**, along with a copy of Contractor's standard software support terms. Contractor hereby does grant AURA such license(s) and shall provide the stated support.

**Article 24
Force Majeure**

1. Neither Contractor nor AURA shall be liable for failure to fulfill its obligations herein or for delays in performance or delivery, as applicable, due to causes beyond its reasonable control, including, but not limited to: acts of God, natural disasters, acts or omissions of other parties, acts or omissions of civil or military authority, Government shut downs (total or partial), the termination, lapse, or delay in government funding, changes in governmental priorities, changes in law, material shortages, fire, strikes, floods, epidemics, pandemics, quarantine restrictions, riots, war, or acts of terrorism (hereinafter collectively or singularly referred to as force majeure

event). Where there is an event of force majeure, the party prevented from or delayed in performing its obligations under this contract must immediately notify the other party giving full particulars of the event of force majeure and the reasons for the event of force majeure preventing that party from or delaying that party in performing its obligations under this contract. That party must use its reasonable efforts to mitigate the effect of the event of force majeure upon its performance of the contract and to fulfill its obligations under the contract. Upon completion of the event of force majeure, the party affected must as soon as reasonably practicable recommence performance of its obligations under this contract. In the event of such delay, the date of performance or of delivery shall be extended for a period equal to the time lost by reason of said delay on written approval of AURA.

Article 25 Applicable Law

1. Governing Law. This Contract shall be governed under the law of the State of Arizona, without regard to its conflict of law provisions.
2. Construction in a Manner Consistent with Applicable Federal Laws. Contractor's obligations under this Contract shall be interpreted and performed in a manner consistent with applicable federal laws, including, but not limited to, federal requirements incorporated by reference.

Article 26 Dispute Resolution

1. Informal Dispute Resolution. The Parties shall first attempt, in good faith, to promptly resolve disputes arising under this Contract informally by negotiation between AURA's Contracts Officer and Contractor's Project Manager. Upon identification of any matter of dispute, the aggrieved Party shall promptly notify the other Party of the matter and its position. Except that this clause shall not be construed as limiting AURA's suspension and termination rights under Article 12 (Termination) in any way whatsoever, the Parties agree that they shall not invoke more formal means of dispute resolution, including the filing of any lawsuit, for ten (10) calendar days following the commencement of informal negotiations, unless such delay would materially prejudice the rights of the aggrieved party.
2. AURA Right to Invoke Mediation and Arbitration. If a dispute, including any allegation of breach, is not resolved by informal means as described above, at AURA's sole discretion, AURA may invoke mediation or arbitration of the disputed matter. AURA's right to invoke mediation or arbitration shall apply to all disputes, including those first raised by AURA and those first raised by Contractor. If mediation or arbitration is invoked by AURA, the mediation or arbitration shall be conducted in accordance with the applicable Commercial Rules of the American Arbitration Association. There shall be a single presiding arbitrator or mediator, and the Parties shall mutually agree to such arbitrator or mediator within thirty (30) calendar days of AURA's invocation of mediation or arbitration. Unless otherwise agreed by AURA, the place of mediation or arbitration shall be Tuscon, Arizona. Mediation and arbitration under this section

shall not be mutually exclusive; AURA may first invoke mediation and later invoke arbitration. In the case of arbitration, the award rendered by the arbitrator shall be final and binding on the Parties and may be entered and enforced in any court having jurisdiction. Each Party shall bear its own costs incurred in the course of mediation or arbitration and shall bear one half of the costs of the mediation or arbitration process.

3. No Other Limitations. Except as otherwise expressly provided in this Contract, the Parties shall have and retain all rights to seek all lawful remedies for breach of this Contract.

Article 27 Assignment

1. Assignment Required by Federal Agency. When required by the federal agency providing the funds for this Contract, or when required by NSF in relation to management of an NSF Major Facility, Contractor agrees that AURA's rights and obligations under this Contract may be assigned to and/or assumed by the funding agency, NSF, or another entity designated by the funding agency or NSF to serve as the successor to AURA's interests under the Contract.

2. No Assignment by Contractor. The rights, obligations and responsibilities established herein shall not be assigned, delegated, or transferred by Contractor without the express written consent of AURA.

Article 28 Miscellaneous

1. No Waivers. No assent or waiver, express or implied, of any breach of any one or more of the covenants, conditions or provisions hereof shall be deemed a waiver of any other covenant, condition or provision hereof, or a waiver of any subsequent breach of the same covenant, condition or provision.

2. Severability. The provisions of this Contract are severable. If any clause, sentence, provision or other portion of this Contract is or becomes illegal, null, void, or unenforceable for any reason, or is held by any court of competent jurisdiction to be so, the remaining portions of this Contract shall continue to be valid and enforceable as to the Parties hereto, unless the Parties agree that such a clause, sentence, provision, or other portion of this Contract is of sufficient materiality to require amendment or termination of this Contract.

3. Intended Beneficiaries. The only intended beneficiaries of this Contract are AURA and Contractor. Notwithstanding the forgoing, if the "standard patent rights clause" of 37 C.F.R. § 401.14 is incorporated into this Contract, the government shall be considered an intended beneficiary of this Contract to the extent, and only to the extent, set forth in such clause. Otherwise, there are no intended third-party beneficiaries of this Contract.

4. Survival. All rights and obligations which, by their terms, are designated to survive expiration or termination of this Contract shall survive such expiration or termination and constitute continuing rights and obligations.

5. Entire Agreement and Amendments. This Contract represents the complete understanding of the Parties with regard to the subject matter. Any amendment to this Contract shall be in writing and signed by both Parties. This Contract supersedes any other agreements or understandings between the Parties, whether oral or written, relating to the subject matter of this Contract.

IN WITNESS WHEREOF, the Parties have caused this Contract to be executed by their duly authorized representatives, intending to be legally bound hereby.

**FOR THE ASSOCIATION OF UNIVERSITIES
FOR RESEARCH IN ASTRONOMY**

Signature: _____

Name: _____

Title: _____

Date: _____

FOR [CONTRACTOR]

Signature: _____

Name: _____

Title: _____

Date: _____

**APPENDIX 1
STATEMENT OF WORK AND BUDGET**

Technical Specifications:

Permits/Licenses Required:

Key Personnel (if any):

Deliverables:

APPENDIX 2
REQUIRED FEDERAL COMPLIANCE TERMS
NATIONAL SCIENCE FOUNDATION

1. **Funding Agency and Type.** This Contract is funded through a Cooperative Agreement with NSF [INSERT CA & CSA NUMBER]. As such, certain specific terms are required as set forth herein.

2. **Federal Requirements.** The performance of Contractor under this Contract is subject to the following federal requirements, which are incorporated by reference herein:
 - (a) 2 C.F.R. Part 200, as adopted by NSF at 2 C.F.R. Part 2500;

 - (b) The NSF Cooperative Agreement Financial & Administrative Terms and Conditions (CA-FATC) (October 1, 2024) as supplemented and modified by the NSF Major Multi-User Research Facility Projects CA-FATC (October 1, 2024), available at: https://www.nsf.gov/awards/managing/co-op_conditions.jsp?org=NSF; and

 - (c) The NSF Performance & Award Policies & Procedures Guide (“PAPPG”), available at: https://www.nsf.gov/pubs/policydocs/pappg20_1/index.jsp, to the extent the requirements of the PAPPG are not inconsistent with the CA-FATC described immediately above.

3. **Whistleblower Protection.** This Contract is subject to the whistleblower protection provisions of 41 U.S.C. § 4712.

4. **Fly America Act.** Any foreign travel funded under this Contract shall be carried out in a manner consistent with the restrictions of the Fly America Act, 40 U.S.C. § 40118. Contractor should contact AURA’s Contracts Officer with any questions regarding compliance.

5. **Domestic Preference to the Extent Practicable.** To the greatest extent practicable for work under this Contract, Contractor shall use goods, manufactured products, or materials produced in the United States. For purposes of this clause, “manufactured products” means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum, plastics and polymer-based products, concrete, glass (including optical fiber), and lumber. For purposes of this clause, “produced in the United States” means, for iron and steel products, that all manufacturing processes, from the initial smelting stage through the application of coatings, occurred in the United States.

For all Construction and Infrastructure Projects

5.1. Build America, Buy America. This Contract is subject to the Build America, Buy America (BABA) Act, 41 USC 8301, and all applicable rules and notices, as may be amended. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this

project must be produced in the United States, as further outlined by the Office of Management and Budget's Memorandum M-24-02, "Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure."

Contractor shall include Manufacturer's Certification for BABA requirements for all BABA-covered items to be incorporated into the infrastructure project. Contractor shall comply with BABA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABA documentation. For any change orders, Contractor shall provide BABA documentation for any new products or materials required by the change. Contractor shall designate the responsible parties for determining the final categorizations for all project items.

6. Certification Regarding Lobbying ("Byrd Anti-Lobbying Amendment"). If this contract exceeds \$100,000, by signature on this Contract, Contractor's representative certifies to the best of his or her knowledge and belief that:

(a) No federal appropriated funds have been paid or will be paid, by or on behalf of Contractor, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

(b) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Contract or the NSF Cooperative Agreement funding this Contract, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(c) Contractor shall require that the language of this certification be included all subcontracts and that all subcontractors shall certify and disclose accordingly.

The above certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. § 1352. Any person who fails to file the required certification may be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

7. Clean Air Act and Clean Water Act. If this Contract is valued in excess of \$150,000, Contractor shall comply with all applicable standards, orders and regulations issued pursuant to the Clean Air Act (42 U.S.C. § 7401 *et seq.*) and Clean Water Act (33 U.S.C. § 1251 *et seq.*). Violations must be reported to AURA, NSF, and the local Regional Office of the Environmental Protection Agency.

8. Debarment. No part of the work shall be subcontracted to parties listed on the General Services Administration's List of Parties Excluded from Federal Procurement or Non-Procurement Programs in accordance with E.O.s 12549 and 12689, "Debarment and Suspension." By signing this contract or performing this purchase order contractor certifies that neither it nor any of its principal employees is on this debarred list. Contractor shall require a similar certification from all firms awarded subcontracts over \$25,000.

10. Assignment/Subcontracting. AURA may assign its rights under this agreement to either the National Science Foundation or to an organization succeeding it as the operator of NOIRLab. Contractor shall not assign or delegate its rights/responsibilities under this agreement without prior written permission from AURA, and any assignment without such permission shall be void. Any assignment with AURA's permission shall not relieve contractor of responsibility for successful performance of the work. Contractor may not subcontract any portion of the work, not including purchases of commercially available items, without prior written permission from AURA.

11. Copeland Anti-Kickback Act. Contractors and subcontractors on public building or public work financed in whole or in Part by Loans or Grants from the United States in excess of \$2,000.00 shall comply 18 USC 874. The Act provides that each contractor or sub-recipient shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he is otherwise entitled. AURA shall report all suspected or reported violations to the Federal awarding agency.

12. Contract Work Hours and Safety Standards Act. In performing the work contractor shall comply with Sections 102 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333), as supplemented by Department of Labor regulations (29 CFR part 5). Under Section 102 of the Act, each contractor shall be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than 1½ times the basic rate of pay for all hours worked in excess of 40 hours-in the work week. Section 107 of the Act is applicable to construction work and provides that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous.

13. Nondiscrimination. This agreement is subject to the provisions of Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d), the regulations issued pursuant thereto by NSF (45 CFR 611), and the Assurance of Compliance which the Contractor has filed with NSF. No person on the basis of race, color, national origin, or handicap shall be excluded from participation in, be denied benefits of, or otherwise be subjected to discrimination under this agreement. In addition, if the project involves an education activity or program, as defined by Title IX of the Education Amendments of 1972 (20 U.S.C. 1681-1686), no person on the basis of sex shall be excluded from participation in the project.

14. Davis-Bacon, as amended (40 U.S.C. 276a to a-7) (applicable to contracts for construction exceeding \$2,000.): All purchase orders for construction shall comply with the

provision titled "Davis-Bacon Act (40 U.S.C. 276A to a-7) and as supplemented by the Department of Labor regulations (29 CFR part 5, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction"). Under this Act, the contract shall be required to pay wages to labor and mechanics at a rate not less than the minimum wages specified in a wage determination made by the Secretary of Labor. In addition, Seller shall be required to pay wages not less than once a week. The Seller shall place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation and the award of a subcontract or purchase order shall be conditioned upon the acceptance of the wage determination. The Seller shall report all suspected or reported violations to AURA.

For Rubin Construction and Operation contracts ONLY

15. Public Relations Activities, News Releases, Media Engagement. When engaging in public relations activities under this award, the Contractor must consider the provisions stated in 2 CFR 200.421 "Advertising and Public Relations," and 2 CFR 200.450 "Lobbying." In addition, the following requirements apply:

1. The Contractor must provide written notice to the AURA Contracts Officer prior to any public relations activities or events concerning the NSF-supported activities.
2. The AURA Contracts Officer or designee must approve all announcements or press releases (including related copies of draft blog posts or draft social media content) prior to final issuance. Advance copies of image releases that include only technical or factual descriptions of the image are not required.
3. The Contractor must provide written notification to AURA within 24 hours of any inquiries made by the media or Congress to the AURA Contracts Officer or designee.

For NOIRLab Base and Gemini contracts ONLY

15. Public Relations Activities, News Releases, Media Engagement. When engaging in public relations activities under this award, the recipient must consider the provisions stated in 2 CFR 200.421 "Advertising and Public Relations," and 2 CFR 200.450 "Lobbying." In addition, the following requirements apply:

1. The Contractor must provide written notice to the AURA Contracts Officer prior to any public relations activities or events concerning the NSF-supported activities.
2. The Contractor must provide draft versions of all announcements and press releases (including related copies of draft blog posts or draft social media content) concerning NSF supported activities to the AURA Contracts Officer. The AURA Contracts Officer or designee must approve all announcements or press releases prior to final issuance. A non-response from AURA within five business days from the date of the initial written notification shall be deemed AURA approval. Advance copies of image releases that include technical or factual descriptions of the image are not required.
3. The Contractor must provide written notification within 24 hours of any inquiries made by the media or Congress to the AURA Contracts Officer or designee.

APPENDIX 3
NONDISCLOSURE AGREEMENT
FORM



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 ▶

Gemini Hilo Base Facility

HBF-X Cooling System Replacement Recommendation



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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1. Project Introduction and Summary

Gemini's Hilo Base Facility had an expansion completed in late 2008, a two-story facility mainly consisting of offices and conference rooms. These spaces are supported by two main split system air conditioning units with condensers located outside and Air Handling Units (AHU) placed in the roof truss space above the second floor. Downstream from the air handling units are Variable Air Volume (VAV) boxes that regulate the airflow to each space depending on the cooling requirements. There are two smaller supplemental air conditioners that support the electrical/server rooms when the main air handling units are not operational. These units have had repairs through the years and recently 3 of the 4 main refrigerant compressors were replaced. The outdoor equipment shows significant signs of decay while the indoor equipment shows minor signs. A building automation system controls all the buildings' air conditioning requirements including maintaining space temperatures, regulating the amount of outside air and controlling the building occupancy schedule.

A third party contractor provided an assessment report on October 17, 2025 noting the facility HVAC system condition. The current condensing units need replacement, but the existing condensers are believed to be oversized. The third party contractor has done a building cooling load calculation and agrees with this assessment.

2. Building Cooling Load Calculations

The third party contractor uses Carrier's Hourly Analysis Program (HAP) to calculate building heating and cooling loads. It can incorporate Heating Ventilation Air Conditioning (HVAC) loads generated by people, lights, electrical equipment, environmental loads through walls and windows including solar loads along with fan heat. A summary of input assumptions is as follows:

- A. Exterior walls – The first floor has 8" concrete block walls without insulation, the second-floor walls have been assumed to be wood stud with R-13 batt insulation. The effective wall insulation value is less than the R-13 value once stud allowance has been applied.
- B. Windows – Are clear single pane units.
- C. Roof – The roof does not have insulation, but insulation has been laid upon the 2nd floor T-bar ceiling tiles, assumed to be R-11. There is a concern that the insulation will be removed to gain access to the ceiling and not be replaced which will reduce insulation effectiveness and not meet the assumed R-value.
- D. Occupants – Most rooms have a single person per workstation applied, some offices had more people added as it was expected meetings would happen within the space.

See Appendix A for people space count. All people are assumed to be in the space all the time.

- E. Lights – Lights were estimated on a watts per square foot basis depending on the occupancy type. The lights are assumed to be on all the time.
- F. Equipment – Occupant workstations are considered to have a laptop, desktop workstation and two large monitors. Conference rooms considered an estimated number of laptop computers and large screen monitors. See Appendix A for equipment loads. All this equipment is assumed to be on 24/7.
- G. Outside Air – Calculated per 2018 International Mechanical Code. Considers the space occupancy type, and uses number of people based on people/sqft and default CFM/sqft, see Appendix B.

Using the above assumptions HAP has calculated the first floor will require 19.9 tons of cooling capacity while the second floor will require 19.4 tons, see Appendix C for calculations. This is less than the previous calculations that had 26.6 tons for the first floor and 24.4 for the second floor. See original drawing (M1.2.2) in Appendix D. While it is not possible to determine the differences between the two calculations, the revised calculations do support the theory that the current HVAC is oversized. This is especially true when you consider the building is currently occupied in the 30% to 40% range, the office lighting turns off when the room is not occupied, not all computers are on, and the outside air ventilation is modulated to meet demand not the maximum design value. The existing first floor condensing unit is rated at 25 tons and is oversized for the cooling load. The existing second floor condensing unit is rated at 21 tons and matches the maximum design load; it is not oversized.

The VAV boxes should have their maximum airflow rates adjusted to the new load calculation values and a minimum value should be set that maintains the AHU fan in a stable part of its fan curve. Most of this activity can be accomplished with changes to set points within the building automation system.

3. HVAC Equipment Replacement Solution

As noted above, the condensers using R22 refrigerant need replacement. New units using this refrigerant are not available. R22 refrigerant was replaced by R410a, and R410a is being replaced by R-32 or R454B. Both new refrigerants are classified as an A2L refrigerant. The main concern with the new refrigerants is they have a low flammability rating which will require additional safety features or monitoring. Previous refrigerants were not considered flammable. A discharge of refrigerant into the occupied space is the main concern if it reaches an ignitable concentration. The solution noted below will require very little additional safety monitoring as a discharge will be spread throughout the building. Newer refrigerants operate at a higher pressure which necessitates the replacement of the R22 coils inside the existing AHU's.

3.1 Selected Solution – Replace the Existing Condensers and AHUs with Multiple Fan Coils

This solution would replace the 2 existing condensers with four 10-ton condensers and the two AHU's with four 10-ton fan coils. Two fan coils will replace each AHU. The fan coils are smaller in footprint and allow for the potential of running only one unit if building loads allow. This may result in energy savings and better dehumidification control. See Appendix F for conceptual demolition and new work plans. This design should enlarge the existing access hatch, so it is large enough to install or remove the new smaller fan coils as a complete unit.

In addition to the main cooling units one of the backup electrical room, 1.5-ton split systems should be replaced. Installation of the unit and fan coil is not expected to be as difficult as the two main AHU coil replacements.

Advantages

- Improved access for maintenance.
- Smaller equipment will be easier to replace.
- May be able to realize additional energy savings when the building is lightly loaded.
- Building will operate as currently designed with small modifications to the sequence of operation.

Disadvantages

- Modifications to duct in attic.
- Modification to roof structure for larger access hatch.

3.2 Additional Scope – Replace Underground Refrigerant Lines

The size of refrigerant liquid and suction lines must be matched to the system's requirements. It is important that the suction line be sized to maintain the correct gas return velocity, this aids in the proper oil return management. Currently there are 6 liquid and suction lines installed. If the new 10-ton condensers are ordered with dual circuits then an additional 4 liquid and suction lines will be required. This estimate has considered the cost to replace 6 liquid and suction lines. This cost may need to be added to Option 1, 2 and 3. See Appendix H for conceptual demolition and new work plans.

Appendix A – Electrical Load Plan



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 PROJECT: MC
 PARTICIPANTS: BLM

REVISIONS
 Δ REVISOR
 Δ DATE

PROJECT NO.: 05961.00
 DATE: 08/22/2006
 PROJECT: MC
 PARTICIPANTS: BLM

SHEET CONTENTS
 UPPER LEVEL
 PLUMBING PLAN

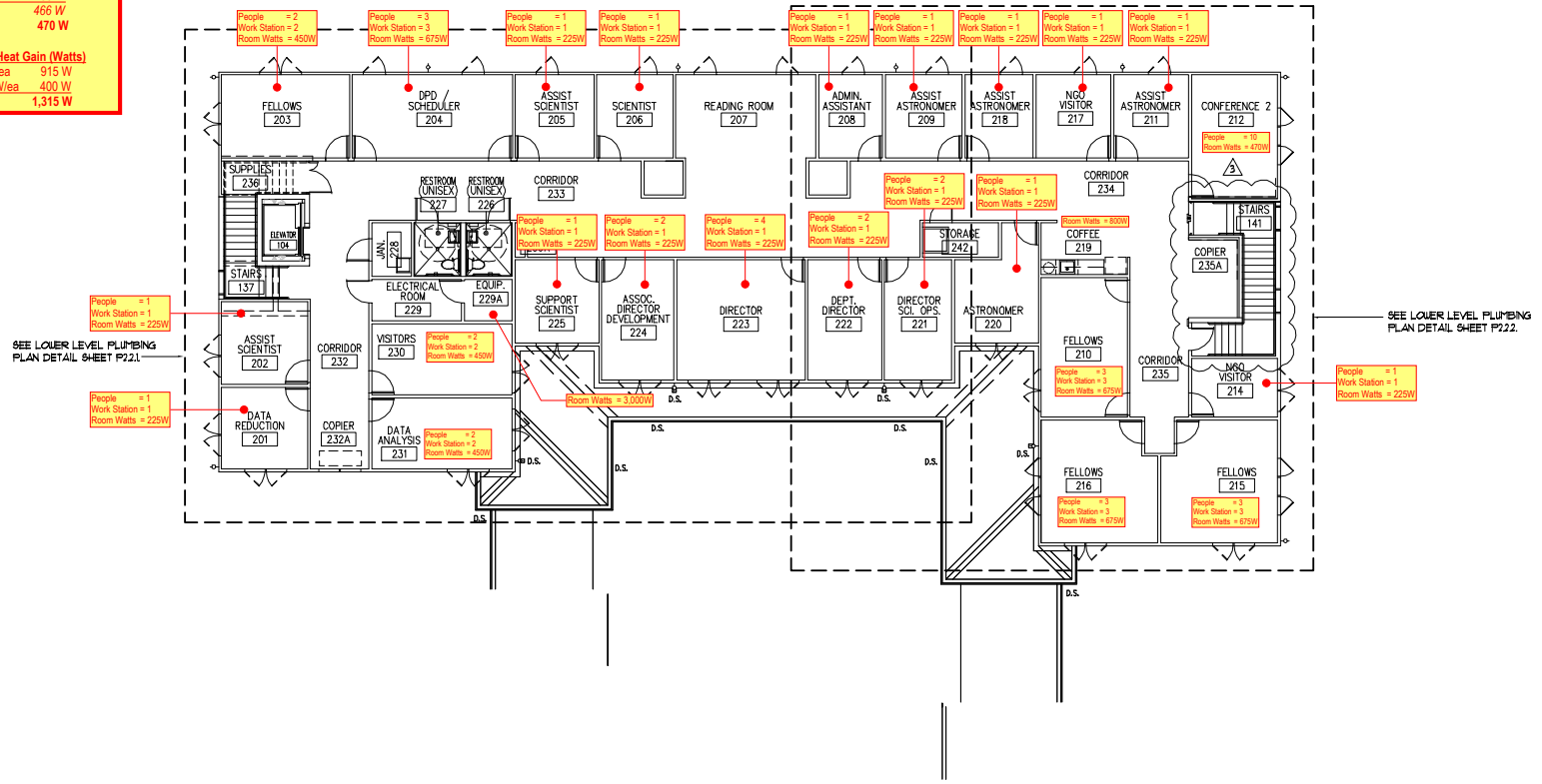
SHEET
P2.1.1

ELECTRICAL HEAT GAINS

Typical Work Station (Watts)
 (1) Work Station (desktop) 82 W
 (1) Laptop 61 W
 (2) Monitors @ 40W/ea 80 W
 Total 223 W
 Used Total 225 W

Small Conference Heat Gain (Watts)
 (6) Laptop @ 61W/ea 366 W
 (1) Monitor 100 W
 Total 466 W
 Used Total 470 W

Large Conference Heat Gain (Watts)
 (15) Laptop @ 61W/ea 915 W
 (4) Monitors @ 100W/ea 400 W
 Total 1,315 W



SEE LOWER LEVEL PLUMBING
 PLAN DETAIL SHEET P221.

SEE LOWER LEVEL PLUMBING
 PLAN DETAIL SHEET P222.

OPERATOR: GEORGE
 DESIGNER: JAMES (JIM) TERRY
 DATE/TIME: APR 27, 2006 11:30:05 AM
 LOCATION: PROJECTS\06085.00 GEMINI BASE FACILITY EXPANSION
 FILE: 06085.00_001003A-PP.DWG



UPPER LEVEL PLUMBING PLAN
 SCALE 1/8" = 1'-0"

Appendix B – Calculations

OUTDOOR AIR CALCULATION (INTERNATIONAL MECHANICAL CODE - 2018)										Ez: ZONE AIR DISTRIBUTION EFFECTIVENESS Per Table 403.3.1.1.2.3.2										Vot: OUTDOOR AIR INTAKE FLOW (CFM) Eq. 4-8 = Vou/Ev										User may input values in IP or SI units, Calculations are done per IMC in IP units									
AZ: ZONE FLOOR AREA (SQFT) OR # OF TOILETS										Pz: Zone population										Vpz: Zone primary airflow (CFM)																			
EA: REQUIRED EXHAUST AIR, PER TABLE 403.3.1.1 (CFM)										Ra: AREA OUTDOOR AIR RATE (CFM/SQFT)										Vou: Uncorrected outdoor air intake Eq 4-6 Vou=D*Sum(Rp*Pz)+Sum(Ra*Az)																			
Evz: ZONE VENTILATION EFFICIENCY. App A Eq A-1 = 1 + Vout / Vps - Voz / Vdz										Rp: PEOPLE OUTDOOR AIR RATE (CFM/PERSON)										Voz: Zone outdoor airflow = Vbz/Ez																			
Ev: =min(Evz)										Vbz: BREATHING ZONE OUTDOOR AIR FLOW (CFM) (Eq. 4-1) =Rp Pz+Ra Az										Vps: System primary airflow																			
BLDG UNIT	ROOM NUM.	ROOM NAME	Units	ft2	cfm	No.	Ez	Actual People	OCCUPANCY CLASSIFICATION	Default Area	Calc Area	Ra	Acfm	Pz	Rp	Rp*Pz	Vbz eq 6-1	Voz	Az	Vpz or Vdz	EA	EA2	Evz	Voz Zone Air	NOTES														
AHU-01	101	ENGINEERING OFFICE	134	393			0.8		Office Spaces	5	0.67	0.06	8.0	0.67	5.0	3.4	11.39	14.2	134.0	393.0			1.03	14.22															
	102	STORAGE	116	352			0.8		Storage Rooms, Occupiable For Dry Materials	2	0.23	0.06	7.0	0.23	5.0	1.2	8.11	10.1	116.0	352.0			1.04	10.13															
	104	ELEVATOR	57	17			0.8		Elevator Car										57.0	17.0	57	57	1.07																
	106	INTERN OFFICE	202	683			0.8		Office Spaces	5	1.01	0.06	12.1	1.01	5.0	5.1	17.17	21.5	202.0	683.0			1.04	21.44															
	107	INTERN OFFICE	254	786			0.8		Office Spaces	5	1.27	0.06	15.2	1.27	5.0	6.4	21.59	27.0	254.0	786.0			1.03	26.96															
	108	INTERN OFFICE	250	776			0.8		Office Spaces	5	1.25	0.06	15.0	1.25	5.0	6.3	21.25	26.6	250.0	776.0			1.03	26.53															
	112	ADMIN. ASSISTANT OFFICE	101	270			0.8		Office Spaces	5	0.51	0.06	6.1	0.51	5.0	2.6	8.61	10.8	101.0	270.0			1.03	10.75															
	113	INTERN OFFICE	124	347			0.8		Office Spaces	5	0.62	0.06	7.4	0.62	5.0	3.1	10.54	13.2	124.0	347.0			1.03	13.16															
	114	ENGINEERING OFFICE	103	276			0.8		Office Spaces	5	0.52	0.06	6.2	0.52	5.0	2.6	8.78	11.0	103.0	276.0			1.03	10.96															
	115	ENGINEERING OFFICE	110	270			0.8		Office Spaces	5	0.55	0.06	6.6	0.55	5.0	2.8	9.35	11.7	110.0	270.0			1.03	11.68															
	116	ENGINEERING OFFICE	122	281			0.8		Office Spaces	5	0.61	0.06	7.3	0.61	5.0	3.1	10.37	13.0	122.0	281.0			1.02	12.95															
	117	ENGINEERING OFFICE	122	280			0.8		Office Spaces	5	0.61	0.06	7.3	0.61	5.0	3.1	10.37	13.0	122.0	280.0			1.02	12.95															
	118	SMALL CONFERENCE RM.	200	594			0.8		Conference Rooms	50	10	0.06	12.0	10.00	5.0	50.0	62.00	77.5	200.0	594.0			0.94	77.42															
	121	CONFERENCE RM.	961	1,388			0.8		Conference Rooms	50	48.05	0.06	57.7	48.05	5.0	240.3	297.91	372.4	961.0	1,388.0			0.80	372.00															
	124	SR ASSISTANT MGR. OFFICE	116	177			0.8		Office Spaces	5	0.58	0.06	7.0	0.58	5.0	2.9	9.86	12.3	116.0	177.0			1.00	12.31															
	125	SR ASSISTANT MGR. OFFICE	114	225			0.8		Office Spaces	5	0.57	0.06	6.8	0.57	5.0	2.9	9.69	12.1	114.0	225.0			1.02	12.10															
	126	SR ASSISTANT MGR. OFFICE	114	224			0.8		Office Spaces	5	0.57	0.06	6.8	0.57	5.0	2.9	9.69	12.1	114.0	224.0			1.02	12.10															
	127	AS. DIRECTOR ENG.	145	237			0.8		Office Spaces	5	0.73	0.06	8.7	0.73	5.0	3.7	12.35	15.4	145.0	237.0			1.00	15.42															
	128	SENIOR ASSISTANT MGR.	114	169			0.8		Office Spaces	5	0.57	0.06	6.8	0.57	5.0	2.9	9.69	12.1	114.0	169.0			1.00	12.10															
	129	SENIOR ASSISTANT MGR.	120	197			0.8		Office Spaces	5	0.6	0.06	7.2	0.60	5.0	3.0	10.20	12.8	120.0	197.0			1.00	12.74															
	130	RESTROOM UNISEX	50	5	1		0.8		Toilet Rooms - Public (Per Wc)										50.0	5.0	70	70	1.07																
	131	RESTROOM UNISEX	52	4	1		0.8		Toilet Rooms - Public (Per Wc)										52.0	4.0	70	70	1.07																
	132	SHOWER	45	4	1		0.8		Shower Room (Per Shower Head)										45.0	4.0	50	50	1.07																
	28	ELECTRICAL	75	28			0.8		Electrical Equipment Rooms			0.06	4.5				4.50	5.6	75.0	28.0			0.87	5.62															
	133A	EQUIPMENT	40	622			0.8		Electrical Equipment Rooms			0.06	2.4				2.40	3.0	40.0	622.0			1.06	3.00															
	134	VISITOR	194	198			0.8		Office Spaces	5	0.97	0.06	11.6	0.97	5.0	4.9	16.49	20.6	194.0	198.0			0.97	20.59															
	135	VISITOR	190	558			0.8		Office Spaces	5	0.95	0.06	11.4	0.95	5.0	4.8	16.15	20.2	190.0	558.0			1.03	20.17															
	137	STAIRS	102	236			0.8		Corridors			0.06	6.1				6.12	7.7	102.0	236.0			1.04	7.64															
	573	CORRIDOR	1,750	573			0.8		Corridors			0.06	105.0				105.00	131.3	1,750.0	573.0			0.84	131.11															
	141	STAIRS	147	222			0.8		Corridors			0.06	8.8				8.82	11.0	147.0	222.0			1.02	11.01															
Totals				6,224	10,392									71.44					718.40	10,392	247	247	0.80																

<-Y to Include ASHRAE + 30% airflow
Minimum O.A. for Un-Occupied bldg -->cfm **361.0**
<Vps>

P Total Zone Occupants (to determine occupant Diversity)
Occupant Diversity = P / SumPz = 100%
<Vps>

Outdoor air per person 12.7 cfm/person
Outdoor air as % of design primary supply air 9%
O.A per unit floor area 0.15 cfm/ft2

O.A.(Vot)	897.06	eq 6-8
	897.06 cfm min required	
SCHED	910	cfm

OUTDOOR AIR CALCULATION (INTERNATIONAL MECHANICAL CODE - 2018)										Ez: ZONE AIR DISTRIBUTION EFFECTIVENESS Per Table 403.3.1.1.2.3.2										Vot: OUTDOOR AIR INTAKE FLOW (CFM) Eq. 4-8 = Vout/Ev										User may input values in IP or SI units. Calculations are done per IMC in IP units									
AZ: ZONE FLOOR AREA (SQFT) OR # OF TOILETS										Pz: Zone population										Vpz: Zone primary airflow (CFM)																			
EA: REQUIRED EXHAUST AIR, PER TABLE 403.3.1.1 (CFM)										Ra: AREA OUTDOOR AIR RATE (CFM/SQFT)										Vou: Uncorrected outdoor air intake Eq 4-6 Vout=D*Sum(Rp*Pz)+Sum(Ra*Az)																			
Evz: ZONE VENTILATION EFFICIENCY, App A Eq A-1 = 1 + Vout / Vps - Voz / Vdz										Rp: PEOPLE OUTDOOR AIR RATE (CFM/PERSON)										Voz: Zone outdoor airflow = Vbz/Ez																			
Ev: =min(Evz)										Vbz: BREATHING ZONE OUTDOOR AIR FLOW (CFM) (Eq. 4-1) =Rp Pz+Ra Az										Vps: System primary airflow																			
BLDG UNIT	ROOM NUM.	ROOM NAME	Area	Flow Rate	No.	Ez	Actual People	OCCUPANCY CLASSIFICATION	Default Area	Calc Area	Ra	Acfm	Pz	Rp	Rp*Pz	Vbz eq 6-1	Voz	Az	Vpz or Vdz	EA	EA2	Evz	Voz Zone Air	NOTES															
AHU-02	104	ELEVATOR	66	16		0.8		Elevator Car										66.0	16.0	66	66	1.05																	
	137	STAIRS	103	111		0.8		Corridors			0.06	6.2					6.18	7.7	103.0	111.0			0.98	18.02															
	141	STAIRS	175	154		0.8		Corridors			0.06	10.5					10.50	13.1	175.0	154.0			0.97	30.61															
	201	DATA REDUCTION	134	426		0.8		Office Spaces	5	0.67	0.06	8.0	0.67	5.0	3.4		11.39	14.2	134.0	426.0			1.02	33.20															
	202	ASSISTANT SCIENTIST	138	325		0.8		Office Spaces	5	0.69	0.06	8.3	0.69	5.0	3.5		11.73	14.7	138.0	325.0			1.01	34.19															
	203	FELLOWS	200	532		0.8		Office Spaces	5	1	0.06	12.0	1.00	5.0	5.0		17.00	21.3	200.0	532.0			1.01	49.56															
	204	DPD SCHEDULER	251	544		0.8		Office Spaces	5	1.26	0.06	15.1	1.26	5.0	6.3		21.36	26.7	251.0	544.0			1.00	62.27															
	205	ASSISTANT SCIENTIST	125	245		0.8		Office Spaces	5	0.63	0.06	7.5	0.63	5.0	3.2		10.65	13.3	125.0	245.0			1.00	31.05															
	206	SCIENTIST	121	243		0.8		Office Spaces	5	0.61	0.06	7.3	0.61	5.0	3.1		10.31	12.9	121.0	243.0			1.00	30.06															
	208	ADMIN ASSISTANT	104	126		0.8		Office Spaces	5	0.52	0.06	6.2	0.52	5.0	2.6		8.84	11.1	104.0	126.0			0.96	25.77															
	209	ASSIST ASTRONOMER	124	242		0.8		Office Spaces	5	0.62	0.06	7.4	0.62	5.0	3.1		10.54	13.2	124.0	242.0			1.00	30.73															
	210	FELLOWS	230	445		0.8		Office Spaces	5	1.15	0.06	13.8	1.15	5.0	5.8		19.55	24.4	230.0	445.0			1.00	56.99															
	211	ASSISTANT ASTRONOMER	120	244		0.8		Office Spaces	5	0.6	0.06	7.2	0.60	5.0	3.0		10.20	12.8	120.0	244.0			1.00	29.73															
	212	CONFERENCE	201	512		0.8		Conference Rooms	50	10.05	0.06	12.1	10.05	5.0	50.3		62.31	77.9	201.0	512.0			0.90	181.64															
	214	AREA OF RESCUER ASSISTANC	96	210		0.8		Office Spaces	5	0.48	0.06	5.8	0.48	5.0	2.4		8.16	10.2	96.0	210.0			1.00	23.79															
	215	FELLOWS	259	488		0.8		Office Spaces	5	1.3	0.06	15.5	1.30	5.0	6.5		22.04	27.6	259.0	488.0			1.00	64.25															
	216	FELLOWS	259	629		0.8		Office Spaces	5	1.3	0.06	15.5	1.30	5.0	6.5		22.04	27.6	259.0	629.0			1.01	64.25															
	217	NGO VISITOR	122	243		0.8		Office Spaces	5	0.61	0.06	7.3	0.61	5.0	3.1		10.37	13.0	122.0	243.0			1.00	30.23															
	218	ASSISTANT ASTRONOMER	110	130		0.8		Office Spaces	5	0.55	0.06	6.6	0.55	5.0	2.8		9.35	11.7	110.0	130.0			0.96	27.26															
	220	ASTRONOMER	163	345		0.8		Office Spaces	5	0.82	0.06	9.8	0.82	5.0	4.1		13.88	17.4	163.0	345.0			1.00	40.46															
	221	DIRECTOR SCI OPS.	156	364		0.8		Office Spaces	5	0.78	0.06	9.4	0.78	5.0	3.9		13.26	16.6	156.0	364.0			1.01	38.66															
	222	DEPT. DIRECTOR	171	370		0.8		Office Spaces	5	0.86	0.06	10.3	0.86	5.0	4.3		14.56	18.2	171.0	370.0			1.00	42.44															
	223	DIRECTOR	293	667		0.8		Office Spaces	5	1.47	0.06	17.6	1.47	5.0	7.4		24.93	31.2	293.0	667.0			1.01	72.67															
	224	ASSOC. DIRECTOR DEVELOPM	167	368		0.8		Office Spaces	5	0.84	0.06	10.0	0.84	5.0	4.2		14.22	17.8	167.0	368.0			1.00	41.45															
	225	SUPPORT SCIENTIST	137	284		0.8		Office Spaces	5	0.69	0.06	8.2	0.69	5.0	3.5		11.67	14.6	137.0	284.0			1.00	34.02															
	226	RESTROOM UNISEX	51	10	1	0.8		Toilet Rooms - Public (Per Wc)										51.0	10.0		70	70	1.05																
	227	RESTROOM UNISEX	51	9	1	0.8		Toilet Rooms - Public (Per Wc)										51.0	9.0		70	70	1.05																
	228	JANITOR	44	11		0.8		Janitor Closets, Trash Rooms, Recycling										44.0	11.0		44	44	1.05																
	229	ELECTRICAL	75	40		0.8		Electrical Equipment Rooms			0.06	4.5					4.50	5.6	75.0	40.0			0.91	13.12															
	229A	EQUIPMENT	39	618		0.8		Electrical Equipment Rooms			0.06	2.3					2.34	2.9	39.0	618.0			1.05	6.82															
	230	VISITOR	193	211		0.8		Office Spaces	5	0.97	0.06	11.6	0.97	5.0	4.9		16.43	20.5	193.0	211.0			0.95	47.90															
	231	DATA ANALYSIS	189	429		0.8		Office Spaces	5	0.95	0.06	11.3	0.95	5.0	4.8		16.09	20.1	189.0	429.0			1.01	46.90															
	234	CORRIDOR	2,105	987		0.8		Corridors			0.06	126.3					126.30	157.9	2,105.0	987.0			0.89	368.18															
	236	SUPPLIES	57	35		0.8		Storage Rooms			0.12	6.8					6.84	8.6	57.0	35.0			0.81	19.94															
	242	STORAGE	52	11		0.8		Storage Rooms			0.12	6.2					6.24	7.8	52.0	11.0			0.34	18.19															
Totals			6,881	10,624								29.42					553.78	10,624	250	250			0.34																

Minimum O.A. for Un-Occupied bldg -->cfm **406.6**

Occupant Diversity = P / SumPz = 100%

Outdoor air per person 55.4 cfm/person Outdoor air as % of design primary supply air 15% O.A per unit floor area 0.24 cfm/ft2

O.A.(Vot)	1,614.36	eq 6-8
	1614.36 cfm min required	
SCHED	1,631	cfm

Appendix C – HAP Design Load Reports

Air System Sizing Summary for AHU 1 - Lower Level (In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

12/01/2025

9:36 AM

Air System Information

Air System Name	AHU 1 - Lower Level	Number of zones	1
Equipment Class	SPLT AHU	Floor Area	6232.1 sqft
Air System Type	SZCAV	Location	Hilo Intl, HI, USA

Sizing Calculation Information

Calculation Months	Jan to Dec	Zone CFM Sizing	Sum of space airflow rates
Sizing Data	Calculated	Space CFM Sizing	Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load	19.9 Tons	Peak coil load occurs at	August 17:00
Total coil load	239.2 MBH	OA DB / WB	83.9 / 73.5 F
Sensible coil load	191.8 MBH	Entering DB / WB	75.8 / 66.0 F
Coil CFM at peak load	10390 CFM	Leaving DB / WB	59.0 / 58.8 F
Sum of peak zone CFM	10390 CFM	Resulting RH	60 %
Sensible heat ratio	0.802	Design supply temp.	58.0 F
CFM/Ton	521.3	Zone T-stat Check	1 of 1 OK
sqft/Ton	312.7	Max zone temperature deviation	0.0 F
BTU/(hr sqft)	38.4		
Water flow @ 10.0 F rise	N/A		

Central Heating Coil Sizing Data

Max coil load	17.9 MBH	Load occurs at	Design Heating
Coil CFM at Design Heating	10390 CFM	BTU/(hr sqft)	2.9
Max coil CFM	10390 CFM	Ent. DB / Lvg DB	69.3 / 70.8 F
Water flow @ 20.0 F drop	N/A		

Supply Fan Sizing Data

Design CFM	10390 CFM	Fan motor BHP	8.54 BHP
Design CFM/sqft	1.67 CFM/sqft	Fan motor kW	6.77 kW
		Fan total static	3.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM	910 CFM	CFM/person	12.13 CFM/person
CFM/sqft	0.15 CFM/sqft		

Zone Sizing Summary for AHU 1 - Lower Level

(In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

12/01/2025

9:36 AM

Air System Information

Air System Name AHU 1 - Lower Level	Number of zones 1
Equipment Class SPLT AHU	Floor Area 6232.1 sqft
Air System Type SZCAV	Location Hilo Intl, HI, USA

Sizing Calculation Information

Calculation Months Jan to Dec	Zone CFM Sizing Sum of space airflow rates
Sizing Data Calculated	Space CFM Sizing Individual peak space loads

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/sqft	Reheat Coil Capacity (MBH)	Reheat Coil Water gpm @ 20.0 F	Zone Htg Unit Coil Capacity (MBH)	Zone Htg Unit Water gpm @ 20.0 F	Mixing Box Fan Airflow (CFM)
AHU 1 - Lower Level	10390	10390	1.67	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (sqft)
AHU 1 - Lower Level	163.6	August 17:00	28.8	6232.1

Zone Sizing Summary for AHU 1 - Lower Level

(In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

12/01/2025

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Space Loads and Airflows

Zone Name / Space Name	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (sqft)	Space CFM/sqft
<i>AHU 1 - Lower Level</i>						
101 ENGINEER	7.2	December 14:00	393	1.5	133.8	2.94
102 STORAGE	6.5	December 14:00	352	0.7	116.4	3.02
104 ELEVATOR	0.3	November 10:00	17	0.1	57.7	0.29
106 INTERNS	12.5	December 16:00	683	1.8	202.5	3.37
107 INTERNS	14.4	August 17:00	786	1.5	254.3	3.09
108 INTERNS	14.2	September 17:00	776	1.4	249.7	3.11
112 ADMIN. ASSISTANT	4.9	September 17:00	270	0.7	101.7	2.65
113 INTERNS	6.4	September 17:00	347	0.7	124.7	2.78
114 ENGINEER	5.1	September 17:00	276	0.7	103.2	2.67
115 ENGINEER	5.0	September 17:00	270	0.6	110.6	2.44
116 ENGINEER	5.1	September 17:00	281	0.7	122.6	2.29
117 ENGINEER	5.1	September 17:00	280	0.7	121.9	2.30
118 SMALL CONFERENCE	10.9	June 17:00	594	1.7	199.8	2.97
121 CONFERENCE	25.4	June 16:00	1388	5.0	961.7	1.44
124 SENIOR ASSISTANT MANAGER	3.3	June 12:00	177	0.7	116.0	1.53
125 SENIOR ASSISTANT MANAGER	4.1	June 7:00	225	0.5	114.3	1.97
126 SENIOR ASSISTANT MANAGER	4.1	June 7:00	224	0.6	114.5	1.96
127 ASSPCOATE DORECTPR EMGOMEER	4.3	June 7:00	237	0.7	145.8	1.62
128 SENIOR ASSISTANT MANAGER	3.1	August 9:00	169	0.5	114.5	1.48
129 SENIOR ASSISTANT MANAGER	3.6	June 9:00	197	0.5	120.8	1.63
130 RESTROOM UNISEX	0.1	July 19:00	5	0.0	50.3	0.10
131 RESTROOM UNISEX	0.1	August 20:00	4	0.0	51.9	0.08
132 SHOWER	0.1	August 19:00	4	0.0	44.8	0.09
133 ELEC.	0.5	August 18:00	28	0.0	76.0	0.37
133A EQUIP.	11.4	July 16:00	622	0.1	39.6	15.73
134 VISITOR	3.6	July 15:00	198	0.6	193.6	1.02
135 VISITOR	10.2	July 10:00	558	2.0	189.4	2.95
137 STAIRS	4.3	December 15:00	236	1.0	102.8	2.29
140 CORRIDOR	10.5	August 16:00	573	2.5	1750.2	0.33
141 STAIRS	4.1	June 18:00	222	1.4	146.9	1.51

Air System Heat Balance Summary for AHU 1 - Lower Level

(In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

12/01/2025

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Table 1. System Loads

COMPONENT LOADS	DESIGN COOLING - AUGUST 17:00			DESIGN HEATING		
	OA DB / WB 83.9 F / 73.5 F			OA DB / WB 61.6 F / 51.5 F		
	Details	Sensible [BTU/hr]	Latent [BTU/hr]	Details	Sensible [BTU/hr]	Latent [BTU/hr]
Zone Conditioning	-	159701	26676	-	32691	0
Plenum Load	-	0	0	-	0	0
Return Fan Load	9480 CFM	0	-	9480 CFM	0	-
Ventilation Load	910 CFM	8605	18778	910 CFM	8244	0
Supply Fan Load	10390 CFM	23103	-	10390 CFM	-23103	-
Zone Fan Coil Fans Load	-	0	-	-	0	-
>> Total System Loads	-	191409	45453	-	17832	0
Central Cooling Coil	-	191827	47334	-	0	0
Central Heating Coil	-	0	-	-	17940	-
>> Total Conditioning	-	191827	47334	-	17940	0
Key:	Positive values are cooling loads Negative values are heating loads			Positive values are heating loads Negative values are cooling loads		

Table 2. Zone Heat Balance Loads

Zone Heat Balance Component	DESIGN COOLING - AUGUST 17:00			DESIGN HEATING		
	OA DB / WB 83.9 F / 73.5 F			OA DB / WB 61.6 F / 51.5 F		
	Details	Sensible [BTU/hr]	Latent [BTU/hr]	Details	Sensible [BTU/hr]	Latent [BTU/hr]
Exterior Wall Convection	3626 sqft	35256	-	3626 sqft	6616	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	545 sqft	4465	-	545 sqft	1834	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	146 sqft	813	-	146 sqft	324	-
Floor Convection	6232 sqft	18717	-	6232 sqft	4656	-
Interior Wall Convection	12167 sqft	27835	-	12167 sqft	3332	-
Ceiling Convection	6232 sqft	19910	-	6232 sqft	2896	-
Overhead Lighting Convection	1997 W	1736	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	11760 W	30095	-	0 W	0	-
People Convection	75	5513	15375	0	0	0
Infiltration	474 CFM	4382	9623	474 CFM	4367	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0	-	-	0	0
Safety Factor	10% / 10%	14872	2500	20%	4805	0
>> Total Zone Loads	-	163593	27498	-	28831	0
Key:	Positive values are cooling loads Negative values are heating loads			Positive values are heating loads Negative values are cooling loads		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Air System Sizing Summary for AHU 2 - Upper Level (In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

12/01/2025

9:36 AM

Air System Information

Air System Name	AHU 2 - Upper Level	Number of zones	1
Equipment Class	SPLT AHU	Floor Area	6891.9 sqft
Air System Type	SZCAV	Location	Hilo Intl, HI, USA

Sizing Calculation Information

Calculation Months	Jan to Dec	Zone CFM Sizing	Sum of space airflow rates
Sizing Data	Calculated	Space CFM Sizing	Individual peak space loads

Central Cooling Coil Sizing Data

Total coil load	19.4 Tons	Peak coil load occurs at	August 15:00
Total coil load	233.2 MBH	OA DB / WB	85.7 / 74.0 F
Sensible coil load	180.7 MBH	Entering DB / WB	76.6 / 67.5 F
Coil CFM at peak load	10624 CFM	Leaving DB / WB	61.2 / 60.9 F
Sum of peak zone CFM	10624 CFM	Resulting RH	63 %
Sensible heat ratio	0.775	Design supply temp.	58.0 F
CFM/Ton	546.7	Zone T-stat Check	1 of 1 OK
sqft/Ton	354.7	Max zone temperature deviation	0.0 F
BTU/(hr sqft)	33.8		
Water flow @ 10.0 F rise	N/A		

Central Heating Coil Sizing Data

Max coil load	14.5 MBH	Load occurs at	Design Heating
Coil CFM at Design Heating	10624 CFM	BTU/(hr sqft)	2.1
Max coil CFM	10624 CFM	Ent. DB / Lvg DB	68.7 / 70.0 F
Water flow @ 20.0 F drop	N/A		

Supply Fan Sizing Data

Design CFM	10624 CFM	Fan motor BHP	8.73 BHP
Design CFM/sqft	1.54 CFM/sqft	Fan motor kW	6.92 kW
		Fan total static	3.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM	1631 CFM	CFM/person	32.62 CFM/person
CFM/sqft	0.24 CFM/sqft		

Zone Sizing Summary for AHU 2 - Upper Level

(In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

12/01/2025

9:36 AM

Air System Information

Air System Name **AHU 2 - Upper Level**
 Equipment Class **SPLT AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **6891.9** sqft
 Location **Hilo Intl, HI, USA**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone CFM Sizing **Sum of space airflow rates**
 Space CFM Sizing **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/sqft	Reheat Coil Capacity (MBH)	Reheat Coil Water gpm @ 20.0 F	Zone Htg Unit Coil Capacity (MBH)	Zone Htg Unit Water gpm @ 20.0 F	Mixing Box Fan Airflow (CFM)
AHU 2 - Upper Level	10624	10624	1.54	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (sqft)
AHU 2 - Upper Level	141.1	July 16:00	20.5	6891.9

Zone Sizing Summary for AHU 2 - Upper Level

(In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

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Space Loads and Airflows

Zone Name / Space Name	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (sqft)	Space CFM/sqft
<i>AHU 2 - Upper Level</i>						
104 ELEVATOR	0.3	December 13:00	16	0.1	66.0	0.24
137 STAIR	2.0	December 12:00	111	0.4	103.1	1.07
141 STAIRS	2.8	June 17:00	154	0.8	175.5	0.88
201 DATA REDUCTION	7.8	February 9:00	426	1.0	133.8	3.18
202 ASSIST SCIENTIST	6.0	December 11:00	325	0.5	138.4	2.35
203 FELLOWS	9.8	December 15:00	532	1.1	200.5	2.65
204 DPD SCHEDULER	10.0	September 16:00	544	0.9	251.6	2.16
205 ASSIST SCIENTIST	4.5	September 16:00	245	0.4	125.1	1.96
206 SCIENTIST	4.5	September 16:00	243	0.4	121.4	2.00
208 ADMIN. ASSISTANT	2.3	August 17:00	126	0.3	104.1	1.21
209 ASSIST ASTRONOMER	4.4	September 16:00	242	0.4	123.9	1.96
210 FELLOWS	8.2	December 11:00	445	0.5	229.9	1.94
211 ASSIST ASTRONOMER	4.5	September 16:00	244	0.4	120.6	2.02
212 CONFERENCE	9.4	June 17:00	512	1.0	201.1	2.54
214 AREA OF RESCUE ASSISTANCE ROOM	3.8	June 17:00	210	0.4	96.9	2.17
215 FELLOWS	9.0	July 8:00	488	1.3	259.3	1.88
216 FELLOWS	11.5	December 9:00	629	1.3	259.6	2.42
217 NGO VISITOR	4.5	September 16:00	243	0.4	122.0	1.99
218 ASSOST ASTRPMP,ER	2.4	August 17:00	130	0.3	110.0	1.18
220 ASTRONOMER	6.3	August 9:00	345	0.5	163.4	2.11
221 DIRECTOR SCI. OPS.	6.7	June 8:00	364	0.6	156.8	2.32
222 DEPT. DIRECTOR	6.8	June 8:00	370	0.5	171.9	2.15
223 DIRECTOR	12.2	June 8:00	667	1.0	293.1	2.28
224 ASSOC. DIRECTOR DEVELOPEMENT	6.7	August 8:00	368	0.6	167.5	2.20
225 SUPPORT SCIENTIST	5.2	June 7:00	284	0.5	137.3	2.07
226 RESTROOM UNISEX	0.2	July 17:00	11	0.1	50.2	0.22
227 RESTROOM UNISEX	0.2	July 17:00	10	0.1	51.1	0.20
228 JANITOR	0.2	August 17:00	9	0.1	44.6	0.19
229 ELECTRICAL	0.7	July 16:00	40	0.1	75.4	0.53
229A EQUIP.	11.3	July 16:00	618	0.0	39.5	15.62
230 VISITIOR	3.9	July 14:00	211	0.4	193.4	1.09
231 DATA ANALYSIS	7.9	July 8:00	429	1.1	189.4	2.27
234 CORRIDOR	18.1	August 16:00	987	2.8	2105.6	0.47
236 SUPPLIES	0.6	November 13:00	35	0.1	57.4	0.61
242 STORAGE	0.2	July 17:00	11	0.1	52.3	0.20

Air System Heat Balance Summary for AHU 2 - Upper Level

(In Alternative: HFB-X Building 2)

Project: 250296 - HFB-X Cooling System Replacement(converted)

12/01/2025

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Table 1. System Loads

COMPONENT LOADS	DESIGN COOLING - AUGUST 15:00			DESIGN HEATING		
	OA DB / WB 85.7 F / 74.0 F			OA DB / WB 61.6 F / 51.5 F		
	Details	Sensible [BTU/hr]	Latent [BTU/hr]	Details	Sensible [BTU/hr]	Latent [BTU/hr]
Zone Conditioning	-	137747	20314	-	23149	0
Plenum Load	-	0	0	-	0	0
Return Fan Load	8993 CFM	0	-	8993 CFM	0	-
Ventilation Load	1631 CFM	18598	28149	1631 CFM	14776	0
Supply Fan Load	10624 CFM	23623	-	10624 CFM	-23623	-
Zone Fan Coil Fans Load	-	0	-	-	0	-
>> Total System Loads	-	179968	48462	-	14302	0
Central Cooling Coil	-	180726	52445	-	0	0
Central Heating Coil	-	0	-	-	14496	-
>> Total Conditioning	-	180726	52445	-	14496	0
Key:	Positive values are cooling loads Negative values are heating loads			Positive values are heating loads Negative values are cooling loads		

Table 2. Zone Heat Balance Loads

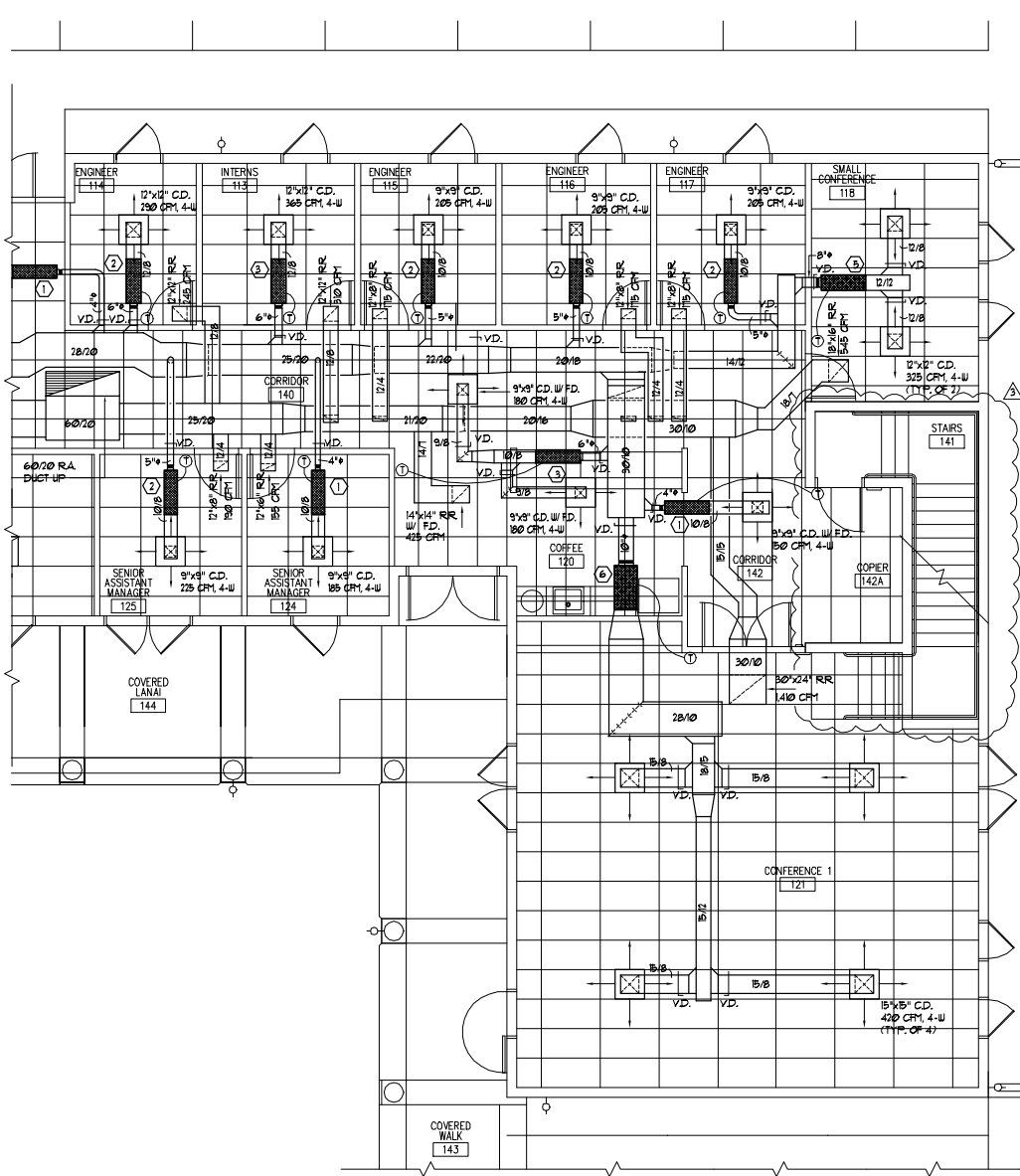
Zone Heat Balance Component	DESIGN COOLING - AUGUST 15:00			DESIGN HEATING		
	OA DB / WB 85.7 F / 74.0 F			OA DB / WB 61.6 F / 51.5 F		
	Details	Sensible [BTU/hr]	Latent [BTU/hr]	Details	Sensible [BTU/hr]	Latent [BTU/hr]
Exterior Wall Convection	3423 sqft	12380	-	3423 sqft	2245	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	678 sqft	4639	-	678 sqft	2157	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	0 sqft	0	-	0 sqft	0	-
Floor Convection	6892 sqft	20877	-	6892 sqft	1912	-
Interior Wall Convection	14849 sqft	23326	-	14849 sqft	3444	-
Ceiling Convection	6900 sqft	24253	-	6900 sqft	3193	-
Overhead Lighting Convection	1992 W	1563	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	12020 W	30760	-	0 W	0	-
People Convection	50	3675	10250	0	0	0
Infiltration	451 CFM	4983	9204	451 CFM	4169	0
Miscellaneous Equipment	-	0	0	-	0	0
Air Internal Energy Change	-	0	-	-	0	0
Safety Factor	10% / 10%	12646	1945	20%	3424	0
>> Total Zone Loads	-	139103	21399	-	20544	0
Key:	Positive values are cooling loads Negative values are heating loads			Positive values are heating loads Negative values are cooling loads		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Appendix D – M1.2.2 Drawing



LOWER LEVEL PARTIAL AIR CONDITIONING PLAN DETAIL
 SCALE 1/4" = 1'-0"

Air System Sizing Summary for Second Floor
 Project Name: Gemini Base Facility Expansion
 Prepared by: M2I International, Inc. 05/12/2006 07:27:26

Air System Information		Second Floor	Number of zones	28
Air System Name		SPLIT AHU	Floor Area	7016.8 sq ft
Equipment Class		VAV		
Sizing Calculation Information		Zone and Space Sizing Method	Zone CFM	Peak zone sensible load
Zone CFM		Space CFM	Calculation Months	Jan to Dec
Sizing Data		Individual peak space loads	Spring Data	Calculated
Central Cooling Coil Sizing Data		Total coil load	74.4 Tons	Load outside at
Total coil load		282.3 MSH	OA DB / WB	36 / 100 °F
Total coil load		282.3 MSH	Chilled coil WB	57.7 / 71.5 °F
Cooling coil load		189.9 CFM	Leaving DB / WB	75.1 / 82.8 °F
Cooling coil load		189.9 CFM	Leaving DB / WB	53.8 / 52.4 °F
Cooling coil load		189.9 CFM	Coil ADP	81.2 °F
Cooling coil load		189.9 CFM	Supply Factor	0.96
Cooling coil load		189.9 CFM	Return Air	45 %
Cooling coil load		189.9 CFM	Change supply temp	35.3 °F
Cooling coil load		189.9 CFM	Zone T-Stat Control	17 of 28 OC
Cooling coil load		189.9 CFM	Min supply temperature deviation	11.3 °F
Supply Fan Sizing Data		Actual max CFM at 0.4 in. static	1968 CFM	Fan motor BHP
Standard CFM		1894 CFM	Fan motor kW	4.78 kW
Actual max CFM		1.98 CFM/sq ft	Fan static	2.90 in w.g.
Outdoor Ventilation Air Data		Design airflow CFM	822 CFM	CFM/person
Design airflow CFM		6.12 CFM/sq ft	CFM/person	15.86 CFM/person

Air System Sizing Summary for First Floor
 Project Name: Gemini Base Facility Expansion
 Prepared by: M2I International, Inc. 05/12/2006 07:29:54

Air System Information		First Floor	Number of zones	28
Air System Name		SPLIT AHU	Floor Area	3863.8 sq ft
Equipment Class		VAV		
Sizing Calculation Information		Zone and Space Sizing Method	Zone CFM	Peak zone sensible load
Zone CFM		Space CFM	Calculation Months	Jan to Dec
Sizing Data		Individual peak space loads	Spring Data	Calculated
Central Cooling Coil Sizing Data		Total coil load	28.8 Tons	Load outside at
Total coil load		28.8 MSH	OA DB / WB	36 / 100 °F
Total coil load		28.8 MSH	Chilled coil WB	54.6 / 73.9 °F
Cooling coil load		192.5 CFM	Leaving DB / WB	75.1 / 82.8 °F
Cooling coil load		192.5 CFM	Leaving DB / WB	53.8 / 52.4 °F
Cooling coil load		192.5 CFM	Coil ADP	81.2 °F
Cooling coil load		192.5 CFM	Supply Factor	0.96
Cooling coil load		192.5 CFM	Return Air	45 %
Cooling coil load		192.5 CFM	Change supply temp	35.3 °F
Cooling coil load		192.5 CFM	Zone T-Stat Control	12 of 28 OC
Cooling coil load		192.5 CFM	Min supply temperature deviation	6.1 °F
Supply Fan Sizing Data		Actual max CFM at 0.4 in. static	1025 CFM	Fan motor BHP
Standard CFM		1026 CFM	Fan motor kW	3.87 kW
Actual max CFM		1.75 CFM/sq ft	Fan static	2.00 in w.g.
Outdoor Ventilation Air Data		Design airflow CFM	462 CFM	CFM/person
Design airflow CFM		6.98 CFM/sq ft	CFM/person	15.86 CFM/person

VAV DAMPER SCHEDULE					
UNIT NO.	NOMINAL AIR FLOW (CFM)	INLET SIZE (IN.)	DIMENSIONS (IN.)		
			PLENUM HEIGHT	PLENUM WIDTH	DISCHARGE WIDTH x HEIGHT
1	200 CFM	4 ROUND	12 1/2	10 1/2	10 1/2 x 12 1/2
2	350 CFM	5 ROUND	12 1/2	10 1/2	10 1/2 x 12 1/2
3	500 CFM	6 ROUND	12 1/2	10 1/2	10 1/2 x 12 1/2
4	650 CFM	7 ROUND	12 1/2	12 1/2	12 1/2 x 12 1/2
5	800 CFM	8 ROUND	12 1/2	12 1/2	12 1/2 x 12 1/2
6	1300 CFM	10 ROUND	12 1/2	14 1/2	14 1/2 x 12 1/2

- NOTE:**
- PROVIDE LOCKING COVERS ON ALL THERMOSTATS.
 - VOLUME DAMPERS SHALL BE PROVIDED FOR EACH DIFFUSER, RETURN REGISTER AND EXHAUST REGISTER.

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.
GEMINI OBSERVATORY
 HILO BASE FACILITY EXPANSION
 HILLO, HAWAII
 2004-07-01 10:00 AM



DURRANT Media Five

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CONSULTANT:

REVISIONS
 REVISED FLOOR PLAN

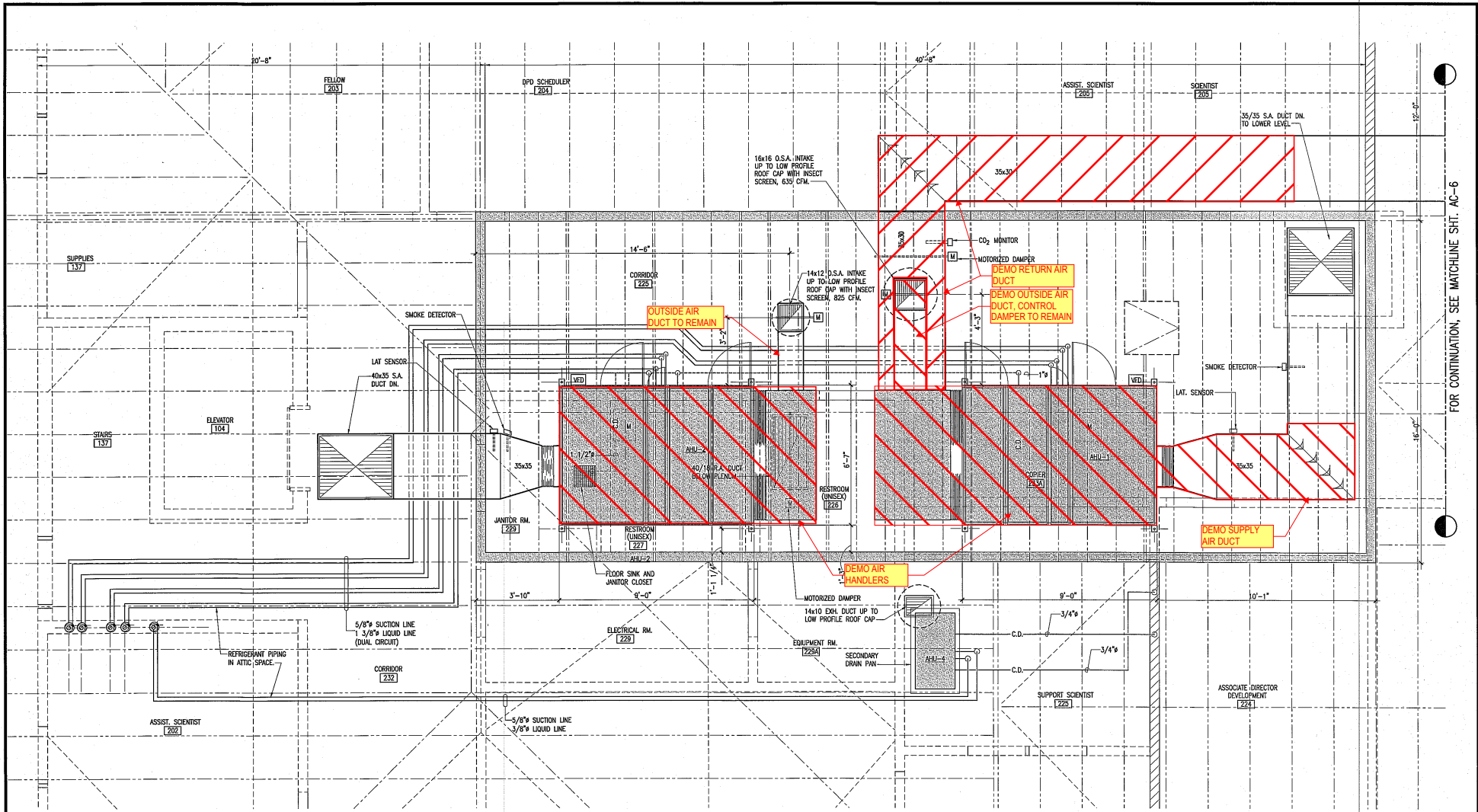
PROJECT NO.: 050510
 DATE: 05/2/2006
 PROJECT DIRECTOR: MC
 PARTICIPANTS: BLM

SHEET CONTENTS
 LOWER LEVEL PARTIAL AIR CONDITIONING PLAN DETAIL

8/05/07
M1.2.2

Appendix E – REMOVED

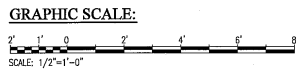
Appendix F – Replace the Existing Condensers and AHUs with Multiple Fan Coils



FOR CONTINUATION, SEE MATCHLINE SHIT. AC-6

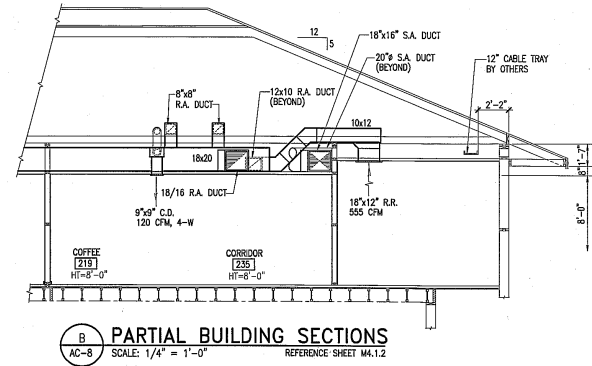
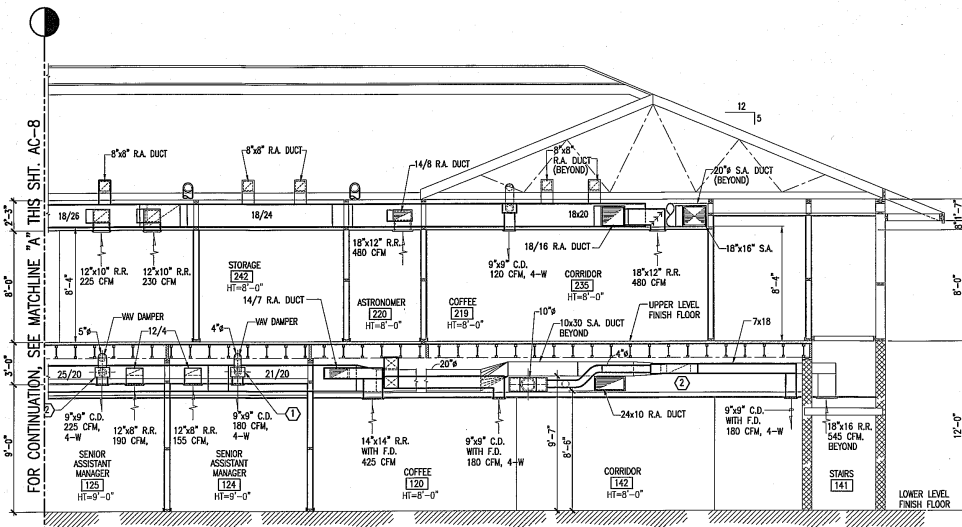
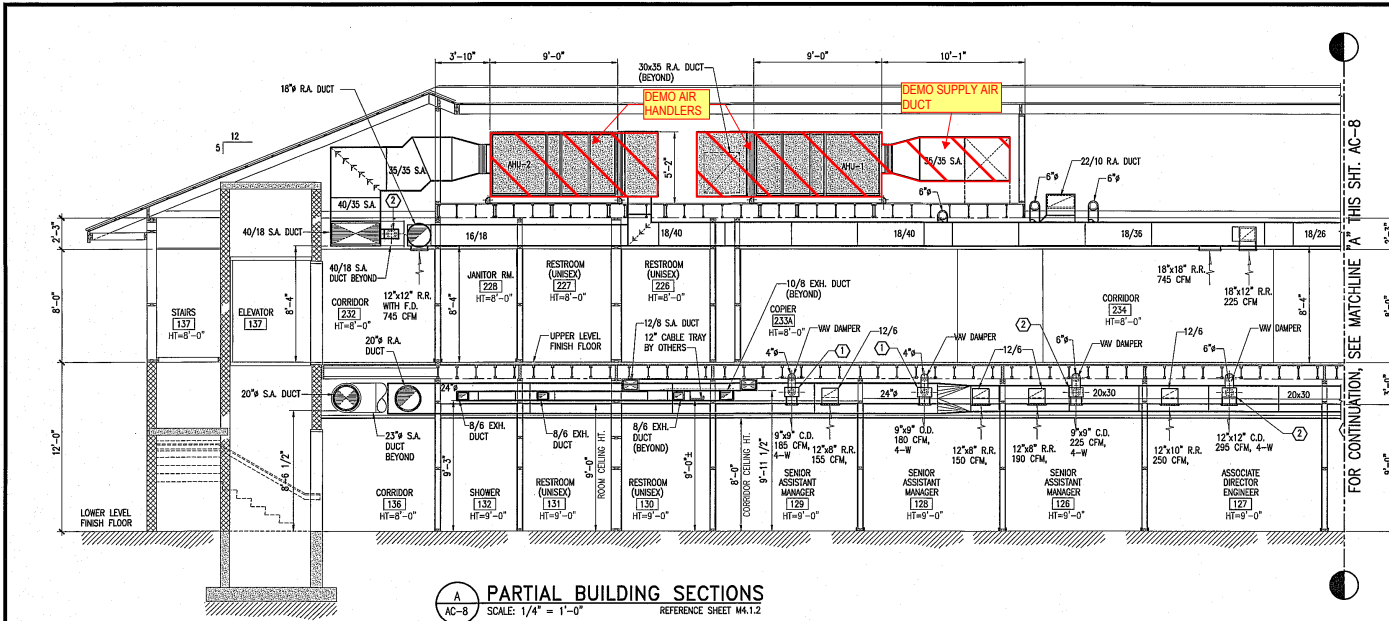
UPPER LEVEL PARTIAL AIR CONDITIONING PLAN DETAIL
 SCALE: 1/2" = 1'-0" REFERENCE SHEET M3.1.1

AS BUILT
 OCTOBER 23, 2008



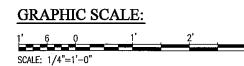
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		DRAWING TITLE: UPPER LEVEL PARTIAL AIR CONDITIONING PLAN DETAIL	
GENERAL CONTRACTOR: TAISEI CONSTRUCTION CORP.			
SUBMITTED BY: OAHU PLUMBING & SHEET METAL, LTD. OAHU AIR CONDITIONING, CO. 938 KOHOU STREET HONOLULU, HAWAII			
DATE: 17301500	DATE: 10-23-08	DRAWN BY: D.A.D.	SHEET NO. / OF SHEETS: AC-5 / 15

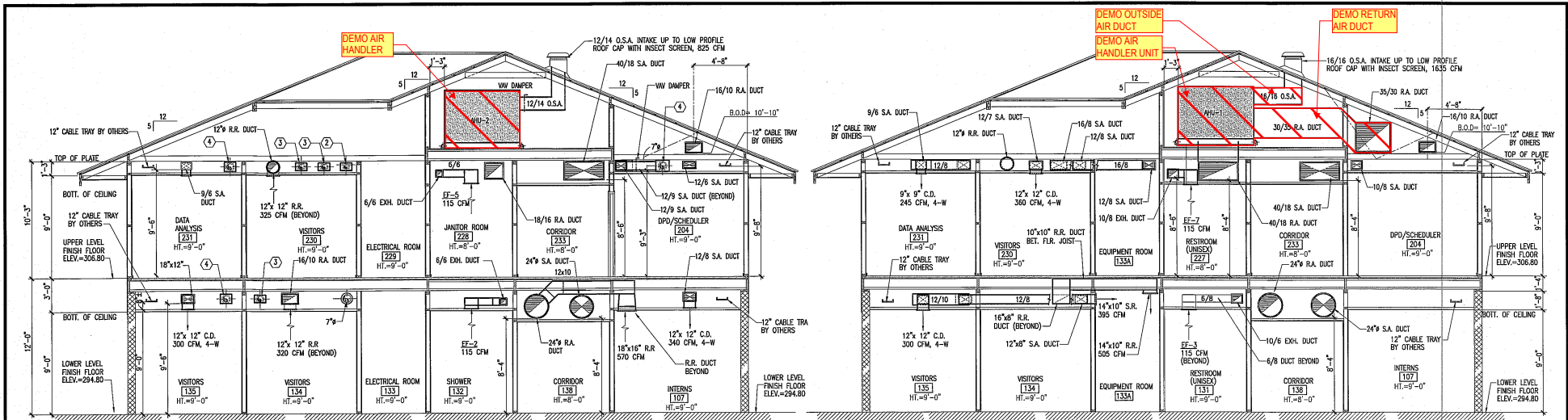


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AS BUILT
OCTOBER 23, 2008

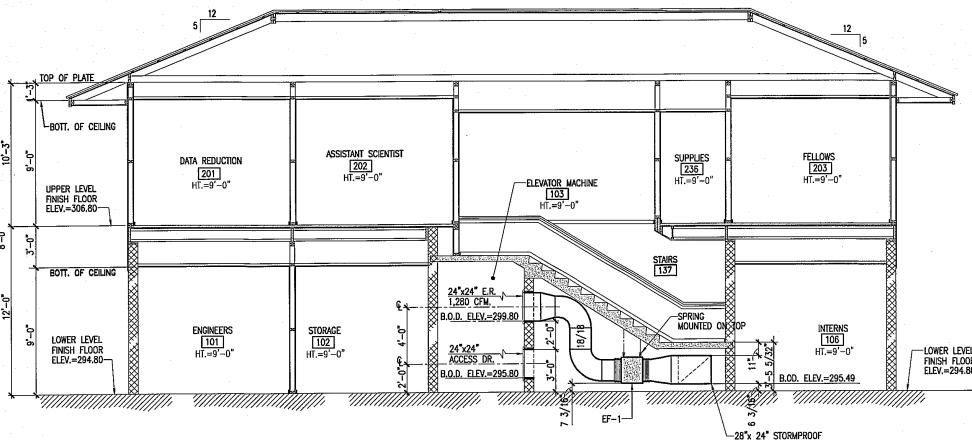


ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.		
GEMINI OBSERVATORY		
HILO BASE FACILITY EXPANSION HILO, HAWAII TAX MAP KEY - 2-4-91-07 (PORTION)		
DRAWN BY: PARTIAL BUILDING SECTIONS		
GENERAL CONTRACTOR: TASEI CONSTRUCTION CORP.		
SUBMITTED BY: OAHU PLUMBING & SHEET METAL, LTD. OAHU AIR CONDITIONING, CO. 938 KOHOU STREET HONOLULU, HAWAII		
DATE: 10-23-08	DESIGNED BY: D.A.D.	SHEET NO. AC-8 OF SHEET: 15



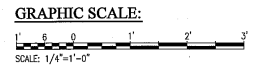
A PARTIAL AIR CONDITIONING SECTIONS
 AC-9 SCALE: 1/4" = 1'-0" REFERENCE SHEET M4.1.1

B PARTIAL AIR CONDITIONING SECTIONS
 AC-9 SCALE: 1/4" = 1'-0"



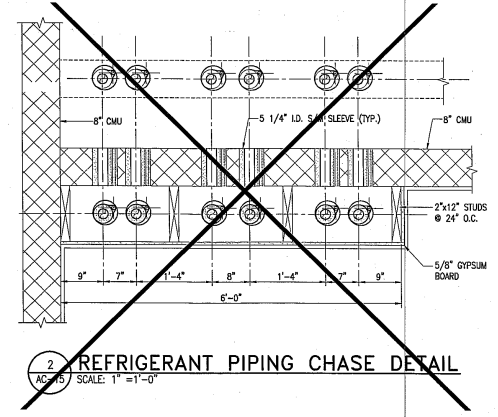
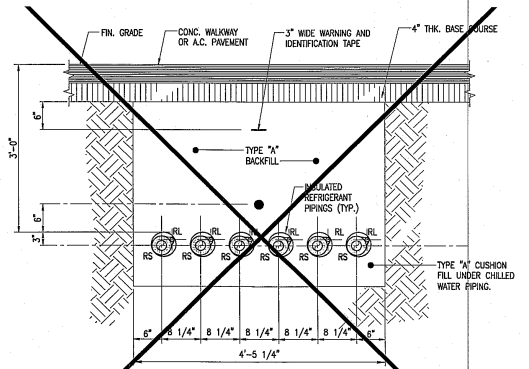
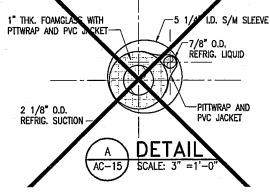
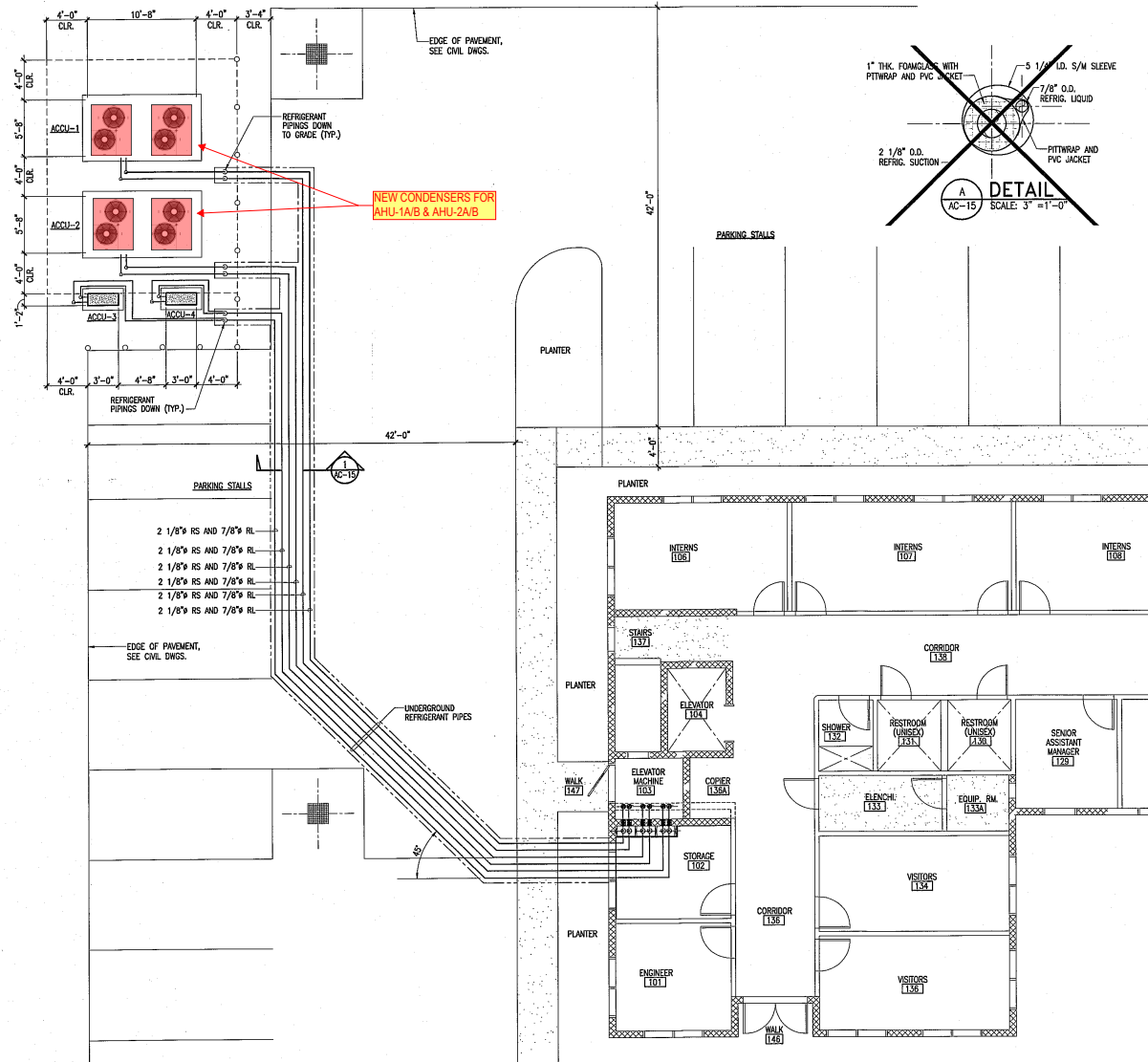
C PARTIAL AIR CONDITIONING SECTIONS
 AC-9 SCALE: 1/4" = 1'-0" REFERENCE SHEET M4.1.1

AS BUILT
 OCTOBER 22, 2008



DEMO

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.		
GEMINI OBSERVATORY		
HILO BASE FACILITY EXPANSION HILO, HAWAII TAX MAP KEY - 2-4-01-07 (PORTION)		
OWNER: PARTIAL BUILDING SECTIONS		
GENERAL CONTRACTOR: TASEI CONSTRUCTION CORP.		
SUBMITTED BY: OAHU PLUMBING & SHEET METAL, LTD.		
OAHU AIR CONDITIONING, CO.		
938 KOHOU STREET HONOLULU, HAWAII		
DATE: 10-23-08	DRAWN BY: D.A.D.	SHEET NO.: AC-9 OF SHEET 15

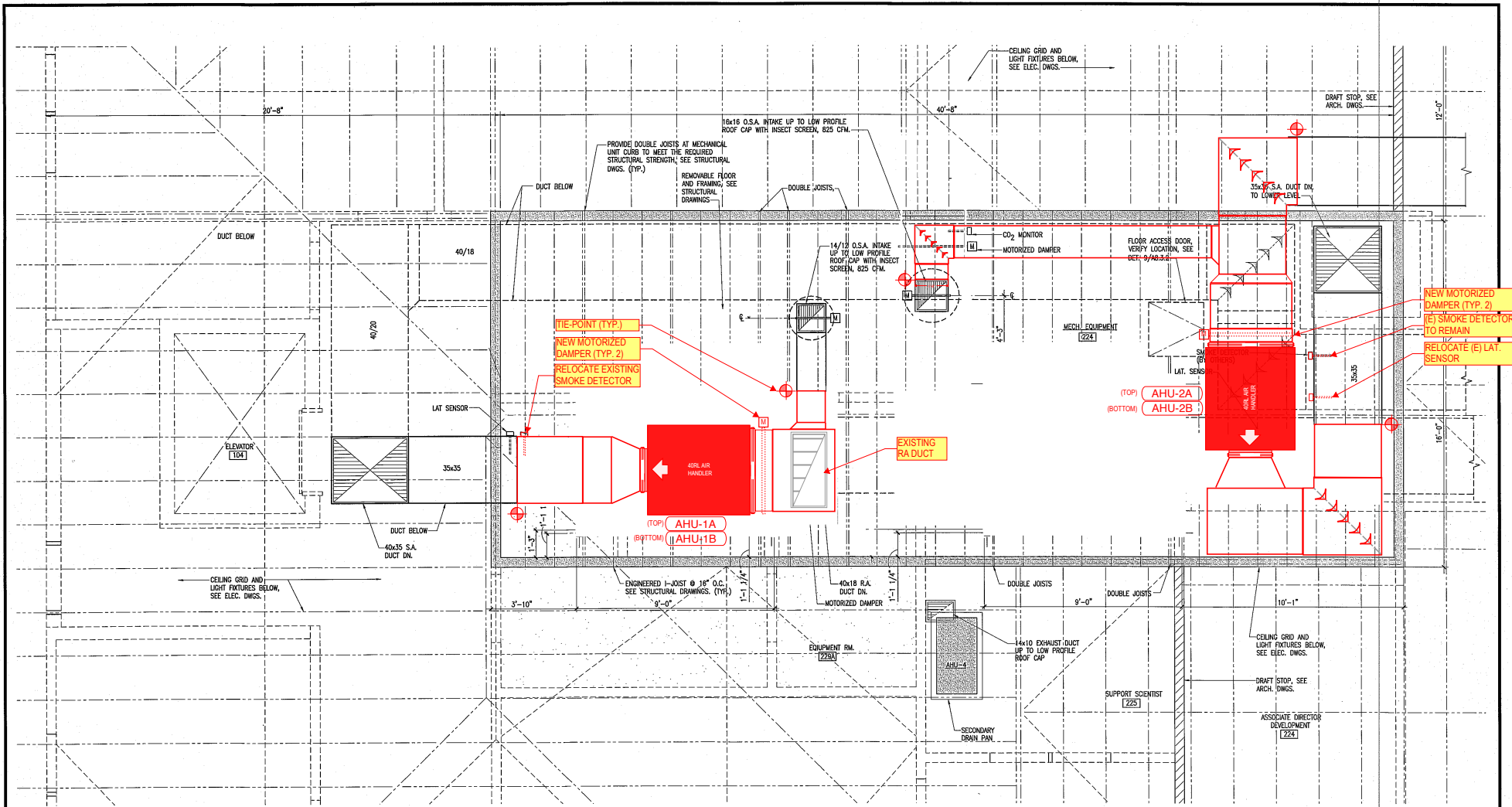


AIR CONDITIONING UNIT PLAN
 SCALE: 3/16" = 1'-0"

AS BUILT
 OCTOBER 23, 2008

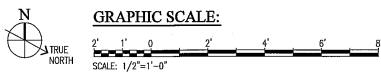
NEW

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.	
GEMINI OBSERVATORY	
HILO BASE FACILITY EXPANSION HILO, HAWAII	
TAX MAP KEY : 2-4-01:07 (PORTION)	
DRAWING TITLE:	LOWER LEVEL REFRIGERANT PIPING PLAN
DRAWING CONTRACTOR:	TASEI CONSTRUCTION CORP.
DRAWING CONTRACTOR:	OAHU PLUMBING & SHEET METAL, LTD. OAHU AIR CONDITIONING, CO. 938 KOHOU STREET HONOLULU, HAWAII
DATE:	10-23-08
DESIGNER:	D.A.D.
CHECKED BY:	AC-15
NO. OF SHEETS:	15



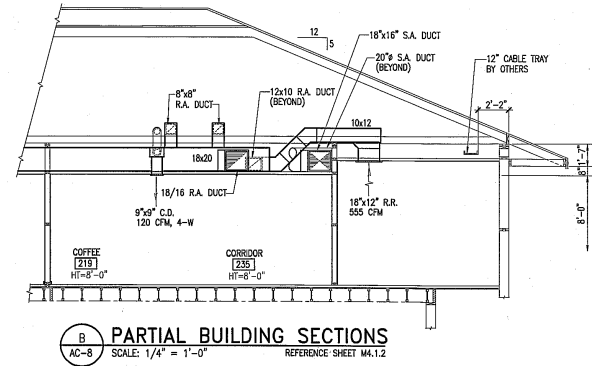
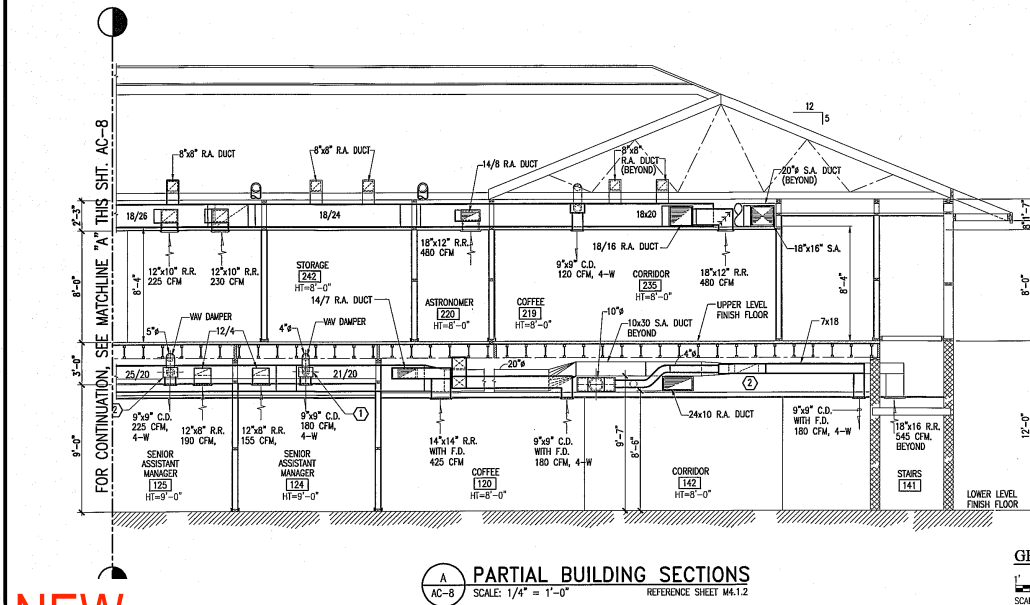
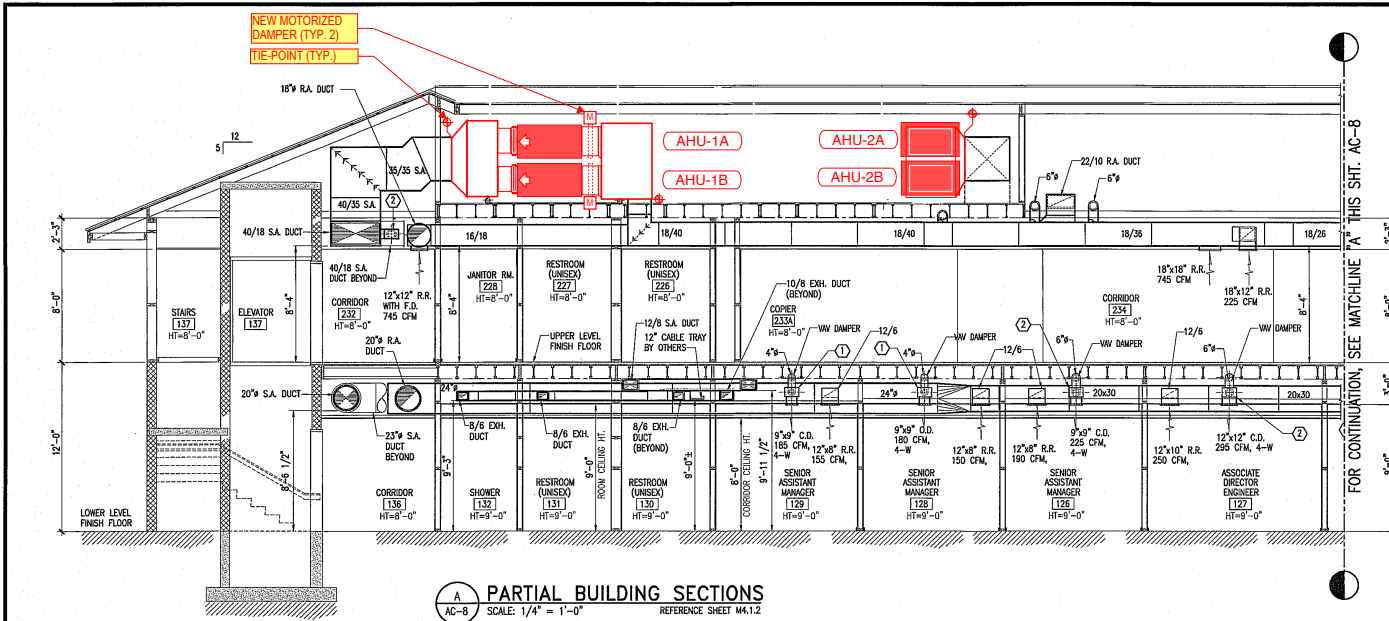
ATTIC LEVEL PARTIAL AIR CONDITIONING PLAN
 SCALE: 1/2" = 1'-0" REFERENCE SHEET M3.1.1

AS BUILT
 OCTOBER 23, 2008



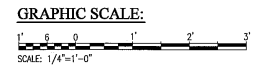
NEW

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.		
GEMINI OBSERVATORY		
HILO BASE FACILITY EXPANSION HILO, HAWAII TAX MAP KEY - 2-4-01-07 (PORTION)		
DRAWING TITLE: ATTIC LEVEL PARTIAL FLOOR PLAN		
GENERAL CONTRACTOR: TAISEI CONSTRUCTION CORP.		
SUBMITTER: OAHU PLUMBING & SHEET METAL, LTD.		
OAHU AIR CONDITIONING, CO.		
938 KOHOU STREET HONOLULU, HAWAII		
JOB: 17301500	DATE: 10-23-08	DRAWN BY: D.A.D. SHEET NO.: AC-7 OF SHEET: 15



NEW

AS BUILT
OCTOBER 23, 2008



NO.	DATE	DESCRIPTION

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.
GEMINI OBSERVATORY
HILO BASE FACILITY EXPANSION
HILO, HAWAII
TAX MAP KEY - 2-4-91-07 (PORTION)

DRAWN BY: **PARTIAL BUILDING SECTIONS**
GENERAL CONTRACTOR: **TAISEI CONSTRUCTION CORP.**
DATE: **OAHU PLUMBING & SHEET METAL, LTD.**
OAHU AIR CONDITIONING, CO.
938 KOHOU STREET HONOLULU, HAWAII

NO. **17301500** DATE **10-23-08** DRAWN BY **D.A.D.** SHEET NO. **AC-8** OF SHEET **15**

Appendix G – REMOVED

Appendix H – Additional Scope: Replace Underground Refrigerant Lines

What Is Build America, Buy America?

When Congress passed the Bipartisan Infrastructure Law—also known as the Infrastructure Investment and Jobs Act—it not only made a once-in-a-generation investment in our nation’s infrastructure, it also created a historic opportunity to increase domestic manufacturing in communities across the country. With this game-changing law, we are rebuilding America’s roads, bridges and rails, expanding access to clean drinking water, ensuring every American has access to high-speed internet, tackling the climate crisis, advancing environmental justice, and investing in communities that have too often been left behind, all while maximizing the use of American iron and steel, manufactured goods and construction materials.

We are building a national network of 500,000 electric vehicle chargers across the country. We are making sure that every child—and every American—has clean water to drink. We are creating good-paying union jobs, helping to revitalize American manufacturing, and positioning the United States to lead the 21st century.

By requiring the use of Made in America content, the Build America, Buy America provisions in the Bipartisan Infrastructure Law will help stimulate private sector investments in domestic manufacturing, bolster critical supply chains, and support the creation of good-paying union jobs so that America’s workers and firms can compete and lead globally for years to come.

As we’ve learned from the pandemic, America’s critical supply chains have gaps. Manufacturers will need time to find on-shore suppliers and scale up production to meet demand. Agencies have the authority to issue waivers from Build America, Buy America requirements, but will do so judiciously—only as needed—and strategically, with an aim toward ensuring that Made in America goods will be used once firms make needed investments to expand domestic production. Waivers will be limited, targeted, and, where appropriate, conditional. They will cover specific items or specific periods of time to enable agencies, recipients, and the private market to build capacity and respond to the new conditions.

Waivers will not be an *alternative* to increasing domestic production, but a *tool* to promote investment in our domestic manufacturing base, strengthen critical supply chains, and position U.S. workers and businesses to compete and lead globally in the 21st century. Unlike in the past, Build America, Buy America waivers will not foreclose American manufacturing, but send clear market signals, creating an incentive for American firms to invest in America and create good jobs in our communities.

Importantly, Build America, Buy America applies to Federal financial assistance programs for infrastructure, *whether or not those programs received funding in the Bipartisan Infrastructure Law*. These new, across-the-board domestic content requirements present an unprecedented opportunity to support good-paying construction *and* manufacturing jobs while strengthening our industrial base and promoting American innovation for years to come.

Successful Build America, Buy America implementation will create an opportunity for a “virtuous cycle” in which infrastructure investment, critical supply chain efforts, and other Biden-Harris Administration priorities, including sustainability and equity, align and support each other.

What Do Federal Financial Assistance Recipients Need to Know About Build America, Buy America?

Q. What are the requirements of Build America, Buy America?

(1) All iron and steel items used in covered projects must be produced in the United States. This means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

(2) All manufactured products used in covered projects must be produced in the United States. This means the manufactured product was manufactured in the United States, and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product.

(3) All construction materials used in covered projects must be manufactured in the United States. This means that all manufacturing processes for the construction material occurred in the United States.

Q. What Federal financial assistance awards are covered by Build America, Buy America?

Build America, Buy America provisions apply to Federal financial assistance awards (e.g., grants and loans) made after May 14, 2022 that will be used to construct, alter, maintain, or repair infrastructure in the United States. Note that these provisions are not limited to infrastructure projects funded by the Bipartisan Infrastructure Law. **Assistance recipients who have questions about whether their particular project is covered by Build America, Buy America should contact the funding agency.**

Q. Can Build America, Buy America requirements be waived?

Yes, when necessary. Agencies may waive Build America, Buy America requirements on the basis of (1) nonavailability, (2) unreasonable cost, or (3) public interest. All waivers must be in writing, published for public comment, and approved judiciously. Waivers should also be limited to specific projects or time periods, targeted to only the products necessary, and when appropriate, conditional, to maximize the use of American-made items. **Assistance recipients who have questions about waivers should contact the funding agency.**

Q. What types of infrastructure are covered by Build America, Buy America?

Infrastructure includes projects with public functions, such as roads, highways, bridges, public transportation facilities, dams, ports, harbors, railroads, freight and intermodal facilities, airports, water systems, electrical transmission facilities and systems (including structures, facilities, and equipment that generate, transport, and distribute energy, including electric vehicle charging facilities), broadband infrastructure, and buildings. **Assistance recipients who have questions about whether their particular project is considered infrastructure should contact the funding agency.**

Q. When and how do I apply for a waiver?

Waivers should be used judiciously. Federal financial assistance recipients must first take proactive steps to identify qualifying Made in America articles, materials, and supplies for their projects. **Recipients who have worked diligently to identify qualifying items, but concluded a waiver may still be necessary, should contact the funding agency to learn how to apply for a waiver.**

Q. When do Build America, Buy America requirements expire?

Build America, Buy America has no expiration date. We encourage and welcome stakeholder input about how we can support recipients in the application of Build America, Buy America as we work to bolster America's manufacturing base and create good manufacturing and construction jobs in communities across the country.

Overview of Build America, Buy America Guidance

Build America, Buy America Sourcing Requirements

The following conditions apply to Federal financial assistance obligations for infrastructure made after May 14, 2022:

- for iron and steel items, all manufacturing processes, from the initial melting stage through the application of coatings, must occur in the United States
- for manufactured products, the final manufacturing process must occur in the United States and the cost of components mined, produced, or manufactured in the United States must be greater than 55 percent
- for construction materials, all manufacturing processes must occur in the United States

An article, material, or supply should only be classified into one of the categories above.

Covered Federal Financial Assistance Programs and Projects¹

- Federal financial assistance means assistance that non-Federal entities receive or administer in the form of grants, cooperative agreements, non-cash contributions or donations of property, direct assistance, loans and loan guarantees.
- A Federal financial assistance program for infrastructure is a program in which funds are used for an infrastructure project, regardless of whether infrastructure is the primary purpose of an award. The Build America, Buy America conditions only apply to infrastructure portions of an award and apply even if Federal funds are not paying for the entire project.
- “Project” means the construction, alteration, maintenance, or repair of infrastructure in the United States.
- “Infrastructure” includes roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; buildings and real property. The generation, transportation, and distribution of energy—including electric vehicle charging facilities—are considered infrastructure. Private homes for personal use are not.
- Build America, Buy America conditions do not apply to tools, equipment, and supplies brought to a construction site and removed at or before the completion of the project or to equipment and furnishings (such as chairs) used at or within the finished infrastructure project, but which are not an integral part of the structure or otherwise affixed to the project. For example, Build America, Buy America conditions would apply to the funds used to construct a library, but not to funds used to buy books or furniture for the library.

Waiver Types

With the concurrence of the Made in America Office, a Federal agency may waive the application of a Buy America Preference when the agency finds that:

(continued on next page)

¹ Some programs or projects may not be covered by Build America, Buy America due to exclusions or the operation of waivers. Assistance recipients who have questions about whether their particular project is covered by Build America, Buy America should contact the funding agency.

- one or more iron or steel items, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality (a “**nonavailability waiver**”),
- the inclusion of one or more iron or steel items, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent (an “**unreasonable cost waiver**”), or
- applying the domestic content procurement preference for one or more iron or steel items, manufactured products, or construction materials would be inconsistent with the public interest (a “**public interest waiver**”)—public interest waivers are the most flexible type of waiver, but, like all waivers, must be necessary and appropriately justified.

Waiver Principles

Federal agencies must be judicious in their use of waivers. They should apply the following principles when developing waiver proposals:

- **Limited:** Waivers should be project- or award-specific whenever possible, and time-limited when not limited to certain projects or awards.
- **Targeted:** Waivers should cover only the products or category of products necessary (rather than covering broad sectors such as “all manufactured products”).
- **Conditional:** Agencies should consider including conditions on the waiver, when appropriate and consistent with law, that advance the goal of Buy America policies.

Waiver Process Requirements

- Agencies must post waivers for at least 15 days for public comment
- Agencies should consult with MIAO prior to posting a waiver with broader applicability (e.g., program-level waiver) to ensure it covers no more than necessary
- Agencies must submit waivers to MIAO for review after public comment to determine if it is consistent with policy
- MIAO, working with GSA, is working to build functionality on the existing [waiver transparency website](#)
- Agencies with existing general applicability waivers that are more than five years old (unless those waivers are product-specific) must begin reviewing those waivers by November 15, 2022. In the meantime, those waivers remain in force.

Construction Materials

- Construction materials include an article, material, or supply that is or consists primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; and drywall.
- The Build America, Buy America Guidance establishes a preliminary standard for construction materials, requiring the last two steps in the manufacturing process of the construction material be completed in the United States. OMB is seeking stakeholder input as it works to update this preliminary standard with a final standard, consistent with Build America, Buy America.

Bid Proposal

REQ NO :

SHEET NO : 1 OF 1

DESCRIPTION OF SOW: HBF-X Cooling System Replacement Engineering Design Services

BIDDER				
Quote Date				
BID Currency				
		USD	USD	USD
Item	Description	Total Cost	Total Cost	Total Cost
1	Project Management and Project Administration			
2	Conceptual Design			
3	Schematic Design			
4	Design Development			
5	Construction Documents			
6	Permit Solicitation			
7	Construction Phase			
8	Project Expenses and Fees			
9	Overhead and Profit			
10	Professional Cost Estimate Subconsultant			
11	Structural Subconsultant			
12	Electrician - Subconsultant			
14	Bid Quaranty Cost			
15	Performance Bond Cost			
16	Payment Bond			
17	Taxes			
TOTAL QUOTED COSTS				
Total Hours				
Estimated Duration of ED and Construction (days)				
BUDGET VALUE (FROM REQUISITION)				
Link to Proposal				

		Mei Starns	Ben White			
Qualification of Company (Weight)	20%	20%	0%	0%	0%	20%
Track record with design of HVAC System Replacements	60	100				
Track record with working with building renovations	40	100				
Total Points	100					
Cost	60%	60%	0%	0%	0%	60%
(i) Design Phase	40	100				
(ii) CA Services	30	100				
(iii) Admin	30	100				
Total Points	100					
Delivery Time (Weight)	10%	10%	0%	0%	0%	10%
(i) Delivery time (Fastest)	100	100				
Total Points (Possible)	100					
Documentation	10%	10%	0%	0%	0%	0%
Technical Proposal	70	100				
Cost Proposal	30	100				
Total Points	100					
Total Points	100%	100%	0%	0%	0%	90%

Comments					
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