



Frequently Asked Questions

CONSIDERING A POTENTIAL NSF INVESTMENT IN A NORTHERN HEMISPHERE EXTREMELY LARGE TELESCOPE

Note that these Frequently Asked Questions are posted at beta.nsf.gov/tmt and will be updated as needed throughout the environmental review process.

Q1. What is the purpose of the U.S. National Science Foundation's scoping meetings, scheduled for Aug. 9-12, 2022, on the Island of Hawaii?

- A. The scoping process is conducted as the first step in NSF's formal environmental review process to solicit public comments and identify issues that will be analyzed in an Environmental Impact Statement (EIS). NSF welcomes public comments on potential alternatives, information and analyses relevant to the environmental review. The comments received during these meetings will play a key role in (1) determining the list of alternatives to ultimately be evaluated in the Draft Environmental Impact Statement (DEIS); (2) informing the scope of the analysis, including any necessary studies and significant issues to be evaluated in the DEIS; and (3) determining appropriate ways to engage the community in a meaningful and effective manner during NSF's environmental review.

Q2. How many Extremely Large Telescope (ELT) projects exist?

- A. Only three such projects are under some level of development in the world: the European-ELT (E-ELT), the Giant Magellan Telescope (GMT) and the Thirty Meter Telescope (TMT). Of those, only two are currently undertaking on-site construction activities, E-ELT and GMT, both in Chile, in the Southern Hemisphere. TMT is the only ELT project currently proposed to be built in the Northern Hemisphere.

Q3. How will NSF decide whether to fund the construction and operations of TMT?

- A. Any consideration of NSF funding for construction and operations of TMT would be dependent upon several factors, including: the results of a comprehensive environmental review with public input; the completion of NSF's major facilities review process (which evaluates technical readiness, financial viability, and project management capabilities); consideration of other NSF priorities; and the availability of funds.

Q4. Why are you only doing an EIS on TMT and not GMT?

- A. The proposed action that NSF is currently considering is a potential future investment in an ELT in the Northern Hemisphere. GMT is a separate project that will be located in the Southern Hemisphere outside of the U.S. and is not, therefore, subject to the requirements of the "National Environmental Policy Act" (the federal statute that requires agencies to prepare an EIS for projects anticipated to result in major environmental impacts).

Q5. Why would NSF consider contributing federal funding to the construction of TMT, which already has significant private funding?

- A. While TMT has significant non-federal funding available, without NSF's participation, science priorities and access to the telescope would be restricted to the private institutional partners. NSF's participation would provide for a public-private partnership that would allow the broader U.S. community to gain access to and shape the science goals of a US-ELT program.

Q6. Does undertaking this environmental process mean that NSF intends to fund construction of TMT on Maunakea?

- A. It is important to note that **no decision regarding whether NSF will contribute funding to TMT's construction and operations has been made.** Any decision to fund TMT would be preceded by a thorough environmental review with public input; the completion of NSF's major facilities review process (which evaluates technical readiness, financial viability and project management capabilities); consideration of other NSF priorities; the availability of funds; and other factors. In addition, a decision not to further consider the potential funding of TMT could be made at any time, even before the environmental review is completed. Also, while the Thirty Meter Telescope International Observatory has declared a preferred site for TMT on Maunakea, NSF has not identified a preferred Action Alternative, which means that NSF has not identified that building TMT on Maunakea is its preferred Action Alternative.

Q7. Hasn't there already been an environmental review of TMT?

- A. In 2010, the University of Hawaii at Hilo, in its capacity as the proposing agency, prepared an EIS under the "Hawaii Environmental Policy Act" for the proposed issuance (by the Board of Land and Natural Resources) of a Conservation District Use Permit and approval of a sublease.

While NSF does not have jurisdiction over use of land on Maunakea, it has a legal obligation to prepare an EIS under the "National Environmental Policy Act" because it is considering a potential future investment of taxpayer dollars for the construction and operations of TMT, which could result in major impacts.

Q8. What happens after the EIS process is completed?

- A. Following completion of an EIS and all other environmental compliance requirements, NSF will consider all relevant factors (including scientific merit, broader impacts, project readiness, potential environmental impacts, availability of funding, NSF priorities, the results of NSF's major facilities review process, etc.) before issuing a Record of Decision (NSF's final funding decision).

Q9. Why do we need to build TMT when we now have the James Webb Space Telescope (Webb or JWST)? Won't JWST search for signatures of life around other stars?

- A. While JWST will have some capability to search for signatures of life (atmospheric biosignatures), this capability will be very limited. JWST was not specifically designed to search for these atmospheric biosignatures, which are very weak compared to the light of its host star. Therefore, its search will be limited to a few of the brightest nearby star systems with mostly giant (Jupiter-size) planets. TMT will have more than 14 times the light-collecting area of JWST; the more light a telescope can collect, the smaller, dimmer and more distant objects it can study. TMT's 30-meter (98-foot) diameter mirror will allow it to directly image and characterize the weak signals from the atmospheres of rocky Earth-sized planets that lie in the "habitable" zones of their host stars. It is these planets that have the greatest chance of harboring signatures of life, which are only within reach of the capabilities of extremely large telescopes like TMT.

Q10. During your informal outreach effort, you were told that there is fierce opposition to the construction and operations of TMT on Maunakea. Knowing that, how can you even consider investing in TMT?

- A. Importantly, conducting an environmental review is not a decision to invest in TMT. While it is an important step in the decision-making process, it does not mean that a decision to fund TMT has been made. NSF's environmental review will be a comprehensive process that will take approximately two years to complete. During our informal outreach effort, we learned that there are very strong views on all sides of the issue of whether TMT should be built. This is why receiving public comments now, through NSF's formal environmental review, is so important. Only comments received during this process will be considered during NSF's decision-making process.

Q11. The Mauna Kea Stewardship and Oversight Authority (MKSOA or Authority) was just established, but no members have yet been appointed. How can you study your Action Alternative 2 (which includes the development of a plan to define and practice responsible astronomy in Hawaii in partnership with the MKSOA, the Maunakea Observatories and the affected Hawaiian community) until the new Authority is up and running? *[updated 11/3/23]*

- A. NSF recognizes that any plan that is developed would need to be cognizant of the authority's role as the exclusive entity with jurisdiction to manage the resources of Maunakea. Following the scoping phase of NSF's environmental review process and the workshop, Action Alternative 2 could be revised, with appropriate deference given to the new authority's role.

Q12. How does NSF's environmental review process interface with the MKSOA role?

- A. NSF's environmental review process is being conducted under federal environmental laws that require NSF to consider anticipated environmental and cultural impacts of a potential future investment in the construction and operations of TMT as part of its decision-making process. NSF's ultimate decision will be whether to invest in TMT's construction and operations. In contrast, the new MKSOA is responsible for managing the resources of

Maunakea. This will include issuing leases to allow the operation of astronomy facilities. NSF's role is different from that of the authority; however, NSF looks forward to working together with the authority during this environmental review within the context of each entity's role.

Q13. What is the timeline for NSF's environmental review following the Notice of Intent? *[updated 11/3/23]*

- A. During 2023, NSF has been actively assessing what adjustments need to be made to the environmental review process in light of the thousands of public comments we received during the Scoping Phase and the establishment of the MKSOA. The high level of interest in this proposed project and the concern about its potential impacts on Maunakea's natural and cultural resources warrant extra consideration regarding ways to engage people in a process that is respectful, sensitive and meaningful. At the same time, the MKSOA has, over the past year, been taking important steps toward its ultimate role of managing the summit of Maunakea. NSF has been very careful to ensure that its environmental review does not interfere with the work of the MKSOA or cause unnecessary confusion regarding the roles of the two agencies. As a result, NSF has added more flexibility and time into its original estimated schedule for conducting its environmental review. The original timeline posted by NSF during public scoping and shown in Section 3 of the Draft Community Engagement Plan is now out of date; as plans develop, NSF will continue to post updates to the TMT environmental review webpage.

Regarding next steps, over the past several months NSF has been focusing on what adjustments need to be made to its Section 106 consultation process under the "National Historic Preservation Act" as a result of the public comments received. For example, in response to those comments, NSF plans to hold Section 106 meetings on multiple islands within Hawaii, as well as a virtual meeting for those who are unable to attend a meeting in person. In addition, the first two series of meetings will be focused on building the relationships between NSF and those who will be participating as "consulting parties" in the Section 106 process. This will be important because more than 150 Native Hawaiian organizations and individuals (including those individuals who requested to serve as consulting parties during the Scoping Phase) will soon be receiving invitation letters to serve as consulting parties in NSF's Section 106 consultation process. Once NSF receives confirmation that the invitees are interested in productively participating in the Section 106 process, the logistics for the first series of Section 106 meetings will be determined and information regarding those meetings will be sent to the consulting parties. We anticipate that the first series of meetings will be held during the first half of 2024.

Q14. Would an Action Alternative involving a proposed NSF investment in TMT on Maunakea be subject to the requirements of the MKSOA (established by Hawaii Act 255)? *[added 3/23/23]*

NSF has no jurisdiction over land management decisions on Maunakea. Those decisions are made by the MKSOA, the state-designated management authority responsible for the lands on Maunakea. **NSF recognizes the MKSOA's jurisdiction and acknowledges that any action alternative**

(evaluated by NSF in its environmental review) involving an NSF investment in the construction of TMT on Maunakea would be subject to the requirements of the MKSOA. Further, any NSF investment in construction would require that all other applicable permits and approvals are granted and all relevant laws are followed.

Q14. Why did NSF provide funding for TMT design and development work when the environmental review is not yet complete? *[added 11/3/23]*

- A. Carrying out design and development work does not, by itself, result in environmental or cultural impacts. Therefore, no environmental review for such work is required. In contrast, proposed construction activities would likely result in environmental and/or cultural impacts. This is why NSF is conducting its environmental review prior to making any decision on construction funding. The design and development work is completely separate from construction activities. Also, an award to conduct design and development work does not in any way guarantee or imply that construction of a proposed project will occur. As has been previously explained in the scoping documents, there are many factors (such as public input, the environmental review, technical readiness and availability of federal funding) that go into a decision regarding whether NSF will provide construction funding for a project like TMT. While the environmental review looks at the potential environmental and cultural impacts associated with a proposed project, NSF's major facilities review process assesses a proposed project's technological readiness, project management and feasibility. Design and development work is frequently funded by NSF to allow a proposed project the opportunity to reach a level of technical maturity so that it can be assessed for construction readiness. This technological work typically continues on a separate track from the environmental review. However, **both processes must be completed before any decision on construction can be reached. This award for design and development work has no bearing on any future decisions to proceed with construction funding.**

Q15. Does the granting of a design and development award imply that NSF has already decided to build this telescope? *[added 11/3/23]*

- A. No. As explained in the previous answer, a design and development award provides an opportunity for a proposed project to reach a level of technical maturity needed to be advanced through NSF's review process. One factor that goes into NSF's decision-making process regarding whether or not to fund the construction of a project is whether a proposed project has a sufficiently mature technical design. There are many other factors that also go into the decision-making process, including the results of NSF's environmental review, scientific priorities and the availability of funding.

Q16. Where can I find more information about NSF's design stage and how it differs from the construction stage? *[added 11/3/23]*

- A. For a detailed description of NSF's design and construction stages, please consult the Research and Infrastructure Guide (<https://www.nsf.gov/pubs/2021/nsf21107/nsf21107.pdf>), specifically, Chapter 2.1.3.