DOE/EA-1055

ENVIRONMENTAL ASSESSMENT
FOR THE PROPOSED
CENTER FOR ADVANCED INDUSTRIAL PROCESSES

WASHINGTON STATE UNIVERSITY
COLLEGE OF ENGINEERING AND ARCHITECTURE

PREPARED BY

U.S. Department of Energy
March 1995

DISCLAIMER

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ABBREVIATIONS AND ACRONYMS

ACM	Asbestos Containing Materials
CAIP	Center for Advanced Industrial Processes
Ci	Curies
CO	Carbon Monoxide
DOE	Department of Energy
dB	Decibels
EA	Environmental Assessment
EPA	Environmental Protection Agency
ETRL	Engineering, Teaching and Research Laboratory
mCi	Millicuries
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NO_x	Nitrous Oxides
Po-210	Polonium isotope 210
RCRA	Resource Conservation and Recovery Act
SO_x	Sulfur Oxides
TSP	Total Suspended Particulates
VOC	Volatile Organic Compounds
WSU	Washington State University

1. DOCUMENT SUMMARY

The DOE proposes to authorize Washington State University (WSU) to proceed with the detailed design, construction, and equipping of the proposed Center for Advanced Industrial Processes (CAIP). The proposed project would involve construction of a three story building containing laboratories, classrooms, seminar rooms, and graduate student and administrative office space. Existing buildings would be demolished. The proposed facility would house research in thermal/fluid sciences, bioengineering, manufacturing processes, and materials processing.

Under the "no-action" DOE would not authorize WSU to proceed with construction under the grant. WSU would then need to consider alternatives for proceeding without DOE funds. Such alternatives (including delaying or scaling back the project), would result in a postponement or slight reduction in the minor adverse environmental, safety and health impacts of the project evaluated in this assessment. More importantly, these alternatives would affect the important environmental, safety, health, and programmatic benefits of the projects.

The surrounding area is fully urbanized and the campus is intensely developed around the proposed site. The buildings scheduled for demolition do not meet State energy codes, are not air conditioned, and lack handicapped access.

Sensitive resources (historical/archeological, protected species/critical habitats, wetlands/floodplains, national forests/parks/trails, prime farmland and special sources of water) would not be affected as they do not occur on or near the proposed site. Routine construction waste as well as some asbestos and PCB waste would be managed according to appropriate regulations. Air quality, traffic and noise impacts would be routine for construction activities.

Domestic and sanitary wastes would be disposed by available municipal facilities. Hazardous wastes (~200 gallon/yr) and a negligible amount of radioactive waste would be collected by licensed contractors for permitted disposal. The only radiation would be from an extremely low-level source in a laboratory device requiring no badging. Toxic air emissions from laboratory ventilation system blowout would produce negligible levels of public exposure. No net increase in or new criteria pollutants would be emitted. There would be no radioactive emissions. Indoor/outdoor noise would be below nuisance levels. Socioeconomic impacts would be small in the scale of overall university economic activity. Accident risk would be very low in view of University safety programs and the history of laboratory accidents. Cumulative impacts would be small.

The proposed action is not related to other actions being considered under other NEPA reviews. There is no conflict between the proposed action and any applicable Federal, State, regional or local land use plans and policies.

2. PURPOSE AND NEED FOR AGENCY ACTION

The DOE has been provided funds by Congress to assist particular universities and facilities. The purpose for this DOE action is to carry out congressional wishes (described in section 3.1) and to contribute to its own mission by supporting research programs such as those which would be conducted at Washington State University.

The University's purpose is to develop a single modern facility to replace inefficient and unsafe laboratory facilities to support research in energy efficient technologies for advanced industrial processes.

3.0 DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 Description of the Proposed Action

The DOE proposes to authorize Washington State University to proceed with the detailed design, construction, and equipping of the proposed Center for Advanced Industrial Processes (CAIP)/Engineering Teaching & Research

Laboratory (ETRL). House Report 102-866 accompanying the FY 1993 Energy and Water Appropriations Act indicated that $8 million had been included in DOE's fiscal year 1993 appropriation to assist Washington State University with construction of the proposed CAIP/ETRL. DOE executed a grant with the University on May 26, 1993, and grant funds are available to the University for the limited purpose of performing preliminary studies, including analysis necessary to conduct this environmental assessment. However, under the terms of the grant, the grantee may not initiate construction or take any other action which would affect the environment or limit alternatives until the DOE NEPA process has been completed and DOE has determined that such action should proceed.

The total project cost would be approximately $27 million with the non-DOE portion funded by the University and the State of Washington. Completion of construction is scheduled for December 1997.

3.2 Project Description

3.2.1 Construction Activities

The project would involve the construction of a three story building of 82,000 gross square feet (56,000 net square feet) containing laboratories, classrooms, seminar rooms, and graduate student and administrative office space. It would occupy a footprint of 26,850 square feet. The foundation would be spread footings. The superstructure would be structural steel frame with sprayed fire proofing.

A modular design would be used so that laboratory facilities could be set up and modified without major renovation. The facility would also be designed to be accessible to people with physical impairments. The site is currently occupied by the Mechanical Engineering Laboratory (or "shops") (built in 1930) and the Engineering Laboratory (built in 1947). The Mechanical Engineering Laboratory would be entirely demolished, and the Engineering Laboratory partially demolished. In addition some footings and retaining walls left in place from a previous building demolition in 1989 would be removed. The existing buildings house a wind tunnel laboratory, a machine tool laboratory, research labs for bio-processing, and technician and graduate student offices. These facilities are now obsolete and would be replaced by state-of-the-art facilities in the new building. Demolition would be accomplished by dismantlement of the structures. In addition the southern portion of Arch Road would be removed to the intersection with College Avenue.

The Mechanical Engineering Shops Building has an estimated 256 linear feet of pipe insulation classified as "asbestos containing materials" (ACM). The Engineering Laboratory has approximately 3774 linear feet of ACM pipe insulation plus approximately 16 square feet of ACM boiler insulation. (Ref 4) The proposed site contains no underground storage tanks. (Ref 1)

3.2.2 Operation Activities

The proposed facility would house laboratories to support research in thermal/fluid sciences, bioengineering, manufacturing processes, and materials processing. Specific research would include: study of multi-phase flow, bio-separations, materials synthesis including aerosol and colloidal particles, manufacturing design using virtual reality, high temperature materials testing, and other laboratory and research investigations. Currently planned specialized research equipment includes (representative sample):

Materials Synthesis and Processing
Hot Isostatic Press
High Temperature Particle Analyzer
Nano-Tensile Tester
High Frequency Fatigue Tester
High Resolution Scanning Transmission Electron Microscope
X-Ray Photoelectric/Auger Electron Spectroscope
Theta-Theta Dynamic X-Ray Diffractometer

Bioprocessing
Ultra-Centrifuge
Large Scale Fermentor
Capillary Electrophoresis
Fourier Transform Infrared Spectroscopy

Manufacturing Processes
Multi/Axial Materials Testing Machine
Computer Controlled Turning Center
Five-Axis Computer Controlled Machining Center
Metal Forming Press
Programmable Heat Treating Oven

The proposed facility would include storage for small amounts of various chemicals including reagents, solvents, lubricants, fuels, (See section 5.2.3 for identification and quantities of these materials as post-usage wastes) (Ref 1). The project involves no activities in navigable air space, and no depletion of non-renewable resources (other than energy resources). (Ref 1)

Additional description of construction and operation activities (asbestos removal/disposal; erosion control; PCB waste handling; and other waste management activities is provided in Chapter 5.

3.3 No Action Alternative

Under the no-action alternative, the DOE would not authorize Washington State University to proceed with construction or any other action which would affect the environment or limit alternatives. The federal funding for this project represents approximately 30% of the total project costs. All planning for this facility has assumed a scope of project with a total cost that includes the federal grant. A no-action alternative would require scaling back the currently planned project by approximately 30% or delaying the project until another source of funding could be found. Delaying the project due to no-action (which would also delay demolition of the existings building since they house critical academic programs), would result in a postponement of the beneficial and adverse environmental, safety and health, and programmatic effects reported in this Environmental Assessment. The alternative - scaling down the size of the planned facility - would not reduce the magnitude of demolition and construction impacts, and would likely reduce operational impacts less than 30% of the estimates in Chapter 5, since scaling back of instruction and research is not anticipated to affect enrollment growth. However, scaling back would likely have a negative impact on laboratory instruction, which would have to be altered due to pressure on laboratories from increased student enrollment. In addition, students with severe handicaps could not be admitted to certain programs. Laboratory experiments would suffer significantly and not reflect modern engineering practice.

Users of the current facility are not exposed to significant health and safety hazards. However, the current design and construction practice of modern laboratory buildings does in fact improve the health/safety conditions and also improves the impact on the environment. Examples of such benefits include: improved chemical handling facilities (e.g., storage, ventilation and spill isolation); improved fire safety protection; improved structural integrity (with reduced risk of failure due to high winds, earthquakes, etc.); and improved research practices that could dramatically reduce the volume of chemicals thereby reducing the environmental impacts.

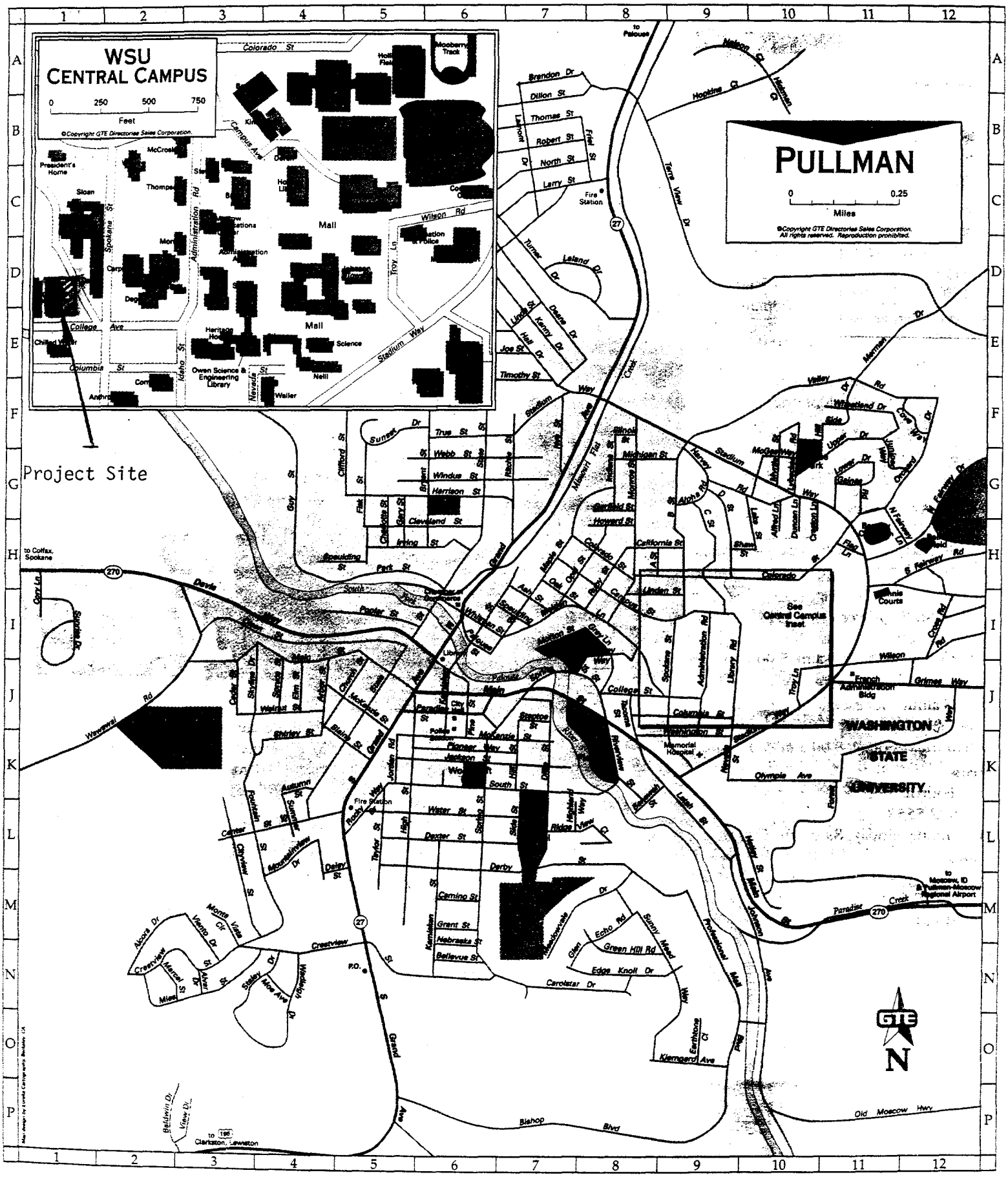


FIGURE 3-1
PROPOSED SITE IN RELATION TO PULLMAN, WASHINGTON

Washington State University

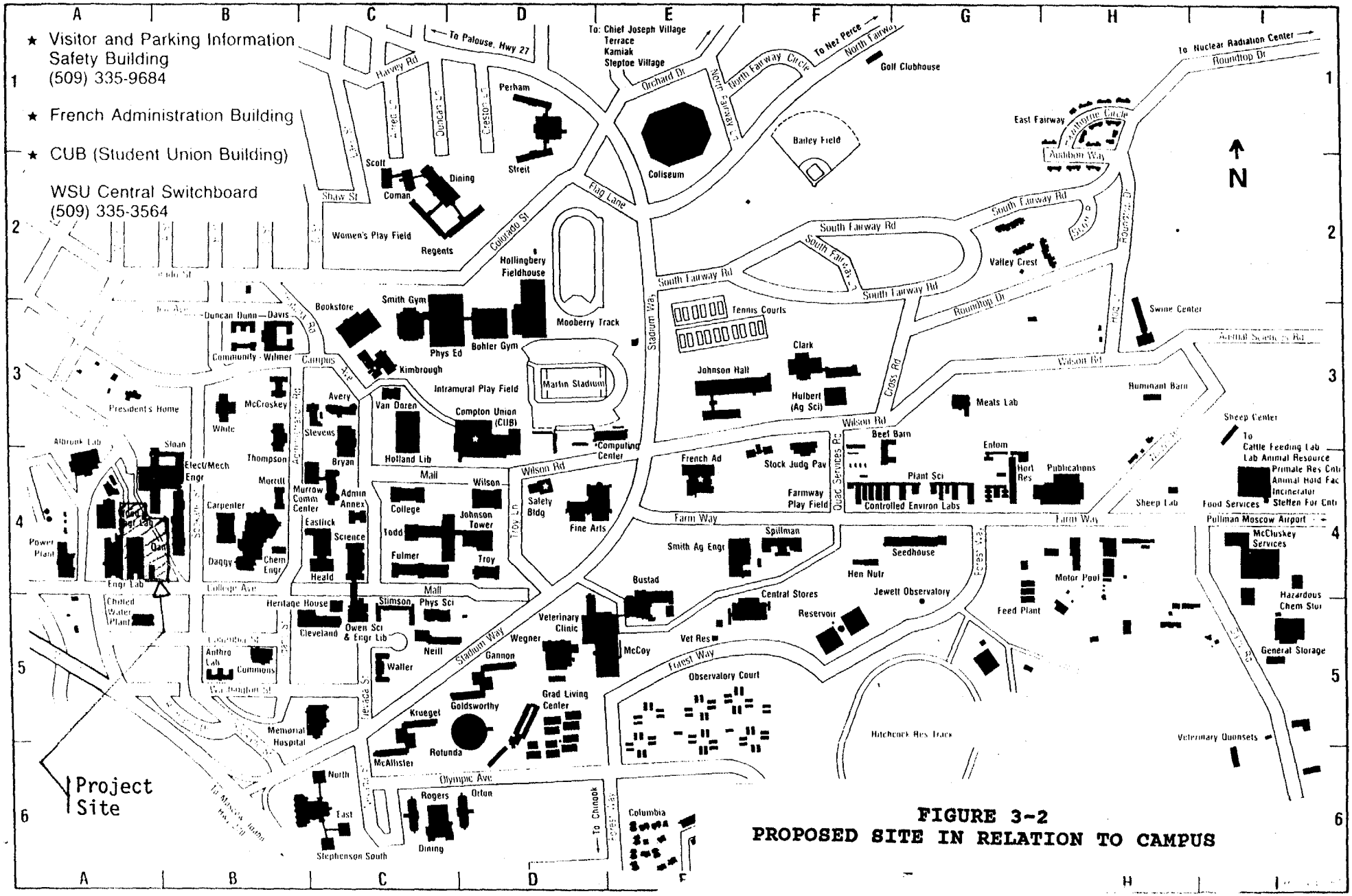
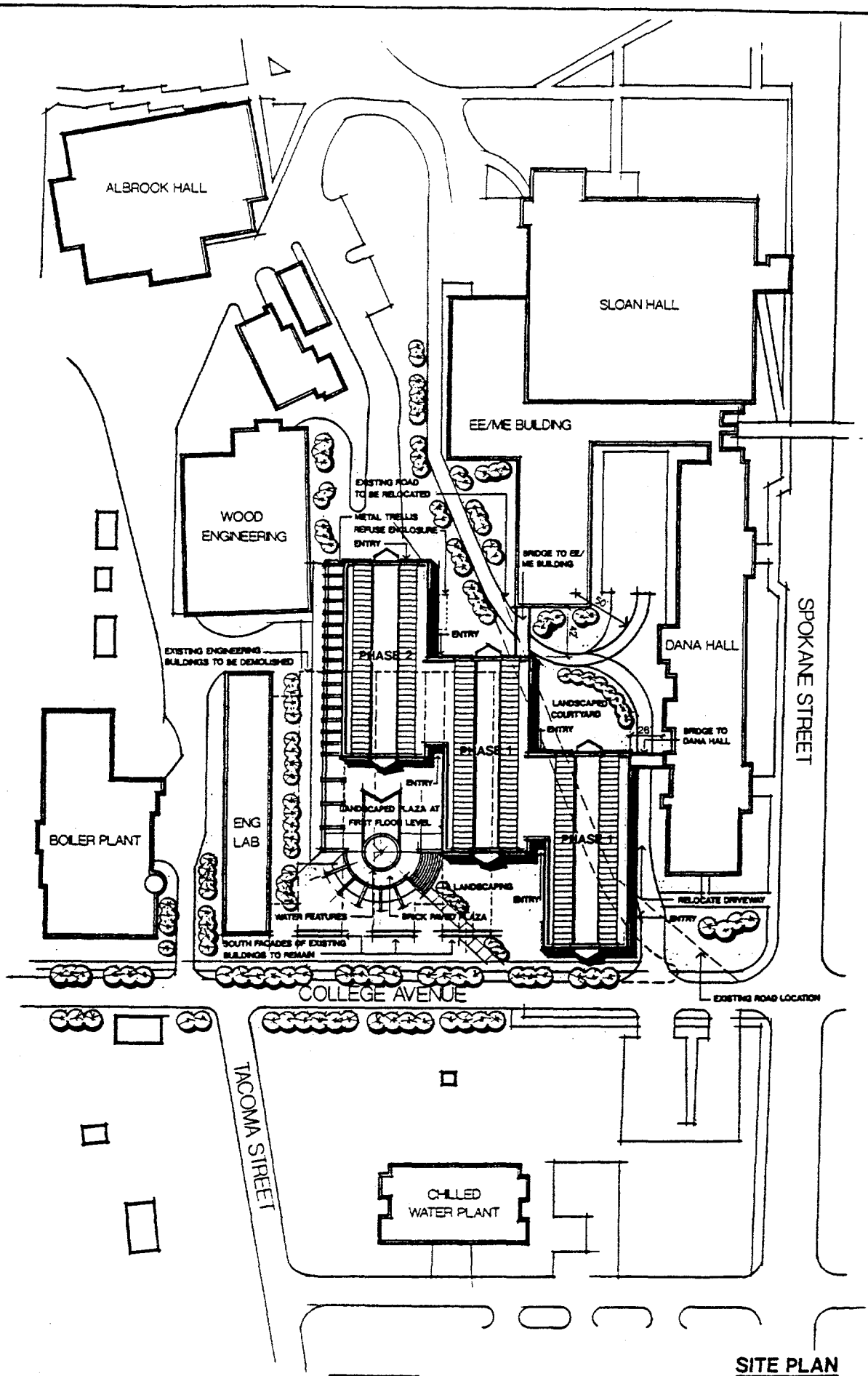


FIGURE 3-2
PROPOSED SITE IN RELATION TO CAMPUS



SITE PLAN

0 10 20 40 80 120

FIGURE 3-3
PROPOSED SITE ON WSU CAMPUS

Engineering Teaching and Research Laboratory

The Callison Partnership

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4. THE AFFECTED ENVIRONMENT

4.1 Site Description

The area in the vicinity of the proposed site is fully urbanized consisting of streets, residential and commercial buildings, a railroad line, some city parks and locally landscaped areas. The campus area is intensely developed with buildings, roadways, recreation areas, and some open lawns and landscaped areas. The proposed site is largely occupied by existing buildings, a campus street (Arch Road), parking areas, and a small amount of lawn or landscaped space with some shrubs. The proposed site is on a slope involving a drop of approximately 65 feet from Dana Hall running east to the Boiler Plant. The buildings scheduled for demolition (described in section 3.2.1) do not meet State energy codes, are not air conditioned, and lack handicapped access. They are also considered unsafe for occupancy during adverse weather conditions. The proposed site in relation to the city of Pullman, Washington is shown in Figure 3-1. The proposed project site in relation to the WSU campus is shown in Figure 3-2. The proposed site on College Avenue at the southwest corner of the WSU site is shown in Figure 3-3.

The City of Pullman zones the entire campus as "university use". Zoning and land use on the campus is the responsibility of WSU and is determined by a master planning process. (Ref 2)

4.2 Air Quality

The proposed site is in Whitman County, a part of the air quality control region defined by the Eastern Regional Office of the Department of Ecology. This area is attainment for all criteria pollutants. (Ref 1)

4.3 Surface/Ground Water Quality

The South Fork of the Palouse River is approximately 1/2 mile southwest of the proposed site on the other side of the Union Pacific railroad tracks. The river is essentially an urban creek and is not used for water supply. Surface drainage from the campus (and the proposed site) is largely captured by a storm drain system and does not drain directly into the river.

The proposed site is approximately 160 feet above the Grande Ronde aquifer, a source of water supply for the City of Pullman. The aquifer is contained within confining layers of basalt. The Grande Ronde is not a sole source aquifer. Some near-surface groundwater occurs in shallow layers over the basalt bedrock. (Ref 1)

4.4 Soil

The proposed site has a thin cover of uncontaminated loamy soil overlying basalt bedrock and is protected against erosion by local landscaping practices. (Ref 1)

4.5 Sensitive Resources

According to the Office of Archeology and Historic Preservation of the State's Department of Community Development the two buildings scheduled for demolition are not eligible for listing in the National Register of Historic Places. (Ref 5)

According to the U.S. Department of Interior Fish and Wildlife Service there are no listed, proposed or candidate state or federally-protected species within the are of the project (Ref 6).

According to the Corps of Engineers the site is located outside the existing 100 and 500 year floodplains as shown

on a copy of the Flood Insurance Rate Map. (Ref 7). The proposed site involves no wetlands. (Ref 8)

There are no national parks, forests, wild or scenic rivers, and no prime, unique or important farmlands in the area of the proposed site, and the proposed site is not located in a coastal zone as defined by the Coastal Zone Management Act. (Ref 1) The water resources described in Section 4.4 are not special sources of water and would not be affected by the proposed construction. A previous construction of a utility tunnel at the proposed site did not encounter any of the shallow groundwater layers over the local basalt. (Ref 1)

5.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

5.1 Construction Impacts

5.1.1 Sensitive Resources

No sensitive resources would be impacted by the proposed action.

5.1.2 Erosion/Run-Off

While conventional methods will be used for erosion control, it is anticipated that the level of any significant erosion during the construction phase will be extremely low. The building is to be located on a proposed site presently occupied by an existing building which is surrounded by other built structures and hardscape. Beneath that portion of the hardscape which will be excavated is a thin top soil layer which covers solid basalt rock. It is expected that any run-off which is not controlled will be contained in a detention system associated with an existing storm sewer which has been designed to meet university and city standards. Hence, the impact from erosion not contained is considered to be of no significance.

5.1.3 Demolition/Construction Waste Disposal

5.1.3.1 Conventional Wastes

Demolition would produce approximately 30,000 cubic yards of conventional rubble such as ceiling tiles, dry wall, wood, masonry, and concrete.

Excavated soil and rock materials would be approximately 2,300 cubic yards and are not expected to be contaminated as there is no history of bulk hazardous materials storage or fuel tanks at the proposed site.

Construction would produce approximately 8000 cubic yards of conventional solid waste such as wood, cardboard, paper and plastic packaging materials and miscellaneous rubble such as masonry and tile materials. The respective demolition, excavation and construction contractors would be responsible for salvage, recycling, or permitted disposal in a landfill.

These wastes would be carried to the Whitman County Landfill for landfill disposal until sometime in 1995 when the landfill will likely be closed. After landfill closure a transfer station will operate at the former landfill site and wastes would be transported to a regional facility in south central Washington. (Ref 1)

5.1.3.2 Contaminated Wastes

Some light ballasts in the buildings scheduled for demolition are known to contain PCBs. Quantitative data is not available at this time. The contractor would be required to identify and report PCB sources as they are encountered, isolate such wastes keep a record, and arrange for their disposal in accordance with State regulations WAC 173-303 (Dangerous Waste Regulations) and 40 CFR Part 700-799. (Ref 1)

5.1.3.3 Asbestos

Asbestos would be disposed of according to applicable Federal and State regulations by the removal contractor. This would be at an asbestos cell currently reserved at the Whitman County Landfill or other permitted facility for asbestos disposal. (Ref 1)

5.1.4 Air Quality Impacts

Emissions would include dust, and vehicle and diesel machinery exhaust. Dust would be controlled by conventional methods such as water sprays per State regulations on fugitive emissions from construction (WAC 173-400 - Air Pollution Sources). Washington State University construction practice is to monitor vehicle and diesel machinery exhaust on an ad-hoc basis to determine if exhaust emissions are impacting people in adjacent buildings. If exhaust fumes are causing operating problems because of vehicle idling, the University will require engines be turned off. The State's Department of Ecology has not developed regulations that govern construction or heavy equipment emissions.

5.1.5 Noise

While no noise permit would be required, noise is regulated by the City of Pullman under Washington State Department of Ecology regulations. Sources of noise would include construction machinery such as bulldozers for excavation and site clearing, compressors, cranes, and vehicles which are conventionally designed to reduce noise emissions. There would be no very high level sustained noise sources such as pile driving.

The best estimate of noise level during construction is a time-weighted average of 20-30 db. This level is based on levels associated with existing construction of similarly design facilities. Construction noise will often be at a level which is below that resulting from adjacent traffic.

Noise receptors in the immediate site area involving academic activity include the EE/ME building, Dana Hall, and the Albrook Hydraulic Laboratory. The Boiler Plant and Chilled Water Plant would also be receptors of construction noise. Off-campus residential receptors would not be expected to experience construction noise levels beyond levels prescribed by local regulation. (Ref 1)

5.1.6 Transportation Impacts

5.1.6.1 Traffic

Construction traffic would use local campus streets including Spokane Street and College Avenue. Access to the Campus would be via Stadium Way. (see Figure 4-2). Average construction induced traffic would be approximately 1-10 construction and delivery vehicles daily, and up to 50 automobile trips for construction workers. Data on existing traffic levels is not available, but the projected construction induced traffic is not expected to create delays or inconvenience. (Ref 1)

5.1.6.2 Parking

No parking lot spaces would be lost during construction, but a few street spaces would be lost along Arch Road. Ample parking for construction workers and to compensate for the Arch Road spaces are available at three parking lots adjacent to the proposed site.

5.1.7 Relocation Impacts

No residential relocations are involved. Office relocation of 3-5 permanent staff and approximately 20 graduate students would occur because of scheduled building demolitions. Relocation would be accomplished according

to a plan involving several temporary campus locations prior to permanent relocation in the new facility. The plan is designed to minimize disruption of research and teaching activities. No jobs would be lost as a result of relocation. (Ref 1)

5.2 Operation Impacts

5.2.1 Domestic Waste

Current campus domestic waste generation is approximately 1680 tons per year, and is hauled by Waste Management Inc. to the Whitman County Landfill and Transfer Station. These wastes would continue be carried to the Whitman County Landfill for landfill disposal until sometime in 1995 when the landfill will likely be closed. After landfill closure a transfer station will operate at the former landfill site and wastes would be transported to a regional facility in south central Washington. The proposed CAIP would produce 5-10 tons per year gross, but no new net domestic waste as it would only replace waste currently generated in the buildings scheduled for demolition and by activities to be relocated to the new building. (Ref 1)

5.2.2 Sanitary Waste

The University currently produces approximately 536 million gallons per year of sanitary sewage. The proposed CAIP would produce approximately 1 million gallons per year, but there would be no new net increase in sanitary waste as it would only replace waste currently generated in the buildings scheduled for demolition and by activities to be relocated to the new building. (Ref 1)

The University maintains a Significant Industrial Discharge Permit with the City of Pullman for discharges to the sanitary sewer from a limited number of points on campus. No toxic pollutants as defined by 40 CFR 401.15 are disposed of in the sanitary waste system. Sanitary waste is conveyed to a City of Pullman sewage treatment plant. (Ref 1)

5.2.3 Hazardous Waste

5.2.3.1 Constituents, Gross Quantities, and Sources

The University produces approximately 50 tons per year of hazardous waste (approximately 10,000 gal/yr) as reported to the Washington Department of Ecology. Quantities of waste by class are not available. Quantities of wastes are not listed because the WSU annual report does not require that they be listed by class. They are generically labeled, for example, as laboratory chemicals, with specific reference to shipment date. No new net increase in hazardous waste is expected, and in fact are expected to be slightly reduced because the proposed facility would be replacing older buildings. The reduction could occur because the new facility would include modern laboratories and equipment which are now designed to have minimal environmental impact (Ref 1).

Laboratories in the proposed CAIP would produce approximately 200 gallons per year (these estimates are based on material currently being used in the existing laboratory and are not expected to increase when the new facility utilized):

- Mineral Acids (Sulfuric, Hydrochloric, Nitric & Phosphoric): 10 gal/yr
- Caustic Agents (Hydroxides of Sodium, Potassium and Ammonium): 2-5 gal/yr
- Flammable Solvents (methanol, ethanol, propanol, hexane, decane, benzene, methyl ethyl ketone, kerosene, Fuel Jet A, ethylene glycol): 60 gal/yr
- Halogenated Solvents(methylene chloride, chloroform, carbon tetrachloride): 60 gal/yr

- Aqueous Organics: (50% acetonitrile in water, 1-25% ethyl acetate/hexane and water contaminated with generally less than 100 mg/l of various regulated pollutants (nitrobenzene, polycyclic aromatic hydrocarbons, polychlorinated byphenyls): 20 gal/yr

- Aqueous Heavy Metals (1000 mg/l and less of lead, cadmium, zinc, copper, mercury, magnesium, chromium and silver with 1-5% mineral acids) 5 gal/yr

- Miscellaneous Listed Chemicals as Waste [surplus old chemicals and 100% concentration (salts, sodium benelfate, sodium iodide, calcium chloride], mineral acids (sulfuric, hydrochloric, nitric), and caustics (hydroxides of sodium, ammonium and potassium)]. 15 gal/yr

- Spent Motor Oil: 6 gal/yr

- Mercury: 3 lbs/yr

Miscellaneous Wastes (10% sodium hydroxide, 40% acetone, 40 % methanol, contaminated diesel, contaminated gasoline, antifreeze, petroleum solvent, microdol-X, dektol, D-76 developer, stop bath): 1-2 gallons per year for each material.

5.2.3.2 Waste Management

A chemical and hazardous waste storage facility would be constructed proximate to the proposed CAIP building. The design and operation of the facility would conform to all applicable Federal and State regulations as described in the University manuals, including appropriate labelling, handling, storing, training and instructions for each type of hazardous material. (Ref 9)

WSU has had a RCRA Part B permit (No. WAD 041485301) in the past (expired June 1994), but will no longer treat any of its hazardous wastes on site. Hazardous wastes from the proposed project would be managed in accordance with Washington Administrative Code 173-303 (Washington State Hazardous Waste Regulations). These wastes would be disposed of at various permitted treatment, storage and disposal facilities located throughout the United States, as numerous licensed contractors are used. WSU Environmental Health and Safety Department maintains records on the wastes and contractors. (Ref 1)

Approximately 100 gallons per year of photographic laboratory (darkroom) waste would be disposed of via sewer. This volume is less than 0.1% of the permitted discharge quantity (per State Waste Discharge Permit for Industrial Discharge to a Public Owned Treatment Works, Permit No. ST 5362). (Ref 1)

5.2.4 Biological/Medical Waste

There would be no medical wastes or wastes associated with live or sacrificed animal experiments. Approximately 1 kg per year of biological wastes containing microbes would be generated from lab experiments involving bioprocessing. This would represent no net increase given the reduction in biological wastes from facilities which would move into the proposed CAIP. (The total University microbe-containing biological waste load is not known). Biological wastes from the proposed CAIP would be autoclaved to ensure microbial death prior to discharge to the sanitary sewer. No permit would be required (Ref 1).

5.2.5 Radioactive and Radioactive Mixed Waste

The proposed CAIP would not generate any radioactive or radioactive mixed wastes in the course of operations with a single minor exception. A static elimination device containing Polonium-210 as a sealed source would be used in an electronic balance in one of the laboratories. The device has a useful life of one year. Thus, approximately 0.5 mCi of Polonium 210 (half life 138.4 days) as a sealed source waste would be produced. The University

produces approximately 700 mCi per year of radioactive waste (Ref 1). Upon termination of use of the device, it would be stored with other sources of low level radioactivity at the University. The Po-210 device has no badging or special handling requirements. (Ref 1)

WSU contracts with Thomas Gray and Associates of Orange, CA for radioactive waste disposal. In addition WSU maintain a Generator Site Use Permit for Commercial Low Level Radioactive Waste Disposal Site (G1033) issued by the State Department of Ecology. Disposal of the spent Po-210 device would be in accordance with one of these permitted disposal options (Ref 1).

5.2.6 Radiation Exposures

The sole source of potential radiation exposure associated with the proposed CAIP would be a small amount of Po-210 sealed-source as described in 5.2.5. Possession of the Po-210 device is covered by broad scope license (WN-C003-1), issued by the State of Washington. Under this license WSU is permitted to possess up to 1.0 Ci of Po-210. The Po-210 device contains 0.5 mCi and total campus possession of Po-210 is approximately 100 mCi. The Po-210 device at the proposed CAIP would be used as a static elimination device in laboratory electronic balances. Under the above license WSU has 170 authorized users of radioisotopes in a wide variety of laboratory and experimental settings. (Ref 1)

The University has a radiation safety program involving the monitoring of 1100 badged personnel each month. Users of the Po-210 device do not require badging. (Ref 1) The University has a radiation safety training program. Users of the Po-210 device do not require any radiation safety training.

No data is available on radiation exposure to the Po-210 device because use of the device requires no badging. The Po-210 device emits alpha radiation at levels similar to that emitted by fire alarm devices, and are too low to be detected by badges. Accordingly, expected radiation exposures at the proposed CAIP from the Po-210 device would be negligible. (Ref 1) Given the negligible levels of expected exposure, there would be no health effects.

5.2.7 Air Emissions

5.2.7.1 Radioactive

The proposed CAIP would not be a source of radioactive emissions. (Ref 1)

5.2.7.2 Criteria Pollutants

The proposed CAIP would be serviced by a central campus boiler system which would use two natural gas boilers for most of the load, and a coal fired boiler as backup. Total emissions for the natural gas boilers for 1993 were:

TSP (total suspended particulates)	2.7 tons/yr
SOx (sulfur oxides)	0.1
NOx (nitrous oxides)	27.7
VOC (volatile organic compounds)	0.5
CO (carbon monoxide)	6.9

Taking into account space in buildings eliminated by the proposed action, the proposed CAIP would add no new criteria pollutant emissions above current university levels. The region is currently attainment for all criteria pollutants and the proposed CAIP would not affect the attainment status. (Ref 1,10)

5.2.7.3 Hazardous Air Pollutants (NESHAPS)

The proposed CAIP would not be a source of any air pollutant emissions with specified emission or exposure limits

under the National Emission Standards for Hazardous Air Pollutants (NESHAPS) Program (Ref 1).

5.2.7.4 Other Compounds Released to Air

A certain fraction of the compounds to be used in proposed CAIP laboratories (see list under section 5.2.3) would volatilize and be exhausted to the atmosphere through a system of 13 laboratory fume exhaust systems. Levels of compounds are expected to be roughly the same or even reduced from current levels because the proposed facility would be replacing older buildings. A reduction could occur because the new facility would include modern laboratories and equipment which are now designed to have minimal environmental impact. No HEPA filters or scrubbers would be used. Quantitative data on current University emissions of these substances, or expected annual releases from the proposed CAIP are not available. There are no current or potential health impacts associated with the routine use of material in the present laboratory, and none is anticipated in the new facility since levels will remain roughly the same. (Refs 11,12)

Emissions of toxic compounds are unregulated by the State and no permit to operate is required (Ref 1).

5.2.8 Noise

The proposed CAIP would add no unique or unusual sources of noise to the external environment. External noise would be low level from building ventilation and exhaust systems and would not be a source of nuisance. The proposed CAIP would have a variety of experimental facilities (see list in Section 3.2.2) some of which may produce high local internal noise levels requiring ear protection. Details are not available, but the University's Environmental Health and Safety Office would require noise protection per equipment manufacturer specifications or the campus safety officer. (Ref 1)

5.2.9 Socioeconomic Impacts

The proposed CAIP would employ approximately 20 faculty, 4 researchers, 90 student employees and 4 support staff. These would not add to total university employment as personnel would be shifted from other locations. Project payroll would be approximately $2.35 million compared with University payroll of $94.4 million. Other proposed CAIP expenditures would be approximately $0.25 million compared with University-wide $10.1 million. No controversy has been associated with the project. (Ref 1)

5.2.10 Accident Analysis

5.2.10.1 Natural Risk Hazards

The project site is in an earthquake prone zone. According to UBC, eastern Washington lies in earthquake zone 2-B. With this designation it assumes that there will be a 90% probability of not exceeding an acceleration due to earthquakes of 0.1 g (g=Acceleration of Gravity) within a 50-year period. Likely accidents from a design-basis earthquake would result from items falling from storage areas. Most shelving where workers are susceptible to injury from fallen objects are designed with earthquake lips. Most chemical storage will be in separate rooms with fixed, vented cabinets with a liquid-tight floor construction to contain any spillage. Liquid-tight floor construction is also used in laboratories where chemicals may be used extensively. Finally, it should be noted that there has been no recorded facility damage or accidents resulting from earthquakes at Washington State University in its history of over one-hundred years.

Standard earthquake design procedures as defined by the national Uniform Building Code, 1991 govern the design of the building.

5.2.10.2 Other Risks

Over the past five years (the period in which reliable records are available), laboratories at the university have reported several hundred minor spills to the University's Environmental Health and Safety Office. Of these, approximately 10 have been reported to the Washington Department of Ecology as occurring within Part B permitted facilities or due to spilled substances reaching sewers or surface waters.

Most spills are cleaned up at the source by trained laboratory personnel following the University's Safety Policy and Procedures Manual (Ref 9). Some spills are cleaned up with the assistance of specially trained and qualified personnel from the University's Environmental Health and Safety Office or from contractor organizations.

Over the last five years none of these spills have caused death or serious injury to personnel or have resulted in permanent or large scale environmental damage. There have been no fires or explosions from laboratory operations which have caused death or injury.

The proposed CAIP would be expected to experience a lower incident of accidents than reported above because it would employ improved chemical storage and handling facilities and because no Part B hazardous waste treatment facilities would be involved. (Ref 1)

5.2.11 Cumulative Impacts

Cumulative impacts are defined as "the environmental impact of the action when added to other past, present and reasonably foreseeable future actions... individually minor but collectively significant ..." per 40 CFR 1508.7. Cumulative impacts have been considered in the context of each environmental impact discussed in this document, as well as in relation to the impact of the proposed project as a whole. There is no other construction proposed for the area of impact. Environmental justice is not an issue for this building site.

5.2.12 Visual/Aesthetic Effects

The proposed CAIP building and landscape plan would constitute a visual and aesthetic enhancement of the campus environment.

5.3 Compliance With Regulations

Construction and operation of the proposed CAIP would require the following permits:

- Electrical Permit (Washington State Department of Labor and Industry)
- Storm Water Permit (Washington State Department of Ecology)
- Erosion/Sediment Control Plan (Washington State Department of Ecology)
- Asbestos Removal/Demolition and Disposal Permit (Washington State Department of Ecology and Department of Labor and Industries)
- Boiler Permit (Washington State Department of Ecology).
- Significant Industrial Discharge Permit (City of Pullman, WA)

Compliance with chemical and hazardous material handling, storage and waste, as it would apply to the proposed CAIP, is described in University plans and guidelines. (Ref 9,13)

6. RELATIONSHIP OF THE PROPOSED ACTION TO OTHER ACTIONS AND ACTIONS BEING CONSIDERED UNDER OTHER NEPA REVIEWS

The proposed action is not related to other actions being considered under other NEPA reviews.

7. RELATIONSHIP OF THE PROPOSED ACTION TO ANY OTHER APPLICABLE FEDERAL, STATE, REGIONAL OR LOCAL LAND USE PLANS AND POLICIES LIKELY TO BE AFFECTED

The City of Pullman has zoned the campus for "university use", and WSU determines land use in accordance with its master planning process (Ref 3). There is no conflict between the proposed action and any applicable Federal, State, regional or local land use plans and policies.

8. LISTING OF AGENCIES AND PERSONS CONSULTED

State of Washington, Department of Community Development, Office of Archeology and Historic Preservation, Stephen A. Mathison, Restoration Designer

U.S. Fish and Wildlife Service, Ecological Services Office, David C. Frederick, Field Supervisor

Corps of Engineers, Walla Walla District, Planning Division, David L. Reese, Chief, Floodplain Management Services

Corps of Engineers, Spokane Area Office, Regulatory Branch, Tim R. Erkal, Spokane Area Biologist

State of Washington, Department of Ecology, Shawn M. Nolph, Regional Air Quality Section

9. REFERENCES

1. Environmental Impact Report for the Center for Advanced Industrial Process, College of Engineering and Architecture, Washington State University, November 1993 as supplemented by:

   - Supplemental Information, John Ringo, WSU Project Director, April 29, 1994

   - Supplemental Information, John Ringo, WSU Project Director, August 2, 1994

   - Supplemental Information, John Ringo, WSU Project Director, September 21, 1994

2 Pre-Design Study for Engineering Teaching and Research Facility, WSU Facilities Planning and Callison Partnership, October 1992

3 WSU Comprehensive Physical Planning Process Document, Adopted 1994, Consultant: Burke/Lee, Campus Planners

4 Hazardous Materials Survey, AGRA Earth and Environmental Inc., WSU Mechanical Engineering Laboratory, August 23, 1994

5 State of Washington, Department of Community Development, Office of Archeology and Historic Preservation, Letter from Stephen A. Mathison, Restoration Designer, November 18, 1993

6 U.S. Fish and Wildlife Service, Ecological Services Office, Letter from David C. Frederick, Field Supervisor, September 15, 1994

7 Corps of Engineers, Walla Walla District, Planning Division, Letter from David L. Reese, Chief, Floodplain Management Services, September 7, 1993

8 Corps of Engineers, Spokane Area Office, Regulatory Branch, Letter from Tim R. Erkal, Spokane Area Biologist, October 15, 1993

9 Washington State University, Safety Policies and Procedures Manual

10 State of Washington, Department of Ecology, 1993 emissions data from campus boiler, Shawn M. Nolph, Regional Air Quality Section, June 23, 1994

11 American Council of Governmental Industrial Hygienists, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 1990-1992

12 Geraghty & Miller Inc., Air Pollution Hazard Analysis (in support of the Environmental Assessment for the Institute of Micromanufacturing at Louisiana Tech University), December 15, 1992

APPENDIX A - SUPPORTING DOCUMENTATION

State of Washington, Department of Community Development, Office of Archeology and Historic Preservation, Letter from Stephen A. Mathison, Restoration Designer, November 18, 1993

U.S. Fish and Wildlife Service, Ecological Services Office, Letter from David C. Frederick, Field Supervisor, September 15, 1994

Corps of Engineers, Walla Walla District, Planning Division, Letter from David L. Reese, Chief, Floodplain Management Services, September 7, 1993

Corps of Engineers, Spokane Area Office, Regulatory Branch, Letter from Tim R. Erkal, Spokane Area Biologist, October 15, 1993