Budget Proposal Narrative
2023 Strategic Budgeting Process

Please carefully review the **Call for Proposals** with particular attention to the evaluation criteria before beginning this application. Criteria should be addressed throughout the proposal narrative.

Section 1: Proposal Title and Department Contact

Proposal Title: **Applied Geoscience**

Division: Academic Affairs
College/Unit: CSE/Geology
Department Contact: Bernie Housen

Section 2: Proposal Summary and Problem Statement

Check the most relevant box (one selection only).

Priority Program and Service Areas:

- ☒ Graduate Programs
- ☐ Inclusive Student Success

Identified Structural or Legacy Funding Needs (to be used sparingly and in conjunction with Division VP)

- ☐ Core Infrastructure, Safety, and Regulatory Compliance
- ☐ Remaining funding needs from partially funded prior request
  If checked, please identify original funding request amount and actual funding received in narrative section
- ☐ Other Click here to enter text

Statement of Purpose (One Page or Less):

What are the challenges or opportunities being addressed? How will the new investment(s) in this proposal address this challenge or opportunity? What are the expected outcomes if this proposal is funded?

Climate changes, water availability and quality, and the nature of geological hazards intrinsic to the region will all impact the land, water, and cultural resources of Washington State. To better understand these impacts the need for trained geologists, hydrogeologists and engineering geologists within the state and in the nation as a whole is becoming more important. The Geology Department has, for the past decade, sought to address critical needs of the state, region, and nation by developing new programs in applied geoscience. This request will be to continue that process by adding two TT faculty positions, one in Surface Water Geoscience, and another in Soil and Rock mechanics, and two support staff positions. These positions would work with existing faculty in Geology to launch a new MS degree program in Applied Geoscience, and a 4+1 (BS and MS) program aimed at recruiting transfer students and new students to our program. Surface water processes- floods, impacts of climate changes, interactions with surficial processes,

groundwater, water quality, and downstream coastal processes play increasingly vital roles for many in our region. Likewise, soil and rock mechanics governs our understanding of landslides, coastal processes including erosion and sediment transport, seismic hazards and risk assessment, all of which have significant local and regional impacts.

The program that we hope to establish at WWU will leverage and improve synergistic efforts in allied fields among existing programs at WWU in the Institute for Watershed Studies, the Marine and Coastal Science program, and research and teaching programs in the Geology, Environmental Sciences, and Environmental Studies Departments.

This program will meet many needs of the state and industry by increasing the production of qualified geoscience professionals and will extend valuable opportunities to graduates of these programs. Washington State requires licensure for practicing geologists, engineering geologists and hydrogeologists to ensure that scientifically qualified professionals contribute their expertise to solutions for these problems and issues. Existing geoscience degree programs in Washington are not presently able to meet anticipated employment demand and the societal needs outlined above, and lack of specific degree programs in engineering geology and hydrogeology represent unmet needs within the state higher education system.

If funded, we will be able to expand existing capacity of an already successful MS program in Geology, and to create a new degree program in Applied Geoscience that will attract additional students. The UG/MS program coordinator, through their work and outreach to recruit transfer students, and new first year students (using experiences gained via our participation in the AEES program), will also yield an increase in our enrollment and retention of UG and MS students. This program will also fulfill vital State and regional needs of Licensed Geologists, Engineering Geologists, and Hydrogeologists- the WWU Geology program is already the leading producer of graduates who obtain these credentials. We also anticipate that increased success in securing external funding for research grants, as well as significant donations to the WWU Foundation, will result from the new and enhanced possibilities for collaboration and advancement that will be a result of these new programs and faculty.

Graduate Impacts: 5 additional MS Geology (expanding existing capacity), 10 students in MS Applied Geoscience (new program). This should also, via better advising and the streamlined 4+1 BS/MS program, improve time to degree and retention for the MS students in our program.

Recruitment/retention/DEI Impacts: Through improved and active recruiting of both incoming first year students, and of transfer students, our target will be to add ~20 additional BS students to our Geology programs, to ensure these additional students add to the diversity of the students we serve and who graduate with degrees from our programs, and to retain students through improved advising and program changes.

Summary of Proposed New Investments:

Summarize the new investments included in this proposal (total monetary amount, number of FTE and type of positions, and other expenses). Explain the need for any goods and services or professional contracts.

New investments requested for this program include:

Two TT faculty (one in surface water hydrology, one in soil/slope processes

Two classified staff- one program manager for the Applied Geoscience programs, one classroom and lab technician to support class labs and other needs of the program

Five Graduate TA positions- to assist in delivery of new and expanded course offerings, and to serve as a vehicle to recruit new Graduate Students to the program via TA support.

Other expenses include new faculty start-up, an addition to the Geology Department operating budget, tuition waivers for the GTA positions, and estimates for needed space renovation for this program

One-time costs for the program are: $746,000
Recurring costs for the program are: $622,235

2024-2026 total cost is $2,398,016

Impact of New Investment on ADEI and Sustainability:

Please provide data or an analysis to support this request and illustrate the anticipated impact of this investment, including in advancing accessibility, diversity, equity, inclusion, and sustainability.

Presently, Washington State is one of the top employers of geoscience professionals in the nation. Employment demand for geoscientists in Washington is forecast by Federal agencies (Bureau of Labor Statistics) and national groups (such as the American Geoscience Institute (AGI)) to grow by more than 18% by 2030. Similar demographic and employment trends for geoscience professionals have been projected by other organizations. Over the next decade, there is predicted to be an 11% growth in geoscience full-time equivalents (FTE), as well as a potential loss of 48% of the geoscience workforce as they reach retirement. Due to these changes, AGI predicts a shortage of geoscience professionals in the coming decade, especially as a result of projected retirements.

In the face of this increased demand for geoscience professionals in Washington, data from the WA Geologists Licensing Board indicates that of the ~2800 professional geologists who currently hold licenses (in Geology, Engineering Geology, or Hydrogeology), 62% of these are older than 55. So while need and demand for geoscience professionals will be high in the coming decade, the demographics of the profession points to a significant shortfall in the availability of qualified professionals in this field within our state over the coming decade.

A related, but important, aspect of this demographic situation is that the gender and ethnic diversity of geology license holders in Washington State is low. According to the WA Licensing Board, women geoscientists make up only 24% of current licensed geologists, 18% of licensed hydrogeologists, and 13% of licensed engineering geologists. Demographic information that tracks ethnic diversity of geology license holders is not kept by the State of Washington- however it is known that overall the geosciences have very low participation rates for all minority groups. **Low participation and licensure rates of women and underrepresented ethnic groups will, if they persist, significantly hamper the ability of the profession to attract and retain an increasing number of new geoscience professionals- and this adverse effect will grow as the population of the state becomes more diverse over time**. For this reason, the activities proposed here will include significant efforts to reach out to, and recruit, a more diverse set of students into the new (and existing) geoscience degree programs at WWU.
Data for the past decade for WWU students who graduated with a BS in Geology (1275 total students) are similar to national demographics. The demographics of Geology UG majors since 2010 indicates that geology degree holders were 57% male, 43% female (using available, binary data), and were 15% students of color, and 85% Caucasian. Figures for MS graduates (217 total students) are similar, with 51% male and 49% female, and 10% students of color, 90% Caucasian.

A key element of this request is to leverage work to recruit and retain more diverse students into the natural sciences at WWU- via the HHMI-funded AEES program that is administered by the College of Science and Engineering. This program identifies and recruits diverse applicants to WWU, inviting them

into a cohort program for improved mentoring and advising. We will expand these efforts by improving communication and recruitment work with in-state 2 year colleges, particularly those with more diverse student populations. These students will be invited, as transfer students, to enter the 4+1 degree program that we will establish. In addition, a number of Geology faculty, staff, and students have been working on a larger ADEI program, URGE -unlearning racism in the geosciences- in order to identify, confront, and mitigate historic practices and bias in our field. Please use this link for more information: WWU URGE Pod | Geology Department | Western Washington University. Building on these efforts, we hope to increase the diversity and success of our undergraduate and graduate students in our program.

Section 3: Performance Outcomes and Risk Mitigation

Expected Outcomes and Evaluation of Success:

Please explain how the success of the proposal will be measured, if funded. What metrics might indicate that the intended impact was achieved? How can the expected outcomes be directly tied to the investment being proposed?

Specifically, provide the targets and explain which method(s) will be used to track progress (refer to the Provost's Overall Metrics to track progress toward University's Strategic Plan), estimated return on investment (such as enrollment increases or efficiencies), divisional KPI's, recruitment and retention especially specifics for historically marginalized populations.

Our goals for these programs include adding ~5 new majors to the current thesis-based MS Geology program, while the new MS program in Applied Geoscience add ~10 new majors in its initial stages. Targeted enrollment in the WWU BS-MS (4+1) Applied Geology program would be 10 degrees awarded each year. We will also, through improved advising, recruitment, and strategic evaluation of our curricula, decrease time to degree for our students. In addition, we anticipate modest growth in our existing degree programs to be achieved if this request is funded. A goal would be to have at least half of these students recruited from diverse sources (working with the AEES program for first-year students) and from 2-yr colleges. While difficult to estimate, a proportion of students currently in the Geology BS, or the Environmental Sciences BS offered by the Environmental Sciences Department, may choose this program, resulting in additional capacity and slightly lower demand for those degrees.

Impact on Recruitment, Retention, and Satisfaction of Diverse Faculty, Staff, and Administrators:

For proposals that include personnel resources, explain how the proposal improves recruitment, retention, and satisfaction of diverse faculty, staff, and administrators.

Funding additional staff and MS student TAships will help to retain our present, quality faculty and staff. Better recruitment of students, via the CSE's AEES program and by fostering better relationships and transfer articulation with 2yr programs will aid in student recruitment and retention. Added research and teaching facilities will help the well-being and productivity of our faculty, staff, and students. Most importantly we will expect to have an increase in the amount and success of our faculty and staff in securing external (grant) support for research, supporting a larger number of both undergraduate and graduate students at WWU.

Risk to Desired Outcomes:

What might occur to prevent the desired outcomes even if funding is obtained? How will these risks be mitigated? Beyond new funding, what other criteria or external factors need to occur in order for this proposal to be successful (e.g., economic or demographic factors, etc.).

Given stated uncertainties in projected demographics and their potential impacts on higher education enrollment in both Washington and the nation as a whole, seeking funds to expand existing programs does incur some risk. These will be mitigated by a significantly increased effort to reach out and recruit new students specifically to our existing programs and to this new geoscience degree program. For expansion of our MS program, it is worth pointing out that the WWU Geology Department has, for over four decades, had a nationally recognized graduate program- we recruit over 70% of our MS students from out of state, and routinely reject >40 well-qualified applicants to our MS program each year. So, the demonstrated demand for spaces in our existing MS program would be more than is needed to expand enrollment increases we project for this proposal- which we projected very conservatively. Our MS program, like others in the sciences, is support-limited (meaning students will be recruited into a MS program with an offer of support, such as a TA-ship). The new TA positions, combined with resources available in part through a new program (the Paul Rady Graduate Scholars, made possible by a $3million gift to the WWU Foundation), will serve to increase the spectrum of support we can offer incoming students, and will serve as a mitigator of some risks.

Anticipated Consequences if Proposal is Not Funded:

What are the anticipated consequences of <u>not</u> funding this proposal?

If not funded, the WWU Geology MS program will continue to turn away many well-qualified applicants- we typically reject >40 program applicants each year. Needs of the State and Nation for trained geologists, engineering geologists, and hydrogeologists will not be met, and WWU will lose an opportunity to play a leadership role in geoscience teaching and research in the region. Not being able to better recruit more diverse faculty, staff, and students will harm the department, our college, and the geoscience profession.

Section 4: Process and Development

Describe Collaborations and Stakeholder Engagement:

What stakeholders were involved, and in what role/capacity? Which groups were engaged and at what stages? How were concerns addressed? What process have you followed to identify unintended consequences that may result from this proposal? Is the issue being addressed a broader issue across the university?

We have discussed this proposal with many stakeholders in State Government- the WA DNR-Geosciences, including the State Geologist, as well as current and former staff at WA-DOT (who are keenly interested in Engineering Geology), professional organizations, the WA State Geologists Licensing Board, and many members of professional/industrial staff, administrators, and CEOs of environmental and geotechnical firms.

Explain how this proposal will leverage resources or commitments from other sources:

Identify any current resources in place, any new commitments, or potential funding partnerships with external entities that have been identified. If exploration is currently underway, note any conversations with university development officers, funding agencies, the Vice Provost for Research, etc.

As noted above, expansion of the graduate programs in Geology via this Applied Geoscience program will build constructively on a recent gift of $5 million to the WWUF for the Geology Department, with $3million of this pledged to a program to directly support and enhance graduate student education and thesis research in the WWU Geology Department. Additional resources are available via an existing endowed professorship (the Digges Distinguished Professor in Engineering Geology- with a $750,000 endowment). There are at least three other major gifts being discussed and developed in through work with the WWUF to support similar programs. In addition, a WWU-State DNR-Federal (USGS) partnership, to house and support state geologists, and professionals working for the US Geological Survey who are already in Bellingham, at WWU or in Ferndale, can be leveraged more successfully if this project is funded.

Has your department previously submitted this proposal?

If so, briefly outline any significant changes and indicate the feedback received during that budget process.

Elements of this request were submitted twice previously as a Decision Package proposal, included once among the primary requests in the State Budget (2015), receiving a Hearing before a legislative Natural Resources Committee meeting. Feedback from College (Dean, internal college governance committees) and University (UPRC, WWUF, etc) as well as stakeholders was received and included in revisions. Important changes include added focus on the Graduate programs and their outcomes, inclusion of both hydrogeology and engineering geology as program elements, and a tighter focus on surface water and soil/slope stability as new faculty specialties.

Describe any funding alternatives that have been explored.

Note both alternative approaches in addressing the problem, as well as alternatives to new funding (repurposing existing divisional funding or one-time fund use). If these alternatives are not being pursued, explain why.

We have used some modest internal approaches to begin to meet these goals. These include strategically redirecting the faculty specialty of a retired Professor of Paleontology to become a TT hire in Surficial and Fluvial Processes. We have also increased general program capacity via successful partnerships with the new Marine and Coastal Science (MACS) program, and by an expanded collaboration in Planetary Science with Physics & Astronomy. These cannot, though, produce the added capacity and expertise needed to deliver the programs we seek to propose here.

Section 5: Fulfillment of WWU's Strategic Plan's Core Themes and Goals

Please explain how your proposal and the anticipated outcomes will advance the Core Themes and Goals of WWU's 2018-2025 Strategic Plan and the strategic priorities set for this budget cycle. How does this allocation or withdrawal of funding advance or hinder access to Western, academic excellence, and/or inclusive achievement?

Core Themes

Advancing Inclusive Success

This proposal will leverage current participation in the outreach, recruitment, and support system being developed for natural sciences majors through the Advancing Excellence and Equity in Science (AEES) program, and by developing partnerships and outreach and recruitment plans with 2-yr colleges to be selected to maximize the potential to recruit more diverse students into these geoscience degree programs. Current 2-yr colleges with existing geoscience programs and faculty that would be well-aligned as partners for this program would be at Olympic College, Seattle Central CC, North Seattle CC, South Seattle CC, Spokane CC, and Highline College.

Increasing Washington Impact

As described in the body of this proposal, the programs to be established here will address many societal needs- water availability and quality, improved understanding and mitigation of geological hazards, better and more sustained efforts to mitigate effects of climate change. In addition, the programs will increase capacity in STEM degree programs, and will specifically address a significant workforce requirement for more qualified geoscience professionals in this state.

Enhancing Academic Excellence

The new degree programs will build on highly successful and high-quality degrees offered by the WWU Geology Department, and allied programs in Environmental Science, and Marine and Coastal Science. The new faculty, staff, and graduate and undergraduate students who will be hired, and who will graduate from, this program will all enhance and expand the impact of these quality programs while advancing critical state needs

Goals

Western will provide a transformational education grounded in the liberal arts and sciences and based on innovative scholarship, research, and creative activity.

This program will ensure and expand student access to a wider range of undergraduate, graduate, and professional programs via the introduction of these new degree, and expanding capacity in the geosciences and allied programs, meeting Goal 1A. Many of the topics and disciplines included in the geosciences, and in particular within hydrogeology, engineering geology, and climate/geological hazards will directly provide additional tools and experiences to activate intellectual curiosity and apply these tools and curiosity to important societal issues, meeting Goal 1B. The project will increase the support and infrastructure within the geosciences and allied programs, bolstering research, teaching and creative activity in these fields, thus meeting Goal 1C. Because the programs proposed here will increase opportunities and experiences in field settings, and in working with off-campus industry and agency partners, this program will directly aid in meeting Goal 1D, to ensure that all students have access to high quality educational experiences beyond the classroom. Finally, the new technological and infrastructure elements of the programs proposed here, along with bolstering allied programs and directly addressing important resource and geohazards problems through engagement with local, regional, and national partners, Goal 1G is also directly addressed by core elements of this proposal.

Western will advance a deeper understanding of and engagement with place.

Many elements of geoscience teaching and research have meaningful and valuable intersections with the physical location and environment. The natural environment, and how it has been modified by the built environment, is at the core of applied geosciences such as hydrogeology and engineering geology. A better understanding of concepts of place will inform the development of the new programs proposed here via targeted local and regional partnerships, including Indian Tribes who are concerned about how warming climates will further jeopardize instream flows and endangered salmon that are important to tribes from both an economic and cultural standpoint.

These programs can meet aspects of Goal C by providing an enhanced understanding of the geological environment and evolution of the region and will include experiences in natural and classroom settings. A better understanding of our regional and local geological setting, hazards and conditions posed by this setting, and important questions such as water availability and impacts of climate changes will be fostered by the programs developed as part of this proposal, and these can in turn be used to directly inform and improve the geological sustainability of the University and its operations, thus meeting Goal 2E.

Likewise, these same programs that lead to improved understanding of the natural, geological environment (which essentially is the physical manifestation of our planet), will provide our students with knowledge, skills, and abilities to understand aspects of the geosciences that promote thriving communities including tribes, and so this will help meet Goal 2F. Working directly with WWU and local, regional, and national communities to better understand aspects of engineering geology and hydrogeology, and to develop direct partnerships with those communities will increase engagement, and so help accomplish Goal 2G. The geosciences have, among the departments and programs in the College of Science and Engineering, better prospects for advancing elements of place as outlined in this goal, as a better understanding of, and respect for, the whole Earth is a foundational element of our program.

Western will foster a caring and supportive environment where all members are respected and treated fairly.

Goal 3F is well-addressed by this proposal. An important element in this project will be to expand the networks and connections between faculty, students, staff, and alums working on issues and projects in the geosciences, specifically in hydrogeology and engineering geology. The Geology Department has a broad network of alumni in these fields that will serve as a solid basis for further advancement in this area.

Western will pursue justice and equity in its policies, practices, and impacts.

While the Geology Department respects, and in some cases exercises leadership in, the elements in this goal, the programs proposed here will only directly address Goal 4C, by seeking to recruit, retain, and graduate larger numbers of under-represented and first-generation UG and MS students. Through professional development from CSE's AEES program and Geology's internal URGE Pod, faculty are advancing their ability to develop inclusive curriculum and department culture.

Section 6: Space Planning, Capital, and Maintenance Considerations

Major Equipment of Software Needs

If the proposal includes new major equipment or software (>$25K), please indicate its anticipated useful life, and associated operating costs such as service contracts or annual licenses.

Proposal will include $240,000 for faculty start-up and shared research and teaching instrumentation, of various types, which typically have useful service lives of ~20 yrs.

Space or Infrastructure Upgrades

Do you believe new space, space modifications, or infrastructure upgrades will be required? If so, please provide the following as best you can.
Please note that Capital Planning and Development will review and evaluate the request after the proposal is submitted to determine options.

Scope:

A companion request was already submitted as part of the current Capital Budget and Planning process. The scope of work for this proposal would require two faculty offices (120 asf each), two faculty labs (200 asf each), two staff offices (120 asf each), and space for ~10 additional MS students (perhaps 500-700 asf total.

Square Footage:

See above

Cost for capital component:

An estimate- likely optimistic- is $500,000 for this

Changes to the Use of Existing Space

If existing space is being repurposed, explain how the proposed activities will be accommodated within existing space. For how long? Who will need to approve the proposed new use of this space?

Some of these spaces could be further repurposed from existing space in ES- please see the different capital project requests submitted for the current budget and planning process. Naturally, a logical and efficient solution would be to build a new ~35,000 to 40,000 asf purpose-built building for the WWU Geology Department, and move the department into this new space. This would solve any attendant space issues for this and other geoscience programs for the next 60 years.

Incorporation of Physical Accessibility and Cultural Inclusion

For proposals that include capital development or IT infrastructure, please explain how physical accessibility and cultural inclusion (beyond statutory requirements) will be resourced as foundational elements of project development.

These elements will be included and emphasized during the planning process

Proposal Title: Applied Geoscience

Divison: Academic Affairs
Department: CSE/Geology
Department Contact: Bernie Housen

Salary and Benefits	Description	Fiscal Year 2024 FTE	Salary	Benefits	One-Time Costs	Total	Fiscal Year 2025 FTE	Salary	Benefits	One-Time Costs	Total
Faculty Positions	two TT faculty and start up	0.75	$80,000	$30,013	$120,000	$230,013	1.50	160,000	60,027	$120,000	340,027
Professional/Exempt Positions		-	$0	$0	$0	$0	-	-	-	$0	-
Classified Positions	two staff	1.75	$85,896	$46,920	$6,000	$138,816	1.75	85,896	46,920	$0	132,816
Student Salaries (Graduate Assistants, Hourly Student, etc)	5 Tas	3.00	$48,000	$3,403	$0	$51,403	5.00	80,000	5,671	$0	85,671
Total Salaries and Benefits		**5.50**	**$213,896**	**$80,336**	**$126,000**	**$420,232**	**8.25**	**325,896**	**112,618**	**$120,000**	**558,514**

Non-Personnel Expenses	Description	Units	Price per Unit	Recurring Costs	One-Time Costs	Total	Units	Price per Unit	Recurring Costs	One-Time Costs	Total
Supplies and Materials	Addition to Dept Operating Budget			$6,000		$6,000			$6,000		$6,000
Professional Service Contracts						$0					$0
Other Goods and Services, Memberships, etc.						$0					$0
Travel						$0					$0
Other						$0					$0
Capital Facility Expenses (New Space or Space Modifications)	space for two faculty, staff, TA				$500,000	$500,000					$0
Total Non-Personnel Expenses				**$6,000**	**$500,000**	**$506,000**			**$6,000**	**$0**	**$6,000**

University Indirect Costs	Description	Include?		Recurring Costs	One-Time Costs	Total			Recurring Costs	One-Time Costs	Total
Libraries** (Estimated at $10k per faculty member)	$10,000 per new faculty member	YES		$10,000	$0	$10,000			$20,000	$0	$20,000
Academic Support Services/Student Support Services	3% of Recurring Direct Costs	YES		$9,007	$0	$9,007			$13,335	$0	$13,335
Institutional Support	2% of Recurring Direct Costs	YES		$6,005	$0	$6,005			$8,890	$0	$8,890
Plant Operation and Maintenance	3% of Recurring Direct Costs	YES		$9,007	$0	$9,007			$13,335	$0	$13,335
Graduate TA Waiver	Input amounts for new TA Positions	YES		$73,296	$0	$73,296			$122,160	$0	$122,160
Total Indirect Costs				**$107,315**	**$0**	**$107,315**			**$177,721**	**$0**	**$177,721**

	FTE	Head Count	Recurring Costs	One-Time Costs	Fiscal Year Total	FTE	Head Count	Recurring Costs	One-Time Costs	Fiscal Year Total
Total Proposal, All Direct and Indirect Costs	**5.50**	**6.00**	**$407,546**	**$626,000**	**$1,033,546**	**8.25**	**9.00**	**$622,235**	**$120,000**	**$742,235**