APPENDIX 14A
FACILITIES CHECKLIST

1. Housing

   a. Structures: cabins, “apartments,” dorms, house trailers (variations include staff vs. visitors, individual vs. married vs. shared accommodations, long term vs. short term, teaching vs. research vs. public use)

      - sleeping quarters
      - restroom and showers
      - kitchen and pantry
      - dining
      - lockable closets and personal storage
      - recreation and lounge

   b. Campgrounds

      - tent space or tent cabins
      - toilets and showers
      - tables
      - water supply
      - fire pits
      - food and equipment storage
      - sun and rain shelters

2. Work Space

   a. Labs

- wet and dry labs

- water/power/gas/ventilation/lighting/drainage systems

- bench space

- supplies and equipment cabinets

- shared equipment (refrigerators, scales, ovens, fume hoods, etc.)

- hazardous materials storage

- safety equipment

b. Offices; space and equipment

(administrative use vs. teaching and research use resident staff vs. visiting users, long-term users vs. short-term users, individuals vs. groups)

c. Library and Map Room

- shelving and cabinetry

- cataloging and/or librarian space

- table space and lighting

- temperature, humidity, and pest control

d. Synoptic Collection Space

- same as c.

e. Classroom, Meeting Room and Conference Space

(dedicated vs. multi-purpose)

f. Computer Room

- power supply: surge and back up protection

- temperature, humidity, and dust control

g. Animal Holding Facilities

- pens, corrals, runways

- cages and aviaries

- tanks and aquaria: seawater and freshwater systems

h. Greenhouses

- heated or unheated

- enclosed?

3. Utilities

a. Water Systems

(drinking supply vs. fire fighting/non-potable supply)

- water company hook-ups

- surface flow (springs, seeps, streams, lakes)

- wells

- rainfall catchment

- storage, treatment, pumping, and distribution systems

- fire hydrant/hose/pump system

b. Power Systems

- electric company hook-ups

- on-site gasoline or diesel generators: noise baffling, exhaust emissions

- small hydro systems

- photovoltaic systems

- windmills

c. Gas Systems

- gas company hook-ups

- propane tanks

d. Sewer and Septic Systems

- sewer line hook-ups
- septic tanks and leach fields
- composting toilets
- pump-out holding tanks
- chemical toilets
- grey water leach pits

4. Communication Systems

a. Telecommunications Hook-ups

- voice
- data transmission

b. CB/FM/Shortwave Radio Systems

- base station(s)
- mobile stations and walkie-talkies
- repeater/booster/antenna stations

c. Satellite Links

d. Emergency Medical and Police Links

5. Environmental Monitoring Systems

a. Weather Stations

b. Stream or Tide Gauges

c. Fixed Plots and Transects

d. Grid Systems

e. Fixed Photo Points

f. Ground Control Points: aerial photo surveys

g. Population Sampling

h. Phenology Records

i. Other: pollution monitoring systems (air and water), erosion survey systems

j. Global Positioning System (GPS) and Geographic Information System (GIS)

k. Data (Numeric and Text) Storage and Retrieval Systems

- NRS Metadata Catalog, developed in coordination with the National Center for Ecological Analysis and Synthesis (NCEAS) and the Knowledge Network for Biocomplexity (KNB) (http://www.ucnrs.org)
- NRS Bibliographic Database (http://www.ucnrs.org)

6. Experimental Systems

a. Structures: streams, ponds, enclosures, etc.

b. Perturbations: single burn event, nutrient additions, species removal, etc.

c. Long-term management: dysclimax, habitat mosaic, burn schedules, community alteration, etc.

7. Circulation and Access

a. Roads

- supplies & equipment transport to field sites
- fire fighting access

b. Trails, Boardwalks, and Trail Registers

c. Parking: Cars, Vans, Buses

d. Bridges, Fords, Culverts, Retaining Walls

e. Docks and Boat Ramps

f. Helicopter Landing Pads

g. Directional Signs

8. Vehicles

(administrative, maintenance & management use vs. teaching & research use; long-term vs. short-term use)

a. Trucks, Vans, and Sedans: 2wd/4wd

b. All-terrain Cycles

c. Boats and Rafts

d. Maintenance Vehicles: caterpillar tractors, back hoes, brush cutters or chippers, pumper truckers

e. Miscellaneous: snowmobiles, mountain bikes, trailers, house trailers

9. Garages and Boat Houses

10. Storage and Maintenance Facilities

(teaching & research storage vs. maintenance & management storage: shared vs. individual space and equipment)

a. Supply Storeroom: consumables, paint, solvents, etc.

b. Equipment and Field Gear Sheds / Corporation Yard(s)

c. Fuel Storage

- propane tanks

- gasoline and diesel tanks (buried and above-ground)

- kerosene

- firewood

d. Maintenance Shop (if different from teaching and research shop)

- carpentry

- plumbing

- machine shop

- electrical

- electronics and telemetry

e. Solid Waste Storage and Transfer Station: trash compactor & dumpster

11. Security and Emergency Systems

a. Fences and Gates

b. Signs

c. Alarm Systems

d. First Aid Station and Dispensary

e. Fire Fighting Systems

- fuel breaks

- water tank, hydrant, pump & host systems

- tools/stockpiles

- fireproof/fire-resistant clothing: gloves, helmets, face masks, nomex coveralls

- mobile tank truck(s)

f. Search and Rescue: equipment stockpiles

- litters(s)

- flares

g. Emergency Contacts

- police, BLM Ranger, etc.

- ambulance

- evacuation helicopter

- fire fighting

12. Administrative Systems

a. NRS Reserve Application Management System (RAMS)

(http://www.ucnrs.net/)

b. NRS Personnel Directory

c. NRS e-mail forwarding system and E-mail discussion lists

FACILITIES PLANNING ISSUES

Once the facilities needs have been inventoried using the Facilities Checklist (Appendix 14A), several issues must be addressed which affect both the scope of the facilities improvements and site planning and design. Ten issues are highlighted here.

1. Justification

All facility improvements must be programmatically justified. Annual reports, as well as reserve evaluation reports, are an important source of program documentation and justification for the proposed facilities.

User demand and the problems associated with that use must be documented: overcrowding, unsafe conditions, fire hazards, inefficient operation, or use with associated higher maintenance costs, reduced academic productivity, inability to meet programmatic goals and objectives, applicants turned away due to inadequate space and facilities, etc. Annual report use statistics, maintenance records, and letters from projects and users denied access are useful here.

Once documented, the justification arguments can then be summarized in reserve management plans, reserve facilities planning studies, and, if used, project planning guides for specific facilities.

2. Siting

Several siting options are available which influence project planning and design. Staff housing is a good example. If local housing is available and cost-effective, reserve-based staff might be housed off-site in the community, saving the costs of construction, financing, habitat loss, and adverse environmental impacts.

For on-site development, clustering of facilities is preferred over dispersed development. The tradeoffs between concentrated and diffuse impacts must be assessed. If widely separated habitats or elevation zones must be served, more than one facilities enclave may be needed. The balance between accessibility and impacts is also an issue for road, trail, and boat launch development.

3. User Mix

NRS reserves serve up to four user communities, each with different and sometimes conflicting needs: (a) resident staff (administrative, maintenance, management, and academic), (b) visiting researchers (faculty, staff, graduate and undergraduate student, research assistants), (c) visiting classes (instructors and students), and (d) the visiting public (docent-led tours, open houses, conservation groups, primary and secondary school classes, extension classes, and the like).

Differences in group size, space needs, length of stay, and susceptibility to disturbance can result in conflicts between researchers and class groups or public tours. Sensitive siting and design can minimize conflicts with facilities that meet

distinctive needs and that separate the different user communities in space and time.

4. Space Assignment

When facilities and funds are limited and use levels are high, space assignment can be a problem. To a degree this problem can be addressed by the development of appropriate policies and procedures: management plans that specify the balance between teaching, research, and public service and the priorities assigned to each; administrative guidelines that provide prioritization criteria and assign decision-making authority; space committees to assist the reserve manager in space assignments.

There are, however, many design and structural tools to address the problem. Will the spaces be "individual" or shared? One or two-person rooms versus bunkhouses and dormitories, or family housing? Individual offices versus multi-desk work rooms? Assigned desk versus first-come/first-served carrels? Separate laboratories and offices for resident staff and visiting users? Communal pantries and storerooms versus individual lockers, cabinets, and cubicles? Single purpose rooms (i.e., dedicated classrooms) versus multi-purpose spaces (combined dining hall, meeting hall, classroom)?

5. Fees, Recharges, and Maintenance Costs

Facilities design and space assignability affect administrative and maintenance overhead with significant budgetary implications. Whether housing, laboratory,

office, and storage spaces are communal or individually assigned will influence how costs are recovered for utilities, maintenance, and consumables. The design of communication systems (phones, modems, satellite and other computer links, telemetry) poses similar problems. Type of utilities and choice of materials can strongly influence costs for energy, cleaning, and long-term maintenance.

6. Aesthetics

Visual impacts are a major concern, for reserve users, donors, adjacent property owners, and such regulatory agencies as the Coastal Commission. Siting, type of construction, and choice of materials all play a role.

7. Safety

Facilities siting and design can mitigate safety hazards: susceptibility to wildfires, structural fires, landslides, earthquakes, floods, wave damage, and erosion; boat/vehicle safety; storage and handling of hazardous substances (toxic or flammable reagents, herbicides or pesticides, radioactive isotopes); and the like. Several offices at the administering campus can provide useful information on safety issues: campus architects and engineers office (building code information), campus representatives of the State Fire Marshal (fire code information), safety committees (campus safety programs), environmental health and safety office (hazardous materials and hazardous waste), hazardous waste management agencies (local hazardous waste disposal).

8. Regulatory Environment

The California State Constitution exempts University land from local land use regulation. This means that the University is not required to submit applications to cities or counties for building permits or pay fees and assessments, nor is UC subject to local zoning ordinances. UC performs functions equivalent to local land use regulation and building permit process internally. UC has adopted the State Building Code, and the head of the campus Architects and Engineers office acts as the Chief Building Official. The University is subject to state and federal health and safety codes and is required to comply with the State Fire Code. Campuses have deputized fire marshals who review building plans for compliance with, and interpretation of, the Fire Code. Given the distance of many NRS sites from their administering campuses, campus NRS administrative officers can discuss the most effective way to assure compliance with their administering campus.

Politically, it is desirable to meet the planning and development standards and concerns of the local community. The local general plan and zoning is unlikely to include standards that are specifically relevant to natural resources based facilities, but it is important to understand the local jurisdiction's prescribed land use development density. NRS sites may be located in areas with "Open Space" designations, and coordination with local jurisdictions during their general plan and zoning updates can be helpful in defining these land use designations in ways that include NRS facilities and uses.

The University is subject to the California Environmental Quality Act (CEQA) and to regulation by several state and federal agencies, including but not limited to: the California Coastal Commission for coastal development permits; the California Department of Fish and Game for stream encroachment permits, state and federal threatened and endangered species protection, and collection permits; the U.S. Fish and Wildlife Service for federally listed threatened and endangered species; the U.S. Marine Mammal Commission for activities affecting marine mammals; state and regional water quality control boards for septic systems and seawater systems; the State Fire Marshall, the California Division of Forestry, the U.S. Forest Service and local fire districts for fire clearance, weed abatement and fire safety; the State Water Rights Board for stream diversions and water appropriation rights; the Office of the State Architect for handicapped access requirements; the Environmental Protection Agency and the Army Corps of Engineers for dredging and spoil disposal and effluent discharge permits. This list is not complete – merely suggestive.

Other factors affecting facilities siting and design include gift and deed restrictions, contract terms and conditions on leased, licensed, and use-agreement lands, and the terms and conditions of conservation and scenic easements, where applicable. In some instances, facilities development may be prohibited by these restrictions.

9. Administrative Review and Approval

The administrative procedures for the review, approval, and subsequent development of facilities and improvements vary widely throughout the NRS. Procedures vary by campus, by site, by distance from the campus, by project

"visibility" (both physical and political), by type of project (new construction, renovation, demolition, use conversion), by type of "structure" (buildings versus roads, trails, fences, or utilities), by cost and scale of the project (major capital improvement [more than $400,000] or minor capital improvement [less than $400,000]), and by type of funding (see issue 10). Minor capital projects are within the delegated authority of the Chancellor, and on each campus, are likely to be further delegated. Please consult with your administering campus as to the appropriate approval level for the contemplated project. Review and approval by appropriate Deans, Provosts, Vice Chancellors or the Chancellor may be required, particularly if the project is to be listed on the campus' capital improvement program or the Operation and Maintenance of Plant (OMP) inventory.

Because campuses develop lots of facilities (as well as maintain and renovate existing facilities), they have an extensive system in place to manage the facility process, and are conversant with both the University policies and procedures for facility development, as well as state laws which regulate facility development. The following offices can provide the listed facilities services (office name and campus organization may differ):

- Campus Planning — land use planning, local land use regulation, site planning, environmental review
- Capital Planning/Projects — budgeting projects, project justification
- Plant Accountant — assigns Plant Asset File Number for the facility (this is required for inclusion of the project in University insurance coverage)
- Accounting — clarification of appropriate accounting for the project

- Design & Construction/Architects & Engineers — architectural services, code compliance (including building and fire), project management, construction supervision, construction contracting, building inspection
- Facilities Management — maintenance of facilities and building systems
- Environmental Health & Safety — hazardous materials management, and hazardous waste disposal
- Contracts and Grants — appropriate contract forms for different types of work

Recharges for these services, including the cost of environmental consultants hired to develop CEQA documentation, should be fully accounted for in the overall project budget. Administrative and approval procedures should be evaluated on a project by project basis in close consultation with campus NRS Advisory Committee, campus NRS Administrative Officers, and the NRS Systemwide office.

10. Funding for Structural Facilities

The initial tasks of needs identification, project justification, and conceptual design can usually be done in-house by NRS personnel without a specific project budget. Beyond this groundwork, however, funding is needed for the following general phases of a project:

a. Preliminary planning, design, and budget estimation. Seed funding is needed to cover architectural, engineering, and other professional fees for the following: aerial photography, site mapping, soils testing, utilities analysis,

schematic site plans, schematic building designs, and preliminary budget estimates. Gift and endowment funds are often used to meet these expenses.

This preliminary information is typically needed to determine project feasibility, assess environmental impacts, adjust the size or scope of the project, prepare grant proposals, design fundraising campaigns, and seek administrative approval to proceed with final design, fundraising, and construction.

b. Environmental review, design development, and budget preparation. Funding will be needed for environmental review, architects and engineering fees for design revisions, working drawings, construction schedule, and budget development. Project approval can occur after this phase.

c. Construction. The bulk of the funding is needed for contract supervision and administrative overhead, site preparation, construction, inspection, and the cost of furnishings and equipment.

FACILITIES: SUGGESTED PLANNING AND DEVELOPMENT PROCEDURES

The actual procedures followed should be tailored to the specific campus, site, and project involved. In general:

1. Develop or clarify a statement of reserve purpose. It is particularly important to separate and clearly distinguish teaching from research functions.
2. Develop a statement of programmatic goals and objectives for teaching, research, and public service programs consistent with the statement of reserve purpose.
3. Identify the facilities, equipment, and improvements needed to support the programmatic goals and objectives.
4. Draft a Reserve Facilities Planning Study for the maximum facilities development contemplated for the reserve. This study is a preliminary assessment of priorities and construction phasing over a five-to-twenty-year planning horizon. A Reserve Facilities Planning Study should include a facilities inventory, a program for needed facilities, site analysis, site planning, land use designations (for research areas — distinguishing between structures and natural areas, public use areas, residential areas, etc.), circulation (auto, bus, emergency), and utilities. (This study can either be an informal planning tool for in-house NRS use, or it can be converted to a formal document to seek official review and approval.)
5. For the highest-priority facilities identified in the Reserve Facilities Planning Study, develop a more detailed summary of the types of spaces and improvements needed by function. For each functional space, identify the

following: occupancy and use levels, special needs and constraints (e.g., utilities, budget), and area estimates (ideally as both “assignable” and “gross’ square footage).

6. Use the issues checklist, above, to assess the opportunities for shared and multi-purpose spaces, and for reductions in construction, operation, and maintenance costs.
7. Use the information in steps 5 and 6 to write a project justification and description, or a more formal Project Planning Guide (PPG). The project description or PPG can then be used to seek preliminary project approval and/or as guidance for architects and engineers retained to prepare preliminary site plans and schematic designs.
8. Coordinate with campus and Systemwide NRS administrations for advice on how to proceed with the project.
9. Contract for the development of preliminary site plans, schematic designs, and budget estimates (consult with campus contracts and grants office for assistance in identifying the appropriate contract for different types of work, verifying approval authority, and clarifying the required hiring process).