Appendix A

About Brigham Young University - 2005

Brigham Young University is a coeducational institution of higher learning established for the purpose of promoting a closer union between the restored gospel and all branches of learning. In addition to high standards of scholarship, the University has always fostered the development of religious faith, high moral character, and responsible citizenship. Sponsored by The Church of Jesus Christ of Latter-Day Saints (Mormon), it offers the student a unique blend of spiritual and secular learning.

Situated just 45 miles south of historic Salt Lake City in beautiful Utah Valley, the 709-acre Provo campus is posed against the magnificent backdrop of the Wasatch Mountains. With 30,000 students from all 50 states and 120 foreign countries, Brigham Young University is the nation’s largest privately operated university. Its more than 1,600 full-time faculty members hold degrees from universities throughout the United States and around the world. Seventy-five percent hold doctor’s degrees. Undergraduate instruction is offered in 190 academic programs by the University’s 11 colleges. Masters degrees are offered in 69 programs, juris doctorate and doctorates in 27.

The university admits persons of either sex and of any race, creed, religion or national origin who meet the university’s admission requirements and agree to abide by standards of behavior as established by its sponsor. Admission is based on reviews of high school transcripts; American College Test (ACT) scores; ecclesiastical recommendations; student essays; service to community, school and church; seminary and/or institute recommendation; and other application information. (BYU Campus Web Site)
Appendix B

Summary of Buildings and Floor Areas 2005

<table>
<thead>
<tr>
<th>Buildings</th>
<th>Gross Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td><strong>Existing Buildings</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>Academic</td>
<td>100</td>
</tr>
<tr>
<td>Administrative</td>
<td>41</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>19</td>
</tr>
<tr>
<td>Housing</td>
<td>159</td>
</tr>
<tr>
<td>Non-Institutional</td>
<td>0</td>
</tr>
<tr>
<td><strong>Current Total</strong></td>
<td>319</td>
</tr>
</tbody>
</table>

**Projected Inventory:**

Buildings under construction as noted below:

<table>
<thead>
<tr>
<th>Buildings</th>
<th>Total</th>
<th>Gross Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic</td>
<td>100</td>
<td>4,367,183</td>
</tr>
<tr>
<td>Joseph F. Smith Building</td>
<td>1</td>
<td>289,700</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>101</td>
<td>4,638,883</td>
</tr>
<tr>
<td>Administrative</td>
<td>41</td>
<td>663,062</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>19</td>
<td>1,500,144</td>
</tr>
<tr>
<td>Housing</td>
<td>159</td>
<td>2,354,740</td>
</tr>
<tr>
<td>Non-Institutional</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Buildings in planning as noted above:**

<table>
<thead>
<tr>
<th>Buildings</th>
<th>Total</th>
<th>Gross Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic</td>
<td>101</td>
<td>4,638,883</td>
</tr>
<tr>
<td>Administrative</td>
<td>41</td>
<td>663,062</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>19</td>
<td>1,500,144</td>
</tr>
<tr>
<td>Housing</td>
<td>159</td>
<td>2,354,740</td>
</tr>
<tr>
<td>Non-Institutional</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>PROJECTED TOTAL</strong></td>
<td>320</td>
<td>9,156,829</td>
</tr>
</tbody>
</table>

Appendix B - Space Management
832
# Appendix C

## BYU Buildings by Abbreviation

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Building Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLN</td>
<td>Allen Hall (Museum of Peoples and Cultures)</td>
<td>Cougar Room, LaVell Edwards Stadium</td>
</tr>
<tr>
<td>ALUM</td>
<td>Alumni House</td>
<td>Cougar Room, Marriott Center</td>
</tr>
<tr>
<td>FARM</td>
<td>Animal Science Farm</td>
<td>CTB Crabtree Technology Building, Roland A.</td>
</tr>
<tr>
<td>AXMB</td>
<td>Auxiliary Maintenance Building</td>
<td>DPL Creamery (Dairy Products Laboratory)</td>
</tr>
<tr>
<td></td>
<td>B21 to B32 (Service Buildings)</td>
<td>CONE Creamery on Ninth East</td>
</tr>
<tr>
<td></td>
<td>B34, B-38, B41, B51 (Temporary Buildings)</td>
<td>DT Deseret Towers and Morris Center (MORC)</td>
</tr>
<tr>
<td></td>
<td>B66 Classroom / Lab Building</td>
<td>DTRA Deseret Towers Recreation Area</td>
</tr>
<tr>
<td></td>
<td>B67 Service Building</td>
<td>ESM Earth Science Museum</td>
</tr>
<tr>
<td></td>
<td>B72 Building (LDS Foundation)</td>
<td>LVES Edwards Stadium, LaVell</td>
</tr>
<tr>
<td></td>
<td>B77 Service Building (Former UVSC Building)</td>
<td>EMLC Ellsworth Meat and Livestock Center, Leo B.</td>
</tr>
<tr>
<td>MLBM</td>
<td>Bean Life Science Museum, Monte L.</td>
<td>ESC Eyring Science Center, Carl F.</td>
</tr>
<tr>
<td>B49</td>
<td>Benson Agriculture and Food Institute, Ezra Taft</td>
<td>FOB Faculty Office Building</td>
</tr>
<tr>
<td>BNSN</td>
<td>Benson Building, Ezra Taft</td>
<td>FB Fletcher Building, Harvey L.</td>
</tr>
<tr>
<td>WSC</td>
<td>Bookstore, BYU</td>
<td>FLSR Foreign Language Student Residence</td>
</tr>
<tr>
<td>BRWB</td>
<td>Brewster Building, Sam F.</td>
<td>HGB Grant Building, Heber J.</td>
</tr>
<tr>
<td>BRMB</td>
<td>Brimhall Building, George H.</td>
<td>HCEB Harman Bldg., Caroline Hemenway (Cont. Ed.)</td>
</tr>
<tr>
<td>BELL</td>
<td>Centennial Carillon Tower</td>
<td>HFAC Harris Fine Arts Center, Franklin S.</td>
</tr>
<tr>
<td></td>
<td>Central Heating and Cooling Plants</td>
<td>HAWF Harrison Arboretum and Botany Pond, Betrand F.</td>
</tr>
<tr>
<td>CMB</td>
<td>Chemicals Management Building</td>
<td>HLB Helaman Halls and Cannon Center (CANC)</td>
</tr>
<tr>
<td>HRCB</td>
<td>Clark Building, Herald R.</td>
<td>HLRA Helaman Recreation Area</td>
</tr>
<tr>
<td>JRCB</td>
<td>Clark Building, J. Reuben (Law School)</td>
<td>HR Heritage Halls and Central Building (HRCN)</td>
</tr>
<tr>
<td>CLFB</td>
<td>Cluff Building, Benjamin (Plant Science Lab)</td>
<td>HLRA Indoor Practice Facility</td>
</tr>
<tr>
<td>CB</td>
<td>Clyde Engineering Building, W. W.</td>
<td>IWRA Intramural Recreation Area (West Stadium)</td>
</tr>
<tr>
<td>CONF</td>
<td>Conference Center, BYU</td>
<td>*</td>
</tr>
</tbody>
</table>

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**Appendix C - Building Name Abbreviations**

833
<table>
<thead>
<tr>
<th>Building Abbreviation</th>
<th>Building Name and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWKT</td>
<td>Kimball Tower, Spencer W.</td>
</tr>
<tr>
<td>AKH</td>
<td>Knight Hall, Amanda</td>
</tr>
<tr>
<td>JKHB</td>
<td>Knight Humanities Building, Jesse</td>
</tr>
<tr>
<td>KMB</td>
<td>Knight Mangum Building</td>
</tr>
<tr>
<td>AXLB</td>
<td>Laundry Building, Auxiliary Services</td>
</tr>
<tr>
<td>HBLL</td>
<td>Lee Library, Harold B.</td>
</tr>
<tr>
<td>MSRB</td>
<td>Maeser Building, Karl G.</td>
</tr>
<tr>
<td>MC</td>
<td>Marriott Center, J. Willard</td>
</tr>
<tr>
<td>MARB</td>
<td>Martin Building, Thomas L.</td>
</tr>
<tr>
<td>MB</td>
<td>McDonald Building, Howard S.</td>
</tr>
<tr>
<td>MCKB</td>
<td>McKay Building, David O.</td>
</tr>
<tr>
<td>MLRP</td>
<td>Miller Park (Baseball / Softball Complex)</td>
</tr>
<tr>
<td>MTC</td>
<td>Missionary Training Center</td>
</tr>
<tr>
<td>PPMV</td>
<td>Motor Pool Vehicle Shelter</td>
</tr>
<tr>
<td>MOA</td>
<td>Museum of Art</td>
</tr>
<tr>
<td>NICB</td>
<td>Nicholes Building, Joseph K.</td>
</tr>
<tr>
<td>OLVH</td>
<td>Oliver House (Performing Arts Management)</td>
</tr>
<tr>
<td>PTSB</td>
<td>Parking and Traffic Services Building</td>
</tr>
<tr>
<td>RB</td>
<td>Richards Building, Stephen L</td>
</tr>
<tr>
<td>RBF</td>
<td>Richards Building Fields</td>
</tr>
<tr>
<td>MTCS</td>
<td>Senior Missionary Training Center</td>
</tr>
<tr>
<td>JSB</td>
<td>Smith Building, Joseph</td>
</tr>
<tr>
<td>SFH</td>
<td>Smith Fieldhouse, George Albert</td>
</tr>
<tr>
<td>SFLD</td>
<td>Smith Fieldhouse South Field (Varsity Soccer)</td>
</tr>
<tr>
<td>ASB</td>
<td>Smoot Administration Building, Abraham O.</td>
</tr>
<tr>
<td>SNLB</td>
<td>Snell Building, William H.</td>
</tr>
<tr>
<td>STEH</td>
<td>Stadium East and West (STWH) Houses</td>
</tr>
<tr>
<td>SASB</td>
<td>Student Auxiliary Services Building</td>
</tr>
<tr>
<td>SHC</td>
<td>Student Health Center</td>
</tr>
<tr>
<td>TMCB</td>
<td>Talmage Math Sciences / Computer Building</td>
</tr>
<tr>
<td>TNRB</td>
<td>Tanner Building, N. Eldon</td>
</tr>
<tr>
<td>TLRB</td>
<td>Taylor Building, John (Comprehensive Clinic)</td>
</tr>
<tr>
<td>TCB</td>
<td>Tennis Courts Building</td>
</tr>
<tr>
<td>TCB</td>
<td>Tennis Courts, Outdoor</td>
</tr>
<tr>
<td>TOMH</td>
<td>Thomas House (Risk Management and Safety)</td>
</tr>
<tr>
<td>VCTR</td>
<td>Track and Field Complex</td>
</tr>
<tr>
<td>UPC</td>
<td>University Parkway Center</td>
</tr>
<tr>
<td>UPB</td>
<td>University Press Building</td>
</tr>
<tr>
<td>VCTR</td>
<td>Visitors Center</td>
</tr>
<tr>
<td>WAIH</td>
<td>Waite House (ISPART)</td>
</tr>
<tr>
<td>ROTC</td>
<td>Wells Building, Daniel H. (Air Force/Army Reserve)</td>
</tr>
<tr>
<td>WIDB</td>
<td>Widtsoe Building, John A.</td>
</tr>
<tr>
<td>WSC</td>
<td>Wilkinson Student Center, Ernest L.</td>
</tr>
<tr>
<td>WT</td>
<td>Wymount Terrace and Adm. Bldg. (WOAD)</td>
</tr>
<tr>
<td>WP</td>
<td>Wyview Park and Central Building (WPCB)</td>
</tr>
</tbody>
</table>
Appendix D

Miscellaneous Information about Buildings

ANIMAL SCIENCE AND POULTRY LABS
The Poultry Lab was razed in 1997 along with Wyview Park, married student trailer housing in 1996, to make way for new married student apartments. A new poultry research facility was rebuilt at the Spanish Fork Farm. As the College of Biology and Agriculture was restructured in 2002 and 2003, the need for the animal science facilities decreased. It was decided that the facilities needed for research functions would be relocated near the Ellsworth Building across the street and the buildings on the east side of University Avenue would be razed.

AMANDA KNIGHT HALL - AKH
This women’s dorm was built as a cooperative unit where the girls assisted in the housework and in the kitchen for credit toward their room and board.

After the English Language Center relocated to a new building in 1999, the Amanda Knight Hall remained vacant for four years until it was once again used as surge space during the remodeling of the Brimhall Building and the Harris Fine Arts Center. Future use is unknown at this time (2005).

BENSON (EZRA TAFT) BUILDING - BNSN
The Benson Building has a roof area the size of a football field covering its 194,000 square feet. Housed within the building are up-to-date facilities to support scientific research and teaching laboratories and lab support for the Chemistry and Biochemistry Departments as well as undergraduate and research labs in organic chemistry, physics, and analytical instrumentation. Built to be state-of-the-art in technology and safety, the four-story building provides 80 laboratories, 110 offices, three conference rooms, 12 classrooms, and three large lecture halls, a laser lab, and an NMR suite, and controlled environment rooms. The Benson Building is one of the largest buildings on the BYU campus, yet it supports a discipline that deals in fractions of grams and the tiniest portions of ounces.

Named in honor of former LDS Church President Ezra Taft Benson, who also served as U.S. Secretary of Agriculture during the Eisenhower administration, the building also includes a display commemorating Benson’s life and career.

BEAN (MONTE L) LIFE SCIENCE MUSEUM - MLBM
Dedicated in March 1978, the museum was named after Seattle businessman and philanthropist Monte L. Bean who, with his wife Birdie, donated the funds that made the museum possible. The museum is a teaching facility housing the university’s outstanding natural science collections and providing a learning resource for the university and the community as
well as for visiting scholars, students, and tourists. The museum’s extensive collections and exhibits include insects, plants, reptiles, fishes, shells, mammals, birds, and eggs for research, visitor display, and educational programs. The exhibits deal with all phases of natural science and include fine trophy animals collected by Mr. Bean during his travels through the Americas, Africa, and India.

**BREWSTER (SAM F) BUILDING - BRWB**
Later additions added 2,000 square feet and included a services station and a truck shelter. The building houses administrative offices, custodial services offices, carpenter shop, paint shop, mechanical shop, heating/air conditioning shop, electrical shop, and storage. Also housed there are the Motor Pool, an automobile repair shop, facilities for a car/truck grease room and paint room, and a car wash room.

**BRIMHALL (GEORGE H) BUILDING - BRMB**
Though utilized for various divisions, offices, and programs through the years, a major renovation occurred with the entire interior of the building in 1987, creating a large photo studio and several dark rooms as well as new faculty offices and a gallery. Central heating and air conditioning were added at that time, and the building’s central atrium was covered and opened. This major renovation created a home for the design programs of the Visual Arts Department with classroom, offices, computer labs, and exhibits.

In 2004 the Brimhall Building was again renovated for the purpose of housing the Communications Department and the University’s NewsNet, including offices, a recording studio, computer labs and a large classroom. Seismic work was also done with this renovation.

**B66**
Built in 1976 as the Design and Technology Building, this structure enabled the Technology Department to offer one of the most sophisticated technology programs in the country, with its advanced computer-aided design and manufacturing program, the first of its kind in the nation. In addition to the computer-aided manufacturing laboratory, the main floor also housed the building construction technology program and the cast metals lab. The second floor was occupied by design and sculpturing from the College of Fine Arts and Communications. With the later addition to campus of the Crabtree Technology Building, the building was renamed B66 (B names are usually used for buildings with no official name and various uses) and now houses working areas for the Visual Arts Department (with kilns for ceramics) and Technology Education and Construction Management (classrooms and wood shops).
CLARK (J RUEBEN) BUILDING - JRCB
BYU’s Law School is now nationally renowned. The building contains individual student study carrels that provide each student with a semi-private study area and a locker. The library, which underwent remodeling and expansion in 1996, provides a sophisticated computer network for faculty and student research and writing. Before expansion, the library contained over 330,000 volumes.

CLUFF (BENJAMIN JR) BUILDING - CLFB
An extension of the building was completed in 1973. The Cluff Building provides dome lighting for the building’s planting rooms and the labs contain over 2,000 varieties (240 families) of plants. Divided into three wings, the building has large glass windows on the inner portions, providing maximum interior lighting, and houses the departments from the College of Biology and Agriculture.

EYRING (CARL F) SCIENCE CENTER - ESC
The Eyring Science Center was distinctive in many ways. It was the largest academic building in the mountain west (153,000 sq. ft.) when it was dedicated. In the dome of the building, along with the astronomical observatory, was located a 24-inch reflecting telescope as well as a complete weather station and public display case, both installed in 1959. On the east side of the dome was the first planetarium constructed in Utah. The underground Physics lab provided an additional 12,900 square feet when it was constructed. An additional 5,000 square feet was added to the underground lab in 2003.

FACULTY OFFICE BUILDING - FOB
The building consists of five wings connected by a long corridor with landscaped courts between each wing. Areas housed in the Faculty Office Building include the Economics Department and the Institutional Assessment and Analysis.

FLETCHER (HARVEY L) BUILDING - FB
Although the Fletcher Building was built for Engineering Departments such as Mechanical, Civil, Electrical, and Chemical, only a small portion is currently occupied by engineering functions. In 1984 the building was remodeled to accommodate a significant portion of the Office of Information Technology and other academic functions including Humanities (who have since relocated).

The Fletcher Building was named after the internationally renowned physicist (known as the father of stereophonic sound) and first dean of BYU’s Engineering Department.

GRANT (HEBER J) BUILDING - HGB
The Grant Building currently houses a Testing Center capable of accommodating more than 500 students taking different tests at the same time, with computerized test results available within minutes of a test being handed in.
HARMON (CAROLINE HEMENWAY) BUILDING /CONFERENCE CENTER - HCEB/CONF

At the time it was completed, this building served as the administrative center for the largest university-related continuing education program in the United States. Dedicated in 1982, the HCEB/CONF offered a 270-seat auditorium and some 50 meeting rooms with the two largest rooms capable of holding 550 people when combined. The Conference Center is a convention facility designed to accommodate both continuing education programs and conventions and workshops sponsored by non-BYU organizations.

KIMBALL (SPENCER W) TOWER – SWKT

At 12 stories, the Kimball Tower is the tallest building on campus and in Provo. The size of the building created some problems and subsequent delay in its construction and in its dedication. Begun in August 1978, the construction was delayed when the ground froze and dirt couldn’t be excavated in the winter. The size of the building presented such challenges as inadequate space for some aspects of the construction work to be done and meeting the earthquake-proof requirements for the zone it was built in, which is the most hazardous earthquake zone.

The monumental building was named for LDS Church President Spencer W Kimball, a man who loved learning and exemplified industry, love, and service. Dedication was delayed when he had to undergo surgery. Although unable to speak at the rescheduled dedication in September 1981, he was recovered from surgery enough to attend. At the time of its dedication, the building housed disciplines relating to family, home, and the helping professions. With 11 of its 12 stories above ground, the building became home for the College of Family, Home and Social Sciences and many of its departments, such as psychology, sociology, history, and geography. It also housed the College of Nursing, BYU personal and career assistance programs, and a variety of university centers and institutes involved in creative research on human behavior and the family.

Student Life functions relocated to the remodeled Wilkinson Center in 1997 and 1998 and allowed the two colleges to expand in the Kimball Tower. A large university open access lab with computer classrooms was also added at that time.

KNIGHT MANGUM BUILDING - KMB

The Knight Mangum Building was home to various academic programs including the History and Social Work Departments. The east end of the building, formerly the Social Hall, has accommodated a math tutorial lab, computer labs, and dance classes as well as rehearsal facilities for the university’s performing groups such as Living Legends and Young Ambassadors.

The Knight Mangum Building was specifically named after Lucy Jane (Jennie) Brimhall Knight (Jesse Knight’s daughter-in-law) and Jennie Knight Mangum (Jesse Knight’s daughter), two sisters-in-law who were lifelong friends of the university.

Appendix D - Misc. Building Information

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LAPEL EDWARDS BUILDING (STADIUM) - LVEB

It is interesting to note that although the stadium was originally completed in 1964, it was not dedicated until 1970 when it was completely paid for. The stadium was expanded in 1982 to seat 66,000 in permanent seating areas, including 2,000 seats in 42 enclosed loges. Since facilities for intercollegiate sports could not be paid for by LDS Church tithing funds, other means of financing had to be arranged. After the Board of Trustees’ approval in June 1962, funds for the stadium came from many different areas, including a Stadium Fund Drive, and the all-steel-construction stadium was completed. Since then, the stadium has seen many great players who later moved into the Pro Football Leagues (Steve Young, Jim McMahan, Mark Wilson, Gifford Nielson, and Ty Detmer). With 42 ticket gates at its various entrances, the stadium is a favorite place for many high school football championship finals, the university’s football games, and large community events such as the Rocky Mountain Band competition and the annual American Freedom Festival. Due to efforts to upgrade various facets of the stadium, it has a special sand-based natural turf that can drain up to 13 inches of rain per hour, up-to-date lighting, and a press box with modern technology for television, radio, and newspaper services. In 1996, a state-of-the-art scoreboard video wall was installed at the south end of the stadium.

LEE (HAROLD B) LIBRARY - HBLL

A three-year construction plan was begun in fall 1996 that included a 240,000 square foot addition as well as remodeling of the existing building. Currently, the library provides seating for 4,000 and houses more than three million volumes, including an extensive collection of pamphlets and titles on microfilm as well as a genealogical library and a vast array of audio and visual materials.

MARRIOTT (J WILLARD) CENTER

The Marriott Center is the third largest on-campus indoor arena in the nation and is used for basketball games, concerts, speakers, pageants, graduation exercises, stake conferences, and other activities. All the center’s concession stands were remodeled in 1988. A state-of-the-art video scoreboard with four screens, 9 feet high and 11 feet wide, were installed in 1992. The university has hosted many special guests and performers in the Marriott Center, including Presidents and General Authorities of the LDS Church, government officials of our country and of England, entertainers and musical groups, as well as many famous athletic participants.

MAESER (KARL G) BUILDING - MSRB

LDS Church President, Joseph F. Smith, supervised the laying of the cornerstone on 16 October 1909, predicting at the time that the Maeser Memorial Building would be the first of many academic buildings on the new campus. True to his prediction, the building became the cornerstone for what is today the BYU campus. The building underwent a major restoration in 1985, during which everything but the original walls was taken out and the interior was rebuilt to conform with modern building techniques.
The building’s limestone exterior was sandblasted and repaired as well, restoring the building as nearly as possible to its original form. Today the Maeser provides facilities for the Honors and General Education programs, including offices, a classic lecture hall with a balcony and seating for 200, classrooms, a ready library, and student study and lounge areas.

**MCDONALD (HOWARD S) BUILDING - MB**

Named for a prominent public school educator and LDS Church leader in Salt Lake City who also served as President of BYU, the McDonald Health Center was a medical facility that served BYU students, their spouses, and their children. In 1999, when a new updated health center was built, the medical facility moved and the building was renamed McDonald Building and remodeled to accommodate administrative offices of the Office of Information Technology.

**MCKAY (DAVID O) BUILDING - MCKB**

The McKay Building was built to educate people to go out into the world and participate in spreading the Gospel. It was appropriately named after David O. McKay, then (ninth) president of the LDS Church and former member of the university’s Board of Trustees who was also a distinguished and lifelong educator. The McKay Building originally housed the College of Education, College of Humanities and Social Sciences, and the departments of English, modern languages, history, political science and psychology. As the campus grew, most of the previous units moved and the College of Education became the sole occupant of the building. When it was remodeled, enlarged, and rededicated in January 1979, the College of Education was able to move all its programs under one roof. In 1996, the college was renamed and reorganized into the David O. McKay School of Education, but continued to call the McKay Building its home.

**MUSEUM OF ART - MOA**

Located north of the Harris Fine Arts Center, this addition to campus houses the university’s superb collection of art, which includes more than 14,000 works of art. James Langenheim, who designed the Harris Fine Arts Center in the early 1960s, was pivotal in the museum’s design, and experts from the Boston Museum of the Fine Arts, the Getty Museum, and Metropolitan Museum of Art also assisted. The museum houses galleries for Asian art, works on paper, sculpture, newer media, historical musical instruments, and permanent and temporary exhibits. An extensive base of works by American artists includes Albert Bierstadt, Thomas Moran, George Inness, and Maynard Dixon as well as Utah artists J. T. Harwood, Edwin Evans, and John Haven.

**NICHOLLES (JOSEPH K) BUILDING - NICB**

This two level-structure and its site were selected for its convenience to the Widstoe Building and the Eyring Science Center – the two buildings where most chemicals are dispensed. The chemicals stored in the building were separated according to bulk and hazardous properties and were then stored in optimum conditions kept constant by an accurate temperature-control system and a filtered air-conditioning system. Each storage area was protected by elaborate fire-protection devices and other

**Appendix D - Misc. Building Information**
safety features. Originally named the Joseph K. Nicholes Chemistry Stores Building and designed specifically for the storage of chemicals and chemistry supplies, the word “stores” was later dropped. The facility also housed instruments, a fully equipped glass lab, a solutions preparation room, and a shipping and receiving room. Native Utahn, James K. Nicholes was a graduate of BYU, a president of Dixie College, and a long-term member of the chemistry faculty (44 years). He was known as an honest, loyal, and unselfish man and was a devoted teacher, administrator, and family man.

PAGE SCHOOL - PAGE
Page School was used for some classes in languages, English and education. Later the building was renovated for use by the BYU Bacteriology Department and by the Department of Zoology and Entomology before being utilized to house electronic media equipment and operations and some research facilities for BYU. An explosion in August 1979 tore off most of an addition to the old building. It was estimated at that time that the building would need to be razed, but the university was able to tear down the most heavily damaged portion of the building and repair the remainder for continued service as geological research and storage.

RICHARDS (STEPHEN L) BUILDING - RB
The Richards Building was named in honor of a member of the Quorum of the Twelve Apostles and a counselor in the First Presidency of the LDS Church who was also a teacher, lawyer, businessman, civic leader, scholar, and administrator. The addition of this building to campus completed a vast physical education complex of gymnasiums, field houses, tennis courts, playing fields, swimming pools, and a stadium. At that time, the building covered more ground space than any other building on campus, although others contained more square footage because of additional floors. Together with the Smith Fieldhouse, the building offered the campus a complete array of fitness facilities.

SMITH (JOSEPH) BUILDING - JSB
The Joseph Smith Building was razed in 1989 and replaced with a new three-story, 74,000 square foot building that is slightly larger, significantly more efficient, and includes a baptismal font. The new masonry and glass building houses 15 classrooms and 85 offices for the Department of Religious Education, a 900-seat auditorium, a student commons and display area, an atrium, a small faculty library, and a conference room.

SMITH (JOSEPH F) FAMILY LIVING CENTER - SFLC
Named after the sixth president of the LDS Church, this building was designed for the promotion of wise and gracious family life and for professional training in home sciences. Completed in 1957, the three-story high building resembled other buildings on campus with its golden buff brick and amber quartz in pressed stone exterior but added a new character with colonnades inside and outside. The columns are functional, however, as all weight is supported by columns and steel beams rather than on walls. An “at home” atmosphere was created by planters in the foyer and benches and gardens in the front yard.
and patio, which was in harmony with the purpose of the buildings as it housed the College of Family Home and Social Sciences. It contained a student lounge, cooking laboratories, including a kitchen for large-quantity cooking, and a nursery school for the training and observation of pre-school children that had both indoor and outdoor areas and its own kitchen. The Smith Family Living Center also housed the telephone exchange for the campus for many years.

SMOOT (ABRAHAM O) ADMINISTRATION BUILDING - ASB

Remodeled first in 1966, again in 1968, and a third time in 1987, this building houses the university’s president and vice-presidents, BYU Development, General Counsel, Student Academic and Advisement Services, Human Resource Services, Financial Services, and various other academic and administrative support programs.

Abraham O Smoot gave so unselfishly of himself and his finances that it was discovered at his death that he was bankrupt – he had used his personal fortune to keep the doors of BYU open.

SNELL (WILLIAM H) BUILDING - SNLB

At the dedication of the Snell Building in April 1960, long-time faculty member William H. Snell was honored as an able teacher, a resourceful administrator, and a kind father. In addition to the building being named after a faculty member, further honor was paid faithful BYU faculty members in this building as various rooms were also named for faculty members. The building was designed to fill the rapidly growing need for more technicians in the various fields of industry and was in keeping with the realization by President Brigham Young of the necessity of developing mechanical and manual skills as part of an education. Two buildings – a gas generator plant and a laboratory, offices, and classroom building – housed the woodwork, metal work, graphic arts, electricity, shop maintenance, surveying, and audio-visual arts classes as well as faculty offices, a seminar room, a library, a reception room, and a counsel room. The building currently serves the School of Technology faculty and students.

WILKINSON (ERNEST L) STUDENT CENTER - WSC

At one time the largest student activities building on campus, the center originally comprised seven levels covering about seven acres. For many years the building housed three student lounges, a hobby center, the student newspaper, dining services, and many meeting rooms of varying sizes that could be used by groups of from 20 to 3,000. The Center underwent a major renovation in 1995-1998 to correct some problems with the infrastructure, replace outdated electrical and mechanical facilities, and add needed space in an addition. The remodeled center houses departments of Students Life previously in other buildings and the existing student services were upgraded or relocated to better serve the student population. At the time of the renovation the word student was added to the name to emphasize the student nature of the building.

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Appendix E
Physical Facilities Division Booklet - 1994

The Physical Facilities Division serves Brigham Young University in several aspects. Physical Facilities has the responsibility of programming (defining the scope and details of a project), planning, constructing and maintaining facilities to provide the best possible environment for the campus community. Physical Facilities strives to provide University personnel and students with a comfortable atmosphere in which to work and learn.

Physical Facilities maintains high standards for all campus development and maintenance. To ensure this, personnel when needing help from architects, engineers, interior designers or planners should work through their College Representatives for services rendered by the Physical Facilities Division.
PROJECT ADMINISTRATOR – The Project Administrator serves as a contact between Physical Facilities and the campus community to expedite inquiries and provide current up-to-date status information on projects. This individual works closely with the College Representatives to maintain harmony between Physical Facilities and campus clientele.

COLLEGE REPRESENTATIVE – Within each college is a person designated to serve as the representative. This person coordinates and prioritizes all projects within the college.

INITIATING WORK ORDERS – To initiate a work order, the College Representative should fill out a Work Request Form and send it to Physical Facilities. Physical Facilities manages the requests with a work order number system, and each time the status changes, the College Representative is notified.

COST ESTIMATE AND APPROVAL – There is a cost estimate and approval process for work orders which require planning or furniture. Each of these is assigned to a designer who contacts the requester and prepares preliminary drawings. A cost estimate is assembled from those drawings and then sent to the College Representative and the requester for approval.

C A P I T A L  N E E D S  A N A L Y S I S  C E N T E R  (CNA)

The CNA Program has been established to maintain and extend the useful life and function of facilities on campus. This program provides a database of all replacement items on campus. An on-going Facility Master Plan is linked to the CNA program.

Each year there is an inspection process of all items in the CNA replacement file. The purpose of the inspection process is to evaluate the remaining life of these items and to prioritize needs.

P L A N N I N G  D E P A R T M E N T

The Planning Department provides professional architectural services to the campus community. These services include, but are not limited to, programming, feasibility studies, cost estimates, architectural design, structural and civil engineering, landscape and interior design. This department implements ADA requirements as approved by the University administration.
The Planning Department manages Furniture Guidelines which establish furnishings standards. These include descriptions and cost limitations for typical office set-ups. Through approved funding, the University provides all standard office furniture set-ups, wall and window coverings and carpet for academic buildings. To request office furniture, a work request form, signed by the College Representative, should be sent to 208 BRWB. To purchase used campus furniture for personal use, contact Moving for University Surplus Sales information.

**SPACE MANAGEMENT**

Space Management manages the space in facilities on campus. Space is a University resource and is allocated to users for a specific function or purpose. New space requests should be referred to Space Management through the College Representative. Colleges/departments are to coordinate all space changes with Space Management.

Space Management coordinates building use for both academic and church purposes. All space on campus is subject to Sunday and/or Tuesday evening use by BYU stakes and wards.

**BUSINESS SUPPORT**

The Business Support Department is responsible for Physical Plant accounting and billing. This department also provides in-house computer assistance.

THE WAREHOUSE/STOCKROOM is responsible for procuring and maintaining materials and supplies for all Physical Plant shops. It is available to all authorized University personnel who charge materials to a work order number or account code.

**PHYSICAL PLANT**

The Physical Plant Department is responsible for all new building construction, maintenance of all existing buildings, utilities and grounds, as well as moving, storage, keys, lockers and transportation services. The following are services provided by Physical Plant:
BUILDING SERVICES

Building Services maintains, remodels and upgrades University physical facilities to meet the needs of each individual department in the most efficient way possible with the goals and standards of the University in mind. Building Services includes the following areas:

CUSTODIAL SERVICES maintains all academic buildings, but not departmental equipment. Departments should bring routine building maintenance matters to the attention of the building custodian. The custodian handles scheduled activities and routine maintenance.

THE KEY SHOP maintains keys for academic buildings (doors, desks, files, cabinets and lockers) and issues keys when presented with authorized key cards.

LOCKERS are available to University personnel and students. Individuals may obtain lockers, excluding those on the ELWC and athletic areas, at the Custodial Office.

THE CARPENTER SHOP maintains sidewalks, ceramic and vinyl tile, suspended and plastered ceilings, doors and woodwork inside and outside campus buildings. This shop also constructs new cabinetry, desks, file drawers, white boards, chalkboards, bulletin boards, shelving and small remodeling projects as needed by University personnel.

THE PAINT/GLASS/SIGN SHOP paints the buildings, streets, curbs, crosswalks and parking lots. This shop installs wall coverings and refinishes furniture. The Sign Shop makes interior and exterior signs. These include buildings signs, nameplates, departmental identification signs, etc. Departments should submit a work request to Physical Facilities for all signs or sign changes. The Glass Shop replaces all broken glass on campus.

THE UPHOLSTERY SHOP repairs and upholsters campus furniture. This shop also measures, orders, installs and maintains carpet, linoleum, tile and window coverings.

THE LOCKSMITH SHOP maintains locks in academic buildings. This includes desks, file cabinets, door locks, exit devices, padlocks and electronic locks.
MOVING serves all departments on campus by assisting with moving furniture and equipment. Furniture no longer needed by campus departments is taken to storage areas at the stadium. Moving assists the Purchasing Department with Surplus Sales.

ROOF REPAIR maintains all campus roofing systems. Foundation leaks are also the responsibility of Roof Repair. Structures are inspected semiannually to analyze the condition of campus roofs.

UTILITIES
The Utilities Section provides and maintains all plumbing lines, heating, air conditioning and electrical service for campus. Utilities includes the following areas:

ELECTRICAL AND MECHANICAL DESIGN provides professional assistance in engineering design and maintenance problems.

THE MECHANICAL SHOP maintains all culinary water, gas, air, steam, sewer and storm sewer piping in all academic buildings and grounds on campus. This shop also provides help with air conditioning installations, sheet metal and welding repairs.

THE AIR CONDITIONING/HEATING SHOP repairs, maintains and installs air conditioning and heating systems on campus. Temperature controls, ventilating systems, refrigeration, chilled water systems and steam and hot water heating systems are responsibilities of this shop.

THE ELECTRICAL SHOP manages all electrical power on campus. This includes lighting, clocks and bells, fire alarms, scoreboards, elevators, high voltage equipment and distribution, street lights and traffic semaphores. The Electric Shop also maintains emergency generators, emergency lighting and power systems.

THE CENTRAL HEATING PLANT generates high temperature water used to satisfy campus needs for domestic and culinary hot water, building heating water and steam. The Heating Plant also provides heat used in absorption chillers to meet cooling needs of campus.
TRANSPORTATION SERVICES
Transportation Services consists of a service station, vehicle rental and auto shop. The service station provides lube, oil, gasoline and cleaning facilities for campus vehicles. Vehicle rental arranges rentals for campus personnel use only. The auto shop purchases, repairs and resells vehicles on campus. Wrecker service is available for all University vehicles. A motorist assist program is available for all University personnel, students and guests. For a nominal fee, assistance is available for lockouts, jump starts and flat tires on campus only.

GROUNDS MAINTENANCE
The Grounds Section is dedicated to making the campus a safe, clean and beautiful environment. Modern techniques and innovative ideas are implemented to accomplish this endeavor. Grounds is divided into four areas to more effectively serve the campus community:

SITE DEVELOPMENT manages landscape construction, sprinkling, tree and shrub replacement, snow removal, garbage collection and the recycling program.

LANDSCAPE SPECIALTY provides tree and shrub pruning, pesticide application, mowing and turf maintenance.

GARDENING MAINTENANCE designs and maintains specifically assigned flower beds.

PLANT & FLORAL grows the flowers used on campus, creates floral arrangements for special events and University remembrances and maintains interior plantings.

CONSTRUCTION
The Construction Section manages all new construction and remodeling on campus involving outside contractors. Plans and specifications are provided by the Planning Department. The Construction Section then prepares the bid documents, bids the projects and begins construction. During construction, quality assurance and project progress are closely monitored by a Project Coordinator. A final inspection, project closeout and occupancy permit are part of the completion process.
Appendix F

History of CNA
Capital Needs Analysis within the Church Educational System
Prepared by Doug Christensen, with input from Harold Anderson and Edwin Cozzens
2004

In 1980, the Commissioner of the LDS Church Educational System, Henry B. Eyring, made a request to complete a study to determine the capital asset needs and funding requirements needed to deal with the replacement and continued improvement of existing educational buildings and campuses within the educational system. The purpose of the initial study was to determine the amount of annual funds that would be needed to ensure a functional and excellent learning environment for the Church Educational System for the years to come.

This initial meeting was attended by Commissioner Henry B. Eyring, associate commissioner Harold Western; BYU representatives, Ed Cozzens, Harold Anderson & Sears Hintze. There was an urgent need for such a study. The concerns of the Board of Trustees was getting a handle on the up and down funding requests coming from higher education and the concern of how much need for funding the campuses have for the future. The building boom in the 1960’s indicated a need coming in the 1980’s.

Upon returning to campus, a meeting was held with Ed Cozzens, Harold Anderson, Sears Hintze and Doug Christensen, Business Support Director for both the Physical Facilities and Auxiliary Maintenance organizations. The request from the Commissioner’s Office was reviewed and the assignment was made to Doug to suggest a way that this kind of a study could take place. Doug proceeded to prepare a plan.

This plan originally consisted of 8 objectives. These objectives came from various sources of information and logic as to how to achieve the results being asked for. The original 8 objectives were:

- Separate Capital and Operating Funds
- Project 40-year, Average Annual Fund Limit
- Manage with an Annual Capital Funding Limit
- Detailed list of Capital Replacements vs Funds only
- Prioritization of ALL Institutional Needs
- Project new Space Needs based on Utilization
- Establish a Replacement Standard for assets
- "Life-Long" program of Maintenance & Planning

Doug Christensen

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Current Practices Search

The early part of the discovery plan consisted of a search for existing work and studies that had been completed in this area of practice. A popular plan introduced in 1979 came from a program put together by Stanford University. The plan was based on formulas. The analysis of a building would be broken into systems and structure. A life cycle would be put on each system and then the cash flow would be projected. This result would suggest the amount of funding needed each year to meet the capital renewal needs of an asset. This approach was reviewed and shared with the Commissioner’s Office. It was their guidance to us that they did not feel confident that funding would be made available without line items showing where the funding was going to be used. This program went against some of the established principles of trying to maximize the useful life of an asset. In order to reach that stated objective it was suggested that we write our own program and collect a database of assets.

We contacted BYU Computer Services about our project. We had already begun the computing of existing processes in Physical Facilities. This project was now the first priority. Bryce Goodwin worked for Computer Services and was assigned to us to program the system. Bryce had not only a Computer Science degree but had an MBA. It was great that he had a business background. It helped him understand our approach and business system.

Choosing Assets

Once we had decided that we were going to develop a database, a series of meetings were held with the shop and department leaders to determine what assets ought to be collected. The following people became the category leaders in the program:

<table>
<thead>
<tr>
<th>Category Leader</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cliff Riley</td>
<td>Utility Systems</td>
</tr>
<tr>
<td>Paul Reese</td>
<td>Parking lot and roads</td>
</tr>
<tr>
<td>Boyd Datwyler</td>
<td>Landscaping</td>
</tr>
<tr>
<td>Roy Peterman</td>
<td>Grounds</td>
</tr>
<tr>
<td>Ed Terris</td>
<td>Interiors</td>
</tr>
<tr>
<td>Ted Sneddon</td>
<td>Roofs &amp; waterproofing</td>
</tr>
<tr>
<td>Eldon Henricksen</td>
<td>Retrofit projects</td>
</tr>
<tr>
<td>Ron Jones</td>
<td>Mandatory and Compliance issues</td>
</tr>
<tr>
<td>Norm Faldmo</td>
<td>Building retrofits</td>
</tr>
<tr>
<td>Anne Schroeder</td>
<td>Space remodeling</td>
</tr>
</tbody>
</table>

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Study becomes an Operational Model

As the study focus and conditions were being completed, it became obvious that the work of completing the study had produced a detailed look at the needs of each institution. It was proposed part way into the study that the study concepts be kept and tracked to see how successful the principles were. Even though the database would be used annually to determine what the needs were, the thought of looking at what we had planned for the next five years and how successful the plan was would be of great value. It was suggested that the study be renewed or re-assessed every 5 years. A strategic process was established. The process suggested that by redoing the database every 5 years would give additional insight as to change and trends that were happening at each institution and would allow for another snapshot to compare and assess the change that had taken place. A proposal was accepted to complete a study every 5 years. At the beginning of each 5-year period a study of the current asset conditions would be frozen and the annual process of determining the capital needs for that period of time would be followed. This introduced the overall management process that would be used to govern this program. The key beginning principles are listed below:

Annual needs request represented the highest priority at each institution.
One funding source for BYU-Provo, BYU-Hawaii, and Ricks College combined.
Required needs vs. lower priority needs would be determined by each institution
A funding limit for each year would be defined. If needs were less than limit, the difference could be saved for future needs and/or additional assets (buildings, additions to buildings, etc.).
Each institution would determine their annual needs.
Presidents would work together to justify any major improvements (over $250,000) and any additions to any campus. These priorities would be the priorities for funding each year.
Priority funding went to maintaining current assets before adding assets.
Replacement funding was assigned to the items rather than a budget year. This allowed for maximum useful life of an asset so funding would be available when needed and not a one-time fund as part of an annual budget.
Inflation factor was adopted by using the ENR index.

1981-1982

The first request for capital needs funding under this new program was in the 1981-1982 budget. The database was completed. An annual new funds rate was figured by extending the cash flow of all items to 40 years and then dividing that accumulated number by 40 years. This provided the 40-year average annual cash flow. This suggested that the annual new funds needed to cover all CNA items was $9.6 million to meet the needs of BYU-Provo, BYU-Hawaii and Ricks College.

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The Board of Trustees reviewed the proposal and suggested a starting annual limit of $7 million. The reason for the lower amount was to see how the system would work and if the suggested life cycle projections would hold up. Later, the Seminary, Institute and Church Schools divisions completed the same kind of program. Due to the growth factor and the buildings being located throughout the world, their amount was not a firm limit until later. This had been the first time that an annual limit had been set for capital funding.

**Annual Capital Needs Inspection and Review Process**

To determine the annual capital needs each year, a process of annual inspections and reviews was developed. This unique approach was designed to inspect the remaining life cycle of one year from the life cycle file, to track problems coming from repairs or emergencies and determine a new remaining life of those items and to review the facility master plan for any one-time projects that were needed. The reason for this inspection is to determine if there was additional life left in the capital asset and determine what the real needs were for the year. The result of the inspection program was not only to identify needs but also to make a judgment on the remaining life of an asset. The goal in this process is to maximize useful life by deferring replacement until the useful life had been spent. The maximum utilization of the investment in each asset allowed managers over that asset the ability to maximize the return of investment. Moving the funding with the asset allows a judgment to be made at the time of need and not the time of funding. This inspection process allows those who manage these assets to better align the assets to their real or actual life cycle. By doing this adjustment, it makes the projection of funding needs in the database more accurate. The inspection process also allows managers of assets to solve problems that come during the year. Any asset in the database can be brought forward to solve problems. Assets can also be funded immediately through an emergency fund or can be part of an annual inspection process. The inspection process deals with all the current capital needs at each institution. The users and stakeholders of each institution complete the annual review process for the facility master plan projects. Requests for needs are made at the college/division level, and then shared with the vice-presidents at each institution. Replacement items are shared with the stockholders. The vice-presidents choose the capital needs projects that best align with the objectives of that area. The vice-presidents at each institution submit their priorities to the Campus Planning and Use Committee. During this priority setting process the inspection results are completed. Coordination between the inspected assets and the facility master plan projects takes place. This coordination assumes that the inspections and the project requests are in harmony and result in good long-term planning for the asset and the institution. This coordination takes place before the approval of needs process so that college/division and vice-presidents can see the whole picture of the capital needs being proposed. The Campus Planning and Use Committees approve the annual capital needs request. It should be pointed out that the list of needs suggests a funding amount. Funding resources are not finalized until all of the institution’s needs have been reviewed. Funding approval happens after the needs have been finalized.

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Establishment of a CES-CNA Center

In 1989, the responsibility for managing the ongoing operation of CNA was moved to its own department from the Physical Facilities Business Support Department. It was suggested by the auditors that there be a separation from the ongoing operations and work of the Provo operation since CNA was a CES role. Currently the CES-CNA Center has a reporting line to the Assistant Administrative Vice-President – Physical Facilities and the Associate Commissioner for the Church Educational System. The Center is housed at BYU-Provo due to computer support and service, office housing and BYU-Provo campus being the flagship campus for CES. The Center works to support the BYU-Provo campus as needed to complete the processes.

Change to an on-going program

In 1990, it was proposed that the CNA database be managed as an ongoing database rather than a 5-year snapshot. This change made it possible to manage the capital needs as they occur. This established a new perspective in reporting. It required an annual update to the Commissioner’s Office and Board of Trustees. This reporting update consisted of annual value change recognition occurring in the database, a new process for keeping the database integrity and accuracy representative. This also included developing a new approach to the annual processes that would better support the needs of the programs and stakeholders. The biggest change had to deal with additional buildings or additional space. The use of “special projects” funding to offset the need to use CNA funding for new space was the result of this change. The CNA program was modified to not fund additional space and any large renovation that would repurpose the asset or be recognized as needing individual approval through the Board of Trustees. The CNA program would still track the master plan projects, but the funding source would be changed to special projects and appear as a line item in the annual budgeting process at each institution. The banking purpose was also changed. Instead of saving funds to build or expand space on each campus, the funds not appropriated would be put into a line of credit to be used for replacement needs that would be greater than the current annual new funding limit each year. The bank became a “line of credit” for future replacements. The final adjustment to funds came as a result of the seismic and asbestos studies completed as part of the facility master plan. It was determined that the funding source for seismic and asbestos would come from a church-wide fund for both of these items. The management of the asbestos and seismic projects would be through the CNA facility master plan but the funding for appropriated buildings would come from designated church funds. For revenue buildings, the funding would come from reserves. The CNA program changed in funding sources, but still manages the total capital needs for CES as one program.

Auxiliary/Revenue/Missionary Training Center/Motion Picture Studio(MTC/MPS) Buildings

In 1985, all auxiliary areas were invited to be part of the CES-CNA program with the funding source coming from their earnings and reserves. Also added were the Missionary Training Center at Provo and the Motion Picture Studio.

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Funding sources were from church appropriations for the MTC and MPS. The annual needs requests are presented and approved through their separate church departments. The assistance from BYU-Provo to maintain and operate the assets they use provides a natural support role for determining their capital needs. These databases were established in 1985 and then re-established in 1995. The re-establishment took place to re-inventory all of the capital items that would be part of CES-CNA. This step provided a total look at assets within each of the institutions and provided a coordinated effort to manage ALL capital asset needs from the same perspective.

**Jerusalem and London Centers**

In 1988, the Jerusalem and London Centers were added to CES-CNA. The London Center was functioning as a revenue area and, therefore, the earnings from the Center became the funding source for the London Center. The Jerusalem Center has three parts to its funding. The administrative areas are funded from Church appropriations. The housing and dining area earn their resources from room rentals and dining. The third area is the laundry, which earns its resources from use. In partnership with the church facility Management Department in London, the annual needs process is completed. The results of the review are coordinated through Student Auxiliary Services who have management responsibility for the London Center. The SAS representatives and the CES-CNA Center work to ensure that capital needs are being met for the London Center. In partnership with the MOR company, who manages the Jerusalem Center, the annual processes of determining capital needs is completed. This annual review is coordinated with Jim Kearl and Carl Bailey who have been assigned oversight responsibilities for the Center. When the review is completed, the CES-CNA Center requests the funding from the Church. Projects are set up locally and managed with representatives in Jerusalem. The CES-CNA Center works close with Jim Kearl and Carl Bailey to assure that capital needs are met.

**LDS Business College**

In 1995, the LDS Business College was added to the CES-CNA program. It was determined by the Board of Trustees that all higher education units of the Church should be together in one funding source. The LDSBC began as a separate funding source and was later added into the same funding source as BYU-Provo, BYU-Hawaii and Ricks College (BYU-Idaho). There were no adjustments to the annual funding limit made at that time.

**Church Meetinghouse and CES-CNA**

In the mid-1990’s the CES-CNA Center was asked to help the Church Physical Facilities Division implement a CNA program for the meetinghouse program of the Church. We worked closely with them and implemented the same procedures.
that we were using in CNA. The challenge faced was dealing with the international nature of the program. The CES-CNA Center learned a lot about its program by helping them complete their program. The conclusion was that the principles and processes need very little modification to work. Since this time, the Church Physical Facilities Division has applied the CNA program to smaller temples, welfare and is in the process of applying it in other areas. We work closely with the leaders of the program to share improvements and ideas that will improve the performance of the CNA program. The Church has recently written a new Facility Management Automated Tools (FMAT) program that uses CNA as its host program.

CES-CNA and the Government Accounting Office GAO

In September 1999, the GAO published a report entitled “Military Infrastructure – Real Property Management Needs Improvement.” Prior to the report, the CES-CNA Center was visited by GAO representatives about practices in facilities management that dealt with capital asset management. They had completed a worldwide search for what the best practices might be in capital asset management. With this list of criteria, they went about the country searching for programs that would meet this criteria. As we visited with them about CES-CNA they became interested. A few more GAO teams later visited us. When the report was published, they cited two institutions that they felt had the “Promising Practices in Facilities Management.” They were the CES-CNA Center at BYU-Provo and the Lawrence Livermore National Laboratory. In the report, they stated that the CES-CNA Center was the most comprehensive approach to capital asset management of all areas visited. The result of this exposure has resulted in a lot of inquiry and information sharing. We have been exposed to a lot of different situations where the principles and processes seem to work. This has given us confidence that the principles of CNA are correct and really are sound principles.

Change to a Process driven program

In 1990, following the change to an on-going program vs. a 5-year snapshot program, came the opportunity to examine the CES-CNA Program. The assessment of the program revealed a better way to manage the program and to simplify what seem to others as a very complicated program. This review established a refined mission statement, a vision statement based on stakeholder needs and current trends, a clearer understanding of the principles and values that had been established from the beginning and the ability to look to the future as a continuous learning opportunity. The result of all of this review was centered on identifying and managing the processes of CES-CNA. The goal was to identify ALL of the processes and sub-processes that make up CES-CNA. That was completed. The next strategic objective was to manage and review each process every four years. This meant that the CES-CNA Center would take time to look at the results that each process was getting, visit with those involved in the process for input on how to make the process
better and then implement the change. The goal is continuous learning and changing the way we do business. The current phase we are in is to develop ways of measuring how each process is meeting its designed results. It is our hope that we will have additional trends to measure against. We currently have about half of the processes with measured results.

**CES-CNA and CES-ITI**

In 2000, a study was made of the impact information technology was having on capital assets. Up to the year 2000 all of the capital needs for this industry had been included in CES-CNA. As the industry matured and the advancements in technology opened up a more comprehensive vision for the future, the results of the study suggested that the Information Technology Infrastructure (ITI) should be managed separate from CES-CNA funding. It was agreed that the line items in CES-CNA would be transferred to a new account within the CES-CNA system called CES-ITI. The scope of the CES-ITI was to include other related technologies so that ALL similar assets could be managed as one asset investment. This happened for ALL institutions and areas currently within CES-CNA. We are currently working on completing the database and establishing the new processes needed to manage information technology.

**Conclusion**

The same approach to process management will exist in CES-ITI. This added responsibility has affirmed the fact that the processes that we have developed over the years can be applied to different industries. The wide use of these processes suggests that there are some basic elements of asset management that can be applied to any industry. As we further define our challenges of developing these process elements and taking the opportunity to compare our results with other industries, we are convinced that we are industry leaders in this quest for excellence. We still have a long ways to go, but the foundation has been set and we are making efforts to continuously learn from inside and outside our purview.
Energy crisis threatens to raise college tuition

BY NICHOLAS BENDER

The rising cost of fuel and power threatens to force public universities and colleges across the state to raise tuition, leaving some to question why the Utah Legislature hasn’t done more to adequately fund institutions of higher learning.

Ten state-sponsord schools in Utah — including Utah Valley State College, Utah State University and the University of Utah — have collectively accrued budget deficits of approximately $152 million over the past several years.

“Even what really means is that the state has been paying for fuel and power up to a certain level,” said Ron Godfrey, USU vice president for business and finance. “But in the last three or four years the state has not been able to fund the increases when rates have gone up. So, we’re doing everything we can to conserve.

USU administrators have scrambled to shift surpluses within their programs and departments to find the necessary funds to pay utility bills, Godfrey said, but the university has still come up short. By the end of this fiscal year, for example, USU could face a fuel and power deficit as high as $10 million. To help reduce the mounting deficits, school officials have been looking for ways to cut school energy consumption. Godfrey, for instance, began teaching one of his classes with the lights off, allowing only sunlight to illuminate the classroom.

“Nobody in the class really complained or said anything about it, so we just kept doing it,” he said. “Nobody’s asleep — well, there may be some people in the back. Maybe we’ll have to start issuing pillows.”

The university has also started turning the temperature down to 69 or 68 degrees Fahrenheit in buildings on the weekends and holidays and using low watt light bulbs. Additionally, private sector consultants will soon visit the school to suggest energy-saving strategies.

Lee Eeig, USU student body president said the administration is also considering a Monday-through-Thursday class schedule, enabling faculty managers to turn off the heating and lighting over the three-day weekend.

“There is a committee doing some research trying to find out what exactly would be feasible,” Eeig said. “Obviously we still need to meet state requirements.”

Whatever action is taken, the university will be fighting an uphill battle as energy rates are growing at an almost exponential rate, Godfrey said. Many school officials, therefore, will have no other option but to pass the additional costs to students in the form of tuition hikes.

“I hope in their hearts [the legislature] can find the money figures a way to help us solve this,” Godfrey said. “If they can’t, some students will have to be put on the shoulders of students. I just don’t know any other way.”

UVSC has experienced a similar power crisis this year. School administrators worked to find an additional $1 million to cover rising power costs. Increasing rates have already forced school officials to increase tuition to defray some of the cost.

“We’ve struggled; we’ve reallocated [funds] internally,” said Derek Hall, UVSC spokesman. “Last year our students had a 12 or 13 percent [tuition] increase. And the trend is likely to continue across the state. State Sen. Ron Allen, a member of the higher education appropriations committee, said state schools are receiving between 22 and 40 percent of their funding from the state.

“We know now that to a large degree, Utah’s colleges and universities are not getting the lion’s share of their money from the state,” Allen said. “This problem continues to develop as the state’s role in financing our colleges and universities has declined over the last few years.”

Allen said the problem is not just the legislature’s willingness to appropriate additional funding. He attributes the reduction in university funding to an overall decline in the state budget.

“Over the past four years, the state of Utah [has had] a cumulative shortfall of some 700 million dollars,” he said. “Those kind of shortfalls and those kind of reductions in tax collections are going to show up in various ways. In this case, it showed up in universities paying their light and utility bills out of other funds.”

University administrators, however, aren’t the only ones who said they feel disappointed with the lack of funding.

“Those of us who serve in the legislature and who are trying to make this work are just as frustrated as some of the citizens when [universities] are underfunded,” Allen said. “We struggle constantly with competing interests up on the hill and to discover that so much money had to be taken out of other programs to pay the light bill is not particularly pleasing to any of us.”

To help solve the problem, lawmakers have looked at closing certain business tax loopholes that account for nearly $500 million in forfeited tax revenues for the state. Allen said. State legislators have also focused their attention on improving the health of the state economy. A more robust economy, they say, would provide a broader tax base.

“Maintaining the talk has been in both political parties about growing the economy,” Allen said. “We know that if we have all of our citizens working, and they have good jobs, then we generate a certain amount of tax revenue that allows us to create good government and fund our universities and our public schools.”

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Crisis

Rising cost of fuel and power may cause rise in tuition costs

Continued from Page 1

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December 8, 2004

Appendix F - CNA

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Campus Memorandum

From: Dan Gleason  To: Ed Cozens  Date: December 9, 2004

Room: 222A BRWB  Ext: 2-5431

RE: Energy Crisis

The recent Daily Universe article regarding rising energy costs causing college tuition to be raised at state institutions is an opportunity for BYU's ongoing energy efficiency efforts to be recognized. BYU has nationally recognized professionals, i.e. Cliff Kelley, at the Physical Facilities Utilities Department, Central Heating Plant, Air Conditioning & Electric Shops, and many others. For the past twenty plus years, we have been aggressive and proactive with state-of-the-art technologies in reducing campus energy costs and improving efficiency.

The Capital Needs Analysis Program, developed by Physical Facilities, has invested considerable non-tuition monies over the last twenty-two years to fund physical needs of the university including improvement projects to lower long-term operating costs. Some ongoing projects are:

- Retaining the Option to Burn Coal at the Central Heating Plant – approximately one fourth the cost of natural gas; less particulate pollution with the bag house than natural gas; provides emergency backup in the winter.
- High Efficiency Lighting – reduced electrical costs and longer life; reduced pollution from retired bulbs; better lighting. This program has been ongoing for more than ten years.
- Variable Frequency Motor Drives – lower electrical usage; better control; reduced operating costs. We now have over 400 in operation on campus.
- Low Emissivity Windows – reduced air conditioning and heating; more comfort.
- Higher Pass Coils – reduced pumping and fan motor loads; higher efficiency reducing the need for additional heating and cooling systems.
- High Efficiency Motors – lower power requirements; longer life.
- Metering / Telemetry – identifies problems quickly; helps find solutions to operational problems; reduces guesswork by proving solutions and gauging problems.
- Absorption Chillers – lower operating costs; uses waste heat and off season capacity from winter heating system to produce cooling in the summer.
- Direct Digital Controls – lower operating and energy costs; better comfort; less maintenance.
- Tunnel System – lower heat loss; better access; longer system life. The tunnel system began many decades ago and has proven to be inspired.
- 12 KVA Electrical Delivery – reduced line losses; increased capacity; provided opportunity to purchase the substations.
- Substation Purchase – lower power rate; reduced demand charges; $500,000 plus in savings so far. The result is that power rates have actually declined at BYU over the last five years.
- Groundwater Management System – less water required; lower costs; healthier landscape.
- Kitchen Waste Recycling System – less water required; less solid waste; lower operating costs.
- Water Recycling and Conservation – BYU now uses 40% less water than we did fifteen years ago.

The best resource we have is our talented people who are continually working to reduce costs and improve BYU for the long-term. We have been preparing for the current crisis for twenty years and have always taken this responsibility seriously. We have been fortunate to obtain power from Provo City because they have not increased rates for several years. Even though we are experiencing higher energy costs, specifically natural gas, and absorbed several additions to the campus, annual inflationary budget increases have allowed the university to meet energy costs due to the items listed above. After visiting our campus, a utilities analyst from a prominent state university remarked, "BYU is twenty years ahead of us."

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Appendix G

Facility Management Degree Program

In 1953 Sam Brewster was elected International President of APPA (Association of Physical Plant Administrators for Colleges and Universities). Sam observed that, nationwide, there was a need to train people for higher education facilities management. At that time, most administrators were retirees from the military or came from engineering firms. Sam felt like there needed to be a more specific focus on preparing men and women to serve as Physical Plant Administrators.

Soon after becoming director of the BYU Physical Plant Department in 1957, he proposed that BYU establish a physical plant administrator’s B.S. degree. After a few years of talking about the program and what it would need to accomplish, the program was launched as a choice or track within an existing construction management degree. The program track was known as the Physical Plant Administrator degree. Sam established two requirements for getting the degree. He wanted every student to be required to spend time in BYU’s Physical Plant Department. They would need to spend time in the various shops. Sam established a fund to pay the student for doing this internship. Sam really wanted this and stated many times, “I want every Physical Plant graduate to be familiar with how a physical plant operates. This will be to their advantage in getting into plant work.” The second was very far reaching in concept. Sam noticed that the work of the administrator was getting more business like rather than engineering. Sam suggested that the degree have a lot of business in it so that the language of business and the need for administrative understanding would be part of the learning. Sam felt like, in the future, the engineering skill could be hired but the administrative skills would be needed in directing the plant operation. The early curriculum had some business. Today (2004) the degree requires a minor in business for graduation.

The first leaders in the program were Ross McArthur who served as the chair of the academic program, and Scott McClellan, accounting office in the Physical Plant Department, served as internship coordinator. Sam followed this program up to his time of retirement in August 1974. Scott McClellan retired in December 1977 and the role of internship coordination went to Doug Christensen. Ross McArthur turned the program over to Loren Martin in 1980. In the early 1990’s Daryl Tichy replaced Doug Christensen. In the 1990’s the name was changed from Physical Plant Administrators to Facility Managers. In 1997, Loren Martin retired and Jeff Campbell was hired as the chair of the Facility Management Program. Since Jeff has taken the role, the program has grown from an average 25-30 students to over 100 students. There has been a cap of 100 placed on the program due to limited resources. In addition, an industrial advisory council was formed to further the curriculum and the stature of the program. Facilities management has had little problem finding job opportunities for those who complete the program.

Appendix G - Degree Program
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Brigham Young University was the first university in the nation to have a Bachelor’s degree Physical Plant Administration program. It took time to get the program built and ready for students. The track first opened in 1962 but there were no takers. The first opportunity came in 1963 when a student majoring in Manufacturing Engineering Technology became interested in managing manufacturing facilities, rather than managing processes. A specific program of study was planned for him, and he obtained a degree in 1968, with an emphasis in facilities management—thus becoming BYU’s first facilities management graduate.

In the early 1970’s, the program was expanded, becoming a separate, official major, developed mainly to benefit full-time employees of the BYU Physical Plant Department. Employees could take courses that corresponded with their jobs and earn a degree in their professional field. As such, most of the early graduates in “Physical Plant Administration” were full-time employees of BYU.

In the mid-1980’s other full-time students became acquainted with the program and began enrolling in order to provide themselves with more external opportunities related to the facilities management field. During this time, the first professional student chapter in facilities management was organized at BYU, the AIPE (American Institute of Plant Engineers). Before long the faculty recognized a need to improve the program, and in the summer of 1989 an advisory committee was organized to help determine appropriate and planned coursework for the major. Representatives of the committee came from areas of healthcare, city and county government, industry, and from the BYU community. Upon the committee’s recommendations, the Physical Plant Administration major became more defined and was recognized as an option for professional degree seeking students.

Other highlights of the program:
- In 1990, Brigham Young University became the only Utah student chapter of IFMA (International Facilities Management Association) and one of only two IFMA student chapters in the Southwest region in the United States.
- In 1994, BYU became the first student chapter of APPA (Association of Higher Education Facilities Officers) in the entire world.
- In August 1995, the name of the major was changed to Facilities Management to better reflect the nature of the degree as recognized by both the profession and industry.
- In 2004, a student chapter of IAAM (International Association of Assembly Managers) was established.
Now in 2004, after a slow beginning, the Facilities Management program at Brigham Young University has a well-defined curriculum. Students take various facilities management classes, construction management classes, business management classes and other courses on campus. One requirement for the major is that each student completes two internships. For one of these internships, students may work in the Physical Plant Department on campus. Students rotate through different physical plant shops to receive hands on experience in several trades. This program prepares students to be part of the administrative/supervisory team in the increasingly complex world of facilities and property management. The facilities manager combines management practices with the most current technical knowledge in eight competency areas: real estate, operations and maintenance, human and environmental factors, project planning and management, finance, quality assessment and innovation, facility function, and communication. With the excellent curriculum, robust internship program, student chapters of professional organizations and a growing interest in the major, BYU’s Facilities Management Program is poised for continued success in this exciting professional field, and will provide students with the tools to advance.

Responsibilities encompass supervision of planning, renovation, and maintenance of buildings and grounds. Attention is given to employee health and safety, security, disaster planning, and environmental concerns. The program is broad based and prepares managers for all types of facilities, with salaries among the upper level of university graduates. Further educational opportunities include advanced degrees in facilities management, business administration, public administration, or other related fields.

The program has nearly 100 percent job placement within the field of facilities management. Employment can be found with colleges and universities, hospitals and health care centers, governmental agencies, recreational complexes, airports, large industrial plants, and other institutions or businesses that have large facilities.

(Physical Facilities Division records)
Appendix H

Computer Impact on Physical Facilities Division Functions - 1980-2005

In 1978, an assignment was given to Doug Christensen to computerize as much of the current business architecture and information functions as feasible and practical. Manual posting of work orders and projects consumed a lot of time. The accounting reconcile of the hand written work to the financial computerized system was taking more time. The records in the Physical Facilities Division Business Support were more accurate than University Financial Services, but it was time to partner with them in sharing digital data.

An effort was made to search out the best practice and add that to what we were doing. Effort was made to notify all of our customers and get an idea as to what data was important for them and how could serve them better. Effort was made to notify all of the current vendors. We invited each to understand our needs and to share their software. This represented the current state of the profession. Current software was focused on the maintenance management side and was not the complete management of the campus. A lot was learned, but it became obvious that it would be necessary to develop our own software to meet the complex needs of the Physical Facilities Division. Permission was sought, justified, and granted to write our own support software.

The goal was to take advantage of technology, better practices and re-engineer of our current business practice before we began to program. Using those who were stewards of each part of the business to establish new or revised processes helped to get it correct. It became a challenge to create a business architecture that was practical and simple to use.

A contact was made to University Computer Services to assist us. Bryce Goodwin was assigned to us as the programmer-analysis and developer of the software. First thing was to choose an operating system that would meet our needs. We chose the PICK Operating and Database System, a multi-valued database. The hardware choice was Micro-data. The first areas programmed were the Vehicle Rental System and the Job/Timecard Management System. That was followed by the Material Management system. Once that was completed, the Routine Work System was programmed. It included the Standing Work Order System, Service Request System, the Planned Maintenance System and a system for safety and supervisor inspections. The next system was the Work Order system along with the cost center management system.

In 1981 work was diverted from the Physical Facilities computer system to the Capital Needs Analysis system. This system included a building and location database, an inventory of all assets and their life cycles, and a facility master plan for all one-time only projects for the future. The basic programming of this system took most of a year to complete, after which there was a return to finishing the main computerization system.
From this time forward the Physical Facilities Division was in the information technology world. The remaining part of this chapter shares some of the accomplishments that have been and are still being made.

Brigham Young University acquired its first computer in 1958. As this new technology developed, old equipment and software was replaced with new. Beginning with one central mainframe and a limited number of terminals, the service gained popularity. Through the following years, one department after another entered the computer age. Space Utilization acquired a computer terminal in 1974. It was not until 1980 that the Physical Plant Department installed its first computer mainframe. It soon became evident that this department, more than any other, would benefit by computerizing. Now, in the year 2005, every aspect in planning, construction, and maintenance of the Brigham Young University campus has been impacted in a very positive way by the computer.

Physical Plant’s first business computer was a 1980 Honeywell with Ultimate’s version of the pick OS embedded in firmware. It consisted of 32 RS232 ports, 75 meg of hard disk and 256k of memory. Over the next 10 years it was upgraded to 64 RS232 ports, 1 meg of memory and three 300 meg disk drives. It physically was mounted in 2 standard 19” racks and each 300 meg disk drive was a stand alone box weighing about 275 lbs. Physical Facilities’ current computer system resides on an IBM RS6000 p615, with 1 gig of memory, 180 gig of hard disk which will fit under a table.
Bryce Goodwin, Physical Facilities, Computer Service Representative

The Physical Facilities Division computer system has evolved from a 1980 stand alone computer with 32 hard wired RS232 ports into a database/file server with network connections to over 150 local Personal Computers (PC’s), 38 network printers and web/telnet access from Idaho to Hawaii.

Bryce Goodwin manages the Information Support Group which is responsible for the following:
(1) Maintain and replace the physical hardware of all Physical Facilities Division PC’s, printers, servers, fax machines, copiers, and Palm Pilots (PDAs).
(2) Maintain and upgrade the PC’s operating systems, virus protection, and desktop applications.
(3) Maintain, upgrade, and run the production applications of the database server of the Physical Facilities Division.

Clyne Curtis, Computer Aided Design (CAD) Manager

The CAD database manager of the Physical Facilities Division provides the following services: (1) Maintains a CAD database of all building floor plans on campus, comprising nearly 9 million sq. ft. The accuracy of this database is critical as many departments on campus use this information as a background for the service they provide the university. As the technology for acquiring and maintaining this information advances, so does the need to stay abreast of the latest and best methods of implementing this technology into our processes. (2) Maintaining the computer systems and software upgrades for the Planning Department, including customized CAD training for Planning Department employees to keep them on the cutting edge of technology and sustain the high levels of efficiency and productivity for which the department is known. (3) The CAD database manager is also currently the campus liaison between our CAD software provider and all end users on campus.
Space Management (Utilization)

In the early days of Space Management, 1970’s, the office computer system was supported by an IBM mainframe computer in the Talmage Building. This was the same computer system used by many entities on campus. We had a computerized space inventory system (buildings and rooms), utilization programs, programs designed to project future space needs of campus units, programs that accounted for stake and ward use of campus facilities, and a myriad of reports that could be generated for a number of uses. These systems and reports were developed in the early days by Ed Haines (founding director) and his staff. We did not have local area printers at that time, so when programs and reports were generated, we had to make a trip to the Talmage Building to pick up the printouts. This was pretty much done on a daily basis since the programs had to be run overnight. Since we did not have our own computer programmer support, our computer support services was provided by the old Computer Services Department. A programmer was assigned to us, by contract, to assist us in writing and adjusting programs, and general troubleshooting. We sometimes had a part-time student with some skills in computer programming.

In the mid 1980’s, we received several personal computers for the office and while they changed the way we did our secretarial/clerical work, we continued to use the mainframe for most of our space management work until the early 1990’s when Physical Facilities moved to the RS6000. At that point, all of our programs were rewritten and converted. At that point, we were able to use our personal computers as a terminal to the mainframe and also use local area printers and run our programs as often as needed. This completely changed our daily operations. The ability to do our own word processing and spread sheets probably affected us the same way it did every other campus department, but having our own mainframe computer dramatically increased our productivity and our effectiveness. At the same time we were also able to have in house computer support services which also increased our productivity.

Anne Schroeder, Director, Space Management
Sign Shop

Up until 1980 all of the signs, banners, and posters were hand drawn and finished with hand lettering, brush, and paint. With the computer being introduced to the Sign Shop, we are now able to do more work in less time. When making signs in the past we would have to make a new layout for every change that was made. Sometimes just one sign would require up to six layouts. Today, with the use of the computer, we can make the changes and print off a fresh copy in minutes, versus the hours it would take before. We are now able to print in full color, such as full color photographs, even on a banner as large as a billboard.

Before computers, all engraving was done either by hand or with templates. Now we create the design on the computer and then send it to a computer-run engraver. The machine does the work for us, which allows us to begin working on other projects. It has proved to be an efficient system.

Air Conditioning

Before the Air Conditioning Shop had a server, the operation of the campus automation system was done with a Johnson Controls mainframe computer called the JC80. When switching to the new system, which is manufactured by Staefa Controls, we used a single workstation (PC) that was fed through a serial switch box to access all the Staefa systems on campus. To access the system after this setup we migrated to a Unix server that replaced the serial switch box. This allows us to use multiple workstations (PC’s) to access the various Staefa systems throughout campus. We are now in the process of upgrading to a newer system. This system will allow us to bring together our old staefa system and the new tridium system. The new system allows us to operate both systems from a web browser, over the BYU network.

Appendix H - Computers
Grounds Sprinkling Systems

Watering the turf at BYU before the arrival of the personal computer, was a hit and miss proposition. The gardening foreman would guess or use historical evapotranspiration data to determine how long to water each system. Changes to run times on sprinkler controllers would only be made when the grass started to burn in the summer or was too wet in the fall. Coordination between gardeners to maintain adequate water flows through main waterlines was difficult. When it rained enough to shut down sprinkling systems, during the evenings or on a weekend, two or three men would be called in to turn off the sprinkling controllers. This would take two to three hours.

The computer now contracts the campus weather station. It retrieves weather data to provide an accurate daily evapotranspiration rate that determines the run time for each sprinkling system. Water flows through main waterlines is kept to a predetermined flow rate so sufficient water pressure is provided for adequate coverage. The computer measures the amount of precipitation during a rainstorm and shuts off sprinkling systems, when enough rain has been received. Convenient last-minute schedule changes and monitoring can be made from a home computer. Watering turf has moved into the present era with technology that saves time and water, resulting in healthier turf.

Civil Engineering

When I first started working in the Planning Department as a Civil Engineer in 1974 there were no computers. Surveying consisted of using a theodolite and writing everything in a field book. This information was then reduced to coordinates manually and plotted by hand onto a sheet of paper. Any changes required erasing and redrawing. Now, surveying is done with an electronic total station instrument or with GPS surveying equipment that collects the data electronically. This information is downloaded into a computer where it is automatically plotted onto a drawing. CAD on the computer allows for generation of the drawing with computer programs assisting in all kinds of computations that assist in decision making. The final drawing can then be plotted in any scale or format.
Inventory Control

Around 1980, the Brigham Young University Physical Facilities Division began to computerize the Warehouse inventory system. Previously, inventory was adjusted by way of an old hand written Cardex System. Each inventory item sold to shop personnel was located on one of the many cardex file cards and subtracted from the current inventory total. The reverse was true when inventory was received from vendors. The new inventory was manually added to the current inventory level.

Doug Christensen, recently from Facility Services (then called Auxiliary Maintenance), came to serve as Physical Facilities Business Support Director and soon began to implement a similar computer inventory system then being used by the Stores Department. This new system was a perpetual inventory system designed to greatly facilitate inventory control as well as to provide many reporting vehicles which would give warehouse personnel greater access to information regarding inventory usage, flow and parameters by which inventory could be controlled to reduce outages, etc.

The then Warehouse Supervisor, Ron Forstner, was given the task to come up with an inventory identification system to assist the changeover from hand written to automated inventory additions and sales. Ron went to various local vendors to see how they tackled the problem for their inventory identification and selected the system used by Mountainland Supply as the most desirable for Physical Facilities. The inventory numbering system selected used a seven digit inventory number. The first two digits were to identify inventory items as part of a larger inventory group - 30 for lumber and wood products, 35 for steel and similar products, etc. The next four digits identified the item within the larger group. To ensure accuracy of data entry of inventory numbers, it was determined that the last digit of the seven digit number would be derived by a mathematical formula. This would make it statistically impossible for warehouse personnel to enter an inventory number, transpose by accident some of the digits and have the erroneous number identify another item altogether. Ron took the entire inventory of approximately ten thousand items and inserted each new number into the mathematical formula by hand to arrive at the seventh digit of each item. After several months, the Warehouse was ready to implement the new computerized inventory control system.

The new system enabled the Warehouse to more accurately control inventory and gave it tools to facilitate automatic order levels, auditing, and historical information heretofore not seen.
Planning Department

The computer has changed the way drawings are made, produced and printed. The first computer used for drafting was introduced into the Planning Department in spring 1986. The first computer was an IBM AT with a 20 meg hard drive and a single pen plotter. One room was designated as the computer room and we took turns learning and working at the computer. By 1992, we had computers at each drafting station and a community plotter and printers. As remodeling and personnel changes have occurred the old drafting tables have been removed. There are only two drafting tables left and they are not used for drafting but as lay-out tables.

The plans produced by the old method of drafting were very personalized. It was easy to identify who had created the drawing because of stylized lettering, line weight and quality of the work by each individual draftsman. It was a challenge to make a sheet of drawing a work of art, organized, readable and with the information clearly identified.

These ideals are still obtainable and in many cases easier to create with computer aided drafting. The computer has made it possible to allow drawings to be created with good line quality and lettering that is legible. The work can be completed by anyone who can use and understand the computer program. The practice and training required to do hand lettering and good quality drawings has been traded for computer skills and techniques.

The advantages of computer aided drafting:

1. Changes can easily be made on the computer and the drawing reprinted. The old drafting method required a lot of erasing and redrafting or starting over completely.
2. The quality of the final computer generated printout is easily readable and clear. The old drafting methods required that the individual preparing the drawing had good skills in creating clean uniform line thicknesses, clean legible lettering style and the ability to keep the drawing clean and organized.
3. Storage of files are done both electronically and in paper flat files. The electronic files can be stored, viewed, reworked and reprinted much easier than the old paper process.

Other changes the computer has provided:

1. The way work processing is completed. The computer allows everyone to prepare letters, memos, and documents that free up a secretary doing the work on a typewriter.
2. The forms used for cost estimating have allowed for spread sheet calculations to be made automatically and provide electronic files for updating and review.
3. The presentation of drawings and photos by use of a PowerPoint presentation have eliminated the need for mounting large drawings on boards and carrying them and easels to meetings.
4. Digital Photography and how it can be used in drawings and printed for clarification to a project is being used more and more.

Warren Jones, Director, Facilities Planning
Transportation Services

Until 1975, there was no unified and consolidated University vehicle fleet. All transactions for fuel and vehicle work orders were manually created with information being entered on pre-printed cardstock forms. All information was compiled by the Physical Facilities Accounting Office and finalized as charges to campus departments on individual issue CPOs (Campus Purchase Orders) or standing CPO’s. The task was laborious, time consuming and prone to errors.

Tracking of vehicle costs or accumulated information of vehicle expenses or replacement life did not exist. Each department “owned” their own vehicles and replacement for departmental vehicles was haphazard. Oftentimes requests for vehicles did not receive proper specifications resulting in over-sized, under-sized, and inappropriately specified vehicles.

Information was compiled, beginning in 1973, for the 50 plus vehicles in the Rental Fleet wherein a manual calculation and monthly information was compiled and typed in a report format. This report opened the door to automation and by 1976 a computer program had been written. All collection of information was diverted from the Accounting Office to the Motor Pool Office where data entry was made due to the computer program which was the first completed program within Physical Facilities. All vehicle expenses were recorded and billed through this automated system with reports that detailed all expenses and provided information to manage the University Fleet.

By 1980, “ownership” of all University vehicles was incorporated and consolidated into the University Motor Pool with life cycles being calculated; specifications for new vehicles were created and monitored in this office. Vehicle service request forms (carbon copy forms) in the Auto Shop were eliminated. All related information regarding vehicle repairs was incorporated into the “work order” system created by this new program. The newly created database was capable of compiling all vehicle related charges which were summarized in the University Motor Pool computer program. By 1992, the University purchased an automated fueling system which downloaded transactions directly to the vehicle database, eliminating the need for manual entry of fuel transactions, again reducing possibility for entry errors and securing the dispensing of fuel to prevent misuse and abuse.

Without the computer, it would be nearly impossible and cost ineffective to properly maintain a University vehicle fleet of the 700 plus vehicles that currently make up BYU’s fleet. With all vehicles centrally maintained and monitored, the University has realized improvement in available information to properly oversee the assignment and use of vehicles.

Appendix H - Computers

Kent Flack, Transportation Services
In the late Eighties and early Nineties, we computerized many processes in our Accounting Office. We went from keeping track of the Work Orders by hand in individual folders, manually job costing time and materials and then billing departments through the CPO (Campus Purchase Order) system, to now having detailed computer programs that keep track of each work order, accumulate and total all the costs and when completed, bills the department directly. We have even eliminated the cost of printing all of the detailed department summaries of charges by having all the information available online. All the expense and income for the Projects and Shop Budgets were kept track of by manual posting into ledgers and new month and year-to-date totals were derived by hand using a calculator. Data then had to be entered manually into several different reports to generate all the needed reports for the managers. Now the entries are posted into a data base where totals, various reports and spreadsheets are easily and quickly generated for reporting and managing. By computerizing our processes, we have benefited in better utilization of time and materials, reduced overall operating costs, increased accuracy, provided more timely and detailed reports and allowed our division to increase in productivity and work more efficiently.

Diane Jacobson, Business Support

Nancy Clawson, Business Support

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Utility Meters

BYU receives about 600 utility bills every month, and reads an additional 300+ submeters. These bills and submeters were tracked by hand for several years. In the 1980's a proprietary computer program PHYUTL was developed on a PICK database to track the bills. In the 1990's small handheld computers were incorporated to enter the submeter readings while at the meter, later passing the data to a desktop computer and from there to PHYUTL. A method was developed to take an email from Provo City with all their billing information and upload the data onto a desktop computer and from there to PHYUTL. A number of technologies were explored and implemented to begin collecting telemetry from the electrical, HVAC, and heating plant Bailey networks. Today about a fourth of the utility metering on campus is gathered at near real-time. This provides detailed histories with time of day usage profiles which have been utilized extensively in managing the individual building utility systems more efficiently. The long term plan is to expand telemetry and incorporate wireless systems as the technology matures.

Keys and Lockers

My predecessors in the Locksmith Shop ran all mechanical key systems by a card system much like the Dewey Decimal System. Each card would contain building, door number, hardware, keys that worked the door and the keying chart for the door. Factory cut/codes were stored in several books, like encyclopedias, requiring constant updates. Today, the keying of locks, is dependant on the support of computers due to digital communication from keypad locksets. There is a constant change of hardware and software in the lock industry and organization of access control.

Before computers the Key Office kept track of details in log books. Everything was done manually, updates, and re-keying information. Audits and security were more difficult because they needed to be typed and/or hand written. To find keys you needed to look in the file system, by building and then numerically by room number, and hope that the files had been updated.

Appendix H - Computers
Payroll and Personnel Information

Prior to Payroll and Personnel Record functions being processed on the business computer, new employees filled out a card with the same information required of them when they are hired today. The cards were filed alphabetically and retrieval of desired information was dependant on the accuracy of the filing. Information from the cards was transferred to another card which recorded hiring, termination and salary history for each person. The payroll clerk would need three to four months to update these cards after the beginning of fall semester when the majority of hiring of students would take place. Once again, the timely retrieval and accuracy of such information was dependant upon human input. Information about one person needed to be retrieved from several source files. Today, the personnel database allows all information regarding these same fields of information to be easily retrieved with greater confidence of accuracy. The computer input of the personnel information and electronic data transfer between the campus Employment Office, allow more information, in a better format to be accessed faster.

Time card information was calculated by hand on adding machines with tabulations hand delivered to the Payroll Office in the Administration Building where paychecks were calculated, printed, and distributed. This took hours of compilation. Today, hours worked are entered into the computer on a daily basis, where they are compiled and transferred electronically in batches, in a matter of minutes, to the Payroll Office for processing. Reports, in any desired format, can be generated quickly from the payroll information residing in the computer. Physical Facilities management and employees have on-line access to information derived from the payroll data compilations.

Electrical Distribution Monitoring

Since the advent of the PC in the 80’s which made “personal computing” available to the masses, society in nearly every aspect has embraced and implemented the powerful features of computing technology. And yes, even electricians and the industry have benefited from its use.

In my job capacity as electrician and high voltage wireman, I work with many devices and apparatuses which have evolved from analog functionality to solid state control. Such equipment includes electrical energy/demand meters, substation transformer and feeder distribution protection relays, Variable Frequency Drives, Uninterruptible Power Supply systems and battery monitors.

The single-function analog mechanisms of the past are now replaced with multi-purpose counterparts that increase productivity while minimizing cost and size.

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These include Fluke recording electrical “multi-meter” hand tools to GE Multilin or ABB DPU/TPU electronic bus differential, distribution and transformer protection relays, Cooper and G&W primary voltage distribution feeder protection relays, Square D Powerlogic circuit and power meters, PowerWare UPS and Alber battery bank monitors.

All of these devices interact with a computer either passively or actively. Some devices are initialized or programmed for a specific behavior prior to being placed in service. Then as need arises, they can be reprogrammed or recalibrated with a laptop and accompanying software or firmware. Then they are disconnected and resume service as a stand-alone device. Many others, however, actively communicate and report to a central computer (server) for information logging, sorting, trending, and reporting.

As an example, I will compare the analog functionality of an electrical demand meter vs. a solid state equivalent. First off, “analog” generally implies something mechanical. As such, these demand meters employed electromagnets and a spinning disk to mechanically move pointers which provide two functions only, indicating energy and peak (thermal) demand usage from the time of the previous manual demand reset until the present reading—which is also recorded manually. These meters are purchased and installed for a specific load, i.e. amperage, voltage, phase, preset demand period, and number of elements.

In contrast, even some of the more basic digital power meters provide several—if not many—quantities of interest besides energy and demand. The most sophisticated of these apparatuses provide hundreds of quantities, including: current, voltage, unbalance, power, power factor, harmonic distortion, selectable demands and periods, and even problem solving algorithms.

Most provide limited internal logging, but when networked to a system server (such as the Square D Powerlogic SMS-3000) their usefulness is increased enormously. Such telemetry allows data base storage (logging) and retrieval of any and/or all quantities, instantaneous alarming and custom reporting. Also, the system allows automatic (scheduled) “reading”—and select quantity resetting—of individual meters. If problems are encountered or suspected, the devices can be set up to constantly monitor for abnormalities and undesired events and aid in troubleshooting of those circuits. One more significant note regarding a solid state meter is that it can accommodate all system types (current, voltage, phase, etc.) by simply changing its programming configuration. And when recalibration is required, batch commands can quickly and easily reprogram entire groups of similar devices at one time.

Last but not least, Personal Digital Assistants are used to aid in the acquisition of demand meter data from those devices which are still of the analog type. While the data must be entered by hand, it is instantly applied to a formula and compared to previous monthly readings to minimize errors and ensure accuracy, and then can be synchronized to a networked computer accessible to utilities personnel for historical and billing purposes.

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The influence of these programmable devices, computers and associated software has changed the face of industry. Even in the electrical shop, computers are relevant and even a necessity. And I have only mentioned the uses specific to my duties. Others will detail the use of computers for such tasks as: fire alarm and security notification, lighting and scene control, and elevator maintenance—just to name a few.

Elevator Systems

The elevator systems on campus have greatly improved during the last ten years. After many years of using relay logic controls and motor-generator drive units, the elevator industry has shifted to newer technologies that include programmable microprocessor controls and solid state VVVF drives (Variable Voltage Variable Frequency). This combination has allowed for a much smoother ride and faster response time as well as increased reliability. Down time for repairs has also decreased as a result of the advanced onboard diagnostics that are available on today’s modern elevator equipment. The latest trend is towards remote monitoring capability via the campus network. The Harold B. Lee library was the first building on campus to be put on the new monitoring system and has allowed maintenance and repair personnel to more efficiently respond to problems with the equipment in a timely manner. In addition to the new elevators installed as part of new campus construction projects, CNA funding has also allowed for a significant number of elevator systems on campus to be modernized with this new microprocessor based equipment.
Security Systems

When I first was hired here at the University our Fire and Security systems were on the same system. This was the Auto Call system. This system consisted of electro mechanical devices that were in all the buildings that reported codes to University Dispatch, when activated by a fire or intrusion. These codes then were matched with a paper written description of location of the device in alarm. This system was prone to errors and high amounts of repair.

Today the system is divided into Fire (life safety) and Security (access control and CCTV). The Fire Alarm computer system is now on its second generation of reporting into University Dispatch. We are now using Notifer, Uninet and some of the Firegraph system. This system is on its own network that reports in all Alarms (Fire, Smoke, Water Flow, Communication Errors, and Floods) in a very timely manner (NFPA standards). This not only gives details of what building, room and device that is in alarm, it also can call up a map with floor and devices showing in alarm. The Security side performs in the same manner, however it uses the OIT network (IP address, Masks, Gateways). We are using the Software system which can incorporate CCTV that can be used to set an alarm off as well as intrusion devices such as motion detectors, glass breaks, hold up buttons, elevator controls and door contacts. We also can tell if a door has been held open or forced open. The system gives us maps as well as description and detailed actions that University Police can or should follow. We have over 100 buildings with CCTV and APC’s (Access & Control) panels on campus. We have 40 plus users (departments) that can use their desk top computers to arm/disarm doors in buildings as well as alarm points and check to see who violated doors or areas of concern.

Without these desk top computers, servers and panels we would not have the excellent systems that we have today. These also include our New Lift Nets for Elevators and the Power Distributions (Power Logic) system for powering for the University’s electrical needs. We have LAN’s for scoreboard work and we have networking for dimming systems all over campus. We also need computers for troubleshooting many other devices around campus from meters, motor controls and breakers in load centers. I have always maintained that one day when you come into the electrical systems shop, part of your standard tools will be a “lap top.”

Ron Keller, Assistant Supervisor, Electric Shop

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Campus Lighting

Computers are important for light and other systems throughout campus. In a few buildings they have a power link lighting system that is computer operated. Before this these systems were operated by switches, which required someone to turn the lights on and off at specific times. Also traffic control is operated by computers. This allows the flow of traffic to be smooth. Before computers there was no traffic control, which meant that there were no traffic lights. In the Museum of Art the computer system controls the lighting. The lights will change due to the different exhibits. This gives a greater effect of art. The Museum of Art was built since the age of computers and has always required lights.

Central Heating Plant

From the 1940s’ to 2004 the Central Heating Plant has been meeting the hot water and heating needs for the campus. To meet these demands, the plant generates 400°F hot water at a pressure of 300 pounds per square inch. There have been additions and upgrades to the plant and its controls over the years. Pneumatic controls were first used for the boiler controls and their related equipment, a change to computer based electronic controls took place in 1988. This change was to facilitate the demands for better boiler efficiency, fuel consumption and emissions management. The computers have twice evolved from the 1988’s very large computers using 8 ½” floppy disks for back-up to desk top Microsoft Windows based PC’s. From 1991 to 1993, a major renovation to the Heating Plant took place. One natural gas fired boiler and two coal fired boilers were removed and replaced with three high efficiency natural gas fired boilers. To meet the State of Utah Clean Air requirements, a bag house for particulate recovery was constructed and installed on the plant’s coal system. With the increased equipment and the maintenance requirements that were created by these up-grades, the Heating Plant has increased from 14 full time employees to 19 full time employees.

Appendix H - Computers

Allen Ewell, Electrician

Clifford Alleman, Supervisor, Heating Plant
Appendix I

Telephone History in Physical Facilities Division - 1951-2005

Both the academic and the housing telephone switchboards remained in the Eyring Science Center from 1951 to 1957. Each were operated as a separate system, administrative offices on dial and housing on manual. (Consolidated Report of the Physical Plant Department, BYU, 1947 through 1957.)

In January of 1957 construction was completed on a $220,000 telephone system with switchboards and dial equipment in the basement of the Smith Family Living Center. At that time it was the largest private branch exchange in the Mountain States territory. Westinghouse men spent 10,000 hours completing this installation which had 200 trunks to the telephone central office in downtown Provo and a complete dial system with 2,500 numbers. With this new installation it was possible to dial directly to any other telephone in the system or in Provo, Springville or Orem. To assist persons in placing and receiving long distance calls, a six position switchboard, requiring 25 operators, was included. (The Monitor, M.T. & T. April 1957, p. 12.)
1957-1978
The campus phone system consisted of a Western Electric “stepper” PBX (Private Branch Exchange) system. Stepper PBXs used electromechanical technologies. The telephone sets were rotary-dial. Some sets were six-button sets that required a 25-pair station cable to the phone. The PBX had the capacity to have up to 5000 numbers and 300 trunks. In 1975, a message service was added that allowed up to 870 phone sets with MW (message waiting) lights. The messages were taken and message lights controlled by operators located in the SFLC.

1978-1988
In 1978 BYU leased an AT&T Dimension 2000 PBX. It was all electronic using TDM (Time Division Multiplexing) technology and computerized call control. This system also introduced Touch-Tone analog telephone sets to campus. It also introduced additional call routing features, larger multi-button analog/digital sets for secretaries, and electronic operator consoles that replaced the old operator switchboard used on the Stepper switch. The new PBX also provided an electronic voicemail system, which replaced MW system. BYU purchased the system from AT&T in 1984 as a result of the divestiture of AT&T. We also assumed responsibility for the maintenance of the PBX. BYU also purchased all of the existing telephone cabling on campus from Mountain Bell.

1988- Present
In the mid 1980s with the rapid growth of over 10,000 lines, the Dimension system began to show signs of being overloaded. In 1988, after an extensive investigation and RFP process, the Dimension system was replaced with a ROLM CBX (Computerized Branch Exchange) or IBM 9751. The CBX is an integrated voice and data system based on TDM technology. It replaced the Dimension 2000 PBX and the Develcon data switches. This project also included replacement of the old telephone cabling with new trunk, riser, and station cables. A new underground switch room was added to the SFLC to house five of the nine nodes of the system. Two additional nodes were placed in the basement of the Conference Center, one node in a small building near the Cannon Center, and one node in a small building near the Wyview housing area. The majority of the telephone sets are multi-button ROLM digital sets. Analog lines are available for modems, FAXs, etc. Data connections to PCs, etc. were made through a serial port option on the ROLM sets. Most data connections migrated to the campus Ethernet network in the mid to late 1990s.

(BYU Office of Information Technology)

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2001 – Present
In 1999 plans were being made to replace the SFLC with a new building. This meant that we had to move or replace the five nodes of the ROLM system located in the SFLC. Given the age of the ROLM CBX and the emergence of VOIP (Voice over IP) technologies, the decision was made to phase out the CBX and move our phone services to run over our Ethernet data network (VOIP). We chose to use Cisco’s AVID VOIP system. This required a major upgrade of our data network and the building of a new underground data center to house network infrastructure and campus data servers. We began implementing VOIP in 2001 for the main part of campus so that we could remove the ROLM system nodes and vacate the SFLC switch room by September of 2002 to allow for the demolition of the SFLC. The new data center construction began in May of 2001 and was completed by June of 2002. The ROLM system was downsized to five nodes with one node being placed in the data center. The new network core was also located in the data center. This first phase of the IPT (IP Telephony) project replaced approximately 6000 ROLM phones with IP phones for the campus buildings that were being serviced by the five CBX nodes in the SFLC. An additional project replaced approximately 3000 phones in the outlying buildings, excluding the residential halls. There is a project to be completed by Fall Semester of this year (2005) to replace all of the ROLM phones in the housing areas with analog service running off the IPT system. When the housing project is completed, we will remove the remaining ROLM CBX nodes. The IPT system will have about 12,000 voice lines and 20,000 data connections. Voicemail is provided by a UNITY voicemail system, which is associated with the IPT system. (BYU Office of Information Technology)
### Appendix J

**Physical Facilities Administrators - 1875-2005**

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1875 - 1892</td>
<td>Building cleaning was the responsibility of a faculty member with the help of a part-time janitor.</td>
</tr>
<tr>
<td>2</td>
<td>1892 - 1900</td>
<td>A faculty member, with the help of a janitor, was responsible for cleaning the building.</td>
</tr>
<tr>
<td>3</td>
<td>1900 - 1921</td>
<td>B. T. Higgs, with the help of students, cleaned and maintained the buildings and grounds.</td>
</tr>
<tr>
<td>4</td>
<td>1921 - 1945</td>
<td>B. T. Higgs, John W. Sauls, Karl A. Miller (all three full-time) with the help of students.</td>
</tr>
<tr>
<td>5</td>
<td>1945 - 1951</td>
<td>In 1947 Leland M. Perry appointed superintendent of the Physical Plant Department, with Karl A. Miller, Robert Hellewell, and J. Alvin Higbee as assistants.</td>
</tr>
<tr>
<td>6</td>
<td>1951 - 1957</td>
<td>In 1955 the Office of Campus Planning and Development was established with Joyce W. Tippetts, Director, independent of the Physical Plant Department.</td>
</tr>
<tr>
<td>7</td>
<td>1957 - 1974</td>
<td>In October 1957 the Departments of Campus Planning and Physical Plant were consolidated into one department, the Department of Physical Plant, with Sam F. Brewster as director, and Harold J. Anderson, Assistant Director. Paul G. Rasmussen supervised the Construction Section, and Ephraim Hatch supervised the Planning Section. In 1959 a Jr. College Development Section was added, consisting of A. E. Carlsen and Wm. Woolf. In 1968 the Jr. College Development Section was closed. At this same time, Ephraim Hatch was appointed Special Projects Coordinator. The Planning and Construction Sections were combined, with Paul Rasmussen as supervisor. In 1971, planning and construction of all Church schools was added, with Norman Faldmo as architect and Edwin Cozzens as engineer. The name of the department was changed from Physical Plant to Facilities Planning, Construction, and Maintenance, Church Educational System.</td>
</tr>
<tr>
<td>8</td>
<td>1974</td>
<td>A Pictorial Survey of the Department of Physical Plant</td>
</tr>
<tr>
<td>9</td>
<td>1974 - 1978</td>
<td>Sam Brewster retired in 1974. Fred A. Schwendiman was appointed, with the title of Asst. Vice President/Physical Plant.</td>
</tr>
</tbody>
</table>
Chapter 10  1978 - 1981  In December 1979, Fred Schwendiman was made Vice President of Support Services. R. Sears Hintze was appointed Physical Plant Director, Edwin Cozzens, Planning Director, and Clyde Bair, Housing Director. Harold Anderson was appointed director of Physical Plant Services, Ed Haines, Director of Space Utilization, and Bruce Barrett, Director of Auxiliary Areas; all reporting to R. Sears Hintze.

Chapter 11  1981 - 1993  With the death of R. Sears Hintze, it became necessary to reorganize. The name, Physical Plant Department, was changed to the Physical Facilities Division. Edwin Cozzens was appointed Director of Physical Facilities; Norman Faldmo as Director of Planning and Architecture, and Douglas Christensen as Director of Business Support. Harold Anderson and Ed Haines continued in their same assignments, all reporting to Edwin Cozzens. Ephraim Hatch retired, and Gene Libutti was appointed, Special Projects Coordinator in his place. The Auxiliary Maintenance Department was removed from Physical Facilities. Following the retirement of Harold Anderson and Ed Haines, Douglas Christensen was appointed Physical Plant Director, and Anne Schroeder, Coordinator of Space Utilization. Later, Scott Briggs replaced Douglas Christensen as Managing Director of Physical Plant, and Douglas Christensen became responsible for Capital Needs Analysis (CNA). J. B. Ostlund was appointed Director of Business Support.

Chapter 12  1993 - 2005  Edwin Cozzens continued as Asst. Admin. Vice President, Physical Facilities Division to 1 March 2005. Reporting to him were the following: Anne Schroeder, Director of Space Management; Warren Jones, Director of Facilities Planning; Scott Briggs, Managing Director of Physical Plant; Dan Gleason, Director Capital Needs/Utilities Analysis; J. B. Ostlund, Director Business Support Asst. A.S. Advocate; Douglas Christensen, Administrative Solutions Advocate.

Chapter 13  2005 -  Edwin Cozzens retired 1 March 2005. Ole M. Smith was appointed Asst. Admin. Vice President, Physical Facilities Division. No other managerial changes were made at this time.

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