OAKLAND COMMUNITY COLLEGE

OAKLAND COMMUNITY COLLEGE

A VISION OF EXCELLENCE IN THE 21st CENTURY

FIVE YEAR CAPITAL OUTLAY MASTER PLAN

Fiscal Year 2019 (7/1/18 – 6/30/19)

Through

Fiscal Year 2023 (7/1/22 – 6/30/23)

Section I

Mission Statement

Mission Statement

Oakland Community College's mission is to guide students to success that fulfills community needs. In addition, OCC has identified values statements that support our mission:

- Accessibility. Provide educational opportunities and compliant programs and services.
- Affordability. Offer affordable educational opportunities.
- Diversity/Inclusion. Embrace people and ideas that broaden and enrich our community.
- Excellence. Offer high-quality programs and services.
- Relevance. Offer the most relevant education to our community.
- Social responsibility. Provide socially responsible programs, services, and activities.

Our vision statements provide further clarification of who we intend to be, what we intend to do, and what we will have when we achieve our vision.

BE
- We will be recognized for our academic program excellence.
- We will be viewed as the premier transfer institution because of the high-quality preparation of our transfer students.
- We will be recognized as the preeminent provider of community education and workforce training

DO
- We will implement a student-focused service model.
- We will streamline administrative practices to optimize operational effectiveness.
- We will increase the flexibility, accessibility, and affordability of our academic programs.
- We will increase our student completion rate.

HAVE
- We will have an organizational structure that supports student success.
- We will have a strong financial position.
- We will have a minimum of 15 nationally/regionally accredited academic programs/certifications.
- We will have an accredited virtual campus.

Section II

Instructional Programming

Instructional Programming

As part of the Five Year Capital Outlay Plan, each college and university shall provide an overview of current academic programs and major academic initiatives. This "instructional programming" component should:

a. Describe existing academic programs and projected programming changes during the next five years, in so far as academic programs are affected by specific structural considerations (i.e., laboratories, classrooms, current and future distance learning initiatives, etc.);

As a comprehensive two-year institution of higher education OCC offers more than 800 courses and 85 career and technical programs in art, business, technology, health, science, humanities, public service and advanced manufacturing. The college is committed to offering high quality curriculum that meet the needs of the community while preparing individuals for high wage, high demand occupations, as well as providing pathways for students who wish to pursue advanced study at a four-year university.

Ensuring that curricular offerings align with community need the college employs a system of continual evaluation. In this process, generally referred to as the curriculum life cycle, OCC examines regional labor market and economic data including occupational demand compared to skilled worker supply, wage levels, and level of required education among other key factors. This process allows the college to rapidly adjust curricular offerings as regional needs shift.

In addition to offering several select courses in an online format, the College offers a fully online program in Criminal Justice and expects to develop additional online programs over the course of the next two years in order to meet community needs with the approval of the Higher Learning Commission.

b. Identify the unique characteristics of each institution's academic mission for two-year degree and certificated technical/vocational training, workforce development activities, adult education focus, continuing or lifelong educational programming, partnerships with intermediate school district(s), community activities; geographic service delivery area(s), articulation agreements or partnerships with four-year institutions, etc.

Two-year degree and certificated technical/vocational training

The college's 85 career and technical certificate and degree programs are designed to prepare individuals for entry-level employment, acquire professional certification, as well as prepare students to pursue advanced degrees at a four-year institution. In order to optimize student success in these areas it is necessary to ensure that the curricular focus of these programs remain aligned with employer needs, certifying agency requirements and transfer institution expectations.

To this end, the college requires that all degree and certificate programs undergo a comprehensive review once every five years. This internal review process results in a series of action strategies that guide curricular revision, pedagogical modification, capital spending and facility improvement, etc.

Additionally, the College recommends each program to have an advisory board composed of content experts who are unrelated to the college. These advisory boards provide the external perspective necessary to keep program curriculum adapting to the needs of employers.

Workforce development activities

The college provides a wide range of essential support and services to public and private sector organizations that support development of an agile and skilled workforce that brings new ideas and creativity to a rapidly changing market and work environment. These services lead towards alignment of employee skills with business goals and objectives, improved employee loyalty, morale, job satisfaction, and retention, which leads to a culture of continuity and consistency in the work place.

Adult education focus

Community education programming is an essential service that contributes to the personal interest, growth, and enrichment of community members. Individuals receive value by engaging in the College's community education courses, seminars, camps, and programs designed to help them fully develop their natural abilities by gaining knowledge and skill on topics of personal interest. By completing these lifelong learning activities, students potentially: enrich their lives, increase their personal satisfaction, gain a sense of self-fulfillment, adapt to change, increase their wisdom, and strike a balance between work and life. Further, students benefit from community education programming that enables them to continuously pursue and sustain their passion in ways that leads to feelings of social inclusion and demonstrations of active citizenship through active and meaningful contributions to society. Students receive greater value when their passions for community education programming can be linked to their professional interests and work life.

Continuing or lifelong educational programming

The college recognizes that continuing education programming is an essential service that assists students with developing new occupational skills to use in their current and/or future career. Students receive value by engaging in the College's continuing education courses, seminars, certifications, credentials, and programs designed to help them upgrade their skills for their current job, retrain for a new job, or prepare for a new career; by completing these activities, students potentially increase their employability, mobility, and earning potential.

Moreover, when employees complete continuing education programming, employers receive value from: an agile and skilled workforce that brings new ideas and creativity to a rapidly changing market and work environment; the alignment of employee skills with business goals and objectives; improved employee loyalty, morale, job satisfaction, and retention which leads to a culture of continuity and consistency; improved productivity and profitability; and the opportunity to develop future organizational leaders.

Community activities

The college is engaged in community outreach activities that provide resources for students and community members, while helping to determine relevant programming. The College sponsors outreach activities that engage the community in social, cultural and educational enrichment. A sampling of these activities include events sponsored by Workforce Development, Student Life, the Culinary Arts Institute, Athletics and Theatre.

Geographic service delivery area(s)

Oakland Community College is a multi-campus, two-year comprehensive institution of higher education serving all of Oakland County. The College opened in September 1965, with a record community college enrollment of 3,860 students on two campuses - Highland Lakes, a renovated hospital in what was Union Lake, and Auburn Hills, a former Army Nike missile site in what was Auburn Heights. In September 1967, the award-winning Orchard Ridge Campus opened. First housed in leased facilities in Oak Park, the Southeast Campus System expanded through the purchase and remodeling of buildings at a second site in Royal Oak. In 1980, a new campus in Southfield replaced the Oak Park facilities. The Royal Oak buildings were replaced by a new campus complex, which opened in the fall of 1982.

Partnerships with intermediate school district(s)

Currently OCC has 109 CTE articulation agreements with 35 area school districts covering 17 OCC courses. These agreements offer students the opportunity to earn college credit while enrolled in state approved technical programs while still in high school. Additionally the college supports several early college/dual enrollment programs including:

- Detroit Promise Path

- Farmington ELL College readiness
- Hazel Park Promise Zone
- NILES Dual Enrollment
- Oakland Accelerated College Experience
- Oakland technical Early College
- Oakland Early College
- Pontiac Dual Enrollment
- Southfield Dual Enrollment
- Troy Schools Dual Enrollment
- Walled Lake College readiness
- West Bloomfield Early College

Articulation agreements or partnerships with four-year institutions

In order to assist students who wish to pursue advanced study at a four-year institution the College maintains over 300 articulation agreements with 22 post-secondary institutions. These agreements provide for the smooth transfer of course credits earned at OCC and avoids unnecessary repeating of courses at the four-year institution. As a result, students are able to complete their advanced study in a more cost effective and timely manner.

c. *Identify other initiatives which may impact facilities usage;*

OCC serves a large geographic region that is economically, demographically and socially diverse and ever changing. With unemployment at historically low levels and a declining school age population, the college has taken steps to restructure administrative and academic offerings while at the same time implementing new technologies to better serve students and the community. The consolidation of academic programs, modernization of administrative processes, changes in pedagogy, as well as the formation of public and private partnerships are directly affecting the utilization of facilities college-wide.

d. *Demonstrate economic development impact of current/future programs (i.e., technical training centers, life science corridor initiatives, etc.).*

While nearly 85 percent of OCC students live within the county, work-commuting patterns indicate that students work throughout southeast Michigan. As a result, when considering labor market needs, the College examines data from a seven county region: Oakland, Genesee, Lapeer, Livingston, Macomb, Washtenaw, and Wayne Counties. More specifically related to available occupations and college programming, within this region, based on available third party data used by state agencies in Michigan, there are an estimated 149,726 annual job openings across all occupations and education levels. When focusing on just those occupations most likely to need some post-secondary education but less than a bachelor's degree, there are approximately 73,889 job openings projected each year for the next five years in the region (based on the typical distribution educational requirements requested by employers).

The college currently offers programs that lead to with approximately 14,020 job openings in the region. For these occupations, the average of the median wages is $24.87/hour.

The ten occupations supported by OCC programs (based on the number of projected job openings) include:

1. Registered Nurses
2. General and Operations Managers
3. Cooks, Restaurant
4. Accountants and Auditors
5. Medical Assistants
6. Software Developers, Applications
7. Automotive Service Technicians and Mechanics
8. Managers, All Other
9. Computer Systems Analysts
10. Management Analysts

In addition to considering the local economy, OCC also believes it is important to consider the regional supply in addition to demand; in other words, while there are approximately 14,000 openings related to programs OCC offers, the regional competition is also supplying graduates for many of the same occupations. Based on regional supply, OCC believes their top priorities for increasing enrollment to better meet community need include the following 10 programs.

1. General Accounting Certificate
2. Library Technician
3. Library Technician Certificate
4. Technological Sciences
5. International Commerce
6. Welding Technology Certificate
7. Hotel / Motel Management
8. Culinary Arts
9. Dental Hygiene
10. Fire Academy

Sources: Economic Modeling Specialist International; Oakland County Economic Outlook 2017-2022; OCC Institutional Effectiveness 2017

In 2014, OCC received a $4.5 million grant to purchase equipment for several programs including automotive servicing, collision auto repair, and what will be a new diesel repair program. Before equipment can be installed, the space must be renovated to accommodate the equipment.

Section III

Staffing and Enrollment

Staffing and Enrollment

Colleges and universities must include staffing and enrollment trends in the annual Five-Year Capital Outlay Plan. This component should:

a. *Describe current full and part-time student enrollment levels by academic program and define how the programs are accessed by the student (i.e., main or satellite campus instruction, collaboration efforts with other institutions, Internet or distance learning, etc.);*

   Of the 29,644 students who attended OCC in 2016-17, 22% of them attended full time in either the fall or the winter term. Meanwhile, 78% did not attend full time in either fall or winter terms. Individuals programs are scheduled so that full time students can complete in normal time. Part-time students are able to select from within the full time plans. In 2017, Academic Affairs examined enrollment levels in each program and set a target for completions. However, the College does not have an expectation for full and part time student enrollment by program, although we know a majority of students attend part time overall.

   Students attend programs on one of five campuses.

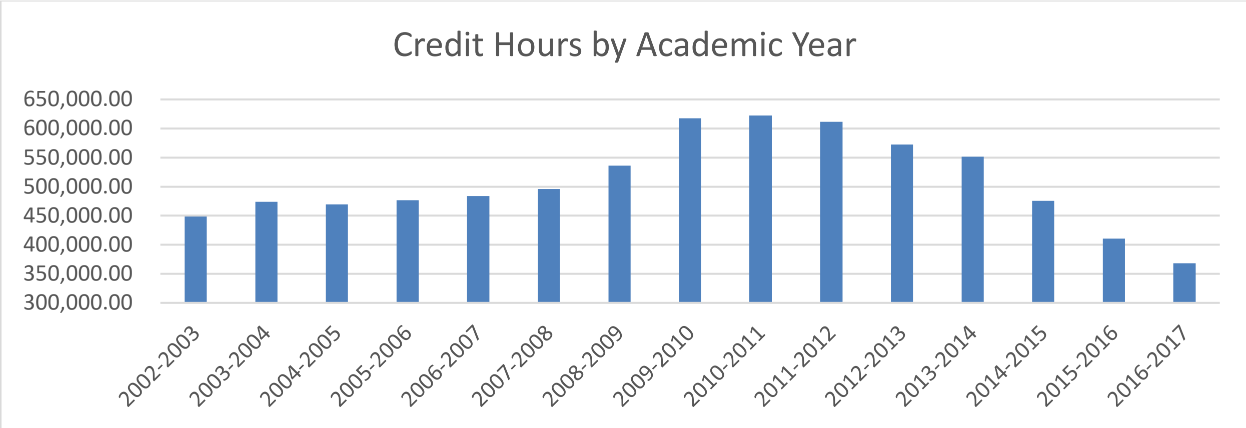
b. *Project enrollment patterns over the next five years (including distance learning initiatives);*

   In terms of student enrollment in available offerings, the College is currently projecting an 8% decline in 2017-18 from 2016-17 levels. In addition, we anticipate another 5% decline in enrollment during 2018-19 compared to 2017-18 enrollment levels. OCC is seeing a return to enrollment levels seen in pre-recession years (2000-2005).

   Source: OCC Institutional Effectiveness 2017

c. *Evaluate enrollment patterns over the last five years;*

   Over the past five years, the College dropped 36% in credit hours from 2012-13 to 2016-17. However, the steepness of the drop is relative to an unnaturally high enrollment spike seen during recession years followed by very low unemployment rates in Oakland County. When we compare our enrollment to say 2002-03, we see that OCC is down 18% for the 2016-17 enrollment.



d. *Provide instructional staff/student and administrative staff/student ratios for major academic programs or colleges;*

OCC offers maximum course sizes of 30 students in most courses, with reduced enrollments in select courses to address high-need populations, accreditation standards and facilities limitations.

e. *Project future staffing needs based on five-year enrollment estimates and future programming changes;*

During fall 2015 as reported in the annual IPEDS report, 1,928 academic, administrative and support staff were employed at OCC. Of these staff:

- 235 were full time and 1,052 were adjunct faculty.
- 46 library staff
- 28 student services
- 84 management
- 42 business
- 25 information technology
- 79 community service
- 93 service occupations
- 215 office support
- 29 in other occupations

The College maintains a contractual limit of 30 seats per course section, although the average seats taken per section is 19.67. The institution is targeting 40-60% of sections taught by a full time faculty member, and given the size of each discipline historically, the college projects that the current full time faculty staffing levels will be maintained in high need disciplines as attrition occurs.

f. *Identify current average class size and projected average class size based on institution's mission and planned programming changes.*

OCC's Mission is to guide our students to success that fulfills community needs. To accomplish this mission, the College keeps class sizes low with a maximum of 30 students per section and reduces enrollment further in select course sections to address high-need populations, accreditation standards and facilities limitations. Using these enrollment limits is seen in the College's average class size of 19.67. Having just reaffirmed this mission the College plans to continue with these class size limitations.

Section IV

Facility Assessment

Facility Assessment

A comprehensive facility condition assessment was completed by ISES Corporation in August 2017. This report was performed to accomplish the following objectives:

- Provide an inventory of the college's facilities in a database format to be easily updated and maintained by OCC personnel and allow for quick access to facilities information.
- Determine the condition of the buildings and grounds at OCC and provide the data in a concise format, allowing quick determination of the current replacement value and condition of each facility.
- Determine a Facilities Condition Index (FCI) for each building, each campus and OCC as a whole. The FCI is a benchmark index that rates the condition of existing college buildings and is used by the facilities managers nationwide to quantify and prioritize deferred maintenance projects for capital planning purposes.
- Assist OCC in meeting the goals of its Mission Statement through timely maintenance of the physical backbone of the college – the buildings of OCC.

The following reports (included herein) were prepared by ISES Corporation.

1. ISES Executive Summary – Facility Condition Assessment
    - Identifies the summary condition of each facility
    - Replacement value of existing buildings
    - Utility system conditions

OAKLAND COMMUNITY COLLEGE

Executive Summary

Facility & Utility Condition Assessments

August 2017

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OVERVIEW

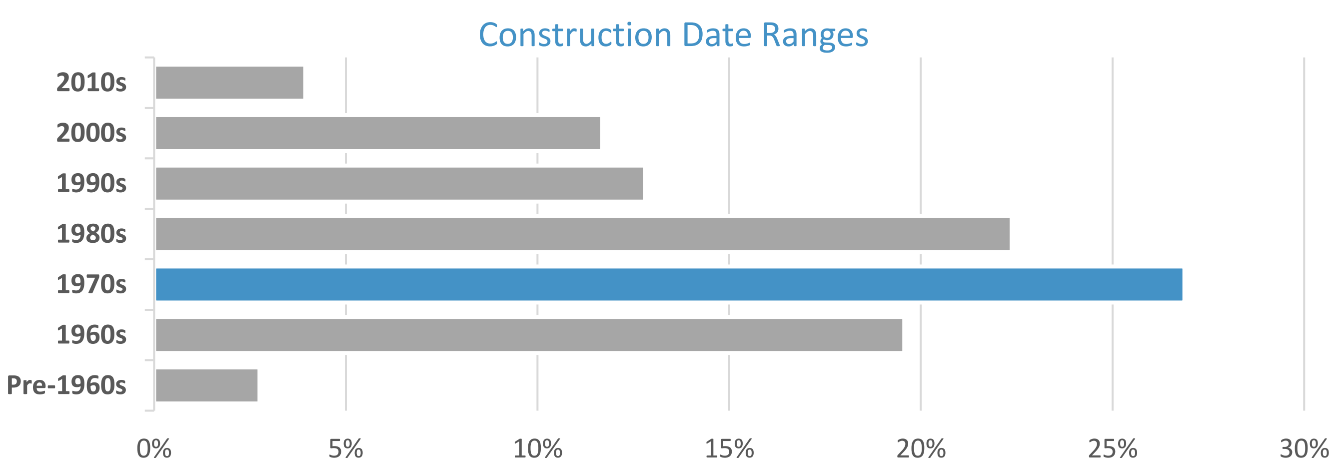
Project Summary

In February and March of 2017, Oakland Community College (OCC) contracted with ISES Corporation to perform comprehensive Facility Condition Assessment (FCA) and Utility Condition Assessment (UCA) services for its Auburn Hills, District Office, Highland Lakes, Orchard Ridge, Royal Oak, and Southfield campuses. The overall FCA effort included 73 buildings encompassing 2.1 million square feet of general education, administrative, infrastructure, athletics, and support space. In addition, 40 utility infrastructure assets were assessed as part of the UCA and include heating and chilled water generation and distribution, high voltage electrical, potable and fire water, and sanitary and stormwater systems. Four additional buildings were also inspected as part of the UCA, bringing the total number of buildings inspected to 77.

Twenty-two percent of the 73 inspected buildings (16) are in below average to poor condition. The average FCNI of these 16 buildings is 0.40, which suggests that there are significant renewal needs in these buildings. Furthermore, the average FCI of these 16 buildings, which is a measure of just Deferred Renewal, is 0.15 and well within the poor rating. The overall FCI for all of the facilities inspected by ISES is 0.07. This means that, beyond just the amount of system renewal needed across the buildings, a significant portion of these systems are considered past due for renewal. It is worth noting that the Facilities Operations department and the Chiefs for the Campus Facility Operations at each campus have done an admirable job of keeping these systems operational. Subsequent sections of this report will define these terms and present the relevant data to help OCC determine where resources are most needed.

Construction Dates

Over 49 percent of the square footage (29 buildings) was built before 1980. The vast majority of these older facilities are located on the Auburn Hills, Highland Lakes, and Orchard Ridge campuses.



Percentages based on square footage

Facility Usage Types

The following table shows the usage types of the inspected buildings.

USAGE TYPE	BUILDING COUNT	SQUARE FOOTAGE	PERCENT OF TOTAL (%)
Classroom/Academic (CL)	23	822,307	38.6
Parking/Garage (PK)	2	330,975	15.5
Laboratory (LB)	7	270,363	12.7
Student Union (SU)	3	186,276	8.7
Office/Administrative (OF)	7	178,845	8.4
Gymnasium/Athletics (GM)	4	152,788	7.2
Library (LY)	2	51,063	2.4
Theater/Auditorium (TH)	2	43,383	2.0
Warehouse/Storage/Utility (WH)	12	34,549	1.6
Retail (RT)	2	32,909	1.5
Shops/Trade (ST)	4	13,272	0.6
Residential/Single Family (RS)	3	6,573	0.3
Child Care (CC)	1	3,491	0.2
Dormitory/Apartments (DM)	1	3,415	0.2
TOTAL	**73**	**2,130,209**	

FCA Inspections

Extensive experience with asset surveys has led ISES to develop a standardized system of data collection that efficiently and effectively utilizes the time spent in each building. Each asset was inspected by a two-person team, which consisted of experienced architectural and engineering inspectors. They inspected the various components in each building and determined what repairs or modifications are necessary to restore the systems and buildings to an acceptable condition, or to a level defined by the college. The team typically starts on the roof, or the highest accessible level, and proceeds to the lowest level, inspecting each of the discrete building categories as the building is walked.

The assessment is an evaluation of the mechanical, electrical and plumbing systems, structural architectural components, vertical transportation systems, and utilities as they relate to each asset in the study. Exterior equipment obviously associated with a building, such as a pad-mounted chiller or loading dock service lot, is included in the assessment. In addition, the recommendations developed within the reports generated by Carl Walker for the condition of the North and South Parking Structures at the Royal Oak campus have been incorporated into this analysis.

An ISES FCA complies fully with ASTM E2018-15. It includes an evaluation of resource conservation opportunities and addresses compliance with the ADA Accessibility Guidelines. All accessible equipment and building components receive a thorough visual inspection. The inspection team lifts ceiling tiles in suspended ceilings and opens access doors to reveal hidden equipment and building components that are integral to the survey.

The visual nature of this inspection process requires close interaction with your operations and maintenance personnel. Many of the problems inherent in building systems are not visually apparent. ISES field assessors conducted staff interviews to ensure that all known system problems were cataloged and identified. Working as a team with your personnel improves the accuracy of the database and provides the most useful data. Historical documents, building and utility drawings, and the current and previous year's water treatment services were reviewed.

Contacts

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Project Manager

Definitions

Facility Renewal Needs

Facility renewal needs are identified during the field inspections and result in recommendations that are intended to bring facilities up to like-new standards and condition. Renewal recommendations can also enhance user safety and mitigate college liability. They replenish the lifecycle of existing assets but do not include updates related to departmental space or program use changes, system replacements as a reaction to failure, or specialized program-related equipment. Routine facilities maintenance and repair activities are also not considered to be facilities renewal efforts.

Recurring vs. Nonrecurring Renewal Needs

Facility renewal needs are divided into two main categories – recurring and nonrecurring. Recurring needs are cyclical and associated with replacement (or renewal) of building components and systems. Examples include roofs, chillers, windows, finishes and air handling units. The tool for projecting the recurring renewal costs is the Lifecycle Component Inventory. Each component has an associated renewal cost, installation date and life expectancy. From this data, a detailed projection of recurring renewal needs is developed for each building. These needs are categorized by UNIFORMAT II classification codes (down to Level 4). The result is a detailed year-by-year projection of recurring renewal needs for a given asset.

Nonrecurring needs pertain to one-time facility repairs and improvements. They typically consist of improvements to accommodate accessibility, address fire life/safety issues, or alter a building for a new use. They also include deficiencies that could negatively affect the structure or systems and components within. For these needs, recommendations are developed with estimated costs to rectify said deficiency. They each have a unique project number and are categorized by system, priority, and classification. The costs are indexed to local conditions and markups applied as the situation dictates. Examples of such needs are repair of building facade damage or a roof section or installing an ADA entrance ramp.

Renewal Need Categories

Renewal needs are divided into appropriate categories, as well as multiple systems, components, and elements within each category. Categories in this study include:

- Immediate Building Site
- Exterior Structure and Roof Systems
- Interior Structure, including Architectural Finishes
- ADA Accessibility
- Energy/Water Conservation
- Health Hazards
- Fire/Life Safety
- Heating, Ventilation, and Air Conditioning Systems
- Plumbing System
- Electrical System
- Vertical Transportation

Recurring Renewal Need Classifications *(generated by the Lifecycle Component Inventory)*

- *Deferred Renewal*
  Recurring needs that are past due for completion and have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral of such renewal could impair the proper functioning of the facility. Costs estimated for Deferred Renewal needs should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to affect the needed repairs.

- *Projected Renewal*
  Recurring renewal needs that will be due within the scope of the assessment. These represent regular or normal facility maintenance, repair, or renovation that should be planned in the near future.

Nonrecurring Renewal Need Classifications *(stored in the Projects module)*

- *Plant Adaption*
  Nonrecurring expenditures required to adapt the physical plant to the evolving needs of the organization and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).

- *Corrective Action*
  Nonrecurring expenditures for repairs needed to correct random and unpredictable deficiencies that could have an effect on building aesthetics, safety, or usability. Such recommendations are not related to aligning a building with codes or standards.

Prioritization of Nonrecurring Renewal Needs

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal need, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- *Immediate*
  Items in this category require immediate action to:
  a. correct a cited safety hazard
  b. stop accelerated deterioration
  c. and/or return a facility to normal operation

- *Critical*
  Items in this category include actions that must be addressed in the short-term:
  a. repairs to prevent further deterioration
  b. improvements to facilities associated with critical accessibility needs
  c. potential safety hazards

- *Noncritical*
  Items in this category include:
  a. improvements to facilities associated with noncritical accessibility needs
  b. actions to bring a facility into compliance with current building codes as grandfather clauses expire
  c. actions to improve the usability of a facility following an occupancy or use change

Calculations

Current Replacement Value

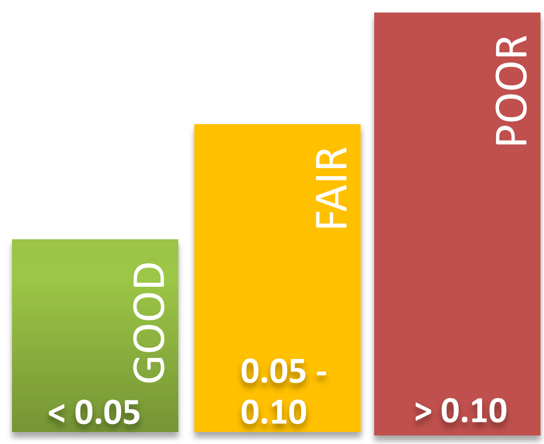
ISES traditionally calculates Current Replacement Value (CRV) using a cost per gross square foot based on building size and use (e.g. theater, research lab, classroom building, etc.). R.S. Means Section Square Foot costs are used as the starting point. This base number is adjusted for the size of the facility and modified with city cost indices to the local area, with appropriate modifiers for professional fees and demolition of existing structure added. Our standard methodology will prorate the base cost per GSF based on different use types in a building.

Traditional methods of calculating CRV do not take into account the historic significance of a structure. Replacement of a historic structure would only occur in the event of a catastrophic loss of said building. In such occurrences, the normal practice ISES observes is to construct modern facilities that meet the site/campus architectural standards rather than attempt to mimic the historical construction style that has been lost. Calculated CRVs are updated automatically in the AMS software when the annual inflation factor is added to the database.

Facility Condition Index

The Facility Condition Index (FCI) provides a relative measure for an objective comparison of building condition. This is a simple calculation derived by dividing the Deferred Renewal needs by the CRV. The following standards can be applied to assess where a facility falls within a range of conditions.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$



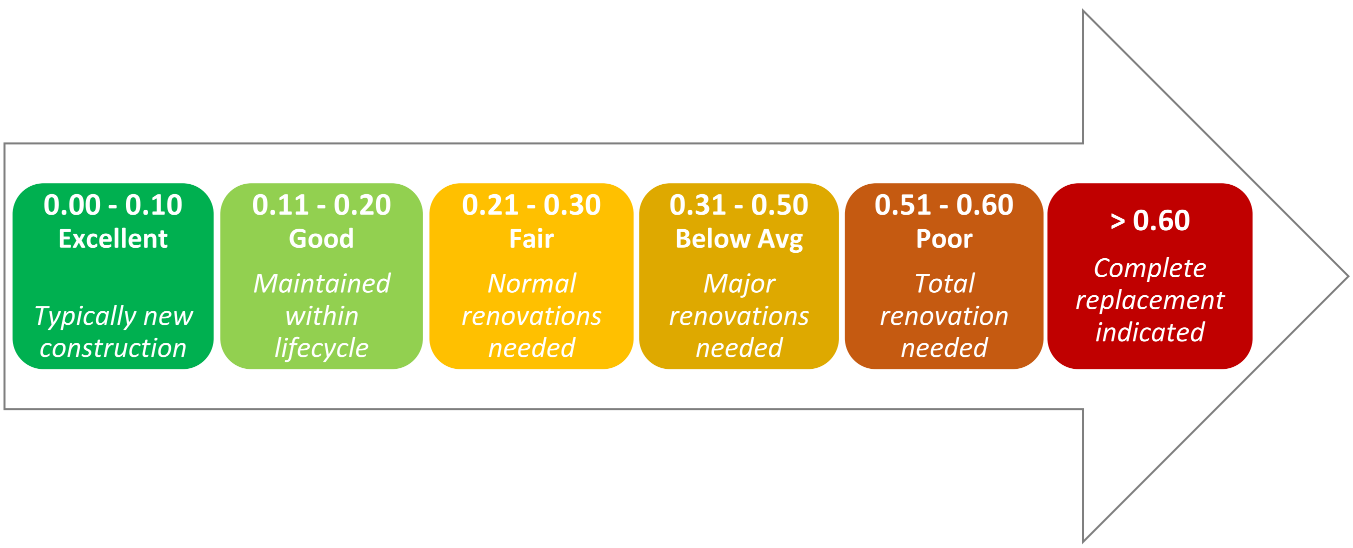
Facility Condition Needs Index

The Facility Condition Needs Index (FCNI) provides a lifecycle cost comparison. It is a ratio of the 10-year renewal needs (including Deferred Renewal) to the current replacement value of the asset.

$$\text{FCNI} = \frac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}}$$

The FCNI can be employed at multiple levels for analysis. It is most commonly used to compare buildings to other buildings. The index can be used as an evaluation tool when applying it to a single facility. The lower the FCNI, the better the facility condition. It should also be noted that this is an index, not a percentage. It can, especially in the case of historic facilities, exceed 1.00.

In terms of assessing where a facility falls within a range of conditions, the following standards can be applied.



The above ranges represent averages based upon our extensive FCA experience. The reader is cautioned, however, to examine each facility independently for mitigating factors (i.e., historic structures, temporary structures, facilities with abnormally low replacement costs, such as warehouses, etc.).

The FCNI can also be used for comparing groups of facilities to other groupings, including entire campuses. Comparisons in this vein form the basis of analysis for comparing the overall state of facilities to another comparable grouping. Note that the above ranges *do not* apply to multiple facilities. Variability among groups of buildings is reduced further as sample sets get larger. You can see how your institution ranks among other institutions in Appendix C.

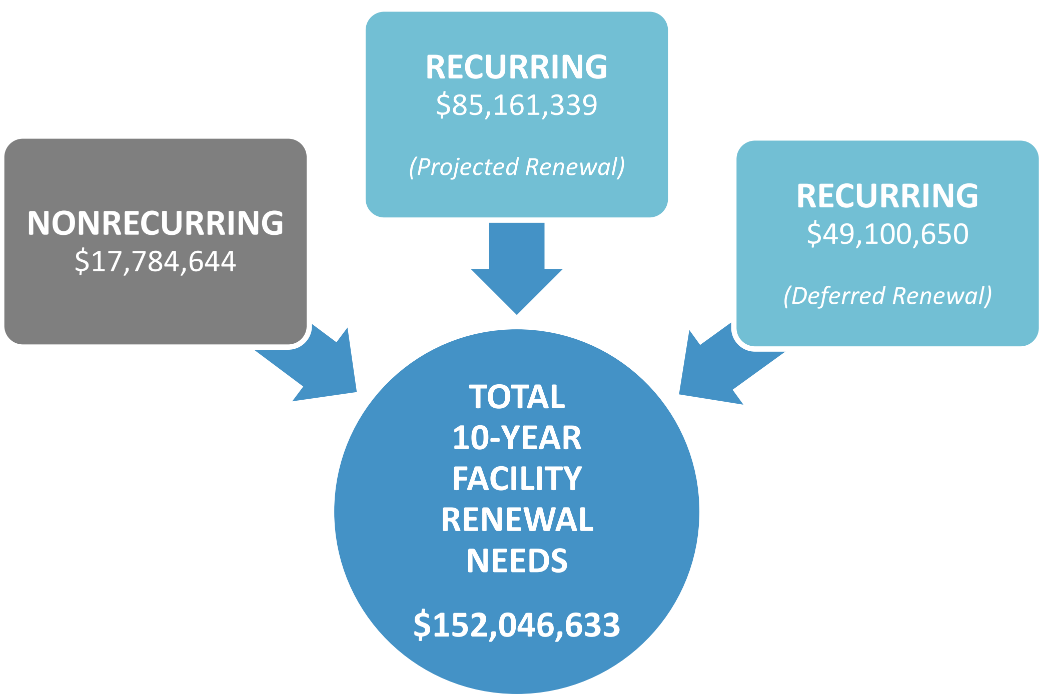
SUMMARY OF FINDINGS

Facility Condition Assessments

All data related to the FCAs was developed in, and is contained within, the ISES AMS (Asset Management System) database. ISES hosts this database system on our servers, and college personnel have access to the system via the Internet. The database is available for ongoing use by the facilities management team.

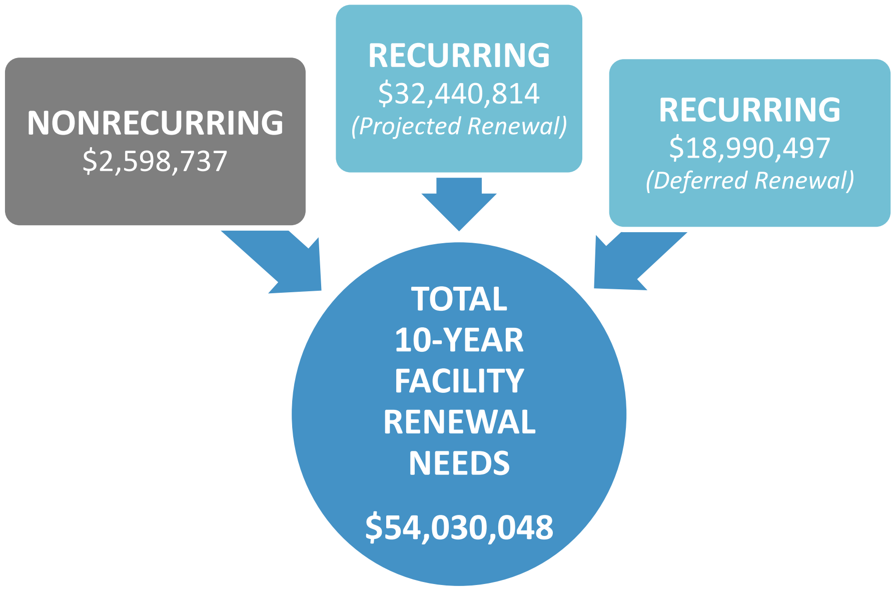
Total 10-Year Renewal Costs

As illustrated below, the FCA effort identified $152 million in nonrecurring projects and recurring renewal needs that should be addressed across all campuses over the next 10 years. Recurring renewal needs total more than $134 million, with the remaining $18 million being nonrecurring Plant Adaption or Corrective Action projects. Of the recurring costs, Deferred Renewal needs total $49 million, which is 32 percent of the total 10-year renewal costs.

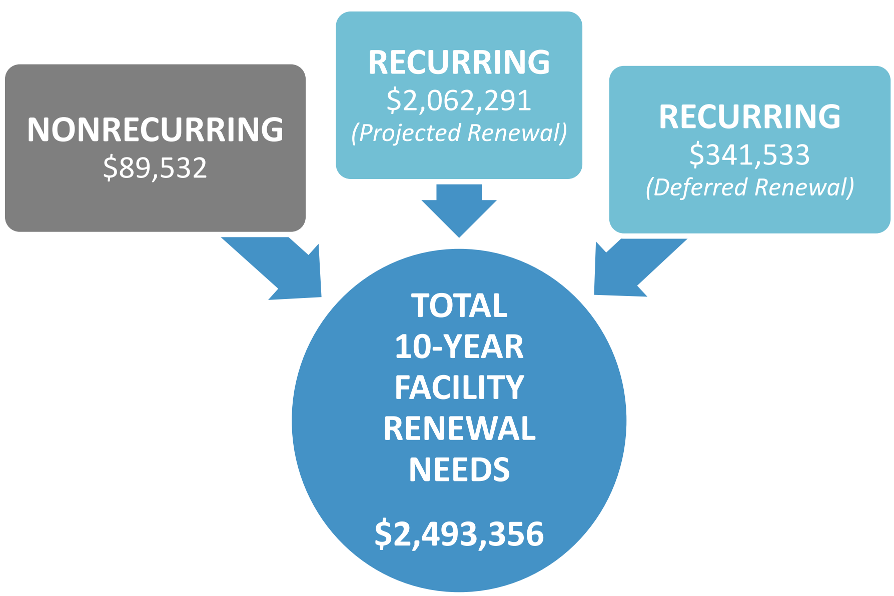


The charts on the following pages show the renewal cost breakdowns for each campus.

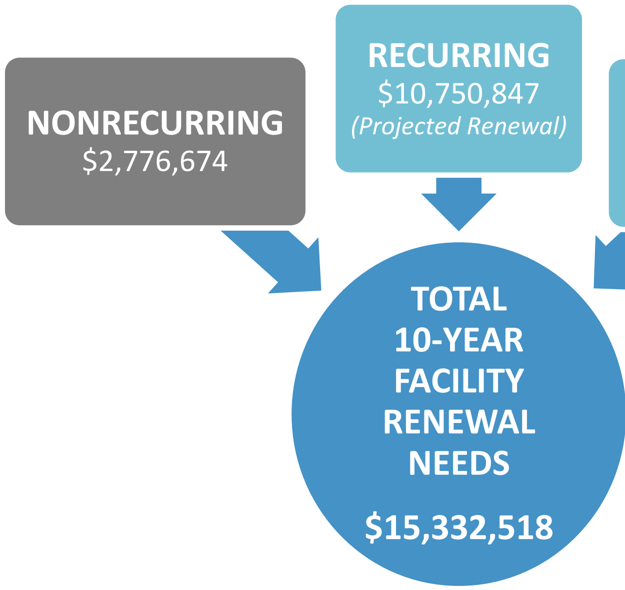
Auburn Hills



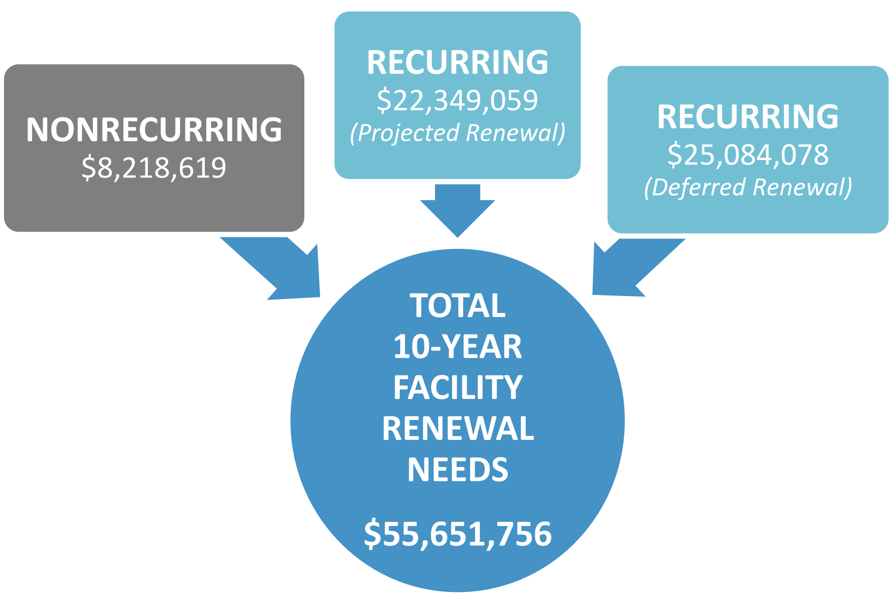
District Offices



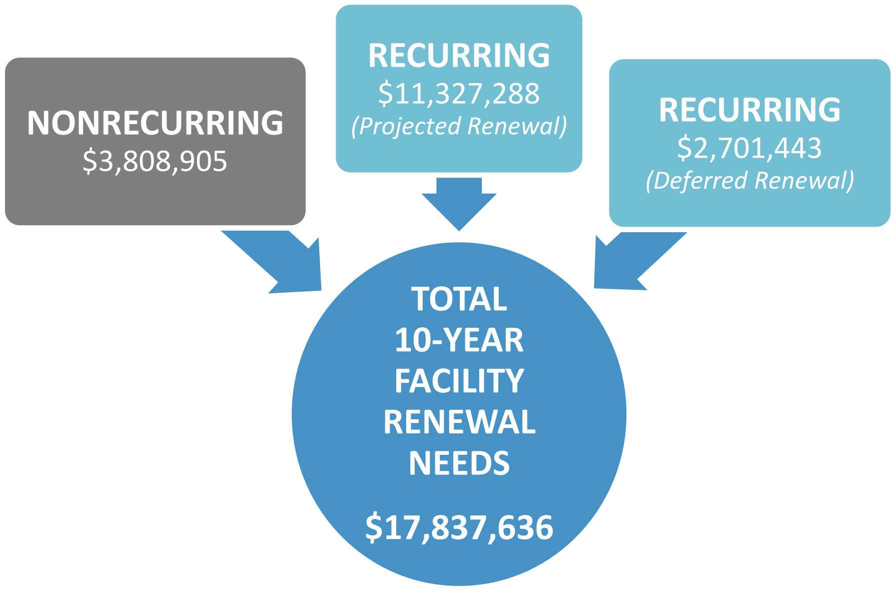
Highland Lakes



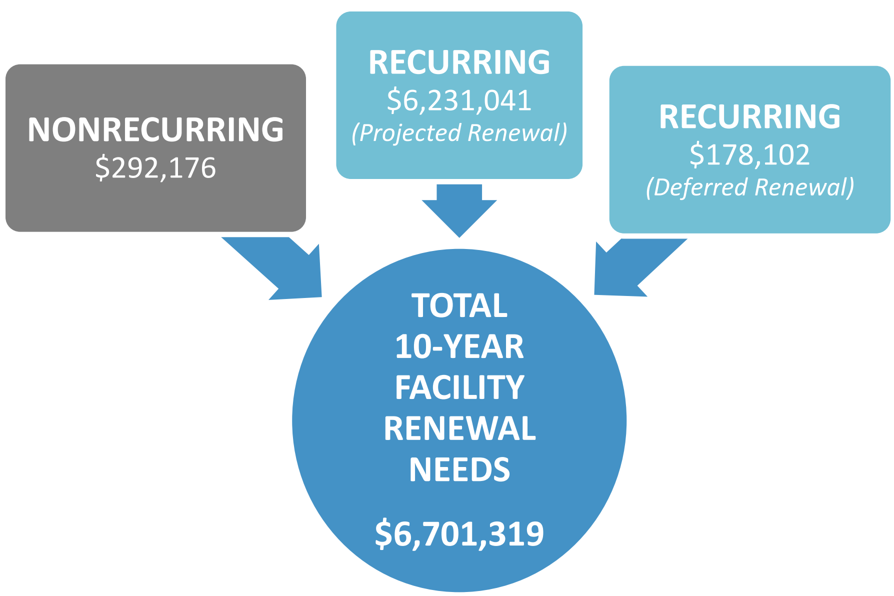
Orchard Ridge



Royal Oak



Southfield



FCNI and FCI Calculations

$$\text{FCNI} \quad \frac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$152{,}046{,}633}{\$703{,}295{,}615} = \mathbf{0.22}$$

$$\text{FCI} \quad \frac{\text{Deferred Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$49{,}100{,}650}{\$703{,}295{,}615} = \mathbf{0.07}$$

The average FCNI of the 73 inspected buildings is 0.22. Although this is in line with the ISES average of 0.24 (as amassed by 30 years of ISES clients), the high average FCI of 0.07 suggests that there is a significant amount of Deferred Renewal across the campuses and that they are underfunded relative to the national average. This underfunding of colleges and universities is not isolated to the State of Michigan but is systemic problem nationally. As funding becomes limited or is removed altogether, one of the first items removed from annual budgets is resources for continued maintenance and staffing. Limited funding places significant strain on the facilities operations and campus facility operations to try to maintain the operational reliability of aging systems. The lack of funded preventative maintenance programs will reduce the reliable service life of equipment and systems.

Several factors beyond limited funding have a significant impact on the overall and individual campus condition indices and general conditions. The overall age of the assets, particularly at the Auburn Hills, Highland Lakes, and Orchard Ridge campuses, is certainly a factor. Also, several unique assets, such as the Earl M. Anderson facility at Auburn Hills and Tirrell Hall at Orchard Ridge, require significant major repairs over the forecast 10-year period, affecting the needs for the system as a whole.

As stated earlier, the high FCI calculation suggests OCC needs to look at major renovations. Twenty-seven of the 37 buildings constructed before 1981, constituting 41 percent of the inspected square footage, are considered to be in fair to poor condition, and many of the major systems in those buildings were assessed to be original. Planned renovations in the 16 poor and below average buildings will help reduce these major backlogs and will improve the overall campus condition and ratings.

The information on the following pages highlights the needs by campus. These statistics reveal that the areas in most need of an influx of capital are Orchard Ridge and Auburn Hills.

Auburn Hills

$$\text{FCNI} \quad \frac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$54{,}030{,}048}{\$214{,}082{,}835} = \mathbf{0.25}$$

$$\text{FCI} \quad \frac{\text{Deferred Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$18{,}990{,}497}{\$214{,}082{,}835} = \mathbf{0.09}$$

District Offices

$$\text{FCNI} \quad \frac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$2{,}493{,}356}{\$11{,}227{,}000} = \mathbf{0.22}$$

$$\text{FCI} \quad \frac{\text{Deferred Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$341{,}533}{\$11{,}227{,}000} = \mathbf{0.03}$$

Highland Lakes

$$\text{FCNI} \quad \frac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$15{,}332{,}518}{\$122{,}177{,}228} = \mathbf{0.13}$$

$$\text{FCI} \quad \frac{\text{Deferred Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$1{,}804{,}997}{\$122{,}177{,}228} = \mathbf{0.01}$$

Orchard Ridge

$$\text{FCNI} \quad \frac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$55{,}651{,}756}{\$192{,}003{,}000} = \mathbf{0.29}$$

$$\text{FCI} \quad \frac{\text{Deferred Renewal Needs}}{\text{Current Replacement Value}} = \frac{\$25{,}084{,}078}{\$192{,}003{,}000} = \mathbf{0.13}$$

Royal Oak

FCNI $\dfrac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}} = \dfrac{\$17,837,636}{\$91,251,000} =$ **0.20**

FCI $\dfrac{\text{Deferred Renewal Needs}}{\text{Current Replacement Value}} = \dfrac{\$2,701,443}{\$91,251,000} =$ **0.03**

Southfield

FCNI $\dfrac{\text{10-Year Renewal Needs}}{\text{Current Replacement Value}} = \dfrac{\$6,701,319}{\$72,555,552} =$ **0.09**

FCI $\dfrac{\text{Deferred Renewal Needs}}{\text{Current Replacement Value}} = \dfrac{\$178,102}{\$72,555,552} =$ **0.00**

The following tables provide a detailed breakdown of all renewal needs listed by system, priority class (nonrecurring), and year (recurring), with totals for each category. There is one for all of the FCA buildings across all campuses and one for each campus.

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	615,219	1,600,029	0	0	0	0	0	0	0	0	0	0	0	**$2,215,248**
EXTERIOR	1,263,750	857,292	1,941,633	6,157,887	103,652	3,233,629	1,866,312	2,530,659	1,424,054	2,146,900	917,935	46,400	399,454	1,025,234	**$23,914,792**
INTERIOR	0	861	27,793	6,287,695	1,734,150	659,889	787,429	4,390,236	615,717	4,055,116	507,968	1,073,120	1,449,167	1,660,738	**$23,249,878**
PLUMBING	0	35,739	0	930,741	4,531,805	371,732	74,372	2,101,625	6,472	47,233	20,817	41,714	854,488	7,799	**$9,024,536**
HVAC	0	0	0	23,902,676	384,868	237,788	41,299	2,910,536	582,423	3,637,698	1,532,124	1,219,633	9,324,315	2,638,602	**$46,411,962**
FIRE/LIFE SAFETY	27,847	129,783	9,831,115	620,671	53,859	191,669	0	92,555	0	974,843	1,372,532	470,426	157,540	3,536,207	**$17,459,046**
ELECTRICAL	0	0	1,307,548	7,881,159	3,450,053	659,339	156,494	5,171,144	179,489	438,513	401,519	790,325	3,369,764	165,369	**$23,970,717**
SITE	0	0	126,148	76,567	0	0	0	46,436	0	100,367	0	0	62,886	0	**$412,404**
VERT. TRANS.	0	0	0	3,176,664	0	0	0	0	0	252,656	252,656	0	252,656	0	**$3,934,631**
HEALTH/EQUIP.	0	0	19,886	66,590	0	0	0	0	0	0	19,026	0	1,347,917	0	**$1,453,419**
SUBTOTAL	**$1,291,597**	**$1,638,894**	**$14,854,152**	**$49,100,650**	**$10,258,386**	**$5,354,045**	**$2,925,905**	**$17,243,190**	**$2,808,155**	**$11,653,326**	**$5,024,575**	**$3,641,617**	**$17,218,188**	**$9,033,950**	**$152,046,633**
TOTAL NONRECURRING PROJECT NEEDS			$17,784,644	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$134,261,989	

CURRENT REPLACEMENT VALUE	**$703,296,615**
FACILITY CONDITION NEEDS INDEX	**0.22**
FACILITY CONDITION INDEX	**0.07**

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
2,130,209	**$152,046,633**	**71.38**

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	106,771	396,558	0	0	0	0	0	0	0	0	0	0	0	**$503,329**
EXTERIOR	0	0	46,649	584,080	0	1,320,216	914,138	1,215,002	627,223	584,436	479,637	31,386	349,523	611,552	**$6,763,843**
INTERIOR	0	0	0	1,143,959	47,302	41,411	40,899	1,945,892	15,465	423,692	411,050	78,523	976,353	1,569,883	**$6,694,429**
PLUMBING	0	0	0	257,068	4,943	23,467	0	2,100,139	6,472	25,824	11,511	23,309	761,416	3,226	**$3,217,376**
HVAC	0	0	0	10,232,741	15,593	162,063	14,715	2,036,152	74,533	24,709	766,021	51,604	3,003,253	312,487	**$16,693,871**
FIRE/LIFE SAFETY	0	20,373	1,164,240	419,359	0	191,669	0	92,555	0	0	998,439	0	0	710,871	**$3,597,505**
ELECTRICAL	0	0	798,920	5,049,672	20,403	596,243	12,025	4,994,420	44,666	229,850	263,495	13,990	2,427,001	12,025	**$14,462,709**
SITE	0	0	51,171	40,340	0	0	0	40,549	0	100,367	0	0	62,886	0	**$295,313**
VERT. TRANS.	0	0	0	1,263,279	0	0	0	0	0	0	252,656	0	252,656	0	**$1,768,591**
HEALTH/EQUIP.	0	0	14,056	0	0	0	0	0	0	0	19,026	0	0	0	**$33,081**
SUBTOTAL	**$0**	**$127,145**	**$2,471,593**	**$18,990,497**	**$88,241**	**$2,335,069**	**$981,777**	**$12,424,710**	**$768,359**	**$1,388,879**	**$3,201,835**	**$198,812**	**$7,833,088**	**$3,220,044**	**$54,030,048**
TOTAL NONRECURRING PROJECT NEEDS			**$2,598,737**	**TOTAL RECURRING COMPONENT REPLACEMENT NEEDS**										**$51,431,311**	

CURRENT REPLACEMENT VALUE	**$214,082,835**
FACILITY CONDITION NEEDS INDEX	**0.25**
FACILITY CONDITION INDEX	**0.09**

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
619,653	**$54,030,048**	**87.19**

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	23,368	18,419	0	0	0	0	0	0	0	0	0	0	0	$41,787
EXTERIOR	0	0	0	10,634	42,134	475,713	0	0	0	0	0	0	0	0	$528,481
INTERIOR	0	0	0	201,107	0	0	0	1,210	0	0	0	354,293	96,837	0	$653,446
PLUMBING	0	0	0	37,494	0	0	0	0	0	0	0	2,095	2,601	0	$42,189
HVAC	0	0	0	0	0	0	0	41,209	0	123,233	0	0	8,849	144,455	$317,746
FIRE/LIFE SAFETY	0	7,662	0	0	0	0	0	0	0	0	0	0	157,540	0	$165,202
ELECTRICAL	0	0	0	92,298	0	1,417	15,086	0	0	96,476	0	359,863	139,280	0	$704,421
SITE	0	0	40,083	0	0	0	0	0	0	0	0	0	0	0	$40,083
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$0	$31,030	$58,502	$341,533	$42,134	$477,129	$15,086	$42,419	$0	$219,710	$0	$716,250	$405,106	$144,455	$2,493,356
TOTAL NONRECURRING PROJECT NEEDS			$89,532	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$2,403,824	

CURRENT REPLACEMENT VALUE	$11,227,000
FACILITY CONDITION NEEDS INDEX	0.22
FACILITY CONDITION INDEX	0.03

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
31,119	$2,493,356	80.12

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	176,707	146,744	0	0	0	0	0	0	0	0	0	0	0	$323,451
EXTERIOR	0	0	169,690	31,131	0	111,277	0	456,856	499,048	388,310	438,297	14,454	8,034	403,178	$2,520,277
INTERIOR	0	0	27,793	236,071	906,314	45,759	0	1,697,887	0	697,398	0	380,482	32,921	0	$4,024,626
PLUMBING	0	7,966	0	127,882	0	976	0	0	0	0	8,330	0	0	3,241	$148,395
HVAC	0	0	0	225,937	0	6,890	0	0	0	1,215,107	239,665	534,333	24,831	1,121,208	$3,367,971
FIRE/LIFE SAFETY	0	6,518	1,726,907	201,313	0	0	0	0	0	0	0	470,426	0	548,739	$2,953,903
ELECTRICAL	0	0	508,629	368,705	32,475	29,134	0	26,047	38,828	7,713	106,126	110,577	19,572	120,526	$1,368,331
SITE	0	0	5,719	0	0	0	0	5,887	0	0	0	0	0	0	$11,606
VERT. TRANS.	0	0	0	613,959	0	0	0	0	0	0	0	0	0	0	$613,959
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$0	$191,192	$2,585,482	$1,804,997	$938,789	$194,036	$0	$2,186,677	$537,876	$2,308,529	$792,417	$1,510,272	$85,357	$2,196,892	$15,332,518
TOTAL NONRECURRING PROJECT NEEDS			$2,776,674	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$12,555,844	

CURRENT REPLACEMENT VALUE	$122,177,228
FACILITY CONDITION NEEDS INDEX	0.13
FACILITY CONDITION INDEX	0.01

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
307,367	$15,332,518	49.88

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	285,983	796,657	0	0	0	0	0	0	0	0	0	0	0	**$1,082,640**
EXTERIOR	0	88,932	63,200	4,678,172	61,518	728,608	0	3,851	0	19,183	0	560	23,586	0	**$5,667,610**
INTERIOR	0	861	0	3,424,776	780,533	572,718	672,180	551,453	462,392	826,164	96,918	244,283	167,455	90,855	**$7,890,587**
PLUMBING	0	27,772	0	449,085	4,526,862	345,513	1,508	1,486	0	21,409	976	11,086	55,410	0	**$5,441,108**
HVAC	0	0	0	13,091,189	6,867	68,835	0	833,175	507,891	2,274,648	507,104	136,789	155,272	8,133	**$17,589,902**
FIRE/LIFE SAFETY	10,450	25,075	6,887,803	0	0	0	0	0	0	0	0	0	0	2,276,597	**$9,199,925**
ELECTRICAL	0	0	0	2,291,270	3,397,174	27,320	54,821	7,321	95,996	91,920	18,301	13,816	0	0	**$5,997,940**
SITE	0	0	29,175	36,227	0	0	0	0	0	0	0	0	0	0	**$65,402**
VERT. TRANS.	0	0	0	1,046,769	0	0	0	0	0	252,656	0	0	0	0	**$1,299,425**
HEALTH/EQUIP.	0	0	2,710	66,590	0	0	0	0	0	0	0	0	1,347,917	0	**$1,417,218**
SUBTOTAL	**$10,450**	**$428,623**	**$7,779,545**	**$25,084,078**	**$8,772,954**	**$1,742,994**	**$728,510**	**$1,397,286**	**$1,066,278**	**$3,485,980**	**$623,299**	**$406,534**	**$1,749,640**	**$2,375,584**	**$55,651,756**
TOTAL NONRECURRING PROJECT NEEDS			**$8,218,619**	**TOTAL RECURRING COMPONENT REPLACEMENT NEEDS**										**$47,433,137**	

CURRENT REPLACEMENT VALUE	**$192,148,755**
FACILITY CONDITION NEEDS INDEX	**0.29**
FACILITY CONDITION INDEX	**0.13**

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
476,120	**$55,651,756**	**116.89**

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	9,839	227,329	0	0	0	0	0	0	0	0	0	0	0	$237,168
EXTERIOR	1,263,750	768,360	1,409,482	841,663	0	597,815	202,117	854,950	297,783	103,338	0	0	0	10,504	$6,349,761
INTERIOR	0	0	0	1,189,174	0	0	72,668	193,794	137,859	276,953	0	15,539	135,443	0	$2,021,430
PLUMBING	0	0	0	59,213	0	1,776	14,578	0	0	0	0	5,224	35,061	1,332	$117,183
HVAC	0	0	0	304,927	291,731	0	0	0	0	0	19,334	493,227	6,129,595	3,355	$7,242,170
FIRE/LIFE SAFETY	4,707	70,155	52,164	0	0	0	0	0	0	974,843	0	0	0	0	$1,101,869
ELECTRICAL	0	0	0	53,811	0	5,226	0	143,354	0	12,553	13,598	69,852	213,888	0	$512,281
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
VERT. TRANS.	0	0	0	252,656	0	0	0	0	0	0	0	0	0	0	$252,656
HEALTH/EQUIP.	0	0	3,120	0	0	0	0	0	0	0	0	0	0	0	$3,120
SUBTOTAL	$1,268,457	$848,354	$1,692,095	$2,701,443	$291,731	$604,816	$289,363	$1,192,098	$435,642	$1,367,686	$32,932	$583,842	$6,513,987	$15,190	$17,837,636
TOTAL NONRECURRING PROJECT NEEDS			$3,808,905	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$14,028,731	

CURRENT REPLACEMENT VALUE	$91,251,000
FACILITY CONDITION NEEDS INDEX	0.20
FACILITY CONDITION INDEX	0.03

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
531,946	$17,837,636	33.53

RENEWAL COSTS MATRIX

All dollars shown as Present Value

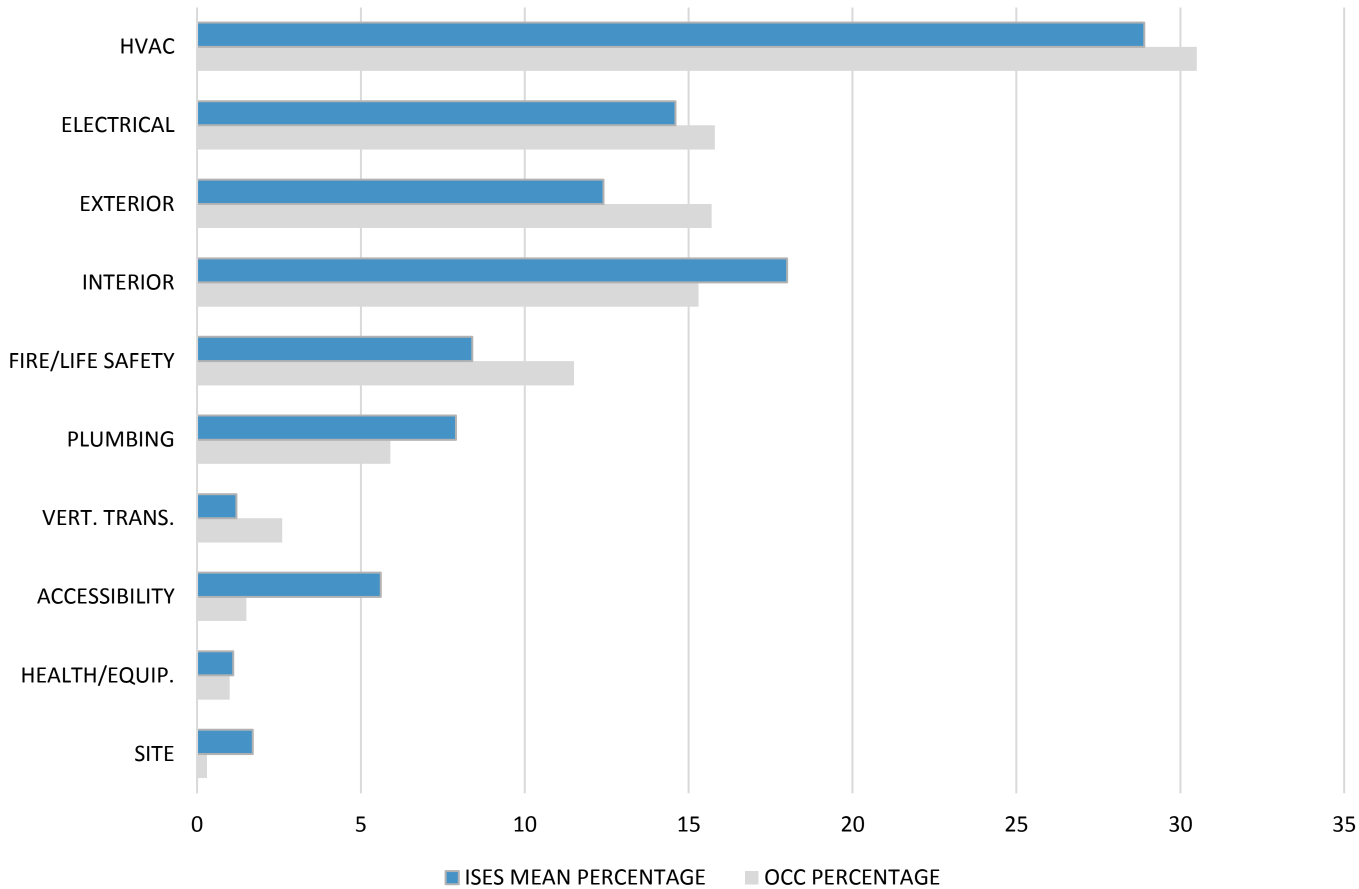
CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	12,551	14,322	0	0	0	0	0	0	0	0	0	0	0	$26,874
EXTERIOR	0	0	252,612	12,208	0	0	750,057	0	0	1,051,633	0	0	18,311	0	$2,084,820
INTERIOR	0	0	0	92,609	0	0	1,681	0	0	1,830,910	0	0	40,159	0	$1,965,359
PLUMBING	0	0	0	0	0	0	58,285	0	0	0	0	0	0	0	$58,285
HVAC	0	0	0	47,881	70,677	0	26,584	0	0	0	0	3,679	2,516	1,048,964	$1,200,302
FIRE/LIFE SAFETY	12,691	0	0	0	53,859	0	0	0	0	0	374,093	0	0	0	$440,643
ELECTRICAL	0	0	0	25,404	0	0	74,562	0	0	0	0	222,227	570,024	32,819	$925,036
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$12,691	$12,551	$266,934	$178,102	$124,536	$0	$911,169	$0	$0	$2,882,543	$374,093	$225,907	$631,009	$1,081,783	$6,701,319
TOTAL NONRECURRING PROJECT NEEDS			$292,176	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$6,409,143	

CURRENT REPLACEMENT VALUE	$72,555,552
FACILITY CONDITION NEEDS INDEX	0.09
FACILITY CONDITION INDEX	0.00

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
164,004	$6,701,319	40.86

Renewal Costs by System Code

A viable approach to capital planning is to analyze common building systems for needs. The following chart illustrates the system project backlog by weight of total backlog and compares the results at OCC to the average found across the ISES clients.



HVAC is the highest proportion of the overall needs backlog at 30.5 percent, which is only slightly higher than the ISES average. Fifty-two percent (over $24 million) of the HVAC needs are considered deferred or needed in the next year. Of these near-term needs, HVAC distribution system upgrades account for nearly $18 million, air handler and fan upgrades $2.5 million, and control systems upgrades $2.3 million.

Electrical needs are the second highest proportion (15.8 percent), which is slightly higher than the ISES average. These needs are also the third highest proportion of Deferred Renewal at nearly $7.9 million. Most of the buildings are in need of near-term interior and exterior lighting upgrades as well as replacement of aging variable speed drives, which provide a measure of investment payback in the form of energy savings if the latest technology is installed.

Interior finish and exterior structure needs account for 15.3 and 15.7 percent, respectively, of the total backlog. Deferred Renewal needs in these categories total $12.5 million. Most of the deferred needs are for flooring, casework, and doors. While not considered deferred, the $10.7 million of roofing upgrades are a significant proportion of the exterior systems backlog and should be included in any future budget planning.

Fire/life safety needs are the next highest proportion of the backlog and are higher than the ISES average. Over half of these needs are for the installation of fire suppression systems in the older buildings.

Accessibility makes up less than 1.5 percent of the overall needs, which is drastically lower than the 5.6 percent ISES mean. This can be attributed to the relatively young age of over 40 percent of the building square footage (32 buildings) and the significant renovations and remodeling of the older buildings built prior to modern ADA requirements. Most of the remaining systems are in line with the ISES client averages.

The Auburn Hills campus has a total FCA renewal need estimate of $54 million, with nearly $19 million identified as deferred. The majority of these needs are in the HVAC, electrical, interior, and exterior systems.

The District Office has a total FCA renewal need estimate of $2.5 million, with nearly $342,000 identified as deferred. The majority of the needs are in interior finish and electrical systems.

The Highland Lakes campus has a total FCA renewal need estimate of $15.3 million, with nearly $1.8 million identified as deferred. The majority of these needs are in the vertical transportation, electrical, and interior finish systems. There is a slightly smaller proportion of needs in the fire/life safety and HVAC systems.

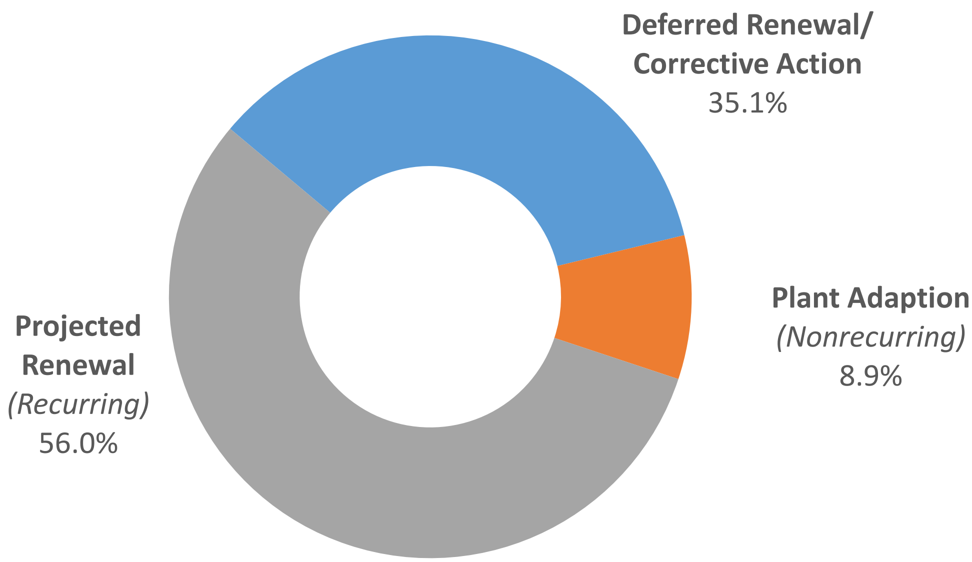
The Orchard Ridge campus has a total FCA renewal need estimate of $55.6 million, with nearly $25.1 million identified as deferred. The majority of these needs are in the HVAC, exterior, and finish interior systems. There is a significant amount of deferred needs in the electrical and vertical transportation systems.

The Royal Oak campus has a total FCA renewal need estimate of $17.8 million, with nearly $2.7 million identified as deferred. The majority of these needs are in the exterior and interior finish systems.

The Southfield campus has a total FCA renewal need estimate of $6.7 million, with nearly $178,102 identified as deferred. The majority of these needs are in the interior finish and HVAC systems.

Renewal Costs by Classification

- Nonrecurring Plant Adaption needs make up 8.9 percent of the total cost ($13,512,794).
- The recurring needs projected to emerge over the next 10 years represent 56.0 percent ($85,161,339) of the facilities renewal recommendations.
- Recurring Deferred Renewal and nonrecurring Corrective Action needs are 35.1 percent of the recommendations ($53,372,500).

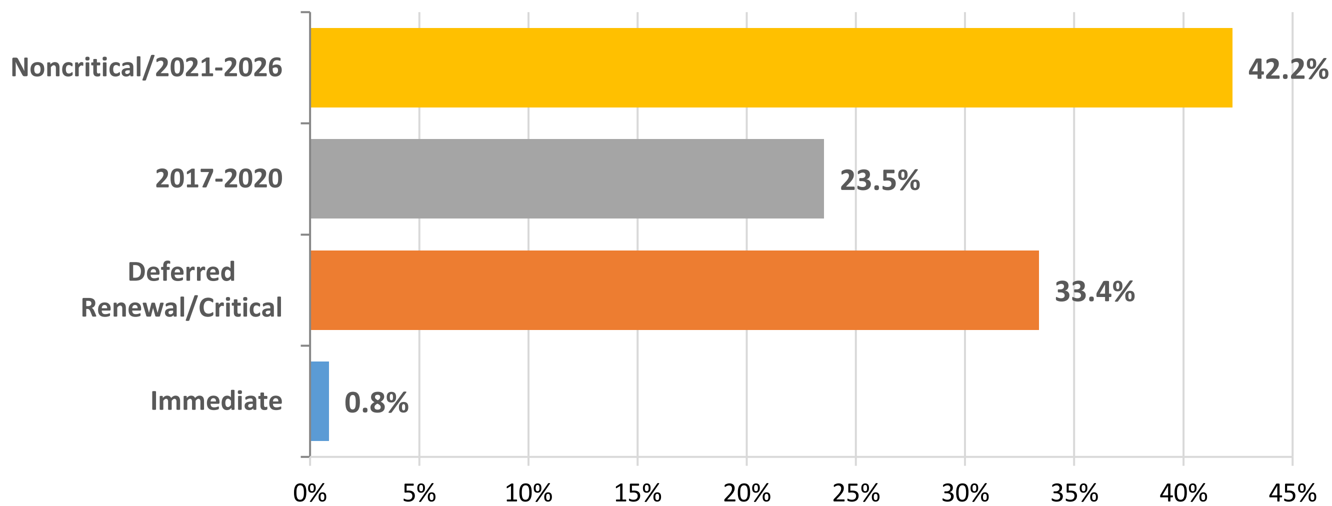


CLASSIFICATION	PERCENTAGE (%)	COST ($)
Projected Renewal	56.0	85,161,339
Deferred Renewal/Corrective Action	35.1	53,372,500
Plant Adaption	8.9	13,512,794
	TOTAL	$152,046,633

Renewal Costs by Priority

The renewal needs have been prioritized to indicate the urgency of the recommendations. Like the previous chart, this also summarizes both the recurring and nonrecurring recommendations.

- Immediate nonrecurring needs are 0.8 percent of the needs and total $1,291,597.
- Recurring Deferred Renewal and nonrecurring Critical needs combined represent 33.4 percent of the recommendations ($50,739,544).
- The first four years (2017-2020) of recurring component replacement needs equal $35,781,527 (23.5 percent).
- The next six years (2021-2026) of recurring component replacement needs combined with the nonrecurring Noncritical needs equal $64,233,964 or 42.2 percent.



PRIORITY	PERCENTAGE (%)	COST ($)
Immediate	0.8	1,291,597
Deferred Renewal/Critical	33.4	50,739,544
2017-2020	23.5	35,781,527
Noncritical/2021-2026	42.2	64,233,964
	TOTAL	**$152,046,633**

Utility Condition Assessments

General Utility Condition

The Utility Condition Assessment (UCA) performed for the Oakland Community College system included a visual, nondestructive inspection of the heating and chilled water generation and distribution systems, along with high voltage electrical, sanitary distribution, stormwater distribution, and potable/fire water systems. In addition, Facility Condition Assessments were performed at each generational plant and associated pump house facilities.

The UCA results indicate that these systems are overall in relatively fair to good condition. With a total current replacement value of nearly $137 million, the utility infrastructure represents a significant percentage of the OCC portfolio. In the late 1990s and early 2000s, there was significant funding for the replacement of the aging boilers and chiller at Highland Lakes and Orchard Ridge, as well as energy upgrades at Auburn Hills in the form of high efficiency burner assemblies installed at each of the three boilers. Regular major maintenance and teardown of the principal generation equipment every three to five years (as funding is available) will extend the reliable and efficient service life of this equipment. The Royal Oak plant underwent a major renewal of chilled and heating water systems in 2003, and the Southfield plant was modernized in 1999 and 2010. In summary, the majority of the recommendations at the generation plants are for the ancillary and system support equipment.

Of the nearly $27 million in total identified needs, approximately 40 percent ($11 million) are for the upgrade of heating and chilled water piping distribution systems and associated valves and support equipment. The average useful life of a section of steel pipe for hydronic systems is approximately 50 years. This service life is directly impacted by the operational history of the systems as well as the consistency of the water treatment programs. While the operational history, in the form of limited capacity fluxuations, has been consistent, the water treatment program has changed over time due to multiple vendors and strategies. Nonrecurring and recurring needs were developed for the upgrade of approximately 30 percent of the piping systems, specifically at the three largest campuses.

The majority of the high voltage electrical systems at the three larger campuses have been retrofit with new primary switchgear that includes automatic transfer capabilities in the event of a loss of one of the main utility service feeds. There is specific equipment at each campus (primarily load interrupters serving buildings) that will require upgrade within the next ten years, but as a whole, the systems are in good condition. The one priority needs established at each campus is the development of a consistent and extensive preventative maintenance and testing program. The majority of the installed electrical equipment needs to undergo operation, testing, and maintenance services every three to five years. A service contract with detailed maintenance practices needs to be implemented to not only extend the life of the new substation equipment but to also ensure the reliable and, most importantly, safe operation of this equipment.

Within the FCA reports of the individual buildings are recommendations for the installation of emergency generators at 14 Auburn Hills and Highland Lakes facilities. It is prudent to perform an analysis to determine whether or not these two campuses would benefit from the installation of central emergency power systems.

The stormwater and sanitary systems are in proper working condition, but investment in the modernization of the underground systems is recommended specifically at Highland Lakes. These two systems should undergo CCTV inspection in order to develop a more detailed priority needs list for future reinvestment.

Total 10-Year Renewal Costs by Utility

BLDG #	BUILDING NAME	YEAR BUILT	SQUARE FEET	CRV ($)	RENEWAL COSTS ($)	FCNI	FCI
AHHCD	HEATING/CHILLED WATER DIST.	1967	NA	17,028,000	4,693,765	0.28	0.00
AHHVE	HIGH VOLTAGE ELECTRICAL	1970	NA	5,451,420	594,308	0.11	0.07
AHP	POWER HOUSE	1970	13,298	15,349,184	4,277,913	0.28	0.01
AHPWF	POTABLE AND FIRE WATER SYS.	1968	NA	2,700,000	206,042	0.08	0.00
AHSAN	SANITARY SEWER SYSTEM	1968	NA	1,625,000	243,248	0.15	0.00
AHSTR	STORMWATER SEWER SYSTEM	1968	NA	4,000,000	367,616	0.09	0.00
HLCP	CENTRAL PLANT	1998	8,135	10,114,400	2,115,344	0.21	0.02
HLHCD	HEATING/CHILLED WATER DIST.	1929	NA	11,136,000	2,363,087	0.21	0.00
HLHVE	HIGH VOLTAGE ELECTRICAL	1929	NA	2,950,000	128,682	0.04	0.03
HLPWF	POTABLE AND FIRE WATER SYS.	1965	NA	1,600,000	91,801	0.06	0.00
HLSAN	SANITARY SEWER SYSTEM	1965	NA	1,500,000	796,926	0.53	0.52
HLSTR	STORMWATER SEWER SYSTEM	1965	NA	2,200,000	1,064,034	0.48	0.47
ORE	POWER HOUSE	1967	17,581	14,079,930	3,507,333	0.25	0.05
ORHCD	HEATING/CHILLED WATER DIST.	1967	NA	19,650,576	3,844,729	0.20	0.00
ORHVE	HIGH VOLTAGE ELECTRICAL	1967	NA	4,474,920	293,152	0.07	0.05
ORPWF	POTABLE AND FIRE WATER SYS.	1967	NA	2,000,000	482,782	0.24	0.07
ORSAN	SANITARY SEWER SYSTEM	1967	NA	1,000,000	316,875	0.32	0.00
ORSTR	STORMWATER SEWER SYSTEM	1967	NA	4,850,000	382,365	0.08	0.00
ROHCD	HEATING/CHILLED WATER DIST.	1982	NA	3,669,000	108,201	0.03	0.00
ROHVE	HIGH VOLTAGE ELECTRICAL	1982	NA	951,400	335,803	0.35	0.00
ROP	POWER HOUSE	1982	3,926	5,214,000	543,637	0.10	0.00
ROPWF	POTABLE AND FIRE WATER SYS.	1982	NA	10,000	0	0.00	0.00
ROSAN	SANITARY SEWER SYSTEM	1982	NA	45,000	0	0.00	0.00

BLDG #	BUILDING NAME	YEAR BUILT	SQUARE FEET	CRV ($)	RENEWAL COSTS ($)	FCNI	FCI
ROSTR	STORMWATER SEWER SYSTEM	1982	NA	800,000	0	0.00	0.00
SFHCD	HEATING/CHILLED WATER DIST.	1980	NA	2,027,368	112,872	0.06	0.00
SFHVE	HIGH VOLTAGE ELECTRICAL	1980	NA	574,700	15,966	0.03	0.00
SFPWF	POTABLE AND FIRE WATER SYS.	1980	NA	50,000	0	0.00	0.00
SFSAN	SANITARY SEWER SYSTEM	1980	NA	150,000	0	0.00	0.00
SFSTR	STORMWATER SEWER SYSTEM	1980	NA	1,600,000	0	0.00	0.00
TOTALS			**42,965**	**$136,800,898**	**$26,886,481**	**0.20**	**0.03**

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	5,810	35,384	0	0	0	0	0	0	0	0	0	0	0	**$41,194**
EXTERIOR	0	0	16,707	14,284	0	0	0	36,623	274,423	531,218	49,184	2,276	0	0	**$924,714**
INTERIOR	0	0	0	218,709	1,466	0	0	36,134	41,337	0	2,488	0	15,036	0	**$315,169**
PLUMBING	0	595,302	800,062	204,397	128,198	290,834	2,167	21,494	0	0	68,355	5,820	172,359	0	**$2,288,989**
HVAC	102,982	2,355,769	8,649,904	215,934	151,088	8,727	20,671	0	29,520	2,546,214	195,358	157,469	805,664	458,206	**$15,697,506**
FIRE/LIFE SAFETY	0	0	0	199,043	0	0	0	0	50,194	18,120	39,820	0	0	5,980	**$313,156**
ELECTRICAL	99,381	133,481	99,705	823,906	219,335	170,176	16,733	463,634	94,987	1,041,241	1,437,138	25,356	10,588	0	**$4,635,661**
SITE	0	0	2,448	1,822,926	0	0	0	0	0	590,701	0	0	0	0	**$2,416,075**
VERT. TRANS.	0	0	0	252,656	0	0	0	0	0	0	0	0	0	0	**$252,656**
HEALTH/EQUIP.	0	0	1,360	0	0	0	0	0	0	0	0	0	0	0	**$1,360**
SUBTOTAL	**$202,363**	**$3,090,363**	**$9,605,571**	**$3,751,855**	**$500,087**	**$469,738**	**$39,571**	**$557,884**	**$490,461**	**$4,727,493**	**$1,792,342**	**$190,921**	**$1,003,647**	**$464,186**	**$26,886,481**
TOTAL NONRECURRING PROJECT NEEDS			**$12,898,297**	**TOTAL RECURRING COMPONENT REPLACEMENT NEEDS**										**$13,988,184**	

CURRENT REPLACEMENT VALUE	**$112,332,760**
FACILITY CONDITION NEEDS INDEX	**0.24**
FACILITY CONDITION INDEX	**0.03**

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
42,965	**$26,886,481**	**625.78**

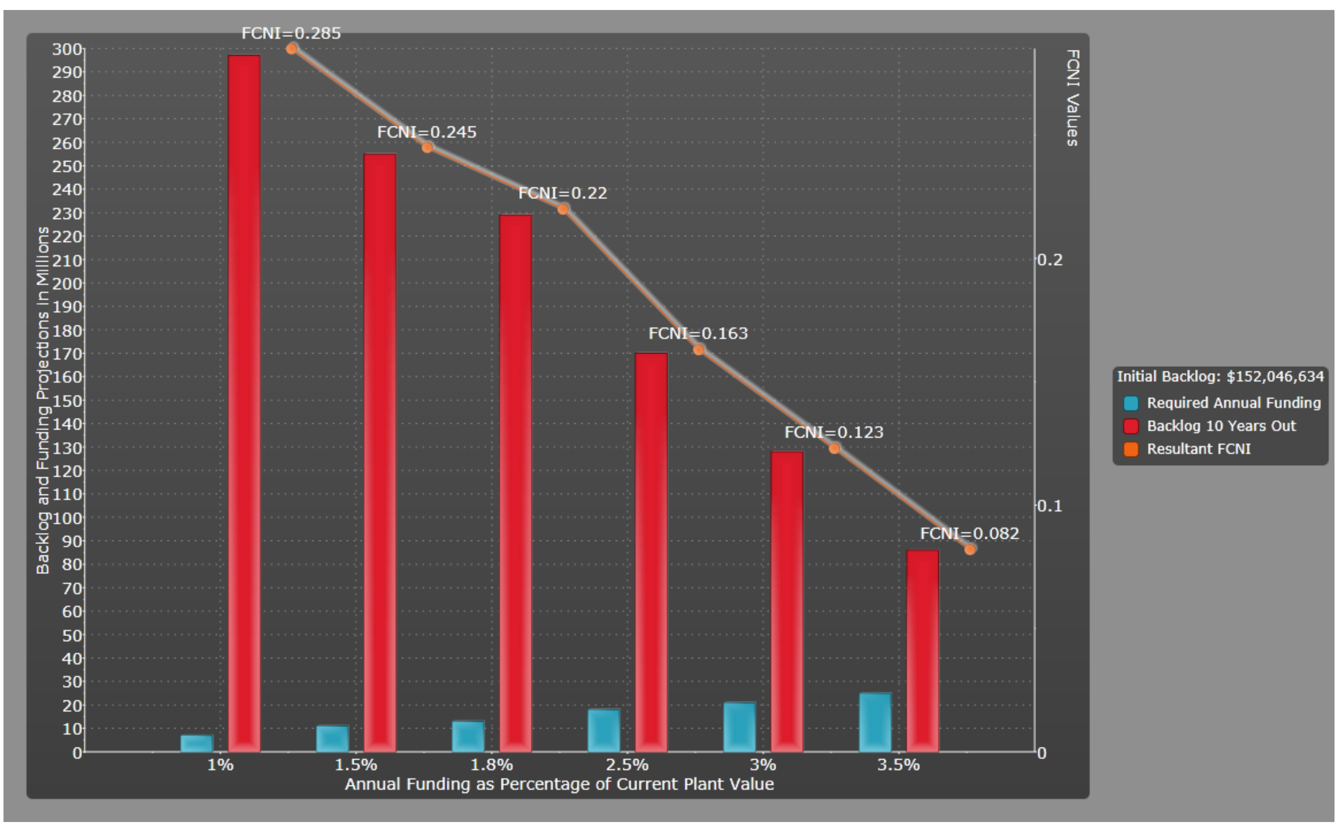
AMS FINANCIAL MODELING

FCNI Projections

The ISES AMS software features a funding modeling tool that can estimate the effects of funding levels on the FCNI. This tool calculates that $12.7 million would need to be reinvested annually to maintain the current FCNI of 0.22. This is equal to 1.8 percent of plant value on an annual basis. (Note: This figure accounts for 3 percent inflation.) The model also incorporates a 1 percent portfolio growth rate (rate at which square footage is added) and a 1.5 percent plant deterioration rate (the rate at which new capital project needs arise).

Reinvestment Rates

If the reinvestment rate is lower than 1.8 percent of plant value, then the FCNI at the end of the tenth year will be higher than it was in the first year. For instance, if 1 percent of plant value ($7 million) is reinvested annually, the resultant FCNI after 10 years is estimated to be 0.29. Conversely, if 3.0 percent of plant value ($21.1 million) is reinvested annually, the resultant FCNI is estimated to be 0.12 after 10 years. The following chart shows sample funding scenarios.



The calculations in the model above take into account all money that goes towards renewing the facilities and their supporting components. In most cases, not all of the needs are funded by the Facilities Management organization's budget. Programs, donors, schools, and other stakeholders can pay for projects. It is common for projects that are part of major renovation efforts to be funded predominately by other sources besides the Facilities department.

The funding level presented in this section is a steady and annualized rate. It is important to understand that, in most cases, the fulfillment of these needs is ad hoc and the amount reinvested can vary widely from year to year. Not all projects are performed on a piecemeal basis. Projects can include limited renovation projects, gut renovation activities, or full raze and replace measures. These large-scale efforts can eliminate a significant proportion of needs in a relatively short period of time.

CONCLUSIONS

Including all of the inspected buildings and utility systems, Oakland Community College has an asset portfolio value estimated at nearly $840 million, and the estimated needs developed from the inspections total $179 million. This results in an overall FCNI of 0.21 for the OCC system (FCA and UCA). Of the total needs, nearly 30 percent ($53 million) are considered to be deferred. Aged facilities and underground utility systems at the Auburn Hills, Orchard Ridge, and Highland Lakes campuses represent that the vast majority of the needs.

Like most institutions, the most needs are found within aging HVAC and electrical distribution systems and in the modernization of interior finishes and exterior systems. HVAC and electrical distribution systems are critical to the day-to-day operation of a facility. Many are aged and, though functional, require routine and repetitive maintenance. The failure of either system could result in the ineffective use of, or the inability to use, the facility as a whole, especially given the age of a large percentage of the asset catalog.

With regard to FCNI, the most effective method of shrinking the index is to holistically reinvest in existing facilities. This means either razing and rebuilding or gut renovating aging assets. This type of project work has collateral benefits, such as making maintenance organizations more effective. New construction will have a positive effect on the FCNI only if existing buildings are replaced. If new structures are built but the older facilities kept in service, any existing FCNI problems will be exacerbated. Furthermore, if the maintenance staff is not expanded in the event of adding incremental square footage to the portfolio, the FCNI issues will become more difficult to manage.

If it is impossible to fully gut renovate or raze and replace a facility, consider bundling ISES recommendations to achieve economy-of-scale and minimize campus impact. For example, if an expensive HVAC system renewal project is justified and funded, consider undertaking any exterior envelope projects in concert with it. Replacing roofs, windows, and exterior doors will produce maximum energy savings, which will allow for as short a payback period as possible. Also, when common efforts are needed in buildings that are close to each other, consider executing projects over multiple buildings. As plans are developed to address identified needs, the scope of these repairs should be carefully considered to maximize the financial impact of capital reinvestment.

The primary goal of reinvesting in or renewing facilities is to mitigate customer or program downtime, which, of course, results in happier customers. There are many other benefits as well, such as providing more suitable and modern space for schools and programs and making the facilities more attractive to prospective students and programs. When effectively executed, facilities renewal efforts will reduce purchased energy consumption and make the existing maintenance organization more efficient.

APPENDIX A

Building List by Building Number

Appendix A is a general building inventory sorted by building number. The table includes typical stats such as primary use, year built, and size and also provides valuable information like CRV, total renewal costs, FCNI, and FCI.

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	RENEWAL COSTS ($)	FCNI	FCI
AHA	EARL M. ANDERSON	CL	1970	104,725	35,575,000	13,895,177	0.39	0.18
AHB	ADMINISTRATION	OF	1975	34,511	12,254,000	3,577,742	0.29	0.10
AHC	JOSEPH E. HILL	CL	1970	56,169	19,819,000	7,935,604	0.40	0.18
AHD	GEORGE R. MOSHER	CL	1975	52,197	18,713,000	7,080,196	0.38	0.07
AHE	BUSINESS, SCIENCE AND ART	CL	1980	28,819	10,900,000	4,433,638	0.41	0.19
AHF1	GENERAL ASSEMBLY - MAIN AND ADDITION	CL	1970	25,550	9,664,000	3,315,206	0.34	0.10
AHF2	GENERAL ASSEMBLY - ADDITION	CL	1998	49,907	17,892,000	1,614,470	0.09	0.03
AHG1	BOOKSTORE, IT, PUBLIC SAFETY	RT	2008	29,909	6,298,000	403,973	0.06	0.00
AHG2	STUDENT UNION ADDITION	SU	2008	36,792	14,330,000	894,345	0.06	0.00
AHGCS	GROUNDS COVERED STORAGE	WH	2008	4,036	755,000	7,453	0.01	0.00
AHGM	GROUNDS MAINTENANCE	WH	2008	3,494	654,000	141,152	0.22	0.00
AHH	HEALTH EDUCATION	GM	1977	35,138	10,989,000	591,411	0.05	0.00
AHH1	WEIGHTLIFTING AND CLASSROOM ADDITION	GM	2010	12,195	4,341,000	83,896	0.02	0.00
AHJ	CRIMINAL JUSTICE	CL	1981	21,378	8,527,000	543,973	0.06	0.05
AHK	CHILD CARE CENTER	CC	1991	3,491	1,367,000	0	0.00	0.00
AHL	LANDSCAPE GREENHOUSE	ST	1993	1,991	298,395	242,014	0.81	0.06

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	RENEWAL COSTS ($)	FCNI	FCI
AHMT1	MICHIGAN TECHNICAL EDUCATION CTR - MAIN	CL	2000	27,561	10,425,000	2,608,615	0.25	0.02
AHMT2	MICHIGAN TECHNICAL EDUCATION CTR - ANNEX	WH	2000	10,859	2,032,000	271,684	0.13	0.02
AHS1	CREST - TRAINING CENTER	CL	2002	10,655	4,444,000	465,967	0.10	0.01
AHS10	CREST - RANCH	RS	2001	1,890	374,100	66,706	0.18	0.08
AHS2	CONTROL TOWER	CL	2003	1,352	564,000	48,296	0.09	0.00
AHS3	CREST - POLE BARN METAL BUILDING	WH	2008	1,739	272,850	34,338	0.13	0.00
AHS4	CREST - BURN BUILDING	CL	2003	13,350	5,569,000	283,662	0.05	0.00
AHS5	CREST - MOTEL	DM	2002	3,415	1,607,000	171,250	0.11	0.02
AHS6	CREST - TWO-STORY	RS	2001	2,700	552,470	79,367	0.14	0.05
AHS7	CREST - BANK	OF	2002	1,800	705,000	130,062	0.18	0.00
AHS8	CREST - CONVENIENCE STORE/GAS STATION	RT	2002	3,000	697,000	109,689	0.16	0.01
AHS9	CREST - CAPE COD	RS	2001	1,983	404,440	85,562	0.21	0.08
AHSD	SALT DOME	WH	2008	987	112,580	0	0.00	0.00
AHT	ADVANCED TECHNOLOGY CENTER	CL	1983	38,060	13,947,000	4,914,602	0.35	0.15
DOGB	GEORGE A. BEE ADMINISTRATION CENTER	OF	1965	26,230	9,313,000	1,877,944	0.20	0.00
DOMH	DORIS MOSHER FOUNDATION HOUSE	OF	1925	4,889	1,914,000	615,411	0.32	0.16
HLGB1	GROUNDS BUILDING	ST	1998	3,175	1,102,000	308,886	0.28	0.06
HLGB2	GROUNDS COVERED STORAGE	WH	1998	3,997	748,000	107,296	0.14	0.02
HLGB3	SALT DOME	WH	2005	900	52,720	5,995	0.11	0.00
HLHOH	HIGH OAKS HALL	CL	1929	46,822	16,786,000	2,261,562	0.13	0.02
HLLH	LEVINSON HALL (SCIENCE)	LB	1977	42,327	23,165,000	2,849,954	0.12	0.00
HLLHA	LEVINSON HALL ADDITION (HEALTH)	LB	2006	38,130	20,868,000	1,604,735	0.08	0.00

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	RENEWAL COSTS ($)	FCNI	FCI
HLMB	METAL BUILDING (OLD SALT STORAGE)	WH	1998	1,200	79,140	21,980	0.28	0.00
HLPAV	PAVILION	WH	1994	2,025	278,368	61,540	0.22	0.09
HLPE	PHYSICAL EDUCATION	GM	1977	35,098	10,976,000	3,303,339	0.30	0.09
HLPH	PUMP HOUSE	WH	1965	1,500	281,000	99,110	0.35	0.03
HLRC	REDWOOD CENTER	ST	1927	4,098	1,422,000	292,981	0.21	0.00
HLSC	STUDENT CENTER	SU	1972	31,120	12,511,000	1,483,546	0.12	0.00
HLWH	WOODLAND HALL (NORTH)	CL	1980	42,505	15,576,000	1,569,187	0.10	0.02
HLWHA	WOODLAND HALL ADDITION (SOUTH)	OF	2008	54,470	18,332,000	1,362,408	0.07	0.00
ORA	CLASSROOM BUILDING A AND ADDITION	LB	1967	36,363	19,684,000	4,062,695	0.21	0.10
ORB	CLASSROOM BUILDING B	LB	1967	26,555	15,001,000	4,246,946	0.28	0.15
ORC	CLASSROOM BUILDING C	LB	1967	26,627	15,042,000	3,567,554	0.24	0.11
ORD	CLASSROOM BUILDING D	LB	1967	28,561	16,134,000	4,720,564	0.29	0.17
ORF	CLASSROOM BUILDING F	CL	1967	28,280	10,697,000	3,462,284	0.32	0.17
ORG	CLASSROOM BUILDING G	CL	1967	26,781	10,130,000	2,469,129	0.24	0.09
ORH	COMMUNITY ACTIVITY	GM	1977	70,357	20,922,000	7,689,514	0.37	0.13
ORJ	TIRRELL HALL	SU	1967	118,364	42,259,000	14,252,443	0.34	0.15
ORK	MARTIN L. KING JR. LIBRARY	LI	1967	40,181	14,437,000	2,903,924	0.20	0.06
ORL	ARTS BUILDING	CL	1967	28,967	10,956,000	4,017,052	0.37	0.19
ORM	ADMINISTRATION	OF	1967	27,383	9,723,000	2,558,008	0.26	0.10
ORN	GROUNDS GARAGE	ST	1972	4,008	1,391,000	523,359	0.38	0.19
ORP	PUMP HOUSE	WH	1967	1,060	198,000	86,169	0.44	0.32
ORT	SMITH THEATRE	TH	1982	12,633	5,429,000	1,092,114	0.20	0.06

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	RENEWAL COSTS ($)	FCNI	FCI
ROA1	CLASSROOM	CL	1980	28,443	10,758,000	2,578,373	0.24	0.05
ROA2	CLASSROOM ADDITION	CL	1999	21,080	8,408,000	472,162	0.06	0.00
ROB	ADMINISTRATION	CL	1980	38,036	13,938,000	3,264,427	0.23	0.05
ROC	LEARNING RESOURCES CENTER	CL	1980	20,188	8,052,000	515,124	0.06	0.01
ROD	FINE ARTS	CL	1980	30,160	11,408,000	2,822,124	0.25	0.02
ROE	LILA R. JONES-JOHNSON THEATER	TH	1980	30,750	11,983,000	3,100,634	0.26	0.05
ROG	GROUNDS BUILDING	WH	1935	2,752	955,000	365,615	0.38	0.10
ROM	MALL	OF	1980	29,562	10,496,000	1,653,719	0.16	0.04
ROPS1	PARKING STRUCTURE - NORTH	PK	1983	155,975	7,200,000	1,872,479	0.26	0.00
ROPS2	PARKING STRUCTURE - SOUTH	PK	1999	175,000	8,053,000	1,192,980	0.15	0.00
SFSF1	SOUTHFIELD - BUILDING A	CL	1979	81,322	28,074,000	3,517,384	0.13	0.00
SFSF2	SOUTHFIELD - BUILDING A ADDITION	LI	1999	10,882	7,115,552	1,798,507	0.25	0.01
SFSF3	SOUTHFIELD - BUILDING B	LB	2010	71,800	37,366,000	1,385,427	0.04	0.00
	GRAND TOTAL			**2,130,209**	**$703,296,615**	**$152,046,634**	**0.22**	**0.07**

APPENDIX B

Building List by FCNI

Appendix B provides a building list sorted by FCNI in descending order. This report is useful for directing funding for building renovations. If a building is high on the list and projected to be a relevant part of the campus mission for years to come, it is recommended that the building be sustained to a minimal degree until a major renovation or facility replacement can be funded.

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	TOTAL 10-YR NEEDS ($)	FCNI
> 0.60							
AHL	LANDSCAPE GREENHOUSE	ST	1993	1,991	298,395	242,014	0.81
0.60 – 0.51							
NONE							
0.50 – 0.31							
ORP	PUMP HOUSE	WH	1967	1,060	198,000	86,169	0.44
AHE	BUSINESS, SCIENCE AND ART	CL	1980	28,819	10,900,000	4,433,638	0.41
AHC	JOSEPH E. HILL	CL	1970	56,169	19,819,000	7,935,604	0.40
AHA	EARL M. ANDERSON	CL	1970	104,725	35,575,000	13,895,177	0.39
ROG	GROUNDS BUILDING	WH	1935	2,752	955,000	365,615	0.38
AHD	GEORGE R. MOSHER	CL	1975	52,197	18,713,000	7,080,196	0.38
ORN	GROUNDS GARAGE	ST	1972	4,008	1,391,000	523,359	0.38
ORH	COMMUNITY ACTIVITY	GM	1977	70,357	20,922,000	7,689,514	0.37
ORL	ARTS BUILDING	CL	1967	28,967	10,956,000	4,017,052	0.37
HLPH	PUMP HOUSE	WH	1965	1,500	281,000	99,110	0.35

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	TOTAL 10-YR NEEDS ($)	FCNI
AHT	ADVANCED TECHNOLOGY CENTER	CL	1983	38,060	13,947,000	4,914,602	0.35
AHF1	GENERAL ASSEMBLY - MAIN AND ADDITION	CL	1970	25,550	9,664,000	3,315,206	0.34
ORJ	TIRRELL HALL	SU	1967	118,364	42,259,000	14,252,443	0.34
ORF	CLASSROOM BUILDING F	CL	1967	28,280	10,697,000	3,462,284	0.32
DOMH	DORIS MOSHER FOUNDATION HOUSE	OF	1925	4,889	1,914,000	615,411	0.32
0.30 – 0.21							
HLPE	PHYSICAL EDUCATION	GM	1977	35,098	10,976,000	3,303,339	0.30
ORD	CLASSROOM BUILDING D	LB	1967	28,561	16,134,000	4,720,564	0.29
AHB	ADMINISTRATION	OF	1975	34,511	12,254,000	3,577,742	0.29
ORB	CLASSROOM BUILDING B	LB	1967	26,555	15,001,000	4,246,946	0.28
HLGB1	GROUNDS BUILDING	ST	1998	3,175	1,102,000	308,886	0.28
HLMB	METAL BUILDING (OLD SALT STORAGE)	WH	1998	1,200	79,140	21,980	0.28
ORM	ADMINISTRATION	OF	1967	27,383	9,723,000	2,558,008	0.26
ROPS1	PARKING STRUCTURE - NORTH	PK	1983	155,975	7,200,000	1,872,479	0.26
ROE	LILA R. JONES-JOHNSON THEATER	TH	1980	30,750	11,983,000	3,100,634	0.26
SFSF2	SOUTHFIELD - BUILDING A ADDITION	LI	1999	10,882	7,115,552	1,798,507	0.25
AHMT1	MICHIGAN TECHNICAL EDUCATION CTR - MAIN	CL	2000	27,561	10,425,000	2,608,615	0.25
ROD	FINE ARTS	CL	1980	30,160	11,408,000	2,822,124	0.25
ORG	CLASSROOM BUILDING G	CL	1967	26,781	10,130,000	2,469,129	0.24
ROA1	CLASSROOM	CL	1980	28,443	10,758,000	2,578,373	0.24
ORC	CLASSROOM BUILDING C	LB	1967	26,627	15,042,000	3,567,554	0.24

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	TOTAL 10-YR NEEDS ($)	FCNI
ROB	ADMINISTRATION	CL	1980	38,036	13,938,000	3,264,427	0.23
HLPAV	PAVILION	WH	1994	2,025	278,368	61,540	0.22
AHGM	GROUNDS MAINTENANCE	WH	2008	3,494	654,000	141,152	0.22
AHS9	CREST - CAPE COD	RS	2001	1,983	404,440	85,562	0.21
ORA	CLASSROOM BUILDING A AND ADDITION	LB	1967	36,363	19,684,000	4,062,695	0.21
HLRC	REDWOOD CENTER	ST	1927	4,098	1,422,000	292,981	0.21
			0.20 – 0.11				
DOGB	GEORGE A. BEE ADMINISTRATION CENTER	OF	1965	26,230	9,313,000	1,877,944	0.20
ORT	SMITH THEATRE	TH	1982	12,633	5,429,000	1,092,114	0.20
ORK	MARTIN L. KING JR. LIBRARY	LI	1967	40,181	14,437,000	2,903,924	0.20
AHS7	CREST - BANK	OF	2002	1,800	705,000	130,062	0.18
AHS10	CREST - RANCH	RS	2001	1,890	374,100	66,706	0.18
ROM	MALL	OF	1980	29,562	10,496,000	1,653,719	0.16
AHS8	CREST - CONVENIENCE STORE/GAS STATION	RT	2002	3,000	697,000	109,689	0.16
ROPS2	PARKING STRUCTURE - SOUTH	PK	1999	175,000	8,053,000	1,192,980	0.15
AHS6	CREST - TWO-STORY	RS	2001	2,700	552,470	79,367	0.14
HLGB2	GROUNDS COVERED STORAGE	WH	1998	3,997	748,000	107,296	0.14
HLHOH	HIGH OAKS HALL	CL	1929	46,822	16,786,000	2,261,562	0.13
AHMT2	MICHIGAN TECHNICAL EDUCATION CTR - ANNEX	WH	2000	10,859	2,032,000	271,684	0.13
AHS3	CREST - POLE BARN METAL BUILDING	WH	2008	1,739	272,850	34,338	0.13
SFSF1	SOUTHFIELD - BUILDING A	CL	1979	81,322	28,074,000	3,517,384	0.13

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	TOTAL 10-YR NEEDS ($)	FCNI
HLLH	LEVINSON HALL (SCIENCE)	LB	1977	42,327	23,165,000	2,849,954	0.12
HLSC	STUDENT CENTER	SU	1972	31,120	12,511,000	1,483,546	0.12
HLGB3	SALT DOME	WH	2005	900	52,720	5,995	0.11
AHS5	CREST - MOTEL	DM	2002	3,415	1,607,000	171,250	0.11
0.10 – 0.00							
AHS1	CREST - TRAINING CENTER	CL	2002	10,655	4,444,000	465,967	0.10
HLWH	WOODLAND HALL (NORTH)	CL	1980	42,505	15,576,000	1,569,187	0.10
AHF2	GENERAL ASSEMBLY - ADDITION	CL	1998	49,907	17,892,000	1,614,470	0.09
AHS2	CONTROL TOWER	CL	2003	1,352	564,000	48,296	0.09
HLLHA	LEVINSON HALL ADDITION (HEALTH)	LB	2006	38,130	20,868,000	1,604,735	0.08
HLWHA	WOODLAND HALL ADDITION (SOUTH)	OF	2008	54,470	18,332,000	1,362,408	0.07
AHG1	BOOKSTORE, IT, PUBLIC SAFETY	RT	2008	29,909	6,298,000	403,973	0.06
ROC	LEARNING RESOURCES CENTER	CL	1980	20,188	8,052,000	515,124	0.06
AHJ	CRIMINAL JUSTICE	CL	1981	21,378	8,527,000	543,973	0.06
AHG2	STUDENT UNION ADDITION	SU	2008	36,792	14,330,000	894,345	0.06
ROA2	CLASSROOM ADDITION	CL	1999	21,080	8,408,000	472,162	0.06
AHH	HEALTH EDUCATION	GM	1977	35,138	10,989,000	591,411	0.05
AHS4	CREST - BURN BUILDING	CL	2003	13,350	5,569,000	283,662	0.05
SFSF3	SOUTHFIELD - BUILDING B	LB	2010	71,800	37,366,000	1,385,427	0.04
AHH1	WEIGHTLIFTING AND CLASSROOM ADDITION	GM	2010	12,195	4,341,000	83,896	0.02
AHGCS	GROUNDS COVERED STORAGE	WH	2008	4,036	755,000	7,453	0.01

BLDG #	BUILDING NAME	BLDG TYPE	YEAR BUILT	SQUARE FEET	CRV ($)	TOTAL 10-YR NEEDS ($)	FCNI
AHSD	SALT DOME	WH	2008	987	112,580	0	0.00
AHK	CHILD CARE CENTER	CC	1991	3,491	1,367,000	0	0.00

APPENDIX C

FCNI Comparison

Appendix C is a comparison table with a sampling of results from similar FCA efforts to benchmark against Oakland Community College.

CLIENT	FCNI	GSF	ASSET COUNT	AVG YEAR BUILT	AVG AGE AT INSP	RENEWAL COSTS/ SF ($)	TOTAL RENEWAL COSTS ($)	FCNI PERCENTILE	AVG AGE PERCENTILE
Georgia College	0.10	1,129,229	21	1991	21	35.09	39,624,804	100%	100%
Columbia College	0.13	452,265	24	1952	61	52.60	23,789,565	92%	9%
San Bernardino Community College District	0.16	1,031,471	54	1991	25	62.50	64,464,728	82%	91%
Kishwaukee College	0.16	576,637	11	1979	38	62.93	36,290,629	84%	42%
North Georgia College & State Univ.	0.20	649,095	9	1989	23	47.86	31,066,394	67%	92%
Oakland Community College	0.22	2,130,209	73	1981	36	71.38	152,046,633	59%	59%
Navarro College	0.25	306,420	14	1967	49	80.65	24,714,139	50%	25%
Notre Dame of Maryland University	0.25	655,037	16	1939	77	92.01	60,268,988	50%	0%
Portland Community College	0.27	2,055,698	39	1983	27	93.49	192,190,548	34%	75%
Morehouse College	0.29	716,619	25	1969	47	97.35	69,765,043	25%	34%
Black Hawk College	0.30	562,976	19	1974	37	114.82	64,639,609	17%	50%
Kenyon College	0.32	825,023	52	1949	58	84.38	69,612,041	9%	17%
University of Nebraska - Omaha	0.36	690,190	6	1971	35	76.81	53,013,995	0%	67%

APPENDIX D

AMS Database Functionality

The ISES AMS database is the industry standard for maintaining and managing capital and deferred renewal needs. It was designed inhouse exclusively for the purpose of managing FCA data and is the tool used daily by ISES personnel for data development and report generation. The system accommodates ongoing management and use of FCA information in an efficient manner, allowing facilities professionals to manage their portfolios – instead of being managed by deteriorating facilities conditions.

AMS is cloud-based and user-friendly. It has a menu-driven system for the efficient management and organization of FCA information. It uses a relational database, eliminating the storage of redundant data. From ease of use for data entry to providing reports and graphics utilized to quantify and qualify capital improvement plans, AMS is a powerful and invaluable tool.

All assessment data is stored in AMS. The database is hosted under an ASP model. There are no minimal hardware specifications, and it is accessible via the Internet to anyone designated by the Client as an authorized user. Users can be created with different levels of view and edit capabilities based upon your needs. ISES will provide access via our own web servers and ensure that the system remains available and current. The only requirements for your authorized users are Internet access and web browser software. It is compatible with Windows Internet Explorer 7.0 or higher, as well as comparable browser systems, such as Firefox.

Benefits

The power of AMS lies in its ability to sort data in numerous ways and generate customized reports to meet your needs. AMS allows you to easily track, sort and prioritize facility conditions by building, defined group, site/campus or for all of the buildings in the database. Users will be able to identify needs across multiple assets through utilization of user-defined queries. Results can be exported for integration into presentations, analytical studies, reports, CMMS databases and more.

AMS Access

Your customized AMS database can be accessed by visiting the ISES homepage (http://www.isescorp.com). Click on **My AMS** in the upper right-hand corner to enter your login information.

Data Sorting and Customized Reporting

The data housed in AMS can be sorted in numerous ways. Project data fields and characteristics enable you to sort and filter electronic data more effectively. Typical sortable fields include, but are not limited to:

- Deficiency Priority
- Deficiency Category
- Facility Type
- Facility Location
- Correction Type
- Repair Cost
- Item/Component Types

AMS generates a report listing all of the renewal needs by building, group, or all buildings. Figures 1a and 1b show renewal needs sorted by priority class and priority sequence.

Detailed Project Summary
Facility Condition Analysis
Priority Class - Priority Sequence
106 : BAKER HALL

Cat. Code	Project Number	Pri Cls	Pri Seq	Project Title	Construction Cost	Professional Fee	Total Cost
IS5A	106IS04	1	1	REPAIRS TO CRACKED AND WORN MARBLE STEPS	27,701	5,540	33,241
				Totals for Pri			
FS1A	106FS02	2	2	REPLACE BATT POWER UNITS			
HV3A	106HV01	2	3	REPLACE HVAC			
EL3B	106EL02	2	4	SECONDARY E REPLACEMENT			
EL5A	106EL04	2	5	INSTALL EMERG NETWORK			
				Totals for Pri			
FS5C	106FS01	3	6	CORRIDOR DO			
AC2A	106AC01	3	7	ADD EXTERIOR			
AC3A	106AC08	3	8	INSTALLATION (			
AC4A	106AC09	3	9	INTERIOR ACC ROOMS			
ES4A	106ES02	3	10	SELECTIVE CLA			

Figure 1a. Priority Class by Priority Sequence report for Facility 106, Baker Hall.

Detailed Project Summary
Facility Condition Assessment
Priority Class - Priority Sequence
ACA : Academic Buildings

Cat. Code	Project Number	Pri Cls	Pri Seq	Project Title	Construction Cost	Professional Fee	Actual Cost to Date	Remaining Cost
FS5D	102FS01	1	1	DOOR INSTALLATION AND RELOCATION OF EQUIPMENT AT EGRESS	8,831	1,413	0	10,244
FS5A	125FS03	1	1	AUDITORIUM FLOOR LEVEL LIGHTING UPGRADE	13,412	2,146	0	15,558
FS5C	133FS04	1	1	ELIMINATE FIRE RATING COMPROMISES	1,326	212	0	1,692
ES1B	134ES02	1	1	EXTERIOR WATERPROOFING OF FOUNDATION	37,099	5,936	0	43,034
AC2A	139AC03	1	1	BUILDING ENTRY ACCESSIBILITY UPGRADES	16,290	2,606	0	20,786
FS5E	140FS01	1	1	EXTERIOR FIRE STAIRS	8,608	1,377	0	9,986
IS2A	145IS01	1	1	MECHANICAL ROOM WALL RECONSTRUCTION	20,065	3,210	0	23,276
FS4A	148FS01	1	1	INSTALL HAZARDOUS CHEMICAL STORAGE CONTAINMENT	1,723	0	0	1,723
PL2B	153PL01	1	1	INSTALL SUMP PUMP SYSTEM	9,261	1,482	0	11,818
ES4A	134ES03	1	2	SELECTIVE GUTTER AND SOFFIT REPAIRS	6,042	967	0	7,009
AC2A	140AC03	1	2	ACCESSIBILITY UPGRADE FOR BUILDING ENTRY	7,762	1,242	0	9,905
ES4B	151ES03	1	4	MODIFY ROOF AND DRAINAGE SYSTEM	425,407	68,065	0	493,472
VT7A	151VT01	1	4	COMPREHENSIVE ELEVATOR MODERNIZATION	48,002	0	0	48,002

Figure 1b. Priority Class by Priority Sequence report for user-created group called "Academic Buildings".

Lifecycle Component Inventory (Recurring Renewal Needs)

The ISES FCA includes development of a full lifecycle component inventory of each facility. The inventory is based on industry standard life expectancies applied to an inventory of building systems and major components within a facility. This inventory covers the *entire* lifespan of the facility.

Figure 2a displays a typical lifecycle inventory list. Figure 2b shows the detail associated with individual line items in the inventory.

Recurring Facility Renewal Components
Asset Component Summary
106: BAKER HALL

Uni-format	Component Description	Identifier	Qty	Units	Unit Cost	Cmplx Adj	Total Cost	Install Date	Life Exp	Lf Adj
D3050	PACKAGE HVAC UNIT, DX, GAS OR ELECTRIC HEAT, SINGLE-ZONE (9-35 TON)	ROOM 107	29	TON	$3,798.03		$110,143	2003	23	
D3050	PACKAGE HVAC UNIT, DX, GAS OR ELECTRIC HEAT, SINGLE-ZONE (35-55 TON)	ROOM 158	46	TON	$2,062.34		$94,868	2003	23	
D3050	PACKAGE HVAC UNIT, DX, GAS OR ELECTRIC HEAT, SINGLE-ZONE (35-55 TON)	ROOM 258	38	TON	$2,062.34		$78,369	2003	23	
D3060	HVAC CONTROLS SYSTEM - OFFICE	ORIGINAL	32,000	SF	$3.18	1.07	$109,039	2003	18	
D4010	FIRE SPRINKLER SYSTEM		32,000	SF	$9.88	1.07	$338,245	2007	80	
D4030	FIRE ALARM PANEL, DIALER, BATTERY & CHARGER	1ST FLR	1	EA	$29,927.14		$29,927	2007	15	
D4030	FIRE ALARM SYST									
D5010	ELECTRICAL DISTR OFFICE									
D5010	MAIN SWITCHBOAR (1600-2500 AMP)									
D5010	VARIABLE FREQUE									

Figure 2a. Lifecycle Component Inventory report for Facility 106, Baker Hall

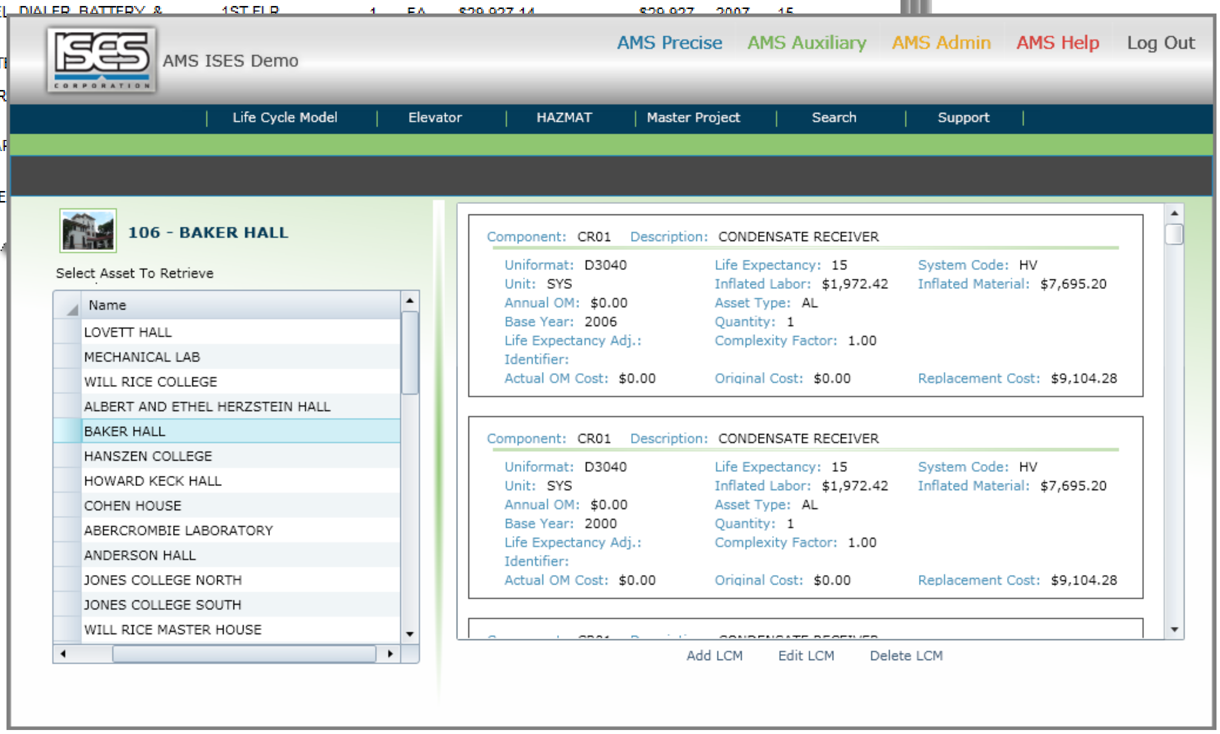


Figure 2b. AMS screenshot of Lifecycle Component Inventory detail.

Nonrecurring Renewal Needs

A. Management of Recommended Projects

The user can select an asset for specific data entry; enter, edit, or view various system data and settings, including photographs and CAD; print or view a wide array of reports produced by SAP Crystal Reports; generate on-the-fly search lists; and construct forecasting models of system financial data. Each deficiency is classified by the major property components identified for survey in the field. The user has the ability to edit fields and support tables to allow for owner-specified classifications to be added to the above lists.

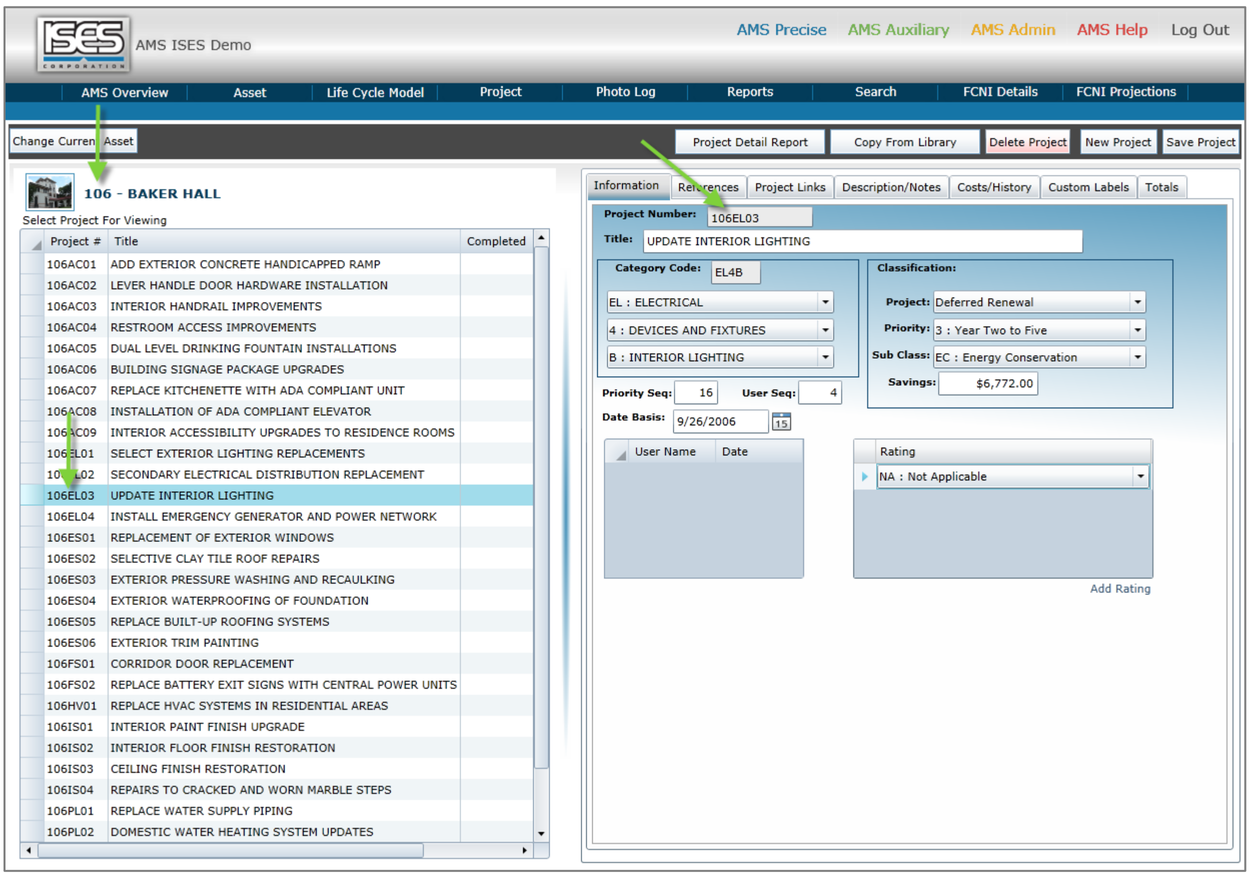


Figure 3. AMS screenshot of Project EL03 showing the Information tab of the Project Menu.

B. Cost Estimates

Costs for nonrecurring renewal needs include multiple tasks, as dictated by circumstances. All costs are estimated and then indexed to local conditions. Markups are applied as the situation dictates.

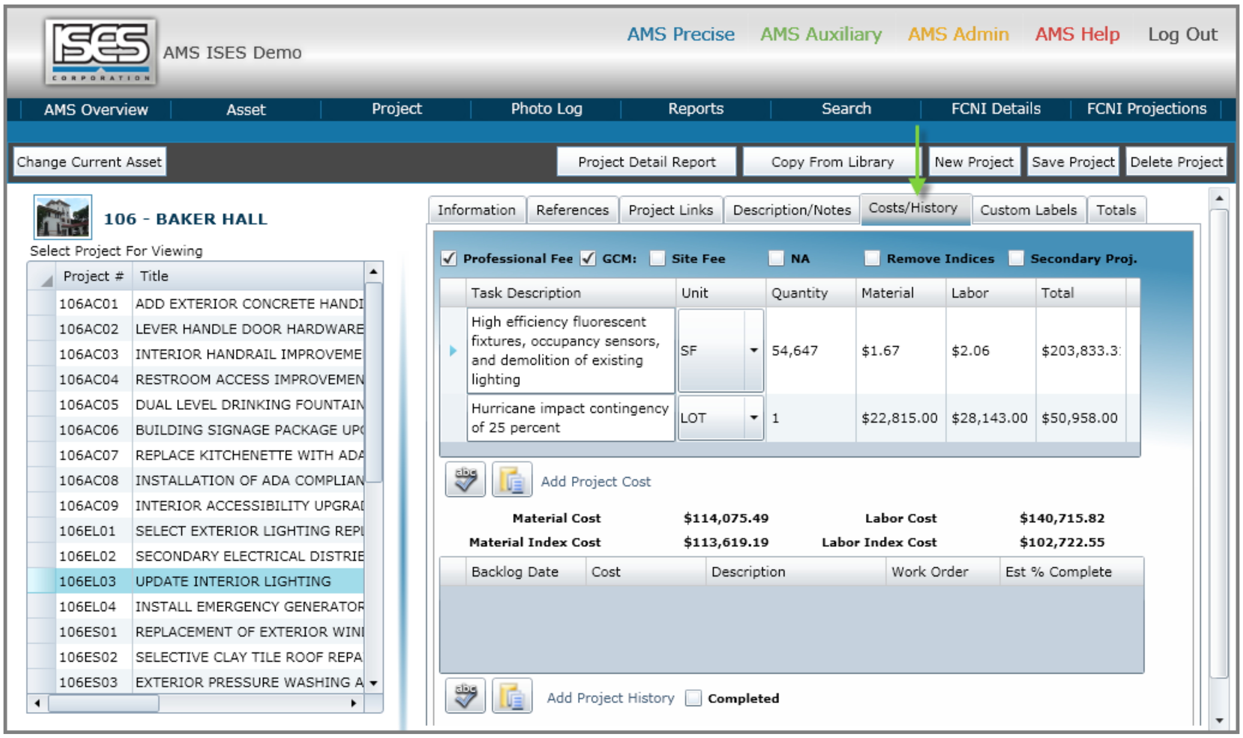


Figure 4. AMS screenshot of Project EL03's Costs/History tab.

The database also contains a History section that allows you to record any work that is performed on a project. This feature records the date, actual cost, description of work performed, work order number (if applicable) and estimated percentage of completion. If the work is 100% complete, it will remain in the database but is removed from the reporting of outstanding projects.

C. Project Totals

This summary shows original costs, inflation (as dictated by the base year of the estimate), total markups and work completed to date.

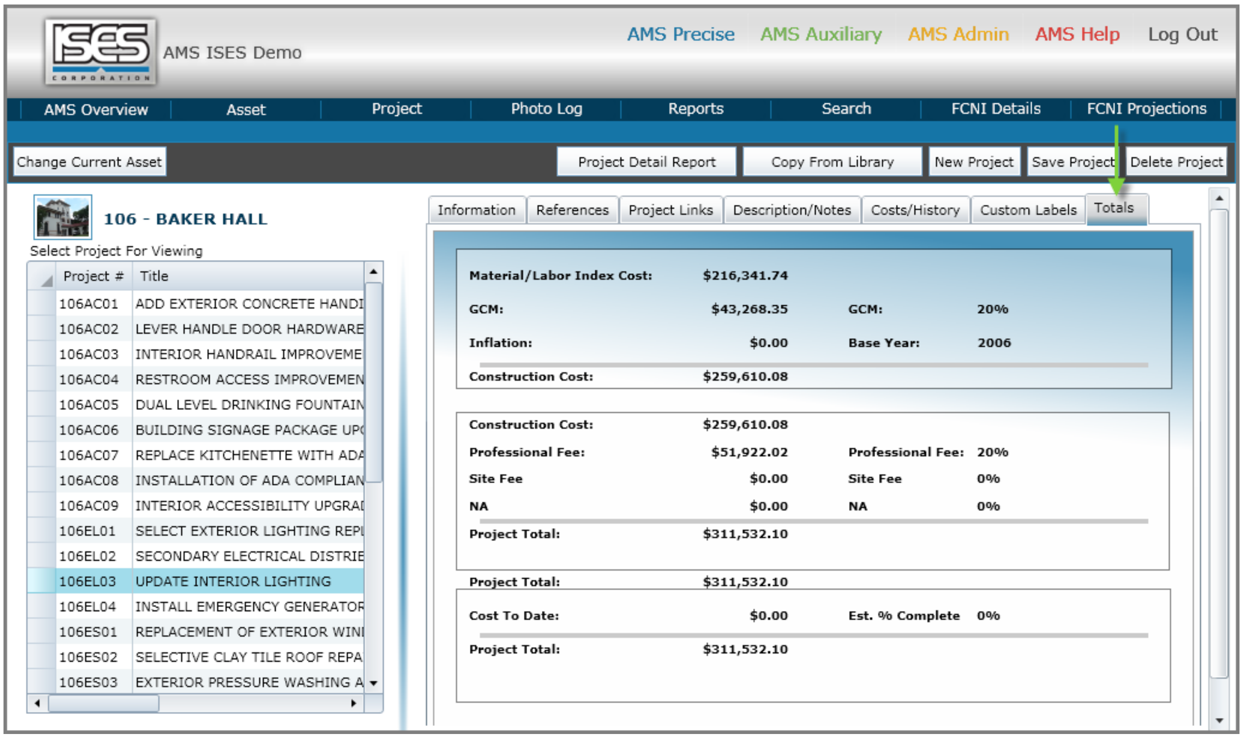


Figure 5. AMS screenshot of Project EL03's Totals tab.

Photolog

In addition to detailed renewal information, ISES creates a full photographic record of the physical inspection of the building, which is accessible via the database. This provides visual identification of the facility, as well as documentation of renewal needs.

Figure 6a depicts thumbnails of the photographs taken by the field inspectors, together with their description and location. Clicking on the photo will generate a larger popup of the image. The photos in 6b are linked to project EL03 (Upgrade Interior Lighting), showing affected areas in the building.

Figure 6a. AMS screenshot of building Photolog.

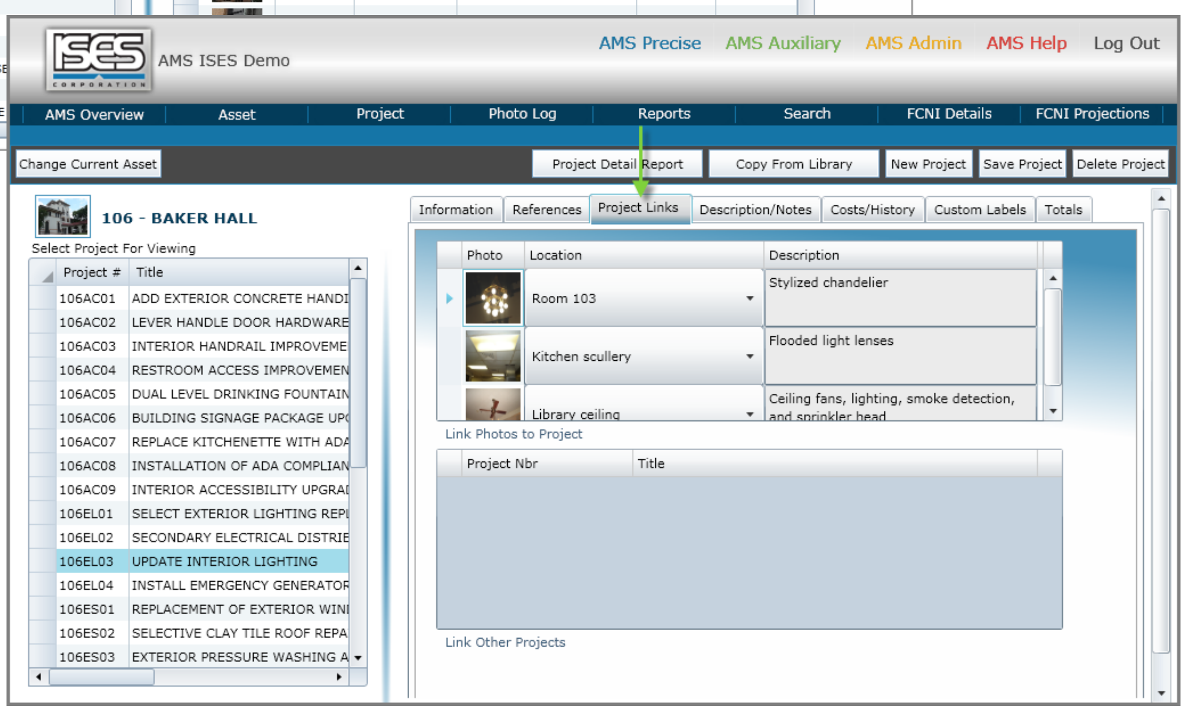


Figure 6b. AMS screenshot of project EL03's Project Links Tab.

CAD Drawings

If drawings are provided by the Client, ISES identifies the location of nonrecurring renewal recommendations on the floor plans. These drawings are integrated with the database and included in published facility reports.

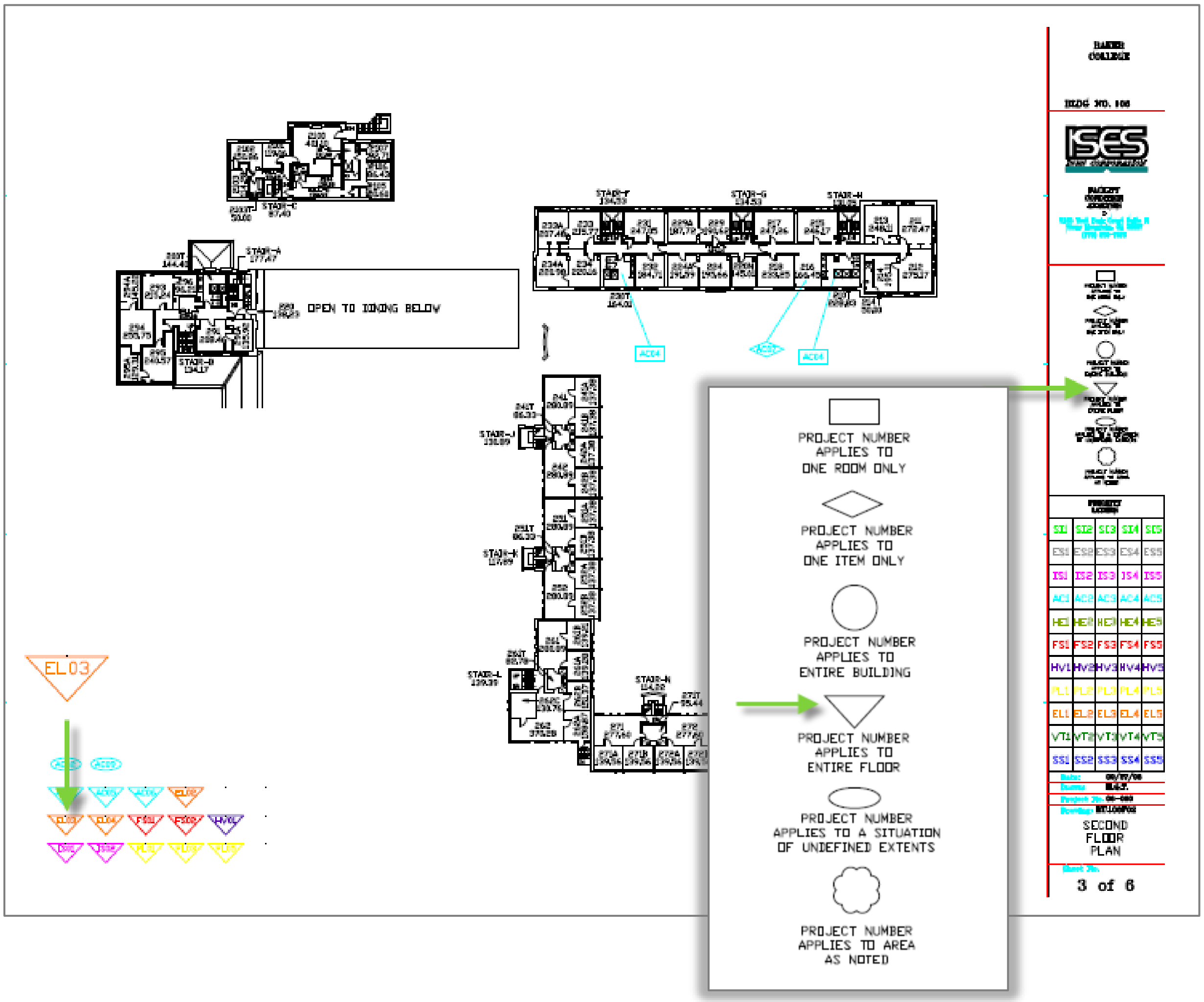


Figure 7. CAD for the second floor of the facility. The triangular icon for EL03 indicates that the renewal recommendation pertains to the entire floor.

Facility Reinvestment Modeling

Once the baseline condition of each facility has been established through the FCA process, the built-in modeling capability of AMS allows you to forecast funding requirements to meet target goals of condition. Multi-level financial modeling can be generated by deferred renewal backlog, capital renewal and selected timeframe. The information can be presented both graphically and textually and exported in standardized Microsoft Office formats. ISES will work with you to develop funding scenarios based on differing targets.

Projections can be based on renewal needs for a single building or across the entire facilities portfolio. AMS also calculates various metrics of your asset portfolio and measures the overall Facility Condition Needs Index (FCNI) against a national standard.

Figure 8 depicts economic parameters for setting up the models. It shows the various parameters that are input into the model once the existing condition has been established.

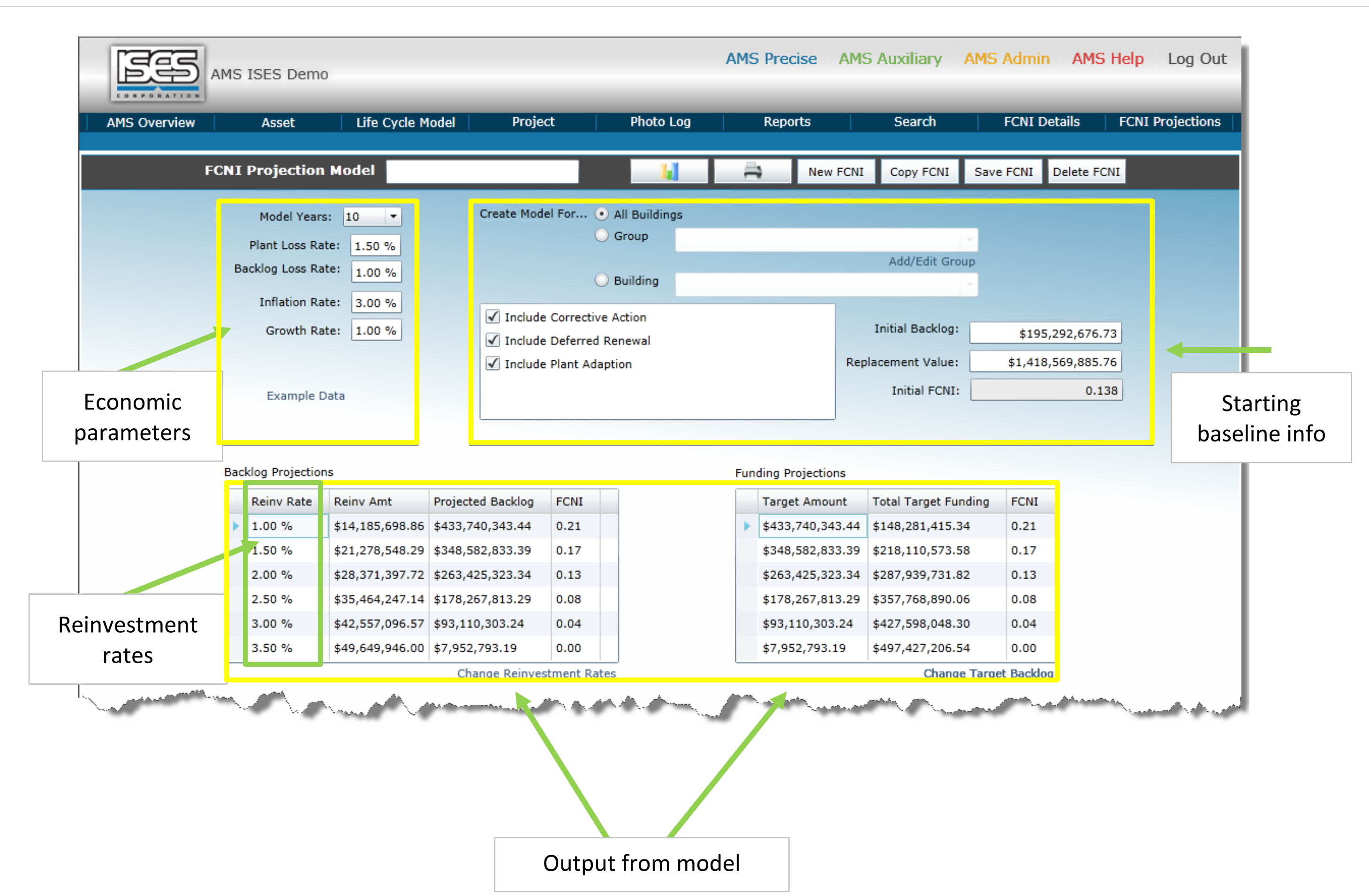


Figure 8. AMS screenshot of the Projection Model feature for the entire campus.

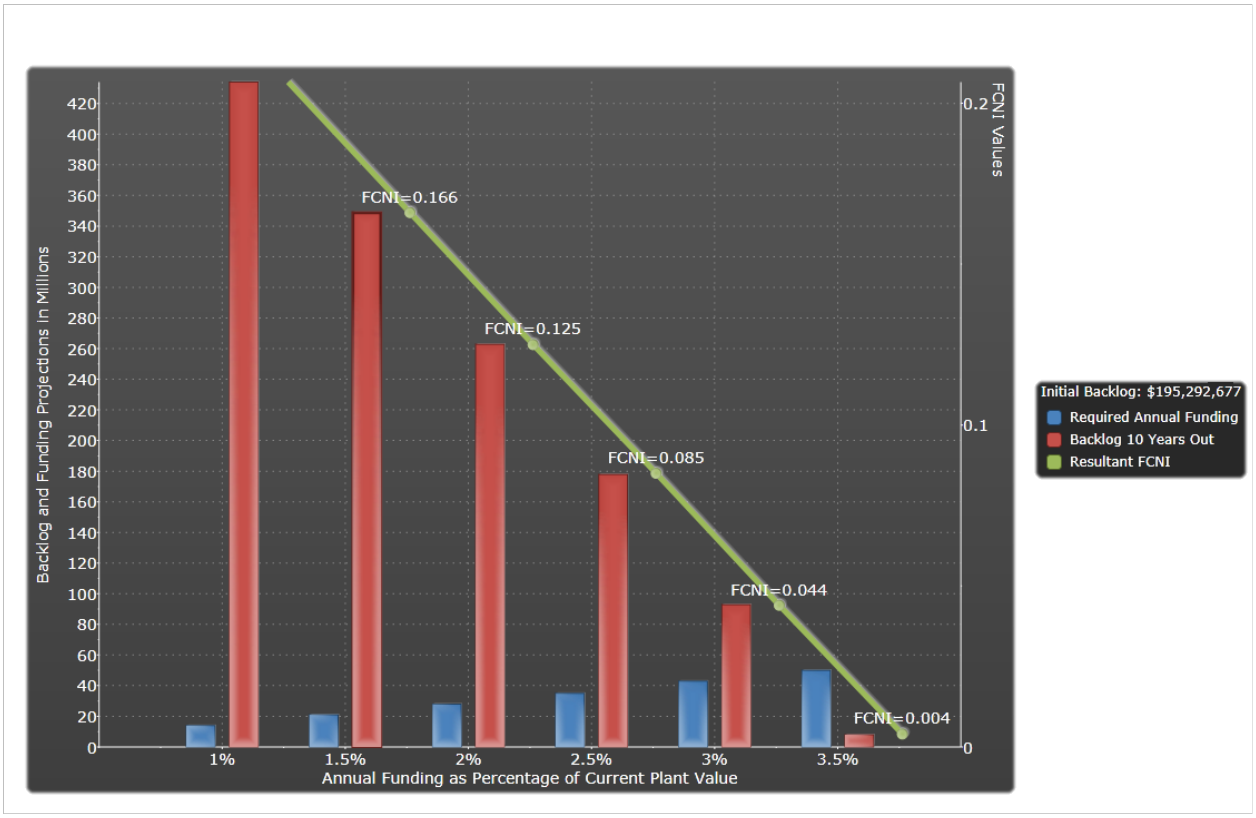


Figure 9. AMS screenshot of the Projection Model's Graphic Report.

ISES will work with you to develop several funding scenarios based on differing targets. Using the modeling function, the required levels of funding to achieve target conditions can be established.

The projections in Figure 8 are based on the facilities renewal need across the entire facilities portfolio. They are displayed graphically in Figure 9.

Classroom Utilization

Fall 2016 classroom utilization is based on 30 count seats for enhanced classrooms. The morning is from 8:00am – 11:55am; afternoon 12:00pm – 5:55pm; evening 6:00pm – 9:55pm.

Auburn Hills:

Morning	Monday – Thursday	44%
Afternoon	Monday – Thursday	37%
Evening	Monday – Thursday	51%
	Friday	7%
	Saturday	3%

Highland Lakes:

Morning	Monday – Thursday	42%
Afternoon	Monday – Thursday	32%
Evening	Monday – Thursday	46%
	Friday	10%

Orchard Ridge:

Morning	Monday – Thursday	65%
	Friday	5%
Afternoon	Monday – Thursday	69%
	Friday	3%
Evening	Monday – Thursday	71%

Royal Oak:

Morning	Monday – Thursday	55%
Afternoon	Monday – Thursday	53%
Evening	Monday – Thursday	55%
	Friday/Saturday	15%

Southfield:

Morning	Monday – Thursday	45%
Afternoon	Monday – Thursday	30%
Evening	Monday – Thursday	45%
	Friday/Saturday	15%

Mandated Facility Standards & Space Allocation by Campus

Below are the mandated facility standards for specific programs and the campuses square footage distribution for the program areas:

- Ceramics – MIOSHA, OSHA, MDEQ/EPA
- Culinary – State/County Health Department, MIOSHA
- Photo (analogue) – MIOSHA, OSHA, MDEQ/EPA
- All Science Labs – MIOSHA, OSHA, MDEQ/EPA
- Auto and Body Lab – MIOSHA, OSHA, MDEQ/EPA
- Nursing – MIOSHA, OSHA
- Radiation Therapy Technology – MIOSHA, OSHA, NRC & Equipment Certification
- Respiratory Therapy – MIOSHA, OSHA
- Surgical Technology – MIOSHA, OSHA

Auburn Hills

- Advanced Engineering & Technology - 76,436 Sq. Ft.
- Emergency Services - 2,374
- Humanities - 10,481
- Life Science - 32,015
- Physical Science - 1,215

Highland Lake

- Dental - 7,500 Sq. Ft.
- Nursing - 6,340
- Massage Therapy - 1,132
- Medical Assist - 3,380

Orchard Ridge

- Life Science - 26,627 Sq. Ft.
- Business Administration - 28,280
- Performing Arts - 28,967
- Culinary - 85,500
- Humanities - 9,870
- Learning Resources - 22,953
- Physical Education - 46,765
- Computer Information Systems - 6,789

Royal Oak

- Ceramics - 7,000 Sq. Ft.
- CIS – 3,600
- Management Technology - 7,500
- Photography - 5,800

Southfield

- All Science Labs - 15,500 Sq. Ft.
- Diagnostic Medical Sonography - 750
- Nursing - 5,500
- Radiation Therapy Technology - 1,750
- Respiratory Therapy - 1,650
- Surgical Technology - 1,650

Facility Replacement Values

The 2016 replacement value of the college's facilities was prepared by Michigan Community College Risk Management Authority.

Location No.	Location	Replacement Value
	Administrative Center	
1	Admin. Ctr. - District Office	6,073,300
47	Admin. Ctr.-Guest House	986,400
48	Admin. Ctr.-Pump House	8,900
	Auburn Hills Campus	
2	Auburn Hills Building A-G	104,821,800
9	Auburn Hills Building H/J	19,535,300
10	Auburn Hills - High Tech	8,702,700
11	Auburn Hills - Power House	10,284,400
12	Auburn Hills - Crest Vehicle Storage	143,100
49	Auburn Hills-Greenhouse	139,200
72	Auburn Hills Grounds Bldg.	1,101,600
73	Auburn Hills Covered Storage	344,000
74	Auburn Hills New Salt Storage	206,200
50	Auburn Hills Project Brave Storage	0
51	Auburn .Hills Tech Storage Building	26,300
57	Auburn Hills Kiln Shelter	46,200
58	Auburn Hills M-TEC	8,862,700
60	Crest Training Center	3,198,900
61	Crest Bank	545,600
62	Crest Convenience Store	602,400
63	Crest Motel	560,600
64	Crest Cape Cod Residence	263,900
65	Crest Ranch Residence	309,400
66	Crest 2-Story Residence	305,900
67	Crest Detached Garage	48,100
68	Crest Burn Simulator	6,332,000
69	Crest Control Tower	731,600
	Highland Lakes Campus	

13	Highland Hall - Building B	0
14	Highland Lakes Building C - Student Union	7,503,600
15	High Lakes Building D - High Oaks Hall	10,609,200
16	Highland Lakes Building E - Physical Ed	8,455,300
17	Highland Lakes - Levinson Hall/Addition	20,712,300
18	Highland Lakes - Woodland Hall/Addition	22,350,600
19	Highland Lakes Building G - Redwood Center	879,600
20	Highland Lakes Maintenance Pole Barn	28,800
21	Highland Lakes-Pump house	491,100
52	Highland Lakes - Pavilion	146,100
54	Highland Lakes - Central Power Plant	13,340,300
55	Highland Lakes - Grounds Building	1,101,600
56	Highland Lakes - Covered Storage	344,000
71	Highland Lakes - Salt Storage	206,200
	Orchard Ridge Campus	
22	Orchard Ridge - Building A-D	31,992,800
26	Orchard Ridge - Building E-G	26,795,600
29	Orchard Ridge - Building H	13,787,400
30	Orchard Ridge.- Building J-K & Fine Arts	51,286,400
32	Orchard Ridge - Building L-M	15,047,500
34	Orchard Ridge - Building N	798,600
36	Orchard Ridge - Pump house	241,000
37	Orchard Ridge - Maintenance Storage	80,500
38	Orchard Ridge. - Utility Tunnels	980,000
53	Orchard Ridge - Kiln Shelter	90,500
	Royal Oak Campus	
40	Royal Oak - Building A-D & Mall	47,887,200
41	Royal Oak - Grounds Storage	272,800
42	Royal Oak - Parking Structure	19,225,800
43	Royal Oak - Power Plant	4,473,500
46	Pontiac Center	0
	Southfield Campus	
39	S.E. Campus-Southfield Building	43,010,600

Grand Total $ 516,319,400.00

Utility System and Facility Infrastructure Condition

In 2017, the College commissioned a comprehensive facility report from ISES Corporation and Carl Walker, Inc. that assessed infrastructure conditions included herein.

OAKLAND COMMUNITY COLLEGE

Utility & Facility Condition Assessment

Auburn Hills Infrastructure

Group AHI

Inspected March 20, 2017

CORPORATION

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UTILITY AND FACILITY
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SECTION 1

ASSET OVERVIEW

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

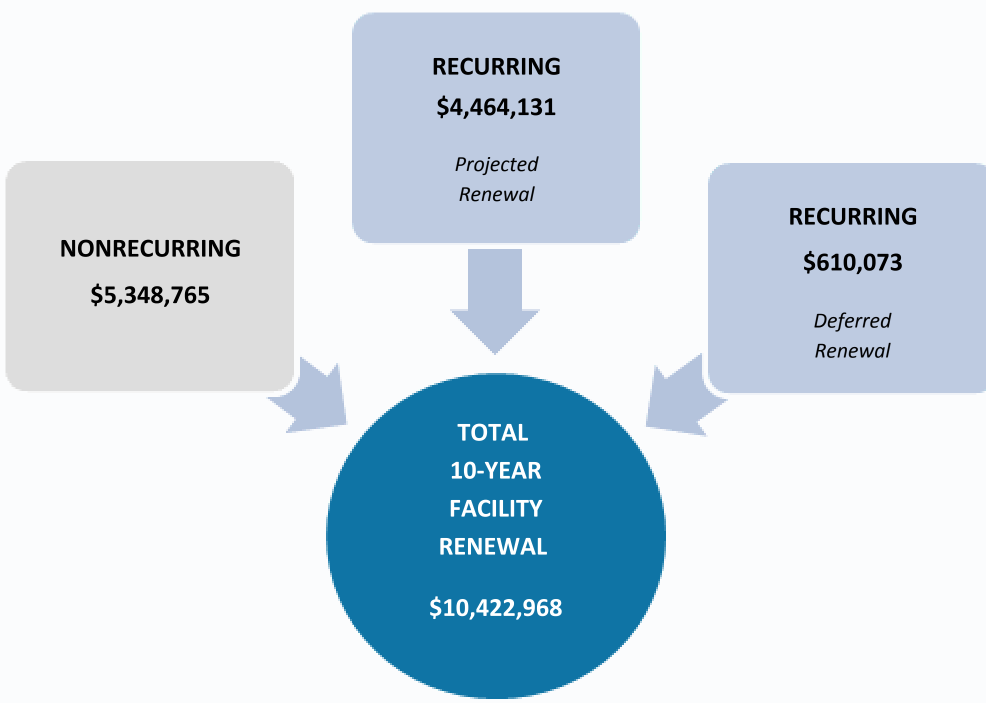
GROUP NAME	AHI : AUBURN HILLS INFRASTRUCTURE	**CURRENT REPLACEMENT VALUE**	$46,153,604
GSF	13,303	**FACILITY CONDITION NEEDS INDEX**	0.23
		FACILITY CONDITION INDEX	0.01
		10-YEAR $/SF	783.51

FCNI Scale

The FCNI for this asset is **0.23**

- Excellent Condition (typically new construction)
- Good Condition (maintained within lifecycle)
- Fair Condition (normal renovations required)
- Below Average Condition (major renovation required)
- Poor Condition (total renovation required)
- Replacement Indicated (unless historic)

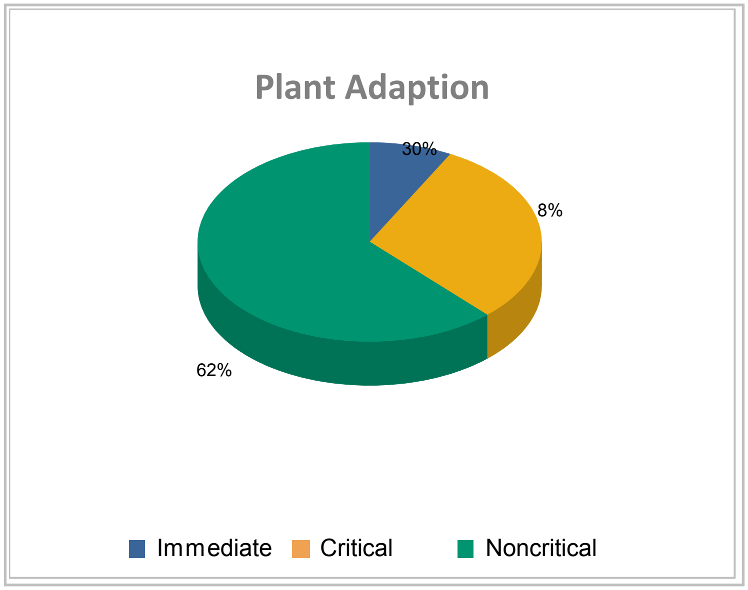
Total Facility Renewal Costs



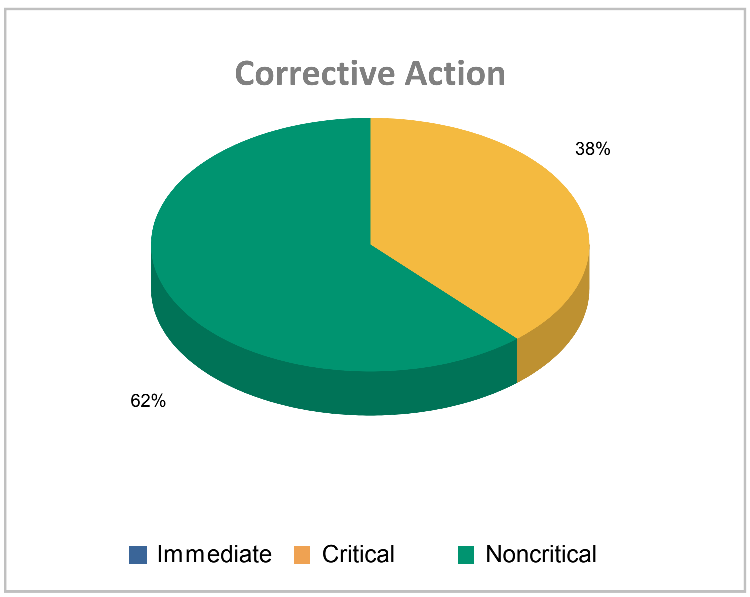
Nonrecurring Costs

Project Cost by Priority

PLANT ADAPTION	
1 - Immediate	**$29,620**
2 - Critical	**$113,761**
3 - Noncritical	**$232,630**

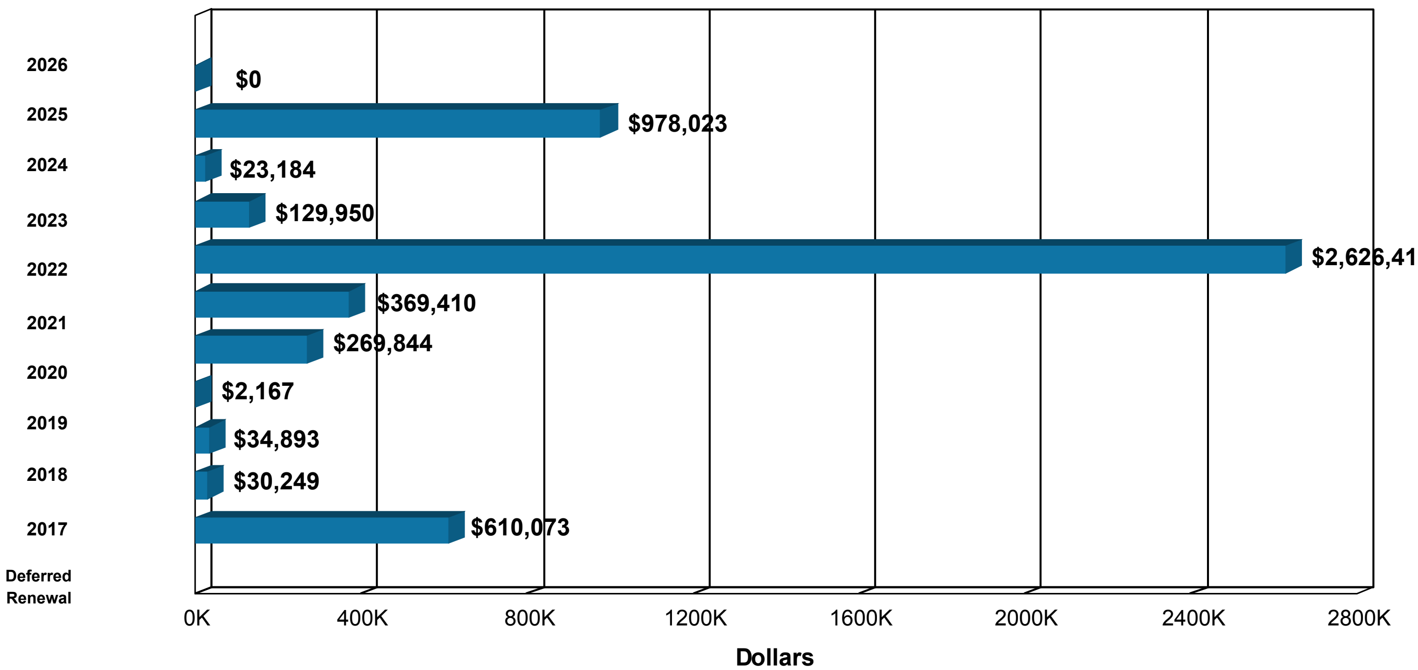


CORRECTIVE ACTION	
1 - Immediate	**$0**
2 - Critical	**$1,907,094**
3 - Noncritical	**$3,065,660**

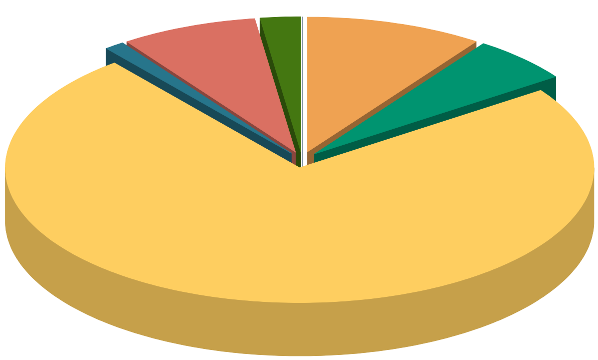


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



Accessibility	$8,481	0%
Electrical	$998,359	10%
Exterior	$596,289	6%
Fire/Life Safety	$0	0%
Health	$0	0%
HVAC	$7,677,545	74%
Interiors	$123,966	1%
Plumbing	$795,703	8%
Site	$222,627	2%
Vert. Trans.	$0	0%
TOTAL	**$10,422,968**	

ASSET SUMMARY

INTRODUCTION

The following is a detailed analysis of the physical condition and estimated remaining reliable operating life of the utility systems serving the facilities at the Auburn Hills campus as well as the Facility Condition Assessment (FCA) of the Power House. The systems include:

- Power House
- Heating and Chilled Water Generation and Distribution
- High Voltage Electrical
- Sanitary Sewer
- Stormwater
- Potable and Fire Water

The goal was to produce a campuswide report with recurring and nonrecurring recommendations that have been entered into the individual utility system assets in the FCA database.

Information for this report was gathered during the site inspection conducted on March 20, 2017 and through a review of historical documents and single-line campus drawings. The assessments and estimates are based solely on visual and nondestructive observations, a review of existing drawings, previously prepared engineering reports, any available maintenance records and reports, and discussions with key personnel and specific external support companies, such as water treatment representatives. In some instances, ISES was not provided up-to-date drawings prior to the development of this report. In these cases, general project recommendations were developed, and no lifecycle model cost data was created. Additional inspection procedures and methods, along with engineering design support, may be necessary to fully define the specific costs and scope to repair various infrastructure facility deficiencies.

The specific activities involved with gathering data included a detailed request for relevant information, including system drawings, inventory data, performance data, both planned and completed capital renewal projects, and operational data (including equipment forced outage statistics. Operating data was reviewed for abnormal excursions, forced outages and peak loads. The data was evaluated for impact on the equipment's estimated useful life. Information related to forced equipment outages, equipment reliability and operating performance was reviewed to determine trends that might affect future safety, reliability and efficiency.

It is important to note that utility infrastructure assets normally encompass more than just a single piece of equipment and will, in most situations, represent a section or group of materials, i.e., linear footage of installed piping systems or electrical wiring. The majority of these systems will continue to operate reliably and safely beyond the ten-year assessment scope, but beyond that, it will be necessary to reinspect the systems to ensure that they continue to operate reliably.

Equipment Useful Life

The estimates for remaining useful life consider safety, reliability, efficiency, and sustainability as the primary operational objectives for capital renewal. These estimates are based on actual equipment age, physical inspections, performance data reviews, personnel interviews, maintenance practices, and operating history. Expected useful life values are averaged forecasts based on equipment that is properly maintained and operated without frequent and/or severe operating excursions. Chronological equipment age is not the primary determinant of service life. In many instances, there is ample evidence of equipment operating well beyond predicted useful life values. This is why it is important to modify these values with actual equipment condition. This modification is based on service history, operating conditions, installation environment, and actual field performance. It should also be noted that equipment reaching the predicted endpoint of its expected useful life does not necessarily cease to function. What does occur is a downward trend toward loss of service reliability and an increase in forced outages and maintenance cost requirements where the equipment becomes unavailable for normal service more frequently.

The trend in recent years toward planned obsolescence by manufacturers of certain plant systems and equipment alters the strategy for capital replacement as some systems become obsolete. Although the equipment may have many remaining years of safe, reliable, and efficient operation, manufacturers are phasing systems out and not supporting the equipment past some specific phase-out date. For example, digital electronic control systems have an estimated operating life of 15 years, not because of failure to function but because of the planned lifecycle established by the OEM due to technological advancements and product development. This also results in a requirement for continuous operator training as equipment is replaced. It is not unusual for newer equipment to have better efficiency and lower operating costs. However, this requires careful analysis by owners to actualize potential savings.

For underground piping serving the potable, fire, and drainage water systems, consistent inspection through closed circuit television (CCTV) to identify intrusion and pipe deterioration is an excellent method for forecasting future capital needs. This inspection function should be included as part of the any campus annual budget and performed on a regular basis.

Factors That Affect Equipment Useful Life

Primary critical equipment was evaluated by comparing current data to manufacturer’s performance ratings. Degradation in operating performance can be the result of normal wear and tear, or it can be indicative of abnormal wear. For example, boiler efficiency losses can increase due to higher than design excess air resulting from parasitic air leaks in boiler casings or out-of-calibration combustion control systems. Losses in efficiency can also be the result of internal scale and deposit formation.

The skill and ability of the operating staff can have a significant impact on overall equipment useful life. Accelerated startups, emergency shutdowns, overload excursions, air leakage, excessive water leaks, and adherence to balance-of-plant maintenance requirements are critical to the safety, reliability, and efficiency of plant equipment. In addition, proper diagnostic skills can often avoid premature outages or result in the correct decision to remove equipment from service to avoid catastrophic damage. We

spent some time in the interviews on campus discussing operator proficiency to evaluate any impact this factor may have had on equipment useful life.

One method of providing consistency in methods of system/equipment operation is the implementation of standard operating procedures (SOPs). These provide a reference guide for the operating staff for most of the expected operating conditions. They cannot, however, provide 100 percent guidance for all possible events. This is why operator training in the fundamentals of plant operation is so critical. The implementation of SOPs also provides a method of reminding operators about system equipment requirements in plants where there are few, if any, abnormal operating excursions. In this type of operation, skills that have not been exercised recently become difficult to recall under the pressure of rapidly developing events.

For heating and chilled water generation equipment and distribution piping systems, water treatment is the most salient issue in considering the estimated useful life. Internal and external equipment piping scale causes rapid performance deterioration, and corrosion can severely reduce the operating life of systems and equipment. In all cases, proper water treatment normally extends generating equipment useful life as well as balance-of-plant equipment life. We evaluated historical data as well as the current water treatment program for application and execution. The OCC system currently utilizes Rochester Midland Corporation to provide the water treatment chemicals. Some of the chemicals used include a pitting and corrosion inhibitor identified as CLT-407 for the chilled and heating water closed loop systems, chlorine, and a liquid oxygen scavenger identified as OS-912 to prevent organic and biocides from developing within the condenser water and chilled water systems.

ASSET FINDINGS

The findings for each individual asset in the Auburn Hills campus infrastructure group will be presented in detail on the following pages, but below is a summary table of the estimated renewal costs for each asset.

FCNI Comparison

ASSET CODE	ASSET NAME	CRV	TOTAL 10-YEAR NEEDS	FCNI	FCI
AHHCD	HEATING/CHILLED WATER DISTRIBUTION	17,028,000	4,693,765	0.28	0.00
AHHVE	HIGH VOLTAGE ELECTRICAL	5,451,420	594,307	0.11	0.07
AHP	POWER HOUSE	15,349,184	4,317,989	0.28	0.01
AHPWF	POTABLE AND FIRE WATER	2,700,000	206,042	0.08	0.00
AHSAN	SANITARY SEWER SYSTEM	1,625,000	243,248	0.15	0.00
AHSTR	STORMWATER SEWER SYSTEM	4,000,000	367,616	0.09	0.00

Auburn Hills Campus Power House (AHP)

The Power House for the Auburn Hills campus of Oakland Community College is a reinforced concrete frame high bay facility constructed around 1970. It is located on the west side of campus, immediately adjacent to Building A. This 13,298 gross square feet facility has a brick masonry facade, a flat aggregate ballasted, asphalt built-up roof over the main building, and a small membrane roof over the 2010 north addition. The west side of the facility has a large expanse of glazing that has been removed in the past to allow the installation of large pieces of equipment. Exterior doors are either single or double hollow metal service doors. The plant interior has concrete floors, exposed reinforced concrete honeycomb roof structure, and reinforced concrete beam and column supports. The Power House contains one large main equipment room, one main electrical room, an office, restroom with adjoining locker room, employee break room, and parts and tool storage areas.

Site

The site around the facility is primarily paved asphalt service and storage areas, with an area of turf grass on the west side. The minimal landscaping is satisfactory, and there are no recommendations for upgrade.

Exterior Structure

The aggregate ballasted, asphalt built-up roof appears to be original and is expected to require replacement within the next ten years. The membrane roof over the newer north section should outlast the report scope. The single pane windows are original and expected to need lifecycle replacement late in the next ten years. Overall, the brick masonry and concrete exterior is in good condition, but the concrete roof crown fascia has some minor cracking and soiling. Cleaning and repairs are recommended. The hollow metal service doors appear to be fairly recent installations and are expected to outlast the scope of this report.

Interior Finishes/Systems

The office has carpeting, one support room has vinyl tile, and the remaining areas, including the restroom and locker room, have sealed concrete slab floors. The floors of the shower area have some ceramic tile. Walls are painted sheetrock or CMU in most areas, with a small amount of ceramic tile in the restroom and locker room. The office has suspended grid acoustical tile ceilings, and the remaining ceilings are painted concrete. Most of the interior finishes, including the casework in the break room, are original and due lifecycle replacement. The interior doors, however, should outlast the scope of this report.

Accessibility

The facility is not open to the public and therefore not normally required to be accessible. However, as interior upgrades are conducted, some accessibility improvements should be incorporated. This includes replacing the single-level water fountain with a dual-level unit and installing a handrail on the steeply sloped ramp in the northwest corner of the main room.

Health

Based on the building age, it is possible that both lead paint and asbestos may have been used in its original construction. No suspect material was reported or observed during the inspection, but no physical testing or sampling was performed. The lead paint and asbestos health risks are minimal, but workers present during any remodeling should be made aware of the hazards of working with such materials.

Fire/Life Safety

This facility is served by an addressable fire alarm system that was installed in 2003. It is comprised of a fire alarm control panel, manual pull stations, heat/smoke detectors, and audible and visual notification devices. This system is in proper working condition and should outlast the scope of this assessment. There is no dedicated fire suppression system, and none is recommended. However, there is an aging refrigerant leak monitoring system that should be considered for replacement.

HVAC

The Power House is equipped with the central chilled water and heating water equipment that serves this campus. Overall, the generation system has been well maintained and is by and large extremely efficient. The boilers are operating at nearly 83 percent efficiency, and the chillers have been consistent in operation and subject to routine maintenance.

The campus chilled water is generated by two local water-cooled absorption chillers rated for 1,100 tons each and one water-cooled centrifugal chiller rated for 470 tons, all installed in 1999. This equipment is in proper working condition and is reportedly reliable and subject to major inspection and maintenance. With this level of service and maintenance, the chillers should remain reliable for at least the next ten years.

The cooling tower assembly located outside the facility is a three-cell unit installed in 2007. Only very minimal deficiencies were observed, consisting of minor scale build-up on the infill and steel support structure that would generally be rectified as part of routine maintenance prior to seasonal start up. With continued service and maintenance, this equipment should remain serviceable beyond the scope of this report.

The campus heating hot water is generated by three natural gas fired boilers. Boilers B-1 and B-2 are rated for 25,000 MBH each and are original. B-3 is a D type water tube boiler rated for 20,000 MBH and installed in 2010. Boilers B-1 and B-2 are type A water tube boilers that have been modified with updated low NOX burners and combustion air equipment. The control systems for all three boilers are also relatively new. Additionally, these units have undergone major repair, such as replacement of the refractory. All three are in proper operating condition, but boilers B-1 and B-2 will have been in continuous service for nearly 60 years at the end of this report scope. It is recommended that they be considered for replacement near the end of the next ten years.

Both the heating and chilled water generation systems are equipped with a series of primary and secondary pumps that are currently in serviceable condition. In addition, the condenser water system has three pumps. All of these pumps have been updated since 1999, and replacement should not be necessary within the next ten years. It is however recommended that that major teardown and inspection of the largest horsepower pumps be performed. This should be done for chilled water pumps P-2A, P-2B, and P-2C and condenser water pumps P-5A, P-5B, and P-5C.

Other ancillary or support equipment serving the chilled and heating water systems include an updated air compressor with associated air dryer that is in good condition and an original thermal storage expansion tank. It is recommended that this tank (ET-1) be replaced within the next ten years.

Air handler AC-701 located on the mezzanine level was installed in 2010 and provides conditioned air to select spaces within the Power House. It is in good condition and with continued service and maintenance will remain reliable beyond the scope of this report. The HVAC ductwork and piping that serve this air handler are original and should be considered for replacement.

Supplemental heating is provided by a series of hydronic and electric unit heaters. Most will outlast the scope of this report, but the hydronic unit heaters UH-705 and UH-706 are original and recommended for replacement. Two independent ductless split systems with DX cooling provide supplemental cooling to the chief’s office and central control room. No upgrade is recommended at this time.

Facility exhaust is achieved through seven centrifugal rooftop exhaust fans, two utility set fans, one inline fan, and one propeller fan. Most were installed in 2010 and will remain serviceable beyond the scope of this report. However, propeller fan EF-708 and rooftop fan EF-1 should be replaced due to lifecycle and condition.

Electrical

Primary electrical service is provided from the high voltage electrical equipment located in the electrical vault. This high voltage and secondary electrical switchgear is discussed further in the High Voltage Electrical section of this report.

The 480/277 and 208/120 volt service to this building is provided from secondary electrical switchgear and dry-type branch transformers. Most of the system, including branch wiring, electrical outlets, circuit breaker panelboards, and switches, is original, with some updates during the 2010 renovation. The remaining original portion should also be updated.

The interior lighting system is a combination of recessed and surface-mounted fixtures that utilize T8 and T12 lamps. There are also high bay fixtures with HID lamps. The lighting system has been partially updated, but some of it is still original or equipped with inefficient lamps and ballasts. A partial lighting upgrade is recommended.

The exterior lighting system consists of recessed and surface-mounted light fixtures with HID, compact fluorescent, and incandescent lamps. The recessed lighting installed around the perimeter of the building is original. All of the exterior lighting upgrade is recommended for replacement within the next ten years.

Four distinct motor control center assemblies were installed in 2010 and serve many of the motors installed throughout the Power House. This equipment is in good condition and with routine maintenance and operation will remain reliable beyond the next ten years.

Variable speed drives are connected to much of the central utility system equipment, including the cooling tower fans, secondary high temperature heating water pumps, and secondary chilled water pumps. All of these VSDs are in proper working condition, but those that serve chilled water pumps P-2A, P-2B and P-2C should be scheduled for replacement due to lifecycle depletion.

The 14 kW natural gas fired emergency generator on the roof is presumed to be primarily for boiler and chiller control in the event of a total loss of power, and there is a local transfer switch rated for 480/277 volts, 100 amps in the electrical vault. This 2010 equipment is in good condition, and no upgrade is recommended.

Plumbing

Domestic water supply piping is copper, and the drain piping is cast-iron or black steel. These systems are original and in proper working condition. The supply piping has reached the end of its expected service life and is recommended for replacement. The drain piping should outlast the scope of this report.

The plumbing fixtures include a porcelain urinal, lavatory, and water closet and an emergency eyewash/shower station. The restroom fixtures are original and recommended for replacement, but the eyewash/shower station is in good condition and should outlast the scope of this report.

Domestic hot water is generated by one electric water heater with a capacity of 82 gallon. It was installed in 2010 and is in good condition. It should remain reliable beyond the next ten years.

There are two backflow preventers that serve the domestic cold water bypass and the secondary domestic cold water make-up. Both are serviceable, but the cold water bypass unit is near the end of its service life and is recommended for replacement.

Two water softeners installed in 2016 provide conditioned water for the central hydronic systems. This equipment is in good condition and should outlast the scope of this report.

This facility is equipped with a large quantity of original central system support equipment, such as natural gas pipe, compressed air pipe, and secondary cold water pipe. These piping networks are vital to the consistent operation of the heating and cooling systems, and a failure of any one could force an unscheduled outage of the generation equipment. It is recommended that these piping systems be replaced late in the next ten years.

Heating and Chilled Water Distribution

The heating hot water and chilled water distribution systems at the Auburn Hills campus consist of approximately 6,480 linear feet of various sizes of chilled water supply and return pipe, 6,750 linear feet of various sizes of heating water supply and return pipe, and 200 linear feet of condenser water pipe for the Power House. These are estimates, as no scaled utility drawings were available prior to the development of this report. Overall, the system is in fair to good condition. It is in proper operating condition and has been well maintained.

It is estimated that the chilled water and heating water piping systems are constructed of schedule 40 steel pipe wrapped with insulation and covered in a water resistant sheathing. These systems can be dated to the phases of building construction and campus expansion. All of the main heating and chilled water pipe and valves are installed within the utility tunnel system, and there are strategically placed expansion joints for the heating water system. A series of gate and butterfly isolation valves are installed at each building supply and within the Power House. The piping systems are installed on a series of steel support stanchions and utilize anchors, guides, and rollers.

Some observed deficiencies on the pipe and support equipment included moderate to severe corrosion on the steel stanchions, some exterior surface corrosion on the piping, and calcium deposits and corrosion on the isolation valves. In addition, some of the older sections of pipe have visibly damaged insulation and sheathing. Repair or replace the damaged support stanchions, insulation, and sheathing.

Although the piping was deemed to be in relatively fair to good condition, it should be anticipated that some replacement will be necessary within the next ten years. To accurately determine the areas of most need, it is recommended that some ultrasonic pipe thickness testing be performed throughout the original tunnel sections.

There is one section of direct-buried pipe that provides secondary heating water to Building H from Building A. There has been an alarming trend throughout the country within the last ten years concerning direct-buried piping system line failures. Piping installed only 30 to 35 years ago are experiencing significant deterioration, and this includes pre-engineered and field installed systems. Nevertheless, the average expected useful life of these systems, with adequate installation specifications, good water treatment, and periodic preventive maintenance, is considered to be 50 years.

A document entitled “Field Investigation of Underground Distribution Systems” published by the National Academy of Sciences, National Research Council, Washington, D.C. for Task Group 54 of the Federal Construction Agency provides a detailed account of the findings of a survey conducted by a task force of 12 engineers, each with broad experience in underground piping systems. This task force conducted surveys of 41 installations at government facilities and at private production facilities in 16 states and the District of Columbia. They evaluated 131 separate systems by system classification types.

A brief summary of the results from this survey showed that 62 percent of the systems had wet insulation, 46 percent showed insulation deterioration, and 75 percent showed wet and/or deteriorated insulation. Since either wet and/or deteriorated insulation produces heat losses greater than design values, 75 percent also had excessive heat loss. External corrosion, a frequent cause of leakage, was primarily due to too thin or inadequate external coatings. Campus staff reported that there is a suspicion that the section of pipe between Buildings H and A could have developed pinhole leaks. This section of pipe should be removed and replaced. Also replace the aging piping and valves in the Power House.

The tunnel system is constructed primarily of cast-in-place concrete and is considered to be in good condition. Very minimal spalling or failing concrete was observed. The tunnels are well ventilated and have a relatively temperate environment. The secondary electrical and lighting systems are in proper working order, and the lighting is equipped with shatter-proof coverings. Portions of the electrical and lighting systems are aging and recommended for lifecycle replacement. There is also fire and life safety equipment and some refrigerant monitoring in the tunnel system, and submersible sump pumps are strategically installed to remove ground and surface water. The sump pumps in the A and B tunnel sections should be replaced due to lifecycle depletion.

High Voltage Electrical System

This campus is provided 13.2 kV primary electrical service from Detroit Edison (DTE) via two separate utility lines installed at Mott Road. This primary voltage is then reduced to 480/277 volts through campus transformers and distributed to the campus through miscellaneous switches and switchgear assemblies. Overall, the high voltage electrical system is in serviceable condition, although the replacement of aging equipment in some of the older facilities is recommended.

The primary switchgear assembly for this campus is in the Power House electrical vault and consists of eight load interrupters rated for 15 kV and 600 amps each. It is equipped with the two main feeders identified as the Kern Feed and Auburn Hills Feed. This switchgear assembly also has an automatic transfer system that provides near instantaneous transfer of power in the event of a loss of one of the main electrical feeds from DTE. This main 15 kV switchgear was installed in 2010 and is good condition. No upgrade is recommended at this time.

This electrical vault also has a section of double-ended switchgear equipped with two dry-type transformers rated for 1,000 kVA each. They reduce the 13.2 kV service to 480/277 volts. The associated low-voltage switchgear is in a main-tie-main configuration and is rated for 1,600 amps. It was installed in 2010 and has 17 Square D Masterpact low-voltage power circuit breakers of varying ampacities. This assembly provides 480 volt service to equipment in the Power House and in buildings throughout campus. It is in good condition and will remain reliable well beyond the next ten years.

Some campus facilities are equipped with additional oil-filled and dry-type transformers as well as fused and nonfused load interrupters. The vast majority are in proper working condition and will require only routine maintenance, testing, and operation to remain safe and reliable for continued use beyond the next ten years.

The Building C main mechanical room has two original 15 kV load interrupters and an associated 300 kVA dry-type transformer. Room D-118 in Building D also has two original 15 kV load interrupters and one 500 kVA dry-type transformer. This equipment is operating well beyond its statistical service life and should be scheduled for replacement as soon as possible.

In room E-126 of Building E are two 15 kV load interrupters (one fused, one nonfused) that are currently in proper operating condition but will reach the end of their reliable service life within the next five years. They should be replaced at that time.

Outside Building F is one pad-mounted selector switch installed in 1996 and rated for approximately 15 kV, 600 amps. It is in proper working condition but will reach the end of its reliable service life within the next eight years and should be replaced at that time.

Although the balance of principal equipment will outlast the report scope, it will be necessary to perform consistent maintenance over the next ten years. Currently, an oil and gas analysis is performed on the oil-filled transformers throughout campus, but the switches and circuit breakers require maintenance and operation. A campuswide electrical maintenance program on three to five year maintenance cycle is recommended. This should include the operation, maintenance, and testing of the primary load interrupters and routine operation and maintenance of any secondary electrical systems vital to the consistent operation of campus systems, such as the power circuit breakers.

The vast majority of the 13.2 kV campus electrical conductor is installed within cable trays in the utility tunnel networks, although there is some underground distribution. Overall, the primary conductor and cable trays are in good condition and should remain reliable beyond the next ten years. Within that tunnel system are three distinct splice boxes. Splice Box #1 has developed moderate to severe base corrosion and will require repair or replacement.

The underground duct bank and cable system is comprised of five electrical manholes. It was reported that they are in fairly good condition and do not have an extensive history of severe water intrusion. There are no recommendations for these manholes at this time.

To the rear of Building H and the M-TEC facility are sections of electrical equipment installed on concrete support slabs. The equipment is in good condition, but the slabs are sinking, which will ultimately place a strain on the feeder cable. There was evidence of repair at Building H, and the M-TEC slab appears to have settled. No repair project was developed, but it is recommended that the areas be routinely monitored for any additional slab movement.

Many of the FCA reports for this campus recommend the installation of individual building emergency power systems (generators and transfer switches). While this is one method of providing emergency power, another option is a central emergency power system. The core campus buildings are interconnected, and a large quantity of square footage could be served by a central system. This would be less maintenance intensive and reduce natural gas or diesel fuel costs and annual emissions. No project was developed for this recommendation, as the costs already in the database for the individual systems would be sufficient to fund such a system.

Potable and Fire Water System

The combined potable water and fire protection system consists of just over 11,000 linear feet of piping (approximately 2.1 miles) ranging from 2 to 12 inches in diameter. The buried water supply line network was installed in 1967 and during subsequent additions to the campus. These water supply lines are supplied water to the campus via a connection with the city of Auburn Hills. This is through a 12 inch pipe connected to a city owned line located adjacent to Squirrel Road to the east of campus. The campus 12 inch line runs from the meter vault, then splits into two 10 inch pipes, creating a small 10 inch looped system with isolation valves to permit isolation of a section of campus line or an area of campus with minimal service interruption. Most of the buildings are fed from campus water mains and are not metered, making specific facility water losses impossible to determine unless directly observed.

Potable or domestic water and fire protection water to the CREST facility is not on the loop but is on an 8 inch diameter extension line off of the west side of the campus loop. If there is a loss of pressure within the loop, CREST will be negatively affected. Fire sprinkler service is provided to each building from the same water loop as the potable water, with hydrants provided around campus. Campus water pressures are typically maintained at around 60 psi, creating adequate water pressure for domestic use and fire protection.

There are approximately 20 campus fire hydrants of various ages and conditions. All are in good condition and should last beyond the next ten years. The hydrants are flushed routinely, and the water pressure on campus is adequate.

The domestic water and fire protection system appears to be in overall good condition and properly sized to serve the campus. The campus staff confirmed that the network has had no significant problems to this point. Even though a good portion of this system is now 50 years old, these buried water lines, which are assumed to be metallic pipe, typically have an expected service life of between 65 and 75 years. Soil type, annual rainfall, and local disturbances typically factor in the longevity of buried piping. No significant replacements are expected in the next ten years, but the lines will likely become more problematic in the next 15 to 25 years as they reach the end of their expected service life and will then require replacement.

It was observed during the inspection that there is no back-up potable water or fire protection supply for the campus beyond that of the single connection with the city along Squirrel Road. If this line goes down for service or there is a disruption of city service, the campus is without water and fire protection. It is recommended that a secondary (back-up) connection to the city water supply be installed from Featherstone Road to the campus network.

Sanitary Sewer Collection System

The sanitary sewer system at the Auburn Hills campus is aged but in good operating condition. Original construction began around 1967, and the campus has since experienced phases of remodel and growth. All of the lines are typically first-time installations, not replacement of previously existing lines. The sanitary sewer owned by the college consists of approximately 5,395 linear feet of sewer collection line. Even though the drawings provided did not indicate the piping material type, it is assumed to be ductile iron, PVC, concrete, or clay. A 10 inch sanitary sewer pipe originally installed by the city runs through the campus. If there are any issues with this line, it is assumed that OCC would be responsible. All of the campus sewer collection lines are 10 inches or smaller, with the service laterals typically sized at 6 inches in diameter. There are also approximately 25 sanitary sewer manholes of varying depths on campus. Grease traps installed for campus kitchens were not part of this assessment but are being properly maintained.

The sanitary sewer system is a collection and conveyance system. Except for the M-TEC building, the Auburn Hills campus drains entirely into the 10 inch city sewer main that runs through campus and that subsequently discharges to a municipally owned manhole and collection lines to the south of campus. These city-owned sewer collection lines then transport sewage via city-owned outfall lines to the nearest municipal waste water treatment plant. The M-TEC facility discharges its sanitary sewage via an 8 inch sewer line to a city-owned manhole and lines upstream of the city manhole into which the majority of the campus discharges.

Even though this area has above average annual rainfall, there were no indications of significant stormwater infiltration or inflow issues within the system. Since most of the sanitary sewer collection lines are within their lifecycles and no problems were reported, only minimal lifecycle replacement of linear assets is recommended. The original building 6 and 8 inch sewer laterals installed in 1967 are the only lines recommended for replacement within the next ten years. However, it should be noted that the entire sanitary sewer collection network installed in 1967 is expected to reach the end of its service life in ten to twenty years.

It is a good policy and a recommendation of this report to develop and conduct a preventative maintenance program for the sanitary sewer collection system. A vital part of that preventive program is video-monitoring the linear assets when and where feasible. Jetwash any built-up debris or solids discovered in the lines and/or manholes to ensure that the pipes have the maximum flow capacity available to handle peak flow demand periods. Lines need to be generally free of flow to allow proper observations. Evaluate the oldest and/or most problematic sewer collection lines first to determine the characteristics of the typical flow and identify any urgent or critical repair or replacement needs. Routinely CCTV inspect a portion of the infrastructure every couple of years and typically all lines at least once every ten years. With the age of the system and expected lifecycle, it is inevitable that portions will wear out and need to be repaired or replaced. The CCTV inspections will allow the college to identify problem areas and then plan and budget for that repair or replacement.

Stormwater Sewer Collection System

There are approximately 2.6 miles of buried stormwater sewer lines of varying ages, material composition, and sizes on campus. The larger diameter main lines are generally precast concrete, ductile iron, or corrugated metal, while the small service collection lines may be the original concrete, terra cotta, or PVC.

The stormwater sewer system is in overall good condition. Most of the stormwater lines were installed around 1967, and the system was added onto as new construction took place. All of the lines are typically first-time installations, not replacements of previously existing lines. The system consists of approximately 13,825 linear feet of drain line that is believed to be mostly concrete construction. It is estimated that 5,315 linear feet of this drain line is large 24 to 60 inch main outfall lines, with the remaining 8,510 linear feet collection and service lateral lines sized at 6 to 18 inches in diameter. There are also approximately 103 stormwater catch basins and drop inlets and the eight stormwater manholes of various depths. Roof drain leaders from campus facilities connect to the underground piping network.

Due to the sloping terrain, the Auburn Hills campus has multiple drainage areas for addressing stormwater runoff. The campus grounds typically slope from north to south, with a draw through the middle of campus, where there is a large diameter stormwater collection main. This stormwater collection main drains the north parking lots and almost everything to south. This main stormwater line begins as a 24 inch pipe and ends up being a 60 inch concrete pipe that discharges to an open ditch on the southern border of campus, where it runs off campus property and is collected by the drainage pattern of Highway 59. Stormwater from facilities to the west, such as the CREST site and Buildings H, J, and K, drains to the south to wooded areas off campus and the subsequent drainage pattern of Highway 59 that runs along the entire southern campus border. The CREST site utilizes an onsite bio-detention pond before discharging offsite. The Building F and parking lot 7 to the southeast drain into woodlands to the south and the M-TEC site drains to the open ditch to the east along Squirrel Road.

The stormwater sewer system is a collection and conveyance system. Surface water runoff collecting on paved areas drains into storm sewer catch basins and drop inlets normally at street corners, curb and gutter lines, and parking lots. Rainfall on landscaped areas is channeled around campus utilizing grassed swales that typically lead to subsurface drainage structures. Stormwater is the rainfall runoff that flows across the ground and pavement that must be controlled to eliminate soil erosion and potential flooding of low-lying areas and facilities. Catch basins and drop inlets on the surface are connected to a series of underground sewer collection pipes that convey the discharge to nearby open channels and/or larger city-owned outfall lines and culverts.

As stormwater recedes, the leaves, sediment, and debris transported during a storm settle in catch basins and sewer lines, reducing the overall capacity of the system. Stormwater can also pick up chemicals and other pollutants as it flows across streets, curbs, and gutters and can erode ditches, grass ways, or stream banks. The debris-laden or polluted runoff is commonly transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local streams, lakes, and coastal marshlands without treatment.

Since the drain lines are well within their lifecycles and no problems have been reported, no lifecycle replacement of linear assets is recommended. However, as with the sanitary lines, it is recommended that the oldest and most problematic stormwater lines be CCTV inspected. It is expected that some lines and structures, such as manholes, catch basins, and drop inlets, will need repair and/or replacement within the next ten years. These improvements may include line replacements or repairs to catch basins, drop inlets, or manholes, including replacing broken storm grates and inlet covers and securing existing and new grates and covers with an adequate concrete collar. It should also be noted that, based on statistical data, the original lines and some of those installed in the 1970s will reach the end of their service life in 16 to 26 years. Some lines will deteriorate faster.

Part of conducting a thorough preventative maintenance program for the stormwater sewer system is the maintenance of stormwater inlets and outlets. As the system continues to age, elevated levels of preventive maintenance should be applied to ensure continued operating reliability. A typical preventative maintenance program for stormwater inlets and outlets includes:

- Inspect and remove debris/litter as necessary

- Inspect for structural repairs and concrete headwall deterioration
- Inspect for erosion issues, filling eroded areas and re-sodding or replanting vegetation and replacing riprap that has washed away
- Unplug or replace damaged screens and/or grates
- Inspect for and reduce potential mosquito breeding habitats

There are numerous catch basins, drop inlets, and curb drains around campus. Some are in natural and/or heavily landscaped areas with well-developed vegetation. As a result, these collection inlets have the potential to clog with vegetative debris and may cause localized flooding. There are also several locations where the collected stormwater is discharged through a pipe outlet to a surface swale or ditch or to a stormwater pond, such as at the CREST site. These areas sometimes erode due to the quantity or velocity of flow from the pipe unless properly protected with riprap or some other laminar flow dissipater. Clean any clogged or partially obstructed inlets, and inspect pipe discharge points to mitigate any erosion.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors thoroughly examined the accessible equipment and various components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the facility to modern standards without any anticipation of change to facility space layout or function. The total costs include variable project delivery costs as determined by the Owner. The costs developed do not represent the cost of a complete facility renovation. Soft costs not represented in this report include telecommunications, security, furniture, window treatment, space change, program issues, relocation, swing space, contingency, or costs that could not be identified or determined from the visual inspection and available building information.

INSPECTION TEAM DATA

Report Development

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Date of Inspection

March 20, 2017

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Carl Mason, PE, BSCP, M.ASCE	Senior Project Engineer	Interior Finishes, Exterior Structure, ADA Compliance, Site, Fire/Life Safety, Health, Plumbing

Client Contact

NAME	POSITION
Dan P. Cherewick	Director, Physical Facilities

DEFINITIONS

The following information is a clarification of this report using example definitions.

Overview

Recurring and Nonrecurring Facility Renewal Costs

Facility renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of facility systems and components (e.g., roof or HVAC system replacement at or past the end of its normal useful life). The tool for projecting the recurring renewal costs is the Asset Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with fire/life safety or accessibility code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Facility Condition Needs Index (FCNI)

The FCNI provides a lifecycle cost comparison. It is a ratio of the sum of the recurring and nonrecurring renewal costs over ten years to the current replacement value of the asset. The current replacement value is based on replacement with current construction standards for the facility use type, and not original design parameters. This index gives the college a comparison within all buildings for identifying worst case/best case building conditions.

$$\text{FCNI} = \frac{\text{Nonrecurring Projects} + \text{10-Year Recurring Component Renewal}}{\text{Current Replacement Value}}$$

Facility Condition Index (FCI)

The FCI is a ratio of the Deferred Renewal facilities renewal costs to the current replacement value.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Oakland using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Typical general contractor fees (which could include profit, overhead, bonds, and insurance) and professional fees (architect or engineer design fees and in-house design costs) are also included in the renewal costs.

GLOBAL MARKUP	%
Local Labor Index	102.9
Local Materials Index	99.3
General Contractor Markup	20.0
Professional Fees	16.0

Recurring Costs

Asset Component Inventory and Cost Projections

The Asset Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major building systems and major components within a facility. This is a list of all major systems and components within the facility. Each indicated component has the following associated information:

CATEGORY	DEFINITION
Uniformat Code	The standard Uniformat Code that applies to the component
Component Description	This line item describes the individual component
Identifier	Unique identifying information entered for a component as necessary
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Unit Cost	The cost to replace each individual component unit (this cost is in today's dollars)
Complexity Adjustment	A factor utilize to adjust component replacement costs accordingly when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	Unit cost multiplied by quantity, in today's dollars. Note that this is a one-time renewal/replacement cost
Install Date	Year that the component was or is estimated to have been installed. When this data is not available, it defaults to the year the asset was constructed
Life Expectancy	Average life expectancy for each individual component
Life Expectancy Adjustment	Utilized to adjust the first lifecycle of the component and to express when the next replacement should occur

The component listing forms the basis of the Recurring Component Renewal Schedule, which provides a year-by-year list of projected recurring renewal costs over the next ten years. Each individual component is assigned a replacement year based on lifecycles, and the costs for each item are in future year dollars. For items that are already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot ($/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- Deferred Renewal
  Recurring repairs, generated by the Asset Component Inventory, that are past due for completion but have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral of such renewal could impair the proper functioning of the facility. Costs estimated for Deferred Renewal projects should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.

- Projected Renewal
  Recurring renewal efforts, generated by the Asset Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with fire/life safety or accessibility code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within are not included in the Asset Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- **Plant Adaption**
  Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).

- **Corrective Action**
  Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- **Immediate**

  Projects in this category require immediate action to:

  a. correct a cited safety hazard
  b. stop accelerated deterioration
  c. and/or return a facility to normal operation

- **Critical**

  Projects in this category include actions that must be addressed in the short-term:

  a. repairs to prevent further deterioration
  b. improvements to facilities associated with critical accessibility needs
  c. potential safety hazards

- Noncritical

  Projects in this category include:

  a. improvements to facilities associated with noncritical accessibility needs

  b. actions to bring a facility into compliance with current building codes as grandfather clauses expire

  c. actions to improve the usability of a facility following an occupancy or use change

Category Codes

CATEGORY CODE*	SYSTEM DESCRIPTION
AC1A – AC4B	ACCESSIBILITY
EL1A – EL8A	ELECTRICAL
ES1A – ES6E	EXTERIOR STRUCTURE
FS1A – FS6A	FIRE/LIFE SAFETY
HE1A – HE7A	HEALTH
HV1A – HV8B	HVAC
IS1A – IS6D	INTERIOR FINISHES/SYSTEMS
PL1A – PL5A	PLUMBING
SI1A – SI4A	SITE
SS1A – SS7A	SECURITY SYSTEMS
VT1A – VT7A	VERTICAL TRANSPORTATION

Example: **Category Code = EL5A**	
EL	System Description
5	Component Description
A	Element Description

**Refer to the Category Code Report starting on page 1.5.1.*

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

Example:

Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Drawings/Project Locations

The drawings for this facility are marked with icons (see legend on plans) denoting the specific location(s) for each project. Within each icon are the last four characters of the respective project number (e.g., 0001IS01 is marked on the plan as IS01).

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

Example: **Photo Number: 0001006e**	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

CATEGORY CODE REPORT

ACCESSIBILITY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
AC1A	Site	Stair and Railings	Includes exterior stairs and railings which are not part of the building entrance points.
AC1B	Site	Ramps and Walks	Includes sidewalks, grade change ramps (except for a building entrance), curb ramps, etc.
AC1C	Site	Parking	Designated parking spaces, including striping, signage, access aisles and ramps, etc.
AC1D	Site	Tactile Warnings	Raised tactile warnings located at traffic crossing and elevation changes.
AC2A	Building Entry	General	Covers all aspects of entry into the building itself, including ramps, lifts, doors and hardware, power operators, etc.
AC3A	Interior Path of Travel	Lifts/Ramps/ Elevators	Interior lifts, ramps and elevators designed to accommodate level changes inside a building. Includes both installation and retrofitting.
AC3B	Interior Path of Travel	Stairs and Railings	Upgrades to interior stairs and handrails for accessibility reasons.
AC3C	Interior Path of Travel	Doors and Hardware	Accessibility upgrades to the interior doors including widening, replacing hardware power, assisted operators, etc.
AC3D	Interior Path of Travel	Signage	Interior building signage upgrades for compliance with the ADA.
AC3E	Interior Path of Travel	Restrooms/ Bathrooms	Modifications to and installation of accessible public restrooms and bathrooms. Bathrooms that are an integral part of residential suites are catalogued under HC4A.
AC3F	Interior Path of Travel	Drinking Fountains	Upgrading/replacing drinking fountains for reasons of accessibility.
AC3G	Interior Path of Travel	Phones	Replacement/modification of public access telephones.
AC4A	General	Functional Space Modifications	This category covers all necessary interior modifications necessary to make the services and functions of a building accessible. It includes installation of assistive listening systems, modification of living quarters, modifications to laboratory workstations, etc. Bathrooms that are integral to efficiency suites are catalogued here.
AC4B	General	Other	All accessibility issues not catalogued elsewhere.

ELECTRICAL

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
EL1A	Incoming Service	Transformer	Main building service transformer.
EL1B	Incoming Service	Disconnects	Main building disconnect and switchgear.
EL1C	Incoming Service	Feeders	Incoming service feeders. Complete incoming service upgrades, including transformers, feeders, and main distribution panels are catalogued here.
EL1D	Incoming Service	Metering	Installation of meters to record consumption and/or demand.
EL2A	Main Distribution Panels	Condition Upgrade	Main distribution upgrade due to deficiencies in condition.
EL2B	Main Distribution Panels	Capacity Upgrade	Main distribution upgrades due to inadequate capacity.
EL3A	Secondary Distribution	Step-Down Transformers	Secondary distribution step-down and isolation transformers.
EL3B	Secondary Distribution	Distribution Network	Includes conduit, conductors, sub-distribution panels, switches, outlets, etc. Complete interior rewiring of a facility is catalogued here.

EL3C	Secondary Distribution	Motor Controllers	Mechanical equipment motor starters and control centers.
EL4A	Devices and Fixtures	Exterior Lighting	Exterior building lighting fixtures, including supply conductors and conduit.
EL4B	Devices and Fixtures	Interior Lighting	Interior lighting fixtures (also system wide emergency lighting), including supply conductors and conduits.
EL4C	Devices and Fixtures	Lighting Controllers	Motion sensors, photocell controllers, lighting contactors, etc.
EL4D	Devices and Fixtures	GFCI Protection	Ground fault protection, including GFCI receptacles and breakers.
EL4E	Devices and Fixtures	Lightning Protection	Lightning arrestation systems including air terminals and grounding conductors.
EL5A	Emergency Power System	Generation/ Distribution	Includes generators, central battery banks, transfer switches, emergency power grid, etc.
EL6A	Systems	UPS/DC Power Supply	Uninterruptible power supply systems and DC motor-generator sets and distribution systems.
EL7A	Infrastructure	Above Ground Transmission	Includes poles, towers, conductors, insulators, fuses, disconnects, etc.
EL7B	Infrastructure	Underground Transmission	Includes direct buried feeders, duct banks, conduit, manholes, feeders, switches, disconnects, etc.
EL7C	Infrastructure	Substations	Includes incoming feeders, breakers, buses, switchgear, meters, CTs, PTs, battery systems, capacitor banks, and all associated auxiliary equipment.
EL7D	Infrastructure	Distribution Switchgear	Stand-alone sectionalizing switches, distribution switchboards, etc.
EL7F	Infrastructure	Area and Street Lighting	Area and street lighting systems, including stanchions, fixtures, feeders, etc.
EL8A	General	Other	Electrical system components not catalogued elsewhere.

EXTERIOR STRUCTURE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
ES1A	Foundation/ Footing	Structure	Structural foundation improvements involving structural work on foundation wall/footing, piers, caissons, and piles, including crack repairs, shoring, and pointing
ES1B	Foundation/ Footing	Dampproofing/ Dewatering	Foundation/footing waterproofing work, including, damp-proofing, dewatering, insulation, etc.
ES2A	Columns/Beams/ Walls	Structure	Structural work to primary load-bearing structural components aside from floors, including columns, beams, bearing walls, lintels, arches, etc.
ES2B	Columns/Beams/ Walls	Finish	Work involving restoration of the appearance and weatherproof integrity of exterior wall/structural envelope components, including masonry/pointing, expansion joints, efflorescence and stain removal, grouting, surfacing, chimney repairs, etc.
ES3A	Floor	Structure	Work concerning the structural integrity of the load supporting floors, both exposed and unexposed, including deformation, delamination, spalling, shoring, crack repair, etc.
ES4A	Roof	Repair	Work on waterproof horizontal finish (roof) involving repair and/or limited replacement (<40% total), including membrane patching, flashing repair, coping caulk/resetting, PPT wall parging/coating, walk pad installation, skylight and roof hatch R&R, etc.
ES4B	Roof	Replacement	Work involving total refurbishment of roofing system, including related component rehab.
ES5A	Fenestrations	Doors	Work on exterior exit/access door, including storefronts, airlocks, air curtains, vinyl slat doors, all power/manual operating hardware (except handicapped), etc.
ES5B	Fenestrations	Windows	Work on exterior fenestration closure and related components, including glass/metal/wood curtain walls, fixed or operable window sashes, glazing, frames, sills, casings, stools, seats, coatings, treatments, screens, storm windows, etc.

ES6A	General	Attached Structure	Work on attached exterior structure components not normally considered in above categories, including porches, stoops, decks, monumental entrance stairs, cupolas, tower, etc.
ES6B	General	Areaways	Work on attached grade level or below structural features, including subterranean lightwells, areaways, basement access stairs, etc.
ES6C	General	Trim	Work on ornamental exterior (generally nonstructural) elements, including beltlines, quoins, porticos, soffits, cornices, moldings, trim, etc.
ES6D	General	Superstructure	Finish and structural work on nonstandard structures with exposed load-bearing elements, such as stadiums, bag houses, bleachers, freestanding towers, etc.
ES6E	General	Other	Any exterior work not specifically categorized elsewhere, including finish and structural work on freestanding boiler stacks.

FIRE/LIFE SAFETY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
FS1A	Lighting	Egress Lighting/Exit Signage	R&R work on exit signage and packaged AC/DC emergency lighting.
FS2A	Detection/Alarm	General	Repair or replacement of fire alarm/detection system/components, including alarms, pull boxes, smoke/heat detectors, annunciator panels, central fire control stations, remote dialers, fire station communications, etc.
FS3A	Suppression	Sprinklers	Repair or installation of water sprinkler type automatic fire suppressions, including wet-pipe and dry-pipe systems, heads, piping, deflectors, valves, monitors, associated fire pump, etc.
FS3B	Suppression	Standpipe/Hose	Repair or installation of standpipe system or components, including hardware, hoses, cabinets, nozzles, necessary fire pumping system, etc.
FS3C	Suppression	Extinguishers	Repairs or upgrades to F.E. cabinets/wall fastenings and handheld extinguisher testing/replacement.
FS3D	Suppression	Other	Other fire suppression items not specifically categorized elsewhere, including fire blankets, carbon dioxide automatic systems, Halon systems, dry chemical systems, etc.
FS4A	Hazardous Materials	Storage Environment	Installation or repair of special storage environment for the safe holding of flammable or otherwise dangerous materials/supplies, including vented flammables storage cabinets, holding pens/rooms, cages, fire safe chemical storage rooms, etc.
FS4B	Hazardous Materials	User Safety	Improvements, repairs, installation, or testing of user safety equipment, including emergency eyewashes, safety showers, emergency panic/shut-down system, etc.
FS5A	Egress Path	Designation	Installation, relocation or repair of posted diagrammatic emergency evacuation routes.
FS5B	Egress Path	Distance/ Geometry	Work involving remediation of egress routing problems, including elimination of dead end corridors, excessive egress distance modifications, and egress routing inadequacies.
FS5C	Egress Path	Separation Rating	Restoration of required fire protective barriers, including wall rating compromises, fire-rated construction, structural fire proofing, wind/safety glazing, transom retrofitting, etc.
FS5D	Egress Path	Obstruction	Clearance of items restricting the required egress routes.
FS5E	Egress Path	Stairs Railing	Retrofit of stair/landing configurations/structure, railing heights/geometries, etc.
FS5F	Egress Path	Fire Doors/ Hardware	Installation/replacement/repair of fire doors and hardware, including labeled fire doors, fire shutters, closers, magnetic holders, panic hardware, etc.
FS5G	Egress Path	Finish/Furniture Ratings	Remediation of improper fire/smoke ratings of finishes and furniture along egress routes.
FS6A	General	Other	Life/fire safety items not specifically categorized elsewhere.

HEALTH

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HE1A	Environmental Control	Equipment and Enclosures	Temperature control chambers (both hot and cold) for non-food storage. Includes both chamber and all associated mechanical equipment.
HE1B	Environmental Control	Other	General environmental control problems not catalogued elsewhere.
HE2A	Pest Control	General	Includes all measures necessary to control and destroy insects, rodents, and other pests.
HE3A	Refuse	General	Issues related to the collection, handling, and disposal of refuse.
HE4A	Sanitation Equipment	Laboratory and Process	Includes autoclaves, cage washers, steam cleaners, etc.
HE5A	Food Service	Kitchen Equipment	Includes ranges, grilles, cookers, sculleries, etc.
HE5B	Food Service	Cold Storage	Includes the cold storage room and all associated refrigeration equipment.
HE6A	Hazardous Material	Structural Asbestos	Testing, abatement, and disposal of structural and building finish materials containing asbestos.
HE6B	Hazardous Material	Mechanical Asbestos	Testing, abatement, and disposal of mechanical insulation materials containing asbestos.
HE6C	Hazardous Material	PCBs	Includes testing, demolition, disposal, and cleanup of PCB contaminated substances.
HE6D	Hazardous Material	Fuel Storage	Includes monitoring, removal, and replacement of above and below ground fuel storage and distribution systems. Also includes testing and disposal of contaminated soils.
HE6E	Hazardous Material	Lead Paint	Testing, removal, and disposal of lead-based paint systems.
HE6F	Hazardous Material	Other	Handling, storage, and disposal of other hazardous materials.
HE7A	General	Other	Health related issues not catalogued elsewhere.

HVAC

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HV1A	Heating	Boilers/Stacks/ Controls	Boilers for heating purposes, including their related stacks, flues, and controls.
HV1B	Heating	Radiators/ Convectors	Including cast-iron radiators, fin tube radiators, baseboard radiators, etc.
HV1C	Heating	Furnace	Furnaces and their related controls, flues, etc.
HV1D	Heating	Fuel Supply/Storage	Storage and/or distribution of fuel for heating purposes, including tanks and piping networks and related leak detection/monitoring.
HV2A	Cooling	Chillers/ Controls	Chiller units for production of chilled water for cooling purposes, related controls (not including mods for CFC compliance).
HV2B	Cooling	Heat Rejection	Repair/replacement of cooling towers, dry coolers, air-cooling, and heat rejection. Includes connection of once-through system to cooling tower.
HV3A	Heating/Cooling	System Retrofit/ Replace	Replacement or major retrofit of HVAC systems.
HV3B	Heating/Cooling	Water Treatment	Treatment of hot water, chilled water, steam, condenser water, etc.
HV3C	Heating/Cooling	Package/Self-Contained Units	Repair/replacement of self-contained/package type units, including stand-up units, rooftop units, window units, etc.; both air conditioners and heat pumps.
HV3D	Heating/Cooling	Conventional Split Systems	Repair, installation, or replacement of conventional split systems, both air conditioners and heat pumps, including independent component replacements of compressors and condensers.

HV4A	Air Moving/ Ventilation	Air Handlers/ Fan Units	Includes air handlers and coils, fan coil units, unit ventilators, filtration upgrades, etc., not including package/self-contained units, split systems, or other specifically categorized systems.
HV4B	Air Moving/ Ventilation	Exhaust Fans	Exhaust fan systems, including fans, range and fume hoods, controls, and related ductwork.
HV4C	Air Moving/ Ventilation	Other Fans	Supply, return, or any other fans not incorporated into a component categorized elsewhere.
HV4D	Air Moving/ Ventilation	Air Distribution Network	Repair, replacement, or cleaning of air distribution network, including ductwork, terminal reheat/cool, VAV units, induction units, power induction units, insulation, dampers, linkages, etc.
HV5A	Steam/Hydronic Distribution	Piping Network	Repair/replacement of piping networks for heating and cooling systems, including pipe, fittings, insulation, related components, etc.
HV5B	Steam/Hydronic Distribution	Pumps	Repair or replacement of pumps used in heating and cooling systems, related control components, etc.
HV5C	Steam/Hydronic Distribution	Heat Exchangers	Including shell-and-tube heat exchangers and plate heat exchangers for heating and cooling.
HV6A	Controls	Complete System Upgrade	Replacement of HVAC control systems.
HV6B	Controls	Modifications/ Repairs	Repair or modification of HVAC control system.
HV6C	Controls	Air Compressors/ Dryers	Repair or modification of control air compressors and dryers.
HV7A	Infrastructure	Steam/Hot Water Generation	Generation of central steam and/or hot water, including boilers and related components.
HV7B	Infrastructure	Steam/Hot Water Distribution	Distribution system for central hot water and/or steam.
HV7C	Infrastructure	Chilled Water Generation	Generation of central chilled water, including chillers and related components.
HV7D	Infrastructure	Chilled Water Distribution	Distribution system for central chilled water.
HV7E	Infrastructure	Tunnels/ Manholes/ Trenches	Repairs, installation, or replacement of utility system access chambers.
HV7F	Infrastructure	Other	HVAC infrastructure issues not specifically categorized elsewhere.
HV8A	General	CFC Compliance	Chiller conversions/replacements for CFC regulatory compliance, monitoring, etc.
HV8B	General	Other	HVAC issues not catalogued elsewhere.

INTERIOR FINISHES/SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
IS1A	Floor	Finishes-Dry	R&R of carpet, hardwood strip flooring, concrete coating, vinyl linoleum and tile, marble, terrazzo, rubber flooring, and underlayment in predominantly dry areas ("dry" includes non-commercial kitchens)
IS1B	Floor	Finishes-Wet	Flooring finish/underlayment work in predominantly "wet" areas, including work with linoleum, rubber, terrazzo, concrete coating, quarry tile, ceramic tile, epoxy aggregate, etc.
IS2A	Partitions	Structure	Structural work on full height permanent interior partitions, including wood/metal stud and drywall systems, CMU systems, structural brick, tile, glass block, etc.
IS2B	Partitions	Finishes	Work on full height permanent interior partitions, including R&R, to gypsum board, plaster, lath, wood paneling, acoustical panels, wall coverings, column coverings, tile, paint, etc.
IS3A	Ceilings	Repair	Repair of interior ceilings (<40% of total), including tiles, gypsum board, plaster, paint, etc.
IS3B	Ceilings	Replacement	Major refurbishments (>40% of total) to interior ceiling systems, including grid system replacements, structural framing, new suspended systems, paint, plastering, etc.

IS4A	Doors	General	Any work on interior non-fire-rated doors, roll-up counter doors, mechanical/plumbing access doors, and all door hardware (except for reasons of access improvement).
IS5A	Stairs	Finish	Any finish restorative work to stair tower walking surfaces, including replacement of rubber treads, safety grips, nosings, etc. (except as required to accommodate disabled persons).
IS6A	General	Molding	R&R to interior trim/molding systems, including rubber/vinyl/wood base, crown/chair/ornamental moldings, cased openings, etc.
IS6B	General	Cabinetry	R&R work to interior casework systems, including cabinets, countertops, wardrobes, lockers, mail boxes, built-in bookcases, lab/work benches, reagent shelving, etc. (except as required for access by the disabled).
IS6C	General	Screening	Work on temporary or partial height partitioning systems, including toilet partitions, urinal/vanity screens, etc.
IS6D	General	Other	Any work on interior elements not logically or specifically categorized elsewhere, including light coves, phone booths, interior lightwells, etc.

PLUMBING

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
PL1A	Domestic Water	Piping Network	Repair or replacement of domestic water supply piping network, insulation, hangers, etc.
PL1B	Domestic Water	Pumps	Domestic water booster pumps, circulating pumps, related controls, etc.
PL1C	Domestic Water	Storage/ Treatment	Equipment or vessels for storage or treatment of domestic water.
PL1D	Domestic Water	Metering	Installation, repair, or replacement of water meters.
PL1E	Domestic Water	Heating	Domestic water heaters, including gas, oil, and electric water heaters, shell-and-tube heat exchangers, tank type, and instantaneous.
PL1F	Domestic Water	Cooling	Central systems for cooling and distributing drinking water.
PL1G	Domestic Water	Fixtures	Plumbing fixtures, including sinks, drinking fountains, water closets, urinals, etc.
PL1H	Domestic Water	Conservation	Alternations made to the water distribution system to conserve water.
PL1I	Domestic Water	Backflow Protection	Backflow protection devices, including backflow preventers, vacuum breakers, etc.
PL2A	Wastewater	Piping Network	Repair or replacement of building wastewater piping network.
PL2B	Wastewater	Pumps	Pump systems used to lift wastewater, including sewage ejectors and other sump systems.
PL3A	Special Systems	Process Gas/Fluids	Generation and/or distribution of process steam, compressed air, natural and LP gas, process water, vacuum, etc.
PL4A	Infrastructure	Potable Water Storage/ Treatment	Storage and treatment of potable water for distribution.
PL4B	Infrastructure	Industrial Water Distribution/ Treatment	Storage and treatment of industrial water for distribution.
PL4C	Infrastructure	Sanitary Water Collection	Sanitary water collection systems and sanitary sewer systems, including combined systems.
PL4D	Infrastructure	Stormwater Collection	Stormwater collection systems and storm sewer systems; storm water only.
PL4E	Infrastructure	Potable Water Distribution	Potable water distribution network.
PL4F	Infrastructure	Wastewater Treatment	Wastewater treatment plants, associated equipment, etc.
PL5A	General	Other	Plumbing issues not categorized elsewhere.

SITE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SI1A	Access	Pedestrian	Paved pedestrian surfaces, including walks, site stairs, step ramps, paths, pedestrian signage, sidewalk bridges/canopies, pedestrian plaza/mall areas, etc.
SI1B	Access	Vehicular	Paved vehicular surfaces, including roads, paths, curbs, guards, bollards, bridges, skyways, joints, shoulder work, culverts, ditches, vehicular signage, etc.
SI2A	Landscape	Grade/Flora	Landscape related work, including new grass/turf refurbishment, grade improvements, catch basins, swales, berms, pruning, new ornamental flora, etc.
SI3A	Hardscape	Structure	Permanent hard site features, predominantly ornamental, including terraces, fences, statues, freestanding signage, fountains, benches, etc.
SI4A	General	Other	Other site work not specifically categorized elsewhere.

SECURITY SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SS1A	Lighting	Exterior	Fixtures, stanchions, foliage interference, cleanliness, locations, etc.
SS2A	Site	Fencing	Perimeter campus fencing, individual building fencing, includes both pedestrian and vehicular control fences.
SS2B	Site	General	Hidden areas due to foliage, fencing, parking, walls, etc.
SS3A	Communications	Emergency Phones	Access, locations, visibility, function, reliability, etc.
SS4A	Access Control	Doors	Access, locks, keys, two-way speakers, reliability, redundancy, etc.
SS4B	Access Control	Windows	Locks, screens, access, reliability, etc.
SS4C	Access Control	Systems	Card key, proximity devices, data control, data use, reliability, system design, etc.
SS5A	Monitoring	Systems	Cameras, audio communication, monitoring stations, locations, system design, etc.
SS6A	Circulation	Pedestrian	On campus as well as to and from off-campus housing and class locations, etc.
SS6B	Circulation	Vehicular	Guard gates, access, systems, data control and use, identification, etc.
SS7A	General	Other	General information/projects pertaining to security issues.

VERTICAL TRANSPORTATION

CODE	Component Description	Element Description	DEFINITION
VT1A	Machine Room	General	Machine, worm gear, thrust bearing, brake, motors, sheaves, generator, controller, selector, governor, pump(s), valves, oil, access, lighting, ventilation, and floor.
VT2A	Car	General	Position indicator, lighting, floor, gate-doors, operation devices, safeties, safety shoe, light ray/detection, emergency light, fire fighter service, car top, door operator, stop switch, car frame, car guides, sheaves, phone, and ventilation.
VT3A	Hoistway	General	Enclosure, fascia, interlock, doors, hangers, closers, sheaves, rails, hoistway switches, ropes, traveling cables, selector tape, weights, and compensation.
VT4A	Hall Fixtures	General	Operating panel, position indicator, hall buttons, lobby panel, hall lanterns, fire fighter service, audible signals, and card/key access.
VT5A	Pit	General	Buffer(s), guards, sheaves, hydro packing, floor, lighting, and safety controls.
VT6A	Operating Conditions	General	Door open time, door close time, door thrust, acceleration, deceleration, leveling, dwell time, speed, OFR time, and nudging.
VT7A	General	Other	General information/projects relating to vertical transportation system components.

UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 2

COST SUMMARIES AND TOTALS

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	5,810	2,671	0	0	0	0	0	0	0	0	0	0	0	$8,481
EXTERIOR	0	0	0	6,484	0	0	0	0	274,423	315,381	0	0	0	0	$596,289
INTERIOR	0	0	0	123,966	0	0	0	0	0	0	0	0	0	0	$123,966
PLUMBING	0	55,530	538,749	4,018	0	1,385	2,167	21,494	0	0	0	0	172,359	0	$795,703
HVAC	0	1,929,895	2,752,932	45,613	0	0	0	0	0	2,084,222	36,035	23,184	805,664	0	$7,677,545
FIRE/LIFE SAFETY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
ELECTRICAL	29,620	29,620	3,938	429,992	30,249	33,508	0	248,350	94,987	4,180	93,915	0	0	0	$998,359
SITE	0	0	0	0	0	0	0	0	0	222,627	0	0	0	0	$222,627
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$29,620	$2,020,855	$3,298,290	$610,073	$30,249	$34,893	$2,167	$269,844	$369,410	$2,626,410	$129,950	$23,184	$978,023	$0	$10,422,968
TOTAL NONRECURRING PROJECT NEEDS			$5,348,765	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$5,074,204	

CURRENT REPLACEMENT VALUE	$46,153,604
FACILITY CONDITION NEEDS INDEX	0.23
FACILITY CONDITION INDEX	0.01

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
13,303	$10,422,968	783.51

All costs shown as Present Value

RENEWAL COSTS BY SYSTEM

CATEGORY	NONRECURRING ASSESSMENT RECOMENDATON	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	$8,481	$0	$8,481
EXTERIOR	$0	$596,289	$596,289
INTERIOR	$0	$123,966	$123,966
PLUMBING	$594,280	$201,423	$795,703
HVAC	$4,682,827	$2,994,718	$7,677,545
FIRE/LIFE SAFETY	$0	$0	$0
ELECTRICAL	$63,177	$935,181	$998,359
SITE	$0	$222,627	$222,627
VERT. TRANS	$0	$0	$0
HEALTH	$0	$0	$0
TOTALS	$5,348,765	$5,074,204	$10,422,968

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COST

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
AHHVEEL01	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	D5010	Immediate	Plant Adaption	29,620
AHSANPL01	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES		Critical	Plant Adaption	20,622
AHSTRPL01	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES		Critical	Plant Adaption	34,909
AHHCDHV02	REPAIR/REPLACE DAMAGED PIPE SUPPORT STANCHIONS		Critical	Corrective Action	20,766
AHHCDHV04	REMOVE AND REPLACE DIRECT BURIED HW PIPE TO BUILDING H		Critical	Corrective Action	1,886,328
AHHCDHV05	PERFORM ULTRASONIC PIPE THICKNESS TESTING ON HW AND CW PIP		Critical	Plant Adaption	22,801
AHPAC01	INSTALL HANDRAILS AT RAMP	C1010	Critical	Plant Adaption	5,810
AHHVEEL02	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	D5010	Critical	Plant Adaption	29,620
AHPHV01	TEAR DOWN AND REBUILD CHILLED WATER PUMPS		Noncritical	Corrective Action	23,917
AHPHV02	TEAR DOWN AND REBUILD CONDENSER WATER PUMPS		Noncritical	Plant Adaption	23,917
AHPWFPL01	PROVIDE SECONDARY WATER FEED FROM FEATHERSTONE RD		Noncritical	Plant Adaption	206,042
AHSTRPL03	REPLACE SELECT AGED/DEFICIENT STORMWATER STRUCTURES		Noncritical	Corrective Action	332,707
AHHCDHV01	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION		Noncritical	Corrective Action	94,577
AHHCDHV03	REMOVE AND REPLACE PIPE, VALVES AND EXPANSION JOINTS		Noncritical	Corrective Action	2,610,522
AHHVEEL03	REPAIR OR REPLACE SPLICE BOX #1		Noncritical	Corrective Action	3,938
AHPAC02	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	C1010	Noncritical	Plant Adaption	2,671
				TOTAL	**5,348,765**

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
AHP EW14	WALL, EXTERIOR, TILT-UP OR PRECAST CONCRETE PANELS - RESTORE NATURAL FINISH	ROOF CROWN OVERHANG	B2010	Deferred Renewal	6,484
AHP CW01	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	BREAKROOM	C1030	Deferred Renewal	10,938
AHP IW01	WALL FINISH - APPLIED, STANDARD	BUILDING-WIDE	C3010	Deferred Renewal	68,344
AHP IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	OFFICE	C3020	Deferred Renewal	1,966
AHP IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	BREAKROOM	C3020	Deferred Renewal	1,816
AHP IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	SHOWER	C3020	Deferred Renewal	690
AHP IF15	FLOORING - FLUID APPLIED, PAINT OR CLEAR SEAL	BUILDING-WIDE	C3020	Deferred Renewal	35,389
AHP IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	OFFICE	C3030	Deferred Renewal	1,852
AHP IC04	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	ENTRY, SHOPS, RR, STORAGE	C3030	Deferred Renewal	2,970
AHP FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG		D2010	Deferred Renewal	1,315
AHP FX10	PLUMBING FIXTURE - URINAL		D2010	Deferred Renewal	1,057
AHP FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS		D2010	Deferred Renewal	1,645
AHP HU50	UNIT HEATER - STEAM/HYDRONIC (1-100 MBH)	UH-706	D3020	Deferred Renewal	5,092
AHP HU51	UNIT HEATER - STEAM/HYDRONIC (101-250 MBH)	UH-705	D3020	Deferred Renewal	7,548
AHP FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-708	D3040	Deferred Renewal	2,648
AHP HV20	HVAC DISTRIBUTION NETWORKS - SHOPS / TRADES, DRY LABORATORY	AC-701	D3040	Deferred Renewal	30,326
AHHVE SW03	LOAD INTERUPTER SWITCH - 15 KV	AHC FEEDER B MECH RM	D5010	Deferred Renewal	51,535
AHHVE SW03	LOAD INTERUPTER SWITCH - 15 KV	AHD FEEDER A RM D-118	D5010	Deferred Renewal	51,535
AHHVE SW03	LOAD INTERUPTER SWITCH - 15 KV	AHE FEEDER B RM E-126	D5010	Deferred Renewal	51,535
AHHVE SW04	LOAD INTERUPTER SWITCH, FUSED - 15 KV	AHD FEEDER B RM D-118	D5010	Deferred Renewal	65,541
AHHVE SW04	LOAD INTERUPTER SWITCH, FUSED - 15 KV	AHE FEEDER A RM E-126	D5010	Deferred Renewal	65,541
AHHVE SW04	LOAD INTERUPTER SWITCH, FUSED - 15 KV	AHC FEEDER A MECH RM	D5010	Deferred Renewal	65,541
AHHVE TX17	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (300-500 KVA)	AHC TRANSFORMER	D5010	Deferred Renewal	40,007

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
AHP LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	RECESSED LIGHTS	D5020	Deferred Renewal	5,906
AHP LI20	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	AHP ORIGINAL HIGH BAY	D5020	Deferred Renewal	31,630
AHP LI20	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	CHEMICAL ROOM	D5020	Deferred Renewal	1,220
AHHCD SE23	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	AH TUNNEL	D5010	2017	30,249
AHHCD PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	AHA TUNNEL	D2030	2018	1,385
AHP LI20	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	AHP OFFICES	D5020	2018	7,756
AHHCD LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	AH TUNNEL PHASE 1	D5020	2018	25,752
AHP BF02	BACKFLOW PREVENTER (1-2 INCHES)	DOM. COLD BYPASS	D2020	2019	2,167
AHP PS20	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	DW SUPPLY PIPE	D2020	2020	20,109
AHHCD PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	AHB TUNNEL	D2030	2020	1,385
AHP SE20	ELECTRICAL DISTRIBUTION NETWORK - SHOPS / TRADES, DRY LABORATORY	POWER PLANT	D5010	2020	202,371
AHHVE TX32	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (500-750 KVA)	AHD TRANSFORMER RM D-118	D5010	2020	45,979
AHP RR06	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	P MAIN	B3010	2021	274,423
AHP VF12	VARIABLE FREQUENCY DRIVE (100-150 HP)	P-2A CHW	D5010	2021	31,662
AHP VF12	VARIABLE FREQUENCY DRIVE (100-150 HP)	P-2B CHW	D5010	2021	31,662
AHP VF12	VARIABLE FREQUENCY DRIVE (100-150 HP)	P-2C CHW	D5010	2021	31,662
AHP WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD		B2020	2022	315,381
AHP BL05	BOILER - GAS/OIL (>2,000 MBH)	B-2	D3020	2022	1,042,111
AHP BL05	BOILER - GAS/OIL (>2,000 MBH)	B-1	D3020	2022	1,042,111
AHP LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID LIGHTS	D5020	2022	4,180
AHSAN SP05	SANITARY SEWER PIPE - 6" DIAMETER		G3020	2022	97,876
AHSAN SP06	SANITARY SEWER PIPE - 8" DIAMETER		G3020	2022	124,751
AHP TK33	THERMAL STORAGE EXPANSION TANK	ET-1	D3020	2023	36,035
AHHVE SW06	PAD-MOUNT SWITCH - 15 KV	AHF SELECTOR SWITCH EXT.	D5010	2023	93,915

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
AHP	BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	REFRIGERANT MONITORING	D3060	2024	23,184
AHP	PS20	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	COMPRESSED AIR PIPE	D2020	2025	37,344
AHP	PS20	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	NATURAL GAS PIPE	D2020	2025	86,180
AHP	PS20	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	MISC. SYSTEM WATER PIPE	D2020	2025	48,835
AHP	FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-1	D3040	2025	8,236
AHP	HV20	HVAC DISTRIBUTION NETWORKS - SHOPS / TRADES, DRY LABORATORY	CHW PIPE	D3040	2025	341,755
AHP	HV20	HVAC DISTRIBUTION NETWORKS - SHOPS / TRADES, DRY LABORATORY	HTHW PIPE AND VALVES	D3040	2025	341,755
AHP	HV20	HVAC DISTRIBUTION NETWORKS - SHOPS / TRADES, DRY LABORATORY	COND. WATER PIPE AND VALVES	D3040	2025	113,918
					TOTAL	**5,074,204**

PROJECT LIST BY CLASSIFICATION

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
HV	AHPHV01	3	Corrective Action	3	TEAR DOWN AND REBUILD CHILLED WATER PUMPS	23,917
PL	AHSTRPL03	2	Corrective Action	3	REPLACE SELECT AGED/DEFICIENT STORMWATER STRUCTURES	332,707
HV	AHHCDHV01	4	Corrective Action	3	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	94,577
HV	AHHCDHV02	1	Corrective Action	2	REPAIR/REPLACE DAMAGED PIPE SUPPORT STANCHIONS	20,766
HV	AHHCDHV03	5	Corrective Action	3	REMOVE AND REPLACE PIPE, VALVES AND EXPANSION JOINTS	2,610,522
HV	AHHCDHV04	2	Corrective Action	2	REMOVE AND REPLACE DIRECT BURIED HW PIPE TO BUILDING H	1,886,328
EL	AHHVEEL03	3	Corrective Action	3	REPAIR OR REPLACE SPLICE BOX #1	3,938
					TOTAL FOR CORRECTIVE ACTION	**4,972,754**
HV	AHPHV02	4	Plant Adaption	3	TEAR DOWN AND REBUILD CONDENSER WATER PUMPS	23,917
AC	AHPAC01	1	Plant Adaption	2	INSTALL HANDRAILS AT RAMP	5,810
AC	AHPAC02	2	Plant Adaption	3	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	2,671
PL	AHPWFPL01	1	Plant Adaption	3	PROVIDE SECONDARY WATER FEED FROM FEATHERSTONE RD	206,042
PL	AHSANPL01	1	Plant Adaption	2	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	20,622
PL	AHSTRPL01	1	Plant Adaption	2	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES	34,909
HV	AHHCDHV05	3	Plant Adaption	2	PERFORM ULTRASONIC PIPE THICKNESS TESTING ON HW AND CW PIPE	22,801
EL	AHHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	29,620

PROJECT LIST BY CLASSIFICATION

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
EL	AHHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	29,620
					TOTAL FOR PLANT ADAPTION	**376,011**
					GRAND TOTAL:	**5,348,765**

PROJECT LIST BY CATEGORY CODE

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
AC	AHPAC01	1	Plant Adaption	2	INSTALL HANDRAILS AT RAMP	5,810
AC	AHPAC02	2	Plant Adaption	3	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	2,671
					TOTAL FOR AC	**8,481**
EL	AHHVEEL03	3	Corrective Action	3	REPAIR OR REPLACE SPLICE BOX #1	3,938
EL	AHHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	29,620
EL	AHHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	29,620
					TOTAL FOR EL	**63,177**
HV	AHPHV01	3	Corrective Action	3	TEAR DOWN AND REBUILD CHILLED WATER PUMPS	23,917
HV	AHPHV02	4	Plant Adaption	3	TEAR DOWN AND REBUILD CONDENSER WATER PUMPS	23,917
HV	AHHCDHV01	4	Corrective Action	3	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	94,577
HV	AHHCDHV02	1	Corrective Action	2	REPAIR/REPLACE DAMAGED PIPE SUPPORT STANCHIONS	20,766
HV	AHHCDHV03	5	Corrective Action	3	REMOVE AND REPLACE PIPE, VALVES AND EXPANSION JOINTS	2,610,522
HV	AHHCDHV04	2	Corrective Action	2	REMOVE AND REPLACE DIRECT BURIED HW PIPE TO BUILDING H	1,886,328
HV	AHHCDHV05	3	Plant Adaption	2	PERFORM ULTRASONIC PIPE THICKNESS TESTING ON HW AND CW PIPE	22,801
					TOTAL FOR HV	**4,682,827**
PL	AHPWFPL01	1	Plant Adaption	3	PROVIDE SECONDARY WATER FEED FROM FEATHERSTONE RD	206,042
PL	AHSANPL01	1	Plant Adaption	2	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	20,622
PL	AHSTRPL01	1	Plant Adaption	2	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES	34,909
PL	AHSTRPL03	2	Corrective Action	3	REPLACE SELECT AGED/DEFICIENT STORMWATER STRUCTURES	332,707
					TOTAL FOR PL	**594,280**

PROJECT LIST BY CATEGORY CODE

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
					GRAND TOTAL:	5,348,765

OAKLAND COMMUNITY COLLEGE

Utility & Facility Condition Assessment

Highland Lakes Infrastructure
Group HLI

Inspected March 21, 2017

ISES
CORPORATION

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UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

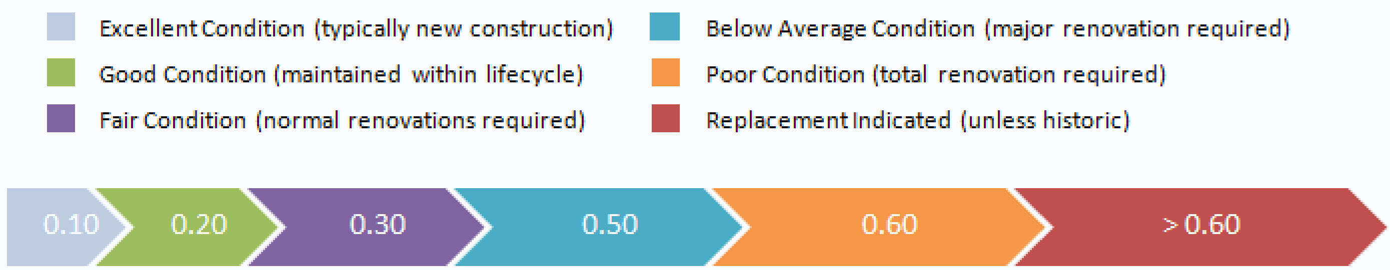
ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

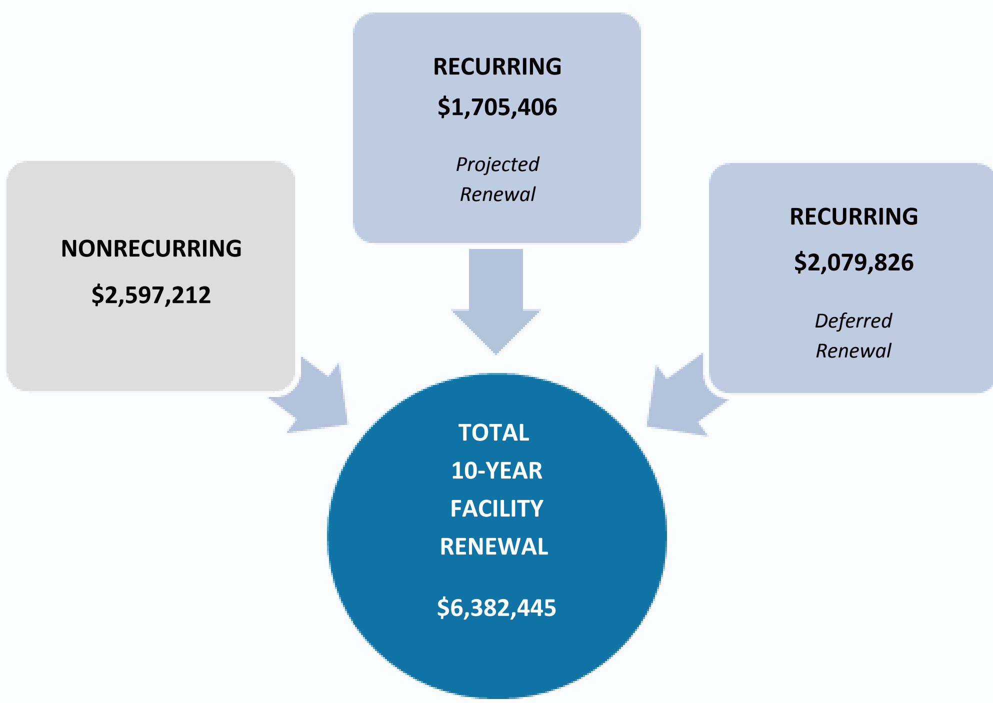
GROUP NAME	HLI : HIGHLAND LAKES INFRASTRUCTURE	**CURRENT REPLACEMENT VALUE**	$29,500,400
GSF	8,140	**FACILITY CONDITION NEEDS INDEX**	0.22
		FACILITY CONDITION INDEX	0.07
		10-YEAR $/SF	784.08

FCNI Scale

The FCNI for this asset is **0.22**



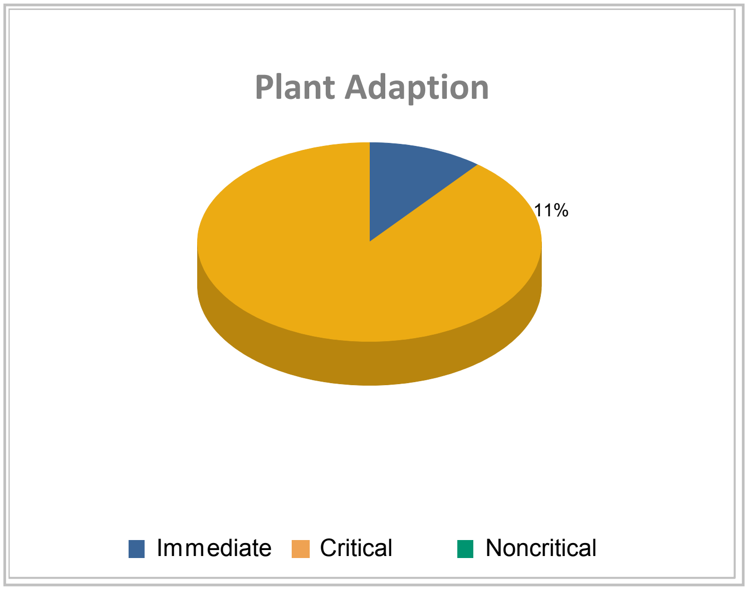
Total Facility Renewal Costs



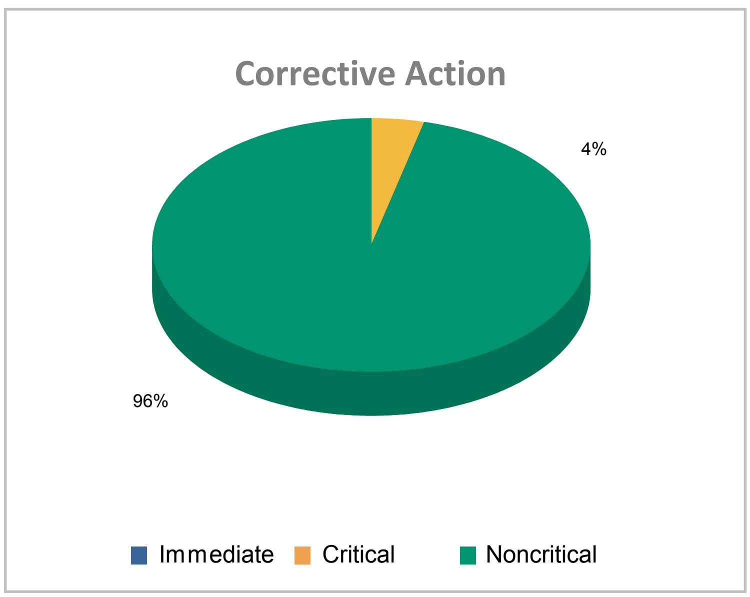
Nonrecurring Costs

Project Cost by Priority

PLANT ADAPTION	
1 - Immediate	**$19,340**
2 - Critical	**$159,676**
3 - Noncritical	**$0**

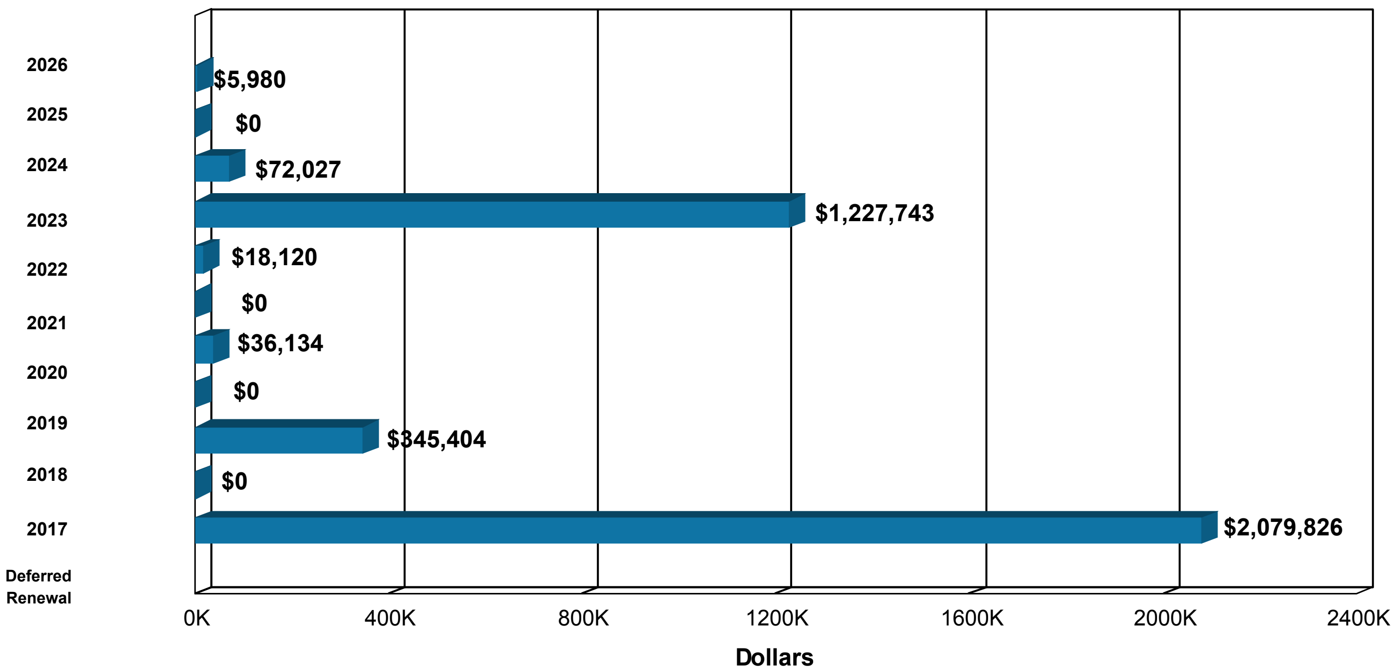


CORRECTIVE ACTION	
1 - Immediate	**$0**
2 - Critical	**$91,801**
3 - Noncritical	**$2,326,395**

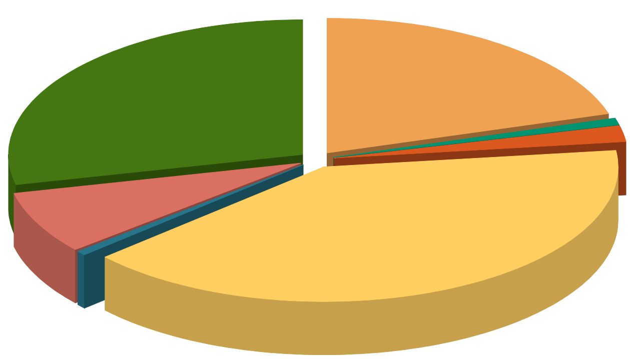


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



Accessibility	$0	0%
Electrical	$1,293,661	20%
Exterior	$60,884	1%
Fire/Life Safety	$125,236	2%
Health	$0	0%
HVAC	$2,563,714	40%
Interiors	$38,621	1%
Plumbing	$474,953	7%
Site	$1,825,374	29%
Vert. Trans.	$0	0%
TOTAL	**$6,382,445**	

ASSET SUMMARY

INTRODUCTION

The following is a detailed analysis of the physical condition and estimated remaining reliable operating life of the utility systems serving the facilities at the Highland Lakes campus as well as the Facility Condition Assessment (FCA) of the Central Plant. The systems include:

- Central Plant
- Heating and Chilled Water Generation and Distribution
- High Voltage Electrical
- Sanitary Sewer
- Stormwater
- Potable and Fire Water

The goal was to produce a campuswide report with recurring and nonrecurring recommendations that have been entered into the individual utility system assets in the FCA database.

Information for this report was gathered during the site inspection conducted on March 21, 2017 and through a review of historical documents and single-line campus drawings. The assessments and estimates are based solely on visual and nondestructive observations, a review of existing drawings, previously prepared engineering reports, any available maintenance records and reports, and discussions with key personnel and specific external support companies, such as water treatment representatives. In some instances, ISES was not provided up-to-date drawings prior to the development of this report. In these cases, general project recommendations were developed, and no lifecycle model cost data was created. Additional inspection procedures and methods, along with engineering design support, may be necessary to fully define the specific costs and scope to repair various infrastructure facility deficiencies.

The specific activities involved with gathering data included a detailed request for relevant information, including system drawings, inventory data, performance data, both planned and completed capital renewal projects, and operational data (including equipment forced outage statistics. Operating data was reviewed for abnormal excursions, forced outages and peak loads. The data was evaluated for impact on the equipment's estimated useful life. Information related to forced equipment outages, equipment reliability and operating performance was reviewed to determine trends that might affect future safety, reliability and efficiency.

It is important to note that utility infrastructure assets normally encompass more than just a single piece of equipment and will, in most situations, represent a section or group of materials, i.e., linear footage of installed piping systems or electrical wiring. The majority of these systems will continue to operate reliably and safely beyond the ten-year assessment scope, but beyond that, it will be necessary to reinspect the systems to ensure that they continue to operate reliably.

Equipment Useful Life

The estimates for remaining useful life consider safety, reliability, efficiency, and sustainability as the primary operational objectives for capital renewal. These estimates are based on actual equipment age, physical inspections, performance data reviews, personnel interviews, maintenance practices, and operating history. Expected useful life values are averaged forecasts based on equipment that is properly maintained and operated without frequent and/or severe operating excursions. Chronological equipment age is not the primary determinant of service life. In many instances, there is ample evidence of equipment operating well beyond predicted useful life values. This is why it is important to modify these values with actual equipment condition. This modification is based on service history, operating conditions, installation environment, and actual field performance. It should also be noted that equipment reaching the predicted endpoint of its expected useful life does not necessarily cease to function. What does occur is a downward trend toward loss of service reliability and an increase in forced outages and maintenance cost requirements where the equipment becomes unavailable for normal service more frequently.

The trend in recent years toward planned obsolescence by manufacturers of certain plant systems and equipment alters the strategy for capital replacement as some systems become obsolete. Although the equipment may have many remaining years of safe, reliable, and efficient operation, manufacturers are phasing systems out and not supporting the equipment past some specific phase-out date. For example, digital electronic control systems have an estimated operating life of 15 years, not because of failure to function but because of the planned lifecycle established by the OEM due to technological advancements and product development. This also results in a requirement for continuous operator training as equipment is replaced. It is not unusual for newer equipment to have better efficiency and lower operating costs. However, this requires careful analysis by owners to actualize potential savings.

For underground piping serving the potable, fire, and drainage water systems, consistent inspection through closed circuit television (CCTV) to identify intrusion and pipe deterioration is an excellent method for forecasting future capital needs. This inspection function should be included as part of the any campus annual budget and performed on a regular basis.

Factors That Affect Equipment Useful Life

Primary critical equipment was evaluated by comparing current data to manufacturer's performance ratings. Degradation in operating performance can be the result of normal wear and tear, or it can be indicative of abnormal wear. For example, boiler efficiency losses can increase due to higher than design excess air resulting from parasitic air leaks in boiler casings or out-of-calibration combustion control systems. Losses in efficiency can also be the result of internal scale and deposit formation.

The skill and ability of the operating staff can have a significant impact on overall equipment useful life. Accelerated startups, emergency shutdowns, overload excursions, air leakage, excessive water leaks, and adherence to balance-of-plant maintenance requirements are critical to the safety, reliability, and efficiency of plant equipment. In addition, proper diagnostic skills can often avoid premature outages or result in the correct decision to remove equipment from service to avoid catastrophic damage. We

spent some time in the interviews on campus discussing operator proficiency to evaluate any impact this factor may have had on equipment useful life.

One method of providing consistency in methods of system/equipment operation is the implementation of standard operating procedures (SOPs). These provide a reference guide for the operating staff for most of the expected operating conditions. They cannot, however, provide 100 percent guidance for all possible events. This is why operator training in the fundamentals of plant operation is so critical. The implementation of SOPs also provides a method of reminding operators about system equipment requirements in plants where there are few, if any, abnormal operating excursions. In this type of operation, skills that have not been exercised recently become difficult to recall under the pressure of rapidly developing events.

For heating and chilled water generation equipment and distribution piping systems, water treatment is the most salient issue in considering the estimated useful life. Internal and external equipment piping scale causes rapid performance deterioration, and corrosion can severely reduce the operating life of systems and equipment. In all cases, proper water treatment normally extends generating equipment useful life as well as balance-of-plant equipment life. We evaluated historical data as well as the current water treatment program for application and execution. The OCC system currently utilizes Rochester Midland Corporation to provide the water treatment chemicals. Some of the chemicals used include a pitting and corrosion inhibitor identified as CLT-407 for the chilled and heating water closed loop systems, chlorine, and a liquid oxygen scavenger identified as OS-912 to prevent organic and biocides from developing within the condenser water and chilled water systems.

ASSET FINDINGS

The findings for each individual asset in the Highland Lakes campus infrastructure group will be presented in detail on the following pages, but below is a summary table of the estimated renewal costs for each asset.

FCNI Comparison

ASSET CODE	ASSET NAME	CRV ($)	TOTAL 10-YEAR NEEDS ($)	FCNI	FCI
HLCP	CENTRAL PLANT	10,114,400	1,937,914	0.19	0.02
HLHCD	HEATING/CHILLED WATER DISTRIBUTION	11,136,000	2,363,087	0.21	0.00
HLHVE	HIGH VOLTAGE ELECTRICAL	2,950,000	128,682	0.04	0.03
HLPWF	POTABLE WATER AND FIRE WATER	1,600,000	91,801	0.06	0.00
HLSAN	SANITARY SEWER SYSTEM	1,500,000	796,926	0.53	0.52
HLSTR	STORMWATER SEWER SYSTEM	2,200,000	1,064,034	0.48	0.47

Central Plant (HLCP)

The Central Plant for the Highland Lakes campus of Oakland Community College is an 8,135 gross square foot, one-story, steel-framed high bay facility with CMU block walls. It was constructed around 1998 to replace an older plant and is located in the central part of campus, just north of the top of the hill on Campus Drive. It has a brick masonry facade and a flat, aggregate ballasted, asphalt built-up roof. There is a large expanse of glazing on the eastern side of the facility. Personnel doors are hollow metal, and there are several large overhead roll-up garage doors. The interior of the plant area has concrete floors, exposed metal decking and frame roof structure, and steel beam and column supports. There is a large boiler room, a large chiller room, one main electrical room, one office-control room, a restroom, and a parts and tool maintenance shop. Three cooling towers and the emergency generator are all located outside the facility on the south end adjacent to the utility tunnel. Overall, this plant is in proper working condition, with relatively low deferred renewal needs and efficient major heating and cooling equipment.

Site

No landscaping upgrade is warranted, but the site immediately around the building should be better graded to promote stormwater runoff away from the foundation.

Exterior Structure

The aggregate ballasted, asphalt built-up roof appears to be original and is expected to require replacement late in the next ten years. The exterior brick masonry appears to be in good condition but has several areas where staining and algae growth should be removed. Clean the exterior to restore the appearance of the facility. The windows are original dual-pane systems. The exterior doors are also original. No window or door upgrades should be necessary within the next ten years.

Interior Finishes/Systems

The main chiller and boiler room floors are painted concrete slab. The office and restroom have vinyl floor tile, and the remaining rooms have sealed concrete slab floors. Most wall finishes are painted sheetrock or CMU. Most of the ceilings are painted roof structure, typically the underside of the metal roof structure. The office and restroom have suspended grid acoustical tile ceilings. Most of the interior finishes are original and in good condition. Only the painted walls, painted or sealed flooring, and the vinyl tile will be due for lifecycle replacement in the next ten years.

Accessibility

The facility is not open to the public and therefore not normally required to be handicapped accessible. However, it is wheelchair accessible and has lever door hardware and an accessible restroom with roll-in shower. No additional ADA upgrades are recommended at this time.

Health

No health issues were observed or reported during this inspection.

Fire/Life Safety

This facility is served by an original addressable fire alarm system comprised of a control panel, manual pull stations, heat/smoke detectors, and audible and visual notification devices. This system is in proper working condition but is operating beyond its statistical service life. Replacement is recommended.

The main campus fire alarm control panel is also located within this facility and is an addressable Simplex panel installed in 2005. It is in proper working condition but will reach the end of its useful life within the next ten years.

This facility is equipped with a refrigerant leak monitoring system that is operating beyond its statistical service life. It should be considered for replacement. There is no dedicated fire suppression system, and none is recommended.

Power House HVAC & Heating/Chilled Water Generation Equipment

This facility houses the central chilled water and heating water equipment that serves this campus. Overall, these systems have been well maintained and are extremely efficient.

The campus chilled water is generated by three original water-cooled centrifugal chillers rated for 320 tons each. This equipment is in proper working condition and is reportedly reliable and subject to major inspection and maintenance. With this continued level of service and maintenance, the chillers should remain reliable for at least the next ten years.

The original cooling tower assembly located outside the facility is a three-cell unit. Only minimal deficiencies were noted, such as minor scale buildup on the infill and steel support structure that would generally be rectified during routine maintenance prior to seasonal start up. These units were relined in 2016 due to the discovery of some small pin-hole leaks. With continued service and maintenance, this equipment should remain serviceable beyond the scope of this report. However, it is recommended that the fans serving these towers be equipped with variable speed drives.

The campus heating hot water is generated by three original natural gas fired boilers manufactured by Johnston Boiler Company. Boiler B-1 has a rated capacity of approximately 4,200 MBH, and boilers B-2 and B-3 are each rated for approximately 16,373 MBH according to the nameplates. All are in relatively good condition and were retubed in 2004. The only recommendation for the boiler assemblies is to update the burners and combustion air systems to a higher efficiency assembly within the next ten years. Ensure that new burner/combustion air assemblies provide a more balanced heating distribution within the fire box.

Both the heating and chilled water generation systems are equipped with a series of primary and secondary pump systems that are currently in serviceable condition. In addition, the condenser water system is equipped with three pumps. All of these pumps are original and should outlast the scope of this report.

Other ancillary or support equipment serving the chilled and heating water systems include an air compressor and four thermal storage expansion tanks, all of which are original. The tanks will continue to operate reliably beyond the scope of this report, but it is recommended that the air compressor be considered for replacement.

Air handlers HVU-1 and HVU-2 located on the mezzanine level are original and provide conditioned air to select spaces of the plant. This equipment is in proper working condition and with continued service and maintenance will remain reliable beyond the scope of this assessment. The HVAC ductwork and piping that serve these air handlers and other ancillary equipment is also in proper working condition. No upgrade is recommended at this time, but modifications should be made to the HVAC control system. The majority of the components are original and recommended for replacement due to technological obsolescence. Supplemental heating is provide by hydronic unit heaters. They are serviceable but will reach the end of their lifecycle near the end of this report scope.

Seven centrifugal rooftop exhaust fans and one inline fan facilitate building exhaust. This equipment is original and in proper working condition, but are recommended for replacement toward the end of the next ten years.

Electrical

Primary electrical service is provided from the high voltage electrical equipment located in the electrical vault. This equipment includes one 13.2 kV fused load interrupter and a dry-type transformer rated for 1,000 kVA. The transformer reduces the incoming source voltage to 480/277 volts. This equipment is in good condition and with proper maintenance and testing will remain serviceable beyond the next ten years.

An original secondary electric switchgear assembly equipped with eight low-voltage power circuit breakers and rated for 1,600 amps provides electrical service to much of the electrical and mechanical equipment in the central plant. With maintenance and testing to ensure the reliable and safe operation of this equipment, no upgrade is recommended within the report scope.

The 480/277 and 208/120 volt building service is provided from secondary electrical switchgear and local dry-type branch transformers. The majority of the system, including branch wiring, electrical outlets, circuit breaker panelboards, and switches, are original. The system will require only routine maintenance, such as circuit breaker, switch, and outlet replacement, to remain reliable beyond the scope of this report

The interior lighting system is a combination of recessed and surface-mounted fixtures with mostly T8 lamps, along with HID high bay fixtures. The lighting system is in proper working condition but this equipment will require replacement within the next ten years due to lifecycle depletion and technological obsolescence. The new lighting system should incorporate higher efficiency lamps and ballasts that support LED or T5 lamps.

The exterior lighting system consists of surface-mounted HID light fixtures. They are in proper working condition but will reach the end of their lifecycle within the next ten years. Replacement is recommended within the next ten years.

The two original motor control center assemblies serve many of the motors in this building. Typically, motor control centers receive very minimal to no maintenance and are only subject of operation when a shutdown occurs or as the seasons transition. This equipment is in proper working condition but should be considered for replacement near the end of the next ten years.

Seven variable speed drives are connected to many of the central utility systems, including the secondary high temperature heating water pumps, secondary chilled water pumps, and the HRU-2 supply fan. All of these VSDs were installed in 1998 are in proper working condition but will reach the end of their reliable life within the next ten years. Replacement is recommended.

One exterior natural gas fired emergency generator rated for 225 kW provides emergency power to the plant and surrounding facilities. A local transfer switch rated for 480/277 volts, 400 amps is located within the electrical vault. This equipment is original and in proper working condition. It will reach lifecycle depletion near the end of the next ten years, but proper maintenance and operation would provide service life extension beyond this report scope.

Plumbing

Domestic water is supplied through a copper piping network, and drain piping is cast-iron or black steel. These systems are original and should outlast the scope of this report. There is also one backflow preventer. It is in proper working condition but will reach the end of its lifecycle within the next few years.

The plumbing fixtures include a porcelain lavatory and water closet as well as a utility sink and shower. There is also an emergency eyewash/shower. These fixtures are in good condition, and no upgrade is recommended at this time.

Domestic hot water is generated by an original 40 gallon, electric water heater. It should remain reliable beyond the ten year scope of this report.

One water softener and four side stream filters provide conditioned water for the central hydronic systems. This equipment is in proper working condition but should be considered for lifecycle replacement within the next ten years.

There is a domestic water booster pump system, along with one submersible sump system. Both are original and serviceable but will reach the end of their statistical lifecycle within the scope of this report. Replacement is recommended.

Heating and Chilled Water Distribution

The heating hot water and chilled water distribution systems at the Highland Lakes campus consist of approximately 6,000 linear feet of various sizes of chilled water supply and return pipe, 6,000 linear feet of various sized heating water supply and return pipe, and 300 linear feet of condenser water pipe. The majority of this pipe is installed within the utility tunnel system, but there is some limited direct buried pipe. These are estimates, as no scaled utility drawings were available prior to the development of this report. Overall, the system is in proper operating condition and has been well maintained.

It is believed that the chilled and heating water piping systems are schedule 40 welded steel pipe wrapped with insulation and covered in a water resistant sheathing. These piping systems date to the phases of building construction, renovation efforts, and campus expansion. All of the main heating and chilled water pipe and valves are installed within the utility tunnel system. Strategically placed expansion joints are installed for the heating water system. A series of gate and butterfly type isolation valves are installed at each building supply and within the Power House. The piping systems are installed on a series of steel support stanchions and utilize anchors, guides, and rollers.

Overall, the piping systems and associated support equipment are in good condition. A large quantity of the pipe for both systems has been updated within the last 20 years. There are some visible deficiencies, such as damaged insulation and sheathing, on the older sections of pipe. Repair or replacement of the damaged insulation and sheathing is recommended. Also, it should be anticipated that some piping replacement will be necessary within the next ten years.

The tunnel system is primarily cast-in-place concrete and in good condition. The tunnels are well ventilated and have a relatively temperate environment. The secondary electrical and lighting systems are in proper working condition, and the fluorescent lighting is equipped with shatter-proof coverings. The tunnels are also equipped with fire/life safety equipment and some refrigerant monitoring. Submersible sump pump are installed strategically throughout to remove ground and surface water. Some areas have aging lighting and secondary electrical equipment that is recommended for replacement. Additionally, the fire alarm devices should be replaced. The sump pump identified as R is also recommended for replacement due to age and condition.

High Voltage Electrical System

This campus is provided 4.8 kV primary electrical service from Detroit Edison (DTE) via one single utility line at Cooley Lake. This primary voltage is then reduced to 480/277 volts through campus transformers and distributed to the campus through miscellaneous switches and switchgear assemblies. Overall, the high voltage electrical system is in serviceable condition, with the majority of the renewal needs coming in the form of the replacement of aging equipment in some of the older facilities.

The primary switchgear assembly for this campus is located at the loading dock of Levinson Hall, where three load interrupters installed in 1997 distribute the 4.8 kV service to various transformers located throughout campus as well as the Central Plant. These three switches and associated metering cabinet are in proper working condition. They are not recommended for replacement, but it is a high priority that they undergo routine maintenance, testing, and operation.

There is a series of load interrupters, pad-mounted selector switch, and oil-filled transformers, and the most will continue to operate reliably beyond the scope of this assessment. The one piece of equipment that will reach lifecycle depletion within the next ten years is a pad-mounted selector switch identified as Switch 3 and located to the exterior of the Redwood Center. It should be replaced.

Although the balance of principal equipment will outlast the ten-year scope, consistent maintenance will be necessary. Currently, oil and gas analysis is performed on the oil-filled transformers throughout campus, but the switches and circuit breakers require maintenance and operation. The development of a campus-wide electrical maintenance program on a three to five year cycle is recommended. It should include operation, maintenance, and testing of the primary load interrupters. Also, any secondary electrical systems vital to the consistent operation of campus systems, such as the power circuit breakers, should undergo routine operation and maintenance.

The majority of the 13.2 kV campus electrical conductor is installed within concrete duct bank. The oldest cable on this campus reportedly dates to the mid-1980s but has been very reliable. There is no history of forced outages due to cable failures. The underground duct bank and cable system is comprised of electrical manholes that are reportedly in fairly good condition and do not have an extensive history of severe water intrusion. No recommendations for these manholes have been developed.

Potable and Fire Water System

It is estimated that the combined potable water and fire protection system for the Highland Lakes campus encompasses over 7,000 linear feet of piping (approximately 1.3 miles) ranging from 2 to 8 inches in diameter. The original water supply network for the site was created in the late 1920s. The site was purchased in 1965 by the college and additional water services were installed in 1977. In 2004, the water supply mains were replaced throughout campus. Most of the buildings are fed from campus water mains and are not metered, making specific facility water losses impossible to determine unless directly observed. The water supply from the city enters the Pump House and is subsequently distributed to the entire campus through numerous distribution lines. It should be noted that no scaled drawings were provided for this assessment. Water supply piping quantities are estimated based on approximated line locations and believed sizing.

Fire sprinkler service is provided to each building from the same water loop as the potable water with both city-owned and college-owned hydrants around campus. Campus water pressures are typically maintained at an adequate level for domestic and fire protection use. The older fire hydrants are typically owned and maintained by the city, while the college’s hydrants are relatively new, having been installed during the 2004 water main upgrades.

The potable water and fire protection system supply mains were installed in 2004. The lines are assumed to be metallic pipe with typically 65 to 75 years of expected service life. It is not expected that any significant lifecycle replacement of most of the water lines will be necessary in the next ten years. However, any remaining original water service lines should be replaced.

The domestic water and fire protection system appears to be in overall good condition and properly sized to serve the campus. The campus staff confirmed that the water supply piping network has had no significant problems to this point. The majority of the original water lines were replaced around 2004. Typically, the individual distribution branches and/or individual building services were constructed around the same time as the buildings they supply and are the only water lines recommended for replacement at this time.

There are approximately 11 campus fire hydrants of various ages and conditions. All but three are owned by the city. They are aged but in good condition and should outlast the report scope. The three college hydrants were installed in 2004. Located within the Pump House are three domestic water booster pumps that are each equipped with 40 hp motors, rated for 500 GPM each, and were installed in 2006. These pumps are served by variable speed drives. In addition, there are also six storage vessels for this system that were installed in 2006. Overall, this equipment is in proper working condition and with continued maintenance will remain serviceable for the next ten years.

Sanitary Sewer Collection System

The sanitary sewer system is aged, and a significant portion of the system is nearing the end of its expected operating life. The original portion of the network dates to the late 1920s. It is believed that additional sewer lines were installed in the 1970s and again in 2007. All of the lines are believed to be first-time installations, not replacements of previously existing lines. It should be noted that no scaled drawings were provided for this assessment. Quantities for sanitary sewer collection piping are estimated based on approximated line locations and believed sizing.

The sanitary sewer owned by the college is estimated to consist of over 5,000 linear feet of sewer collection line. It is assumed that the lines are a combination of ductile iron, PVC, or clay pipe, with terra cotta clay pipe believed to be the majority. It is estimated that the campus sewer collection lines are 12 inches or smaller, with the service laterals typically 8 inches in diameter. There are also approximately 14 sanitary sewer manholes of varying depths. Grease traps installed for campus kitchens were not part of this assessment.

The sanitary sewer system is a collection and conveyance system. The Highland Lakes campus sanitary sewers drain entirely to the south. Facilities on the north of the hilltop campus have sewage ejection pumps in the basements or ground floors that pump wastewater to a south manhole, where it subsequently flows by gravity to the south. Sanitary sewage collected on campus is believed to generally flow adjacent to Marylestone Street and subsequently discharges to a municipally owned manhole and collection lines to the south of campus along Colley Lake Road.

It is estimated that there is just under one mile of buried sanitary sewer lines of varying ages, material composition, and sizes on campus. The larger diameter main lines are generally assumed to be ductile iron or clay, while the small service lateral collection lines are probably the original terra cotta clay or newer PVC.

Even though most of the newer facilities have service laterals of the age of the facility, those newer laterals discharge into older sewer mains and outfalls that possibly date to the 1920s. Even though this area has relatively high average annual rainfall, there were no indications during the inspection of significant stormwater infiltration or inflow issues within the system. Reducing potable water use on campus helps to reduce wastewater flows, which in turn helps keep the maximum capacity available for peak flow events.

There were no reported past or present systematic issues with the sanitary sewer network. The system is aged but in fair condition, and there is significant accumulation of deferred maintenance. Over 50 percent of the sanitary sewer lines are believed to date to the 1920s, but this could not be confirmed. The network additions and extensions installed in 1970s are expected to outlast the scope of this report. Based on discussions with the facility staff, it is also believed that most of the larger main collection trunk lines and outfalls, along with the manholes associated with these lines, are original to the 1920s. It was determined that these main sanitary sewer lines have the most potential for failure based on the past performance and system history. These aging 8 and 12 inch sewer lines and manholes should be replaced within the next ten years.

It is a good policy and a recommendation of this report to develop and conduct a preventative maintenance program for the sanitary sewer collection system. A vital part of that program is video-monitoring the linear assets when and where feasible. Jetwash any built-up debris or solids in the lines and/or manholes to ensure that the pipes have the maximum capacity for peak flow demand periods. Lines need to be generally free of flow to allow proper observations. Evaluate the oldest and/or most problematic sewer collection lines first to determine the characteristics of the typical flow and identify any urgent or critical repair or replacement needs. Routinely CCTV inspect a portion of the infrastructure every couple of years, but typically all lines at least once every ten years. With the age of the system and expected lifecycle, it is inevitable that portions will wear out and need to be repaired or replaced. The CCTV inspections will allow the college to identify problem areas and then plan and budget for that repair or replacement. Not every line needs to be inspected every year.

Stormwater Sewer Collection System

The stormwater collection system at Highland Lakes is believed to be significantly aged, with any original portions of the system being past their expected useful life and other lines nearing the end of it. The original stormwater sewer collection network dates to the late 1920s. It is believed that additional lines were installed in the 1970s as new construction occurred and again in 2007. All of the lines are believed to be first time installations, not replacements of previously existing lines. It should be noted that no scaled drawings were provided for this assessment. Due to the fact that no design or construction plans were provided for this campus, locations, quantities, and pipe diameters for stormwater sewer collection piping were estimated based on approximated line locations and believed sizing. The system is estimated to consist of approximately 8,000 linear feet of drain line that is believed to be mostly concrete, corrugated metal, and clay. It is estimated that 1,000 linear feet is large 24 inch main outfall lines, and the remaining 7,000 linear feet collection and service lateral lines are 12 to 18 inches in diameter. Additional stormwater site components include an estimated 35 stormwater catch basins and drop inlets and an estimated ten stormwater manholes of various depths. Roof drain leaders from campus facilities also are connected to the underground piping network, and the water is collected along with the other campus stormwater runoff.

Due to the hilltop location of most of the campus, there are multiple drainage areas for addressing stormwater runoff. The majority of the campus grounds typically slope from the hilltop to the south, with the stormwater collection main carrying stormwater through the center of campus. Much of the stormwater collected on the south side of the hill is released into the drainage basin in the large greenspace just south of the baseball athletic field. The stormwater collected on the north side generally is transported to the north and the low-lying wetlands.

The stormwater sewer system is a collection and conveyance system. Surface water runoff collecting on paved areas drains into storm sewer catch basins and drop inlets normally at street corners, curb and gutter lines, and parking lots. Rainfall on landscaped areas is channeled around campus utilizing grassed swales that typically lead to subsurface drainage structures. Stormwater is the rainfall runoff that flows across the ground and pavement that must be controlled to eliminate soil erosion and potential flooding of low-lying areas and facilities. Catch basins and drop inlets on the surface are connected to a series of underground sewer collection pipes that convey the discharge to nearby open channels and/or larger city-owned outfall lines and culverts.

As stormwater recedes, the leaves, sediment, and debris transported during a storm settle in catch basins and sewer lines, reducing the overall capacity of the system. Stormwater can also pick up chemicals and other pollutants as it flows across streets, curbs, and gutters and can erode ditches, grass ways, or stream banks. The debris-laden or polluted runoff is commonly transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local streams, lakes, and coastal marshlands without treatment.

There are approximately 1.5 miles of buried stormwater sewer lines of varying ages, material composition, and sizes on campus. The larger diameter main lines are generally precast concrete, ductile iron, or corrugated metal, while the small service collection lines may be the original concrete, terra cotta, or PVC.

The stormwater sewer system is in overall fair condition. Based on information gathered onsite and discussions with the facility staff, it is believed that most of the main stormwater collection main lines and outfalls and the manholes associated with these lines are original to the 1920s. It was determined that these stormwater sewer lines have the most potential for failure based on the past performance and system history. The 1920s sewer lines and manholes are recommended for replacement within the next ten years.

Based on discussions with the campus staff, there are no existing systematic problems and no detected root intrusion. However, as with the sanitary sewer system, these original lines and manholes should be monitored via CCTV inspection for deterioration. This should precede the anticipated lifecycle replacement of aged lines to ensure they do indeed need to be replaced. Some of the possible improvements identified through this process may include line replacements and miscellaneous catch basin, drop inlet, or manhole structural or concrete repairs, including replacing broken storm grates and inlet covers and securing both existing and new grates and covers with an adequate concrete collar.

Another part of conducting a thorough preventative maintenance program for this system is the maintenance of stormwater inlets and outlets. As the system continues to age, elevated levels of preventive maintenance should be applied to ensure continued operating reliability. A typical preventative maintenance program for stormwater inlets and outlets includes:

- Inspect and remove debris/litter as necessary
- Inspect for structural repairs and concrete headwall deterioration
- Inspect for erosion issues, filling eroded areas and re-sodding or replanting vegetation and replacing riprap that has washed away
- Unplug or replace damaged screens and/or grates
- Inspect for and reduce potential mosquito breeding habitats

There are numerous catch basins, drop inlets, and curb drains around campus. Some are in natural and/or heavily landscaped areas with well-developed vegetation. As a result, these collection inlets have the potential to clog with vegetative debris and may cause localized flooding. There are also several locations where the collected stormwater is discharged through a pipe outlet to a surface swale or ditch. These areas sometimes erode due to the quantity or velocity of flow from the pipe unless properly protected with riprap or some other laminar flow dissipater. Clean any clogged or partially obstructed inlets, and inspect pipe discharge points to mitigate any erosion.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors thoroughly examined the accessible equipment and various components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the facility to modern standards without any anticipation of change to facility space layout or function. The total costs include variable project delivery costs as determined by the Owner. The costs developed do not represent the cost of a complete facility renovation. Soft costs not represented in this report include telecommunications, security, furniture, window treatment, space change, program issues, relocation, swing space, contingency, or costs that could not be identified or determined from the visual inspection and available building information.

INSPECTION TEAM DATA

Report Development

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Date of Inspection

March 21, 2017

Inspection Team Personnel

NAME	POSITION	SPECIALTY
Rob Camperlino	Facility Assessor	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health
Carl Mason, PE, BSCP, M.ASCE	Senior Project Engineer	Interior Finishes, Exterior Structure, ADA Compliance, Site, Fire/Life Safety, Health, Plumbing

Client Contact

NAME	POSITION
Dan P. Cherewick	Director, Physical Facilities

DEFINITIONS

The following information is a clarification of this report using example definitions.

Overview

Recurring and Nonrecurring Facility Renewal Costs

Facility renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of facility systems and components (e.g., roof or HVAC system replacement at or past the end of its normal useful life). The tool for projecting the recurring renewal costs is the Asset Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with fire/life safety or accessibility code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Facility Condition Needs Index (FCNI)

The FCNI provides a lifecycle cost comparison. It is a ratio of the sum of the recurring and nonrecurring renewal costs over ten years to the current replacement value of the asset. The current replacement value is based on replacement with current construction standards for the facility use type, and not original design parameters. This index gives the college a comparison within all buildings for identifying worst case/best case building conditions.

$$\text{FCNI} = \frac{\text{Nonrecurring Projects} + \text{10-Year Recurring Component Renewal}}{\text{Current Replacement Value}}$$

Facility Condition Index (FCI)

The FCI is a ratio of the Deferred Renewal facilities renewal costs to the current replacement value.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Oakland using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Typical general contractor fees (which could include profit, overhead, bonds, and insurance) and professional fees (architect or engineer design fees and in-house design costs) are also included in the renewal costs.

GLOBAL MARKUP	%
Local Labor Index	102.9
Local Materials Index	99.3
General Contractor Markup	20.0
Professional Fees	16.0

Recurring Costs

Asset Component Inventory and Cost Projections

The Asset Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major building systems and major components within a facility. This is a list of all major systems and components within the facility. Each indicated component has the following associated information:

CATEGORY	DEFINITION
Uniformat Code	The standard Uniformat Code that applies to the component
Component Description	This line item describes the individual component
Identifier	Unique identifying information entered for a component as necessary
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Unit Cost	The cost to replace each individual component unit (this cost is in today's dollars)
Complexity Adjustment	A factor utilize to adjust component replacement costs accordingly when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	Unit cost multiplied by quantity, in today's dollars. Note that this is a one-time renewal/replacement cost
Install Date	Year that the component was or is estimated to have been installed. When this data is not available, it defaults to the year the asset was constructed
Life Expectancy	Average life expectancy for each individual component
Life Expectancy Adjustment	Utilized to adjust the first lifecycle of the component and to express when the next replacement should occur

The component listing forms the basis of the Recurring Component Renewal Schedule, which provides a year-by-year list of projected recurring renewal costs over the next ten years. Each individual component is assigned a replacement year based on lifecycles, and the costs for each item are in future year dollars. For items that are already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot ($/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- Deferred Renewal
  Recurring repairs, generated by the Asset Component Inventory, that are past due for completion but have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral of such renewal could impair the proper functioning of the facility. Costs estimated for Deferred Renewal projects should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.

- Projected Renewal
  Recurring renewal efforts, generated by the Asset Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with fire/life safety or accessibility code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within are not included in the Asset Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- Plant Adaption
  Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).

- Corrective Action
  Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- Immediate

  Projects in this category require immediate action to:

  a. correct a cited safety hazard
  b. stop accelerated deterioration
  c. and/or return a facility to normal operation

- Critical

  Projects in this category include actions that must be addressed in the short-term:

  a. repairs to prevent further deterioration
  b. improvements to facilities associated with critical accessibility needs
  c. potential safety hazards

- Noncritical

  Projects in this category include:

  a. improvements to facilities associated with noncritical accessibility needs

  b. actions to bring a facility into compliance with current building codes as grandfather clauses expire

  c. actions to improve the usability of a facility following an occupancy or use change

Category Codes

CATEGORY CODE*			SYSTEM DESCRIPTION
AC1A	–	AC4B	ACCESSIBILITY
EL1A	–	EL8A	ELECTRICAL
ES1A	–	ES6E	EXTERIOR STRUCTURE
FS1A	–	FS6A	FIRE/LIFE SAFETY
HE1A	–	HE7A	HEALTH
HV1A	–	HV8B	HVAC
IS1A	–	IS6D	INTERIOR FINISHES/SYSTEMS
PL1A	–	PL5A	PLUMBING
SI1A	–	SI4A	SITE
SS1A	–	SS7A	SECURITY SYSTEMS
VT1A	–	VT7A	VERTICAL TRANSPORTATION

Example: Category Code = EL5A	
EL	System Description
5	Component Description
A	Element Description

**Refer to the Category Code Report starting on page 1.5.1.*

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

Example:

Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Drawings/Project Locations

The drawings for this facility are marked with icons (see legend on plans) denoting the specific location(s) for each project. Within each icon are the last four characters of the respective project number (e.g., 0001IS01 is marked on the plan as IS01).

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

Example: **Photo Number: 0001006e**	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

CATEGORY CODE REPORT

ACCESSIBILITY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
AC1A	Site	Stair and Railings	Includes exterior stairs and railings which are not part of the building entrance points.
AC1B	Site	Ramps and Walks	Includes sidewalks, grade change ramps (except for a building entrance), curb ramps, etc.
AC1C	Site	Parking	Designated parking spaces, including striping, signage, access aisles and ramps, etc.
AC1D	Site	Tactile Warnings	Raised tactile warnings located at traffic crossing and elevation changes.
AC2A	Building Entry	General	Covers all aspects of entry into the building itself, including ramps, lifts, doors and hardware, power operators, etc.
AC3A	Interior Path of Travel	Lifts/Ramps/ Elevators	Interior lifts, ramps and elevators designed to accommodate level changes inside a building. Includes both installation and retrofitting.
AC3B	Interior Path of Travel	Stairs and Railings	Upgrades to interior stairs and handrails for accessibility reasons.
AC3C	Interior Path of Travel	Doors and Hardware	Accessibility upgrades to the interior doors including widening, replacing hardware power, assisted operators, etc.
AC3D	Interior Path of Travel	Signage	Interior building signage upgrades for compliance with the ADA.
AC3E	Interior Path of Travel	Restrooms/ Bathrooms	Modifications to and installation of accessible public restrooms and bathrooms. Bathrooms that are an integral part of residential suites are catalogued under HC4A.
AC3F	Interior Path of Travel	Drinking Fountains	Upgrading/replacing drinking fountains for reasons of accessibility.
AC3G	Interior Path of Travel	Phones	Replacement/modification of public access telephones.
AC4A	General	Functional Space Modifications	This category covers all necessary interior modifications necessary to make the services and functions of a building accessible. It includes installation of assistive listening systems, modification of living quarters, modifications to laboratory workstations, etc. Bathrooms that are integral to efficiency suites are catalogued here.
AC4B	General	Other	All accessibility issues not catalogued elsewhere.

ELECTRICAL

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
EL1A	Incoming Service	Transformer	Main building service transformer.
EL1B	Incoming Service	Disconnects	Main building disconnect and switchgear.
EL1C	Incoming Service	Feeders	Incoming service feeders. Complete incoming service upgrades, including transformers, feeders, and main distribution panels are catalogued here.
EL1D	Incoming Service	Metering	Installation of meters to record consumption and/or demand.
EL2A	Main Distribution Panels	Condition Upgrade	Main distribution upgrade due to deficiencies in condition.
EL2B	Main Distribution Panels	Capacity Upgrade	Main distribution upgrades due to inadequate capacity.
EL3A	Secondary Distribution	Step-Down Transformers	Secondary distribution step-down and isolation transformers.
EL3B	Secondary Distribution	Distribution Network	Includes conduit, conductors, sub-distribution panels, switches, outlets, etc. Complete interior rewiring of a facility is catalogued here.

EL3C	Secondary Distribution	Motor Controllers	Mechanical equipment motor starters and control centers.
EL4A	Devices and Fixtures	Exterior Lighting	Exterior building lighting fixtures, including supply conductors and conduit.
EL4B	Devices and Fixtures	Interior Lighting	Interior lighting fixtures (also system wide emergency lighting), including supply conductors and conduits.
EL4C	Devices and Fixtures	Lighting Controllers	Motion sensors, photocell controllers, lighting contactors, etc.
EL4D	Devices and Fixtures	GFCI Protection	Ground fault protection, including GFCI receptacles and breakers.
EL4E	Devices and Fixtures	Lightning Protection	Lightning arrestation systems including air terminals and grounding conductors.
EL5A	Emergency Power System	Generation/ Distribution	Includes generators, central battery banks, transfer switches, emergency power grid, etc.
EL6A	Systems	UPS/DC Power Supply	Uninterruptible power supply systems and DC motor-generator sets and distribution systems.
EL7A	Infrastructure	Above Ground Transmission	Includes poles, towers, conductors, insulators, fuses, disconnects, etc.
EL7B	Infrastructure	Underground Transmission	Includes direct buried feeders, duct banks, conduit, manholes, feeders, switches, disconnects, etc.
EL7C	Infrastructure	Substations	Includes incoming feeders, breakers, buses, switchgear, meters, CTs, PTs, battery systems, capacitor banks, and all associated auxiliary equipment.
EL7D	Infrastructure	Distribution Switchgear	Stand-alone sectionalizing switches, distribution switchboards, etc.
EL7F	Infrastructure	Area and Street Lighting	Area and street lighting systems, including stanchions, fixtures, feeders, etc.
EL8A	General	Other	Electrical system components not catalogued elsewhere.

EXTERIOR STRUCTURE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
ES1A	Foundation/ Footing	Structure	Structural foundation improvements involving structural work on foundation wall/footing, piers, caissons, and piles, including crack repairs, shoring, and pointing
ES1B	Foundation/ Footing	Dampproofing/ Dewatering	Foundation/footing waterproofing work, including, damp-proofing, dewatering, insulation, etc.
ES2A	Columns/Beams/ Walls	Structure	Structural work to primary load-bearing structural components aside from floors, including columns, beams, bearing walls, lintels, arches, etc.
ES2B	Columns/Beams/ Walls	Finish	Work involving restoration of the appearance and weatherproof integrity of exterior wall/structural envelope components, including masonry/pointing, expansion joints, efflorescence and stain removal, grouting, surfacing, chimney repairs, etc.
ES3A	Floor	Structure	Work concerning the structural integrity of the load supporting floors, both exposed and unexposed, including deformation, delamination, spalling, shoring, crack repair, etc.
ES4A	Roof	Repair	Work on waterproof horizontal finish (roof) involving repair and/or limited replacement (<40% total), including membrane patching, flashing repair, coping caulk/resetting, PPT wall parging/coating, walk pad installation, skylight and roof hatch R&R, etc.
ES4B	Roof	Replacement	Work involving total refurbishment of roofing system, including related component rehab.
ES5A	Fenestrations	Doors	Work on exterior exit/access door, including storefronts, airlocks, air curtains, vinyl slat doors, all power/manual operating hardware (except handicapped), etc.
ES5B	Fenestrations	Windows	Work on exterior fenestration closure and related components, including glass/metal/wood curtain walls, fixed or operable window sashes, glazing, frames, sills, casings, stools, seats, coatings, treatments, screens, storm windows, etc.

ES6A	General	Attached Structure	Work on attached exterior structure components not normally considered in above categories, including porches, stoops, decks, monumental entrance stairs, cupolas, tower, etc.
ES6B	General	Areaways	Work on attached grade level or below structural features, including subterranean lightwells, areaways, basement access stairs, etc.
ES6C	General	Trim	Work on ornamental exterior (generally nonstructural) elements, including beltlines, quoins, porticos, soffits, cornices, moldings, trim, etc.
ES6D	General	Superstructure	Finish and structural work on nonstandard structures with exposed load-bearing elements, such as stadiums, bag houses, bleachers, freestanding towers, etc.
ES6E	General	Other	Any exterior work not specifically categorized elsewhere, including finish and structural work on freestanding boiler stacks.

FIRE/LIFE SAFETY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
FS1A	Lighting	Egress Lighting/Exit Signage	R&R work on exit signage and packaged AC/DC emergency lighting.
FS2A	Detection/Alarm	General	Repair or replacement of fire alarm/detection system/components, including alarms, pull boxes, smoke/heat detectors, annunciator panels, central fire control stations, remote dialers, fire station communications, etc.
FS3A	Suppression	Sprinklers	Repair or installation of water sprinkler type automatic fire suppressions, including wet-pipe and dry-pipe systems, heads, piping, deflectors, valves, monitors, associated fire pump, etc.
FS3B	Suppression	Standpipe/Hose	Repair or installation of standpipe system or components, including hardware, hoses, cabinets, nozzles, necessary fire pumping system, etc.
FS3C	Suppression	Extinguishers	Repairs or upgrades to F.E. cabinets/wall fastenings and handheld extinguisher testing/replacement.
FS3D	Suppression	Other	Other fire suppression items not specifically categorized elsewhere, including fire blankets, carbon dioxide automatic systems, Halon systems, dry chemical systems, etc.
FS4A	Hazardous Materials	Storage Environment	Installation or repair of special storage environment for the safe holding of flammable or otherwise dangerous materials/supplies, including vented flammables storage cabinets, holding pens/rooms, cages, fire safe chemical storage rooms, etc.
FS4B	Hazardous Materials	User Safety	Improvements, repairs, installation, or testing of user safety equipment, including emergency eyewashes, safety showers, emergency panic/shut-down system, etc.
FS5A	Egress Path	Designation	Installation, relocation or repair of posted diagrammatic emergency evacuation routes.
FS5B	Egress Path	Distance/ Geometry	Work involving remediation of egress routing problems, including elimination of dead end corridors, excessive egress distance modifications, and egress routing inadequacies.
FS5C	Egress Path	Separation Rating	Restoration of required fire protective barriers, including wall rating compromises, fire-rated construction, structural fire proofing, wind/safety glazing, transom retrofitting, etc.
FS5D	Egress Path	Obstruction	Clearance of items restricting the required egress routes.
FS5E	Egress Path	Stairs Railing	Retrofit of stair/landing configurations/structure, railing heights/geometries, etc.
FS5F	Egress Path	Fire Doors/ Hardware	Installation/replacement/repair of fire doors and hardware, including labeled fire doors, fire shutters, closers, magnetic holders, panic hardware, etc.
FS5G	Egress Path	Finish/Furniture Ratings	Remediation of improper fire/smoke ratings of finishes and furniture along egress routes.
FS6A	General	Other	Life/fire safety items not specifically categorized elsewhere.

HEALTH

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HE1A	Environmental Control	Equipment and Enclosures	Temperature control chambers (both hot and cold) for non-food storage. Includes both chamber and all associated mechanical equipment.
HE1B	Environmental Control	Other	General environmental control problems not catalogued elsewhere.
HE2A	Pest Control	General	Includes all measures necessary to control and destroy insects, rodents, and other pests.
HE3A	Refuse	General	Issues related to the collection, handling, and disposal of refuse.
HE4A	Sanitation Equipment	Laboratory and Process	Includes autoclaves, cage washers, steam cleaners, etc.
HE5A	Food Service	Kitchen Equipment	Includes ranges, grilles, cookers, sculleries, etc.
HE5B	Food Service	Cold Storage	Includes the cold storage room and all associated refrigeration equipment.
HE6A	Hazardous Material	Structural Asbestos	Testing, abatement, and disposal of structural and building finish materials containing asbestos.
HE6B	Hazardous Material	Mechanical Asbestos	Testing, abatement, and disposal of mechanical insulation materials containing asbestos.
HE6C	Hazardous Material	PCBs	Includes testing, demolition, disposal, and cleanup of PCB contaminated substances.
HE6D	Hazardous Material	Fuel Storage	Includes monitoring, removal, and replacement of above and below ground fuel storage and distribution systems. Also includes testing and disposal of contaminated soils.
HE6E	Hazardous Material	Lead Paint	Testing, removal, and disposal of lead-based paint systems.
HE6F	Hazardous Material	Other	Handling, storage, and disposal of other hazardous materials.
HE7A	General	Other	Health related issues not catalogued elsewhere.

HVAC

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HV1A	Heating	Boilers/Stacks/ Controls	Boilers for heating purposes, including their related stacks, flues, and controls.
HV1B	Heating	Radiators/ Convectors	Including cast-iron radiators, fin tube radiators, baseboard radiators, etc.
HV1C	Heating	Furnace	Furnaces and their related controls, flues, etc.
HV1D	Heating	Fuel Supply/Storage	Storage and/or distribution of fuel for heating purposes, including tanks and piping networks and related leak detection/monitoring.
HV2A	Cooling	Chillers/ Controls	Chiller units for production of chilled water for cooling purposes, related controls (not including mods for CFC compliance).
HV2B	Cooling	Heat Rejection	Repair/replacement of cooling towers, dry coolers, air-cooling, and heat rejection. Includes connection of once-through system to cooling tower.
HV3A	Heating/Cooling	System Retrofit/ Replace	Replacement or major retrofit of HVAC systems.
HV3B	Heating/Cooling	Water Treatment	Treatment of hot water, chilled water, steam, condenser water, etc.
HV3C	Heating/Cooling	Package/Self-Contained Units	Repair/replacement of self-contained/package type units, including stand-up units, rooftop units, window units, etc.; both air conditioners and heat pumps.
HV3D	Heating/Cooling	Conventional Split Systems	Repair, installation, or replacement of conventional split systems, both air conditioners and heat pumps, including independent component replacements of compressors and condensers.

HV4A	Air Moving/ Ventilation	Air Handlers/ Fan Units	Includes air handlers and coils, fan coil units, unit ventilators, filtration upgrades, etc., not including package/self-contained units, split systems, or other specifically categorized systems.
HV4B	Air Moving/ Ventilation	Exhaust Fans	Exhaust fan systems, including fans, range and fume hoods, controls, and related ductwork.
HV4C	Air Moving/ Ventilation	Other Fans	Supply, return, or any other fans not incorporated into a component categorized elsewhere.
HV4D	Air Moving/ Ventilation	Air Distribution Network	Repair, replacement, or cleaning of air distribution network, including ductwork, terminal reheat/cool, VAV units, induction units, power induction units, insulation, dampers, linkages, etc.
HV5A	Steam/Hydronic Distribution	Piping Network	Repair/replacement of piping networks for heating and cooling systems, including pipe, fittings, insulation, related components, etc.
HV5B	Steam/Hydronic Distribution	Pumps	Repair or replacement of pumps used in heating and cooling systems, related control components, etc.
HV5C	Steam/Hydronic Distribution	Heat Exchangers	Including shell-and-tube heat exchangers and plate heat exchangers for heating and cooling.
HV6A	Controls	Complete System Upgrade	Replacement of HVAC control systems.
HV6B	Controls	Modifications/ Repairs	Repair or modification of HVAC control system.
HV6C	Controls	Air Compressors/ Dryers	Repair or modification of control air compressors and dryers.
HV7A	Infrastructure	Steam/Hot Water Generation	Generation of central steam and/or hot water, including boilers and related components.
HV7B	Infrastructure	Steam/Hot Water Distribution	Distribution system for central hot water and/or steam.
HV7C	Infrastructure	Chilled Water Generation	Generation of central chilled water, including chillers and related components.
HV7D	Infrastructure	Chilled Water Distribution	Distribution system for central chilled water.
HV7E	Infrastructure	Tunnels/ Manholes/ Trenches	Repairs, installation, or replacement of utility system access chambers.
HV7F	Infrastructure	Other	HVAC infrastructure issues not specifically categorized elsewhere.
HV8A	General	CFC Compliance	Chiller conversions/replacements for CFC regulatory compliance, monitoring, etc.
HV8B	General	Other	HVAC issues not catalogued elsewhere.

INTERIOR FINISHES/SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
IS1A	Floor	Finishes-Dry	R&R of carpet, hardwood strip flooring, concrete coating, vinyl linoleum and tile, marble, terrazzo, rubber flooring, and underlayment in predominantly dry areas ("dry" includes non-commercial kitchens)
IS1B	Floor	Finishes-Wet	Flooring finish/underlayment work in predominantly "wet" areas, including work with linoleum, rubber, terrazzo, concrete coating, quarry tile, ceramic tile, epoxy aggregate, etc.
IS2A	Partitions	Structure	Structural work on full height permanent interior partitions, including wood/metal stud and drywall systems, CMU systems, structural brick, tile, glass block, etc.
IS2B	Partitions	Finishes	Work on full height permanent interior partitions, including R&R, to gypsum board, plaster, lath, wood paneling, acoustical panels, wall coverings, column coverings, tile, paint, etc.
IS3A	Ceilings	Repair	Repair of interior ceilings (<40% of total), including tiles, gypsum board, plaster, paint, etc.
IS3B	Ceilings	Replacement	Major refurbishments (>40% of total) to interior ceiling systems, including grid system replacements, structural framing, new suspended systems, paint, plastering, etc.

IS4A	Doors	General	Any work on interior non-fire-rated doors, roll-up counter doors, mechanical/plumbing access doors, and all door hardware (except for reasons of access improvement).
IS5A	Stairs	Finish	Any finish restorative work to stair tower walking surfaces, including replacement of rubber treads, safety grips, nosings, etc. (except as required to accommodate disabled persons).
IS6A	General	Molding	R&R to interior trim/molding systems, including rubber/vinyl/wood base, crown/chair/ornamental moldings, cased openings, etc.
IS6B	General	Cabinetry	R&R work to interior casework systems, including cabinets, countertops, wardrobes, lockers, mail boxes, built-in bookcases, lab/work benches, reagent shelving, etc. (except as required for access by the disabled).
IS6C	General	Screening	Work on temporary or partial height partitioning systems, including toilet partitions, urinal/vanity screens, etc.
IS6D	General	Other	Any work on interior elements not logically or specifically categorized elsewhere, including light coves, phone booths, interior lightwells, etc.

PLUMBING

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
PL1A	Domestic Water	Piping Network	Repair or replacement of domestic water supply piping network, insulation, hangers, etc.
PL1B	Domestic Water	Pumps	Domestic water booster pumps, circulating pumps, related controls, etc.
PL1C	Domestic Water	Storage/ Treatment	Equipment or vessels for storage or treatment of domestic water.
PL1D	Domestic Water	Metering	Installation, repair, or replacement of water meters.
PL1E	Domestic Water	Heating	Domestic water heaters, including gas, oil, and electric water heaters, shell-and-tube heat exchangers, tank type, and instantaneous.
PL1F	Domestic Water	Cooling	Central systems for cooling and distributing drinking water.
PL1G	Domestic Water	Fixtures	Plumbing fixtures, including sinks, drinking fountains, water closets, urinals, etc.
PL1H	Domestic Water	Conservation	Alternations made to the water distribution system to conserve water.
PL1I	Domestic Water	Backflow Protection	Backflow protection devices, including backflow preventers, vacuum breakers, etc.
PL2A	Wastewater	Piping Network	Repair or replacement of building wastewater piping network.
PL2B	Wastewater	Pumps	Pump systems used to lift wastewater, including sewage ejectors and other sump systems.
PL3A	Special Systems	Process Gas/Fluids	Generation and/or distribution of process steam, compressed air, natural and LP gas, process water, vacuum, etc.
PL4A	Infrastructure	Potable Water Storage/ Treatment	Storage and treatment of potable water for distribution.
PL4B	Infrastructure	Industrial Water Distribution/ Treatment	Storage and treatment of industrial water for distribution.
PL4C	Infrastructure	Sanitary Water Collection	Sanitary water collection systems and sanitary sewer systems, including combined systems.
PL4D	Infrastructure	Stormwater Collection	Stormwater collection systems and storm sewer systems; storm water only.
PL4E	Infrastructure	Potable Water Distribution	Potable water distribution network.
PL4F	Infrastructure	Wastewater Treatment	Wastewater treatment plants, associated equipment, etc.
PL5A	General	Other	Plumbing issues not categorized elsewhere.

SITE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SI1A	Access	Pedestrian	Paved pedestrian surfaces, including walks, site stairs, step ramps, paths, pedestrian signage, sidewalk bridges/canopies, pedestrian plaza/mall areas, etc.
SI1B	Access	Vehicular	Paved vehicular surfaces, including roads, paths, curbs, guards, bollards, bridges, skyways, joints, shoulder work, culverts, ditches, vehicular signage, etc.
SI2A	Landscape	Grade/Flora	Landscape related work, including new grass/turf refurbishment, grade improvements, catch basins, swales, berms, pruning, new ornamental flora, etc.
SI3A	Hardscape	Structure	Permanent hard site features, predominantly ornamental, including terraces, fences, statues, freestanding signage, fountains, benches, etc.
SI4A	General	Other	Other site work not specifically categorized elsewhere.

SECURITY SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SS1A	Lighting	Exterior	Fixtures, stanchions, foliage interference, cleanliness, locations, etc.
SS2A	Site	Fencing	Perimeter campus fencing, individual building fencing, includes both pedestrian and vehicular control fences.
SS2B	Site	General	Hidden areas due to foliage, fencing, parking, walls, etc.
SS3A	Communications	Emergency Phones	Access, locations, visibility, function, reliability, etc.
SS4A	Access Control	Doors	Access, locks, keys, two-way speakers, reliability, redundancy, etc.
SS4B	Access Control	Windows	Locks, screens, access, reliability, etc.
SS4C	Access Control	Systems	Card key, proximity devices, data control, data use, reliability, system design, etc.
SS5A	Monitoring	Systems	Cameras, audio communication, monitoring stations, locations, system design, etc.
SS6A	Circulation	Pedestrian	On campus as well as to and from off-campus housing and class locations, etc.
SS6B	Circulation	Vehicular	Guard gates, access, systems, data control and use, identification, etc.
SS7A	General	Other	General information/projects pertaining to security issues.

VERTICAL TRANSPORTATION

CODE	Component Description	Element Description	DEFINITION
VT1A	Machine Room	General	Machine, worm gear, thrust bearing, brake, motors, sheaves, generator, controller, selector, governor, pump(s), valves, oil, access, lighting, ventilation, and floor.
VT2A	Car	General	Position indicator, lighting, floor, gate-doors, operation devices, safeties, safety shoe, light ray/detection, emergency light, fire fighter service, car top, door operator, stop switch, car frame, car guides, sheaves, phone, and ventilation.
VT3A	Hoistway	General	Enclosure, fascia, interlock, doors, hangers, closers, sheaves, rails, hoistway switches, ropes, traveling cables, selector tape, weights, and compensation.
VT4A	Hall Fixtures	General	Operating panel, position indicator, hall buttons, lobby panel, hall lanterns, fire fighter service, audible signals, and card/key access.
VT5A	Pit	General	Buffer(s), guards, sheaves, hydro packing, floor, lighting, and safety controls.
VT6A	Operating Conditions	General	Door open time, door close time, door thrust, acceleration, deceleration, leveling, dwell time, speed, OFR time, and nudging.
VT7A	General	Other	General information/projects relating to vertical transportation system components.

UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 2

COST SUMMARIES
AND TOTALS

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
EXTERIOR	0	0	11,701	0	0	0	0	0	0	0	49,184	0	0	0	$60,884
INTERIOR	0	0	0	0	0	0	0	36,134	0	0	2,488	0	0	0	$38,621
PLUMBING	0	129,835	0	0	0	289,449	0	0	0	0	54,284	1,385	0	0	$474,953
HVAC	0	0	2,312,246	38,132	0	8,727	0	0	0	0	159,323	45,285	0	0	$2,563,714
FIRE/LIFE SAFETY	0	0	0	61,316	0	0	0	0	0	18,120	39,820	0	0	5,980	$125,236
ELECTRICAL	19,340	121,643	0	157,451	0	47,227	0	0	0	0	922,644	25,356	0	0	$1,293,661
SITE	0	0	2,448	1,822,926	0	0	0	0	0	0	0	0	0	0	$1,825,374
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$19,340	$251,477	$2,326,395	$2,079,826	$0	$345,404	$0	$36,134	$0	$18,120	$1,227,743	$72,027	$0	$5,980	$6,382,445
TOTAL NONRECURRING PROJECT NEEDS			$2,597,212	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$3,785,232	

CURRENT REPLACEMENT VALUE	$29,500,400
FACILITY CONDITION NEEDS INDEX	0.22
FACILITY CONDITION INDEX	0.07

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
8,140	$6,382,445	784.08

All costs shown as Present Value

RENEWAL COSTS BY SYSTEM

CATEGORY	NONRECURRING ASSESSMENT RECOMENDATON	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	$0	$0	$0
EXTERIOR	$11,701	$49,184	$60,884
INTERIOR	$0	$38,621	$38,621
PLUMBING	$129,835	$345,118	$474,953
HVAC	$2,312,246	$251,468	$2,563,714
FIRE/LIFE SAFETY	$0	$125,236	$125,236
ELECTRICAL	$140,983	$1,152,679	$1,293,661
SITE	$2,448	$1,822,926	$1,825,374
VERT. TRANS	$0	$0	$0
HEALTH	$0	$0	$0
TOTALS	**$2,597,212**	**$3,785,232**	**$6,382,445**

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COST

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
HLHVEEL01	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	D5010	Immediate	Plant Adaption	19,340
HLCPEL01	INSTALL VFDS FOR THE COOLING TOWER FANS		Critical	Plant Adaption	102,303
HLPWFPL01	REPLACE OLDEST WATER SERVICE LINES		Critical	Corrective Action	91,801
HLSANPL01	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES		Critical	Plant Adaption	14,491
HLSTRPL01	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES		Critical	Plant Adaption	23,542
HLHVEEL02	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	D5010	Critical	Plant Adaption	19,340
HLHCDHV01	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION		Noncritical	Corrective Action	47,288
HLHCDHV02	REMOVE AND REPLACE PIPE, VALVES, AND EXPANSION JOINTS		Noncritical	Corrective Action	2,264,958
HLCPES01	EXTERIOR WALL FINISH RENEWAL	B2010	Noncritical	Corrective Action	11,701
HLCPSI01	REDIRECT RUNOFF AWAY FROM FOUNDATION	G2050	Noncritical	Corrective Action	2,448
				TOTAL	**2,597,212**

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
HLCP	BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	HLCP HVAC DIST.	D3060	Deferred Renewal	16,186
HLCP	BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	HLCP REF. MONITOR	D3060	Deferred Renewal	21,947
HLCP	FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	HLCP CENTRAL PLANT	D4030	Deferred Renewal	39,820
HLCP	FA02	FIRE ALARM SYSTEM - DEVICES	HLCP CENTRAL PLANT	D4030	Deferred Renewal	21,496
HLHVE	SW06	PAD-MOUNT SWITCH - 15 KV	HLRC SWITCH 3	D5010	Deferred Renewal	90,002
HLCP	VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	HLCP VFD HRU-2 SF	D5010	Deferred Renewal	6,276
HLCP	VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	HLCP VSD CP-10	D5010	Deferred Renewal	9,150
HLCP	VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	HLCP VSD CP-11	D5010	Deferred Renewal	9,150
HLCP	VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	HLCP VSD CP-12	D5010	Deferred Renewal	9,150
HLCP	VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	HLCP VSD CP-4	D5010	Deferred Renewal	9,150
HLCP	VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	HLCP VSD CP-5	D5010	Deferred Renewal	9,150
HLCP	VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	HLCP VSD CP-6	D5010	Deferred Renewal	9,150
HLCP	LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HLCP EXT. LIGHTING	D5020	Deferred Renewal	6,271
HLSAN	MH02	MANHOLE - 5 TO 10 FT DEEP	ESTIMATED	G3020	Deferred Renewal	30,944
HLSAN	MH03	MANHOLE - 10 TO 15 FT DEEP	ESTIMATED	G3020	Deferred Renewal	34,737
HLSAN	SP06	SANITARY SEWER PIPE - 8" DIAMETER	ESTIMATED	G3020	Deferred Renewal	469,491
HLSAN	SP08	SANITARY SEWER PIPE - 12" DIAMETER	ESTIMATED	G3020	Deferred Renewal	247,262
HLSTR	ST02	STORMWATER PIPE - 12" DIAMETER	ESTIMATED	G3030	Deferred Renewal	477,284
HLSTR	ST03	STORMWATER PIPE - 15" DIAMETER	ESTIMATED	G3030	Deferred Renewal	244,697
HLSTR	ST04	STORMWATER PIPE - 18" DIAMETER	ESTIMATED	G3030	Deferred Renewal	125,781
HLSTR	ST05	STORMWATER PIPE - 24" DIAMETER	ESTIMATED	G3030	Deferred Renewal	108,815
HLSTR	ST12	COMBO DRAIN - LESS THAN 5 FT DEEP	ESTIMATED	G3030	Deferred Renewal	60,831
HLSTR	ST15	MANHOLE - LESS THAN 5 FT DEEP	ESTIMATED	G3030	Deferred Renewal	15,348
HLSTR	ST16	MANHOLE - 5 TO 10 FT DEEP	ESTIMATED	G3030	Deferred Renewal	7,736
HLCP	BF03	BACKFLOW PREVENTER (2-3 INCHES)	HLCP BF-1	D2020	2018	7,105

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
HLCP	PP01	DOMESTIC WATER BOOSTER SYSTEM	HLCP BOOSTER PUMP	D2020	2018	61,598
HLCP	WT04	WATER SOFTENER (>200 GPM)	HLCP SSF-3	D2020	2018	44,149
HLCP	WT04	WATER SOFTENER (>200 GPM)	HLCP SSF-2	D2020	2018	44,149
HLCP	WT04	WATER SOFTENER (>200 GPM)	HLCP SSF-1	D2020	2018	44,149
HLCP	WT04	WATER SOFTENER (>200 GPM)	HLCP WSF	D2020	2018	88,299
HLCP	AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	HLCP ACC-1	D3060	2018	8,727
HLCP	LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	HLCP MAIN LIGHTING	D5020	2018	19,727
HLCP	LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	HLCP HIGH-BAY LIGHTING	D5020	2018	27,500
HLCP	IW01	WALL FINISH - APPLIED, STANDARD		C3010	2020	12,266
HLCP	IF15	FLOORING - FLUID APPLIED, PAINT OR CLEAR SEAL		C3020	2020	23,867
HLHCD	FA02	FIRE ALARM SYSTEM - DEVICES	2004 FIRE ALARM	D4030	2022	4,530
HLHCD	FA02	FIRE ALARM SYSTEM - DEVICES	1998 FIRE ALARM	D4030	2022	13,590
HLCP	RR07	ROOF - BITUMINOUS, 2-PLY, APPLIED MODIFIED BITUMEN, TORCH	AGGREGATE BALLASTED	B3010	2023	49,184
HLCP	IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD		C3020	2023	2,488
HLCP	WT04	WATER SOFTENER (>200 GPM)	HLCP SSF CW	D2020	2023	51,507
HLCP	PP03	SEWAGE LIFT STATION	HLCP SUMP PUMPS	D2030	2023	2,777
HLCP	BR02	BURNER ASSEMBLY UTILITY (0-5000 MBH)	HLCP B-1 BURNER	D3020	2023	34,885
HLCP	BR02	BURNER ASSEMBLY UTILITY (0-5000 MBH)	HLCP B-2 BURNER	D3020	2023	34,885
HLCP	BR02	BURNER ASSEMBLY UTILITY (0-5000 MBH)	HLCP B-3 BURNER	D3020	2023	34,885
HLCP	FN19	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (20"-22" DIAMETER)	HLCP EF-2	D3040	2023	6,742
HLCP	FN19	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (20"-22" DIAMETER)	HLCP EF-3	D3040	2023	6,742
HLCP	FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	HLCP GRH-1	D3040	2023	8,236
HLCP	FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	HLCP GRH-2	D3040	2023	8,236
HLCP	FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	HLCP GRH-3	D3040	2023	8,236

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
HLCP	FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	HLCP GRH-4	D3040	2023	8,236
HLCP	FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	HLCP GRH-5	D3040	2023	8,236
HLCP	FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	HLCP MAIN CAMPUS	D4030	2023	39,820
HLCP	MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	HLCP MCC-2	D5010	2023	296,303
HLCP	MC03	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (600-800A) W/STARTERS	HLCP-MCC-1	D5010	2023	626,341
HLHCD	PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	R SUMP	D2030	2024	1,385
HLCP	HU51	UNIT HEATER - STEAM/HYDRONIC (101-250 MBH)	HLCP UH-1	D3020	2024	7,548
HLCP	HU51	UNIT HEATER - STEAM/HYDRONIC (101-250 MBH)	HLCP UH-2	D3020	2024	7,548
HLCP	HU51	UNIT HEATER - STEAM/HYDRONIC (101-250 MBH)	HLCP UH-3	D3020	2024	7,548
HLCP	HU51	UNIT HEATER - STEAM/HYDRONIC (101-250 MBH)	HLCP UH-4	D3020	2024	7,548
HLCP	HU51	UNIT HEATER - STEAM/HYDRONIC (101-250 MBH)	HLCP UH-5	D3020	2024	7,548
HLCP	HU51	UNIT HEATER - STEAM/HYDRONIC (101-250 MBH)	HLCP UH-6	D3020	2024	7,548
HLHCD	LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	1998 LIGHTING	D5020	2024	19,017
HLHCD	LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	2004 LIGHTING	D5020	2024	6,339
HLHCD	FA02	FIRE ALARM SYSTEM - DEVICES	2008 TUNNEL FIRE ALARM	D4030	2026	5,980
					TOTAL	**3,785,232**

PROJECT LIST BY CLASSIFICATION

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
ES	HLCPES01	2	Corrective Action	3	EXTERIOR WALL FINISH RENEWAL	11,701
SI	HLCPSI01	3	Corrective Action	3	REDIRECT RUNOFF AWAY FROM FOUNDATION	2,448
PL	HLPWFPL01	1	Corrective Action	2	REPLACE OLDEST WATER SERVICE LINES	91,801
HV	HLHCDHV01	1	Corrective Action	3	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	47,288
HV	HLHCDHV02	2	Corrective Action	3	REMOVE AND REPLACE PIPE, VALVES, AND EXPANSION JOINTS	2,264,958
					TOTAL FOR CORRECTIVE ACTION	**2,418,196**
EL	HLCPEL01	1	Plant Adaption	2	INSTALL VFDS FOR THE COOLING TOWER FANS	102,303
PL	HLSANPL01	1	Plant Adaption	2	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	14,491
PL	HLSTRPL01	1	Plant Adaption	2	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES	23,542
EL	HLHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	19,340
EL	HLHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	19,340
					TOTAL FOR PLANT ADAPTION	**179,017**
					GRAND TOTAL:	**2,597,212**

PROJECT LIST BY CATEGORY CODE

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
EL	HLCPEL01	1	Plant Adaption	2	INSTALL VFDS FOR THE COOLING TOWER FANS	102,303
EL	HLHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	19,340
EL	HLHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	19,340
					TOTAL FOR EL	**140,983**
ES	HLCPES01	2	Corrective Action	3	EXTERIOR WALL FINISH RENEWAL	11,701
					TOTAL FOR ES	**11,701**
HV	HLHCDHV01	1	Corrective Action	3	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	47,288
HV	HLHCDHV02	2	Corrective Action	3	REMOVE AND REPLACE PIPE, VALVES, AND EXPANSION JOINTS	2,264,958
					TOTAL FOR HV	**2,312,246**
PL	HLPWFPL01	1	Corrective Action	2	REPLACE OLDEST WATER SERVICE LINES	91,801
PL	HLSANPL01	1	Plant Adaption	2	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	14,491
PL	HLSTRPL01	1	Plant Adaption	2	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES	23,542
					TOTAL FOR PL	**129,835**
SI	HLCPSI01	3	Corrective Action	3	REDIRECT RUNOFF AWAY FROM FOUNDATION	2,448
					TOTAL FOR SI	**2,448**
					GRAND TOTAL:	**2,597,212**

OAKLAND COMMUNITY COLLEGE

Utility & Facility Condition Assessment

Orchard Ridge Infrastructure
Group ORI

Inspected March 22, 2017

CORPORATION

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UTILITY AND FACILITY
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SECTION 1

ASSET OVERVIEW

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

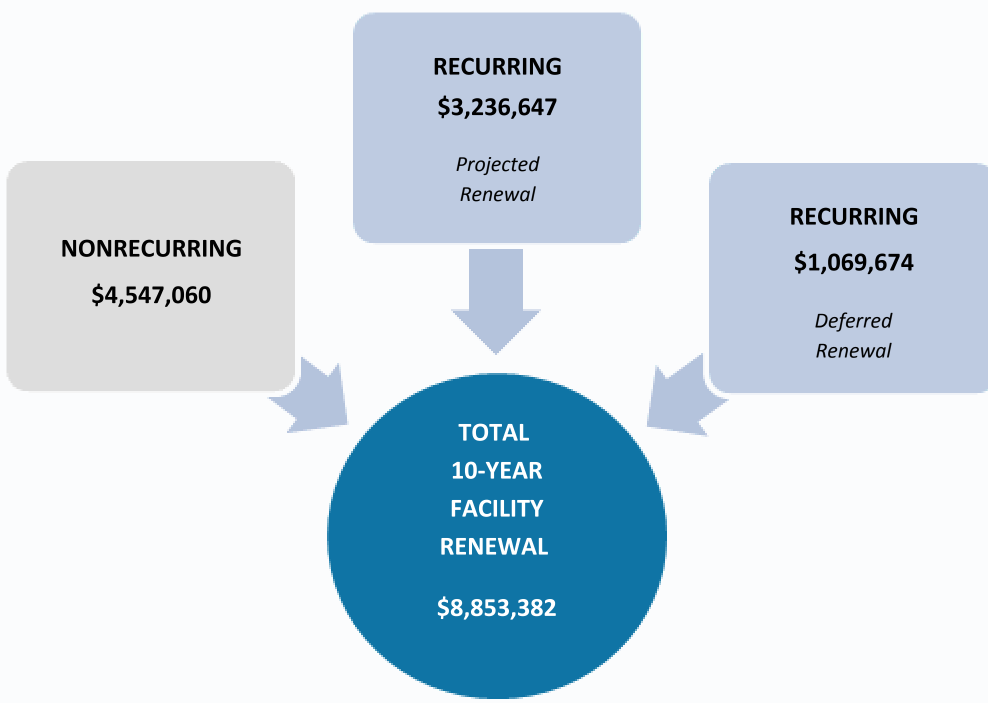
GROUP NAME	ORI : ORCHARD RIDGE INFRASTRUCTURE	**CURRENT REPLACEMENT VALUE**	$46,055,426
GSF	17,586	**FACILITY CONDITION NEEDS INDEX**	0.19
		FACILITY CONDITION INDEX	0.02
		10-YEAR $/SF	503.43

FCNI Scale

The FCNI for this asset is **0.19**

- Excellent Condition (typically new construction)
- Good Condition (maintained within lifecycle)
- Fair Condition (normal renovations required)
- Below Average Condition (major renovation required)
- Poor Condition (total renovation required)
- Replacement Indicated (unless historic)

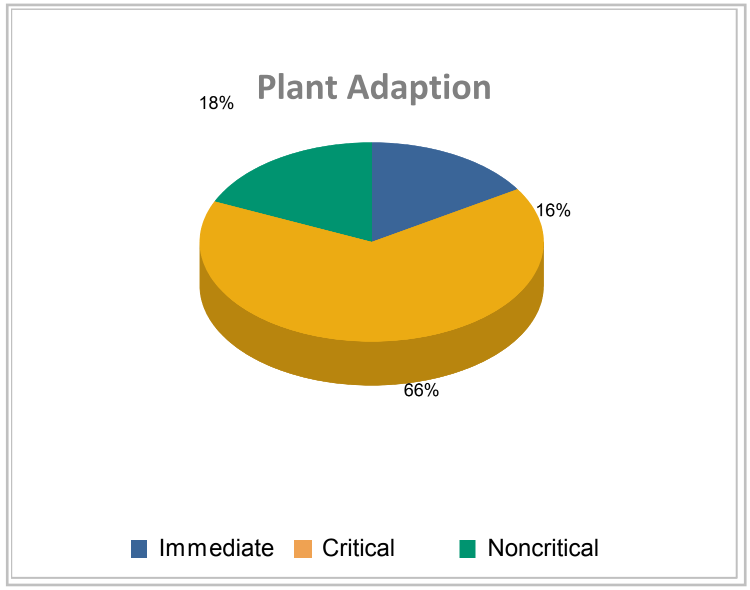
Total Facility Renewal Costs



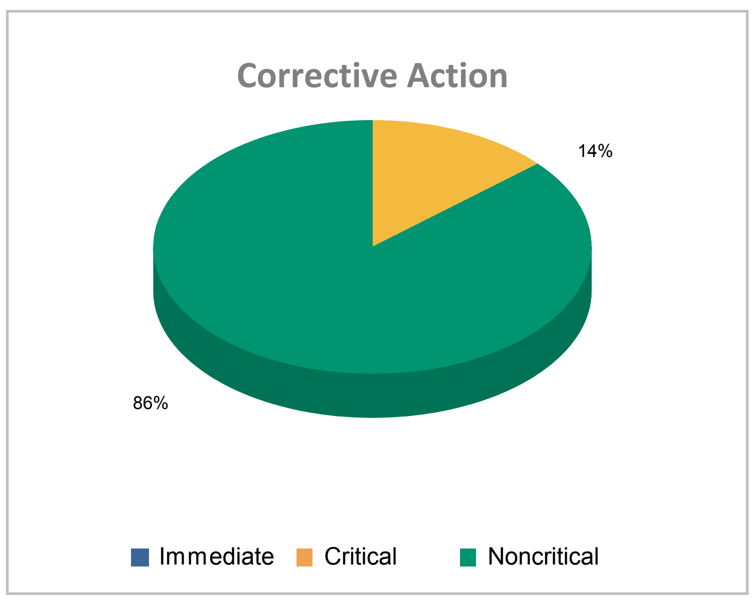
Nonrecurring Costs

Project Cost by Priority

PLANT ADAPTION	
1 - Immediate	**$30,062**
2 - Critical	**$122,715**
3 - Noncritical	**$34,073**

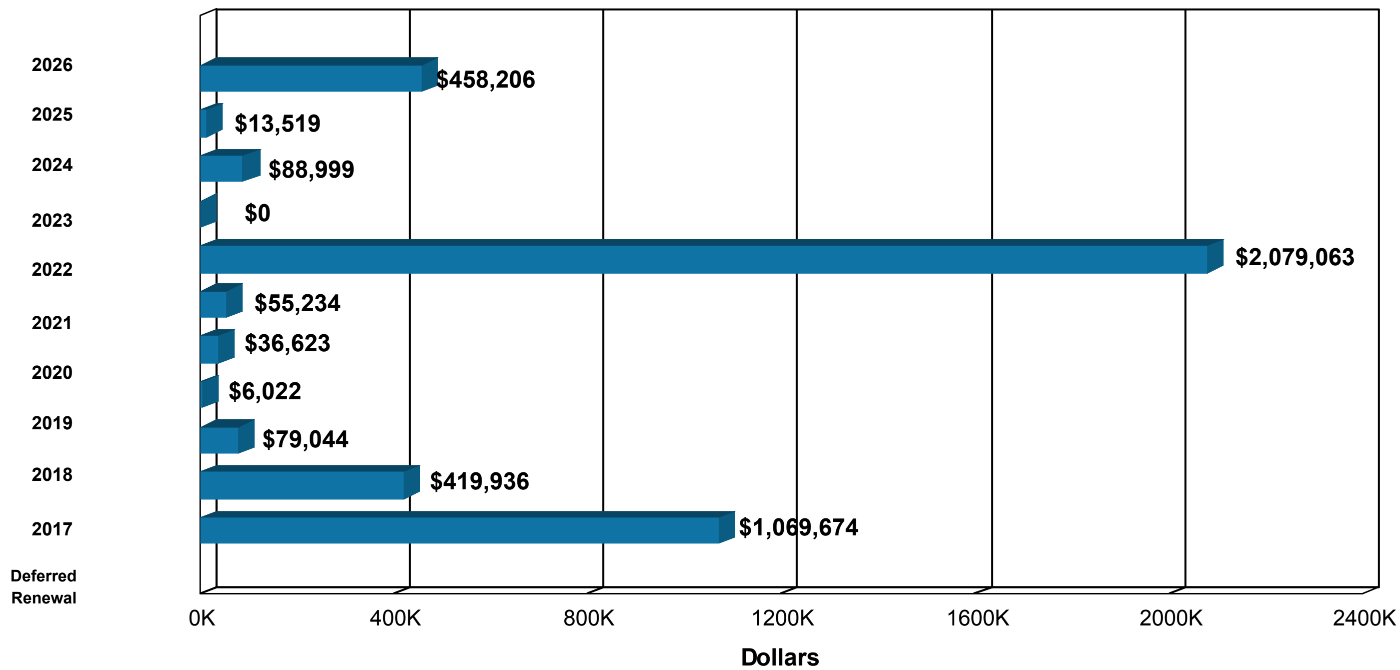


CORRECTIVE ACTION	
1 - Immediate	**$0**
2 - Critical	**$592,273**
3 - Noncritical	**$3,767,937**

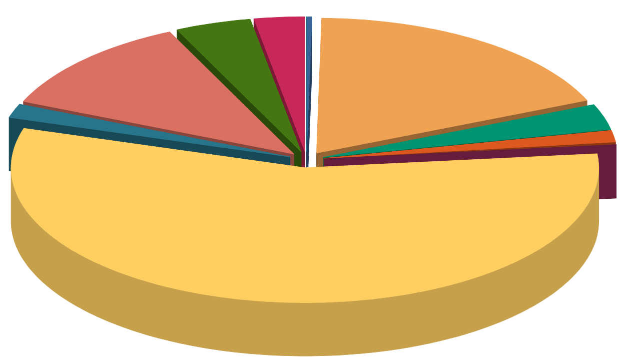


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



Accessibility	$32,713	0%
Electrical	$1,625,416	18%
Exterior	$256,359	3%
Fire/Life Safety	$137,726	2%
Health	$1,360	0%
HVAC	$5,012,183	57%
Interiors	$139,701	2%
Plumbing	$1,027,193	12%
Site	$368,074	4%
Vert. Trans.	$252,656	3%
TOTAL	**$8,853,382**	

ASSET SUMMARY

INTRODUCTION

The following is a detailed analysis of the physical condition and estimated remaining reliable operating life of the utility systems serving the facilities at the Orchard Ridge campus as well as the Facility Condition Assessment (FCA) of the Power House. The systems include:

- Power House
- Heating and Chilled Water Generation and Distribution
- High Voltage Electrical
- Sanitary Sewer
- Stormwater
- Potable and Fire Water

The goal was to produce a campuswide report with recurring and nonrecurring recommendations that have been entered into the individual utility system assets in the FCA database.

Information for this report was gathered during the site inspection conducted on March 22, 2017 and through a review of historical documents and single-line campus drawings. The assessments and estimates are based solely on visual and nondestructive observations, a review of existing drawings, previously prepared engineering reports, any available maintenance records and reports, and discussions with key personnel and specific external support companies, such as water treatment representatives. In some instances, ISES was not provided up-to-date drawings prior to the development of this report. In these cases, general project recommendations were developed, and no lifecycle model cost data was created. Additional inspection procedures and methods, along with engineering design support, may be necessary to fully define the specific costs and scope to repair various infrastructure facility deficiencies.

The specific activities involved with gathering data included a detailed request for relevant information, including system drawings, inventory data, performance data, both planned and completed capital renewal projects, and operational data (including equipment forced outage statistics. Operating data was reviewed for abnormal excursions, forced outages and peak loads. The data was evaluated for impact on the equipment’s estimated useful life. Information related to forced equipment outages, equipment reliability and operating performance was reviewed to determine trends that might affect future safety, reliability and efficiency.

It is important to note that utility infrastructure assets normally encompass more than just a single piece of equipment and will, in most situations, represent a section or group of materials, i.e., linear footage of installed piping systems or electrical wiring. The majority of these systems will continue to operate reliably and safely beyond the ten-year assessment scope, but beyond that, it will be necessary to reinspect the systems to ensure that they continue to operate reliably.

Equipment Useful Life

The estimates for remaining useful life consider safety, reliability, efficiency, and sustainability as the primary operational objectives for capital renewal. These estimates are based on actual equipment age, physical inspections, performance data reviews, personnel interviews, maintenance practices, and operating history. Expected useful life values are averaged forecasts based on equipment that is properly maintained and operated without frequent and/or severe operating excursions. Chronological equipment age is not the primary determinant of service life. In many instances, there is ample evidence of equipment operating well beyond predicted useful life values. This is why it is important to modify these values with actual equipment condition. This modification is based on service history, operating conditions, installation environment, and actual field performance. It should also be noted that equipment reaching the predicted endpoint of its expected useful life does not necessarily cease to function. What does occur is a downward trend toward loss of service reliability and an increase in forced outages and maintenance cost requirements where the equipment becomes unavailable for normal service more frequently.

The trend in recent years toward planned obsolescence by manufacturers of certain plant systems and equipment alters the strategy for capital replacement as some systems become obsolete. Although the equipment may have many remaining years of safe, reliable, and efficient operation, manufacturers are phasing systems out and not supporting the equipment past some specific phase-out date. For example, digital electronic control systems have an estimated operating life of 15 years, not because of failure to function but because of the planned lifecycle established by the OEM due to technological advancements and product development. This also results in a requirement for continuous operator training as equipment is replaced. It is not unusual for newer equipment to have better efficiency and lower operating costs. However, this requires careful analysis by owners to actualize potential savings.

For underground piping serving the potable, fire, and drainage water systems, consistent inspection through closed circuit television (CCTV) to identify intrusion and pipe deterioration is an excellent method for forecasting future capital needs. This inspection function should be included as part of the any campus annual budget and performed on a regular basis.

Factors That Affect Equipment Useful Life

Primary critical equipment was evaluated by comparing current data to manufacturer's performance ratings. Degradation in operating performance can be the result of normal wear and tear, or it can be indicative of abnormal wear. For example, boiler efficiency losses can increase due to higher than design excess air resulting from parasitic air leaks in boiler casings or out-of-calibration combustion control systems. Losses in efficiency can also be the result of internal scale and deposit formation.

The skill and ability of the operating staff can have a significant impact on overall equipment useful life. Accelerated startups, emergency shutdowns, overload excursions, air leakage, excessive water leaks, and adherence to balance-of-plant maintenance requirements are critical to the safety, reliability, and efficiency of plant equipment. In addition, proper diagnostic skills can often avoid premature outages or result in the correct decision to remove equipment from service to avoid catastrophic damage. We

spent some time in the interviews on campus discussing operator proficiency to evaluate any impact this factor may have had on equipment useful life.

One method of providing consistency in methods of system/equipment operation is the implementation of standard operating procedures (SOPs). These provide a reference guide for the operating staff for most of the expected operating conditions. They cannot, however, provide 100 percent guidance for all possible events. This is why operator training in the fundamentals of plant operation is so critical. The implementation of SOPs also provides a method of reminding operators about system equipment requirements in plants where there are few, if any, abnormal operating excursions. In this type of operation, skills that have not been exercised recently become difficult to recall under the pressure of rapidly developing events.

For heating and chilled water generation equipment and distribution piping systems, water treatment is the most salient issue in considering the estimated useful life. Internal and external equipment piping scale causes rapid performance deterioration, and corrosion can severely reduce the operating life of systems and equipment. In all cases, proper water treatment normally extends generating equipment useful life as well as balance-of-plant equipment life. We evaluated historical data as well as the current water treatment program for application and execution. The OCC system currently utilizes Rochester Midland Corporation to provide the water treatment chemicals. Some of the chemicals used include a pitting and corrosion inhibitor identified as CLT-407 for the chilled and heating water closed loop systems, chlorine, and a liquid oxygen scavenger identified as OS-912 to prevent organic and biocides from developing within the condenser water and chilled water systems.

ASSET FINDINGS

The findings for each individual asset in the Orchard Ridge campus infrastructure group will be presented in detail on the following pages, but below is a summary table of the estimated renewal costs for each asset.

FCNI Comparison

ASSET CODE	ASSET NAME	CRV ($)	TOTAL 10-YEAR NEEDS ($)	FCNI	FCI
ORE	POWER HOUSE	14,079,930	3,565,020	0.25	0.05
ORHCD	HEATING/CHILLED WATER DISTRIBUTION	19,650,576	3,844,729	0.20	0.00
ORHVE	HIGH VOLTAGE ELECTRICAL	4,474,920	293,152	0.07	0.05
ORPWF	POTABLE AND FIRE WATER	2,000,000	451,240	0.23	0.07
ORSAN	SANITARY SEWER SYSTEM	1,000,000	316,875	0.32	0.00
ORSTR	STORMWATER SEWER SYSTEM	4,850,000	382,365	0.08	0.00

Power House (ORE)

The Power House for the Orchard Ridge campus of Oakland Community College is a reinforced concrete framed high bay facility constructed in 1967 as part of the original campus and is located on the southern side of campus adjacent to and north of Oakland Drive and immediately south and connected to Building F. The facility has a brick masonry facade over a CMU wall system with a split-gable sloped concrete tile roof over a double-tee reinforced concrete beam roof truss system. The facility has hollow metal service doors for personnel access and several large overhead rollup garage doors. The interior of the plant area has concrete floors, CMU walls, with exposed concrete double-tee beam roof structure and reinforced concrete beam and column supports. The Power House contains one large main equipment room, with a support area with several small offices, a locker room, an employee break room, and parts and tool storage areas. There is a small second floor mezzanine area with a small restroom and locker room area and two small offices.

Site

The site around the facility is primarily paved asphalt service and storage areas on the west side and turf grass areas to the south and east. The cooling towers are also on the east side of the facility. The minimal landscaping is satisfactory, and no upgrade is recommended.

Exterior Structure

The pitched flat concrete tile roof appears to be original and in good condition. It is expected to outlast the scope of this report. There is a small metal canopy over the west loading dock and a small single-ply area over the boilers and the stack penetrations through the roof. These two small roofs should outlast the scope of this report. The brick masonry and concrete exterior is also in good condition, and no upgrade is recommended. However, most of the exterior metal doors, both personnel and overhead garage doors, are aging and due for replacement. The windows are original, single-pane units that are also recommended for lifecycle replacement.

Interior Finishes/Systems

The main floor is a concrete slab with a coat of paint or clear sealer. The offices have carpet, and the break room has vinyl tile. The remaining rooms, including the restroom and locker room, have sealed concrete slab floors. Most walls are painted sheetrock or CMU, except the ceramic tile in the restroom. Most ceilings are painted concrete. The office that has 12 inch adhered ceiling tile, and the break room has an aged suspended grid acoustical tile ceiling. Most of these finishes and the break room casework are due for lifecycle replacement to improve the overall appearance of the interior. The interior doors are original but should just outlast the scope of this report.

Accessibility

The facility is not open to the public and therefore not normally required to be handicapped accessible. However, as interior upgrades are made, accessibility improvements should be incorporated. This should include the installation of ADA compliant handrails and code compliant guardrails on the stairs. Also, any new interior doors should have lever hardware. Also provide handicapped accessible restroom and break room amenities as these are upgraded at the end of their lifecycle. No additional accessibility upgrades are deemed necessary at this time.

Health

Based on the age of the structure, it is possible that both lead paint and asbestos-containing materials were used in the original building construction. The original 12 inch adhered ceiling tiles in the first floor offices are suspected to contain asbestos. Prior to replacing these systems, they should be properly investigated and abated. The lead paint and asbestos health risks are minimal, but workers present during any remodeling should be made aware of the hazards of working with such materials.

Fire/Life Safety

This facility is served by an addressable fire alarm system that was installed in 1997. It is comprised of a control panel (FACP), manual pull stations, heat/smoke detectors, and audible and visual notification devices. This system is in proper working order, but the main panel and associated devices are operating beyond their statistical lifecycle. It is recommended that this system be updated.

The main campus FACP is also located within this facility and is an addressable Simplex panel installed in 1997. It is in proper working order but will reach the end of its useful life within the next ten years and should be replaced. This facility is equipped with a refrigerant leak monitoring system that is operating beyond the statistical service life. Replacement is recommended.

This facility has some limited dedicated fire suppression equipment. Although original, this system is reportedly in proper working order and should outlast the scope of this report. However, some of the sprinkler heads may need to be replaced as part of routine maintenance.

HVAC

The Power House is equipped with the central chilled and heating water equipment that serves this campus. These systems have been maintained and are in proper operating condition.

The campus chilled water is generated by two local Trane water-cooled, centrifugal chillers identified as CH-1 and CH-2. Chiller CH-1 is rated for 770 tons and was installed in 1998, while CH-2 is rated for 500 tons and was installed in 2004. Both are serviceable and with continued maintenance and inspection will remain reliable beyond the next ten years.

The cooling tower assembly located outside the facility is an original three-cell unit. The components of these towers have been modified, including new fan assemblies and infill. Observed deficiencies include moderate white rust on the steel support structure and minor to moderate scale on the infill. Modifications to the tower assembly have extended its reliable life, but additional modifications and replacement are recommended.

Campus heating hot water is generated by three natural gas fired boilers. Boilers B-1 and B-3 are rated for 18,800 MBH each, and boiler B-3 is rated for 12,550 MBH, all installed in 1997. They have been updated with higher efficiency, low NOX burners and combustion air equipment, but ever since this equipment was installed, the boilers have been developing tube failures. All three units are currently serviceable, but further analysis is required to fully determine the root cause of the tube failures.

Both the heating and chilled water generation systems are equipped with a series of primary and secondary pump systems that are in serviceable condition. The condenser water system is equipped with three pumps. Most of the pumps were installed in 1997 and 2008 and are in proper working condition, requiring only minimal maintenance to remain reliable. It is recommended that a major teardown and inspection of the largest horsepower chilled and condenser pumps be performed within the next ten years. Pumps P-19E, P-25E, and CWMP-1 are original and operating well beyond their useful life. They are recommended for replacement.

Other ancillary or support equipment serving the chilled and heating water systems include an original air compressor and thermal storage expansion tank located on the mezzanine. It is recommended that this equipment be replaced.

Three local air handlers provide conditioned air to occupied areas of this facility, such as offices, the break room, and locker rooms. This equipment is in proper working order. Air handlers HV-1E and AC-5E are presumed to have been installed in 2001 and with continued service will outlast the scope of this report. Air handler HV-2E on the mezzanine is original and recommended for replacement.

In addition to the forced-air system, this facility is equipped with some original hydronic heating equipment. The majority of the HVAC distribution system, which includes ductwork, heating water, and chilled water pipe, and the vast majority of the utility heating and chilled water pipe, are also original. Modernization of this system is recommended.

The controls are a hybrid of direct digital control and some pneumatic. The system is presumed to have been modernized in 2001. Although not aged like the distribution system, controls are recommended for lifecycle replacement due to technological advancements.

This building has four utility-grade through-wall/propeller exhaust fans (EF-4A, EF-4B, EF-4C and EF-4B). There is also one inline fan (EF-1). This equipment is in proper operating condition, but the propeller fans will likely require replacement near the end of the report scope.

Electrical

Primary electrical service is provided to this facility directly from DTE, and the primary electrical equipment is detailed in the High Voltage Electrical section of this report.

One dry-type transformer reduces the 13.2 kV power to 480/277 volts. It is rated for 1,000 kVA and was installed in 1997. This transformer along with a section of Square D secondary electrical switchgear form what is identified as the Bldg. E Substation. That switchgear assembly is equipped with five low-voltage power circuit breakers and has a rated capacity of 1,600 amps. This equipment is in proper working order and with continued service and maintenance will operate reliably beyond the next ten years.

An additional low-voltage switchgear assembly was installed in 2015 and has a rated capacity of 1,600 amps. This Eaton switchgear is equipped with 11 low voltage power circuit breakers that are in good condition. With continued service and maintenance, it will operate reliably beyond the report scope.

This facility is equipped with 480/277 and 208/120 volt service provided by secondary electrical switchgear and dry-type branch transformers. This system has undergone replacement in phases, including in 1997, 2009, and 2012. Panelboards SDP and EDP were updated in 2009. The remaining original portion of the secondary electrical system is recommended for replacement.

The interior lighting system is a combination of pendant, recessed, and surface-mounted fixtures primarily equipped with T8 lamps. Most of the fixtures are in proper working order but near the end of their lifecycle. Replacement with more energy-efficient fixtures is recommended.

Exterior lighting is provided by surface-mounted fixtures with HID lamps. Although in proper working condition, they are recommended for lifecycle replacement within the next ten years.

Multiple motor control center assemblies were installed in 1997 and serve many of the motors in the Power House. Typically, motor control centers receive very minimal to no maintenance and are only subject of operation when a shutdown occurs or as the seasons transition. This equipment is in proper working condition but should be considered for replacement near the end of the report scope.

Variable speed drives are connected to much of the central utility system equipment, including the cooling tower fans, secondary high temperature heating water pumps, and secondary chilled water pumps. All of these VSDs are in proper working order, but CT-1E-1, P-29, P-30, and P-31 should be replaced.

Two local transfer switches identified as ATS-1 and ATS-2 are rated for 480/277 volts and were installed in 2009. This equipment is in good condition and no recommendations were developed at this time.

Plumbing

Domestic water supply piping is copper, and the drain piping is cast-iron or black steel pipe. These systems are original but appear to be in proper working condition. The supply piping has reached the end of its reliable life and is recommended for replacement. The drain piping should outlast the scope of this report.

The plumbing fixtures consist of original porcelain lavatories and water closets, a shower stall, kitchen sink, and utility sink. They have reached the end of their lifecycle and are recommended for replacement. The emergency eyewash and combination eyewash/shower station were installed in 2001 and are in good condition. No upgrade is recommended.

Domestic hot water is generated from two unfired shell-and-tube water heaters. Unit HE-7E is original and recommended for replacement. Unit WH-2E was updated in 2000 and will remain reliable beyond the scope of this assessment.

The two backflow preventers are in proper working order and are presumed to be the domestic water primary and bypass backflows. They were installed in 1997 and have reached the end of their statistical life. Replacement is recommended.

The water softener was installed in 1997 and provides conditioned water for the central hydronic systems. It has reached the end of its reliable service life and is recommended for replacement.

Vertical Transportation

The hydraulic service elevator is original and recommended for modernization.

Heating and Chilled Water Distribution

The heating hot water and chilled water distribution systems at the Auburn Hills campus consist of approximately 6,200 linear feet of chilled water supply and return pipe of various sizes. There is also an estimated 6,500 linear feet of heating water supply and return pipe of various sizes. There is 300 linear feet of condenser water pipe for the Power House as well. These are estimates, as no scaled utility drawings were available prior to the development of this report. Overall, the system is in proper operating condition and has been well maintained.

It is believed that the chilled water and heating water piping systems are constructed of schedule 40 steel pipe wrapped with insulation and covered in a water resistant sheathing. The piping systems date to the phases of building construction and campus expansion, but the majority of the pipe in the tunnel is original. All of the main heating and chilled water pipe and valves are installed in the utility tunnel system. A series of gate and butterfly-type isolation valves are installed at each building supply and within the Power House. The piping systems are installed on a series of steel pipe hangers and utilize anchors, guides, and rollers.

Overall, the piping systems and associated support equipment are in fair condition considering their age. Observed deficiencies on the pipe and support equipment include moderate to severe corrosion on the pipe hangers, some exterior surface corrosion on the piping, and calcium deposits and corrosion on the isolation valves. In addition, some sections of pipe have damaged insulation and sheathing that should be repaired or replaced. It should be anticipated that some piping renewal will be necessary within the next ten years. To accurately determine the areas of most need, it is recommended that some ultrasonic pipe thickness testing be performed throughout the original tunnel sections.

There is one section of direct buried pipe that provides secondary heating water to building ORH. There has been an alarming trend throughout the country within the last ten years concerning direct-buried piping system line failures. Piping installed only 30 to 35 years ago is experiencing significant deterioration, and this includes pre-engineered and field installed systems. Nevertheless, the average expected useful life of these systems, with adequate installation specifications, good water treatment, and periodic preventive maintenance, is considered to be 50 years.

A document entitled “Field Investigation of Underground Distribution Systems” published by the National Academy of Sciences, National Research Council, Washington, D.C. for Task Group 54 of the Federal Construction Agency provides a detailed account of the findings of a survey conducted by a task force of 12 engineers, each with broad experience in underground piping systems. This task force conducted surveys of 41 installations at government facilities and at private production facilities in 16 states and the District of Columbia. They evaluated 131 separate systems by system classification types.

A brief summary of the results from this survey showed that 62 percent of the systems had wet insulation, 46 percent showed insulation deterioration, and 75 percent showed wet and/or deteriorated insulation. Since either wet and/or deteriorated insulation produces heat losses greater than design values, 75 percent also had excessive heat loss. External corrosion, a frequent cause of leakage, was primarily due to too thin or inadequate external coatings. Campus staff reported that there is a suspicion that the section of pipe to building ORH might have pinhole leaks. Removal and replacement of this section of pipe is recommended.

The tunnel system is constructed primarily of cast-in-place concrete and is considered to be in good condition. Very minimal spalling or failing concrete was observed. The tunnels are well ventilated and have a relatively temperate environment. The secondary electrical and lighting systems are aged and in proper working condition, and the lighting is equipped with shatter-proof coverings. The tunnels also have fire and life safety equipment and some refrigerant monitoring. It is recommended that all of these systems and equipment be replaced.

High Voltage Electrical System

This campus is provided 13.2 kV primary electrical service from Detroit Edison (DTE) via two separate utility lines (Mott and Drexel Lines) installed along Oakland Drive. This primary voltage is then reduced to 480/277 volts through campus transformers and distributed to the campus through miscellaneous switches and switchgear assemblies. Overall, the high voltage electrical system is considered to be in good condition, as there has been a concerted effort to upgrade the majority of the campus high voltage electrical gear.

The primary switchgear assembly for the campus is located within the Power House and consists of 11 load interrupters rated for 15 kV and 600 amps each. This assembly is equipped with the two main feeders (Main A Drexel Feed and Main B Southfield Feed) as well as a tie feeder. This switchgear assembly also has an automatic transfer system that provides near instantaneous transfer of power in the event of a loss of one of the main electrical feeds from DTE. This main 15 kV switchgear was installed in 2010 and is good condition. No upgrade is recommended.

An additional ten load interrupters and seven oil-filled transformers were assessed as part of this report, and most are in good to excellent condition. With proper maintenance and testing, including oil and gas analysis for the transformers, this equipment will remain safe and reliable beyond the next ten years.

In buildings B and L are sets of two original load interrupters. These are A3 and B3 in building B and A2 and B2 in building L.

Although the balance of principal equipment will outlast the report scope, it will be necessary to perform consistent maintenance over the next ten years. Currently, an oil and gas analysis is performed on the oil-filled transformers throughout campus, but the switches and circuit breakers require maintenance and operation. A campuswide electrical maintenance program on three to five year maintenance cycle is recommended. This should include the operation, maintenance, and testing of the primary load interrupters and routine operation and maintenance of any secondary electrical systems vital to the consistent operation of campus systems, such as the power circuit breakers.

The majority of the 13.2 kV campus electrical conductor is installed within cable trays in the utility tunnel networks. Overall, the primary conductor and cable trays are in good condition and should remain reliable beyond the next ten years. Within that tunnel system are three distinct splice boxes.

One natural gas fired emergency generator is located outside the Power House and is rated for 150 kW. This equipment was installed in 2010 and is in good condition.

Potable and Fire Water System

The combined potable water and fire protection system for Orchard Ridge consists of approximately 8,175 linear feet of piping (approximately 1.5 miles) ranging from 8 to 12 inches in diameter. The main supply line was installed by the township and the building loop and service lines by the college. The buried water supply line network was installed in 1967 with the original campus construction. These lines are supplied water for the campus via an eastern connection with the Farmington Township and a western connection. These connections are through 12 inch pipes connected to a township-owned line located adjacent to Orchard Lake Road to the east of campus and adjacent to Farmington Road to the west. The campus main 12 inch line runs along the south side of the campus facilities, with an 8 inch loop running along the north side. This creates a small looped system with isolation valves to permit isolation of a section of campus line or an area of campus with minimal service interruption. Most of the buildings on campus are fed from campus water mains and are not metered, making specific facility water losses impossible to determine unless directly observed.

Fire sprinkler service is provided to each building from the same water loop as the potable water, with seven site hydrants provided around campus. Campus water pressures are typically maintained at around 60 psi, creating adequate water pressure for domestic use and fire protection. Fire hydrants are maintained and pressure tested. They should outlast the scope of this report.

The domestic water and fire protection systems appear to be in overall good condition and properly sized to serve the campus. The campus staff reported no significant problems with the water supply piping. The buried linear assets of these systems are assumed to be metallic pipe with typically 65 to 75 years of expected service life, although soil type, annual rainfall, and local disturbances typically factor in the longevity of buried piping. Based on this presumption, it is not expected that wholesale line lifecycle replacement will be necessary in the next ten years. However, based on discussions with the facility staff, it is believed that the original campus water service laterals are aged and could be nearing the end of their expected service life. Most of the supply lines on campus were installed by the city. They are primarily the service laterals from the city supply mains. The service lines are now around 50 years old and are anticipated to need replacement in the next ten years. Also, the domestic water booster systems and the storage tank are reaching the end of their expected service life and should be replaced.

Sanitary Sewer Collection System

The sanitary sewer system is a collection and conveyance system. It is aged but in good operating condition. Campus staff reported no past or present systematic issues with the network. Campus construction began around 1967, and with the exception of the addition of several facilities, the campus has experienced little change. All of the lines are typically first-time installations, not replacement of previously installed lines. Farmington Township has a large 15 to 21 inch sewer outfall line crossing the east half of campus by the parking lots and discharging into the northernmost campus manhole. The sanitary sewer owned by the college is collected on the west side of campus and also discharges into that manhole. The college sewer network consists of approximately 3,440 linear feet of sewer collection line. Even though the drawings provided did not indicate the material type for the piping, it is assumed to be ductile iron, PVC, concrete, or clay. All of the sewer collection lines on campus are 10 inches or smaller, with the service laterals typically sized at 6 inches in diameter. There are also approximately 12 sanitary sewer manholes of varying depths. Grease traps installed for campus kitchens were not part of this assessment but are being properly maintained.

Even though this area has an above average annual rainfall, there were no indications during the inspection of significant stormwater infiltration or inflow issues within the system. Reducing potable water use on campus helps to reduce wastewater flows, which in turn helps keep the maximum capacity available for peak flow events.

The Orchard Ridge campus drains entirely into the college 10 inch sewer main that runs north of campus and that subsequently discharges into the township sanitary sewage manhole and conveyance lines to the north of campus. These municipal-owned lines transport the sewage to the nearest wastewater treatment facility.

Over 80 percent of the sanitary sewer lines were installed around 1967, but only the original 6 and 8 inch sewer laterals will reach the end of their expected service life in the next ten years and should be replaced. It should be noted that the entire original sanitary sewer collection network is expected to reach the end of its typical service life within the next ten to twenty years. Through discussions with the facility staff, it was determined that the building laterals have the most potential for failure based on the past performance and system history.

It is a good policy and a recommendation of this report to develop and conduct a preventative maintenance program for the sanitary sewer collection system. A vital part of that preventive program is video-monitoring the linear assets when and where feasible. Jetwash any built-up debris or solids discovered in the lines and/or manholes to ensure that the pipes have the maximum flow capacity available to handle peak flow demand periods. Lines need to be generally free of flow to allow proper observations. Evaluate the oldest and/or most problematic sewer collection lines first to determine the characteristics of the typical flow and identify any urgent or critical repair or replacement needs. Routinely CCTV inspect a portion of the infrastructure every couple of years and typically all lines at least once every ten years. With the age of the system and expected lifecycle, it is inevitable that portions will wear out and need to be repaired or replaced. The CCTV inspections will allow the college to identify problem areas and then plan and budget for that repair or replacement.

Stormwater Sewer Collection System

Most of the stormwater sewer network dates to the 1967 campus construction, with only minor additions and connections installed as a result of new facility construction. The campus stormwater is all gravity flow through a network of pipes and manholes, with no mechanical pumping systems required. All of the lines are typically first-time installations, with no known replacements of previously deficient lines. The system consists of approximately 16,970 linear feet of drain line that is believed to be mostly concrete. It is estimated that 7,025 linear feet of this drain line is large 24 to 60 inch main outfall lines, with the remaining 9,945 linear feet being collection and service lateral lines sized between 6 and 18 inches in diameter. There are also approximately 75 stormwater catch basins and drop inlets and 20 stormwater manholes of various depths. Roof drain leaders from campus facilities are connected to the underground piping network and the stormwater collected along with other campus stormwater runoff.

Because of the rolling hills the campus was built on, there are multiple drainage areas for addressing stormwater runoff. The eastern third of the campus typically slopes to the east, and the stormwater collected from the east parking lots flows by gravity to the lower wetlands to the east. Most of the stormwater collected in the central campus area, where most of the buildings are, flows to the north through numerous outfall lines to Minnow Drain creek and the two manmade ponds. One of the larger outfall lines collects stormwater through the central campus courtyard, where it then discharges into the main pond to the north. The western third of the campus, which is primarily parking lots, collects stormwater and generally transports it to the west to Minnow Drain. All of these areas flow by gravity.

The stormwater sewer system is a collection and conveyance system. Surface water runoff collecting on paved areas drains into storm sewer catch basins and drop inlets normally at street corners, curb and gutter lines, and parking lots. Rainfall on landscaped areas is channeled around campus utilizing grassed swales that typically lead to subsurface drainage structures. Catch basins and drop inlets on the surface are connected to a series of underground sewer collection pipes that convey the discharge to nearby open channels and/or larger city-owned outfall lines and culverts.

As stormwater recedes, the leaves, sediment, and debris transported during a storm settle in catch basins and sewer lines, reducing the overall capacity of the system. Stormwater can also pick up chemicals and other pollutants as it flows across streets, curbs, and gutters and can erode ditches, grass ways, or stream banks. The debris-laden or polluted runoff is commonly transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local streams, lakes, and coastal marshlands without treatment.

Since the drain lines are well within their lifecycles, and no problems have been reported, no lifecycle replacement of linear assets is recommended. However, based on statistical data, the original lines installed in 1967 and some installed in the 1970s will reach the end of their service life in the next 16 to 26 years. As with the sanitary sewer lines, it is recommended that the system be CCTV inspected to record and observe any flow characteristics and identify potential structural deficiencies that could reduce the capacity. Based on the CCTV inspections, it is expected that some lines and structures, such as manholes, catch basins, and drop inlets, will need repair and/or replacement. This may include line replacements and miscellaneous catch basin, drop inlet, or manhole structural or concrete repairs, including replacing broken storm grates and inlet covers and securing both existing and new grates and covers with an adequate concrete collar.

Part of conducting a thorough preventative maintenance program for the stormwater sewer system is the maintenance of stormwater inlets and outlets. As the system continues to age, elevated levels of preventive maintenance should be applied to ensure continued operating reliability. A typical preventative maintenance program for stormwater inlets and outlets includes:

- Inspect and remove debris/litter as necessary
- Inspect for structural repairs and concrete headwall deterioration
- Inspect for erosion issues, filling eroded areas and re-sodding or replanting vegetation and replacing riprap that has washed away
- Unplug or replace damaged screens and/or grates
- Inspect for and reduce potential mosquito breeding habitats

There are numerous catch basins, drop inlets, and curb drains around campus. Some are in natural and/or landscaped areas with well-developed vegetation. As a result, these collection inlets have the potential to clog with vegetative debris, possibly causing localized flooding. There are also several locations where the collected stormwater is discharged through a pipe outlet to a surface swale or ditch or to the stormwater pond north of campus. These areas sometimes erode due to the quantity or velocity of flow from the pipe unless properly protected with riprap or some other laminar flow dissipater. Clean any clogged or partially obstructed inlets, and inspect pipe discharge points to mitigate any erosion.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors thoroughly examined the accessible equipment and various components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the facility to modern standards without any anticipation of change to facility space layout or function. The total costs include variable project delivery costs as determined by the Owner. The costs developed do not represent the cost of a complete facility renovation. Soft costs not represented in this report include telecommunications, security, furniture, window treatment, space change, program issues, relocation, swing space, contingency, or costs that could not be identified or determined from the visual inspection and available building information.

INSPECTION TEAM DATA

Report Development

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Date of Inspection

March 22, 2017

Inspection Team Personnel

NAME	POSITION	SPECIALTY
Rob Camperlino	Facility Assessor	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health
Carl Mason, PE, BSCP, M.ASCE	Senior Project Engineer	Interior Finishes, Exterior Structure, ADA Compliance, Site, Fire/Life Safety, Health, Plumbing

Client Contact

NAME	POSITION
Dan P. Cherewick	Director, Physical Facilities

DEFINITIONS

The following information is a clarification of this report using example definitions.

Overview

Recurring and Nonrecurring Facility Renewal Costs

Facility renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of facility systems and components (e.g., roof or HVAC system replacement at or past the end of its normal useful life). The tool for projecting the recurring renewal costs is the Asset Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with fire/life safety or accessibility code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Facility Condition Needs Index (FCNI)

The FCNI provides a lifecycle cost comparison. It is a ratio of the sum of the recurring and nonrecurring renewal costs over ten years to the current replacement value of the asset. The current replacement value is based on replacement with current construction standards for the facility use type, and not original design parameters. This index gives the college a comparison within all buildings for identifying worst case/best case building conditions.

$$\text{FCNI} = \frac{\text{Nonrecurring Projects} + \text{10-Year Recurring Component Renewal}}{\text{Current Replacement Value}}$$

Facility Condition Index (FCI)

The FCI is a ratio of the Deferred Renewal facilities renewal costs to the current replacement value.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Oakland using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Typical general contractor fees (which could include profit, overhead, bonds, and insurance) and professional fees (architect or engineer design fees and in-house design costs) are also included in the renewal costs.

GLOBAL MARKUP	%
Local Labor Index	102.9
Local Materials Index	99.3
General Contractor Markup	20.0
Professional Fees	16.0

Recurring Costs

Asset Component Inventory and Cost Projections

The Asset Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major building systems and major components within a facility. This is a list of all major systems and components within the facility. Each indicated component has the following associated information:

CATEGORY	DEFINITION
Uniformat Code	The standard Uniformat Code that applies to the component
Component Description	This line item describes the individual component
Identifier	Unique identifying information entered for a component as necessary
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Unit Cost	The cost to replace each individual component unit (this cost is in today's dollars)
Complexity Adjustment	A factor utilize to adjust component replacement costs accordingly when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	Unit cost multiplied by quantity, in today's dollars. Note that this is a one-time renewal/replacement cost
Install Date	Year that the component was or is estimated to have been installed. When this data is not available, it defaults to the year the asset was constructed
Life Expectancy	Average life expectancy for each individual component
Life Expectancy Adjustment	Utilized to adjust the first lifecycle of the component and to express when the next replacement should occur

The component listing forms the basis of the Recurring Component Renewal Schedule, which provides a year-by-year list of projected recurring renewal costs over the next ten years. Each individual component is assigned a replacement year based on lifecycles, and the costs for each item are in future year dollars. For items that are already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot ($/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- Deferred Renewal
  Recurring repairs, generated by the Asset Component Inventory, that are past due for completion but have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral of such renewal could impair the proper functioning of the facility. Costs estimated for Deferred Renewal projects should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.
- Projected Renewal
  Recurring renewal efforts, generated by the Asset Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with fire/life safety or accessibility code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within are not included in the Asset Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- Plant Adaption
  Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).

- Corrective Action
  Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- Immediate

  Projects in this category require immediate action to:

  a. correct a cited safety hazard
  b. stop accelerated deterioration
  c. and/or return a facility to normal operation

- Critical

  Projects in this category include actions that must be addressed in the short-term:

  a. repairs to prevent further deterioration
  b. improvements to facilities associated with critical accessibility needs
  c. potential safety hazards

- Noncritical

  Projects in this category include:

  a. improvements to facilities associated with noncritical accessibility needs

  b. actions to bring a facility into compliance with current building codes as grandfather clauses expire

  c. actions to improve the usability of a facility following an occupancy or use change

Category Codes

CATEGORY CODE*			SYSTEM DESCRIPTION
AC1A	–	AC4B	ACCESSIBILITY
EL1A	–	EL8A	ELECTRICAL
ES1A	–	ES6E	EXTERIOR STRUCTURE
FS1A	–	FS6A	FIRE/LIFE SAFETY
HE1A	–	HE7A	HEALTH
HV1A	–	HV8B	HVAC
IS1A	–	IS6D	INTERIOR FINISHES/SYSTEMS
PL1A	–	PL5A	PLUMBING
SI1A	–	SI4A	SITE
SS1A	–	SS7A	SECURITY SYSTEMS
VT1A	–	VT7A	VERTICAL TRANSPORTATION

Example: **Category Code = EL5A**	
EL	System Description
5	Component Description
A	Element Description

**Refer to the Category Code Report starting on page 1.5.1.*

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

Example:

Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Drawings/Project Locations

The drawings for this facility are marked with icons (see legend on plans) denoting the specific location(s) for each project. Within each icon are the last four characters of the respective project number (e.g., 0001IS01 is marked on the plan as IS01).

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

Example: **Photo Number: 0001006e**	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

CATEGORY CODE REPORT

ACCESSIBILITY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
AC1A	Site	Stair and Railings	Includes exterior stairs and railings which are not part of the building entrance points.
AC1B	Site	Ramps and Walks	Includes sidewalks, grade change ramps (except for a building entrance), curb ramps, etc.
AC1C	Site	Parking	Designated parking spaces, including striping, signage, access aisles and ramps, etc.
AC1D	Site	Tactile Warnings	Raised tactile warnings located at traffic crossing and elevation changes.
AC2A	Building Entry	General	Covers all aspects of entry into the building itself, including ramps, lifts, doors and hardware, power operators, etc.
AC3A	Interior Path of Travel	Lifts/Ramps/ Elevators	Interior lifts, ramps and elevators designed to accommodate level changes inside a building. Includes both installation and retrofitting.
AC3B	Interior Path of Travel	Stairs and Railings	Upgrades to interior stairs and handrails for accessibility reasons.
AC3C	Interior Path of Travel	Doors and Hardware	Accessibility upgrades to the interior doors including widening, replacing hardware power, assisted operators, etc.
AC3D	Interior Path of Travel	Signage	Interior building signage upgrades for compliance with the ADA.
AC3E	Interior Path of Travel	Restrooms/ Bathrooms	Modifications to and installation of accessible public restrooms and bathrooms. Bathrooms that are an integral part of residential suites are catalogued under HC4A.
AC3F	Interior Path of Travel	Drinking Fountains	Upgrading/replacing drinking fountains for reasons of accessibility.
AC3G	Interior Path of Travel	Phones	Replacement/modification of public access telephones.
AC4A	General	Functional Space Modifications	This category covers all necessary interior modifications necessary to make the services and functions of a building accessible. It includes installation of assistive listening systems, modification of living quarters, modifications to laboratory workstations, etc. Bathrooms that are integral to efficiency suites are catalogued here.
AC4B	General	Other	All accessibility issues not catalogued elsewhere.

ELECTRICAL

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
EL1A	Incoming Service	Transformer	Main building service transformer.
EL1B	Incoming Service	Disconnects	Main building disconnect and switchgear.
EL1C	Incoming Service	Feeders	Incoming service feeders. Complete incoming service upgrades, including transformers, feeders, and main distribution panels are catalogued here.
EL1D	Incoming Service	Metering	Installation of meters to record consumption and/or demand.
EL2A	Main Distribution Panels	Condition Upgrade	Main distribution upgrade due to deficiencies in condition.
EL2B	Main Distribution Panels	Capacity Upgrade	Main distribution upgrades due to inadequate capacity.
EL3A	Secondary Distribution	Step-Down Transformers	Secondary distribution step-down and isolation transformers.
EL3B	Secondary Distribution	Distribution Network	Includes conduit, conductors, sub-distribution panels, switches, outlets, etc. Complete interior rewiring of a facility is catalogued here.

EL3C	Secondary Distribution	Motor Controllers	Mechanical equipment motor starters and control centers.
EL4A	Devices and Fixtures	Exterior Lighting	Exterior building lighting fixtures, including supply conductors and conduit.
EL4B	Devices and Fixtures	Interior Lighting	Interior lighting fixtures (also system wide emergency lighting), including supply conductors and conduits.
EL4C	Devices and Fixtures	Lighting Controllers	Motion sensors, photocell controllers, lighting contactors, etc.
EL4D	Devices and Fixtures	GFCI Protection	Ground fault protection, including GFCI receptacles and breakers.
EL4E	Devices and Fixtures	Lightning Protection	Lightning arrestation systems including air terminals and grounding conductors.
EL5A	Emergency Power System	Generation/ Distribution	Includes generators, central battery banks, transfer switches, emergency power grid, etc.
EL6A	Systems	UPS/DC Power Supply	Uninterruptible power supply systems and DC motor-generator sets and distribution systems.
EL7A	Infrastructure	Above Ground Transmission	Includes poles, towers, conductors, insulators, fuses, disconnects, etc.
EL7B	Infrastructure	Underground Transmission	Includes direct buried feeders, duct banks, conduit, manholes, feeders, switches, disconnects, etc.
EL7C	Infrastructure	Substations	Includes incoming feeders, breakers, buses, switchgear, meters, CTs, PTs, battery systems, capacitor banks, and all associated auxiliary equipment.
EL7D	Infrastructure	Distribution Switchgear	Stand-alone sectionalizing switches, distribution switchboards, etc.
EL7F	Infrastructure	Area and Street Lighting	Area and street lighting systems, including stanchions, fixtures, feeders, etc.
EL8A	General	Other	Electrical system components not catalogued elsewhere.

EXTERIOR STRUCTURE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
ES1A	Foundation/ Footing	Structure	Structural foundation improvements involving structural work on foundation wall/footing, piers, caissons, and piles, including crack repairs, shoring, and pointing
ES1B	Foundation/ Footing	Dampproofing/ Dewatering	Foundation/footing waterproofing work, including, damp-proofing, dewatering, insulation, etc.
ES2A	Columns/Beams/ Walls	Structure	Structural work to primary load-bearing structural components aside from floors, including columns, beams, bearing walls, lintels, arches, etc.
ES2B	Columns/Beams/ Walls	Finish	Work involving restoration of the appearance and weatherproof integrity of exterior wall/structural envelope components, including masonry/pointing, expansion joints, efflorescence and stain removal, grouting, surfacing, chimney repairs, etc.
ES3A	Floor	Structure	Work concerning the structural integrity of the load supporting floors, both exposed and unexposed, including deformation, delamination, spalling, shoring, crack repair, etc.
ES4A	Roof	Repair	Work on waterproof horizontal finish (roof) involving repair and/or limited replacement (<40% total), including membrane patching, flashing repair, coping caulk/resetting, PPT wall parging/coating, walk pad installation, skylight and roof hatch R&R, etc.
ES4B	Roof	Replacement	Work involving total refurbishment of roofing system, including related component rehab.
ES5A	Fenestrations	Doors	Work on exterior exit/access door, including storefronts, airlocks, air curtains, vinyl slat doors, all power/manual operating hardware (except handicapped), etc.
ES5B	Fenestrations	Windows	Work on exterior fenestration closure and related components, including glass/metal/wood curtain walls, fixed or operable window sashes, glazing, frames, sills, casings, stools, seats, coatings, treatments, screens, storm windows, etc.

ES6A	General	Attached Structure	Work on attached exterior structure components not normally considered in above categories, including porches, stoops, decks, monumental entrance stairs, cupolas, tower, etc.
ES6B	General	Areaways	Work on attached grade level or below structural features, including subterranean lightwells, areaways, basement access stairs, etc.
ES6C	General	Trim	Work on ornamental exterior (generally nonstructural) elements, including beltlines, quoins, porticos, soffits, cornices, moldings, trim, etc.
ES6D	General	Superstructure	Finish and structural work on nonstandard structures with exposed load-bearing elements, such as stadiums, bag houses, bleachers, freestanding towers, etc.
ES6E	General	Other	Any exterior work not specifically categorized elsewhere, including finish and structural work on freestanding boiler stacks.

FIRE/LIFE SAFETY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
FS1A	Lighting	Egress Lighting/Exit Signage	R&R work on exit signage and packaged AC/DC emergency lighting.
FS2A	Detection/Alarm	General	Repair or replacement of fire alarm/detection system/components, including alarms, pull boxes, smoke/heat detectors, annunciator panels, central fire control stations, remote dialers, fire station communications, etc.
FS3A	Suppression	Sprinklers	Repair or installation of water sprinkler type automatic fire suppressions, including wet-pipe and dry-pipe systems, heads, piping, deflectors, valves, monitors, associated fire pump, etc.
FS3B	Suppression	Standpipe/Hose	Repair or installation of standpipe system or components, including hardware, hoses, cabinets, nozzles, necessary fire pumping system, etc.
FS3C	Suppression	Extinguishers	Repairs or upgrades to F.E. cabinets/wall fastenings and handheld extinguisher testing/replacement.
FS3D	Suppression	Other	Other fire suppression items not specifically categorized elsewhere, including fire blankets, carbon dioxide automatic systems, Halon systems, dry chemical systems, etc.
FS4A	Hazardous Materials	Storage Environment	Installation or repair of special storage environment for the safe holding of flammable or otherwise dangerous materials/supplies, including vented flammables storage cabinets, holding pens/rooms, cages, fire safe chemical storage rooms, etc.
FS4B	Hazardous Materials	User Safety	Improvements, repairs, installation, or testing of user safety equipment, including emergency eyewashes, safety showers, emergency panic/shut-down system, etc.
FS5A	Egress Path	Designation	Installation, relocation or repair of posted diagrammatic emergency evacuation routes.
FS5B	Egress Path	Distance/ Geometry	Work involving remediation of egress routing problems, including elimination of dead end corridors, excessive egress distance modifications, and egress routing inadequacies.
FS5C	Egress Path	Separation Rating	Restoration of required fire protective barriers, including wall rating compromises, fire-rated construction, structural fire proofing, wind/safety glazing, transom retrofitting, etc.
FS5D	Egress Path	Obstruction	Clearance of items restricting the required egress routes.
FS5E	Egress Path	Stairs Railing	Retrofit of stair/landing configurations/structure, railing heights/geometries, etc.
FS5F	Egress Path	Fire Doors/ Hardware	Installation/replacement/repair of fire doors and hardware, including labeled fire doors, fire shutters, closers, magnetic holders, panic hardware, etc.
FS5G	Egress Path	Finish/Furniture Ratings	Remediation of improper fire/smoke ratings of finishes and furniture along egress routes.
FS6A	General	Other	Life/fire safety items not specifically categorized elsewhere.

HEALTH

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HE1A	Environmental Control	Equipment and Enclosures	Temperature control chambers (both hot and cold) for non-food storage. Includes both chamber and all associated mechanical equipment.
HE1B	Environmental Control	Other	General environmental control problems not catalogued elsewhere.
HE2A	Pest Control	General	Includes all measures necessary to control and destroy insects, rodents, and other pests.
HE3A	Refuse	General	Issues related to the collection, handling, and disposal of refuse.
HE4A	Sanitation Equipment	Laboratory and Process	Includes autoclaves, cage washers, steam cleaners, etc.
HE5A	Food Service	Kitchen Equipment	Includes ranges, grilles, cookers, sculleries, etc.
HE5B	Food Service	Cold Storage	Includes the cold storage room and all associated refrigeration equipment.
HE6A	Hazardous Material	Structural Asbestos	Testing, abatement, and disposal of structural and building finish materials containing asbestos.
HE6B	Hazardous Material	Mechanical Asbestos	Testing, abatement, and disposal of mechanical insulation materials containing asbestos.
HE6C	Hazardous Material	PCBs	Includes testing, demolition, disposal, and cleanup of PCB contaminated substances.
HE6D	Hazardous Material	Fuel Storage	Includes monitoring, removal, and replacement of above and below ground fuel storage and distribution systems. Also includes testing and disposal of contaminated soils.
HE6E	Hazardous Material	Lead Paint	Testing, removal, and disposal of lead-based paint systems.
HE6F	Hazardous Material	Other	Handling, storage, and disposal of other hazardous materials.
HE7A	General	Other	Health related issues not catalogued elsewhere.

HVAC

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HV1A	Heating	Boilers/Stacks/ Controls	Boilers for heating purposes, including their related stacks, flues, and controls.
HV1B	Heating	Radiators/ Convectors	Including cast-iron radiators, fin tube radiators, baseboard radiators, etc.
HV1C	Heating	Furnace	Furnaces and their related controls, flues, etc.
HV1D	Heating	Fuel Supply/Storage	Storage and/or distribution of fuel for heating purposes, including tanks and piping networks and related leak detection/monitoring.
HV2A	Cooling	Chillers/ Controls	Chiller units for production of chilled water for cooling purposes, related controls (not including mods for CFC compliance).
HV2B	Cooling	Heat Rejection	Repair/replacement of cooling towers, dry coolers, air-cooling, and heat rejection. Includes connection of once-through system to cooling tower.
HV3A	Heating/Cooling	System Retrofit/ Replace	Replacement or major retrofit of HVAC systems.
HV3B	Heating/Cooling	Water Treatment	Treatment of hot water, chilled water, steam, condenser water, etc.
HV3C	Heating/Cooling	Package/Self-Contained Units	Repair/replacement of self-contained/package type units, including stand-up units, rooftop units, window units, etc.; both air conditioners and heat pumps.
HV3D	Heating/Cooling	Conventional Split Systems	Repair, installation, or replacement of conventional split systems, both air conditioners and heat pumps, including independent component replacements of compressors and condensers.

HV4A	Air Moving/ Ventilation	Air Handlers/ Fan Units	Includes air handlers and coils, fan coil units, unit ventilators, filtration upgrades, etc., not including package/self-contained units, split systems, or other specifically categorized systems.
HV4B	Air Moving/ Ventilation	Exhaust Fans	Exhaust fan systems, including fans, range and fume hoods, controls, and related ductwork.
HV4C	Air Moving/ Ventilation	Other Fans	Supply, return, or any other fans not incorporated into a component categorized elsewhere.
HV4D	Air Moving/ Ventilation	Air Distribution Network	Repair, replacement, or cleaning of air distribution network, including ductwork, terminal reheat/cool, VAV units, induction units, power induction units, insulation, dampers, linkages, etc.
HV5A	Steam/Hydronic Distribution	Piping Network	Repair/replacement of piping networks for heating and cooling systems, including pipe, fittings, insulation, related components, etc.
HV5B	Steam/Hydronic Distribution	Pumps	Repair or replacement of pumps used in heating and cooling systems, related control components, etc.
HV5C	Steam/Hydronic Distribution	Heat Exchangers	Including shell-and-tube heat exchangers and plate heat exchangers for heating and cooling.
HV6A	Controls	Complete System Upgrade	Replacement of HVAC control systems.
HV6B	Controls	Modifications/ Repairs	Repair or modification of HVAC control system.
HV6C	Controls	Air Compressors/ Dryers	Repair or modification of control air compressors and dryers.
HV7A	Infrastructure	Steam/Hot Water Generation	Generation of central steam and/or hot water, including boilers and related components.
HV7B	Infrastructure	Steam/Hot Water Distribution	Distribution system for central hot water and/or steam.
HV7C	Infrastructure	Chilled Water Generation	Generation of central chilled water, including chillers and related components.
HV7D	Infrastructure	Chilled Water Distribution	Distribution system for central chilled water.
HV7E	Infrastructure	Tunnels/ Manholes/ Trenches	Repairs, installation, or replacement of utility system access chambers.
HV7F	Infrastructure	Other	HVAC infrastructure issues not specifically categorized elsewhere.
HV8A	General	CFC Compliance	Chiller conversions/replacements for CFC regulatory compliance, monitoring, etc.
HV8B	General	Other	HVAC issues not catalogued elsewhere.

INTERIOR FINISHES/SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
IS1A	Floor	Finishes-Dry	R&R of carpet, hardwood strip flooring, concrete coating, vinyl linoleum and tile, marble, terrazzo, rubber flooring, and underlayment in predominantly dry areas ("dry" includes non-commercial kitchens)
IS1B	Floor	Finishes-Wet	Flooring finish/underlayment work in predominantly "wet" areas, including work with linoleum, rubber, terrazzo, concrete coating, quarry tile, ceramic tile, epoxy aggregate, etc.
IS2A	Partitions	Structure	Structural work on full height permanent interior partitions, including wood/metal stud and drywall systems, CMU systems, structural brick, tile, glass block, etc.
IS2B	Partitions	Finishes	Work on full height permanent interior partitions, including R&R, to gypsum board, plaster, lath, wood paneling, acoustical panels, wall coverings, column coverings, tile, paint, etc.
IS3A	Ceilings	Repair	Repair of interior ceilings (<40% of total), including tiles, gypsum board, plaster, paint, etc.
IS3B	Ceilings	Replacement	Major refurbishments (>40% of total) to interior ceiling systems, including grid system replacements, structural framing, new suspended systems, paint, plastering, etc.

IS4A	Doors	General	Any work on interior non-fire-rated doors, roll-up counter doors, mechanical/plumbing access doors, and all door hardware (except for reasons of access improvement).
IS5A	Stairs	Finish	Any finish restorative work to stair tower walking surfaces, including replacement of rubber treads, safety grips, nosings, etc. (except as required to accommodate disabled persons).
IS6A	General	Molding	R&R to interior trim/molding systems, including rubber/vinyl/wood base, crown/chair/ornamental moldings, cased openings, etc.
IS6B	General	Cabinetry	R&R work to interior casework systems, including cabinets, countertops, wardrobes, lockers, mail boxes, built-in bookcases, lab/work benches, reagent shelving, etc. (except as required for access by the disabled).
IS6C	General	Screening	Work on temporary or partial height partitioning systems, including toilet partitions, urinal/vanity screens, etc.
IS6D	General	Other	Any work on interior elements not logically or specifically categorized elsewhere, including light coves, phone booths, interior lightwells, etc.

PLUMBING

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
PL1A	Domestic Water	Piping Network	Repair or replacement of domestic water supply piping network, insulation, hangers, etc.
PL1B	Domestic Water	Pumps	Domestic water booster pumps, circulating pumps, related controls, etc.
PL1C	Domestic Water	Storage/ Treatment	Equipment or vessels for storage or treatment of domestic water.
PL1D	Domestic Water	Metering	Installation, repair, or replacement of water meters.
PL1E	Domestic Water	Heating	Domestic water heaters, including gas, oil, and electric water heaters, shell-and-tube heat exchangers, tank type, and instantaneous.
PL1F	Domestic Water	Cooling	Central systems for cooling and distributing drinking water.
PL1G	Domestic Water	Fixtures	Plumbing fixtures, including sinks, drinking fountains, water closets, urinals, etc.
PL1H	Domestic Water	Conservation	Alternations made to the water distribution system to conserve water.
PL1I	Domestic Water	Backflow Protection	Backflow protection devices, including backflow preventers, vacuum breakers, etc.
PL2A	Wastewater	Piping Network	Repair or replacement of building wastewater piping network.
PL2B	Wastewater	Pumps	Pump systems used to lift wastewater, including sewage ejectors and other sump systems.
PL3A	Special Systems	Process Gas/Fluids	Generation and/or distribution of process steam, compressed air, natural and LP gas, process water, vacuum, etc.
PL4A	Infrastructure	Potable Water Storage/ Treatment	Storage and treatment of potable water for distribution.
PL4B	Infrastructure	Industrial Water Distribution/ Treatment	Storage and treatment of industrial water for distribution.
PL4C	Infrastructure	Sanitary Water Collection	Sanitary water collection systems and sanitary sewer systems, including combined systems.
PL4D	Infrastructure	Stormwater Collection	Stormwater collection systems and storm sewer systems; storm water only.
PL4E	Infrastructure	Potable Water Distribution	Potable water distribution network.
PL4F	Infrastructure	Wastewater Treatment	Wastewater treatment plants, associated equipment, etc.
PL5A	General	Other	Plumbing issues not categorized elsewhere.

SITE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SI1A	Access	Pedestrian	Paved pedestrian surfaces, including walks, site stairs, step ramps, paths, pedestrian signage, sidewalk bridges/canopies, pedestrian plaza/mall areas, etc.
SI1B	Access	Vehicular	Paved vehicular surfaces, including roads, paths, curbs, guards, bollards, bridges, skyways, joints, shoulder work, culverts, ditches, vehicular signage, etc.
SI2A	Landscape	Grade/Flora	Landscape related work, including new grass/turf refurbishment, grade improvements, catch basins, swales, berms, pruning, new ornamental flora, etc.
SI3A	Hardscape	Structure	Permanent hard site features, predominantly ornamental, including terraces, fences, statues, freestanding signage, fountains, benches, etc.
SI4A	General	Other	Other site work not specifically categorized elsewhere.

SECURITY SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SS1A	Lighting	Exterior	Fixtures, stanchions, foliage interference, cleanliness, locations, etc.
SS2A	Site	Fencing	Perimeter campus fencing, individual building fencing, includes both pedestrian and vehicular control fences.
SS2B	Site	General	Hidden areas due to foliage, fencing, parking, walls, etc.
SS3A	Communications	Emergency Phones	Access, locations, visibility, function, reliability, etc.
SS4A	Access Control	Doors	Access, locks, keys, two-way speakers, reliability, redundancy, etc.
SS4B	Access Control	Windows	Locks, screens, access, reliability, etc.
SS4C	Access Control	Systems	Card key, proximity devices, data control, data use, reliability, system design, etc.
SS5A	Monitoring	Systems	Cameras, audio communication, monitoring stations, locations, system design, etc.
SS6A	Circulation	Pedestrian	On campus as well as to and from off-campus housing and class locations, etc.
SS6B	Circulation	Vehicular	Guard gates, access, systems, data control and use, identification, etc.
SS7A	General	Other	General information/projects pertaining to security issues.

VERTICAL TRANSPORTATION

CODE	Component Description	Element Description	DEFINITION
VT1A	Machine Room	General	Machine, worm gear, thrust bearing, brake, motors, sheaves, generator, controller, selector, governor, pump(s), valves, oil, access, lighting, ventilation, and floor.
VT2A	Car	General	Position indicator, lighting, floor, gate-doors, operation devices, safeties, safety shoe, light ray/detection, emergency light, fire fighter service, car top, door operator, stop switch, car frame, car guides, sheaves, phone, and ventilation.
VT3A	Hoistway	General	Enclosure, fascia, interlock, doors, hangers, closers, sheaves, rails, hoistway switches, ropes, traveling cables, selector tape, weights, and compensation.
VT4A	Hall Fixtures	General	Operating panel, position indicator, hall buttons, lobby panel, hall lanterns, fire fighter service, audible signals, and card/key access.
VT5A	Pit	General	Buffer(s), guards, sheaves, hydro packing, floor, lighting, and safety controls.
VT6A	Operating Conditions	General	Door open time, door close time, door thrust, acceleration, deceleration, leveling, dwell time, speed, OFR time, and nudging.
VT7A	General	Other	General information/projects relating to vertical transportation system components.

UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 2

COST SUMMARIES AND TOTALS

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	0	32,713	0	0	0	0	0	0	0	0	0	0	0	$32,713
EXTERIOR	0	0	0	7,800	0	0	0	36,623	0	211,936	0	0	0	0	$256,359
INTERIOR	0	0	0	95,433	0	0	0	0	41,337	0	0	0	2,931	0	$139,701
PLUMBING	0	378,396	261,313	200,379	187,105	0	0	0	0	0	0	0	0	0	$1,027,193
HVAC	0	306,531	3,506,624	130,346	43,745	0	1,842	0	13,898	461,992	0	88,999	0	458,206	$5,012,183
FIRE/LIFE SAFETY	0	0	0	137,726	0	0	0	0	0	0	0	0	0	0	$137,726
ELECTRICAL	30,062	30,062	0	245,333	189,087	79,044	4,180	0	0	1,037,060	0	0	10,588	0	$1,625,416
SITE	0	0	0	0	0	0	0	0	0	368,074	0	0	0	0	$368,074
VERT. TRANS.	0	0	0	252,656	0	0	0	0	0	0	0	0	0	0	$252,656
HEALTH/EQUIP.	0	0	1,360	0	0	0	0	0	0	0	0	0	0	0	$1,360
SUBTOTAL	$30,062	$714,988	$3,802,010	$1,069,674	$419,936	$79,044	$6,022	$36,623	$55,234	$2,079,063	$0	$88,999	$13,519	$458,206	$8,853,382
TOTAL NONRECURRING PROJECT NEEDS			$4,547,060	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$4,306,321	

CURRENT REPLACEMENT VALUE	$46,055,426
FACILITY CONDITION NEEDS INDEX	0.19
FACILITY CONDITION INDEX	0.02

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
17,586	$8,853,382	503.43

All costs shown as Present Value

RENEWAL COSTS BY SYSTEM

CATEGORY	NONRECURRING ASSESSMENT RECOMENDATON	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	$32,713	$0	$32,713
EXTERIOR	$0	$256,359	$256,359
INTERIOR	$0	$139,701	$139,701
PLUMBING	$639,709	$387,484	$1,027,193
HVAC	$3,813,155	$1,199,028	$5,012,183
FIRE/LIFE SAFETY	$0	$137,726	$137,726
ELECTRICAL	$60,124	$1,565,293	$1,625,416
SITE	$0	$368,074	$368,074
VERT. TRANS	$0	$252,656	$252,656
HEALTH	$1,360	$0	$1,360
TOTALS	**$4,547,060**	**$4,306,321**	**$8,853,382**

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COST

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
ORHVEEL01	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	D5010	Immediate	Plant Adaption	30,062
ORPWFPL01	REPLACE OLDEST WATER SERVICE LINES		Critical	Corrective Action	308,543
ORSANPL01	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES		Critical	Plant Adaption	15,871
ORSTRPL01	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES		Critical	Plant Adaption	53,982
ORHCDHV01	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION		Critical	Corrective Action	283,730
ORHCDHV04	PERFORM ULTRASONIC PIPE THICKNESS TEST ON HW AND CW		Critical	Plant Adaption	22,801
ORHVEEL02	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	D5010	Critical	Plant Adaption	30,062
OREHV01	TEAR DOWN AND REBUILD CHILLED WATER PUMPS		Noncritical	Corrective Action	23,917
OREHV02	TEAR DOWN AND REBUILD CONDENSER WATER PUMP		Noncritical	Corrective Action	7,972
ORSTRPL02	REPLACE SELECT AGED/DEFICIENT STORMWATER STRUCTURES		Noncritical	Corrective Action	261,313
ORHCDHV02	REMOVE AND REPLACE PIPE AND VALVES		Noncritical	Corrective Action	3,223,225
ORHCDHV03	REMOVE/REPLACE DIRECT-BURIED HW PIPE TO BUILDING ORH		Noncritical	Corrective Action	251,510
OREAC01	STAIR SAFETY UPGRADES	C2020	Noncritical	Plant Adaption	32,713
OREHE01	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	F2020	Noncritical	Plant Adaption	1,360
				TOTAL	**4,547,060**

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
ORE	DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL		B2030	Deferred Renewal	7,800
ORE	CW01	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	METAL	C1030	Deferred Renewal	5,469
ORE	IW01	WALL FINISH - APPLIED, STANDARD		C3010	Deferred Renewal	19,252
ORE	IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	OFFICES	C3020	Deferred Renewal	11,565
ORE	IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	BREAK ROOM	C3020	Deferred Renewal	3,362
ORE	IF15	FLOORING - FLUID APPLIED, PAINT OR CLEAR SEAL	CONCRETE SLAB	C3020	Deferred Renewal	49,724
ORE	IC03	CEILING FINISH - ATTACHED ACOUSTICAL TILE	OFFICES, 12"	C3030	Deferred Renewal	6,061
ORE	VT03	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	ORE FREIGHT	D1010	Deferred Renewal	252,656
ORE	FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	2 FLR LOCKER ROOM	D2010	Deferred Renewal	2,631
ORE	FX04	PLUMBING FIXTURE - SINK, KITCHEN	BREAK ROOM	D2010	Deferred Renewal	754
ORE	FX08	PLUMBING FIXTURE - SHOWER VALVE AND HEAD	2 FLR LOCKER ROOM	D2010	Deferred Renewal	1,112
ORE	FX11	PLUMBING FIXTURE - WATER CLOSET, TANK-TYPE	2 FLR LOCKER ROOM	D2010	Deferred Renewal	1,269
ORPWF	PP01	DOMESTIC WATER BOOSTER SYSTEM	ORPH P-27H	D2020	Deferred Renewal	29,567
ORPWF	PP01	DOMESTIC WATER BOOSTER SYSTEM	ORPH P-26H	D2020	Deferred Renewal	29,567
ORPWF	TK38	POTABLE WATER STORAGE TANK		D2020	Deferred Renewal	83,563
ORE	WH27	WATER HEATER - SHELL & TUBE (45-93 GPM)	ORE HE-7E	D2020	Deferred Renewal	51,915
ORE	TK33	THERMAL STORAGE EXPANSION TANK	ORE MEZ. TANK	D3020	Deferred Renewal	46,846
ORE	AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	ORE HV-2E	D3040	Deferred Renewal	8,630
ORE	PH01	PUMP - ELECTRIC (<=10 HP)	ORE P-19E	D3040	Deferred Renewal	3,299
ORE	PH01	PUMP - ELECTRIC (<=10 HP)	ORE P-25E	D3040	Deferred Renewal	1,649
ORE	PH01	PUMP - ELECTRIC (<=10 HP)	ORE CWMP-1	D3040	Deferred Renewal	13,194
ORE	AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	ORE AC	D3060	Deferred Renewal	6,982
ORE	BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	ORE REF. MON. SYSTEM	D3060	Deferred Renewal	41,957
ORHCD	BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	OR REF. MON SYSTEM TUNNEL	D3060	Deferred Renewal	7,790

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
ORE	FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	ORE FACP	D4030	Deferred Renewal	39,820
ORE	FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	OR CAMPUS FACP	D4030	Deferred Renewal	39,820
ORE	FA02	FIRE ALARM SYSTEM - DEVICES	ORE FIRE ALARM SYSTEM	D4030	Deferred Renewal	44,245
ORHCD	FA02	FIRE ALARM SYSTEM - DEVICES	OR TUNNEL	D4030	Deferred Renewal	13,841
ORHVE	SW03	LOAD INTERUPTER SWITCH - 15 KV	ORL LOAD. INT. A3	D5010	Deferred Renewal	58,257
ORHVE	SW03	LOAD INTERUPTER SWITCH - 15 KV	ORL LOAD. INT. B3	D5010	Deferred Renewal	58,257
ORHVE	SW03	LOAD INTERUPTER SWITCH - 15 KV	ORB LOAD. INT. B2	D5010	Deferred Renewal	58,257
ORHVE	SW03	LOAD INTERUPTER SWITCH - 15 KV	ORB LOAD. INT. A2	D5010	Deferred Renewal	58,257
ORHCD	LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	OR TUNNEL	D5020	Deferred Renewal	12,305
ORE	FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FIRST FLOOR	D2010	2017	1,620
ORE	BF02	BACKFLOW PREVENTER (1-2 INCHES)	ORE BYPASS	D2020	2017	2,167
ORE	BF04	BACKFLOW PREVENTER (3-4 INCHES)	ORE BF	D2020	2017	8,152
ORE	PS20	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	ORE DW SUPPLY PIPE	D2020	2017	85,832
ORE	PS20	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	ORE DW PIPE	D2020	2017	26,585
ORE	PS23	SUPPLY PIPING SYSTEM - WAREHOUSE	ORE NAT GAS PIPE	D2020	2017	52,453
ORE	WT01	WATER SOFTENER (41 - 70 GPM)	ORE WS	D2020	2017	10,295
ORE	RH01	HEATING SYSTEM, STEAM OR HYDRONIC	ORE ORIGINAL. HVAC DIST.	D3040	2017	43,745
ORE	SE23	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	ORE ORIGINAL ELEC. DIST.	D5010	2017	66,960
ORHCD	SE23	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	OR TUNNEL	D5010	2017	29,527
ORE	LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	ORE INT. LIGHTING	D5020	2017	92,599
ORE	VF11	VARIABLE FREQUENCY DRIVE (75-100 HP)	ORE VSD P-29	D5010	2018	26,348
ORE	VF11	VARIABLE FREQUENCY DRIVE (75-100 HP)	ORE VSD P-30	D5010	2018	26,348
ORE	VF11	VARIABLE FREQUENCY DRIVE (75-100 HP)	ORE VSD P-31	D5010	2018	26,348
ORE	AD02	AIR DRYER - REFRIGERATED (11-25 CFM)	ORE AD	D3060	2019	1,842

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
ORE	LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	ORE EXT. LIGHT	D5020	2019	4,180
ORE	DR19	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	2 DOORS	B2030	2020	32,552
ORE	DR30	DOOR OPERATOR, OVERHEAD DOOR, COMMERCIAL, PADS		B2030	2020	4,070
ORE	IC04	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	MAIN FLOOR AREAS	C3030	2021	41,337
ORE	FN28	FAN - PROPELLER WITH LOUVER, 1/4" SP (1.5-2 HP)	ORE EF-4A	D3040	2021	3,474
ORE	FN28	FAN - PROPELLER WITH LOUVER, 1/4" SP (1.5-2 HP)	ORE EF-4B	D3040	2021	3,474
ORE	FN28	FAN - PROPELLER WITH LOUVER, 1/4" SP (1.5-2 HP)	ORE EF-4C	D3040	2021	3,474
ORE	FN28	FAN - PROPELLER WITH LOUVER, 1/4" SP (1.5-2 HP)	ORE EF-4D	D3040	2021	3,474
ORE	WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	SINGLE PANE METAL FRAME	B2020	2022	211,936
ORE	CT06	COOLING TOWER (301-550 TONS)	ORE CT-1	D3030	2022	153,997
ORE	CT06	COOLING TOWER (301-550 TONS)	ORE CT-2	D3030	2022	153,997
ORE	CT06	COOLING TOWER (301-550 TONS)	ORE CT-3	D3030	2022	153,997
ORE	MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	ORE MCC-1	D5010	2022	518,530
ORE	MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	ORE MCC-2	D5010	2022	518,530
ORSAN	SP05	SANITARY SEWER PIPE - 6" DIAMETER		G3020	2022	193,692
ORSAN	SP06	SANITARY SEWER PIPE - 8" DIAMETER		G3020	2022	107,312
ORSTR	SP06	SANITARY SEWER PIPE - 8" DIAMETER	STORMWATER	G3020	2022	67,070
ORE	BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	ORE ORIGINAL. HVAC DIST.	D3060	2024	88,999
ORE	DR24	DOOR LOCK, COMMERCIAL-GRADE	EXTERIOR	C1020	2025	2,931
ORE	VF07	VARIABLE FREQUENCY DRIVE (25-30 HP)	ORE CT-1E-1	D5010	2025	10,588
ORE	HV23	HVAC DISTRIBUTION NETWORKS - WAREHOUSE	ORE ORIG. HVAC DIST.	D3040	2026	186,249
ORE	HV23	HVAC DISTRIBUTION NETWORKS - WAREHOUSE	ORE CW AND HW PIPE	D3040	2026	271,957
					TOTAL	**4,306,321**

PROJECT LIST BY CLASSIFICATION

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
HV	OREHV01	3	Corrective Action	3	TEAR DOWN AND REBUILD CHILLED WATER PUMPS	23,917
HV	OREHV02	4	Corrective Action	3	TEAR DOWN AND REBUILD CONDENSER WATER PUMP	7,972
PL	ORPWFPL01	1	Corrective Action	2	REPLACE OLDEST WATER SERVICE LINES	308,543
PL	ORSTRPL02	2	Corrective Action	3	REPLACE SELECT AGED/DEFICIENT STORMWATER STRUCTURES	261,313
HV	ORHCDHV01	2	Corrective Action	2	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	283,730
HV	ORHCDHV02	3	Corrective Action	3	REMOVE AND REPLACE PIPE AND VALVES	3,223,225
HV	ORHCDHV03	4	Corrective Action	3	REMOVE/REPLACE DIRECT-BURIED HW PIPE TO BUILDING ORH	251,510
					TOTAL FOR CORRECTIVE ACTION	**4,360,210**
HE	OREHE01	1	Plant Adaption	3	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	1,360
AC	OREAC01	2	Plant Adaption	3	STAIR SAFETY UPGRADES	32,713
PL	ORSANPL01	1	Plant Adaption	2	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	15,871
PL	ORSTRPL01	1	Plant Adaption	2	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES	53,982
EL	ORHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	30,062
EL	ORHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	30,062
HV	ORHCDHV04	1	Plant Adaption	2	PERFORM ULTRASONIC PIPE THICKNESS TEST ON HW AND CW	22,801
					TOTAL FOR PLANT ADAPTION	**186,850**

PROJECT LIST BY CLASSIFICATION

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
					GRAND TOTAL:	4,547,060

PROJECT LIST BY CATEGORY CODE

All costs shown as Present Value

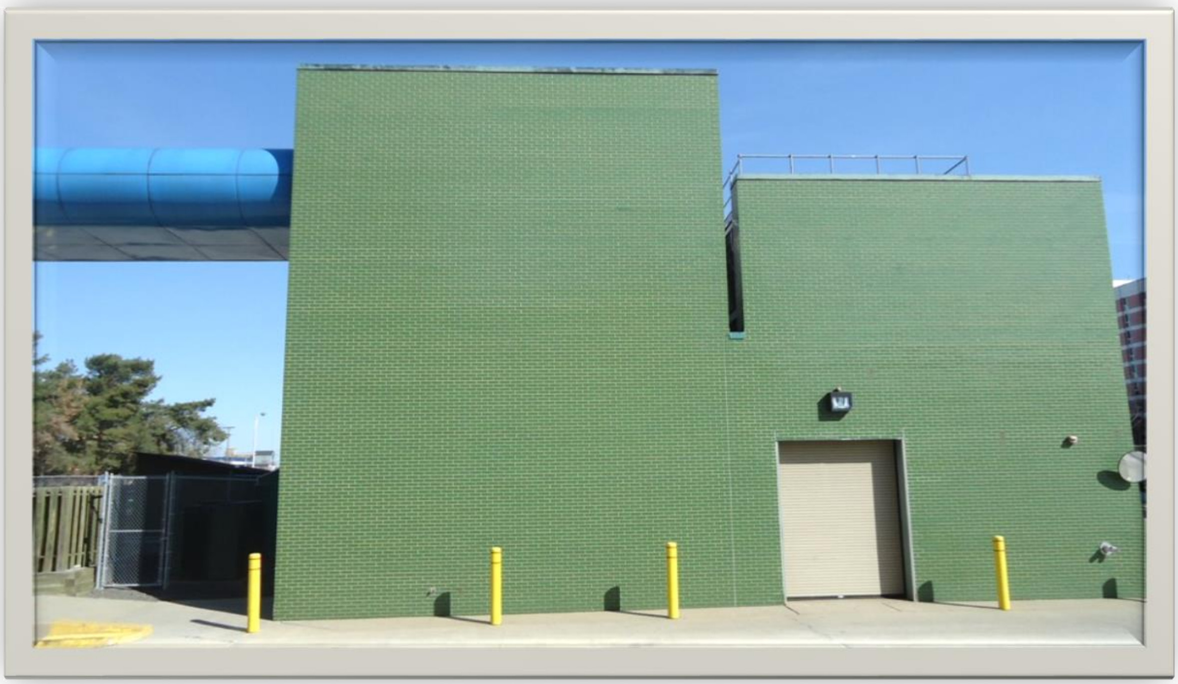
SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
AC	OREAC01	2	Plant Adaption	3	STAIR SAFETY UPGRADES	32,713
					TOTAL FOR AC	**32,713**
EL	ORHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	30,062
EL	ORHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	30,062
					TOTAL FOR EL	**60,124**
HE	OREHE01	1	Plant Adaption	3	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	1,360
					TOTAL FOR HE	**1,360**
HV	OREHV01	3	Corrective Action	3	TEAR DOWN AND REBUILD CHILLED WATER PUMPS	23,917
HV	OREHV02	4	Corrective Action	3	TEAR DOWN AND REBUILD CONDENSER WATER PUMP	7,972
HV	ORHCDHV01	2	Corrective Action	2	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	283,730
HV	ORHCDHV02	3	Corrective Action	3	REMOVE AND REPLACE PIPE AND VALVES	3,223,225
HV	ORHCDHV03	4	Corrective Action	3	REMOVE/REPLACE DIRECT-BURIED HW PIPE TO BUILDING ORH	251,510
HV	ORHCDHV04	1	Plant Adaption	2	PERFORM ULTRASONIC PIPE THICKNESS TEST ON HW AND CW	22,801
					TOTAL FOR HV	**3,813,155**
PL	ORPWFPL01	1	Corrective Action	2	REPLACE OLDEST WATER SERVICE LINES	308,543
PL	ORSANPL01	1	Plant Adaption	2	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	15,871
PL	ORSTRPL01	1	Plant Adaption	2	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES	53,982
PL	ORSTRPL02	2	Corrective Action	3	REPLACE SELECT AGED/DEFICIENT STORMWATER STRUCTURES	261,313
					TOTAL FOR PL	**639,709**
					GRAND TOTAL:	**4,547,060**

OAKLAND COMMUNITY COLLEGE

Utility & Facility Condition Assessment

Royal Oak Campus
Group ROI

Inspected March 23, 2017



ISES CORPORATION

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SECTION 1 ASSET OVERVIEW

SECTION 2 COST SUMMARIES AND TOTALS

UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

GROUP NAME	ROI : ROYAL OAK INFRASTRUCTURE	**CURRENT REPLACEMENT VALUE**	$10,689,400
GSF	3,931	**FACILITY CONDITION NEEDS INDEX**	0.10
		FACILITY CONDITION INDEX	0.00
		10-YEAR $/SF	269.36

FCNI Scale

The FCNI for this asset is **0.10**

- Excellent Condition (typically new construction)
- Good Condition (maintained within lifecycle)
- Fair Condition (normal renovations required)
- Below Average Condition (major renovation required)
- Poor Condition (total renovation required)
- Replacement Indicated (unless historic)

0.10 | 0.20 | 0.30 | 0.50 | 0.60 | > 0.60

Total Facility Renewal Costs

RECURRING
$721,179
Projected Renewal

NONRECURRING
$313,082

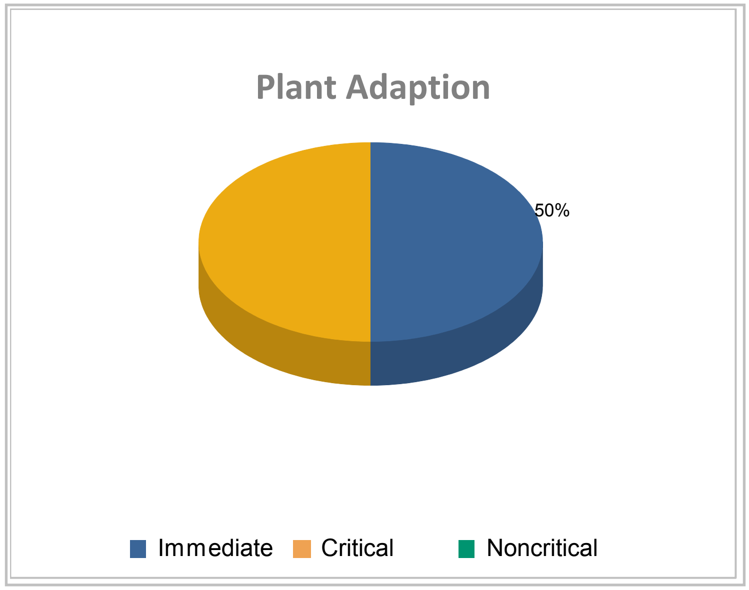
RECURRING
$24,603
Deferred Renewal

TOTAL 10-YEAR FACILITY RENEWAL
$1,058,864

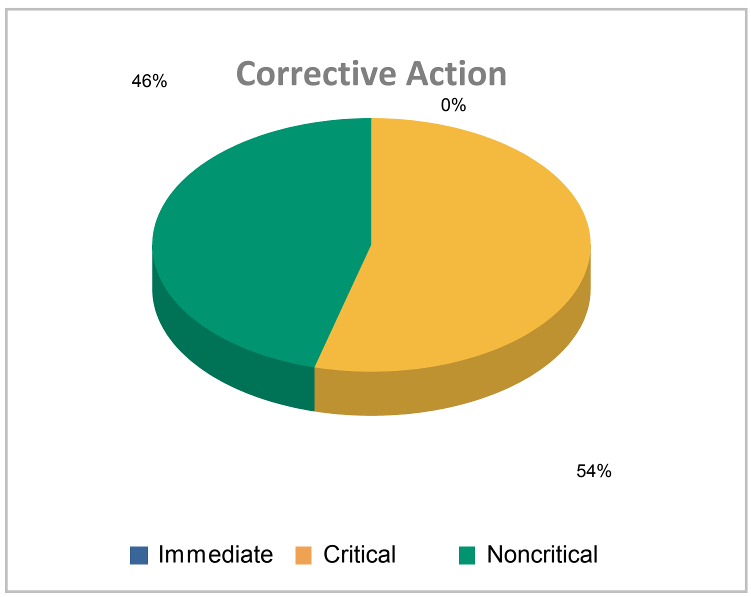
Nonrecurring Costs

Project Cost by Priority

PLANT ADAPTION	
1 - Immediate	**$12,376**
2 - Critical	**$12,376**
3 - Noncritical	**$0**

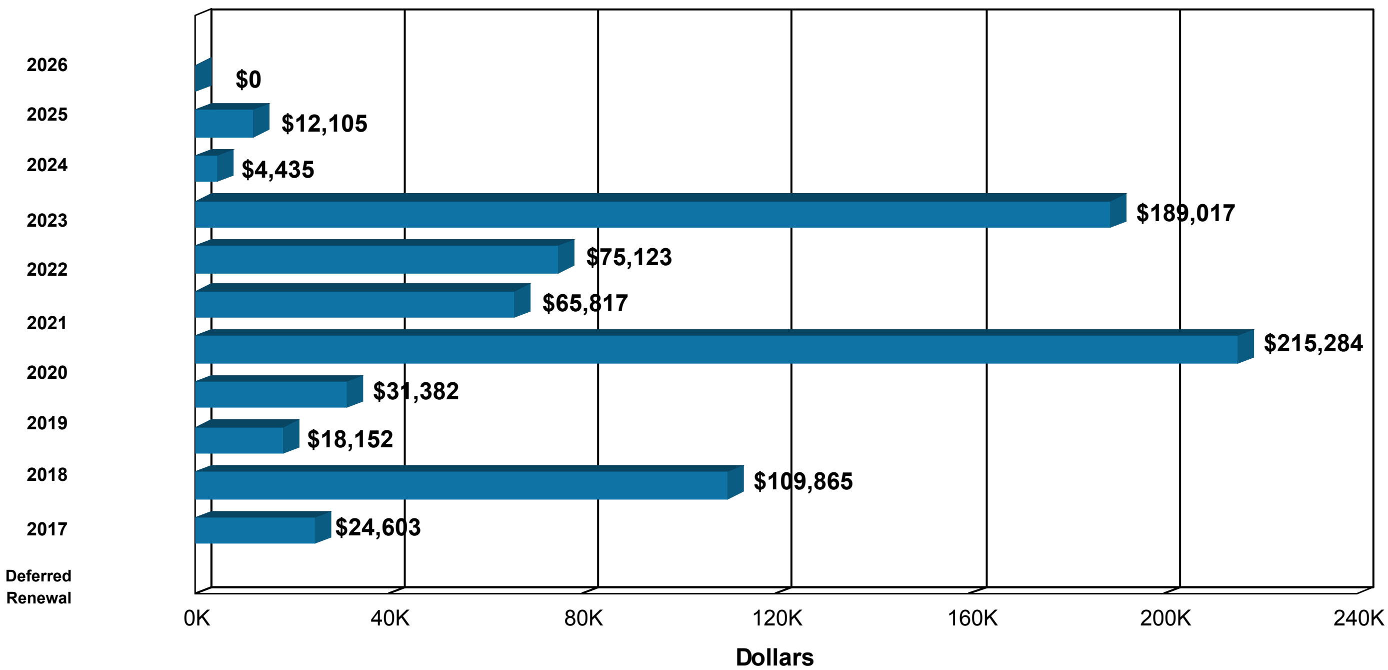


CORRECTIVE ACTION	
1 - Immediate	**$68,212**
2 - Critical	**$119,344**
3 - Noncritical	**$100,774**

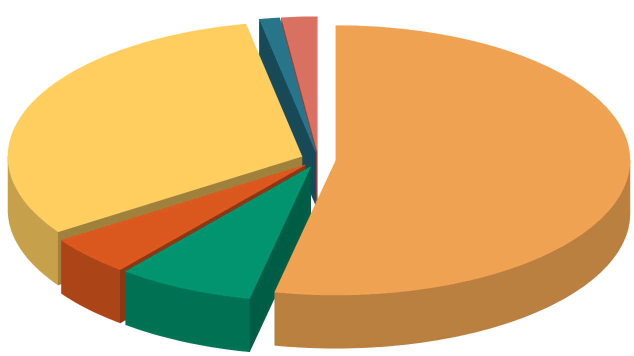


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



Accessibility	$0	0%
Electrical	$564,215	53%
Exterior	$80,130	8%
Fire/Life Safety	$50,194	5%
Health	$0	0%
HVAC	$331,193	31%
Interiors	$13,571	1%
Plumbing	$19,562	2%
Site	$0	0%
Vert. Trans.	$0	0%
TOTAL	**$1,058,864**	

ASSET SUMMARY

INTRODUCTION

The following is a detailed analysis of the physical condition and estimated remaining reliable operating life of the utility systems serving the facilities at the Royal Oak Campus as well as the Facility Condition Assessment (FCA) of the Power House. The systems include:

- Power House
- Heating and Chilled Water Generation and Distribution
- High Voltage Electrical
- Sanitary Sewer
- Stormwater
- Potable and Fire Water

The goal was to produce a campuswide report with recurring and nonrecurring recommendations that have been entered into the individual utility system assets in the FCA database.

Information for this report was gathered during the site inspection conducted on March 23, 2017 and through a review of historical documents and single-line campus drawings. The assessments and estimates are based solely on visual and nondestructive observations, a review of existing drawings, previously prepared engineering reports, any available maintenance records and reports, and discussions with key personnel and specific external support companies, such as water treatment representatives. In some instances, ISES was not provided up-to-date drawings prior to the development of this report. In these cases, general project recommendations were developed, and no lifecycle model cost data was created. Additional inspection procedures and methods, along with engineering design support, may be necessary to fully define the specific costs and scope to repair various infrastructure facility deficiencies.

The specific activities involved with gathering data included a detailed request for relevant information, including system drawings, inventory data, performance data, both planned and completed capital renewal projects, and operational data (including equipment forced outage statistics. Operating data was reviewed for abnormal excursions, forced outages and peak loads. The data was evaluated for impact on the equipment's estimated useful life. Information related to forced equipment outages, equipment reliability and operating performance was reviewed to determine trends that might affect future safety, reliability and efficiency.

It is important to note that utility infrastructure assets normally encompass more than just a single piece of equipment and will, in most situations, represent a section or group of materials, i.e., linear footage of installed piping systems or electrical wiring. The majority of these systems will continue to operate reliably and safely beyond the ten-year assessment scope, but beyond that, it will be necessary to reinspect the systems to ensure that they continue to operate reliably.

Equipment Useful Life

The estimates for remaining useful life consider safety, reliability, efficiency, and sustainability as the primary operational objectives for capital renewal. These estimates are based on actual equipment age, physical inspections, performance data reviews, personnel interviews, maintenance practices, and operating history. Expected useful life values are averaged forecasts based on equipment that is properly maintained and operated without frequent and/or severe operating excursions. Chronological equipment age is not the primary determinant of service life. In many instances, there is ample evidence of equipment operating well beyond predicted useful life values. This is why it is important to modify these values with actual equipment condition. This modification is based on service history, operating conditions, installation environment, and actual field performance. It should also be noted that equipment reaching the predicted endpoint of its expected useful life does not necessarily cease to function. What does occur is a downward trend toward loss of service reliability and an increase in forced outages and maintenance cost requirements where the equipment becomes unavailable for normal service more frequently.

The trend in recent years toward planned obsolescence by manufacturers of certain plant systems and equipment alters the strategy for capital replacement as some systems become obsolete. Although the equipment may have many remaining years of safe, reliable, and efficient operation, manufacturers are phasing systems out and not supporting the equipment past some specific phase-out date. For example, digital electronic control systems have an estimated operating life of 15 years, not because of failure to function but because of the planned lifecycle established by the OEM due to technological advancements and product development. This also results in a requirement for continuous operator training as equipment is replaced. It is not unusual for newer equipment to have better efficiency and lower operating costs. However, this requires careful analysis by owners to actualize potential savings.

Factors That Affect Equipment Useful Life

Primary critical equipment was evaluated by comparing current data to manufacturer's performance ratings. Degradation in operating performance can be the result of normal wear and tear, or it can be indicative of abnormal wear. For example, boiler efficiency losses can increase due to higher than design excess air resulting from parasitic air leaks in boiler casings or out-of-calibration combustion control systems. Losses in efficiency can also be the result of internal scale and deposit formation.

The skill and ability of the operating staff can have a significant impact on overall equipment useful life. Accelerated startups, emergency shutdowns, overload excursions, air leakage, excessive water leaks, and adherence to balance-of-plant maintenance requirements are critical to the safety, reliability, and efficiency of plant equipment. In addition, proper diagnostic skills can often avoid premature outages or result in the correct decision to remove equipment from service to avoid catastrophic damage. We spent some time in the interviews on campus discussing operator proficiency to evaluate any impact this factor may have had on equipment useful life.

One method of providing consistency in methods of system/equipment operation is the implementation of standard operating procedures (SOPs). These provide a reference guide for the operating staff for most of the expected operating conditions. They cannot, however, provide 100 percent guidance for all possible events. This is why operator training in the fundamentals of plant operation is so critical. The implementation of SOPs also provides a method of reminding operators about system equipment requirements in plants where there are few, if any, abnormal operating excursions. In this type of operation, skills that have not been exercised recently become difficult to recall under the pressure of rapidly developing events.

For heating and chilled water generation equipment and distribution piping systems, water treatment is the most salient issue in considering the estimated useful life. Internal and external equipment piping scale causes rapid performance deterioration, and corrosion can severely reduce the operating life of systems and equipment. In all cases, proper water treatment normally extends generating equipment useful life as well as balance-of-plant equipment life. We evaluated historical data as well as the current water treatment program for application and execution. The OCC system currently utilizes Rochester Midland Corporation to provide the water treatment chemicals. Some of the chemicals used include a pitting and corrosion inhibitor identified as CLT-407 for the chilled and heating water closed loop systems, chlorine, and a liquid oxygen scavenger identified as OS-912 to prevent organic and biocides from developing within the condenser water and chilled water systems.

ASSET FINDINGS

The findings for each individual asset in the Royal Oak campus infrastructure group will be presented in detail on the following pages, but below is a summary table of the estimated renewal costs for each asset.

FCNI Comparison

ASSET CODE	ASSET NAME	CRV	TOTAL 10-YEAR NEEDS	FCNI	FCI
ROHCD	HEATING/CHILLED WATER DISTRIBUTION	3,669,000	108,201	0.03	0.00
ROHVE	HIGH VOLTAGE ELECTRICAL	951,400	335,803	0.35	0.00
ROP	POWER HOUSE	5,214,000	614,860	0.12	0.00
ROPWF	POTABLE/FIRE WATER	10,000	0	0.00	0.00
ROSAN	SANITARY SEWER	45,000	0	0.00	0.00
ROSTR	STORMWATER	800,000	0	0.00	0.00

Power House (ROP)

The Power House, or central utility plant, for the Royal Oak campus is a 3,926 gross square foot, two-story, steel-framed facility constructed in 1982 to support the campus complex. It has a distinctive green glazed brick masonry facade and a flat, aggregate ballasted, asphalt built-up roof. The interior plant area has exposed steel beam and column supports, CMU walls, concrete floors, and exposed ceiling to metal decking and frame floor and roof structure. There is a boiler room on the first floor and two second floor electrical and mechanical rooms. The Power House is connected to the campus facilities by a blue fiberglass enclosed overhead utility bridge that runs to the west.

Site

The facility sits at the east end of campus surrounded by asphalt parking and service lots. There is no landscaping, but a security fence encloses an equipment and storage area. The east side of the facility has a concrete sidewalk adjacent to the roadway. No pavement was assessed as part of this report.

Exterior Structure

The aggregate ballasted, asphalt built-up roof appears to be aged and is expected to require replacement late in the next ten years. The green glazed brick exterior wall finish is generally in good condition except at the northeast corner. This relatively small area is in need of extensive repair work, which may include brick replacement, repointing, and finish restoration. Match any new masonry and pointing to the existing systems as well as possible. The flexible fiberglass siding of the overhead utility bridge appears to be satisfactory and should outlast the report scope. There are two hollow metal service doors and one large overhead rollup garage door. The exterior doors are in good condition and expected to outlast report scope. There are no windows.

Interior Finishes/Systems

The floors are painted concrete slab and should be repainted within the next ten years. There are no formal wall or ceiling finishes. The interior doors should outlast the scope of this report.

Accessibility

The facility is not normally required to be handicapped accessible since it is not open to the public, and there are no accessible amenities, although there is wheelchair access into the first floor. No accessibility upgrades are deemed necessary for this building.

Health

No health issues were observed or reported during the inspection.

Fire/Life Safety

This facility is served by an addressable fire alarm system that was installed in 2003. This system is comprised of a control panel, manual pull stations, heat/smoke detectors, and audible/visual notification devices. Although the system is currently serviceable, it will reach the end of its statistical service life within the next ten years and will require replacement. There is no dedicated fire suppression system in this building, but it does house the main campus fire water backflow preventer. The backflow preventer is in proper working condition but will reach the end of its statistical service life near the end of the next ten years and should be replaced at that time. Also replace the eyewash station within the next ten years.

Power House HVAC & Heating/Chilled Water Generation Equipment

The Power House contains the central chilled and heating water equipment for this campus. The chilled water system consists of two local water-cooled centrifugal chillers, each rated for 300 tons and installed in 2003. This equipment is in proper working condition, and operations staff reported that it has been reliable and undergoes major inspection every three years. With continued service and maintenance, this equipment should remain reliable for the next ten years. However, it will be necessary to update the purge assemblies for each unit as soon as possible.

Two rooftop cooling tower assemblies each generate approximately 375 tons of condenser water that is utilized by the local chillers. Only very minimal deficiencies were observed, which included minor scale build-up on the infill and steel support structure. This would usually be handled as routine maintenance prior to seasonal start up. With continued service and maintenance, this equipment should remain serviceable beyond the scope of this report.

It was reported during the interview that there is a flow imbalance or restriction within the chilled water and condenser water systems that requires the cooling tower to consistently operate. Historically, this has not always been the case, as campus demand was able to be achieved through the use of limited tower operation. It is suspected that the backflow preventer for the condenser water system is undersized and needs to be modified. To ensure that this system is operating at its maximum efficiency, a hydraulic analysis should be performed. It is also recommended that the makeup water backflow preventer be updated, as it will reach the end of its reliable service life within the next ten years.

The cooling system is equipped with two condenser water pumps rated for 40 hp each, two primary chilled water pumps rated at 7.5 hp each, and two secondary chilled water pumps rated for 30 hp each. All six pumps were installed in 2003 and are in good physical condition. With continued maintenance and service, they should remain reliable for the scope of this report. The secondary pumps are equipped with variable speed drives (VSD) that have a history of tripping offline and need to be manually bypassed to ensure the pumps remain in service. These VSDs will reach the end of their reliable and technological life in the next three years and are recommended for replacement. As part of the proposed hydraulic analysis, it should be determined whether the VSDs are undersized and should be replaced with a larger capacity unit.

Three natural gas fired, water-tube heating water boilers rated for 9,000 MBH each were installed in 2003. These Cleaver-Brooks boilers generate the heating water for facility heating throughout campus. Much like the chillers, they undergo routine maintenance and inspection every three years. The boilers, associated burner assemblies, and blower coil units are in proper working condition and with continued service will remain reliable and efficient for the next ten years.

Two primary heating water pumps and two secondary heating water pumps are in service and rated for 15 hp each. These pumps were installed in 2003 and are in proper working condition. The secondary pumps are equipped with VSDs that have a history of tripping offline and need to be manually bypassed to ensure the pumps remain in service. This issue should also be inspected as part of the hydraulic analysis.

Other ancillary or support equipment serving the chilled and heating water systems include a series of expansion tanks that are in good condition. No upgrade of this equipment is recommended at this time.

The Power House is provided central heating and chilled water from the central system boilers and chillers. Air handler HV-1E distributes tempered air throughout this facility. This air handler is served by an inline return air fan identified as RA-1E. Both the return air and supply fan system are equipped with variable speed drives. This equipment is currently serviceable but will require lifecycle replacement within the next ten years.

The HVAC system ductwork and associated hydronic piping are in proper working condition and should outlast the scope of this report. The refrigerant monitoring system will reach the end of their statistical service life within the next ten years and are recommended for replacement. It is also recommended that the associated controls air compressor, air dryer, and supplemental utility air compressor be replaced within the next ten years.

Electrical

Primary electrical service for this facility was assessed as part of the High Voltage Electrical section of this report. This building is equipped with 480/277 volt and 208/120 volt power. The secondary electrical system was last partially updated in 2003 but is still equipped with some original branch wiring. This system is currently serviceable and should remain reliable beyond the next ten years.

The interior lighting is a combination of surface-mounted and pendent fluorescent fixtures equipped with T12 and T8 lamps. Although serviceable, the lighting system is largely aged and inefficient. A new lighting system should be installed that utilizes more energy-efficient lamps, such as T5 or even LED. The exterior lighting consists of surface-mounted HID fixtures and floodlight fixtures with dual lamps on the roof. These fixtures are currently serviceable but will require replacement within the ten-year scope of this report.

A local switchboard rated for 2,000 amps is considered to be the motor control center for this facility and supplies electrical service to the heating and chilled water system equipment. This electrical equipment is original and will reach the end of its reliable, safe operating life within the scope of this assessment. Replacement is recommended.

Plumbing

Domestic water supply piping is copper, and the drain piping is cast-iron. No piping deficiencies were observed during the inspection. Domestic hot water for this and surrounding facilities is generated by two shell-and-tube hot water heat exchangers that were installed in 2003. Plumbing fixtures in this building consist of one emergency eyewash station and a utility sink. Of all of these plumbing systems, only the eyewash station is expected to require replacement within the next ten years.

Heating and Chilled Water Distribution

The heating hot water and chilled water distribution systems consists of approximately 5,100 linear feet (2,550 each) of various sizes of supply and return pipe. An additional 200 linear feet of condenser water pipe is installed for use at the Power House. The majority of this pipe was installed in two phases, with the installed in 1982 and most recent in 2003. It is presumed that the piping network is constructed of Grade B, schedule 40, steel pipe. The majority of the pipe is properly insulated and encapsulated with a water resistant sheathing. Overall, most of the pipe system is in good condition and will remain reliable beyond the next ten years.

The heating, chilled and condenser water systems are equipped with butterfly isolation valves that require regular operation to ensure their functional reliability. A butterfly valve is regularly used within hydronic systems due to its initial lower installation cost and compact size. The majority of the valves are in good physical condition, but it should be anticipated that some will require replacement within the next ten years.

High Voltage Electrical System

The 4.8 kV electrical power is fed to this campus from a Detroit Edison (DTE) electrical service line installed along Lincoln Street. There is a section of original switchgear consisting of two fused load interrupters and associated DTE metering cabinet. This equipment is currently serviceable, but it should be anticipated that the switches and assembly will need to be updated within the next ten years.
On the exterior of the Power House is one oil-filled transformer installed in 2004 and with a rated capacity of 1,500 kVA. One exterior natural gas fired generator provides the Power House with standby electricity in the event of a loss of utility power. This generator is rated for 280 kW and was also installed in 2004. There are two automatic transfer switches in the Power House rated for 480/277 volts and 225 amps each. These four pieces of equipment are currently in good condition and with continued service and maintenance will outlast the scope of this report.

It was reported that the electrical distribution system, including the electrical manholes and associated electrical conductor, has no history of unscheduled forced outages as a result of premature failure. Although this conductor is currently serviceable, it should be anticipate that some of this wire will need to be updated within the next ten years.

Although the balance of principal equipment will outlast the report scope, it will be necessary to perform consistent maintenance over the next ten years. Toward that end, two projects were developed for the creation of a campus-wide electrical maintenance program that provides for three to five year maintenance cycles. This includes the operation, maintenance, and testing of the primary load interrupters; maintenance, testing, and oil and gas analysis of the local oil-filled transformer; and routine operation and maintenance of any secondary electrical systems vital to the consistent operation of campus systems, such as power or vacuum circuit breakers.

The 4.8 kV transformer located in room A100 of building A has been assessed as part of the FCA that was performed on that facility.

Potable and Fire Water System

This campus is located in the downtown business district of Royal Oak, Michigan and takes up approximately 90 percent of a city block. The north and west sides of the college are built out to the property line adjacent to the street right-of-way, while the south and east sides have small irrigated landscaped areas. Due to the compact nature of this campus, much of the utilities that support the college are supplied directly from the nearest municipal service and supply lines located within the city street right-of-way. There is no extensive campus-wide, college-owned utility network.

As such, the potable water and fire protection system belonging to the college and required to be maintained by the college is minimal. It is estimated that there may be around 40 linear feet of actual water line owned by the college outside of facility footprints. Fire suppression water systems, backflow devices, booster pumps, valves, and meters located within the facilities are addressed within the individual facility assessment reports. Campus water pressures are typically maintained at adequate levels for domestic use and fire protection. Nearby fire hydrants located on the north, west, and south sides of the main facility are all owned and maintained by the city.

The domestic water and fire protection system appears to be in good condition and properly sized to serve the campus. Based on the condition and age of the supply piping, there are no required upgrades or expected lifecycle replacement needs for the relatively short length of buried water lines connecting the internal distribution network of the potable water and fire protection system to the municipal water supply.

For underground piping serving the potable, fire and drainage water systems, consistent inspection through the use of closed circuit television (CCTV) to identify intrusion and pipe deterioration is an excellent method for forecasting future capital needs. This inspection function should be included as part of the any campus annual budget and performed on a regular basis.

Sanitary Sewer Collection System

As with the potable water system, due to the small, compact nature of this campus, there is no network of collection piping located outside the facility footprint, only a couple of sanitary sewer service lines or laterals from the college facilities discharging into municipal manholes and then collection lines or mains located within the city street right-of-way that convey the sewage to the nearest municipal wastewater treatment facility.

It is estimated that there are only a couple hundred linear feet of actual sanitary sewer line owned by the college outside of the facility footprint running directly to the nearest municipal manhole. Any sewer ejector pump within the facilities would be addressed within the individual facility assessment report.

The sanitary sewer collection and conveyance system appears to be in overall good condition and properly sized to serve the campus. Based on the condition and age of the sewer pipe, there are no required upgrades or expected lifecycle replacement needs for the minimal buried sewer lines utilized for collecting the college sanitary sewage from this small campus.

Stormwater Sewer Collection System

As previously mentioned, this campus has minimal grounds and therefore a very small stormwater collection system. On the north side of the academic facilities are a couple of small landscaped courtyard areas where catchbasins collect the surface stormwater and transport it to larger lines and catchbasins in the parking lot area. Then the stormwater is discharged into city manholes located north in the right-of-way of Seventh Avenue. On the southwest corner of the campus is one of the main entrances with landscaping and paved walkways. Catchbasins in this area transport collected stormwater to a city manhole within the right-of-way of Lincoln Street.

Based on 2002 GASB Infrastructure drawings provided to ISES, a large stormwater retention/detention system has been installed in the east end of the asphalt parking lot just south of the two parking garages owned by the college across Lincoln Street. This system consists of over 1,800 linear feet of large diameter stormwater pipe used to collect and contain the stormwater, allowing it to slowly re-enter the subsurface and recharge the local groundwater table with minimal effects on downstream flow while collecting contaminants and debris from the runoff.

The stormwater sewer collection system appears to be in good condition and properly sized to serve the campus. Similar to the other systems, based on the condition and age of the supply pipe, there are no required upgrades or expected lifecycle replacement needs for the buried stormwater sewer lines. However, it is recommended that the potential for sand and debris accumulations within the stormwater retention system south of the parking garages be investigated to ensure the design capacity is maintained and the system is operating properly.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors thoroughly examined the accessible equipment and various components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the facility to modern standards without any anticipation of change to facility space layout or function. The total costs include variable project delivery costs as determined by the Owner. The costs developed do not represent the cost of a complete facility renovation. Soft costs not represented in this report include telecommunications, security, furniture, window treatment, space change, program issues, relocation, swing space, contingency, or costs that could not be identified or determined from the visual inspection and available building information.

INSPECTION TEAM DATA

Report Development

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Duluth, GA 30096

Project Manager

Rob Camperlino
770.674.3139
robc@isescorp.com

Date of Inspection

March 23, 2017

Inspection Team Personnel

NAME	POSITION	SPECIALTY
Rob Camperlino	Facility Assessor	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health
Carl Mason, PE, BSCP, M.ASCE	Senior Project Engineer	Interior Finishes, Exterior Structure, ADA Compliance, Site, Fire/Life Safety, Health, Plumbing

Client Contact

NAME	POSITION
Dan P. Cherewick	Director, Physical Facilities

DEFINITIONS

The following information is a clarification of this report using example definitions.

Overview

Recurring and Nonrecurring Facility Renewal Costs

Facility renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of facility systems and components (e.g., roof or HVAC system replacement at or past the end of its normal useful life). The tool for projecting the recurring renewal costs is the Asset Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with fire/life safety or accessibility code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Facility Condition Needs Index (FCNI)

The FCNI provides a lifecycle cost comparison. It is a ratio of the sum of the recurring and nonrecurring renewal costs over ten years to the current replacement value of the asset. The current replacement value is based on replacement with current construction standards for the facility use type, and not original design parameters. This index gives the college a comparison within all buildings for identifying worst case/best case building conditions.

$$\text{FCNI} = \frac{\text{Nonrecurring Projects} + \text{10-Year Recurring Component Renewal}}{\text{Current Replacement Value}}$$

Facility Condition Index (FCI)

The FCI is a ratio of the Deferred Renewal facilities renewal costs to the current replacement value.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Oakland using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Typical general contractor fees (which could include profit, overhead, bonds, and insurance) and professional fees (architect or engineer design fees and in-house design costs) are also included in the renewal costs.

GLOBAL MARKUP	%
Local Labor Index	102.9
Local Materials Index	99.3
General Contractor Markup	20.0
Professional Fees	16.0

Recurring Costs

Asset Component Inventory and Cost Projections

The Asset Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major building systems and major components within a facility. This is a list of all major systems and components within the facility. Each indicated component has the following associated information:

CATEGORY	DEFINITION
Uniformat Code	The standard Uniformat Code that applies to the component
Component Description	This line item describes the individual component
Identifier	Unique identifying information entered for a component as necessary
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Unit Cost	The cost to replace each individual component unit (this cost is in today's dollars)
Complexity Adjustment	A factor utilize to adjust component replacement costs accordingly when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	Unit cost multiplied by quantity, in today's dollars. Note that this is a one-time renewal/replacement cost
Install Date	Year that the component was or is estimated to have been installed. When this data is not available, it defaults to the year the asset was constructed
Life Expectancy	Average life expectancy for each individual component
Life Expectancy Adjustment	Utilized to adjust the first lifecycle of the component and to express when the next replacement should occur

The component listing forms the basis of the Recurring Component Renewal Schedule, which provides a year-by-year list of projected recurring renewal costs over the next ten years. Each individual component is assigned a replacement year based on lifecycles, and the costs for each item are in future year dollars. For items that are already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot ($/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- Deferred Renewal
  Recurring repairs, generated by the Asset Component Inventory, that are past due for completion but have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral of such renewal could impair the proper functioning of the facility. Costs estimated for Deferred Renewal projects should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.

- Projected Renewal
  Recurring renewal efforts, generated by the Asset Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with fire/life safety or accessibility code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within are not included in the Asset Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- Plant Adaption
  Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).

- Corrective Action
  Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- Immediate

  Projects in this category require immediate action to:

  a. correct a cited safety hazard

  b. stop accelerated deterioration

  c. and/or return a facility to normal operation

- Critical

  Projects in this category include actions that must be addressed in the short-term:

  a. repairs to prevent further deterioration

  b. improvements to facilities associated with critical accessibility needs

  c. potential safety hazards

- Noncritical

  Projects in this category include:

  a. improvements to facilities associated with noncritical accessibility needs

  b. actions to bring a facility into compliance with current building codes as grandfather clauses expire

  c. actions to improve the usability of a facility following an occupancy or use change

Category Codes

CATEGORY CODE*	SYSTEM DESCRIPTION
AC1A – AC4B	ACCESSIBILITY
EL1A – EL8A	ELECTRICAL
ES1A – ES6E	EXTERIOR STRUCTURE
FS1A – FS6A	FIRE/LIFE SAFETY
HE1A – HE7A	HEALTH
HV1A – HV8B	HVAC
IS1A – IS6D	INTERIOR FINISHES/SYSTEMS
PL1A – PL5A	PLUMBING
SI1A – SI4A	SITE
SS1A – SS7A	SECURITY SYSTEMS
VT1A – VT7A	VERTICAL TRANSPORTATION

Example: **Category Code = EL5A**	
EL	System Description
5	Component Description
A	Element Description

**Refer to the Category Code Report starting on page 1.5.1.*

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

Example:

Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Drawings/Project Locations

The drawings for this facility are marked with icons (see legend on plans) denoting the specific location(s) for each project. Within each icon are the last four characters of the respective project number (e.g., 0001IS01 is marked on the plan as IS01).

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

Example: **Photo Number: 0001006e**	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

CATEGORY CODE REPORT

ACCESSIBILITY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
AC1A	Site	Stair and Railings	Includes exterior stairs and railings which are not part of the building entrance points.
AC1B	Site	Ramps and Walks	Includes sidewalks, grade change ramps (except for a building entrance), curb ramps, etc.
AC1C	Site	Parking	Designated parking spaces, including striping, signage, access aisles and ramps, etc.
AC1D	Site	Tactile Warnings	Raised tactile warnings located at traffic crossing and elevation changes.
AC2A	Building Entry	General	Covers all aspects of entry into the building itself, including ramps, lifts, doors and hardware, power operators, etc.
AC3A	Interior Path of Travel	Lifts/Ramps/ Elevators	Interior lifts, ramps and elevators designed to accommodate level changes inside a building. Includes both installation and retrofitting.
AC3B	Interior Path of Travel	Stairs and Railings	Upgrades to interior stairs and handrails for accessibility reasons.
AC3C	Interior Path of Travel	Doors and Hardware	Accessibility upgrades to the interior doors including widening, replacing hardware power, assisted operators, etc.
AC3D	Interior Path of Travel	Signage	Interior building signage upgrades for compliance with the ADA.
AC3E	Interior Path of Travel	Restrooms/ Bathrooms	Modifications to and installation of accessible public restrooms and bathrooms. Bathrooms that are an integral part of residential suites are catalogued under HC4A.
AC3F	Interior Path of Travel	Drinking Fountains	Upgrading/replacing drinking fountains for reasons of accessibility.
AC3G	Interior Path of Travel	Phones	Replacement/modification of public access telephones.
AC4A	General	Functional Space Modifications	This category covers all necessary interior modifications necessary to make the services and functions of a building accessible. It includes installation of assistive listening systems, modification of living quarters, modifications to laboratory workstations, etc. Bathrooms that are integral to efficiency suites are catalogued here.
AC4B	General	Other	All accessibility issues not catalogued elsewhere.

ELECTRICAL

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
EL1A	Incoming Service	Transformer	Main building service transformer.
EL1B	Incoming Service	Disconnects	Main building disconnect and switchgear.
EL1C	Incoming Service	Feeders	Incoming service feeders. Complete incoming service upgrades, including transformers, feeders, and main distribution panels are catalogued here.
EL1D	Incoming Service	Metering	Installation of meters to record consumption and/or demand.
EL2A	Main Distribution Panels	Condition Upgrade	Main distribution upgrade due to deficiencies in condition.
EL2B	Main Distribution Panels	Capacity Upgrade	Main distribution upgrades due to inadequate capacity.
EL3A	Secondary Distribution	Step-Down Transformers	Secondary distribution step-down and isolation transformers.
EL3B	Secondary Distribution	Distribution Network	Includes conduit, conductors, sub-distribution panels, switches, outlets, etc. Complete interior rewiring of a facility is catalogued here.

EL3C	Secondary Distribution	Motor Controllers	Mechanical equipment motor starters and control centers.
EL4A	Devices and Fixtures	Exterior Lighting	Exterior building lighting fixtures, including supply conductors and conduit.
EL4B	Devices and Fixtures	Interior Lighting	Interior lighting fixtures (also system wide emergency lighting), including supply conductors and conduits.
EL4C	Devices and Fixtures	Lighting Controllers	Motion sensors, photocell controllers, lighting contactors, etc.
EL4D	Devices and Fixtures	GFCI Protection	Ground fault protection, including GFCI receptacles and breakers.
EL4E	Devices and Fixtures	Lightning Protection	Lightning arrestation systems including air terminals and grounding conductors.
EL5A	Emergency Power System	Generation/ Distribution	Includes generators, central battery banks, transfer switches, emergency power grid, etc.
EL6A	Systems	UPS/DC Power Supply	Uninterruptible power supply systems and DC motor-generator sets and distribution systems.
EL7A	Infrastructure	Above Ground Transmission	Includes poles, towers, conductors, insulators, fuses, disconnects, etc.
EL7B	Infrastructure	Underground Transmission	Includes direct buried feeders, duct banks, conduit, manholes, feeders, switches, disconnects, etc.
EL7C	Infrastructure	Substations	Includes incoming feeders, breakers, buses, switchgear, meters, CTs, PTs, battery systems, capacitor banks, and all associated auxiliary equipment.
EL7D	Infrastructure	Distribution Switchgear	Stand-alone sectionalizing switches, distribution switchboards, etc.
EL7F	Infrastructure	Area and Street Lighting	Area and street lighting systems, including stanchions, fixtures, feeders, etc.
EL8A	General	Other	Electrical system components not catalogued elsewhere.

EXTERIOR STRUCTURE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
ES1A	Foundation/ Footing	Structure	Structural foundation improvements involving structural work on foundation wall/footing, piers, caissons, and piles, including crack repairs, shoring, and pointing
ES1B	Foundation/ Footing	Dampproofing/ Dewatering	Foundation/footing waterproofing work, including, damp-proofing, dewatering, insulation, etc.
ES2A	Columns/Beams/ Walls	Structure	Structural work to primary load-bearing structural components aside from floors, including columns, beams, bearing walls, lintels, arches, etc.
ES2B	Columns/Beams/ Walls	Finish	Work involving restoration of the appearance and weatherproof integrity of exterior wall/structural envelope components, including masonry/pointing, expansion joints, efflorescence and stain removal, grouting, surfacing, chimney repairs, etc.
ES3A	Floor	Structure	Work concerning the structural integrity of the load supporting floors, both exposed and unexposed, including deformation, delamination, spalling, shoring, crack repair, etc.
ES4A	Roof	Repair	Work on waterproof horizontal finish (roof) involving repair and/or limited replacement (<40% total), including membrane patching, flashing repair, coping caulk/resetting, PPT wall parging/coating, walk pad installation, skylight and roof hatch R&R, etc.
ES4B	Roof	Replacement	Work involving total refurbishment of roofing system, including related component rehab.
ES5A	Fenestrations	Doors	Work on exterior exit/access door, including storefronts, airlocks, air curtains, vinyl slat doors, all power/manual operating hardware (except handicapped), etc.
ES5B	Fenestrations	Windows	Work on exterior fenestration closure and related components, including glass/metal/wood curtain walls, fixed or operable window sashes, glazing, frames, sills, casings, stools, seats, coatings, treatments, screens, storm windows, etc.

ES6A	General	Attached Structure	Work on attached exterior structure components not normally considered in above categories, including porches, stoops, decks, monumental entrance stairs, cupolas, tower, etc.
ES6B	General	Areaways	Work on attached grade level or below structural features, including subterranean lightwells, areaways, basement access stairs, etc.
ES6C	General	Trim	Work on ornamental exterior (generally nonstructural) elements, including beltlines, quoins, porticos, soffits, cornices, moldings, trim, etc.
ES6D	General	Superstructure	Finish and structural work on nonstandard structures with exposed load-bearing elements, such as stadiums, bag houses, bleachers, freestanding towers, etc.
ES6E	General	Other	Any exterior work not specifically categorized elsewhere, including finish and structural work on freestanding boiler stacks.

FIRE/LIFE SAFETY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
FS1A	Lighting	Egress Lighting/Exit Signage	R&R work on exit signage and packaged AC/DC emergency lighting.
FS2A	Detection/Alarm	General	Repair or replacement of fire alarm/detection system/components, including alarms, pull boxes, smoke/heat detectors, annunciator panels, central fire control stations, remote dialers, fire station communications, etc.
FS3A	Suppression	Sprinklers	Repair or installation of water sprinkler type automatic fire suppressions, including wet-pipe and dry-pipe systems, heads, piping, deflectors, valves, monitors, associated fire pump, etc.
FS3B	Suppression	Standpipe/Hose	Repair or installation of standpipe system or components, including hardware, hoses, cabinets, nozzles, necessary fire pumping system, etc.
FS3C	Suppression	Extinguishers	Repairs or upgrades to F.E. cabinets/wall fastenings and handheld extinguisher testing/replacement.
FS3D	Suppression	Other	Other fire suppression items not specifically categorized elsewhere, including fire blankets, carbon dioxide automatic systems, Halon systems, dry chemical systems, etc.
FS4A	Hazardous Materials	Storage Environment	Installation or repair of special storage environment for the safe holding of flammable or otherwise dangerous materials/supplies, including vented flammables storage cabinets, holding pens/rooms, cages, fire safe chemical storage rooms, etc.
FS4B	Hazardous Materials	User Safety	Improvements, repairs, installation, or testing of user safety equipment, including emergency eyewashes, safety showers, emergency panic/shut-down system, etc.
FS5A	Egress Path	Designation	Installation, relocation or repair of posted diagrammatic emergency evacuation routes.
FS5B	Egress Path	Distance/ Geometry	Work involving remediation of egress routing problems, including elimination of dead end corridors, excessive egress distance modifications, and egress routing inadequacies.
FS5C	Egress Path	Separation Rating	Restoration of required fire protective barriers, including wall rating compromises, fire-rated construction, structural fire proofing, wind/safety glazing, transom retrofitting, etc.
FS5D	Egress Path	Obstruction	Clearance of items restricting the required egress routes.
FS5E	Egress Path	Stairs Railing	Retrofit of stair/landing configurations/structure, railing heights/geometries, etc.
FS5F	Egress Path	Fire Doors/ Hardware	Installation/replacement/repair of fire doors and hardware, including labeled fire doors, fire shutters, closers, magnetic holders, panic hardware, etc.
FS5G	Egress Path	Finish/Furniture Ratings	Remediation of improper fire/smoke ratings of finishes and furniture along egress routes.
FS6A	General	Other	Life/fire safety items not specifically categorized elsewhere.

HEALTH

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HE1A	Environmental Control	Equipment and Enclosures	Temperature control chambers (both hot and cold) for non-food storage. Includes both chamber and all associated mechanical equipment.
HE1B	Environmental Control	Other	General environmental control problems not catalogued elsewhere.
HE2A	Pest Control	General	Includes all measures necessary to control and destroy insects, rodents, and other pests.
HE3A	Refuse	General	Issues related to the collection, handling, and disposal of refuse.
HE4A	Sanitation Equipment	Laboratory and Process	Includes autoclaves, cage washers, steam cleaners, etc.
HE5A	Food Service	Kitchen Equipment	Includes ranges, grilles, cookers, sculleries, etc.
HE5B	Food Service	Cold Storage	Includes the cold storage room and all associated refrigeration equipment.
HE6A	Hazardous Material	Structural Asbestos	Testing, abatement, and disposal of structural and building finish materials containing asbestos.
HE6B	Hazardous Material	Mechanical Asbestos	Testing, abatement, and disposal of mechanical insulation materials containing asbestos.
HE6C	Hazardous Material	PCBs	Includes testing, demolition, disposal, and cleanup of PCB contaminated substances.
HE6D	Hazardous Material	Fuel Storage	Includes monitoring, removal, and replacement of above and below ground fuel storage and distribution systems. Also includes testing and disposal of contaminated soils.
HE6E	Hazardous Material	Lead Paint	Testing, removal, and disposal of lead-based paint systems.
HE6F	Hazardous Material	Other	Handling, storage, and disposal of other hazardous materials.
HE7A	General	Other	Health related issues not catalogued elsewhere.

HVAC

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HV1A	Heating	Boilers/Stacks/ Controls	Boilers for heating purposes, including their related stacks, flues, and controls.
HV1B	Heating	Radiators/ Convectors	Including cast-iron radiators, fin tube radiators, baseboard radiators, etc.
HV1C	Heating	Furnace	Furnaces and their related controls, flues, etc.
HV1D	Heating	Fuel Supply/Storage	Storage and/or distribution of fuel for heating purposes, including tanks and piping networks and related leak detection/monitoring.
HV2A	Cooling	Chillers/ Controls	Chiller units for production of chilled water for cooling purposes, related controls (not including mods for CFC compliance).
HV2B	Cooling	Heat Rejection	Repair/replacement of cooling towers, dry coolers, air-cooling, and heat rejection. Includes connection of once-through system to cooling tower.
HV3A	Heating/Cooling	System Retrofit/ Replace	Replacement or major retrofit of HVAC systems.
HV3B	Heating/Cooling	Water Treatment	Treatment of hot water, chilled water, steam, condenser water, etc.
HV3C	Heating/Cooling	Package/Self-Contained Units	Repair/replacement of self-contained/package type units, including stand-up units, rooftop units, window units, etc.; both air conditioners and heat pumps.
HV3D	Heating/Cooling	Conventional Split Systems	Repair, installation, or replacement of conventional split systems, both air conditioners and heat pumps, including independent component replacements of compressors and condensers.

HV4A	Air Moving/ Ventilation	Air Handlers/ Fan Units	Includes air handlers and coils, fan coil units, unit ventilators, filtration upgrades, etc., not including package/self-contained units, split systems, or other specifically categorized systems.
HV4B	Air Moving/ Ventilation	Exhaust Fans	Exhaust fan systems, including fans, range and fume hoods, controls, and related ductwork.
HV4C	Air Moving/ Ventilation	Other Fans	Supply, return, or any other fans not incorporated into a component categorized elsewhere.
HV4D	Air Moving/ Ventilation	Air Distribution Network	Repair, replacement, or cleaning of air distribution network, including ductwork, terminal reheat/cool, VAV units, induction units, power induction units, insulation, dampers, linkages, etc.
HV5A	Steam/Hydronic Distribution	Piping Network	Repair/replacement of piping networks for heating and cooling systems, including pipe, fittings, insulation, related components, etc.
HV5B	Steam/Hydronic Distribution	Pumps	Repair or replacement of pumps used in heating and cooling systems, related control components, etc.
HV5C	Steam/Hydronic Distribution	Heat Exchangers	Including shell-and-tube heat exchangers and plate heat exchangers for heating and cooling.
HV6A	Controls	Complete System Upgrade	Replacement of HVAC control systems.
HV6B	Controls	Modifications/ Repairs	Repair or modification of HVAC control system.
HV6C	Controls	Air Compressors/ Dryers	Repair or modification of control air compressors and dryers.
HV7A	Infrastructure	Steam/Hot Water Generation	Generation of central steam and/or hot water, including boilers and related components.
HV7B	Infrastructure	Steam/Hot Water Distribution	Distribution system for central hot water and/or steam.
HV7C	Infrastructure	Chilled Water Generation	Generation of central chilled water, including chillers and related components.
HV7D	Infrastructure	Chilled Water Distribution	Distribution system for central chilled water.
HV7E	Infrastructure	Tunnels/ Manholes/ Trenches	Repairs, installation, or replacement of utility system access chambers.
HV7F	Infrastructure	Other	HVAC infrastructure issues not specifically categorized elsewhere.
HV8A	General	CFC Compliance	Chiller conversions/replacements for CFC regulatory compliance, monitoring, etc.
HV8B	General	Other	HVAC issues not catalogued elsewhere.

INTERIOR FINISHES/SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
IS1A	Floor	Finishes-Dry	R&R of carpet, hardwood strip flooring, concrete coating, vinyl linoleum and tile, marble, terrazzo, rubber flooring, and underlayment in predominantly dry areas ("dry" includes non-commercial kitchens)
IS1B	Floor	Finishes-Wet	Flooring finish/underlayment work in predominantly "wet" areas, including work with linoleum, rubber, terrazzo, concrete coating, quarry tile, ceramic tile, epoxy aggregate, etc.
IS2A	Partitions	Structure	Structural work on full height permanent interior partitions, including wood/metal stud and drywall systems, CMU systems, structural brick, tile, glass block, etc.
IS2B	Partitions	Finishes	Work on full height permanent interior partitions, including R&R, to gypsum board, plaster, lath, wood paneling, acoustical panels, wall coverings, column coverings, tile, paint, etc.
IS3A	Ceilings	Repair	Repair of interior ceilings (<40% of total), including tiles, gypsum board, plaster, paint, etc.
IS3B	Ceilings	Replacement	Major refurbishments (>40% of total) to interior ceiling systems, including grid system replacements, structural framing, new suspended systems, paint, plastering, etc.

IS4A	Doors	General	Any work on interior non-fire-rated doors, roll-up counter doors, mechanical/plumbing access doors, and all door hardware (except for reasons of access improvement).
IS5A	Stairs	Finish	Any finish restorative work to stair tower walking surfaces, including replacement of rubber treads, safety grips, nosings, etc. (except as required to accommodate disabled persons).
IS6A	General	Molding	R&R to interior trim/molding systems, including rubber/vinyl/wood base, crown/chair/ornamental moldings, cased openings, etc.
IS6B	General	Cabinetry	R&R work to interior casework systems, including cabinets, countertops, wardrobes, lockers, mail boxes, built-in bookcases, lab/work benches, reagent shelving, etc. (except as required for access by the disabled).
IS6C	General	Screening	Work on temporary or partial height partitioning systems, including toilet partitions, urinal/vanity screens, etc.
IS6D	General	Other	Any work on interior elements not logically or specifically categorized elsewhere, including light coves, phone booths, interior lightwells, etc.

PLUMBING

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
PL1A	Domestic Water	Piping Network	Repair or replacement of domestic water supply piping network, insulation, hangers, etc.
PL1B	Domestic Water	Pumps	Domestic water booster pumps, circulating pumps, related controls, etc.
PL1C	Domestic Water	Storage/ Treatment	Equipment or vessels for storage or treatment of domestic water.
PL1D	Domestic Water	Metering	Installation, repair, or replacement of water meters.
PL1E	Domestic Water	Heating	Domestic water heaters, including gas, oil, and electric water heaters, shell-and-tube heat exchangers, tank type, and instantaneous.
PL1F	Domestic Water	Cooling	Central systems for cooling and distributing drinking water.
PL1G	Domestic Water	Fixtures	Plumbing fixtures, including sinks, drinking fountains, water closets, urinals, etc.
PL1H	Domestic Water	Conservation	Alternations made to the water distribution system to conserve water.
PL1I	Domestic Water	Backflow Protection	Backflow protection devices, including backflow preventers, vacuum breakers, etc.
PL2A	Wastewater	Piping Network	Repair or replacement of building wastewater piping network.
PL2B	Wastewater	Pumps	Pump systems used to lift wastewater, including sewage ejectors and other sump systems.
PL3A	Special Systems	Process Gas/Fluids	Generation and/or distribution of process steam, compressed air, natural and LP gas, process water, vacuum, etc.
PL4A	Infrastructure	Potable Water Storage/ Treatment	Storage and treatment of potable water for distribution.
PL4B	Infrastructure	Industrial Water Distribution/ Treatment	Storage and treatment of industrial water for distribution.
PL4C	Infrastructure	Sanitary Water Collection	Sanitary water collection systems and sanitary sewer systems, including combined systems.
PL4D	Infrastructure	Stormwater Collection	Stormwater collection systems and storm sewer systems; storm water only.
PL4E	Infrastructure	Potable Water Distribution	Potable water distribution network.
PL4F	Infrastructure	Wastewater Treatment	Wastewater treatment plants, associated equipment, etc.
PL5A	General	Other	Plumbing issues not categorized elsewhere.

SITE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SI1A	Access	Pedestrian	Paved pedestrian surfaces, including walks, site stairs, step ramps, paths, pedestrian signage, sidewalk bridges/canopies, pedestrian plaza/mall areas, etc.
SI1B	Access	Vehicular	Paved vehicular surfaces, including roads, paths, curbs, guards, bollards, bridges, skyways, joints, shoulder work, culverts, ditches, vehicular signage, etc.
SI2A	Landscape	Grade/Flora	Landscape related work, including new grass/turf refurbishment, grade improvements, catch basins, swales, berms, pruning, new ornamental flora, etc.
SI3A	Hardscape	Structure	Permanent hard site features, predominantly ornamental, including terraces, fences, statues, freestanding signage, fountains, benches, etc.
SI4A	General	Other	Other site work not specifically categorized elsewhere.

SECURITY SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SS1A	Lighting	Exterior	Fixtures, stanchions, foliage interference, cleanliness, locations, etc.
SS2A	Site	Fencing	Perimeter campus fencing, individual building fencing, includes both pedestrian and vehicular control fences.
SS2B	Site	General	Hidden areas due to foliage, fencing, parking, walls, etc.
SS3A	Communications	Emergency Phones	Access, locations, visibility, function, reliability, etc.
SS4A	Access Control	Doors	Access, locks, keys, two-way speakers, reliability, redundancy, etc.
SS4B	Access Control	Windows	Locks, screens, access, reliability, etc.
SS4C	Access Control	Systems	Card key, proximity devices, data control, data use, reliability, system design, etc.
SS5A	Monitoring	Systems	Cameras, audio communication, monitoring stations, locations, system design, etc.
SS6A	Circulation	Pedestrian	On campus as well as to and from off-campus housing and class locations, etc.
SS6B	Circulation	Vehicular	Guard gates, access, systems, data control and use, identification, etc.
SS7A	General	Other	General information/projects pertaining to security issues.

VERTICAL TRANSPORTATION

CODE	Component Description	Element Description	DEFINITION
VT1A	Machine Room	General	Machine, worm gear, thrust bearing, brake, motors, sheaves, generator, controller, selector, governor, pump(s), valves, oil, access, lighting, ventilation, and floor.
VT2A	Car	General	Position indicator, lighting, floor, gate-doors, operation devices, safeties, safety shoe, light ray/detection, emergency light, fire fighter service, car top, door operator, stop switch, car frame, car guides, sheaves, phone, and ventilation.
VT3A	Hoistway	General	Enclosure, fascia, interlock, doors, hangers, closers, sheaves, rails, hoistway switches, ropes, traveling cables, selector tape, weights, and compensation.
VT4A	Hall Fixtures	General	Operating panel, position indicator, hall buttons, lobby panel, hall lanterns, fire fighter service, audible signals, and card/key access.
VT5A	Pit	General	Buffer(s), guards, sheaves, hydro packing, floor, lighting, and safety controls.
VT6A	Operating Conditions	General	Door open time, door close time, door thrust, acceleration, deceleration, leveling, dwell time, speed, OFR time, and nudging.
VT7A	General	Other	General information/projects relating to vertical transportation system components.

UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 2

COST SUMMARIES AND TOTALS

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
EXTERIOR	0	0	5,007	0	0	0	0	0	0	75,123	0	0	0	0	$80,130
INTERIOR	0	0	0	0	1,466	0	0	0	0	0	0	0	12,105	0	$13,571
PLUMBING	0	0	0	0	1,057	0	0	0	0	0	14,071	4,435	0	0	$19,562
HVAC	68,212	119,344	0	1,842	107,343	0	18,829	0	15,622	0	0	0	0	0	$331,193
FIRE/LIFE SAFETY	0	0	0	0	0	0	0	0	50,194	0	0	0	0	0	$50,194
ELECTRICAL	12,376	12,376	95,767	22,761	0	18,152	12,553	215,284	0	0	174,947	0	0	0	$564,215
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$80,588	$131,719	$100,774	$24,603	$109,865	$18,152	$31,382	$215,284	$65,817	$75,123	$189,017	$4,435	$12,105	$0	$1,058,864
TOTAL NONRECURRING PROJECT NEEDS			$313,082	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$745,782	

CURRENT REPLACEMENT VALUE	$10,689,400
FACILITY CONDITION NEEDS INDEX	0.10
FACILITY CONDITION INDEX	0.00

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
3,931	$1,058,864	269.36

All costs shown as Present Value

RENEWAL COSTS BY SYSTEM

CATEGORY	NONRECURRING ASSESSMENT RECOMENDATON	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	$0	$0	$0
EXTERIOR	$5,007	$75,123	$80,130
INTERIOR	$0	$13,571	$13,571
PLUMBING	$0	$19,562	$19,562
HVAC	$187,556	$143,636	$331,193
FIRE/LIFE SAFETY	$0	$50,194	$50,194
ELECTRICAL	$120,519	$443,696	$564,215
SITE	$0	$0	$0
VERT. TRANS	$0	$0	$0
HEALTH	$0	$0	$0
TOTALS	$313,082	$745,782	$1,058,864

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COST

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
ROPHV02	PERFORM HYDRAULIC ANALYSIS		Immediate	Corrective Action	51,450
ROPHV03	MODIFY CONDENSER WATER SYSTEM		Immediate	Corrective Action	16,762
ROHVEEL01	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	D5010	Immediate	Plant Adaption	12,376
ROPHV01	REMOVE AND REPLACE PURGE PUMP ASSEMBLIES AT CHILLERS		Critical	Corrective Action	11,143
ROHCDHV01	REMOVE AND REPLACE OLDER VALVES THROUGHOUT CAMPUS		Critical	Corrective Action	108,201
ROHVEEL02	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	D5010	Critical	Plant Adaption	12,376
ROHVEEL03	REMOVE AND REPLACE AGING ELECTRICAL CONDUCTOR		Non-Critical	Corrective Action	95,767
ROPES01	EXTERIOR MASONRY WALL RENEWAL	B2010	Non-Critical	Corrective Action	5,007
				TOTAL	**313,082**

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
ROP AD02	AIR DRYER - REFRIGERATED (11-25 CFM)	ROP AD	D3060	Deferred Renewal	1,842
ROP VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	ROP RA-1E	D5010	Deferred Renewal	5,418
ROP VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	ROP HV-1E	D5010	Deferred Renewal	6,276
ROP LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	ROP EXT. FLOOD LIGHTS	D5020	Deferred Renewal	473
ROP LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	ROP LIGHTING T12	D5020	Deferred Renewal	10,593
ROP DR24	DOOR LOCK, COMMERCIAL-GRADE		C1020	2017	1,466
ROP FX15	PLUMBING FIXTURE - EMERGENCY EYEWASH	ROP EM. EYEWASH	D2010	2017	1,057
ROP AH08	AIR HANDLING UNIT - INDOOR (12-17 HP)	ROP HV-1E	D3040	2017	94,549
ROP FN21	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY, 2.5" SP (<=30 HP)	ROP RA-1E	D3040	2017	12,794
ROP VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	ROP SCW CP-4	D5010	2018	5,418
ROP VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	ROP SCW CP-3	D5010	2018	5,418
ROP LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	ROP EXT. HID LIGHTS	D5020	2018	7,316
ROP AC02	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (6-10 TOTAL HP)	ROP AC-1	D3060	2019	18,829
ROP VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	ROP SHW CP-9	D5010	2019	6,276
ROP VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	ROP SHW CP-8	D5010	2019	6,276
ROHVE SG17	MC SWGR ENCLOSURE VERT STACK SECT (<800 AMP)	ROA BAY NO.1 DTE INCOMING	D5010	2020	14,719
ROHVE SG24	MC SWGR METERING AND INSTRUMENT SYSTEMS	ROA SUBSTATION METER AND RELAY	D5010	2020	46,685
ROHVE SW04	LOAD INTERUPTER SWITCH, FUSED - 15 KV	ROA SS UNIT A NORTH/ TRF#1	D5010	2020	76,940
ROHVE SW04	LOAD INTERUPTER SWITCH, FUSED - 15 KV	ROA TRANS. AT PWR HOUSE/ TRF#2	D5010	2020	76,940
ROP BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	ROP DDC AND BAS	D3060	2021	7,811
ROP BA23	HVAC CONTROLS SYSTEM - WAREHOUSE	ROP REF. MONTIOR	D3060	2021	7,811
ROP FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	ROP FACP	D4030	2021	39,820

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE	COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
ROP	FA02	FIRE ALARM SYSTEM - DEVICES	ROP FA DEVICES	D4030	2021	10,374
ROP	RR08	ROOF - BITUMINOUS, 4-PLY, COAL TAR PITCH - R30	BOILER 2 - AGGREGATE BALLASTED	B3010	2022	29,080
ROP	RR08	ROOF - BITUMINOUS, 4-PLY, COAL TAR PITCH - R30	BOILER 1- AGGREGATE BALLASTED	B3010	2022	46,043
ROP	BF02	BACKFLOW PREVENTER (1-2 INCHES)	ROP CT MAKEUP	D2020	2023	2,167
ROP	BF05	BACKFLOW PREVENTER (4-6 INCHES)	ROP FIRE BF	D2020	2023	11,904
ROP	SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	ROP MCC/ SWBD	D5010	2023	163,946
ROP	LI23	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	ROP LIGHTING T8	D5020	2023	11,000
ROP	PG15	AIR COMPRESSOR - UTILITY (< =5 HP)	ROP AC-2	D2090	2024	4,435
ROP	IF15	FLOORING - FLUID APPLIED, PAINT OR CLEAR SEAL		C3020	2025	12,105
					TOTAL	**745,782**

PROJECT LIST BY CLASSIFICATION

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
HV	ROPHV01	3	Corrective Action	2	REMOVE AND REPLACE PURGE PUMP ASSEMBLIES AT CHILLERS	11,143
HV	ROPHV02	1	Corrective Action	1	PERFORM HYDRAULIC ANALYSIS	51,450
HV	ROPHV03	2	Corrective Action	1	MODIFY CONDENSER WATER SYSTEM	16,762
ES	ROPES01	4	Corrective Action	3	EXTERIOR MASONRY WALL RENEWAL	5,007
EL	ROHVEEL03	3	Corrective Action	3	REMOVE AND REPLACE AGING ELECTRICAL CONDUCTOR	95,767
HV	ROHCDHV01	1	Corrective Action	2	REMOVE AND REPLACE OLDER VALVES THROUGHOUT CAMPUS	108,201
					TOTAL FOR CORRECTIVE ACTION	**288,330**
EL	ROHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	12,376
EL	ROHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	12,376
					TOTAL FOR PLANT ADAPTION	**24,752**
					GRAND TOTAL:	**313,082**

PROJECT LIST BY CATEGORY CODE

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
EL	ROHVEEL03	3	Corrective Action	3	REMOVE AND REPLACE AGING ELECTRICAL CONDUCTOR	95,767
EL	ROHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	12,376
EL	ROHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	12,376
					TOTAL FOR EL	**120,519**
ES	ROPES01	4	Corrective Action	3	EXTERIOR MASONRY WALL RENEWAL	5,007
					TOTAL FOR ES	**5,007**
HV	ROPHV01	3	Corrective Action	2	REMOVE AND REPLACE PURGE PUMP ASSEMBLIES AT CHILLERS	11,143
HV	ROPHV02	1	Corrective Action	1	PERFORM HYDRAULIC ANALYSIS	51,450
HV	ROPHV03	2	Corrective Action	1	MODIFY CONDENSER WATER SYSTEM	16,762
HV	ROHCDHV01	1	Corrective Action	2	REMOVE AND REPLACE OLDER VALVES THROUGHOUT CAMPUS	108,201
					TOTAL FOR HV	**187,556**
					GRAND TOTAL:	**313,082**

OAKLAND COMMUNITY COLLEGE

Utility & Facility Condition Assessment

Southfield Infrastructure
Group SFI

Inspected March 23, 2017

ISES
CORPORATION

TABLE OF CONTENTS

SECTION 1 ASSET OVERVIEW

SECTION 2 COST SUMMARIES AND TOTALS

UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

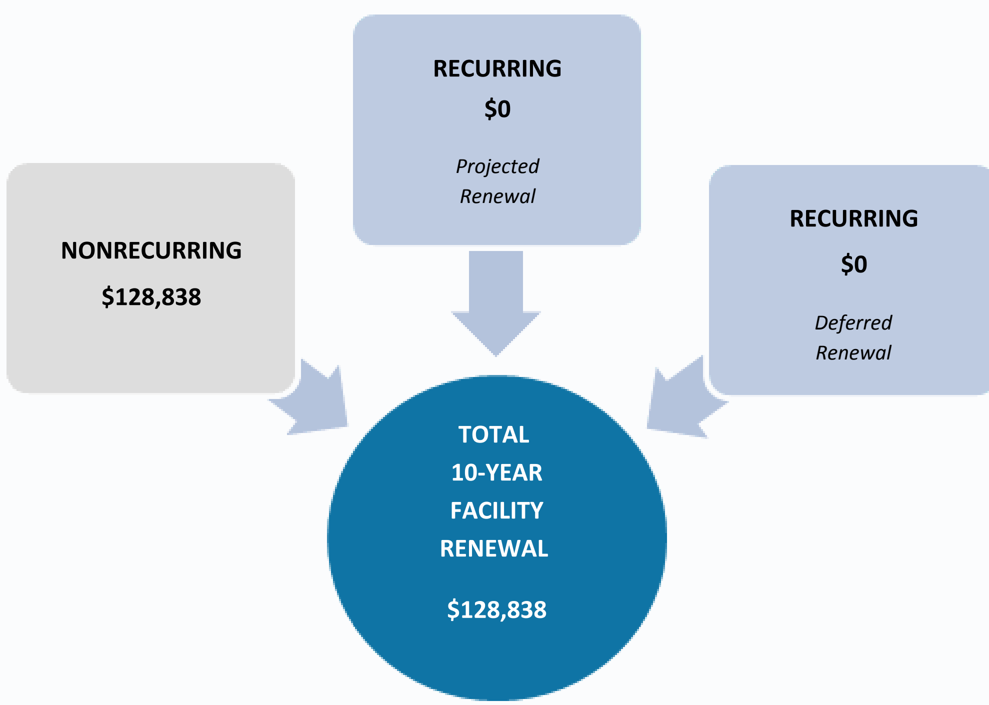
GROUP NAME	SFI : SOUTHFIELD INFRASTRUCTURE	**CURRENT REPLACEMENT VALUE**	$4,402,068
GSF	NA	**FACILITY CONDITION NEEDS INDEX**	0.03
		FACILITY CONDITION INDEX	0.00
		10-YEAR $/SF	25,767.59

FCNI Scale

The FCNI for this asset is **0.03**

- Excellent Condition (typically new construction)
- Good Condition (maintained within lifecycle)
- Fair Condition (normal renovations required)
- Below Average Condition (major renovation required)
- Poor Condition (total renovation required)
- Replacement Indicated (unless historic)

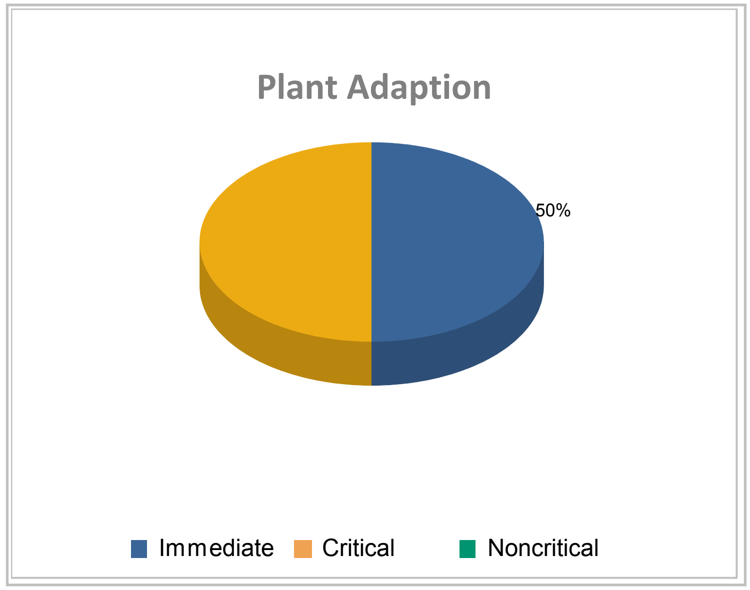
Total Facility Renewal Costs



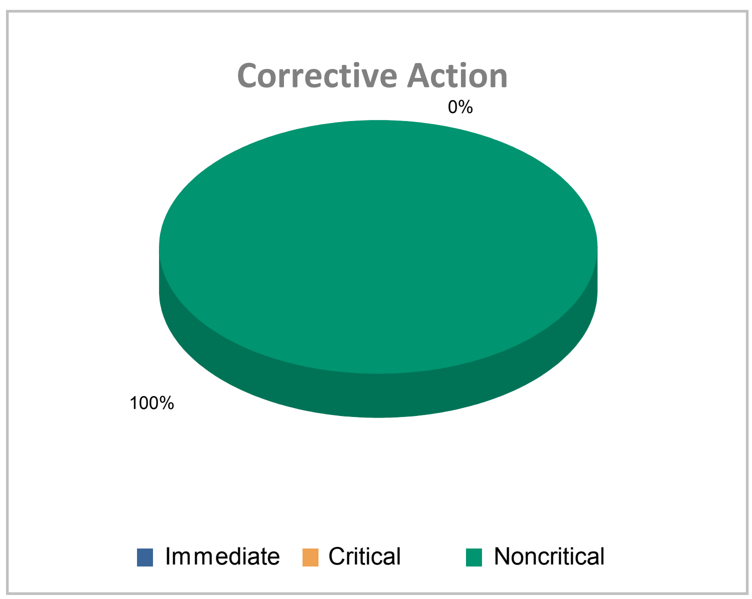
Nonrecurring Costs

Project Cost by Priority

PLANT ADAPTION	
1 - Immediate	**$7,983**
2 - Critical	**$7,983**
3 - Noncritical	**$0**

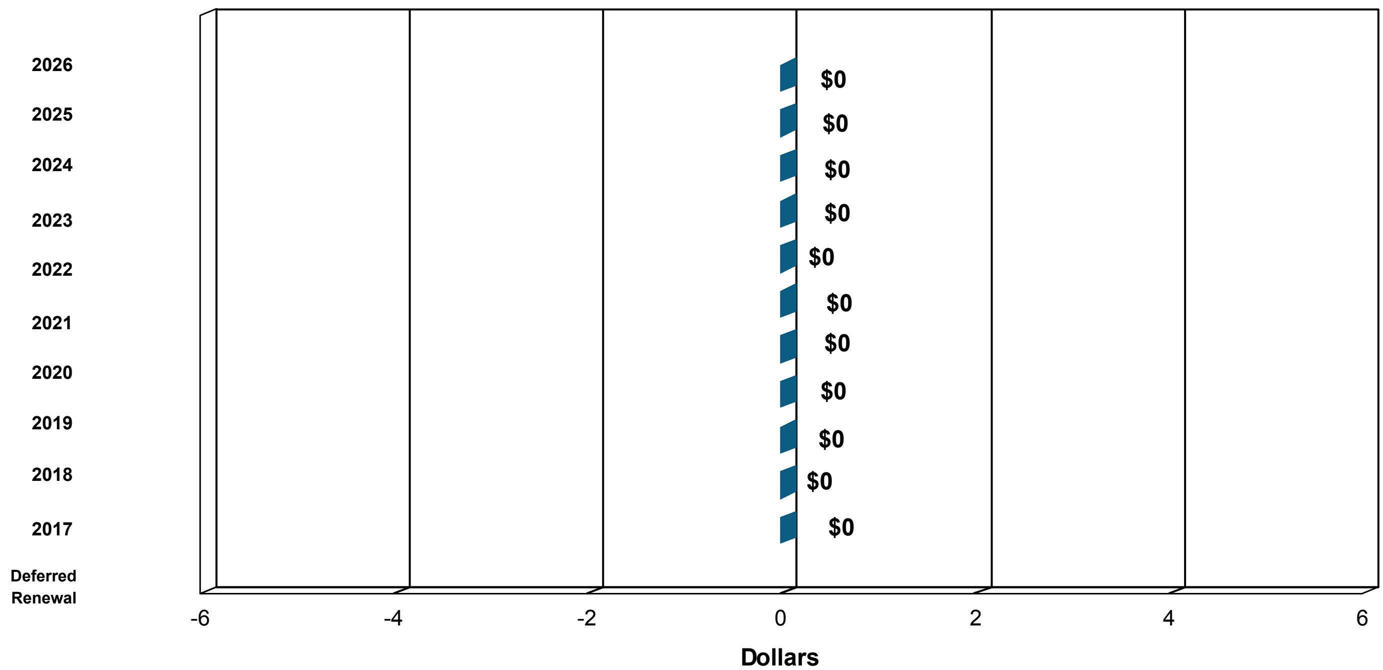


CORRECTIVE ACTION	
1 - Immediate	**$34,770**
2 - Critical	**$0**
3 - Noncritical	**$78,102**

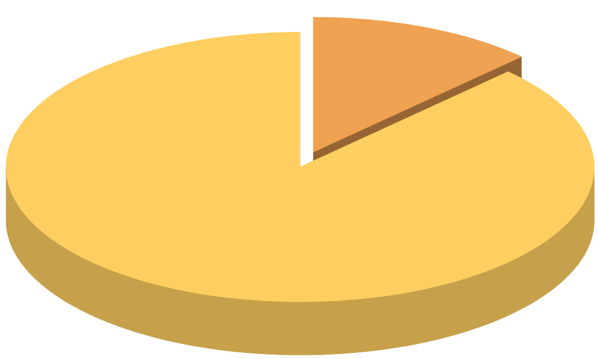


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



Accessibility	$0	0%
Electrical	$15,966	12%
Exterior	$0	0%
Fire/Life Safety	$0	0%
Health	$0	0%
HVAC	$112,872	88%
Interiors	$0	0%
Plumbing	$0	0%
Site	$0	0%
Vert. Trans.	$0	0%
TOTAL	**$128,838**	

ASSET SUMMARY

INTRODUCTION

The Southfield campus of the Oakland Community College system was originally constructed in 1980 and currently comprises three facilities totaling approximately 164,000 gross square feet. The following is a detailed analysis of the physical condition of the utility systems serving the facilities at Southfield:

- Heating and Chilled Water Generation and Distribution
- High voltage Electrical System
- Sanitary Sewer System
- Stormwater System
- Potable/Fire Water System

The goal was to produce a campuswide report with recurring and nonrecurring recommendations that have been entered into the individual utility system assets in the FCA database.

Information for this report was gathered during the site inspection conducted on March 23, 2017 and through a review of historical documents and single-line campus drawings. The assessments and estimates are based solely on visual and nondestructive observations, a review of existing drawings, previously prepared engineering reports, any available maintenance records and reports, and discussions with key personnel and specific external support companies, such as water treatment representatives. In some instances, ISES was not provided up-to-date drawings prior to the development of this report. In these cases, general project recommendations were developed, and no lifecycle model cost data was created. Additional inspection procedures and methods, along with engineering design support, may be necessary to fully define the specific costs and scope to repair various infrastructure facility deficiencies.

The specific activities involved with gathering data included a detailed request for relevant information, including system drawings, inventory data, performance data, both planned and completed capital renewal projects, and operational data (including equipment forced outage statistics. Operating data was reviewed for abnormal excursions, forced outages and peak loads. The data was evaluated for impact on the equipment's estimated useful life. Information related to forced equipment outages, equipment reliability and operating performance was reviewed to determine trends that might affect future safety, reliability and efficiency.

It is important to note that utility infrastructure assets normally encompass more than just a single piece of equipment and will, in most situations, represent a section or group of materials, i.e., linear footage of installed piping systems or electrical wiring. The majority of these systems will continue to operate reliably and safely beyond the ten-year assessment scope, but beyond that, it will be necessary to reinspect the systems to ensure that they continue to operate reliably.

Equipment Useful Life

The estimates for remaining useful life consider safety, reliability, efficiency, and sustainability as the primary operational objectives for capital renewal. These estimates are based on actual equipment age, physical inspections, performance data reviews, personnel interviews, maintenance practices, and operating history. Expected useful life values are averaged forecasts based on equipment that is properly maintained and operated without frequent and/or severe operating excursions. Chronological equipment age is not the primary determinant of service life. In many instances, there is ample evidence of equipment operating well beyond predicted useful life values. This is why it is important to modify these values with actual equipment condition. This modification is based on service history, operating conditions, installation environment, and actual field performance. It should also be noted that equipment reaching the predicted endpoint of its expected useful life does not necessarily cease to function. What does occur is a downward trend toward loss of service reliability and an increase in forced outages and maintenance cost requirements where the equipment becomes unavailable for normal service more frequently.

The trend in recent years toward planned obsolescence by manufacturers of certain plant systems and equipment alters the strategy for capital replacement as some systems become obsolete. Although the equipment may have many remaining years of safe, reliable, and efficient operation, manufacturers are phasing systems out and not supporting the equipment past some specific phase-out date. For example, digital electronic control systems have an estimated operating life of 15 years, not because of failure to function but because of the planned lifecycle established by the OEM due to technological advancements and product development. This also results in a requirement for continuous operator training as equipment is replaced. It is not unusual for newer equipment to have better efficiency and lower operating costs. However, this requires careful analysis by owners to actualize potential savings.

For underground piping serving the potable, fire, and drainage water systems, consistent inspection through closed circuit television (CCTV) to identify intrusion and pipe deterioration is an excellent method for forecasting future capital needs. This inspection function should be included as part of the any campus annual budget and performed on a regular basis.

Factors That Affect Equipment Useful Life

Primary critical equipment was evaluated by comparing current data to manufacturer's performance ratings. Degradation in operating performance can be the result of normal wear and tear, or it can be indicative of abnormal wear. For example, boiler efficiency losses can increase due to higher than design excess air resulting from parasitic air leaks in boiler casings or out-of-calibration combustion control systems. Losses in efficiency can also be the result of internal scale and deposit formation.

The skill and ability of the operating staff can have a significant impact on overall equipment useful life. Accelerated startups, emergency shutdowns, overload excursions, air leakage, excessive water leaks, and adherence to balance-of-plant maintenance requirements are critical to the safety, reliability, and efficiency of plant equipment. In addition, proper diagnostic skills can often avoid premature outages or result in the correct decision to remove equipment from service to avoid catastrophic damage. We

spent some time in the interviews on campus discussing operator proficiency to evaluate any impact this factor may have had on equipment useful life.

One method of providing consistency in methods of system/equipment operation is the implementation of standard operating procedures (SOPs). These provide a reference guide for the operating staff for most of the expected operating conditions. They cannot, however, provide 100 percent guidance for all possible events. This is why operator training in the fundamentals of plant operation is so critical. The implementation of SOPs also provides a method of reminding operators about system equipment requirements in plants where there are few, if any, abnormal operating excursions. In this type of operation, skills that have not been exercised recently become difficult to recall under the pressure of rapidly developing events.

For heating and chilled water generation equipment and distribution piping systems, water treatment is the most salient issue in considering the estimated useful life. Internal and external equipment piping scale causes rapid performance deterioration, and corrosion can severely reduce the operating life of systems and equipment. In all cases, proper water treatment normally extends generating equipment useful life as well as balance-of-plant equipment life. We evaluated historical data as well as the current water treatment program for application and execution. The OCC system currently utilizes Rochester Midland Corporation to provide the water treatment chemicals. Some of the chemicals used include a pitting and corrosion inhibitor identified as CLT-407 for the chilled and heating water closed loop systems, chlorine, and a liquid oxygen scavenger identified as OS-912 to prevent organic and biocides from developing within the condenser water and chilled water systems.

ASSET FINDINGS

The findings for each individual asset in the Southfield campus infrastructure group will be presented in detail on the following pages, but below is a summary table of the estimated renewal costs for each asset.

FCNI Comparison

ASSET CODE	ASSET NAME	CRV ($)	TOTAL 10-YEAR NEEDS ($)	FCNI	FCI
SFHCD	HEATING/CHILLED WATER DISTRIBUTION	2,027,368	112,872	0.06	0.00
SFHVE	HIGH VOLTAGE ELECTRICAL	574,700	15,966	0.03	0.00
SFPWF	POTABLE AND FIRE WATER SYSTEM	50,000	0	0.00	0.00
SFSAN	SANITARY SEWER SYSTEM	150,000	0	0.00	0.00
SFSTR	STORMWATER SEWER SYSTEM	1,600,000	0	0.00	0.00

Heating and Chilled Water Generation

Central heating and cooling are generated within the main mechanical room of A Building Addition. Two natural gas fired boilers rated for approximately 9,000 MBH each generate central heating water, and two water-cooled chillers rated for 235 tons and one air-cooled chiller rated for 80 tons generate central chilled water. This primary generation equipment and the balance of distribution equipment are in proper working condition. As detailed within the ISES FCA report for A Building Addition, it should be anticipated that boilers B-1 and B-2 and many of the variable speed drives serving the primary and secondary system pumps will require replacement within the next ten years.

Heating and Chilled Water Distribution

The heating hot water and chilled water distribution systems consists of approximately 3,000 linear feet (1,500 each) of various sizes of supply and return pipe. There is an additional 200 linear feet of condenser water pipe for the main mechanical space. The majority of this pipe was installed in two phases, with the oldest dating to 1982. The 2003 construction of A Building Addition led to renovation of the central plant and the installation of additional distribution piping. It is presumed that the piping network is constructed of Grade B, schedule 4 steel pipe. Most the pipe is properly insulated and encapsulated with a water resistant sheathing and is in good condition. It will remain reliable beyond the next ten years.

It was reported that there might be a flow imbalance or restriction within the chilled and condenser water systems that requires more than one chiller and cooling tower to operate at a time. Historically, this has not always been the case, as campus demand could be met by one water-cooled chiller and the air-cooled unit. To ensure that this system is operating at its maximum efficiency, a hydraulic analysis should be performed. Also modify the condenser/chilled water backflow preventer installation if needed.

The heating, chilled, and condenser water systems are equipped with butterfly-type isolation valves that require regular operation to ensure the functional reliability of the equipment. A butterfly valve is regularly used within hydronic systems due to its initial lower installation cost and compact size. The majority of the valves are in good physical condition, but it should be anticipated that some will require replacement within the next ten years.

High Voltage Electrical System

Primary 13.2 kV electrical service is fed to this campus from two separate Detroit Edison electrical service lines installed along Rutland Drive. Two fused load interrupters were installed in 2001 and a third for the expansion in 2010. This equipment is rated for 15 kV and 600 amps and is in good condition. One oil-filled transformer rated for 1,500 kVA and outside A Building reduces the incoming 13.2 kV service to 480/277 volts for use throughout campus. This equipment is also in proper working order.

The electrical distribution system, including electrical manholes and associated electrical conductor, reportedly has no history of unscheduled forced outages as a result of premature failure. No upgrade of this equipment is recommended at this time.

Although the balance of principal equipment will outlast the report scope, it will be necessary to perform consistent maintenance over the next ten years. A campuswide electrical maintenance program that provides for three to five year maintenance cycles is recommended. It should include the operation, maintenance, and testing of the primary load interrupters; the maintenance, testing, and oil and gas analysis of the local oil-filled transformer; and routine operation and maintenance of any secondary electrical systems vital to the consistent operation of campus systems, such as power or vacuum circuit breakers.

Potable and Fire Water System

The Southfield campus of Oakland Community College consists of a little more than ten acres of flat terrain in a suburban setting. Most of the utilities that support this campus are from the nearest municipal water supply lines located within the city right-of-way of Rutland Drive. There is over 600 linear feet of 12 inch diameter city water line crossing the campus parcel between the original building and the north parking lot within a 12 foot wide water main easement.

The potable water and fire protection system that belongs to and would be maintained by the college is around 225 linear feet of 6 and 8 inch water line outside the facility footprint. The system appears to be in overall good condition and properly sized to serve the campus. No upgrade or replacement needs are anticipated within the next ten years. Fire suppression water systems, backflow devices, booster pumps, valves, and meters located within the facilities are addressed within the individual FCA report. Campus water pressures are typically maintained at an adequate level for domestic use and fire protection. Fire hydrants are owned by the city.

Sanitary Sewer Collection System

Due to the relatively few individual facilities on this campus, there is no sanitary sewer pipe network, only two 8 inch sanitary sewer service lines or laterals from the college facilities directly to municipal sanitary sewer manholes and collection lines or mains located within the Rutland Drive street right-of-ways that convey the sewage southward to the nearest municipal wastewater treatment facility. It is estimated that there is approximately 450 linear feet of mostly 8 inch sanitary sewer line owned by the college outside of the facility footprint. The sanitary sewer collection and conveyance system appears to be in overall good condition and properly sized to serve the campus. No upgrade or replacement needs are anticipated within the next ten years. Any sewer ejector pumps located within the facilities would be addressed within the individual FCA reports.

Stormwater Sewer Collection System

The Southfield campus consists of one large facility built in different phases with minimal grounds and a small stormwater collection system. The north parking lot is drained to the south to large 42 and 48 inch outfall lines carrying the stormwater offsite. Stormwater from the roof drains, around the building, and within the south parking lot is collected and discharged into a 36 and 42 inch outfall running along the east side of Rutland Drive, transporting the stormwater to the south and subsequently into city manholes located in the right-of-way. The system appears to be in overall good condition and properly sized to serve the campus. No upgrade or replacement needs are anticipated within the next ten years.

A set of drawings provided to ISES for the expansion of the facility to the south detailed two small underground stormwater retention/detention systems to be installed in the south parking lot. These systems were not confirmed to have been constructed and were not observed or assessed during the inspection. If they are confirmed to have been installed, it is recommended that the systems be properly investigated internally for potential sand and trash accumulations to ensure the design capacity is maintained and the system is operating properly.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors thoroughly examined the accessible equipment and various components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the facility to modern standards without any anticipation of change to facility space layout or function. The total costs include variable project delivery costs as determined by the Owner. The costs developed do not represent the cost of a complete facility renovation. Soft costs not represented in this report include telecommunications, security, furniture, window treatment, space change, program issues, relocation, swing space, contingency, or costs that could not be identified or determined from the visual inspection and available building information.

INSPECTION TEAM DATA

Report Development

ISES Corporation
3100 Breckinridge Boulevard, Suite 400
Duluth, GA 30096

Project Manager

Rob Camperlino
770.674.3139
robc@isescorp.com

Date of Inspection

March 23, 2017

Inspection Team Personnel

NAME	POSITION	SPECIALTY
Rob Camperlino	Facility Assessor	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health
Carl Mason, PE, BSCP, M.ASCE	Senior Project Engineer	Interior Finishes, Exterior Structure, ADA Compliance, Site, Fire/Life Safety, Health, Plumbing

Client Contact

NAME	POSITION
Dan P. Cherewick	Director, Physical Facilities

DEFINITIONS

The following information is a clarification of this report using example definitions.

Overview

Recurring and Nonrecurring Facility Renewal Costs

Facility renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of facility systems and components (e.g., roof or HVAC system replacement at or past the end of its normal useful life). The tool for projecting the recurring renewal costs is the Asset Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with fire/life safety or accessibility code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Facility Condition Needs Index (FCNI)

The FCNI provides a lifecycle cost comparison. It is a ratio of the sum of the recurring and nonrecurring renewal costs over ten years to the current replacement value of the asset. The current replacement value is based on replacement with current construction standards for the facility use type, and not original design parameters. This index gives the college a comparison within all buildings for identifying worst case/best case building conditions.

$$\text{FCNI} = \frac{\text{Nonrecurring Projects} + \text{10-Year Recurring Component Renewal}}{\text{Current Replacement Value}}$$

Facility Condition Index (FCI)

The FCI is a ratio of the Deferred Renewal facilities renewal costs to the current replacement value.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Oakland using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Typical general contractor fees (which could include profit, overhead, bonds, and insurance) and professional fees (architect or engineer design fees and in-house design costs) are also included in the renewal costs.

GLOBAL MARKUP	%
Local Labor Index	102.9
Local Materials Index	99.3
General Contractor Markup	20.0
Professional Fees	16.0

Recurring Costs

Asset Component Inventory and Cost Projections

The Asset Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major building systems and major components within a facility. This is a list of all major systems and components within the facility. Each indicated component has the following associated information:

CATEGORY	DEFINITION
Uniformat Code	The standard Uniformat Code that applies to the component
Component Description	This line item describes the individual component
Identifier	Unique identifying information entered for a component as necessary
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Unit Cost	The cost to replace each individual component unit (this cost is in today's dollars)
Complexity Adjustment	A factor utilize to adjust component replacement costs accordingly when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	Unit cost multiplied by quantity, in today's dollars. Note that this is a one-time renewal/replacement cost
Install Date	Year that the component was or is estimated to have been installed. When this data is not available, it defaults to the year the asset was constructed
Life Expectancy	Average life expectancy for each individual component
Life Expectancy Adjustment	Utilized to adjust the first lifecycle of the component and to express when the next replacement should occur

The component listing forms the basis of the Recurring Component Renewal Schedule, which provides a year-by-year list of projected recurring renewal costs over the next ten years. Each individual component is assigned a replacement year based on lifecycles, and the costs for each item are in future year dollars. For items that are already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot ($/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- Deferred Renewal
  Recurring repairs, generated by the Asset Component Inventory, that are past due for completion but have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral of such renewal could impair the proper functioning of the facility. Costs estimated for Deferred Renewal projects should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.

- Projected Renewal
  Recurring renewal efforts, generated by the Asset Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with fire/life safety or accessibility code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within are not included in the Asset Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- **Plant Adaption**
  Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).

- **Corrective Action**
  Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- **Immediate**

  Projects in this category require immediate action to:

  a. correct a cited safety hazard

  b. stop accelerated deterioration

  c. and/or return a facility to normal operation

- **Critical**

  Projects in this category include actions that must be addressed in the short-term:

  a. repairs to prevent further deterioration

  b. improvements to facilities associated with critical accessibility needs

  c. potential safety hazards

- Noncritical

  Projects in this category include:

  a. improvements to facilities associated with noncritical accessibility needs

  b. actions to bring a facility into compliance with current building codes as grandfather clauses expire

  c. actions to improve the usability of a facility following an occupancy or use change

Category Codes

CATEGORY CODE*	SYSTEM DESCRIPTION
AC1A – AC4B	ACCESSIBILITY
EL1A – EL8A	ELECTRICAL
ES1A – ES6E	EXTERIOR STRUCTURE
FS1A – FS6A	FIRE/LIFE SAFETY
HE1A – HE7A	HEALTH
HV1A – HV8B	HVAC
IS1A – IS6D	INTERIOR FINISHES/SYSTEMS
PL1A – PL5A	PLUMBING
SI1A – SI4A	SITE
SS1A – SS7A	SECURITY SYSTEMS
VT1A – VT7A	VERTICAL TRANSPORTATION

Example: **Category Code = EL5A**	
EL	System Description
5	Component Description
A	Element Description

**Refer to the Category Code Report starting on page 1.5.1.*

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

Example:

Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Drawings/Project Locations

The drawings for this facility are marked with icons (see legend on plans) denoting the specific location(s) for each project. Within each icon are the last four characters of the respective project number (e.g., 0001IS01 is marked on the plan as IS01).

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

Example: **Photo Number: 0001006e**	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

CATEGORY CODE REPORT

ACCESSIBILITY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
AC1A	Site	Stair and Railings	Includes exterior stairs and railings which are not part of the building entrance points.
AC1B	Site	Ramps and Walks	Includes sidewalks, grade change ramps (except for a building entrance), curb ramps, etc.
AC1C	Site	Parking	Designated parking spaces, including striping, signage, access aisles and ramps, etc.
AC1D	Site	Tactile Warnings	Raised tactile warnings located at traffic crossing and elevation changes.
AC2A	Building Entry	General	Covers all aspects of entry into the building itself, including ramps, lifts, doors and hardware, power operators, etc.
AC3A	Interior Path of Travel	Lifts/Ramps/ Elevators	Interior lifts, ramps and elevators designed to accommodate level changes inside a building. Includes both installation and retrofitting.
AC3B	Interior Path of Travel	Stairs and Railings	Upgrades to interior stairs and handrails for accessibility reasons.
AC3C	Interior Path of Travel	Doors and Hardware	Accessibility upgrades to the interior doors including widening, replacing hardware power, assisted operators, etc.
AC3D	Interior Path of Travel	Signage	Interior building signage upgrades for compliance with the ADA.
AC3E	Interior Path of Travel	Restrooms/ Bathrooms	Modifications to and installation of accessible public restrooms and bathrooms. Bathrooms that are an integral part of residential suites are catalogued under HC4A.
AC3F	Interior Path of Travel	Drinking Fountains	Upgrading/replacing drinking fountains for reasons of accessibility.
AC3G	Interior Path of Travel	Phones	Replacement/modification of public access telephones.
AC4A	General	Functional Space Modifications	This category covers all necessary interior modifications necessary to make the services and functions of a building accessible. It includes installation of assistive listening systems, modification of living quarters, modifications to laboratory workstations, etc. Bathrooms that are integral to efficiency suites are catalogued here.
AC4B	General	Other	All accessibility issues not catalogued elsewhere.

ELECTRICAL

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
EL1A	Incoming Service	Transformer	Main building service transformer.
EL1B	Incoming Service	Disconnects	Main building disconnect and switchgear.
EL1C	Incoming Service	Feeders	Incoming service feeders. Complete incoming service upgrades, including transformers, feeders, and main distribution panels are catalogued here.
EL1D	Incoming Service	Metering	Installation of meters to record consumption and/or demand.
EL2A	Main Distribution Panels	Condition Upgrade	Main distribution upgrade due to deficiencies in condition.
EL2B	Main Distribution Panels	Capacity Upgrade	Main distribution upgrades due to inadequate capacity.
EL3A	Secondary Distribution	Step-Down Transformers	Secondary distribution step-down and isolation transformers.
EL3B	Secondary Distribution	Distribution Network	Includes conduit, conductors, sub-distribution panels, switches, outlets, etc. Complete interior rewiring of a facility is catalogued here.

EL3C	Secondary Distribution	Motor Controllers	Mechanical equipment motor starters and control centers.
EL4A	Devices and Fixtures	Exterior Lighting	Exterior building lighting fixtures, including supply conductors and conduit.
EL4B	Devices and Fixtures	Interior Lighting	Interior lighting fixtures (also system wide emergency lighting), including supply conductors and conduits.
EL4C	Devices and Fixtures	Lighting Controllers	Motion sensors, photocell controllers, lighting contactors, etc.
EL4D	Devices and Fixtures	GFCI Protection	Ground fault protection, including GFCI receptacles and breakers.
EL4E	Devices and Fixtures	Lightning Protection	Lightning arrestation systems including air terminals and grounding conductors.
EL5A	Emergency Power System	Generation/ Distribution	Includes generators, central battery banks, transfer switches, emergency power grid, etc.
EL6A	Systems	UPS/DC Power Supply	Uninterruptible power supply systems and DC motor-generator sets and distribution systems.
EL7A	Infrastructure	Above Ground Transmission	Includes poles, towers, conductors, insulators, fuses, disconnects, etc.
EL7B	Infrastructure	Underground Transmission	Includes direct buried feeders, duct banks, conduit, manholes, feeders, switches, disconnects, etc.
EL7C	Infrastructure	Substations	Includes incoming feeders, breakers, buses, switchgear, meters, CTs, PTs, battery systems, capacitor banks, and all associated auxiliary equipment.
EL7D	Infrastructure	Distribution Switchgear	Stand-alone sectionalizing switches, distribution switchboards, etc.
EL7F	Infrastructure	Area and Street Lighting	Area and street lighting systems, including stanchions, fixtures, feeders, etc.
EL8A	General	Other	Electrical system components not catalogued elsewhere.

EXTERIOR STRUCTURE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
ES1A	Foundation/ Footing	Structure	Structural foundation improvements involving structural work on foundation wall/footing, piers, caissons, and piles, including crack repairs, shoring, and pointing
ES1B	Foundation/ Footing	Dampproofing/ Dewatering	Foundation/footing waterproofing work, including, damp-proofing, dewatering, insulation, etc.
ES2A	Columns/Beams/ Walls	Structure	Structural work to primary load-bearing structural components aside from floors, including columns, beams, bearing walls, lintels, arches, etc.
ES2B	Columns/Beams/ Walls	Finish	Work involving restoration of the appearance and weatherproof integrity of exterior wall/structural envelope components, including masonry/pointing, expansion joints, efflorescence and stain removal, grouting, surfacing, chimney repairs, etc.
ES3A	Floor	Structure	Work concerning the structural integrity of the load supporting floors, both exposed and unexposed, including deformation, delamination, spalling, shoring, crack repair, etc.
ES4A	Roof	Repair	Work on waterproof horizontal finish (roof) involving repair and/or limited replacement (<40% total), including membrane patching, flashing repair, coping caulk/resetting, PPT wall parging/coating, walk pad installation, skylight and roof hatch R&R, etc.
ES4B	Roof	Replacement	Work involving total refurbishment of roofing system, including related component rehab.
ES5A	Fenestrations	Doors	Work on exterior exit/access door, including storefronts, airlocks, air curtains, vinyl slat doors, all power/manual operating hardware (except handicapped), etc.
ES5B	Fenestrations	Windows	Work on exterior fenestration closure and related components, including glass/metal/wood curtain walls, fixed or operable window sashes, glazing, frames, sills, casings, stools, seats, coatings, treatments, screens, storm windows, etc.

ES6A	General	Attached Structure	Work on attached exterior structure components not normally considered in above categories, including porches, stoops, decks, monumental entrance stairs, cupolas, tower, etc.
ES6B	General	Areaways	Work on attached grade level or below structural features, including subterranean lightwells, areaways, basement access stairs, etc.
ES6C	General	Trim	Work on ornamental exterior (generally nonstructural) elements, including beltlines, quoins, porticos, soffits, cornices, moldings, trim, etc.
ES6D	General	Superstructure	Finish and structural work on nonstandard structures with exposed load-bearing elements, such as stadiums, bag houses, bleachers, freestanding towers, etc.
ES6E	General	Other	Any exterior work not specifically categorized elsewhere, including finish and structural work on freestanding boiler stacks.

FIRE/LIFE SAFETY

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
FS1A	Lighting	Egress Lighting/Exit Signage	R&R work on exit signage and packaged AC/DC emergency lighting.
FS2A	Detection/Alarm	General	Repair or replacement of fire alarm/detection system/components, including alarms, pull boxes, smoke/heat detectors, annunciator panels, central fire control stations, remote dialers, fire station communications, etc.
FS3A	Suppression	Sprinklers	Repair or installation of water sprinkler type automatic fire suppressions, including wet-pipe and dry-pipe systems, heads, piping, deflectors, valves, monitors, associated fire pump, etc.
FS3B	Suppression	Standpipe/Hose	Repair or installation of standpipe system or components, including hardware, hoses, cabinets, nozzles, necessary fire pumping system, etc.
FS3C	Suppression	Extinguishers	Repairs or upgrades to F.E. cabinets/wall fastenings and handheld extinguisher testing/replacement.
FS3D	Suppression	Other	Other fire suppression items not specifically categorized elsewhere, including fire blankets, carbon dioxide automatic systems, Halon systems, dry chemical systems, etc.
FS4A	Hazardous Materials	Storage Environment	Installation or repair of special storage environment for the safe holding of flammable or otherwise dangerous materials/supplies, including vented flammables storage cabinets, holding pens/rooms, cages, fire safe chemical storage rooms, etc.
FS4B	Hazardous Materials	User Safety	Improvements, repairs, installation, or testing of user safety equipment, including emergency eyewashes, safety showers, emergency panic/shut-down system, etc.
FS5A	Egress Path	Designation	Installation, relocation or repair of posted diagrammatic emergency evacuation routes.
FS5B	Egress Path	Distance/ Geometry	Work involving remediation of egress routing problems, including elimination of dead end corridors, excessive egress distance modifications, and egress routing inadequacies.
FS5C	Egress Path	Separation Rating	Restoration of required fire protective barriers, including wall rating compromises, fire-rated construction, structural fire proofing, wind/safety glazing, transom retrofitting, etc.
FS5D	Egress Path	Obstruction	Clearance of items restricting the required egress routes.
FS5E	Egress Path	Stairs Railing	Retrofit of stair/landing configurations/structure, railing heights/geometries, etc.
FS5F	Egress Path	Fire Doors/ Hardware	Installation/replacement/repair of fire doors and hardware, including labeled fire doors, fire shutters, closers, magnetic holders, panic hardware, etc.
FS5G	Egress Path	Finish/Furniture Ratings	Remediation of improper fire/smoke ratings of finishes and furniture along egress routes.
FS6A	General	Other	Life/fire safety items not specifically categorized elsewhere.

HEALTH

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HE1A	Environmental Control	Equipment and Enclosures	Temperature control chambers (both hot and cold) for non-food storage. Includes both chamber and all associated mechanical equipment.
HE1B	Environmental Control	Other	General environmental control problems not catalogued elsewhere.
HE2A	Pest Control	General	Includes all measures necessary to control and destroy insects, rodents, and other pests.
HE3A	Refuse	General	Issues related to the collection, handling, and disposal of refuse.
HE4A	Sanitation Equipment	Laboratory and Process	Includes autoclaves, cage washers, steam cleaners, etc.
HE5A	Food Service	Kitchen Equipment	Includes ranges, grilles, cookers, sculleries, etc.
HE5B	Food Service	Cold Storage	Includes the cold storage room and all associated refrigeration equipment.
HE6A	Hazardous Material	Structural Asbestos	Testing, abatement, and disposal of structural and building finish materials containing asbestos.
HE6B	Hazardous Material	Mechanical Asbestos	Testing, abatement, and disposal of mechanical insulation materials containing asbestos.
HE6C	Hazardous Material	PCBs	Includes testing, demolition, disposal, and cleanup of PCB contaminated substances.
HE6D	Hazardous Material	Fuel Storage	Includes monitoring, removal, and replacement of above and below ground fuel storage and distribution systems. Also includes testing and disposal of contaminated soils.
HE6E	Hazardous Material	Lead Paint	Testing, removal, and disposal of lead-based paint systems.
HE6F	Hazardous Material	Other	Handling, storage, and disposal of other hazardous materials.
HE7A	General	Other	Health related issues not catalogued elsewhere.

HVAC

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
HV1A	Heating	Boilers/Stacks/ Controls	Boilers for heating purposes, including their related stacks, flues, and controls.
HV1B	Heating	Radiators/ Convectors	Including cast-iron radiators, fin tube radiators, baseboard radiators, etc.
HV1C	Heating	Furnace	Furnaces and their related controls, flues, etc.
HV1D	Heating	Fuel Supply/Storage	Storage and/or distribution of fuel for heating purposes, including tanks and piping networks and related leak detection/monitoring.
HV2A	Cooling	Chillers/ Controls	Chiller units for production of chilled water for cooling purposes, related controls (not including mods for CFC compliance).
HV2B	Cooling	Heat Rejection	Repair/replacement of cooling towers, dry coolers, air-cooling, and heat rejection. Includes connection of once-through system to cooling tower.
HV3A	Heating/Cooling	System Retrofit/ Replace	Replacement or major retrofit of HVAC systems.
HV3B	Heating/Cooling	Water Treatment	Treatment of hot water, chilled water, steam, condenser water, etc.
HV3C	Heating/Cooling	Package/Self-Contained Units	Repair/replacement of self-contained/package type units, including stand-up units, rooftop units, window units, etc.; both air conditioners and heat pumps.
HV3D	Heating/Cooling	Conventional Split Systems	Repair, installation, or replacement of conventional split systems, both air conditioners and heat pumps, including independent component replacements of compressors and condensers.

HV4A	Air Moving/ Ventilation	Air Handlers/ Fan Units	Includes air handlers and coils, fan coil units, unit ventilators, filtration upgrades, etc., not including package/self-contained units, split systems, or other specifically categorized systems.
HV4B	Air Moving/ Ventilation	Exhaust Fans	Exhaust fan systems, including fans, range and fume hoods, controls, and related ductwork.
HV4C	Air Moving/ Ventilation	Other Fans	Supply, return, or any other fans not incorporated into a component categorized elsewhere.
HV4D	Air Moving/ Ventilation	Air Distribution Network	Repair, replacement, or cleaning of air distribution network, including ductwork, terminal reheat/cool, VAV units, induction units, power induction units, insulation, dampers, linkages, etc.
HV5A	Steam/Hydronic Distribution	Piping Network	Repair/replacement of piping networks for heating and cooling systems, including pipe, fittings, insulation, related components, etc.
HV5B	Steam/Hydronic Distribution	Pumps	Repair or replacement of pumps used in heating and cooling systems, related control components, etc.
HV5C	Steam/Hydronic Distribution	Heat Exchangers	Including shell-and-tube heat exchangers and plate heat exchangers for heating and cooling.
HV6A	Controls	Complete System Upgrade	Replacement of HVAC control systems.
HV6B	Controls	Modifications/ Repairs	Repair or modification of HVAC control system.
HV6C	Controls	Air Compressors/ Dryers	Repair or modification of control air compressors and dryers.
HV7A	Infrastructure	Steam/Hot Water Generation	Generation of central steam and/or hot water, including boilers and related components.
HV7B	Infrastructure	Steam/Hot Water Distribution	Distribution system for central hot water and/or steam.
HV7C	Infrastructure	Chilled Water Generation	Generation of central chilled water, including chillers and related components.
HV7D	Infrastructure	Chilled Water Distribution	Distribution system for central chilled water.
HV7E	Infrastructure	Tunnels/ Manholes/ Trenches	Repairs, installation, or replacement of utility system access chambers.
HV7F	Infrastructure	Other	HVAC infrastructure issues not specifically categorized elsewhere.
HV8A	General	CFC Compliance	Chiller conversions/replacements for CFC regulatory compliance, monitoring, etc.
HV8B	General	Other	HVAC issues not catalogued elsewhere.

INTERIOR FINISHES/SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
IS1A	Floor	Finishes-Dry	R&R of carpet, hardwood strip flooring, concrete coating, vinyl linoleum and tile, marble, terrazzo, rubber flooring, and underlayment in predominantly dry areas ("dry" includes non-commercial kitchens)
IS1B	Floor	Finishes-Wet	Flooring finish/underlayment work in predominantly "wet" areas, including work with linoleum, rubber, terrazzo, concrete coating, quarry tile, ceramic tile, epoxy aggregate, etc.
IS2A	Partitions	Structure	Structural work on full height permanent interior partitions, including wood/metal stud and drywall systems, CMU systems, structural brick, tile, glass block, etc.
IS2B	Partitions	Finishes	Work on full height permanent interior partitions, including R&R, to gypsum board, plaster, lath, wood paneling, acoustical panels, wall coverings, column coverings, tile, paint, etc.
IS3A	Ceilings	Repair	Repair of interior ceilings (<40% of total), including tiles, gypsum board, plaster, paint, etc.
IS3B	Ceilings	Replacement	Major refurbishments (>40% of total) to interior ceiling systems, including grid system replacements, structural framing, new suspended systems, paint, plastering, etc.

IS4A	Doors	General	Any work on interior non-fire-rated doors, roll-up counter doors, mechanical/plumbing access doors, and all door hardware (except for reasons of access improvement).
IS5A	Stairs	Finish	Any finish restorative work to stair tower walking surfaces, including replacement of rubber treads, safety grips, nosings, etc. (except as required to accommodate disabled persons).
IS6A	General	Molding	R&R to interior trim/molding systems, including rubber/vinyl/wood base, crown/chair/ornamental moldings, cased openings, etc.
IS6B	General	Cabinetry	R&R work to interior casework systems, including cabinets, countertops, wardrobes, lockers, mail boxes, built-in bookcases, lab/work benches, reagent shelving, etc. (except as required for access by the disabled).
IS6C	General	Screening	Work on temporary or partial height partitioning systems, including toilet partitions, urinal/vanity screens, etc.
IS6D	General	Other	Any work on interior elements not logically or specifically categorized elsewhere, including light coves, phone booths, interior lightwells, etc.

PLUMBING

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
PL1A	Domestic Water	Piping Network	Repair or replacement of domestic water supply piping network, insulation, hangers, etc.
PL1B	Domestic Water	Pumps	Domestic water booster pumps, circulating pumps, related controls, etc.
PL1C	Domestic Water	Storage/ Treatment	Equipment or vessels for storage or treatment of domestic water.
PL1D	Domestic Water	Metering	Installation, repair, or replacement of water meters.
PL1E	Domestic Water	Heating	Domestic water heaters, including gas, oil, and electric water heaters, shell-and-tube heat exchangers, tank type, and instantaneous.
PL1F	Domestic Water	Cooling	Central systems for cooling and distributing drinking water.
PL1G	Domestic Water	Fixtures	Plumbing fixtures, including sinks, drinking fountains, water closets, urinals, etc.
PL1H	Domestic Water	Conservation	Alternations made to the water distribution system to conserve water.
PL1I	Domestic Water	Backflow Protection	Backflow protection devices, including backflow preventers, vacuum breakers, etc.
PL2A	Wastewater	Piping Network	Repair or replacement of building wastewater piping network.
PL2B	Wastewater	Pumps	Pump systems used to lift wastewater, including sewage ejectors and other sump systems.
PL3A	Special Systems	Process Gas/Fluids	Generation and/or distribution of process steam, compressed air, natural and LP gas, process water, vacuum, etc.
PL4A	Infrastructure	Potable Water Storage/ Treatment	Storage and treatment of potable water for distribution.
PL4B	Infrastructure	Industrial Water Distribution/ Treatment	Storage and treatment of industrial water for distribution.
PL4C	Infrastructure	Sanitary Water Collection	Sanitary water collection systems and sanitary sewer systems, including combined systems.
PL4D	Infrastructure	Stormwater Collection	Stormwater collection systems and storm sewer systems; storm water only.
PL4E	Infrastructure	Potable Water Distribution	Potable water distribution network.
PL4F	Infrastructure	Wastewater Treatment	Wastewater treatment plants, associated equipment, etc.
PL5A	General	Other	Plumbing issues not categorized elsewhere.

SITE

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SI1A	Access	Pedestrian	Paved pedestrian surfaces, including walks, site stairs, step ramps, paths, pedestrian signage, sidewalk bridges/canopies, pedestrian plaza/mall areas, etc.
SI1B	Access	Vehicular	Paved vehicular surfaces, including roads, paths, curbs, guards, bollards, bridges, skyways, joints, shoulder work, culverts, ditches, vehicular signage, etc.
SI2A	Landscape	Grade/Flora	Landscape related work, including new grass/turf refurbishment, grade improvements, catch basins, swales, berms, pruning, new ornamental flora, etc.
SI3A	Hardscape	Structure	Permanent hard site features, predominantly ornamental, including terraces, fences, statues, freestanding signage, fountains, benches, etc.
SI4A	General	Other	Other site work not specifically categorized elsewhere.

SECURITY SYSTEMS

CODE	COMPONENT DESCRIPTION	ELEMENT DESCRIPTION	DEFINITION
SS1A	Lighting	Exterior	Fixtures, stanchions, foliage interference, cleanliness, locations, etc.
SS2A	Site	Fencing	Perimeter campus fencing, individual building fencing, includes both pedestrian and vehicular control fences.
SS2B	Site	General	Hidden areas due to foliage, fencing, parking, walls, etc.
SS3A	Communications	Emergency Phones	Access, locations, visibility, function, reliability, etc.
SS4A	Access Control	Doors	Access, locks, keys, two-way speakers, reliability, redundancy, etc.
SS4B	Access Control	Windows	Locks, screens, access, reliability, etc.
SS4C	Access Control	Systems	Card key, proximity devices, data control, data use, reliability, system design, etc.
SS5A	Monitoring	Systems	Cameras, audio communication, monitoring stations, locations, system design, etc.
SS6A	Circulation	Pedestrian	On campus as well as to and from off-campus housing and class locations, etc.
SS6B	Circulation	Vehicular	Guard gates, access, systems, data control and use, identification, etc.
SS7A	General	Other	General information/projects pertaining to security issues.

VERTICAL TRANSPORTATION

CODE	Component Description	Element Description	DEFINITION
VT1A	Machine Room	General	Machine, worm gear, thrust bearing, brake, motors, sheaves, generator, controller, selector, governor, pump(s), valves, oil, access, lighting, ventilation, and floor.
VT2A	Car	General	Position indicator, lighting, floor, gate-doors, operation devices, safeties, safety shoe, light ray/detection, emergency light, fire fighter service, car top, door operator, stop switch, car frame, car guides, sheaves, phone, and ventilation.
VT3A	Hoistway	General	Enclosure, fascia, interlock, doors, hangers, closers, sheaves, rails, hoistway switches, ropes, traveling cables, selector tape, weights, and compensation.
VT4A	Hall Fixtures	General	Operating panel, position indicator, hall buttons, lobby panel, hall lanterns, fire fighter service, audible signals, and card/key access.
VT5A	Pit	General	Buffer(s), guards, sheaves, hydro packing, floor, lighting, and safety controls.
VT6A	Operating Conditions	General	Door open time, door close time, door thrust, acceleration, deceleration, leveling, dwell time, speed, OFR time, and nudging.
VT7A	General	Other	General information/projects relating to vertical transportation system components.

UTILITY AND FACILITY
CONDITION ASSESSMENT

SECTION 2

COST SUMMARIES AND TOTALS

RENEWAL COSTS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL
ACCESSIBILITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
EXTERIOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
INTERIOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
PLUMBING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HVAC	34,770	0	78,102	0	0	0	0	0	0	0	0	0	0	0	$112,872
FIRE/LIFE SAFETY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
ELECTRICAL	7,983	7,983	0	0	0	0	0	0	0	0	0	0	0	0	$15,966
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$42,753	$7,983	$78,102	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$128,838
TOTAL NONRECURRING PROJECT NEEDS			$128,838	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$0	

CURRENT REPLACEMENT VALUE	$4,402,068
FACILITY CONDITION NEEDS INDEX	0.03
FACILITY CONDITION INDEX	0.00

GSF	TOTAL 10-YEAR FACILITY NEEDS	10-YEAR NEEDS/SF
NA	$128,838	NA

All costs shown as Present Value

RENEWAL COSTS BY SYSTEM

CATEGORY	NONRECURRING ASSESSMENT RECOMENDATON	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	$0	$0	$0
EXTERIOR	$0	$0	$0
INTERIOR	$0	$0	$0
PLUMBING	$0	$0	$0
HVAC	$112,872	$0	$112,872
FIRE/LIFE SAFETY	$0	$0	$0
ELECTRICAL	$15,966	$0	$15,966
SITE	$0	$0	$0
VERT. TRANS	$0	$0	$0
HEALTH	$0	$0	$0
TOTALS	**$128,838**	**$0**	**$128,838**

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COST

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
SFHCDHV02	PERFORM HYDRAULIC ANALYSIS		Immediate	Corrective Action	18,008
SFHCDHV03	MODIFY CONDENSER WATER SYSTEM		Immediate	Corrective Action	16,762
SFHVEEL01	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	D5010	Immediate	Plant Adaption	7,983
SFHVEEL02	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	D5010	Critical	Plant Adaption	7,983
SFHCDHV01	REMOVE AND REPLACE MISCELLANEOUS ISOLATION VALVES		Noncritical	Corrective Action	78,102
				TOTAL	**128,838**

FACILITIES RENEWAL PLAN

RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	UNI-FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
	THERE ARE NO RECURRING NEEDS WITHIN THE NEXT TEN YEARS				
				TOTAL	0

PROJECT LIST BY CLASSIFICATION

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
HV	SFHCDHV01	3	Corrective Action	3	REMOVE AND REPLACE MISCELLANEOUS ISOLATION VALVES	78,102
HV	SFHCDHV02	1	Corrective Action	1	PERFORM HYDRAULIC ANALYSIS	18,008
HV	SFHCDHV03	2	Corrective Action	1	MODIFY CONDENSER WATER SYSTEM	16,762
					TOTAL FOR CORRECTIVE ACTION	**112,872**
EL	SFHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	7,983
EL	SFHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	7,983
					TOTAL FOR PLANT ADAPTION	**15,966**
					GRAND TOTAL:	**128,838**

PROJECT LIST BY CATEGORY CODE

All costs shown as Present Value

SYS CODE	PROJECT NUMBER	PRI SEQ	PROJECT CLASSIFICATION	PRI CLS	PROJECT TITLE	TOTAL COST
EL	SFHVEEL01	1	Plant Adaption	1	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	7,983
EL	SFHVEEL02	2	Plant Adaption	2	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	7,983
					TOTAL FOR EL	**15,966**
HV	SFHCDHV01	3	Corrective Action	3	REMOVE AND REPLACE MISCELLANEOUS ISOLATION VALVES	78,102
HV	SFHCDHV02	1	Corrective Action	1	PERFORM HYDRAULIC ANALYSIS	18,008
HV	SFHCDHV03	2	Corrective Action	1	MODIFY CONDENSER WATER SYSTEM	16,762
					TOTAL FOR HV	**112,872**
					GRAND TOTAL:	**128,838**

OAKLAND COMMUNITY COLLEGE

North Parking Structure | REPORT

R1-2016-175 | December, 2016 | Condition Appraisal Report

Carl Walker

RESTORATION & PRESERVATION Solutions

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OAKLAND COMMUNITY COLLEGE NORTH PARKING STRUCTURE

Condition Appraisal Report

REPORT | December, 2016

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Carl Walker, Inc.
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I. INTRODUCTION

In accordance with our proposal dated July 22, 2016, we have completed our condition appraisal of the Oakland Community College North Parking Structure formerly known as Parking Structure No. 1. The objective of our investigation was to assess the current condition of the structure, and identify areas in need of repair. We performed the following scope of services for our condition appraisal:

1. Review existing parking structure documentation, including original design drawings, specifications, previous repair documents, previous reports, etc.

2. Provide a visual review of the structure to determine quantities and locations of items of deterioration such as cracking, scaling, and spalling of concrete structural elements.

3. Perform a chain drag of the entire supported slab to identify/quantify top-of-slab delaminations.

4. Review the existing joint sealants, expansion joints and waterproofing coatings.

5. Provide a general review of other building components such as exposed electrical conduit, light fixtures, plumbing, perimeter rails, barrier cables, and the building exterior.

6. Prepare a written report (with photographs) summarizing the field investigation, research, and analysis, and providing recommended repairs. This will include:
   A. Documentation of observed deficiencies and repair needs relative to the structural, waterproofing, mechanical, electrical, and related systems.
   B. Develop repair and waterproofing protection options.
   C. Estimated costs for repairs and any options considered. Advantages and disadvantages of any proposed repair options will be presented.
   D. Prepare 20-year repair and protection plan for each facility with associated probable construction costs.

II. STRUCTURE DESCRIPTION

There are two parking structures at the Oakland Community College Royal Oak Campus, the North Parking Structure and the South Parking Structure. The parking structures are connected together at each level by two stairtowers and a vehicular bridge, and are located at the corner of Lincoln Ave. and Washington Ave. The North Parking Structure is the original structure and was built in 1980 and the South Parking Structure is the horizontal addition and was built in 1997.

The North Parking Structure is composed of 4 levels with 3 bays per level. The north and south bays are flat while the middle bay is ramped. The overall dimensions of the structure are approximately 236 feet in the east-west direction and 180 feet in the north-south direction yielding a total of 41,000 square feet per complete level. The total parking area of the structure is approximately 158,000 square feet. See the attached drawings for plan views of the facility.

The structural system is primarily cast-in-place post-tensioned concrete. The supported post-tensioned slabs are 5 to 6 inches thick with primary tendons running in the east-west direction and temperature tendons running in the north-south direction. There is also conventional reinforcement in the slab, typically #5 bars spaced at 24” on center. The top bars are directly above the beams and the bottom bars are located at midspan. The structural slab spans in the east-west direction over post-tensioned concrete beams spaced at 20’-3”. Typically, the beam dimensions are 3’ deep by 1’-3” wide. These beams are supported by conventionally reinforced concrete columns. The Grade Level consists of 3.5” thick asphalt.

Functionally, the structure provides one-way traffic on the north and south bays and two-way traffic on the center bay. The parking spaces are at 90 degrees. The parking structure provides approximately 500 parking spaces for employees and students. There is an entrance/exit servicing Washington Street on the west side of the Grade Level. The designated clearance height is 6'-6".

There are three stairtowers that service the parking structure. One stairtower is located at the northwest corner of the structure and the other two stairtowers are located at the southeast and southwest corners between the North and South Parking Structures. The northwest and southeast stairtowers each have one elevator in addition to the stairs.

III. DOCUMENT REVIEW

The following documents and drawings were obtained for a review of the structural systems and general dimensioning and detailing:

- Original design drawings (as-built drawings) prepared by *Straub, VanDine, Associates/Architects*, dated February, 1985.
- Oakland Community College Parking Structure No. 1 Maintenance Review by ***Carl Walker, Inc.***, 2003
- Plans and Specifications for the "Oakland Community College Royal Oak Campus Parking Structure Renovations 2004" by ***Carl Walker, Inc.***, 2004.
- Oakland Community College Parking Structure No. 1 Limited Condition Appraisal Report by ***Carl Walker, Inc.***, 2008.
- Plans and Specifications for the "Oakland Community College Royal Oak Campus North Parking Structure Stair, Elevator, and Storage Renovation" by ***Carl Walker, Inc.***, 2009.

IV. PREVIOUS REPAIRS

The following is a list of previous repairs:

- Concrete delamination repairs, slab post-tensioning repairs, deck coating applied to all supported slabs, sealant repairs and portions of the northwest stairtower were repaired in the late 1990's.
- Miscellaneous concrete repairs, slab post-tensioning repairs, sealant repairs, asphalt sealer application at Grade Level, and deck coating recoat application to all supported slabs was completed in 2004 & 2005.
- Miscellaneous concrete repairs, slab post-tensioning repairs, façade gasket repairs along east elevation, sealant repairs, asphalt sealer application at Grade Level, and deck coating recoat application to all supported slabs was completed in 2009.
- Asphalt ramp from Grade Level to Level 2 was removed and replaced with concrete in 2010.
- Barrier cable repairs including replacing damaged cables and repairing damaged sheathing was completed in 2015.

V. FIELD OBSERVATIONS

On August 30, 2016 Mark Sampson, Trey Just, and Josh Whitmore of ***Carl Walker, Inc.*** completed a review of the North Parking Structure. The review included a visual examination of floor and ceiling surfaces, structural members, façade, and stairtowers to assess the current condition and locate areas of deterioration. We performed a chain drag survey of the entire supported slab surface, focusing on areas above the beams where the reinforcement is near the top of the slab and more susceptible to chloride related deterioration.

Floor Survey

To assess the condition of the floor slabs we performed a chain drag. Dragging a chain across a delaminated area results in a distinct hollow sound. For reference, a "delamination" is a horizontal fracture beneath the concrete surface that is generally caused by corrosion of the embedded steel reinforcement and P/T tendon anchorages. Rust, which is the byproduct of the corrosion process, has a volume several times that of the original steel. The volume change created by corrosion generates pressures on the surrounding concrete that eventually becomes sufficient to cause internal fracturing of the concrete and the loss of bond of the corroded reinforcing steel with the surrounding concrete.

In general, the cast-in-place concrete slab is in good condition. The chain drag survey indicated that the cast-in-place concrete floor delaminations are mostly confined to the areas above the beams. Top of slab delaminations totaled 4,300 square feet, which is approximately 3.5% of the total supported slab area. The delaminated areas noted were of various sizes ranging from 2 square feet to 360 square feet. The majority of delaminations (88%) were located at Level 2.

Ceiling Survey

The underside of the floor slabs appears to be in good condition. Very few leaking cracks and ceiling delaminations were noted. We noted approximately 40 square feet of ceiling delaminations.

The beams are in good condition. No cracks in the beams or other signs of deterioration were noted during our review.

Columns and Walls

The columns and walls are in good condition. Few column delaminations were noted, about 60 square feet.

Some cracking was noted near the beam/column connections along the sides of many interior columns. The cracking appears to be caused by restraint. The column is tied at the two slabs creating a "short" column; therefore it has no flexibility to move from thermal expansion or flexural loads. We recommend applying an elastomeric coating on the face of these columns to protect them from moisture.

Waterproofing

The deck coating on the supported slabs is in good condition. During our chain drag survey, we discovered approximately 600 square feet of deck coating that has debonded, mostly on Level 4. A deck coating recoat system was applied to all supported slabs in 2004/2005 and again in 2009. The deck coating is nearing the end of the estimated service life of 8 to 10 years and will most likely need a recoat in 2 to 3 years.

The joint sealants across the top of the CMU wall along the south wall have deteriorated and need to be removed and replaced.

The grout pockets in the columns for the barrier cables at the Roof Level were noted to have efflorescence indicating moisture intrusion. We recommend installing an elastomeric coating over the grout pockets to protect the barrier cable anchoring system from moisture. Also we recommend installing sealant at the opening where the barrier cable enters the columns to protect the anchors from moisture. This would be performed at all levels at the interior column lines.

Mullion joints along the windows of the northwest stairtower are open and susceptible to moisture and chlorides. Wet sealant in the corners of these windows has also deteriorated, allowing moisture in. The mullions need 123 Tape to seal them and the windows need wet sealant applied in all corners in order to protect them from moisture and chlorides.

Stairtowers

The northwest stairtower is in fair condition whereas the southeast and southwest stairtowers are in good condition. The northwest stairs consist of metal pans with concrete infill and the southeast and southwest stairs consist of precast concrete. The southeast and southwest stairtowers are discussed in more detail in the South Parking Structure Report.

Corrosion of the steel was noted at the underside of the stair pans in the northwest stairtower, particularly on the south side at the upper levels. There is an open gap between the deck and the Northwest stair tower that may be allowing moisture and chlorides to enter the stairtower and cause corrosion of the steel. An enclosure could be installed at the roof level to cover the gap and prevent the infiltration of moisture and chlorides. Deck coating the stairway would also help protect the steel from moisture and chlorides.

The steel noses of many of the steps are corroded, causing the steel to separate from the concrete, particularly at the upper levels. These are potential trip hazards.

The ribbon seals between the deck and the entrances to the stairtowers have failed at the supported levels. The seals need to be replaced.

Exterior

Failure of the gaskets on the metal façade was noted at several locations on the north and east elevations. The failure is due to the continuous thermal movement of the metal panels which over time loosens the gaskets. These gaskets need to be reinstalled and wet sealed to protect them.

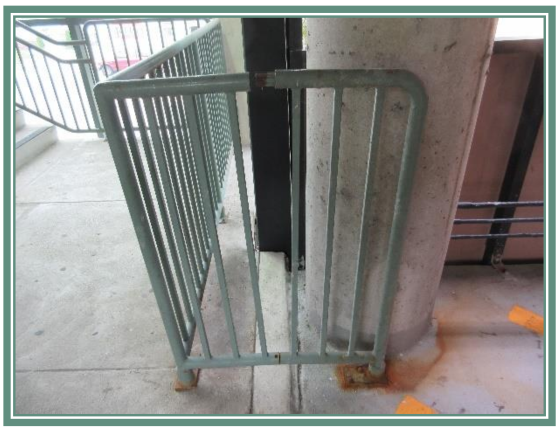
Corrosion was noted on a few of the metal façade plates. These were localized to the Grade Level in the southwest corner of the structure. The plates should be repaired or replaced.

The connections attaching the metal façade to the concrete slabs are corroded throughout the structure. These connections need to be cleaned and repainted.

Miscellaneous Features

Several non-structural features of the parking structure were observed including the guardrails, barrier cables and electrical.

The metal guardrails located at the south perimeter of each supported level was noted to have damage painting.



Handrails leading into the southwest stairtower across the expansion joint at Levels 2 and 3 are pulling apart and corroded. These need to be repaired.

Handrails throughout the structure need to be repainted.

The southeast floor drain grate at Level 2 was noted to be broken and is a possible trip hazard.

The lighting system appears to consist of older light fixtures serviced by an embedded conduit. The lights are typically located by alternating between one and two lights per column bay with pole-mounted lighting on Level 4. The lighting system appears to be in good condition.

LED lighting technology is available that could provide energy savings as well as a longer bulb life. We also recommend switching from embedded conduits to external conduits when updating the lighting system. By switching to external conduits, the maintenance cost becomes much lower.

There is an old pay phone stand at Level 4 in the north stairtower. The stand could be removed since the phone has been removed.

VI. RECOMMENDATIONS

Based on the review of the parking structure we recommend the following repairs to prolong the service life of the structure:

Concrete Repairs

C1 – Top of Slab Repair: Repairs include removal of concrete delaminations, reconditioning of the tendons as required, and patching in accordance with current state of the art procedures.

C2 – Underside of Slab Repair: Repairs include removal of concrete delaminations and patching in accordance with current state of the art procedures.

C3 – Slab Post-Tensioning Repair: We recommend an allowance for repairing tendon damage identified during the slab repairs. We did not observe any damaged or broken tendons during our review.

C4 – Column Repair: Repairs include removal of concrete delaminations and patching in accordance with current state of the art procedures.

Waterproofing

W1 – Rout & Seal Cracks: Involves routing along the length of all leaking cracks and filling them with sealant to help prevent the penetration of moisture and chlorides.

W2 – Ribbon Seal Remove and Replace: Involves removing and replacing the failed ribbon seal all stairtower entrances.

W3 – Deck Coating Repair: Involves removing the debonded deck coating and replacing it with new deck coating.

W4 – Deck Coating at Patches: Involves the application of a deck coating at the floor repairs to protect the concrete from moisture and chloride penetration.

W5 – Deck Coating in Stairtower: Involves the application of a deck coating to the northwest stairtower to help protect the concrete and steel from moisture and chlorides.

W6 – Exterior Gasket Repair: Involves reinstalling the gaskets at the interface of the mullions and the metal panels at various locations along the face of the parking structure. Wet sealant will also be installed to protect the gaskets from further deterioration.

W7 – Install Sealant at Cap Stones: Involves removing and replacing sealant at the capstones of the CMU wall along the south edge of Levels 2, 3, and 4.

W8 – Install Sealant at Barrier Cables: Involves applying a sealant around the cable penetrations into the anchor columns.

W9 – Install 123 Tape at Mullion Joints: Involves installing 123 tape at the northwest stairs and along the façade where mullion joints come together.

W10 – Exterior Wet Sealant Replacement at Corners: Involves installing sealant in the corners of the windows of the northwest stairtower.

Stairs

S1 – Steel Tread Pan Repair: Repairs include repairing or replacing corroded steel pans and concrete infill in the northwest stairtower.

Finishes

F1 – Clean and Paint Steel Guardrail: Involves cleaning the metal guardrails to remove loose paint and corrosion, and repainting them to protect against further deterioration.

F2 – Clean and Paint Steel Handrails: Involves cleaning the metal handrails to remove loose paint and corrosion, and repainting them to protect against further deterioration.

F3 – Clean and Repaint Façade Connections: Involves cleaning and repainting the connections between the façade and the concrete slab.

Miscellaneous

M1 – Repair Handrail Across Expansion Joints: Repairs include repairing the handrails across expansion joints that are corroded and pulled apart.

M2 – Remove & Replace Broken Drain Grate: Involves replacing the corroded and broken grate at Level 2.

M3 – Repair Exterior Panels: Repairs include repairing the exterior façade panels on the southwest corner of Level 1 that have corrosions stains on their outer face.

Alternatives

A1 – Update Lighting System: Updates involve replacing the existing lights with updated LED lights.

A2 – Update Lighting System – External Conduits: Updates involve replacing the existing lights with updated LED lights and abandoning embedded conduits and installing new external conduits for lighting.

A3 – Remove Pay Phone Stand: Removal of unused pay phone stand from Level 4 in the north stairtower.

VII. COST ESTIMATE

Oakland Community College North Parking Structure
Cost Estimate

Carl Walker, Inc. Project No. R1-2016-175

December, 2016

Work Item	Work Item Description	Units	Factored Quantity	Unit Cost	Cost
	Concrete Repairs				
C1	Top of Slab Repair	S.F.	4,300	$ 35.00	$ 150,500.00
C2	Underside of Slab Repair	S.F.	40	$ 100.00	$ 4,000.00
C3	Slab Post-Tensioning Repair	EA.	20	$ 4,000.00	$ 80,000.00
C4	Column Repair	S.F.	60	$ 100.00	$ 6,000.00
	Waterproofing				
W1	Rout & Seal Cracks	L.F.	300	$ 10.00	$ 3,000.00
W2	Ribbon Seal Nosing Repair	L.F.	60	$ 100.00	$ 6,000.00
W3	Deck Coating Repair	S.F.	590	$ 5.00	$ 3,000.00
W4	Deck Coating at Patches	S.F.	8,500	$ 5.00	$ 42,500.00
W5	Deck Coating in Stairtower	S.F.	3,600	$ 8.00	$ 28,800.00
W6	Exterior Gasket Repair	L.S.	1	$ 2,000.00	$ 2,000.00
W7	Install Sealant at Cap Stones	L.F.	329	$ 30.00	$ 9,900.00
W8	Install Sealant at Barrier Cables	EA.	12	$ 300.00	$ 3,600.00
W9	Install 123 Tape at Mullion Joints	EA.	140	$ 7.50	$ 1,100.00
W10	Exterior Wet Sealant Replacement at Corners	EA.	150	$ 10.00	$ 1,500.00
	Stairs				
S1	Steel Tread Pan Repair	EA.	4	$ 2,500.00	$ 10,000.00
	Finishes				
F1	Clean & Paint Steel Guardrail	L.S.	1	$ 3,000.00	$ 3,000.00
F2	Clean & Paint Steel Handrail	L.S.	1	$ 2,000.00	$ 2,000.00
F3	Clean & Repaint Façade Connections	EA.	465	$ 43.00	$ 20,000.00
	Miscellaneous				
M1	Repair Handrail Across Expansion Joints	EA.	2	$ 1,000.00	$ 2,000.00
M2	Remove & Replace Broken Drain Grate	EA.	1	$ 200.00	$ 200.00
M3	Repair Exterior Panels	EA.	3	$ 75.00	$ 225.00
MOB	Mobilization and General Conditions (8%)	L.S.	n/a	n/a	$ 30,400.00
	Total Construction Cost				**$ 409,725.00**

	Alternates				
A1	Update Lighting System	S.F.	158,000	$ 1.10	$ 173,800.00
A2	Update Lighting System - External Conduits	S.F.	158,000	$ 1.50	$ 237,000.00
A3	Remove Pay Phone Stand	EA.	1	$ 200.00	$ 200.00

The probable construction costs are based on historical data and are estimated in 2016 dollars. Soft costs such as loss of revenue, design fees, construction administration services, etc. are not included in the cost estimate.

VIII. LIMITATIONS

The recommended restoration and protection of the parking structure can be performed and the rate of further deterioration reduced. However, we cannot guarantee that further deterioration will not take place with continued service-related exposure. Effective ongoing maintenance can significantly reduce long-term maintenance costs. Monitoring of the parking structure can assist in scheduling future maintenance.

Specific repair procedures are not part of this evaluation. This report defines items in need of repair and presents conceptual procedures. Construction Documents are required to address all aspects of materials selection and methods for repair of the parking structure. Repair cost projections are based on deterioration quantities identified during our review. Quantities and costs are not intended to define a guaranteed maximum cost, and variations in final quantities should be anticipated.

The evaluation and restoration of existing structures require that certain assumptions be made regarding existing conditions. Since some of these assumptions may not be confirmed without expending additional sums of money and/or destroying otherwise adequate or serviceable portions of the building, Carl Walker, Inc. cannot be held responsible for latent deficiencies which may exist in the structure, but which have not been discovered within the scope of this evaluation.

OAKLAND COMMUNITY COLLEGE

South Parking Structure | REPORT

R1-2016-175 | December, 2016 | Condition Appraisal Report

Carl Walker

RESTORATION & PRESERVATION Solutions

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OAKLAND COMMUNITY COLLEGE SOUTH PARKING STRUCTURE

Condition Appraisal Report

REPORT | December, 2016

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I. INTRODUCTION

In accordance with our proposal dated July 22, 2016, we have completed our limited condition appraisal of the Oakland Community College South Parking Structure formerly known as Parking Structure No. 2. The objective of our investigation was to assess the current condition of the structure, and identify areas in need of repair. We performed the following scope of services for our condition appraisal:

1. Review existing documentation, including original design drawings, specifications, previous repair documents, reports, etc.

2. Provide a visual review of the structure to determine quantities and locations of items of deterioration such as cracking, scaling, and spalling of concrete structural elements.

3. Perform a chain drag in representative areas of the supported slab to identify/quantify top-of-slab delaminations.

4. Review the existing joint sealants, expansion joints and waterproofing coatings.

5. Provide a general review of other building components such as exposed electrical conduit, light fixtures, plumbing, perimeter rails, barrier cables, and the building exterior.

6. Prepare a written report (with photographs) summarizing the field investigation, research, and analysis, and providing recommended repairs. This will include:
   A. Documentation of observed deficiencies and repair needs relative to the structural, waterproofing, mechanical, electrical, and related systems.
   B. Develop repair and waterproofing protection options.
   C. Estimate costs for repairs and any options considered. Advantages and disadvantages of any proposed repair options will be presented.
   D. Prepare 20-year repair and protection plan for each facility with associated probable construction costs.

II. STRUCTURE DESCRIPTION

There are two parking structures at the Oakland Community College Royal Oak Campus, the North Parking Structure and the South Parking Structure. The parking structures are connected together at each level by two stairtowers and a vehicular bridge, and are located at the corner of Lincoln Ave. and Washington Ave. The North Parking Structure is the original structure and was built in 1980 and the South Parking Structure is the horizontal addition and was built in 1997.

The South Parking Structure has 4 levels with 3 bays per level. The north and south bays are flat while the middle bay is ramped. The overall dimensions of the structure are approximately 239 feet in the east-west direction and 183 feet in the north-south direction yielding a total of 43,000 square feet per complete level. The total parking area of the structure is approximately 165,000 square feet. See the attached drawings for plan views of the facility.

The structural system is composed of precast concrete double-tees, beams, and columns. Each precast concrete double-tee spans 60 feet in the north-south direction across a bay. The double-tees are 10 feet wide, which forms the column spacing of 30 feet in the east-west direction. There is a 3-inch thick cast-in-place concrete topping on the tees. The double-tees are supported by precast lightwalls on the interior and precast spandrel on the exterior. Precast inverted tee beams are used to support the double-tees at the east and west ends of the interior. Precast concrete columns support the beams and spandrels.

Functionally, the structure provides one-way traffic on the north and south bays and two-way traffic on the center bay. The parking structure utilizes 90-degree parking and provides 552 parking spaces for employees and students. There is an entrance/exit servicing Washington Street on the west side of Grade Level. The designated clearance height is 7'-0".

There are two stairtowers that service the parking structure. The stairtowers are located between the North and South Parking Structures at the northeast and northwest corners of the South Parking Structure. The northeast stairtower has one elevator in addition to the stairs.

III. DOCUMENT REVIEW

The following documents and drawings were obtained for a review of the structural systems and general dimensioning and detailing:

- Original design drawings prepared by *TMP Associates and* ***Carl Walker, Inc.***, dated March, 1997.
- Oakland Community College Parking Structure No. 2 Maintenance Review by ***Carl Walker, Inc.***, 2003
- Plans and Specifications for the "Oakland Community College Royal Oak Campus Parking Structure Renovations 2004" by ***Carl Walker, Inc.***, 2004.
- Oakland Community College Parking Structure No. 2 Limited condition Appraisal Report by ***Carl Walker, Inc.***, 2008.
- Plans and Specifications for the "Oakland Community College Royal Oak Campus South Parking Structure Stair, Elevator, and Storage Renovation" by ***Carl Walker, Inc.***, 2009.

IV. PREVIOUS REPAIRS

The following is a list of previous repairs:

- Miscellaneous concrete repairs, all sealants at the tee to tee joints, cove joints and construction joints were replaced and a concrete sealer was applied to all supported slab surfaces in 2004.
- Miscellaneous concrete repairs and joint sealant repairs were completed in 2009.

V. FIELD OBSERVATIONS

On August 30, 2016 Mark Sampson, Trey Just, and Josh Whitmore of ***Carl Walker, Inc.*** completed a review of the South Parking Structure. The review included a visual examination of floor and ceiling surfaces, structural members, façade, and stairtowers to assess the current condition and locate areas of deterioration. We performed a limited chain drag survey, focusing on the most vulnerable slab areas, such as areas near the crossovers and edges. These are areas where the reinforcement is located near the top of the slab and more susceptible to chloride related deterioration.

Floor Survey

To assess the condition of the floor slabs we performed a limited chain drag in representative areas. A distinct hollow sound results when the chain passes over a delaminated area or an area where the concrete topping has debonded from the underlying precast tees.

For reference, a "delamination" is a horizontal fracture beneath the concrete surface that is generally caused by corrosion of the embedded steel reinforcement. Rust, which is the byproduct of the corrosion process, has a volume several times that of the original steel. The volume change created by corrosion generates pressures on the surrounding concrete that eventually becomes sufficient to cause internal fracturing of the concrete and the loss of bond of the corroded reinforcing steel with the surrounding concrete.

The cast-in-place concrete topping is in good condition. The chain drag survey indicated that the cast-in-place concrete topping delaminations totaled 140 square feet and ranged in size from 1 to 5 square feet. The delaminations are mostly confined to the crossover areas and near the edges of the structure.

Precast Double Tees

The precast double tees are in good condition. A very small amount of delaminations, approximately 10 square feet, were noted at the underside of the tee flanges.

Inverted Tee and Spandrel Beams

The inverted tee and spandrel beams are in good condition. No deterioration was observed during our review.

Columns and Walls

The columns and walls are in good condition overall. Approximately 40 square feet of wall delaminations and 30 square feet of column delaminations were noted in the structure. A number of the exterior columns along the south edge of the structure have developed delaminations right along the ground.

Waterproofing

The tee to tee joint sealants vary in condition. At the Roof Level the sealants are in poor condition. At the lower levels the sealants are in fair condition. Failed joint sealants allow the infiltration of moisture and chlorides which can lead to deterioration of the precast elements. The joint sealants are 12 years old, much more than their estimated service life of 8 to 10 years. The sealants need to be completely replaced.

The cove joint sealants vary in condition. At the Roof Level the sealants are in poor condition. At the lower levels the sealants are in fair condition. Failed cove sealants allow the infiltration of moisture and chlorides which can lead to deterioration of the precast elements. The cove joint sealants are 12 years old, much more than their estimated service life of 8 to 10 years. The sealants need to be completely replaced.

Wall sealants along the edges of the columns on the roof level are in poor condition. The sealants are 12 years old, much more than their estimated service life of 8 to 10 years. The sealants need to be completely replaced.

Leaks from the tee to tee joints were noted in various spots, indicating that the joint sealants had failed. These joints need to be replaced to prevent infiltration of water and chlorides.

The supported levels had sealer applied in 2004. Sealer has a service life of 8 to 10 years and is therefore in need of a fresh coat of sealer. This sealer will provide protection for the concrete from water and chlorides.

Stairtowers

The Northeast and Northwest stairtowers (same as the Southeast and Southwest stairtowers as referred to in the North Parking Structure Report) are in good condition.

The ribbon seals between the stairtowers and the deck have failed at the entrances to both stairtowers from each supported level. These need to be removed and replaced to protect the structure from water and chlorides.

There were locations of concrete delaminations in the landings in both stairtowers. About 25 square feet of delaminations were noted in the northwest stairtower and about 15 square feet in the northeast stairtower.

Mullion joints along the windows of the northwest stairtower are open and susceptible to moisture and chlorides. Wet sealant in the corners of these windows has also deteriorated, allowing moisture in. The mullions need 123 Tape to seal them and the windows need wet sealant applied in all corners in order to protect them from moisture and chlorides.

The exterior metal-to-metal sealant on the corners of both of the stairtowers have failed. These joints should be replaced to protect the stairtower from moisture related deterioration.

Exterior

Overall the exterior sealant of Parking Structure No. 2 is in poor condition. Both the horizontal and vertical exterior sealants have failed and need to be replaced.

Miscellaneous Features

A few non-structural features of the parking structure were observed during our review.

Some of the column connection caps on the Level 4 are missing and need to be replaced.

The traffic striping on Level 4 is worn in many spots and needs to be repainted.

Several signs are damaged and need to be replaced.

Handrails throughout the structure need to be repainted.

The CMU wall along the north end of Level 1 of the structure has about 40 lineal feet of deteriorated mortar joints that need to be repointed to protect from moisture and chlorides.

The lighting system appears to consist of older light fixtures serviced by an external conduit. The lights are typically placed alternatingly between one and two lights per bay per column bay with pole-mounted lights on Level 4. The lighting system appears to be in good condition.

Newer LED lighting technology is available that could provide energy savings as well as a longer bulb life.

VI. RECOMMENDATIONS

Based on the review of the parking structure we recommend the following repairs to prolong the service life of the structure:

Concrete Repairs

C1 – Topping Repair: Repairs include removal of concrete delaminations and patching in accordance with current state of the art procedures.

C2 – Tee Flange Repair: Repairs are located at the underside of the tee flanges. These repairs include the removal of concrete delaminations, and patching in accordance with current state of the art procedures.

C3 – Wall Repair: Repairs include the removal of the concrete delaminations and patching in accordance with current state of the art procedures.

C4 – Column Repair: Repairs include the removal of concrete delaminations and patching in accordance with current state of the art procedures.

C5 – Stair Landing Repair: Repairs are located in the northeast stairtower at Level 4 and in the northwest stairtower at Level 3. Repairs include the removal of the concrete delaminations and patching in accordance with current state of the art procedures.

Waterproofing

W1 – Rout & Seal Cracks: Involves routing along the length of all leaking cracks and filling them with sealant to help prevent the penetration of moisture and chlorides.

W2 – Ribbon Seal Remove and Replace: Involves removing and replacing the failed ribbon seals at the entrances to both stairtowers at all supported levels.

W3 – Cove Sealant Replacement: Involves removing and replacing all cove sealants to help protect the structure from moisture and chloride related deterioration.

W4 – Joint Sealant Replacement: Involves removing and replacing all joint sealants to help protect the structure from moisture and chloride related deterioration.

W5 – Wall Sealant Replacement: Involves removing and replacing all joint sealant along the walls at the columns at the roof level to protect the structure from moisture and chlorides.

W6 – Deck Coating in Stairtowers: Involves the application of a deck coating to the northwest and northeast startowers to help protect the concrete and steel from moisture and chlorides.

W7 – Exterior Wall Sealant Replacement: Involves removing and replacing all exterior wall sealants.

W8 – Exterior Metal-to-Metal Sealant Replacement: Involves removing and replacing the failed vertical sealant on the southwest corner of the Northwest stairtower.

W9 – Install 123 Tape at Mullion Joints: Involves installing sealant tape along the façade where mullion joints come together.

W10 – Exterior Wet Sealant Replacement at Corners: Involves installing sealant in the corners of the windows of the northwest stairtower.

W11 – Concrete Sealer: Involves the application of a concrete sealer to all supported levels.

Finishes

F1 – Repaint Pavement Markings: Involves repainting worn pavement markings.

F2 – Clean and Paint Handrails: Involves cleaning the metal handrails to remove loose paint and corrosion, and repainting them to protect against further deterioration.

Miscellaneous

M1 – Replace Column Connection Caps: Involves replacing all of the column connection caps on Level 4.

M2 – Replace Signage: Involves replacing damaged signs throughout the structure.

M3 – Repoint Deteriorated Mortar Joints: Involves repairing the mortar joints of the CMU walls along the southern façade.

Alternates

A1 – Update Lighting System: Involves replacing the existing lights with updated LED lights.

I. COST ESTIMATE

Oakland Community College South Parking Structure
Cost Estimate

Carl Walker, Inc. Project No. R1-2016-175

December, 2016

Work Item	Work Item Description	Units	Factored Quantity	Unit Cost	Cost
	Concrete Repairs				
C1	Topping Repair	S.F.	140	$ 35.00	$ 4,900.00
C2	Tee Flange Repair	S.F.	10	$ 100.00	$ 1,000.00
C3	Wall Delam Repair	S.F.	40	$ 100.00	$ 4,000.00
C4	Column Repair	S.F.	30	$ 100.00	$ 3,000.00
C5	Stair Landing Repair	S.F.	40	$ 35.00	$ 1,400.00
	Waterproofing				
W1	Rout & Seal Cracks	L.F.	1,000	$ 5.00	$ 5,000.00
W2	Ribbon Seal Remove and Replace	L.F.	60	$ 100.00	$ 6,000.00
W3	Cove Sealant Replacement	L.F.	4,800	$ 10.00	$ 48,000.00
W4	Joint Sealant Replacement	L.F.	14,100	$ 10.00	$141,000.00
W5	Wall Sealant Replacement	L.F.	300	$ 10.00	$ 3,000.00
W6	Deck Coating in Stairtowers	S.F.	2,000	$ 8.00	$ 16,000.00
W7	Exterior Wall Sealant Replacement	L.F.	3,500	$ 10.00	$ 35,000.00
W8	Exterior Metal-to-Metal Sealant Replacement	L.F.	740	$ 10.00	$ 7,400.00
W9	Install 123 Tape at Mullion Joints	EA.	410	$ 7.50	$ 3,075.00
W10	Exterior Wet Sealant Replacement	EA.	1,100	$ 10.00	$ 11,000.00
W11	Concrete Sealer	S.F.	135,500	$ 0.50	$ 67,750.00
	Finishes				
F1	Repaint Pavement Markings	EA.	544	$ 10.00	$ 5,440.00
F2	Clean and Paint Handrails	L.S.	1	$ 4,000.00	$ 4,000.00
	Miscellaneous				
M1	Replace Column Connection Caps	EA.	2	$ 100.00	$ 200.00
M2	Replace Signage	EA.	6	$ 300.00	$ 1,800.00
M3	Repoint Deteriorated Mortar Joints	L.F.	40	$ 30.00	$ 1,200.00
MOB	Mobilization and General Conditions (8%)	L.S.	na	na	$ 29,700.00
	Total Construction Cost				**$399,865.00**
	Alternates				
A1	Update Lighting System	S.F.	165,000	$ 1.10	$181,500.00

The probable construction costs are based on historical data and are estimated in 2016 dollars. Soft costs such as loss of revenue, design fees, construction administration services, etc. are not included in the cost estimate.

VII. LIMITATIONS

The recommended restoration and protection of the parking structure can be performed and the rate of further deterioration reduced. However, we cannot guarantee that further deterioration will not take place with continued service-related exposure. Effective ongoing maintenance can significantly reduce long-term maintenance costs. Monitoring of the parking structure can assist in scheduling future maintenance.

Specific repair procedures are not part of this evaluation. This report defines items in need of repair and presents conceptual procedures. Construction Documents are required to address all aspects of materials selection and methods for repair of the parking structure. Repair cost projections are based on deterioration quantities identified during our review. Quantities and costs are not intended to define a guaranteed maximum cost, and variations in final quantities should be anticipated.

The evaluation and restoration of existing structures require that certain assumptions be made regarding existing conditions. Since some of these assumptions may not be confirmed without expending additional sums of money and/or destroying otherwise adequate or serviceable portions of the building, Carl Walker, Inc. cannot be held responsible for latent deficiencies which may exist in the structure, but which have not been discovered within the scope of this evaluation.

Enterprise-Wide Energy Plan

The college has an active enterprise-wide energy plan implemented through the Siemens Building Technology, Building Automation System (BAS). The goal of the plan is reduce energy usage, decrease greenhouse gas emissions, and avoid energy costs. Level One energy audits have been completed and no-cost/low-cost energy efficiency measures were implemented.

Land owned by Oakland Community College

Below is the property that OCC possesses along with its acreage. At this time OCC has the capacity for future development.

- Auburn Hills Campus, Auburn Hills 170 acres
- Highland Lakes Campus, Waterford 157 acres
- Orchard Ridge Campus, Farmington Hills 147 acres
- Royal Oak Campus, Royal Oak 7 acres
- Southfield Campus, Southfield 31 acres
- District Office, Bloomfield Hills 8 acres

OCC does not have any State Building Authority leases.

Section V

Implementation Plan

The Five-Year Capital Outlay Plan should identify the schedule, by which the institution proposes to address major capital deficiencies, and:

a. **Prioritize major capital projects requested from the State, including a brief project description and estimated cost, in the format provided. (Adjust previously developed or prior year's figures utilizing industry standard CPI indexes where appropriate).**

   Due to significant changes in our local economic landscape, OCC has redirected its focus as an institution and we will be presenting a new project for consideration in the near future.

b. **If applicable, provide an estimate relative to the institution's current deferred maintenance backlog. Define the impact of addressing deferred maintenance and structural repairs, including programmatic impact, immediately versus over the next five years.**

   Refer to the Major Maintenance and Renovation Priorities document contained on next page.

c. **Include the status of on-going projects financed with State Building Authority resources and explain how completion coincides with the overall Five-year Capital Outlay Plan.**

   There are no on-going projects financed with the State Building Authority at this time.

d. **Identify to the extent possible, a rate of return on planned expenditures. This could be expressed as operations "savings" that a planned capital expenditure would yield in future years.**

   Not applicable.

e. **Where applicable, consider alternatives to new infrastructure, such as distance learning.**

   Currently offer a variety of distance learning classes.

f. **Identify a maintenance schedule for major maintenance items in excess of $1,000,000 for fiscal year 2019 through fiscal year 2023.**

   Refer to the Major Maintenance and Renovation Priorities document contained on next page.

g. **Identify the amount on non-routine maintenance institution has budgeted for in its current fiscal year and relevant sources of financing.**

   Refer to the Major Maintenance and Renovation Priorities document contained on next page. Sources of financing are funded from the capital operating budget.

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AUBURN HILLS	BUILDING A	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 298,777.20		$ 298,777.20								
AUBURN HILLS	BUILDING A	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
AUBURN HILLS	BUILDING A	DRINKING FOUNTAIN, DUAL-LEVEL	$ 3,211.30		$ 3,211.30								
AUBURN HILLS	BUILDING A	BACKFLOW PREVENTER (3-4 INCHES)	$ 10,022.88		$ 10,022.88								
AUBURN HILLS	BUILDING A	WATER HEATER - SHELL & TUBE (105-400 GPM)	$ 67,456.14		$ 67,456.14								
AUBURN HILLS	BUILDING A	AIR HANDLING UNIT - INDOORS	$ 505,820.23		$ 505,820.23								
AUBURN HILLS	BUILDING A	AIR HANDLING UNIT - OUTDOOR MAKEUP, GAS (>525 MBH INPUT)	$ 42,161.40		$ 42,161.40								
AUBURN HILLS	BUILDING A	FAN - CENTRIFUGAL ROOF EXHAUST	$ 327,171.06		$ 327,171.06								
AUBURN HILLS	BUILDING A	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY, 2.5" SP (<=30 HP)	$ 23,595.19		$ 23,595.19								
AUBURN HILLS	BUILDING A	HOOD, FUME	$ 175,410.57		$ 175,410.57								
AUBURN HILLS	BUILDING A	UNIT HEATER - INDOOR, GAS, SUSPENDED	$ 44,289.04		$ 44,289.04								
AUBURN HILLS	BUILDING A	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 4,304,495.47		$ 4,304,495.47								
AUBURN HILLS	BUILDING A	HEAT EXCHANGER - SHELL & TUBE WATER TO WATER (85-255 GPM)	$ 62,652.55		$ 62,652.55								
AUBURN HILLS	BUILDING A	PUMP - ELECTRIC	$ 14,194.61		$ 14,194.61								
AUBURN HILLS	BUILDING A	COMPUTER ROOM AC UNIT - CHILLED WATER, A415/A417	$ 102,693.95		$ 102,693.95								
AUBURN HILLS	BUILDING A	AIR COMPRESSOR SYSTEM - HVAC CONTROLS, A110/A400	$ 91,451.15		$ 91,451.15								
AUBURN HILLS	BUILDING A	MAIN SWITCHBOARD W/BREAKERS	$ 149,603.39		$ 149,603.39								
AUBURN HILLS	BUILDING A	VARIABLE FREQUENCY DRIVE	$ 27,161.01		$ 27,161.01								
AUBURN HILLS	BUILDING A	LIGHTING - EXTERIOR, RECESSED	$ 17,244.72		$ 17,244.72								
AUBURN HILLS	BUILDING A	LIGHTING - EXTERIOR, WALL FLOOD	$ 2,569.94		$ 2,569.94								
AUBURN HILLS	BUILDING A	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 1,122,197.05		$ 1,122,197.05								
AUBURN HILLS	BUILDING A	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 50,285.73		$ 50,285.73								
AUBURN HILLS	BUILDING A	FAN - CENTRIFUGAL ROOF EXHAUST, UNIT CEF-R02/DEF-4	$ 9,047.58		$ 9,047.58								
AUBURN HILLS	BUILDING A	ENTRY DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 36,249.06			$ 36,249.06							
AUBURN HILLS	BUILDING A	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 160,092.16			$ 160,092.16							
AUBURN HILLS	BUILDING A	SUPPLY PIPING SYSTEM - CLASSROOM	$ 1,390,455.36			$ 1,390,455.36							
AUBURN HILLS	BUILDING A	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	$ 3,008,044.97			$ 3,008,044.97							
AUBURN HILLS	BUILDING A	FAN - UTILITY SET, 1/4" SP (12-17 HP)	$ 28,026.14				$ 28,026.14						
AUBURN HILLS	BUILDING A	FAN - CENTRIFUGAL ROOF EXHAUST, UNIT CEF-R01	$ 30,380.15					$ 30,380.15					
AUBURN HILLS	BUILDING A	HVAC CONTROLS SYSTEM - CLASSROOM	$ 664,656.73						$ 664,656.73				
AUBURN HILLS	BUILDING A	BACKFLOW PREVENTER (2-3 INCHES)	$ 8,735.45							$ 8,735.45			
AUBURN HILLS	BUILDING A	FAN - CENTRIFUGAL ROOF EXHAUST, UNITS F-622/F-623/F-603	$ 63,446.64							$ 63,446.64			
AUBURN HILLS	BUILDING A	DOOR AND FRAME, INTERIOR, NON-RATED	$ 52,963.40								$ 52,963.40		
AUBURN HILLS	BUILDING A	DOOR AND FRAME, INTERIOR, FIRE-RATED	$ 328,595.22								$ 328,595.22		
AUBURN HILLS	BUILDING A	WATER HEATER - RESIDENTIAL, ELECTRIC (25-46 GAL)	$ 2,456.02								$ 2,456.02		
AUBURN HILLS	BUILDING A	GLASS, STOREFRONT	$ 93,603.06									$ 93,603.06	
AUBURN HILLS	BUILDING A	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	$ 243,027.47									$ 243,027.47	
AUBURN HILLS	BUILDING A	SERVICE DOORS AND FRAMES, EXTERIOR, SWINGING, HOLLOW METAL	$ 14,385.15									$ 14,385.15	
AUBURN HILLS	BUILDING A	WALL FINISH - APPLIED, STANDARD	$ 331,315.71									$ 331,315.71	
AUBURN HILLS	BUILDING A	FIRE ALARM SYSTEM - DEVICES	$ 518,462.54									$ 518,462.54	
AUBURN HILLS	BUILDING A	BUILDING ENTRY ACCESSIBILITY UPGRADES	$ 49,108.39			$ 49,108.39							
AUBURN HILLS	BUILDING A	SIGNAGE ACCESSIBILITY UPGRADES	$ 10,643.31		$ 10,643.31								
AUBURN HILLS	BUILDING A	STAIR SAFETY UPGRADES	$ 67,034.36					$ 67,034.36					
AUBURN HILLS	BUILDING A	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 216,348.02										$ 216,348.02
AUBURN HILLS	BUILDING A	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	$ 17,281.50				$ 17,281.50						
AUBURN HILLS	**BUILDING A**	**BUILDING A TOTALS**	**$ 15,097,463.38**	**$ -**	**$ 7,772,795.89**	**$ 4,643,949.94**	**$ 45,307.64**	**$ 97,414.51**	**$ 664,656.73**	**$ 72,182.08**	**$ 384,014.65**	**$ 1,200,793.92**	**$ 216,348.02**
AUBURN HILLS	BUILDING B	GLASS, STOREFRONT	$ 60,647.20		$ 60,647.20								
AUBURN HILLS	BUILDING B	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 28,999.25		$ 28,999.25								
AUBURN HILLS	BUILDING B	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 4,795.05		$ 4,795.05								
AUBURN HILLS	BUILDING B	DOOR OPERATOR, POWER-ASSIST	$ 64,710.84		$ 64,710.84								
AUBURN HILLS	BUILDING B	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 16,810.56		$ 16,810.56								
AUBURN HILLS	BUILDING B	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
AUBURN HILLS	BUILDING B	PLUMBING FIXTURE - EMERGENCY COMBINATION SHOWER/EYEWASH	$ 1,849.65		$ 1,849.65								
AUBURN HILLS	BUILDING B	AIR HANDLING UNIT - INDOOR	$ 42,442.03		$ 42,442.03								
AUBURN HILLS	BUILDING B	FAN - CENTRIFUGAL ROOF EXHAUST	$ 24,867.79		$ 24,867.79								
AUBURN HILLS	BUILDING B	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 6,438.17		$ 6,438.17								
AUBURN HILLS	BUILDING B	HVAC CONTROLS SYSTEM - OFFICE	$ 199,349.95		$ 199,349.95								
AUBURN HILLS	BUILDING B	MAIN SWITCHBOARD W/BREAKERS	$ 79,856.68		$ 79,856.68								
AUBURN HILLS	BUILDING B	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	$ 6,661.47		$ 6,661.47								
AUBURN HILLS	BUILDING B	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 605.08		$ 605.08								
AUBURN HILLS	BUILDING B	LIGHTING SYSTEM, INTERIOR - OFFICE	$ 582,136.94		$ 582,136.94								
AUBURN HILLS	BUILDING B	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34		$ 14,784.34								
AUBURN HILLS	BUILDING B	WALL FINISH - APPLIED, STANDARD	$ 237,513.93			$ 237,513.93							
AUBURN HILLS	BUILDING B	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 399,351.68			$ 399,351.68							
AUBURN HILLS	BUILDING B	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68						$ 1,199.68				
AUBURN HILLS	BUILDING B	FIRE ALARM SYSTEM - DEVICES	$ 190,430.76						$ 190,430.76				
AUBURN HILLS	BUILDING B	SUPPLY PIPING SYSTEM - OFFICE	$ 184,515.30								$ 184,515.30		
AUBURN HILLS	BUILDING B	ELECTRICAL DISTRIBUTION NETWORK - OFFICE	$ 985,466.51								$ 985,466.51		
AUBURN HILLS	BUILDING B	GLASS, CURTAIN WALL, STANDARD	$ 120,001.67									$ 120,001.67	
AUBURN HILLS	BUILDING B	UNIT HEATER - INDOOR, GAS, SUSPENDED (<=40 MBH)	$ 527.60									$ 527.60	
AUBURN HILLS	BUILDING B	SIGNAGE ACCESSIBILITY UPGRADES	$ 4,824.98		$ 4,824.98								
AUBURN HILLS	BUILDING B	STAIR SAFETY UPGRADES	$ 26,813.74					$ 26,813.74					
AUBURN HILLS	BUILDING B	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 100,479.14										$ 100,479.14
AUBURN HILLS	**BUILDING B**	**BUILDING B TOTALS**	**$ 3,696,720.40**	**$ -**	**$ 1,450,420.39**	**$ 636,865.61**	**$ -**	**$ 26,813.74**	**$ 191,630.44**	**$ -**	**$ 1,169,981.81**	**$ 120,529.27**	**$ 100,479.14**
AUBURN HILLS	BUILDING C	WATER HEATER - SHELL & TUBE (105-400 GPM)	$ 67,456.14		$ 67,456.14								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AUBURN HILLS	BUILDING C	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	$ 851.63	$ 851.63									
AUBURN HILLS	BUILDING C	AIR HANDLING UNIT - INDOOR	$ 190,335.58			$ 190,335.58							
AUBURN HILLS	BUILDING C	FAN - CENTRIFUGAL ROOF EXHAUST	$ 48,245.04			$ 48,245.04							
AUBURN HILLS	BUILDING C	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY	$ 17,303.14	$ 17,303.14									
AUBURN HILLS	BUILDING C	HOOD, FUME	$ 175,410.57						$ 175,410.57				
AUBURN HILLS	BUILDING C	UNIT HEATER - INDOOR, GAS, SUSPENDED	$ 18,089.10	$ 18,089.10									
AUBURN HILLS	BUILDING C	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 2,404,901.78					$ 2,404,901.78					
AUBURN HILLS	BUILDING C	HEAT EXCHANGER - SHELL & TUBE WATER TO WATER, UNITS HE-502, HE-501 EAST	$ 100,244.08					$ 100,244.08					
AUBURN HILLS	BUILDING C	PUMP - ELECTRIC (<=10 HP)	$ 2,027.80	$ 2,027.80									
AUBURN HILLS	BUILDING C	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 6,438.17	$ 6,438.17									
AUBURN HILLS	BUILDING C	HVAC CONTROLS SYSTEM - CLASSROOM	$ 371,340.65					$ 371,340.65					
AUBURN HILLS	BUILDING C	MAIN SWITCHBOARD W/BREAKERS (400-600 AMP)	$ 56,566.35	$ 56,566.35									
AUBURN HILLS	BUILDING C	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 6,424.85	$ 6,424.85									
AUBURN HILLS	BUILDING C	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 759,150.99					$ 759,150.99					
AUBURN HILLS	BUILDING C	LOAD INTERUPTER SWITCH - 15 KV	$ 75,189.59						$ 75,189.59				
AUBURN HILLS	BUILDING C	LOAD INTERUPTER SWITCH, FUSED - 15 KV	$ 95,624.56						$ 95,624.56				
AUBURN HILLS	BUILDING C	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (300-500 KVA)	$ 58,370.30							$ 58,370.30			
AUBURN HILLS	BUILDING C	WATER HEATER - RESIDENTIAL, ELECTRIC (46-100 GAL)	$ 3,173.49	$ 3,173.49									
AUBURN HILLS	BUILDING C	WALL FINISH - APPLIED, STANDARD	$ 390,761.82			$ 390,761.82							
AUBURN HILLS	BUILDING C	BACKFLOW PREVENTER	$ 11,222.56			$ 11,222.56							
AUBURN HILLS	BUILDING C	SUPPLY PIPING SYSTEM - CLASSROOM	$ 776,841.00			$ 776,841.00							
AUBURN HILLS	BUILDING C	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	$ 1,680,580.87				$ 1,680,580.87						
AUBURN HILLS	BUILDING C	FAN - CENTRIFUGAL ROOF EXHAUST, UNITS EF-1, EXF-RO7, EXF-R05, EXF-RO06	$ 29,301.01				$ 29,301.01						
AUBURN HILLS	BUILDING C	FIRE ALARM SYSTEM - DEVICES	$ 289,662.63										$ 289,662.63
AUBURN HILLS	BUILDING C	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 28,999.25										$ 28,999.25
AUBURN HILLS	BUILDING C	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 9,590.10										$ 9,590.10
AUBURN HILLS	BUILDING C	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 171,393.47									$ 171,393.47	
AUBURN HILLS	BUILDING C	HEAT EXCHANGER - SHELL & TUBE WATER TO WATER, UNIT HE-1 WEST	$ 37,591.53			$ 37,591.53							
AUBURN HILLS	BUILDING C	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 56,230.58								$ 56,230.58		
AUBURN HILLS	BUILDING C	STAIR SAFETY UPGRADES	$ 17,701.68								$ 17,701.68		
AUBURN HILLS	BUILDING C	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 155,040.18										$ 155,040.18
AUBURN HILLS	BUILDING C	FIRE SPRINKLER SYSTEM EXTENSION	$ 492,648.60									$ 492,648.60	
AUBURN HILLS	**BUILDING C**	**BUILDING C TOTALS**	**$ 8,604,709.11**	**$ 110,874.53**	**$ 67,456.14**	**$ 1,454,997.54**	**$ 1,709,881.88**	**$ 3,635,637.51**	**$ 346,224.72**	**$ 58,370.30**	**$ 73,932.26**	**$ 664,042.07**	**$ 483,292.16**
AUBURN HILLS	BUILDING D	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 50,431.68		$ 50,431.68								
AUBURN HILLS	BUILDING D	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
AUBURN HILLS	BUILDING D	WATER HEATER - RESIDENTIAL, ELECTRIC (46-100 GAL)	$ 3,252.83		$ 3,252.83								
AUBURN HILLS	BUILDING D	AIR HANDLING UNIT - INDOOR	$ 21,221.02		$ 21,221.02								
AUBURN HILLS	BUILDING D	FAN - CENTRIFUGAL ROOF EXHAUST	$ 9,047.58		$ 9,047.58								
AUBURN HILLS	BUILDING D	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY	$ 3,146.02		$ 3,146.02								
AUBURN HILLS	BUILDING D	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 10,730.29		$ 10,730.29								
AUBURN HILLS	BUILDING D	HVAC CONTROLS SYSTEM - CLASSROOM	$ 351,982.86		$ 351,982.86								
AUBURN HILLS	BUILDING D	MAIN SWITCHBOARD W/BREAKERS (600-800 AMP)	$ 69,746.71		$ 69,746.71								
AUBURN HILLS	BUILDING D	TRANSFORMER - DRY-TYPE, 3PH, 5-15KV PRIMARY (300-500 KVA)	$ 83,580.85		$ 83,580.85								
AUBURN HILLS	BUILDING D	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 2,569.94		$ 2,569.94								
AUBURN HILLS	BUILDING D	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	$ 1,746.43		$ 1,746.43								
AUBURN HILLS	BUILDING D	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 719,576.85		$ 719,576.85								
AUBURN HILLS	BUILDING D	LOAD INTERUPTER SWITCH - 15 KV	$ 63,362.30		$ 63,362.30								
AUBURN HILLS	BUILDING D	LOAD INTERUPTER SWITCH, FUSED - 15 KV	$ 80,582.86		$ 80,582.86								
AUBURN HILLS	BUILDING D	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (500-750 KVA)	$ 56,531.66		$ 56,531.66								
AUBURN HILLS	BUILDING D	WALL FINISH - APPLIED, STANDARD	$ 142,562.46			$ 142,562.46							
AUBURN HILLS	BUILDING D	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 2,279,535.54			$ 2,279,535.54							
AUBURN HILLS	BUILDING D	VARIABLE FREQUENCY DRIVE	$ 8,709.20			$ 8,709.20							
AUBURN HILLS	BUILDING D	VARIABLE FREQUENCY DRIVE (20-25 HP)	$ 11,250.27					$ 11,250.27					
AUBURN HILLS	BUILDING D	FIRE ALARM SYSTEM - DEVICES	$ 274,562.67						$ 274,562.67				
AUBURN HILLS	BUILDING D	SUPPLY PIPING SYSTEM - CLASSROOM	$ 736,344.70								$ 736,344.70		
AUBURN HILLS	BUILDING D	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	$ 1,592,973.08								$ 1,592,973.08		
AUBURN HILLS	BUILDING D	VARIABLE FREQUENCY DRIVE (50-75 HP)	$ 18,753.07								$ 18,753.07		
AUBURN HILLS	BUILDING D	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 476,490.03									$ 476,490.03	
AUBURN HILLS	BUILDING D	ELEVATOR ACCESSIBILITY UPGRADES	$ 3,475.59		$ 3,475.59								
AUBURN HILLS	BUILDING D	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 30,954.72				$ 30,954.72						
AUBURN HILLS	BUILDING D	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 23,227.71				$ 23,227.71						
AUBURN HILLS	BUILDING D	STAIR SAFETY UPGRADES	$ 81,306.04							$ 81,306.04			
AUBURN HILLS	BUILDING D	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 150,766.87										$ 150,766.87
AUBURN HILLS	BUILDING D	FIRE SPRINKLER SYSTEM INSTALLATION	$ 867,657.58					$ 867,657.58					
AUBURN HILLS	**BUILDING D**	**BUILDING D TOTALS**	**$ 8,536,719.83**	**$ -**	**$ 1,841,625.89**	**$ 2,430,807.20**	**$ 54,182.43**	**$ 878,907.85**	**$ 274,562.67**	**$ 81,306.04**	**$ 2,348,070.85**	**$ 476,490.03**	**$ 150,766.87**
AUBURN HILLS	BUILDING E	WALL, EXTERIOR, TILT-UP OR PRECAST CONCRETE PANELS - RESTORE NATURAL FINISH	$ 6,278.29		$ 6,278.29								
AUBURN HILLS	BUILDING E	WALL FINISH - APPLIED, STANDARD	$ 140,296.88		$ 140,296.88								
AUBURN HILLS	BUILDING E	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
AUBURN HILLS	BUILDING E	BACKFLOW PREVENTER (1-2 INCHES)	$ 2,664.01		$ 2,664.01								
AUBURN HILLS	BUILDING E	BACKFLOW PREVENTER (3-4 INCHES)	$ 10,022.88		$ 10,022.88								
AUBURN HILLS	BUILDING E	WATER HEATER - RESIDENTIAL, ELECTRIC (<=15 GAL)	$ 553.35		$ 553.35								
AUBURN HILLS	BUILDING E	WATER HEATER - SHELL & TUBE (105-400 GPM)	$ 67,456.14		$ 67,456.14								
AUBURN HILLS	BUILDING E	AIR HANDLING UNIT - INDOOR	$ 169,114.57		$ 169,114.57								
AUBURN HILLS	BUILDING E	AIR HANDLING UNIT - OUTDOOR MAKEUP, GAS	$ 125,341.09		$ 125,341.09								
AUBURN HILLS	BUILDING E	FAN - CENTRIFUGAL ROOF EXHAUST	$ 150,542.22		$ 150,542.22								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AUBURN HILLS	BUILDING E	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY	$ 17,303.14		$ 17,303.14								
AUBURN HILLS	BUILDING E	HOOD, FUME	$ 140,328.46		$ 140,328.46								
AUBURN HILLS	BUILDING E	UNIT HEATER - INDOOR, GAS, SUSPENDED (<=40 MBH)	$ 3,014.85		$ 3,014.85								
AUBURN HILLS	BUILDING E	HEAT EXCHANGER - SHELL & TUBE WATER TO WATER (85-255 GPM)	$ 62,652.55		$ 62,652.55								
AUBURN HILLS	BUILDING E	PUMP - ELECTRIC	$ 24,333.61		$ 24,333.61								
AUBURN HILLS	BUILDING E	AIR COMPRESSOR SYSTEM - HVAC CONTROLS	$ 27,442.22		$ 27,442.22								
AUBURN HILLS	BUILDING E	HVAC CONTROLS SYSTEM - CLASSROOM	$ 203,863.04		$ 203,863.04								
AUBURN HILLS	BUILDING E	DUST COLLECTION SYSTEM	$ 18,403.98		$ 18,403.98								
AUBURN HILLS	BUILDING E	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	$ 546,456.78		$ 546,456.78								
AUBURN HILLS	BUILDING E	VARIABLE FREQUENCY DRIVE	$ 11,990.64		$ 11,990.64								
AUBURN HILLS	BUILDING E	LOAD INTERUPTER SWITCH - 15 KV	$ 63,362.30		$ 63,362.30								
AUBURN HILLS	BUILDING E	LOAD INTERUPTER SWITCH, FUSED - 15 KV	$ 80,582.86		$ 80,582.86								
AUBURN HILLS	BUILDING E	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 1,210.16		$ 1,210.16								
AUBURN HILLS	BUILDING E	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 1,284.97		$ 1,284.97								
AUBURN HILLS	BUILDING E	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 416,767.80		$ 416,767.80								
AUBURN HILLS	BUILDING E	GLASS, STOREFRONT	$ 211,928.28			$ 211,928.28							
AUBURN HILLS	BUILDING E	FAN - UTILITY SET	$ 49,868.05			$ 49,868.05							
AUBURN HILLS	BUILDING E	MAIN SWITCHBOARD W/BREAKERS (600-800 AMP)	$ 69,746.71			$ 69,746.71							
AUBURN HILLS	BUILDING E	TRANSFORMER - DRY-TYPE, 3PH, 5-15KV PRIMARY (300-500 KVA)	$ 83,580.85			$ 83,580.85							
AUBURN HILLS	BUILDING E	FIRE ALARM SYSTEM - DEVICES	$ 159,022.46						$ 159,022.46				
AUBURN HILLS	BUILDING E	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 55,354.54							$ 55,354.54			
AUBURN HILLS	BUILDING E	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 19,923.53							$ 19,923.53			
AUBURN HILLS	BUILDING E	DOOR AND FRAME, INTERIOR, NON-RATED	$ 39,722.55								$ 39,722.55		
AUBURN HILLS	BUILDING E	DOOR AND FRAME, INTERIOR, FIRE-RATED	$ 153,344.44								$ 153,344.44		
AUBURN HILLS	BUILDING E	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 54,773.59								$ 54,773.59		
AUBURN HILLS	BUILDING E	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 1,320,271.77								$ 1,320,271.77		
AUBURN HILLS	BUILDING E	ELEVATOR ACCESSIBILITY UPGRADES	$ 15,855.55		$ 15,855.55								
AUBURN HILLS	BUILDING E	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 20,636.49				$ 20,636.49						
AUBURN HILLS	BUILDING E	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 51,118.72					$ 51,118.72					
AUBURN HILLS	BUILDING E	STAIR SAFETY UPGRADES	$ 9,112.08					$ 9,112.08					
AUBURN HILLS	BUILDING E	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 92,033.23										$ 92,033.23
AUBURN HILLS	BUILDING E	EXTERIOR MASONRY WALL RENEWAL	$ 49,399.60									$ 49,399.60	
AUBURN HILLS	BUILDING E	IMPROVE EGRESS PATHWAY DESIGNATION	$ 16,378.10		$ 16,378.10								
AUBURN HILLS	**BUILDING E**	**BUILDING E TOTALS**	**$ 5,073,977.75**	**$ -**	**$ 2,634,140.84**	**$ 415,123.89**	**$ 20,636.49**	**$ 60,230.81**	**$ 159,022.46**	**$ 75,278.08**	**$ 1,568,112.35**	**$ 49,399.60**	**$ 92,033.23**
AUBURN HILLS	BUILDING F	DOOR LOCK, COMMERCIAL-GRADE	$ 21,623.42		$ 21,623.42								
AUBURN HILLS	BUILDING F	FAN - CENTRIFUGAL ROOF EXHAUST	$ 20,253.43		$ 20,253.43								
AUBURN HILLS	BUILDING F	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 1,170,510.56		$ 1,170,510.56								
AUBURN HILLS	BUILDING F	UNIT HEATER - INDOOR, GAS, SUSPENDED (<=40 MBH)	$ 12,059.40		$ 12,059.40								
AUBURN HILLS	BUILDING F	HVAC CONTROLS SYSTEM - CLASSROOM	$ 336,540.58		$ 336,540.58								
AUBURN HILLS	BUILDING F	FIRE ALARM SYSTEM - DEVICES	$ 262,516.99		$ 262,516.99								
AUBURN HILLS	BUILDING F	LIGHTING - EXTERIOR, BOLLARD (SV, MH, ID, LED) COM	$ 16,929.87		$ 16,929.87								
AUBURN HILLS	BUILDING F	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 1,512.69		$ 1,512.69								
AUBURN HILLS	BUILDING F	DOOR OPERATOR, POWER-ASSIST	$ 32,355.42		$ 32,355.42								
AUBURN HILLS	BUILDING F	PLUMBING FIXTURE - SINK, KITCHEN	$ 1,854.65		$ 1,854.65								
AUBURN HILLS	BUILDING F	BACKFLOW PREVENTER	$ 18,758.33		$ 18,758.33								
AUBURN HILLS	BUILDING F	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	$ 3,406.53		$ 3,406.53								
AUBURN HILLS	BUILDING F	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 4,292.11		$ 4,292.11								
AUBURN HILLS	BUILDING F	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 688,007.39		$ 688,007.39								
AUBURN HILLS	BUILDING F	SUPPLY PIPING SYSTEM - CLASSROOM	$ 378,103.01			$ 378,103.01							
AUBURN HILLS	BUILDING F	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	$ 817,970.05			$ 817,970.05							
AUBURN HILLS	BUILDING F	HEAT EXCHANGER - SHELL & TUBE WATER TO WATER (>255 GPM)	$ 63,611.70				$ 63,611.70						
AUBURN HILLS	BUILDING F	PAD-MOUNT SWITCH - 15 KV	$ 115,468.96						$ 115,468.96				
AUBURN HILLS	BUILDING F	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 65,248.31						$ 65,248.31				
AUBURN HILLS	BUILDING F	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43						$ 310,640.43				
AUBURN HILLS	BUILDING F	PLUMBING FIXTURE - LAVATORY, COUNTER	$ 4,136.49						$ 4,136.49				
AUBURN HILLS	BUILDING F	DUCTLESS DX SPLIT SYSTEM (>2 TON)	$ 5,343.15						$ 5,343.15				
AUBURN HILLS	BUILDING F	FAN - CENTRIFUGAL ROOF EXHAUST	$ 42,204.62						$ 42,204.62				
AUBURN HILLS	BUILDING F	HVAC CONTROLS SYSTEM - CLASSROOM	$ 180,738.42						$ 180,738.42				
AUBURN HILLS	BUILDING F	FIRE ALARM SYSTEM - DEVICES	$ 140,984.21						$ 140,984.21				
AUBURN HILLS	BUILDING F	DOOR AND FRAME, INTERIOR, NON-RATED	$ 15,889.02									$ 15,889.02	
AUBURN HILLS	BUILDING F	DOOR AND FRAME, INTERIOR, FIRE-RATED	$ 96,387.93									$ 96,387.93	
AUBURN HILLS	BUILDING F	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
AUBURN HILLS	BUILDING F	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 20,636.49							$ 20,636.49			
AUBURN HILLS	BUILDING F	SIGNAGE ACCESSIBILITY UPGRADES	$ 3,122.03		$ 3,122.03								
AUBURN HILLS	BUILDING F	RESTROOM ACCESSIBILITY UPGRADES	$ 36,125.65		$ 36,125.65								
AUBURN HILLS	BUILDING F	IMPROVE EGRESS PATHWAY DESIGNATION	$ 8,670.77		$ 8,670.77								
AUBURN HILLS	BUILDING F	ELEVATOR ACCESSIBILITY UPGRADES	$ 15,855.55		$ 15,855.55								
AUBURN HILLS	BUILDING F	STAIR SAFETY UPGRADES	$ 26,813.74					$ 26,813.74					
AUBURN HILLS	**BUILDING F**	**BUILDING F TOTALS**	**$ 4,987,530.65**	**$ -**	**$ 2,654,395.38**	**$ 1,196,073.06**	**$ 63,611.70**	**$ 26,813.74**	**$ 864,764.59**	**$ 20,636.49**	**$ -**	**$ 161,235.68**	**$ -**
AUBURN HILLS	BUILDING G	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 2,146.06		$ 2,146.06								
AUBURN HILLS	BUILDING G	WALL FINISH - APPLIED, STANDARD	$ 301,051.62			$ 301,051.62							
AUBURN HILLS	BUILDING G	PLUMBING FIXTURE - SINK, KITCHEN	$ 5,563.95						$ 5,563.95				

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AUBURN HILLS	BUILDING G	WATER HEATER - RESIDENTIAL, ELECTRIC (46-100 GAL)	$ 3,252.83						$ 3,252.83				
AUBURN HILLS	BUILDING G	FIRE ALARM SYSTEM - DEVICES	$ 165,037.05						$ 165,037.05				
AUBURN HILLS	BUILDING G	VARIABLE FREQUENCY DRIVE	$ 15,370.66						$ 15,370.66				
AUBURN HILLS	BUILDING G	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 1,210.16						$ 1,210.16				
AUBURN HILLS	BUILDING G	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 2,569.94						$ 2,569.94				
AUBURN HILLS	BUILDING G	REFRIGERATION SYSTEM - WALK-IN	$ 23,392.11						$ 23,392.11				
AUBURN HILLS	BUILDING G	VARIABLE FREQUENCY DRIVE	$ 17,200.27							$ 17,200.27			
AUBURN HILLS	BUILDING G	UNIT HEATER - INDOOR, GAS, SUSPENDED (<=40 MBH)	$ 3,014.85								$ 3,014.85		
AUBURN HILLS	BUILDING G	VARIABLE FREQUENCY DRIVE	$ 22,500.53								$ 22,500.53		
AUBURN HILLS	BUILDING G	HVAC CONTROLS SYSTEM	$ 337,536.70									$ 337,536.70	
AUBURN HILLS	BUILDING G	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
AUBURN HILLS	BUILDING G	FIRE ALARM SYSTEM - DEVICES	$ 197,325.18									$ 197,325.18	
AUBURN HILLS	BUILDING G	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34									$ 14,784.34	
AUBURN HILLS	**BUILDING G**	**BUILDING G TOTALS**	**$ 1,160,914.97**	**$ -**	**$ 2,146.06**	**$ 301,051.62**	**$ -**	**$ -**	**$ 216,396.69**	**$ 17,200.27**	**$ 25,515.38**	**$ 598,604.96**	**$ -**
AUBURN HILLS	GROUNDS STORAGE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 6,424.85						$ 6,424.85				
AUBURN HILLS	GROUNDS STORAGE	UNIT HEATER - INDOOR, GAS, SUSPENDED (40-100 MBH)	$ 2,738.68								$ 2,738.68		
AUBURN HILLS	**GROUNDS STORAGE**	**GROUND STORAGE TOTALS**	**$ 9,163.53**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 6,424.85**	**$ -**	**$ 2,738.68**	**$ -**	**$ -**
AUBURN HILLS	GROUNDS MAINTENANCE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 6,424.85						$ 6,424.85				
AUBURN HILLS	GROUNDS MAINTENANCE	WALL FINISH - APPLIED, STANDARD	$ 20,356.40								$ 20,356.40		
AUBURN HILLS	GROUNDS MAINTENANCE	HVAC CONTROLS SYSTEM - WAREHOUSE	$ 8,547.16									$ 8,547.16	
AUBURN HILLS	GROUNDS MAINTENANCE	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
AUBURN HILLS	GROUNDS MAINTENANCE	FIRE ALARM SYSTEM - DEVICES	$ 11,351.66									$ 11,351.66	
AUBURN HILLS	GROUNDS MAINTENANCE	DRINKING FOUNTAIN ACCESSIBILITY UPGRADE	$ 10,318.23				$ 10,318.23						
AUBURN HILLS	GROUNDS MAINTENANCE	FIRE SPRINKLER SYSTEM INSTALLATION	$ 67,589.82					$ 67,589.82					
AUBURN HILLS	**GROUNDS MAINTENANCE**	**GROUNDS MAINTENANCE TOTALS**	**$ 173,546.85**	**$ -**	**$ -**	**$ -**	**$ 10,318.23**	**$ 67,589.82**	**$ 6,424.85**	**$ -**	**$ 20,356.40**	**$ 68,857.54**	**$ -**
AUBURN HILLS	BUILDING H	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 10,730.29		$ 10,730.29								
AUBURN HILLS	BUILDING H	WATER HEATER - RESIDENTIAL, ELECTRIC (>100 GAL)	$ 4,002.34		$ 4,002.34								
AUBURN HILLS	BUILDING H	WALL FINISH - APPLIED, STANDARD	$ 26,307.78					$ 26,307.78					
AUBURN HILLS	BUILDING H	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	$ 6,043.59								$ 6,043.59		
AUBURN HILLS	BUILDING H	WATER HEATER - RESIDENTIAL, ELECTRIC (46-100 GAL)	$ 3,966.86									$ 3,966.86	
AUBURN HILLS	BUILDING H	FIRE ALARM SYSTEM - DEVICES	$ 7,880.39						$ 7,880.39				
AUBURN HILLS	BUILDING H	WALL FINISH - APPLIED, STANDARD	$ 39,698.37								$ 39,698.37		
AUBURN HILLS	**BUILDING H**	**BUILDING H TOTALS**	**$ 98,629.61**	**$ -**	**$ 14,732.62**	**$ -**	**$ -**	**$ 26,307.78**	**$ 7,880.39**	**$ -**	**$ 45,741.96**	**$ 3,966.86**	**$ -**
AUBURN HILLS	BUILDING J	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 134,250.10		$ 134,250.10								
AUBURN HILLS	BUILDING J	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	$ 10,610.51		$ 10,610.51								
AUBURN HILLS	BUILDING J	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 326,495.34		$ 326,495.34								
AUBURN HILLS	BUILDING J	DOOR OPERATOR, POWER-ASSIST	$ 16,177.71								$ 16,177.71		
AUBURN HILLS	**BUILDING J**	**BUILDING J TOTALS**	**$ 487,533.65**	**$ -**	**$ 471,355.94**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 16,177.71**	**$ -**	**$ -**
AUBURN HILLS	GREENHOUSE	UNIT HEATER - INDOOR, GAS, SUSPENDED (40-100 MBH)	$ 5,477.37				$ 5,477.37						
AUBURN HILLS	GREENHOUSE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 1,284.97				$ 1,284.97						
AUBURN HILLS	GREENHOUSE	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	$ 14,934.92				$ 14,934.92						
AUBURN HILLS	GREENHOUSE	GREENHOUSE	$ 275,859.15									$ 275,859.15	
AUBURN HILLS	**GREENHOUSE**	**GREENHOUSE TOTALS**	**$ 297,556.41**	**$ -**	**$ -**	**$ -**	**$ 21,697.26**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 275,859.15**	**$ -**
AUBURN HILLS	MTEC	WALL FINISH - APPLIED, STANDARD	$ 158,624.41		$ 158,624.41								
AUBURN HILLS	MTEC	VARIABLE FREQUENCY DRIVE	$ 29,811.82		$ 29,811.82								
AUBURN HILLS	MTEC	LIGHTING - EXTERIOR	$ 49,855.22		$ 49,855.22								
AUBURN HILLS	MTEC	UNIT HEATER - INDOOR, GAS, SUSPENDED	$ 9,044.55		$ 9,044.55								
AUBURN HILLS	MTEC	HVAC CONTROLS SYSTEM - CLASSROOM	$ 194,964.06		$ 194,964.06								
AUBURN HILLS	MTEC	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73		$ 48,958.73								
AUBURN HILLS	MTEC	FIRE ALARM SYSTEM	$ 186,697.88		$ 186,697.88								
AUBURN HILLS	MTEC	PLUMBING FIXTURE - SINK, KITCHEN	$ 927.32			$ 927.32							
AUBURN HILLS	MTEC	BACKFLOW PREVENTER	$ 23,371.52			$ 23,371.52							
AUBURN HILLS	MTEC	LIGHTING SYSTEM, INTERIOR	$ 472,007.27			$ 472,007.27							
AUBURN HILLS	MTEC	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 2,637.54							$ 2,637.54			
AUBURN HILLS	MTEC	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 242,167.88								$ 242,167.88		
AUBURN HILLS	MTEC	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43								$ 310,640.43		
AUBURN HILLS	MTEC	DRINKING FOUNTAIN, DUAL-LEVEL	$ 12,845.21								$ 12,845.21		
AUBURN HILLS	MTEC	CONDENSER - REFRIGERANT, AIR-COOLED	$ 235,063.26								$ 235,063.26		
AUBURN HILLS	MTEC	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	$ 6,043.59								$ 6,043.59		
AUBURN HILLS	MTEC	FAN - CENTRIFUGAL ROOF EXHAUST	$ 37,680.84								$ 37,680.84		
AUBURN HILLS	MTEC	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	$ 364,304.52								$ 364,304.52		
AUBURN HILLS	MTEC	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 163,306.89										$ 163,306.89
AUBURN HILLS	**MTEC**	**MTEC TOTALS**	**$ 2,548,952.94**	**$ -**	**$ 677,956.67**	**$ 496,306.12**	**$ -**	**$ -**	**$ -**	**$ 2,637.54**	**$ 1,208,745.72**	**$ -**	**$ 163,306.89**
AUBURN HILLS	CREST - TRAINING CENTER	WALL FINISH - APPLIED, STANDARD	$ 60,562.00		$ 60,562.00								
AUBURN HILLS	CREST - TRAINING CENTER	LIGHTING - EXTERIOR	$ 3,780.10		$ 3,780.10								
AUBURN HILLS	CREST - TRAINING CENTER	UNIT HEATER - INDOOR, GAS, SUSPENDED (<=40 MBH)	$ 9,044.55		$ 9,044.55								
AUBURN HILLS	CREST - TRAINING CENTER	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (<=3 TON)	$ 46,527.50			$ 46,527.50							
AUBURN HILLS	CREST - TRAINING CENTER	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73			$ 48,958.73							
AUBURN HILLS	CREST - TRAINING CENTER	FIRE ALARM SYSTEM - DEVICES	$ 64,838.24			$ 64,838.24							
AUBURN HILLS	CREST - TRAINING CENTER	DOOR OPERATOR, POWER-ASSIST	$ 64,710.84					$ 64,710.84					
AUBURN HILLS	CREST - TRAINING CENTER	PLUMBING FIXTURE - SINK, KITCHEN	$ 927.32					$ 927.32					

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AUBURN HILLS	CREST - TRAINING CENTER	BACKFLOW PREVENTER	$ 18,758.33					$ 18,758.33					
AUBURN HILLS	CREST - TRAINING CENTER	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 169,928.78					$ 169,928.78					
AUBURN HILLS	CREST - TRAINING CENTER	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 6,898.18									$ 6,898.18	
AUBURN HILLS	CREST - TRAINING CENTER	INTERIOR SIGNAGE ACCESSIBILITY UPGRADES	$ 3,547.76		$ 3,547.76								
AUBURN HILLS	**CREST - TRAINING CENTER**	**CREST - TRAINING CENTER TOTALS**	**$ 498,482.32**	**$ -**	**$ 76,934.40**	**$ 160,324.47**	**$ -**	**$ 254,325.27**	**$ -**	**$ -**	**$ -**	**$ 6,898.18**	**$ -**
AUBURN HILLS	CREST - RANCH	WALL FINISH - APPLIED, STANDARD	$ 15,351.84		$ 15,351.84								
AUBURN HILLS	CREST - RANCH	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	$ 2,910.71		$ 2,910.71								
AUBURN HILLS	CREST - RANCH	DOOR, EXTERIOR, OVERHEAD PANEL OR SECTIONAL, PAINTED, LOCK	$ 12,064.36				$ 12,064.36						
AUBURN HILLS	CREST - RANCH	DOOR OPERATOR, OVERHEAD PANEL DOOR, RESIDENTIAL, PADS	$ 1,072.11				$ 1,072.11						
AUBURN HILLS	CREST - RANCH	WATER HEATER - RESIDENTIAL, GAS (35-45 GAL)	$ 2,575.30				$ 2,575.30						
AUBURN HILLS	CREST - RANCH	LIGHTING SYSTEM, INTERIOR - RESIDENCE	$ 15,790.75				$ 15,790.75						
AUBURN HILLS	CREST - RANCH	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 5,444.15								$ 5,444.15		
AUBURN HILLS	**CREST - RANCH**	**CREST - RANCH TOTALS**	**$ 55,209.23**	**$ -**	**$ 18,262.55**	**$ -**	**$ 31,502.52**	**$ -**	**$ -**	**$ -**	**$ 5,444.15**	**$ -**	**$ -**
AUBURN HILLS	CREST - CONTROL TOWER	WATER HEATER - RESIDENTIAL, ELECTRIC (<=15 GAL)	$ 1,660.04		$ 1,660.04								
AUBURN HILLS	CREST - CONTROL TOWER	LIGHTING - EXTERIOR	$ 7,589.13		$ 7,589.13								
AUBURN HILLS	CREST - CONTROL TOWER	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 21,562.06						$ 21,562.06				
AUBURN HILLS	CREST - CONTROL TOWER	WALL FINISH - APPLIED, STANDARD	$ 9,704.80									$ 9,704.80	
AUBURN HILLS	CREST - CONTROL TOWER	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 10,318.23			$ 10,318.23							
AUBURN HILLS	**CREST - CONTROL TOWER**	**CREST - CONTROL TOWER TOTALS**	**$ 50,834.26**	**$ -**	**$ 9,249.17**	**$ 10,318.23**	**$ -**	**$ -**	**$ 21,562.06**	**$ -**	**$ -**	**$ 9,704.80**	**$ -**
AUBURN HILLS	CREST - POLE BARN	LIGHTING - EXTERIOR, POST LANTERN, (INC, CFL, LED) RES	$ 928.80						$ 928.80				
AUBURN HILLS	CREST - POLE BARN	UNIT HEATER - INDOOR, GAS, SUSPENDED (40-100 MBH)	$ 5,477.37								$ 5,477.37		
AUBURN HILLS	CREST - POLE BARN	EXTERIOR WALL FINISH RENEWAL	$ 7,955.46			$ 7,955.46							
AUBURN HILLS	CREST - POLE BARN	INSTALL EMERGENCY LIGHTS	$ 3,536.91		$ 3,536.91								
AUBURN HILLS	CREST - POLE BARN	STABILIZE CRACKED CONCRETE FLOOR SLAB	$ 24,319.56				$ 24,319.56						
AUBURN HILLS	**CREST - POLE BARN**	**CREST - POLE BARN TOTALS**	**$ 42,218.09**	**$ -**	**$ 3,536.91**	**$ 7,955.46**	**$ 24,319.56**	**$ -**	**$ 928.80**	**$ -**	**$ 5,477.37**	**$ -**	**$ -**
AUBURN HILLS	CREST - BURN BUILDING	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 33,409.22		$ 33,409.22								
AUBURN HILLS	CREST - BURN BUILDING	UNIT HEATER - INDOOR, GAS	$ 25,125.78			$ 25,125.78							
AUBURN HILLS	CREST - BURN BUILDING	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 212,909.35						$ 212,909.35				
AUBURN HILLS	**CREST - BURN BUILDING**	**CREST - BURN BUILDING TOTALS**	**$ 271,444.35**	**$ -**	**$ 33,409.22**	**$ 25,125.78**	**$ -**	**$ -**	**$ 212,909.35**	**$ -**	**$ -**	**$ -**	**$ -**
AUBURN HILLS	CREST - MOTEL	WALL FINISH - APPLIED, STANDARD	$ 43,756.13		$ 43,756.13								
AUBURN HILLS	CREST - MOTEL	WATER HEATER - RESIDENTIAL, ELECTRIC (<=15 GAL)	$ 691.68		$ 691.68								
AUBURN HILLS	CREST - MOTEL	LIGHTING - EXTERIOR	$ 4,007.82		$ 4,007.82								
AUBURN HILLS	CREST - MOTEL	PLUMBING FIXTURE - BATHTUB WITH FIXTURES	$ 7,811.10					$ 7,811.10					
AUBURN HILLS	CREST - MOTEL	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68					$ 1,199.68					
AUBURN HILLS	CREST - MOTEL	LIGHTING SYSTEM, INTERIOR - DORMITORY	$ 38,857.02					$ 38,857.02					
AUBURN HILLS	CREST - MOTEL	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 7,405.40									$ 7,405.40	
AUBURN HILLS	**CREST - MOTEL**	**CREST - MOTEL TOTALS**	**$ 103,728.83**	**$ -**	**$ 48,455.63**	**$ -**	**$ -**	**$ 47,867.80**	**$ -**	**$ -**	**$ -**	**$ 7,405.40**	**$ -**
AUBURN HILLS	CREST - TWO STORY HOUSE	WALL FINISH - APPLIED, STANDARD	$ 28,911.51		$ 28,911.51								
AUBURN HILLS	CREST - TWO STORY HOUSE	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	$ 3,492.85		$ 3,492.85								
AUBURN HILLS	CREST - TWO STORY HOUSE	DOOR, EXTERIOR, OVERHEAD PANEL OR SECTIONAL, PAINTED, LOCK	$ 12,064.36				$ 12,064.36						
AUBURN HILLS	CREST - TWO STORY HOUSE	DOOR OPERATOR, OVERHEAD PANEL DOOR, RESIDENTIAL, PADS	$ 1,072.11				$ 1,072.11						
AUBURN HILLS	CREST - TWO STORY HOUSE	WATER HEATER - RESIDENTIAL, GAS (45-55 GAL)	$ 2,690.98				$ 2,690.98						
AUBURN HILLS	CREST - TWO STORY HOUSE	LIGHTING SYSTEM, INTERIOR - RESIDENCE	$ 22,558.21				$ 22,558.21						
AUBURN HILLS	CREST - TWO STORY HOUSE	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 7,777.36								$ 7,777.36		
AUBURN HILLS	**CREST - TWO STORY HOUSE**	**CREST - TWO STORY HOUSE TOTALS**	**$ 78,567.38**	**$ -**	**$ 32,404.36**	**$ -**	**$ 38,385.66**	**$ -**	**$ -**	**$ -**	**$ 7,777.36**	**$ -**	**$ -**
AUBURN HILLS	CREST - BANK	WATER HEATER - RESIDENTIAL, ELECTRIC (<=15 GAL)	$ 691.68		$ 691.68								
AUBURN HILLS	CREST - BANK	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 907.62		$ 907.62								
AUBURN HILLS	CREST - BANK	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68					$ 1,199.68					
AUBURN HILLS	CREST - BANK	LIGHTING SYSTEM, INTERIOR - OFFICE	$ 33,484.08					$ 33,484.08					
AUBURN HILLS	CREST - BANK	WALL FINISH - APPLIED, STANDARD	$ 16,129.58							$ 16,129.58			
AUBURN HILLS	CREST - BANK	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 236.70									$ 236.70	
AUBURN HILLS	**CREST - BANK**	**CREST - BANK TOTALS**	**$ 52,649.34**	**$ -**	**$ 1,599.30**	**$ -**	**$ -**	**$ 34,683.76**	**$ -**	**$ 16,129.58**	**$ -**	**$ 236.70**	**$ -**
AUBURN HILLS	CREST - STORE	WALL FINISH - APPLIED, STANDARD	$ 7,980.25		$ 7,980.25								
AUBURN HILLS	CREST - STORE	WATER HEATER - RESIDENTIAL, ELECTRIC (<=15 GAL)	$ 691.68		$ 691.68								
AUBURN HILLS	CREST - STORE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 5,139.88		$ 5,139.88								
AUBURN HILLS	CREST - STORE	LIGHTING SYSTEM, INTERIOR - RETAIL	$ 29,080.85					$ 29,080.85					
AUBURN HILLS	**CREST - STORE**		**$ 42,892.66**	**$ -**	**$ 13,811.81**	**$ -**	**$ -**	**$ 29,080.85**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
AUBURN HILLS	CREST - CAPE COD	WALL FINISH - APPLIED, STANDARD	$ 14,438.85		$ 14,438.85								
AUBURN HILLS	CREST - CAPE COD	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	$ 1,164.28		$ 1,164.28								
AUBURN HILLS	CREST - CAPE COD	WATER HEATER - RESIDENTIAL, GAS (45-55 GAL)	$ 2,690.98				$ 2,690.98						
AUBURN HILLS	CREST - CAPE COD	LIGHTING SYSTEM, INTERIOR - RESIDENCE	$ 16,567.75				$ 16,567.75						
AUBURN HILLS	CREST - CAPE COD	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 5,714.67								$ 5,714.67		
AUBURN HILLS	**CREST - CAPE COD**	**CREST - CAPE COD TOTALS**	**$ 40,576.53**	**$ -**	**$ 15,603.13**	**$ -**	**$ 19,258.73**	**$ -**	**$ -**	**$ -**	**$ 5,714.67**	**$ -**	**$ -**
AUBURN HILLS	BUILDING T	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 355,293.26		$ 355,293.26								
AUBURN HILLS	BUILDING T	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 18,124.53		$ 18,124.53								
AUBURN HILLS	BUILDING T	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 40,023.04		$ 40,023.04								
AUBURN HILLS	BUILDING T	DOOR OPERATOR, OVERHEAD DOOR, COMMERCIAL, PADS	$ 5,004.38		$ 5,004.38								
AUBURN HILLS	BUILDING T	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
AUBURN HILLS	BUILDING T	WATER HEATER - RESIDENTIAL, ELECTRIC (25-46 GAL)	$ 1,637.35		$ 1,637.35								
AUBURN HILLS	BUILDING T	AIR COMPRESSOR - MEDICAL/LABORATORY PCKG (>40 HP), WITH DRYER	$ 79,630.36		$ 79,630.36								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AUBURN HILLS	BUILDING T	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56		$ 3,255.56								
AUBURN HILLS	BUILDING T	UNIT HEATER - INDOOR, GAS, SUSPENDED (<=40 MBH)	$ 12,059.40		$ 12,059.40								
AUBURN HILLS	BUILDING T	HEAT EXCHANGER - SHELL & TUBE WATER TO WATER (85-255 GPM)	$ 37,591.53		$ 37,591.53								
AUBURN HILLS	BUILDING T	HEAT EXCHANGER - SHELL & TUBE WATER TO WATER (>255 GPM)	$ 57,795.78		$ 57,795.78								
AUBURN HILLS	BUILDING T	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 10,730.29		$ 10,730.29								
AUBURN HILLS	BUILDING T	HVAC CONTROLS SYSTEM - CLASSROOM	$ 261,684.46		$ 261,684.46								
AUBURN HILLS	BUILDING T	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73		$ 48,958.73								
AUBURN HILLS	BUILDING T	FIRE ALARM SYSTEM - DEVICES	$ 204,125.80		$ 204,125.80								
AUBURN HILLS	BUILDING T	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	$ 546,456.78		$ 546,456.78								
AUBURN HILLS	BUILDING T	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	$ 6,661.47		$ 6,661.47								
AUBURN HILLS	BUILDING T	LIGHTING - EXTERIOR	$ 11,050.93		$ 11,050.93								
AUBURN HILLS	BUILDING T	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 534,975.13		$ 534,975.13								
AUBURN HILLS	BUILDING T	VARIABLE FREQUENCY DRIVE (20-25 HP)	$ 11,250.27		$ 11,250.27								
AUBURN HILLS	BUILDING T	DOOR LOCK, COMMERCIAL-GRADE	$ 7,207.81		$ 7,207.81								
AUBURN HILLS	BUILDING T	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 43,707.45		$ 43,707.45								
AUBURN HILLS	BUILDING T	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68			$ 1,199.68							
AUBURN HILLS	BUILDING T	FAN - CENTRIFUGAL ROOF EXHAUST	$ 29,391.57			$ 29,391.57							
AUBURN HILLS	BUILDING T	PUMP - ELECTRIC	$ 73,000.83			$ 73,000.83							
AUBURN HILLS	BUILDING T	PLUMBING FIXTURE - SINK, KITCHEN	$ 1,854.65					$ 1,854.65					
AUBURN HILLS	BUILDING T	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 7,192.57						$ 7,192.57				
AUBURN HILLS	BUILDING T	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 347,390.43						$ 347,390.43				
AUBURN HILLS	BUILDING T	FAN - UTILITY SET	$ 19,578.99						$ 19,578.99				
AUBURN HILLS	BUILDING T	MAIN SWITCHBOARD W/BREAKERS (400-600 AMP)	$ 56,566.35						$ 56,566.35				
AUBURN HILLS	BUILDING T	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 3,651.98							$ 3,651.98			
AUBURN HILLS	BUILDING T	DUCTLESS DX SPLIT SYSTEM (<=1 TON)	$ 3,546.29								$ 3,546.29		
AUBURN HILLS	BUILDING T	AIR HANDLING UNIT - INDOOR	$ 377,880.50								$ 377,880.50		
AUBURN HILLS	BUILDING T	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 1,694,738.81								$ 1,694,738.81		
AUBURN HILLS	BUILDING T	WALL FINISH - APPLIED, STANDARD	$ 47,205.22									$ 47,205.22	
AUBURN HILLS	BUILDING T	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 13,206.96		$ 13,206.96								
AUBURN HILLS	BUILDING T	RESTROOM ACCESSIBILITY UPGRADES	$ 10,854.71				$ 10,854.71						
AUBURN HILLS	BUILDING T	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 104,297.37										$ 104,297.37
AUBURN HILLS	**BUILDING T**	**BUILDING T TOTALS**	**$ 5,399,421.63**	**$ -**	**$ 2,621,071.67**	**$ 103,592.08**	**$ 10,854.71**	**$ 1,854.65**	**$ 430,728.34**	**$ 3,651.98**	**$ 2,076,165.60**	**$ 47,205.22**	**$ 104,297.37**
AUBURN HILLS	POWERHOUSE	INSTALL HANDRAILS AT RAMP	$ 7,143.03				$ 7,143.03						
AUBURN HILLS	POWERHOUSE	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 3,284.42					$ 3,284.42					
AUBURN HILLS	POWERHOUSE	TEAR DOWN AND REBUILD CHILLED WATER PUMPS	$ 29,405.46		$ 29,405.46								
AUBURN HILLS	POWERHOUSE	TEAR DOWN AND REBUILD CONDENSER WATER PUMPS	$ 29,405.46		$ 29,405.46								
AUBURN HILLS	**POWERHOUSE**	**POWERHOUSE TOTALS**	**$ 69,238.37**	**$ -**	**$ 58,810.92**	**$ -**	**$ 7,143.03**	**$ 3,284.42**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
AUBURN HILLS	SITE	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	$ 116,282.03			$ 116,282.03							
AUBURN HILLS	SITE	REPAIR/REPLACE DAMAGED PIPE SUPPORT STANCHIONS	$ 25,531.43		$ 25,531.43								
AUBURN HILLS	SITE	REMOVE AND REPLACE PIPE, VALVES AND EXPANSION JOINTS	$ 3,209,636.80	$ 3,209,636.80									
AUBURN HILLS	SITE	REMOVE AND REPLACE DIRECT BURIED HW PIPE TO BUILDING H	$ 2,319,240.80		$ 2,319,240.80								
AUBURN HILLS	SITE	PERFORM ULTRASONIC PIPE THICKNESS TESTING ON HW AND CW PIPE	$ 28,033.34	$ 28,033.34									
AUBURN HILLS	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	$ 36,417.56	$ 36,417.56									
AUBURN HILLS	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	$ 36,417.56					$ 36,417.56					
AUBURN HILLS	SITE	REPAIR OR REPLACE SPLICE BOX #1	$ 4,841.16	$ 4,841.16									
AUBURN HILLS	SITE	PROVIDE SECONDARY WATER FEED FROM FEATHERSTONE RD	$ 253,329.11	$ 253,329.11									
AUBURN HILLS	SITE	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	$ 25,354.29		$ 25,354.29								
AUBURN HILLS	SITE	CCTV CRITICAL STORM WATER SEWER LINES FOR DEFICIENCIES	$ 42,920.43		$ 42,920.43								
AUBURN HILLS	SITE	REPLACE SELECT AGED/DEFICIENT STORM WATER STRUCTURES	$ 409,063.22				$ 409,063.22						
AUBURN HILLS	SITE	SANITARY SEWER PIPE - 6" DIAMETER	$ 120,338.72					$ 120,338.72					
AUBURN HILLS	SITE	SANITARY SEWER PIPE - 8" DIAMETER	$ 153,380.82					$ 153,380.82					
AUBURN HILLS	SITE	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	$ 37,191.03	$ 37,191.03									
AUBURN HILLS	SITE	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	$ 1,703.26	$ 1,703.26									
AUBURN HILLS	SITE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 31,662.60	$ 31,662.60									
AUBURN HILLS	SITE	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	$ 1,703.26			$ 1,703.26							
AUBURN HILLS	**SITE**	**SITE TOTALS**	**$ 6,853,047.42**	**$ 3,602,814.84**	**$ 2,413,046.96**	**$ 117,985.29**	**$ 409,063.22**	**$ 310,137.10**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
AUBURN HILLS	POWER HOUSE	WALL, EXTERIOR, TILT-UP OR PRECAST CONCRETE PANELS - RESTORE NATURAL FINISH	$ 7,972.43	$ 7,972.43									
AUBURN HILLS	POWER HOUSE	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 13,448.45	$ 13,448.45									
AUBURN HILLS	POWER HOUSE	WALL FINISH - APPLIED, STANDARD	$ 84,029.35	$ 84,029.35									
AUBURN HILLS	POWER HOUSE	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 2,276.65	$ 2,276.65									
AUBURN HILLS	POWER HOUSE	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 3,651.98	$ 3,651.98									
AUBURN HILLS	POWER HOUSE	PLUMBING FIXTURES	$ 4,939.91	$ 4,939.91									
AUBURN HILLS	POWER HOUSE	UNIT HEATER - STEAM/HYDRONIC	$ 15,540.73	$ 15,540.73									
AUBURN HILLS	POWER HOUSE	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56	$ 3,255.56									
AUBURN HILLS	POWER HOUSE	HVAC DISTRIBUTION NETWORKS - SHOPS / TRADES, DRY LABORATORY	$ 37,285.37	$ 37,285.37									
AUBURN HILLS	POWER HOUSE	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 7,260.94	$ 7,260.94									
AUBURN HILLS	POWER HOUSE	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	$ 49,925.05	$ 49,925.05									
AUBURN HILLS	POWER HOUSE	BACKFLOW PREVENTER (1-2 INCHES)	$ 2,664.01		$ 2,664.01								
AUBURN HILLS	POWER HOUSE	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 24,723.47			$ 24,723.47							
AUBURN HILLS	POWER HOUSE	ELECTRICAL DISTRIBUTION NETWORK - SHOPS / TRADES, DRY LABORATORY	$ 248,815.19			$ 248,815.19							
AUBURN HILLS	POWER HOUSE	VARIABLE FREQUENCY DRIVES	$ 116,786.08				$ 116,786.08						
AUBURN HILLS	POWER HOUSE	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	$ 387,761.32					$ 387,761.32					
AUBURN HILLS	POWER HOUSE	BOILERS- GAS/OIL	$ 2,562,550.76					$ 2,562,550.76					
AUBURN HILLS	POWER HOUSE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 5,139.88					$ 5,139.88					
AUBURN HILLS	POWER HOUSE	THERMAL STORAGE EXPANSION TANK	$ 44,305.12						$ 44,305.12				

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AUBURN HILLS	POWER HOUSE	HVAC CONTROLS SYSTEM - WAREHOUSE	$ 28,504.89							$ 28,504.89			
AUBURN HILLS	POWER HOUSE	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 211,915.49								$ 211,915.49		
AUBURN HILLS	POWER HOUSE	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	$ 10,126.72								$ 10,126.72		
AUBURN HILLS	POWER HOUSE	HVAC DISTRIBUTION NETWORKS - SHOPS / TRADES, DRY LABORATORY	$ 980,436.79								$ 980,436.79		
AUBURN HILLS	**POWER HOUSE**	**POWER HOUSE TOTALS**	**$ 4,853,316.15**	**$ 229,586.42**	**$ 2,664.01**	**$ 273,538.66**	**$ 116,786.08**	**$ 2,955,451.96**	**$ 44,305.12**	**$ 28,504.89**	**$ 1,202,479.00**	**$ -**	**$ -**
		AUBURN HILLS CAMPUS WIDE - GRAND TOTAL	**$ 69,185,045.65**	**$ 3,943,275.79**	**$ 22,935,885.87**	**$ 12,274,014.97**	**$ 2,582,949.14**	**$ 8,456,401.56**	**$ 3,448,422.07**	**$ 375,897.24**	**$ 10,166,445.93**	**$ 3,691,229.39**	**$ 1,310,523.68**

CAMPUS	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
DISTRICT OFFICE	BEE CENTER	DOOR, EXTERIOR, SLIDING ENTRANCE SYSTEM, POWERED	$ 43,937.11										$ 43,937.11
DISTRICT OFFICE	BEE CENTER	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 7,867.21								$ 7,867.21		
DISTRICT OFFICE	BEE CENTER	VARIABLE FREQUENCY DRIVE (<=5 HP)	$ 1,741.84		$ 1,741.84								
DISTRICT OFFICE	BEE CENTER	VARIABLE FREQUENCY DRIVE (<=5 HP)	$ 2,612.76		$ 2,612.76								
DISTRICT OFFICE	BEE CENTER	VARIABLE FREQUENCY DRIVE (<=5 HP)	$ 2,612.76		$ 2,612.76								
DISTRICT OFFICE	BEE CENTER	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	$ 6,661.47		$ 6,661.47								
DISTRICT OFFICE	BEE CENTER	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	$ 6,661.47		$ 6,661.47								
DISTRICT OFFICE	BEE CENTER	PACKAGE HVAC UNIT, DX, GAS OR ELECTRIC HEAT, SINGLE-ZONE (<= 5 TO	$ 25,333.23			$ 25,333.23							
DISTRICT OFFICE	BEE CENTER	PACKAGE HVAC UNIT, DX, GAS OR ELECTRIC HEAT, SINGLE-ZONE (<= 5 TO	$ 25,333.23			$ 25,333.23							
DISTRICT OFFICE	BEE CENTER	HVAC CONTROLS SYSTEM - OFFICE	$ 151,515.43				$ 151,515.43						
DISTRICT OFFICE	BEE CENTER	UNINTERRUPTIBLE POWER SUPPLY - 277/480 VOLTS	$ 118,617.64				$ 118,617.64						
DISTRICT OFFICE	BEE CENTER	LIGHTING SYSTEM, INTERIOR - OFFICE	$ 442,451.74					$ 442,451.74					
DISTRICT OFFICE	BEE CENTER	WALL FINISH - APPLIED, STANDARD	$ 180,502.47						$ 180,502.47				
DISTRICT OFFICE	BEE CENTER	WATER HEATER - RESIDENTIAL, GAS (35-45 GAL)	$ 2,575.30						$ 2,575.30				
DISTRICT OFFICE	BEE CENTER	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73							$ 48,958.73			
DISTRICT OFFICE	BEE CENTER	FIRE ALARM SYSTEM - DEVICES	$ 144,736.43							$ 144,736.43			
DISTRICT OFFICE	BEE CENTER	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 16,704.61								$ 16,704.61		
DISTRICT OFFICE	BEE CENTER	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	$ 582.14								$ 582.14		
DISTRICT OFFICE	BEE CENTER	BOILER - GAS (250-2,000 MBH)	$ 88,803.76									$ 88,803.76	
DISTRICT OFFICE	BEE CENTER	BOILER - GAS (250-2,000 MBH)	$ 88,803.76									$ 88,803.76	
DISTRICT OFFICE	BEE CENTER	DRINKING FOUNTAIN UPGRADE	$ 10,377.57										$ 10,377.57
DISTRICT OFFICE	**BEE CENTER**	**BEE CENTER TOTALS**	**$ 1,417,390.64**	**$ -**	**$ 20,290.29**	**$ 50,666.45**	**$ 270,133.08**	**$ 442,451.74**	**$ 183,077.78**	**$ 193,695.16**	**$ 25,153.96**	**$ 177,607.52**	**$ 54,314.68**
DISTRICT OFFICE	FOUNDATION HOUSE	CEILING FINISH - ATTACHED ACOUSTICAL TILE	$ 10,246.78								$ 10,246.78		
DISTRICT OFFICE	FOUNDATION HOUSE	DOOR LOCK, COMMERCIAL-GRADE	$ 19,821.47				$ 19,821.47						
DISTRICT OFFICE	FOUNDATION HOUSE	DRAIN PIPING SYSTEM - OFFICE	$ 43,103.17					$ 43,103.17					
DISTRICT OFFICE	FOUNDATION HOUSE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 2,569.94						$ 2,569.94				
DISTRICT OFFICE	FOUNDATION HOUSE	LIGHTING SYSTEM, INTERIOR - OFFICE	$ 90,946.48						$ 90,946.48				
DISTRICT OFFICE	FOUNDATION HOUSE	MAIN SWITCHBOARD W/BREAKERS (<400 AMP)	$ 19,964.17									$ 19,964.17	
DISTRICT OFFICE	FOUNDATION HOUSE	PLUMBING FIXTURE - LAVATORY, COUNTER	$ 2,068.24			$ 2,068.24							
DISTRICT OFFICE	FOUNDATION HOUSE	PLUMBING FIXTURE - SINK, KITCHEN	$ 927.32			$ 927.32							
DISTRICT OFFICE	FOUNDATION HOUSE	WALL FINISH - APPLIED, STANDARD	$ 33,307.41				$ 33,307.41						
DISTRICT OFFICE	FOUNDATION HOUSE	WALL FINISH - WOOD PANEL, STANDARD	$ 65,086.57										$ 65,086.57
DISTRICT OFFICE	FOUNDATION HOUSE	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 13,074.79										$ 13,074.79
DISTRICT OFFICE	FOUNDATION HOUSE	BOILER - GAS (<=250 MBH)	$ 10,879.79							$ 10,879.79			
DISTRICT OFFICE	FOUNDATION HOUSE	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 14,731.28							$ 14,731.28			
DISTRICT OFFICE	FOUNDATION HOUSE	DOOR AND FRAME, INTERIOR, FIRE-RATED	$ 52,575.24							$ 52,575.24			
DISTRICT OFFICE	FOUNDATION HOUSE	DOOR AND FRAME, INTERIOR, NON-RATED	$ 26,481.70							$ 26,481.70			
DISTRICT OFFICE	FOUNDATION HOUSE	ELECTRICAL DISTRIBUTION NETWORK - OFFICE	$ 153,958.12							$ 153,958.12			
DISTRICT OFFICE	FOUNDATION HOUSE	PLUMBING FIXTURE - WATER CLOSET, TANK-TYPE	$ 1,560.37			$ 1,560.37							
DISTRICT OFFICE	FOUNDATION HOUSE	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	$ 25,272.52							$ 25,272.52			
DISTRICT OFFICE	FOUNDATION HOUSE	WATER HEATER - RESIDENTIAL, ELECTRIC (25-46 GAL)	$ 1,637.35			$ 1,637.35							
DISTRICT OFFICE	FOUNDATION HOUSE	RESTROOM ACCESSIBILITY UPGRADES	$ 28,730.49		$ 28,730.49								
DISTRICT OFFICE	FOUNDATION HOUSE	IMPROVE EGRESS PATHWAY DESIGNATION	$ 9,420.29			$ 9,420.29							
DISTRICT OFFICE	FOUNDATION HOUSE	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 12,268.49								$ 12,268.49		
DISTRICT OFFICE	**FOUNDATION HOUSE**	**FOUNDATION HOUSE TOTALS**	**$ 638,631.97**	**$ -**	**$ 28,730.49**	**$ 15,613.57**	**$ 53,128.88**	**$ 43,103.17**	**$ 93,516.42**	**$ 283,898.65**	**$ 22,515.28**	**$ 19,964.17**	**$ 78,161.36**
		DISTRICT OFFICE CAMPUS WIDE - GRAND TOTAL	**$ 2,056,022.61**	**$ -**	**$ 49,020.78**	**$ 66,280.02**	**$ 323,261.95**	**$ 485,554.90**	**$ 276,594.20**	**$ 477,593.80**	**$ 47,669.24**	**$ 197,571.69**	**$ 132,476.03**

Major Renovation / Maintenance Program **Oakland Community College**

Asset Name	Item	Identifier	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
COLLEGE WIDE	**ROOF UPGRADES**		**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-2		X								
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-1		X								
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-3		X								
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A		X								
Auburn Hills	ROOF - SHINGLE ASPHALT COMPOSITE, PREMIUM, MAIN GARAGE	GARAGE - MAIN		X								
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	B-2				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	B-1				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	B				X						
Auburn Hills	ROOF - PANEL, ALUMINUM OR GALVANIZED, STANDING SEAM	B-3				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	C		X								
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	E-1		X								
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	E					X					
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	F-6	X									
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	F-2	X									
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	F-3	X									
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	F-5	X									
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	F-1	X									
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	F-4	X									
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	F	X									
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	H-2				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	J-4				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	J-1					X					
Auburn Hills	ROOF - 1-PLY, UNBALLASTED	M-TEC			X							
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	M-TEC			X							
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	M-TEC			X							
Auburn Hills	ROOF - 1-PLY, UNBALLASTED	TRAINING CTR				X						
Auburn Hills	ROOF - 1-PLY, UNBALLASTED	CONTROL TOWER				X						
Auburn Hills	ROOF - 1-PLY, UNBALLASTED	CONTROL TOWER				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	MOTEL				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	BANK		X								
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STORE			X							
Auburn Hills	ROOF - SHINGLE ASPHALT COMPOSITE, PREMIUM	ALL HOUSES & GARAGE				X						
Auburn Hills	ROOF - PANEL, ALUMINUM OR GALVANIZED, STANDING SEAM	T-1				X						
Auburn Hills	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	T					X					
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	HIGH OAKS HALL		X								
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	LEVINSON HALL					X					
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	LEVINSON HALL								X		
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	LEVINSON HALL								X		
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	LEVINSON HALL								X		
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	LEVINSON HALL								X		
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	PE								X		
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	PE								X		
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	PE								X		
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	REDWOOD CENTER							X			
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	REDWOOD CENTER							X			
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	REDWOOD CENTER							X			
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STUDENT CENTER						X				
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STUDENT CENTER						X				
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STUDENT CENTER						X				
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STUDENT CENTER						X				
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STUDENT CENTER						X				
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STUDENT CENTER						X				
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	WOODLAND HALL									X	
Highland Lakes	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	WOODLAND HALL NORTH									X	
Highland Lakes	ROOF - SHINGLE ASPHALT COMPOSITE, PREMIUM	HIGH OAKS HALL					X					
Highland Lakes	ROOF - BITUMINOUS, 2-PLY, APPLIED MODIFIED BITUMEN, TORCH	CENTRAL PLANT					X					
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	POWERHOUSE			X							
Orchard Ridge	ROOF - 1-PLY, UNBALLASTED	A		X								
Orchard Ridge	ROOF - 1-PLY, UNBALLASTED	B		X								
Orchard Ridge	ROOF - 1-PLY, UNBALLASTED	B		X								
Orchard Ridge	ROOF - 1-PLY, UNBALLASTED	J						X				
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	GROUNDS						X				
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	H-E		X								
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	H-B		X								
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	H-A		X								

Major Renovation / Maintenance Program | Oakland Community College

Asset Name	Item	Identifier	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	H-C		X								
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	H-D		X								
Orchard Ridge	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	H-F		X								
Orchard Ridge	REPAIR CLAY TILE ROOF	SMITH THEATER			X							
Royal Oak	ROOF - 1-PLY, UNBALLASTED	A-5								X		
Royal Oak	ROOF - 1-PLY, UNBALLASTED	B-2								X		
Royal Oak	ROOF - BITUMINOUS, 2-PLY, APPLIED MODIFIED BITUMEN, TORCH	G				X						
Royal Oak	ROOF - BITUMINOUS, 2-PLY, APPLIED MODIFIED BITUMEN, TORCH	G				X						
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	NA-2					X					
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	NA-1					X					
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	E-1						X				
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	D-4	X									
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	D-2	X									
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-3					X					
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	C-1							X			
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	B-3								X		
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	B-1								X		
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	D-1	X									
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-4					X					
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-1					X					
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-6					X					
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	A-2					X					
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	D-3	X									
Royal Oak	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	STAIRTOWER									X	
Royal Oak	ROOF - BITUMINOUS, 4-PLY, COAL TAR PITCH - R30	BOILER 2 - AGGREGATE BALLASTED									X	
Royal Oak	ROOF - BITUMINOUS, 4-PLY, COAL TAR PITCH - R30	BOILER 1- AGGREGATE BALLASTED									X	
Royal Oak	ROOF GUTTER AND LEADER - ALUMINUM OR GALVANIZED, COATED										X	
District Office	ROOF - BITUMINOUS, 2-PLY, APPLIED MODIFIED BITUMEN, TORCH	DORMERS			X							
District Office	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	MAIN ENT.			X							
Southfield	ROOF - 1-PLY, UNBALLASTED	ROOFS A - M & CLERESTORY										X
College Wide	**PAVING, CATCH BASING & SIDEWALK RESTORATION**		**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**	**$ 1,000,000.00**
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	G		X								
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	G-1		X								
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	H				X						
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	H-1		X								
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	M-1	X									
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	M2	X									
Auburn Hills	CONCRETE VEHICULAR PAVING - JOINT MAINTENANCE	BURN BLDG							X			
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	BURN BLDG							X			
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	MOTEL		X								
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	MOTEL		X								
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	BANK		X								
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	B		X								
Auburn Hills	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	STORE		X								
Auburn Hills	CONCRETE PEDESTRIAN PAVING - JOINT MAINTENANCE	STORE		X								
Auburn Hills	SITE VEHICULAR PAVING RENEWAL	M-2			X							
Highland Lakes	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	GROUNDS		X								
Highland Lakes	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	SERVICE YARD		X								
Orchard Ridge	SITE PEDESTRIAN PAVING RENEWAL	J					X					
Orchard Ridge	SITE VEHICULAR PAVING RENEWAL	GROUNDS			X							
Royal Oak	URGENT PARKING STRUCTURE REPAIRS AND MAINTENANCE		X									
Royal Oak	URGENT PARKING STRUCTURE REPAIRS AND MAINTENANCE							X				
Royal Oak	SHORT-TERM PARKING STRUCTURE REPAIRS AND MAINTENANCE								X			
Royal Oak	SHORT-TERM PARKING STRUCTURE REPAIRS AND MAINTENANCE									X		
Royal Oak	LONG-TERM PARKING STRUCTURE REPAIRS AND MAINTENANCE										X	
Royal Oak	LONG-TERM PARKING STRUCTURE REPAIRS AND MAINTENANCE											X
District Office	VEHICULAR PAVING RENEWAL					X						
College Wide	**EMERGING NEEDS/CONTINGENCY/EMERGENCY REPAIR**		$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00
College Wide	**ACADEMIC ENHANCEMENTS**		$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00	$ 1,000,000.00
College Wide	**CARPET REPLACEMENT**		$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000
College Wide	**CONSTRUCTION MANAGEMENT CORE STAFF**		$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000	$ 400,000
		COLLEGE WIDE - GRAND TOTAL	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**	**$ 4,550,000.00**

Major Renovation / Maintenance Program | Oakland Community College

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
HIGHLAND LAKES	GROUNDS BUILDING	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
HIGHLAND LAKES	GROUNDS BUILDING	FIRE ALARM SYSTEM - DEVICES	$ 10,315.26						$ 10,315.26				
HIGHLAND LAKES	GROUNDS BUILDING	UNIT HEATER - INDOOR, GAS, SUSPENDED (<=40 MBH)	$ 3,014.85						$ 3,014.85				
HIGHLAND LAKES	GROUNDS BUILDING	WALL FINISH - APPLIED, STANDARD	$ 15,047.51						$ 15,047.51				
HIGHLAND LAKES	GROUNDS BUILDING	WATER HEATER - RESIDENTIAL, ELECTRIC (46-100 GAL)	$ 1,983.43	$ 1,983.43									
HIGHLAND LAKES	GROUNDS BUILDING	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68			$ 1,199.68							
HIGHLAND LAKES	GROUNDS BUILDING	FAN - CENTRIFUGAL ROOF EXHAUST	$ 26,705.24						$ 26,705.24				
HIGHLAND LAKES	GROUNDS BUILDING	HVAC CONTROLS SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 12,823.20						$ 12,823.20				
HIGHLAND LAKES	GROUNDS BUILDING	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 6,424.85						$ 6,424.85				
HIGHLAND LAKES	GROUNDS BUILDING	SEWAGE LIFT STATION	$ 10,241.29						$ 10,241.29				
HIGHLAND LAKES	GROUNDS BUILDING	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 92,122.47						$ 92,122.47				
HIGHLAND LAKES	GROUNDS BUILDING	BOILER - GAS (250-2,000 MBH)	$ 32,265.37									$ 32,265.37	
HIGHLAND LAKES	GROUNDS BUILDING	INTERIOR SIGNAGE ACCESSIBILITY UPGRADES	$ 993.36						$ 993.36				
HIGHLAND LAKES	GROUNDS BUILDING	FIRE SPRINKLER SYSTEM INSTALLATION	$ 61,418.91								$ 61,418.91		
HIGHLAND LAKES	**GROUNDS BUILDING**	**GROUNDS BUILDING TOTALS**	**$ 323,514.14**	**$ 1,983.43**	**$ -**	**$ 1,199.68**	**$ -**	**$ -**	**$ 226,646.75**	**$ -**	**$ 61,418.91**	**$ 32,265.37**	**$ -**
HIGHLAND LAKES	GROUNDS STORAGE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 3,854.91	$ 3,854.91									
HIGHLAND LAKES	GROUNDS STORAGE	WALL FINISH - APPLIED, STANDARD	$ 16,061.95						$ 16,061.95				
HIGHLAND LAKES	GROUNDS STORAGE	LIGHTING SYSTEM, INTERIOR	$ 27,029.03	$ 27,029.03									
HIGHLAND LAKES	GROUNDS STORAGE	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 80,702.33						$ 80,702.33				
HIGHLAND LAKES	**GROUNDS STORAGE**	**GROUNDS STORAGE TOTALS**	**$ 127,648.21**	**$ 30,883.94**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 96,764.27**	**$ -**	**$ -**	**$ -**	**$ -**
HIGHLAND LAKES	SALT DOME	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 1,284.97			$ 1,284.97							
HIGHLAND LAKES	SALT DOME	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 6,086.10								$ 6,086.10		
HIGHLAND LAKES	**SALT DOME**	**SALT DOME TOTALS**	**$ 7,371.07**	**$ -**	**$ -**	**$ 1,284.97**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 6,086.10**	**$ -**	**$ -**
HIGHLAND LAKES	HIGH OAKS HALL	ELEVATOR MODERNIZATION - TRACTION - LOW RISE 2-8 FLOORS	$ 444,222.41						$ 444,222.41				
HIGHLAND LAKES	HIGH OAKS HALL	FAN - CENTRIFUGAL ROOF EXHAUST	$ 16,578.52						$ 16,578.52				
HIGHLAND LAKES	HIGH OAKS HALL	PLUMBING FIXTURES	$ 5,632.19	$ 5,632.19									
HIGHLAND LAKES	HIGH OAKS HALL	VARIABLE FREQUENCY DRIVES	$ 10,658.35						$ 10,658.35				
HIGHLAND LAKES	HIGH OAKS HALL	WALL FINISH - APPLIED, STANDARD	$ 286,105.55					$ 286,105.55					
HIGHLAND LAKES	HIGH OAKS HALL	VARIABLE FREQUENCY DRIVE	$ 8,709.20						$ 8,709.20				
HIGHLAND LAKES	HIGH OAKS HALL	LIGHTING - EXTERIOR	$ 3,477.56								$ 3,477.56		
HIGHLAND LAKES	HIGH OAKS HALL	VARIABLE FREQUENCY DRIVES	$ 14,499.74								$ 14,499.74		
HIGHLAND LAKES	HIGH OAKS HALL	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 11,987.62									$ 11,987.62	
HIGHLAND LAKES	HIGH OAKS HALL	BUILDING ENTRY ACCESSIBILITY UPGRADES	$ 24,480.54	$ 24,480.54									
HIGHLAND LAKES	HIGH OAKS HALL	DOOR HARDWARE UPGRADES	$ 18,858.34	$ 18,858.34									
HIGHLAND LAKES	HIGH OAKS HALL	RESTROOM ACCESSIBILITY UPGRADES	$ 6,333.70						$ 6,333.70				
HIGHLAND LAKES	HIGH OAKS HALL	STAIR SAFETY UPGRADES	$ 9,164.63	$ 9,164.63									
HIGHLAND LAKES	HIGH OAKS HALL	FIRE SPRINKLER SYSTEM INSTALLATION	$ 778,310.32							$ 778,310.32			
HIGHLAND LAKES	HIGH OAKS HALL	REBUILD PLANTER RETAINING WALL	$ 7,031.54										$ 7,031.54
HIGHLAND LAKES	**HIGH OAKS HALL**	**HIGH OAKS HALL TOTAL**	**$ 1,647,541.04**	**$ 58,135.70**	**$ -**	**$ -**	**$ -**	**$ 286,105.55**	**$ 486,502.17**	**$ 778,310.32**	**$ 17,977.30**	**$ 11,987.62**	**$ 7,031.54**
HIGHLAND LAKES	LEVINSON HALL	LIGHTING - EXTERIOR	$ 4,898.51		$ 4,898.51								
HIGHLAND LAKES	LEVINSON HALL	PLUMBING FIXTURES	$ 48,878.34		$ 48,878.34								
HIGHLAND LAKES	LEVINSON HALL	UNIT HEATER - INDOOR, GAS, SUSPENDED (40-100 MBH)	$ 2,738.68						$ 2,738.68				
HIGHLAND LAKES	LEVINSON HALL	CASEWORK - LABORATORY, INCLUDES REAGENT SHELF AND TOP	$ 1,057,966.87		$ 1,057,966.87								
HIGHLAND LAKES	LEVINSON HALL	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	$ 39,366.81		$ 39,366.81								
HIGHLAND LAKES	LEVINSON HALL	WALL FINISH - APPLIED, STANDARD	$ 328,103.32			$ 328,103.32							
HIGHLAND LAKES	LEVINSON HALL	LIGHTING - EXTERIOR	$ 11,051.06				$ 11,051.06						
HIGHLAND LAKES	LEVINSON HALL	VARIABLE FREQUENCY DRIVE	$ 36,687.35				$ 36,687.35						
HIGHLAND LAKES	LEVINSON HALL	VARIABLE FREQUENCY DRIVE (15-20 HP)	$ 9,483.48					$ 9,483.48					
HIGHLAND LAKES	LEVINSON HALL	DOOR OPERATOR, POWER-ASSIST	$ 64,710.84						$ 64,710.84				
HIGHLAND LAKES	LEVINSON HALL	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	$ 6,043.59						$ 6,043.59				
HIGHLAND LAKES	LEVINSON HALL	VARIABLE FREQUENCY DRIVE	$ 30,741.32						$ 30,741.32				
HIGHLAND LAKES	LEVINSON HALL	UNIT HEATER - INDOOR, GAS, SUSPENDED (40-100 MBH)	$ 5,477.37						$ 5,477.37				
HIGHLAND LAKES	LEVINSON HALL	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
HIGHLAND LAKES	LEVINSON HALL	FIRE ALARM SYSTEM - DEVICES	$ 227,010.85						$ 227,010.85				
HIGHLAND LAKES	LEVINSON HALL	VARIABLE FREQUENCY DRIVE (15-20 HP)	$ 9,483.48							$ 9,483.48			
HIGHLAND LAKES	LEVINSON HALL	WALL FINISH - APPLIED, STANDARD	$ 269,806.90							$ 269,806.90			
HIGHLAND LAKES	LEVINSON HALL	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
HIGHLAND LAKES	LEVINSON HALL	FIRE ALARM SYSTEM - DEVICES	$ 204,501.23						$ 204,501.23				
HIGHLAND LAKES	LEVINSON HALL	HVAC CONTROLS SYSTEM - LABORATORY, WET	$ 656,962.87						$ 656,962.87				
HIGHLAND LAKES	LEVINSON HALL	UNINTERRUPTIBLE POWER SUPPLY - 120/208 VOLTS	$ 93,837.63							$ 93,837.63			
HIGHLAND LAKES	LEVINSON HALL	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 9,590.10									$ 9,590.10	
HIGHLAND LAKES	LEVINSON HALL	GREENHOUSE	$ 124,697.76									$ 124,697.76	
HIGHLAND LAKES	LEVINSON HALL	HVAC CONTROLS SYSTEM - LABORATORY, WET	$ 729,275.31									$ 729,275.31	
HIGHLAND LAKES	LEVINSON HALL	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34									$ 14,784.34	
HIGHLAND LAKES	LEVINSON HALL	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 10,318.23						$ 10,318.23				
HIGHLAND LAKES	LEVINSON HALL	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 26,413.89						$ 26,413.89				

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
HIGHLAND LAKES	LEVINSON HALL	RESTROOM ACCESSIBILITY UPGRADES	$ 47,044.26		$ 47,044.26								
HIGHLAND LAKES	LEVINSON HALL	BACKFLOW PREVENTER INSTALLATION	$ 9,794.60						$ 9,794.60				
HIGHLAND LAKES	LEVINSON HALL	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 213,260.76										$ 213,260.76
HIGHLAND LAKES	LEVINSON HALL	EXTERIOR MASONRY WALL RENEWAL	$ 73,453.12								$ 73,453.12		
HIGHLAND LAKES	LEVINSON HALL	STAIR AND RAILING SAFETY UPGRADES	$ 29,342.82					$ 29,342.82					
HIGHLAND LAKES	**LEVINSON HALL**	**LEVINSON HALL TOTALS**	**$ 4,494,835.82**	**$ -**	**$ 1,198,154.79**	**$ 328,103.32**	**$ 47,738.41**	**$ 38,826.30**	**$ 1,342,630.93**	**$ 373,128.01**	**$ 73,453.12**	**$ 878,347.51**	**$ 213,260.76**
HIGHLAND LAKES	METAL BUILDING	DOOR OPERATOR, OVERHEAD PANEL DOOR, RESIDENTIAL, PADS	$ 2,144.23										$ 2,144.23
HIGHLAND LAKES	METAL BUILDING	EXTERIOR WALL FINISH RENEWAL	$ 6,894.72										$ 6,894.72
HIGHLAND LAKES	METAL BUILDING	INTERIOR REPAIRS	$ 15,018.58										$ 15,018.58
HIGHLAND LAKES	**METAL BUILDING**	**METAL BUILDING TOTALS**	**$ 24,057.52**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 24,057.52**
HIGHLAND LAKES	PAVILION	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 9,590.10						$ 9,590.10				
HIGHLAND LAKES	PAVILION	DOOR AND FRAME, INTERIOR, NON-RATED	$ 2,648.17						$ 2,648.17				
HIGHLAND LAKES	PAVILION	DOOR LOCK, RESIDENTIAL-GRADE / INT & EXT	$ 1,490.84						$ 1,490.84				
HIGHLAND LAKES	PAVILION	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	$ 2,328.57						$ 2,328.57				
HIGHLAND LAKES	PAVILION	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 13,693.72						$ 13,693.72				
HIGHLAND LAKES	PAVILION	WALL FINISH - WOOD PANEL, STANDARD	$ 6,031.19							$ 6,031.19			
HIGHLAND LAKES	PAVILION	WALL, EXTERIOR, SIDING, WOOD BOARD, STANDARD	$ 17,770.62							$ 17,770.62			
HIGHLAND LAKES	PAVILION	PATH OF TRAVEL ACCESSIBILITY UPGRADES	$ 22,110.54					$ 22,110.54					
HIGHLAND LAKES	**PAVILION**	**PAVILION TOTALS**	**$ 75,663.75**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 22,110.54**	**$ 29,751.40**	**$ 23,801.81**	**$ -**	**$ -**	**$ -**
HIGHLAND LAKES	PHYSICAL EDUCATION	AIR HANDLING UNIT - INDOOR	$ 230,809.37		$ 230,809.37								
HIGHLAND LAKES	PHYSICAL EDUCATION	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 26,896.89		$ 26,896.89								
HIGHLAND LAKES	PHYSICAL EDUCATION	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 9,028.51		$ 9,028.51								
HIGHLAND LAKES	PHYSICAL EDUCATION	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 14,731.28		$ 14,731.28								
HIGHLAND LAKES	PHYSICAL EDUCATION	DOOR LOCK, RESIDENTIAL-GRADE	$ 596.34		$ 596.34								
HIGHLAND LAKES	PHYSICAL EDUCATION	DOOR OPERATOR, OVERHEAD DOOR, COMMERCIAL, PADS	$ 2,502.19		$ 2,502.19								
HIGHLAND LAKES	PHYSICAL EDUCATION	DOOR OPERATOR, POWER-ASSIST	$ 16,177.71		$ 16,177.71								
HIGHLAND LAKES	PHYSICAL EDUCATION	DOOR PANIC HARDWARE	$ 22,670.10		$ 22,670.10								
HIGHLAND LAKES	PHYSICAL EDUCATION	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 10,005.76		$ 10,005.76								
HIGHLAND LAKES	PHYSICAL EDUCATION	FIRE ALARM SYSTEM - DEVICES	$ 188,239.82		$ 188,239.82								
HIGHLAND LAKES	PHYSICAL EDUCATION	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 1,210.16		$ 1,210.16								
HIGHLAND LAKES	PHYSICAL EDUCATION	LIGHTING SYSTEM, INTERIOR	$ 398,449.84		$ 398,449.84								
HIGHLAND LAKES	PHYSICAL EDUCATION	PLUMBING FIXTURES	$ 61,738.72		$ 61,738.72								
HIGHLAND LAKES	PHYSICAL EDUCATION	UNIT HEATER - INDOOR, GAS, SUSPENDED (40-100 MBH)	$ 24,648.16		$ 24,648.16								
HIGHLAND LAKES	PHYSICAL EDUCATION	WALL FINISH - APPLIED, STANDARD	$ 114,225.81		$ 114,225.81								
HIGHLAND LAKES	PHYSICAL EDUCATION	MAIN SWITCHBOARD W/BREAKERS (<400 AMP)	$ 39,928.34		$ 39,928.34								
HIGHLAND LAKES	PHYSICAL EDUCATION	HVAC DISTRIBUTION NETWORKS - GYMNASIUM	$ 1,487,175.12		$ 1,487,175.12								
HIGHLAND LAKES	PHYSICAL EDUCATION	HVAC CONTROLS SYSTEM - GYMNASIUM	$ 227,039.92						$ 227,039.92				
HIGHLAND LAKES	PHYSICAL EDUCATION	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
HIGHLAND LAKES	PHYSICAL EDUCATION	DOOR AND FRAME, EXTERIOR ALL	$ 44,554.54		$ 44,554.54								
HIGHLAND LAKES	PHYSICAL EDUCATION	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 44,253.21		$ 44,253.21								
HIGHLAND LAKES	PHYSICAL EDUCATION	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 28,174.82		$ 28,174.82								
HIGHLAND LAKES	PHYSICAL EDUCATION	RESTROOM ACCESSIBILITY UPGRADES	$ 23,522.13		$ 23,522.13								
HIGHLAND LAKES	PHYSICAL EDUCATION	LOCKER ROOM ACCESSIBILITY UPGRADES	$ 55,080.63		$ 55,080.63								
HIGHLAND LAKES	PHYSICAL EDUCATION	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 101,110.67										$ 101,110.67
HIGHLAND LAKES	PHYSICAL EDUCATION	EXTERIOR MASONRY WALL RENEWAL	$ 112,072.40		$ 112,072.40								
HIGHLAND LAKES	PHYSICAL EDUCATION	FIRE SPRINKLER SYSTEM INSTALLATION	$ 596,210.89										$ 596,210.89
HIGHLAND LAKES	PHYSICAL EDUCATION	REPLACE DAMAGED RESTROOM PARTITIONS	$ 19,153.35		$ 19,153.35								
HIGHLAND LAKES	**PHYSICAL EDUCATION**	**PHYSICAL EDUCATION TOTALS**	**$ 3,949,165.38**	**$ -**	**$ 2,975,845.17**	**$ -**	**$ -**	**$ -**	**$ 275,998.65**	**$ -**	**$ -**	**$ -**	**$ 697,321.56**
HIGHLAND LAKES	PUMP HOUSE	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	$ 2,950.28					$ 2,950.28					
HIGHLAND LAKES	PUMP HOUSE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 1,352.47					$ 1,352.47					
HIGHLAND LAKES	PUMP HOUSE	WALL FINISH - APPLIED, STANDARD	$ 2,705.17										$ 2,705.17
HIGHLAND LAKES	PUMP HOUSE	HVAC CONTROLS SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 8,471.22										$ 8,471.22
HIGHLAND LAKES	PUMP HOUSE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 8,791.03					$ 8,791.03					
HIGHLAND LAKES	PUMP HOUSE	UNIT HEATER - ELECTRIC	$ 6,799.16					$ 6,799.16					
HIGHLAND LAKES	PUMP HOUSE	STAIR SAFETY UPGRADES	$ 6,890.35	$ 6,890.35									
HIGHLAND LAKES	**PUMP HOUSE**	**PUMP HOUSE TOTALS**	**$ 37,959.67**	**$ 6,890.35**	**$ -**	**$ -**	**$ -**	**$ 19,892.93**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 11,176.39**
HIGHLAND LAKES	REDWOOD CENTER	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 6,424.85	$ 6,424.85									
HIGHLAND LAKES	REDWOOD CENTER	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	$ 30,739.99						$ 30,739.99				
HIGHLAND LAKES	REDWOOD CENTER	FAN - CENTRIFUGAL ROOF EXHAUST	$ 16,578.52						$ 16,578.52				
HIGHLAND LAKES	REDWOOD CENTER	WALL FINISH - APPLIED, STANDARD	$ 29,384.91								$ 29,384.91		
HIGHLAND LAKES	REDWOOD CENTER	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 8,249.10									$ 8,249.10	
HIGHLAND LAKES	REDWOOD CENTER	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
HIGHLAND LAKES	REDWOOD CENTER	FIRE ALARM SYSTEM - DEVICES	$ 13,313.99						$ 13,313.99				
HIGHLAND LAKES	REDWOOD CENTER	HVAC CONTROLS SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 16,551.01									$ 16,551.01	
HIGHLAND LAKES	REDWOOD CENTER	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 11,330.04										$ 11,330.04
HIGHLAND LAKES	REDWOOD CENTER	RESTROOM ACCESSIBILITY UPGRADES	$ 11,761.07										$ 11,761.07
HIGHLAND LAKES	REDWOOD CENTER	EXTERIOR WALL FINISH RENEWAL	$ 16,213.97							$ 16,213.97			

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
HIGHLAND LAKES	REDWOOD CENTER	FIRE SPRINKLER SYSTEM INSTALLATION	$ 79,273.93										$ 79,273.93
HIGHLAND LAKES	**REDWOOD CENTER**	**REDWOOD CENTER TOTALS**	**$ 288,780.11**	**$ 6,424.85**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 109,591.24**	**$ 16,213.97**	**$ 29,384.91**	**$ 24,800.11**	**$ 102,365.03**
HIGHLAND LAKES	STUDENT CENTER	LIGHTING - EXTERIOR	$ 7,500.67		$ 7,500.67								
HIGHLAND LAKES	STUDENT CENTER	PLUMBING FIXTURES	$ 38,998.51		$ 38,998.51								
HIGHLAND LAKES	STUDENT CENTER	WALL FINISH - APPLIED, STANDARD	$ 169,749.42										$ 169,749.42
HIGHLAND LAKES	STUDENT CENTER	VARIABLE FREQUENCY DRIVE	$ 12,192.87						$ 12,192.87				
HIGHLAND LAKES	STUDENT CENTER	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78							$ 7,716.78			
HIGHLAND LAKES	STUDENT CENTER	FAN - CENTRIFUGAL ROOF EXHAUST	$ 20,253.43								$ 20,253.43		
HIGHLAND LAKES	STUDENT CENTER	UNIT HEATER - INDOOR, GAS	$ 4,246.11								$ 4,246.11		
HIGHLAND LAKES	STUDENT CENTER	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 3,984.71									$ 3,984.71	
HIGHLAND LAKES	STUDENT CENTER	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 8,804.62						$ 8,804.62				
HIGHLAND LAKES	STUDENT CENTER	RESTROOM ACCESSIBILITY UPGRADES	$ 49,038.77		$ 49,038.77								
HIGHLAND LAKES	STUDENT CENTER	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 96,830.90										$ 96,830.90
HIGHLAND LAKES	STUDENT CENTER	FIRE SPRINKLER SYSTEM INSTALLATION	$ 545,886.58										$ 545,886.58
HIGHLAND LAKES	STUDENT CENTER	STAIR AND RAILING SAFETY UPGRADE	$ 25,898.46				$ 25,898.46						
HIGHLAND LAKES	**STUDENT CENTER**	**STUDENT CENTER TOTALS**	**$ 991,101.84**	**$ -**	**$ 95,537.96**	**$ -**	**$ 25,898.46**	**$ -**	**$ 20,997.49**	**$ 7,716.78**	**$ 24,499.54**	**$ 3,984.71**	**$ 812,466.90**
HIGHLAND LAKES	WOODLAND HALL	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
HIGHLAND LAKES	WOODLAND HALL	WALL FINISH - APPLIED, STANDARD	$ 347,614.36										$ 347,614.36
HIGHLAND LAKES	WOODLAND HALL	LIGHTING - EXTERIOR	$ 20,557.30						$ 20,557.30				
HIGHLAND LAKES	WOODLAND HALL	VARIABLE FREQUENCY DRIVES	$ 76,772.83						$ 76,772.83				
HIGHLAND LAKES	WOODLAND HALL	UNIT HEATER - INDOOR, GAS	$ 6,029.70						$ 6,029.70				
HIGHLAND LAKES	WOODLAND HALL	FIRE ALARM SYSTEM - DEVICES	$ 227,965.51						$ 227,965.51				
HIGHLAND LAKES	WOODLAND HALL	HVAC CONTROLS SYSTEM - CLASSROOM	$ 292,246.40									$ 292,246.40	
HIGHLAND LAKES	WOODLAND HALL	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 97,917.46						$ 97,917.46				
HIGHLAND LAKES	WOODLAND HALL	FIRE ALARM SYSTEM - DEVICES	$ 286,518.93									$ 286,518.93	
HIGHLAND LAKES	WOODLAND HALL	HVAC CONTROLS SYSTEM - OFFICE	$ 299,938.60									$ 299,938.60	
HIGHLAND LAKES	WOODLAND HALL	UNINTERRUPTIBLE POWER SUPPLY - 277/480 VOLTS	$ 118,617.64									$ 118,617.64	
HIGHLAND LAKES	WOODLAND HALL	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34									$ 14,784.34	
HIGHLAND LAKES	WOODLAND HALL	INSTALL EMERGENCY GENERATOR AND POWER NETWORK	$ 153,212.31										$ 153,212.31
HIGHLAND LAKES	**WOODLAND HALL**	**WOODLAND HALL TOTALS**	**$ 2,252,815.80**	**$ -**	**$ 310,640.43**	**$ -**	**$ -**	**$ -**	**$ 429,242.80**	**$ -**	**$ -**	**$ 1,012,105.91**	**$ 500,826.67**
HIGHLAND LAKES	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	$ 23,778.65	$ 23,778.65									
HIGHLAND LAKES	SITE	INSTALL VFDS FOR THE COOLING TOWER FANS	$ 125,781.10	$ 125,781.10									
HIGHLAND LAKES	SITE	REPLACE OLDEST WATER SERVICE LINES	$ 112,869.33										$ 112,869.33
HIGHLAND LAKES	SITE	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	$ 17,817.18	$ 17,817.18									
HIGHLAND LAKES	SITE	CCTV CRITICAL STORM WATER SEWER LINES FOR DEFICIENCIES	$ 28,945.26	$ 28,945.26									
HIGHLAND LAKES	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	$ 23,778.65						$ 23,778.65				
HIGHLAND LAKES	SITE	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	$ 58,141.01										$ 58,141.01
HIGHLAND LAKES	SITE	REMOVE AND REPLACE PIPE, VALVES, AND EXPANSION JOINTS	$ 2,784,765.86										$ 2,784,765.86
HIGHLAND LAKES	SITE	EXTERIOR WALL FINISH RENEWAL	$ 14,385.88										$ 14,385.88
HIGHLAND LAKES	SITE	REDIRECT RUNOFF AWAY FROM FOUNDATION	$ 3,009.82	$ 3,009.82									
HIGHLAND LAKES	SITE	PAD-MOUNT SWITCH - 15 KV	$ 110,657.76										
HIGHLAND LAKES	SITE	MANHOLE - 5 TO 10 FT DEEP	$ 38,045.06										$ 38,045.06
HIGHLAND LAKES	SITE	MANHOLE - 10 TO 15 FT DEEP	$ 42,709.22										$ 42,709.22
HIGHLAND LAKES	SITE	SANITARY SEWER PIPE - 8" DIAMETER	$ 577,239.66										$ 577,239.66
HIGHLAND LAKES	SITE	SANITARY SEWER PIPE - 12" DIAMETER	$ 304,008.98										$ 304,008.98
HIGHLAND LAKES	SITE	STORMWATER PIPE - 12" DIAMETER	$ 586,820.21										$ 586,820.21
HIGHLAND LAKES	SITE	STORMWATER PIPE - 15" DIAMETER	$ 300,855.01										$ 300,855.01
HIGHLAND LAKES	SITE	STORMWATER PIPE - 18" DIAMETER	$ 154,647.26										$ 154,647.26
HIGHLAND LAKES	SITE	STORMWATER PIPE - 24" DIAMETER	$ 133,788.30										$ 133,788.30
HIGHLAND LAKES	SITE	COMBO DRAIN - LESS THAN 5 FT DEEP	$ 74,792.19										$ 74,792.19
HIGHLAND LAKES	SITE	MANHOLE - LESS THAN 5 FT DEEP	$ 18,870.87										$ 18,870.87
HIGHLAND LAKES	SITE	MANHOLE - 5 TO 10 FT DEEP	$ 9,511.26										$ 9,511.26
HIGHLAND LAKES	SITE	FIRE ALARM SYSTEM - DEVICES	$ 5,569.54						$ 5,569.54				
HIGHLAND LAKES	SITE	FIRE ALARM SYSTEM - DEVICES	$ 16,708.63						$ 16,708.63				
HIGHLAND LAKES	SITE	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	$ 1,703.26							$ 1,703.26			
HIGHLAND LAKES	SITE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 23,381.61							$ 23,381.61			
HIGHLAND LAKES	SITE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 7,793.87							$ 7,793.87			
HIGHLAND LAKES	SITE	FIRE ALARM SYSTEM - DEVICES	$ 7,351.80						$ 7,351.80				
HIGHLAND LAKES	**SITE**	**SITE TOTALS**	**$ 5,607,727.21**	**$ 199,332.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 53,408.62**	**$ 32,878.74**	**$ -**	**$ -**	**$ 5,211,450.09**
HIGHLAND LAKES	CENTRAL PLANT	HVAC CONTROLS SYSTEM - WAREHOUSE	$ 46,883.40						$ 46,883.40				
HIGHLAND LAKES	CENTRAL PLANT	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
HIGHLAND LAKES	CENTRAL PLANT	FIRE ALARM SYSTEM - DEVICES	$ 26,429.80						$ 26,429.80				
HIGHLAND LAKES	CENTRAL PLANT	VARIABLE FREQUENCY DRIVES	$ 75,218.38	$ 75,218.38									
HIGHLAND LAKES	CENTRAL PLANT	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 7,709.82	$ 7,709.82									
HIGHLAND LAKES	CENTRAL PLANT	BACKFLOW PREVENTER (2-3 INCHES)	$ 8,735.45						$ 8,735.45				
HIGHLAND LAKES	CENTRAL PLANT	DOMESTIC WATER BOOSTER SYSTEM	$ 75,734.66						$ 75,734.66				

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
HIGHLAND LAKES	CENTRAL PLANT	WATER SOFTENER	$ 271,407.61						$ 271,407.61				
HIGHLAND LAKES	CENTRAL PLANT	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 10,730.29						$ 10,730.29				
HIGHLAND LAKES	CENTRAL PLANT	LIGHTING SYSTEM, INTERIOR	$ 58,065.77	$ 58,065.77									
HIGHLAND LAKES	CENTRAL PLANT	WALL FINISH - APPLIED, STANDARD	$ 15,081.32						$ 15,081.32				
HIGHLAND LAKES	CENTRAL PLANT	WATER SOFTENER (>200 GPM)	$ 63,328.44						$ 63,328.44				
HIGHLAND LAKES	CENTRAL PLANT	SEWAGE LIFT STATION	$ 3,413.76						$ 3,413.76				
HIGHLAND LAKES	CENTRAL PLANT	BURNER ASSEMBLY UTILITY	$ 128,675.17	$ 128,675.17									
HIGHLAND LAKES	CENTRAL PLANT	FAN - CENTRIFUGAL ROOF EXHAUSTS	$ 67,212.11						$ 67,212.11				
HIGHLAND LAKES	CENTRAL PLANT	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
HIGHLAND LAKES	CENTRAL PLANT	MOTOR CONTROL CENTER VERTICAL SECTIONS	$ 1,134,391.09										$ 1,134,391.09
HIGHLAND LAKES	CENTRAL PLANT	UNIT HEATER - STEAM/HYDRONIC	$ 55,678.45							$ 55,678.45			
HIGHLAND LAKES	**CENTRAL PLANT**	**CENTRAL PLANT TOTALS**	**$ 2,146,612.97**	**$ 269,669.13**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 686,874.30**	**$ 55,678.45**	**$ -**	**$ -**	**$ 1,134,391.09**
		HIGHLAND LAKES CAMUS WIDE - GRAND TOTALS	**$ 21,974,794.53**	**$ 573,319.40**	**$ 4,580,178.34**	**$ 330,587.97**	**$ 73,636.87**	**$ 366,935.32**	**$ 3,758,408.61**	**$ 1,287,728.10**	**$ 212,819.88**	**$ 1,963,491.23**	**$ 8,714,347.54**

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	BUILDING A	AIR HANDLING UNIT - INDOOR	$ 21,221.02		$ 21,221.02								
ORCHARD RIDGE	BUILDING A	CASEWORK - LABORATORY, INCLUDES REAGENT SHELF AND TOP	$ 166,696.46		$ 166,696.46								
ORCHARD RIDGE	BUILDING A	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING A	GLASS, STOREFRONT	$ 126,348.34		$ 126,348.34								
ORCHARD RIDGE	BUILDING A	HVAC CONTROLS SYSTEM - LABORATORY, WET	$ 541,776.85		$ 541,776.85								
ORCHARD RIDGE	BUILDING A	HVAC DISTRIBUTION NETWORKS - LABORATORY, WET	$ 1,453,766.01		$ 1,453,766.01								
ORCHARD RIDGE	BUILDING A	LIGHTING - EXTERIOR	$ 13,643.19	$ 13,643.19									
ORCHARD RIDGE	BUILDING A	PLUMBING FIXTURE - LAVATORY, COUNTER	$ 8,272.97		$ 8,272.97								
ORCHARD RIDGE	BUILDING A	PUMP - ELECTRIC	$ 7,097.30	$ 7,097.30									
ORCHARD RIDGE	BUILDING A	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 3,984.71		$ 3,984.71								
ORCHARD RIDGE	BUILDING A	SUPPLY PIPING SYSTEM - LABORATORY, WET	$ 638,863.14		$ 638,863.14								
ORCHARD RIDGE	BUILDING A	HVAC CONTROLS SYSTEM - CLASSROOM	$ 45,246.59		$ 45,246.59								
ORCHARD RIDGE	BUILDING A	BACKFLOW PREVENTER (<=1 INCH)	$ 899.76			$ 899.76							
ORCHARD RIDGE	BUILDING A	PLUMBING FIXTURE - SINK, KITCHEN	$ 927.32			$ 927.32							
ORCHARD RIDGE	BUILDING A	WALL FINISH - APPLIED, PREMIUM	$ 561,669.67			$ 561,669.67							
ORCHARD RIDGE	BUILDING A	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78						$ 7,716.78				
ORCHARD RIDGE	BUILDING A	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70								$ 2,749.70		
ORCHARD RIDGE	BUILDING A	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 28,999.25								$ 28,999.25		
ORCHARD RIDGE	BUILDING A	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
ORCHARD RIDGE	BUILDING A	FIRE ALARM SYSTEM - DEVICES	$ 195,024.34									$ 195,024.34	
ORCHARD RIDGE	BUILDING A	PUMP - ELECTRIC (<=10 HP)	$ 2,027.80									$ 2,027.80	
ORCHARD RIDGE	BUILDING A	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 34,704.11				$ 34,704.11						
ORCHARD RIDGE	BUILDING A	AUDITORIUM ACCESSIBILITY UPGRADES	$ 33,314.36		$ 33,314.36								
ORCHARD RIDGE	BUILDING A	STAIR SAFETY UPGRADES	$ 13,406.86				$ 13,406.86						
ORCHARD RIDGE	BUILDING A	TUNNEL ACCESSIBILITY IMPROVEMENTS	$ 5,780.21		$ 5,780.21								
ORCHARD RIDGE	BUILDING A	FIRE SPRINKLER SYSTEM INSTALLATION	$ 617,699.47										$ 617,699.47
ORCHARD RIDGE	BUILDING A	IMPROVE EGRESS PATHWAY DESIGNATION	$ 9,634.18		$ 9,634.18								
ORCHARD RIDGE	BUILDING A	REPLACE MISSING RESTROOM PARTITIONS	$ 1,058.57		$ 1,058.57								
ORCHARD RIDGE	BUILDING A	BACKFLOW PREVENTER INSTALLATION	$ 8,536.52		$ 8,536.52								
ORCHARD RIDGE	**BUILDING A**	**BUILDING A TOTALS**	**$ 4,603,461.37**	**$ 24,177.63**	**$ 3,064,499.92**	**$ 563,496.76**	**$ 48,110.97**	**$ -**	**$ 7,716.78**	**$ -**	**$ 31,748.95**	**$ 246,010.87**	**$ 617,699.47**
ORCHARD RIDGE	BUILDING B	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 8,584.23		$ 8,584.23								
ORCHARD RIDGE	BUILDING B	AIR HANDLING UNIT - INDOOR	$ 12,732.61		$ 12,732.61								
ORCHARD RIDGE	BUILDING B	CASEWORK - LABORATORY, INCLUDES REAGENT SHELF AND TOP	$ 383,401.86		$ 383,401.86								
ORCHARD RIDGE	BUILDING B	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 160,704.90		$ 160,704.90								
ORCHARD RIDGE	BUILDING B	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING B	DOOR - OVERHEAD, INTERIOR	$ 6,253.60		$ 6,253.60								
ORCHARD RIDGE	BUILDING B	DOOR, FRAME AND PANIC HARDWARE, EXTERIOR	$ 20,167.15		$ 20,167.15								
ORCHARD RIDGE	BUILDING B	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56		$ 3,255.56								
ORCHARD RIDGE	BUILDING B	GLASS, STOREFRONT	$ 443,061.50		$ 443,061.50								
ORCHARD RIDGE	BUILDING B	HVAC DISTRIBUTION NETWORKS - LABORATORY, WET	$ 1,608,470.95		$ 1,608,470.95								
ORCHARD RIDGE	BUILDING B	LIGHTING - EXTERIOR	$ 12,487.75	$ 12,487.75									
ORCHARD RIDGE	BUILDING B	PLUMBING FIXTURES	$ 38,260.21		$ 38,260.21								
ORCHARD RIDGE	BUILDING B	PUMP - ELECTRIC	$ 5,576.45	$ 5,576.45									
ORCHARD RIDGE	BUILDING B	VARIABLE FREQUENCY DRIVES	$ 11,106.56	$ 11,106.56									
ORCHARD RIDGE	BUILDING B	LOAD INTERRUPTER SWITCH - 15 KV	$ 143,253.91		$ 143,253.91								
ORCHARD RIDGE	BUILDING B	ELECTRICAL DISTRIBUTION NETWORK - LABORATORY, WET	$ 297,916.07		$ 297,916.07								
ORCHARD RIDGE	BUILDING B	SUPPLY PIPING SYSTEM - LABORATORY, WET	$ 555,083.30		$ 555,083.30								
ORCHARD RIDGE	BUILDING B	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78	$ 7,716.78									
ORCHARD RIDGE	BUILDING B	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34	$ 14,784.34									
ORCHARD RIDGE	BUILDING B	HVAC CONTROLS SYSTEM - LABORATORY, WET	$ 470,728.80			$ 470,728.80							
ORCHARD RIDGE	BUILDING B	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56					$ 3,255.56					
ORCHARD RIDGE	BUILDING B	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70								$ 2,749.70		
ORCHARD RIDGE	BUILDING B	DOOR LOCK, SECURITY	$ 7,006.34								$ 7,006.34		
ORCHARD RIDGE	BUILDING B	FIRE ALARM SYSTEM - DEVICES	$ 146,529.77									$ 146,529.77	
ORCHARD RIDGE	BUILDING B	WALL FINISH - APPLIED, STANDARD	$ 96,743.65									$ 96,743.65	
ORCHARD RIDGE	BUILDING B	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 61,909.46						$ 61,909.46				
ORCHARD RIDGE	BUILDING B	STAIR SAFETY UPGRADES	$ 13,406.86		$ 13,406.86								
ORCHARD RIDGE	BUILDING B	FIRE SPRINKLER SYSTEM INSTALLATION	$ 465,810.34										$ 465,810.34
ORCHARD RIDGE	BUILDING B	IMPROVE EGRESS PATHWAY DESIGNATION	$ 9,634.18				$ 9,634.18						
ORCHARD RIDGE	**BUILDING B**	**BUILDING B TOTALS**	**$ 5,014,029.51**	**$ 55,109.04**	**$ 3,694,552.70**	**$ 470,728.80**	**$ 9,634.18**	**$ 3,255.56**	**$ 61,909.46**	**$ -**	**$ 9,756.04**	**$ 243,273.41**	**$ 465,810.34**
ORCHARD RIDGE	BUILDING C	AIR HANDLING UNIT - INDOOR	$ 12,732.61		$ 12,732.61								
ORCHARD RIDGE	BUILDING C	DEAERATOR SYSTEM	$ 6,874.28	$ 6,874.28									
ORCHARD RIDGE	BUILDING C	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 14,499.63		$ 14,499.63								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	BUILDING C	GLASS, STOREFRONT	$ 299,866.72		$ 299,866.72								
ORCHARD RIDGE	BUILDING C	HVAC DISTRIBUTION NETWORKS - LABORATORY, WET	$ 1,612,832.25		$ 1,612,832.25								
ORCHARD RIDGE	BUILDING C	LIGHTING - EXTERIOR	$ 9,819.62	$ 9,819.62									
ORCHARD RIDGE	BUILDING C	PUMP - ELECTRIC	$ 3,548.65	$ 3,548.65									
ORCHARD RIDGE	BUILDING C	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 1,992.35		$ 1,992.35								
ORCHARD RIDGE	BUILDING C	SUPPLY PIPING SYSTEM - LABORATORY, WET	$ 556,588.32		$ 556,588.32								
ORCHARD RIDGE	BUILDING C	WALL FINISH - APPLIED, STANDARD	$ 77,029.72		$ 77,029.72								
ORCHARD RIDGE	BUILDING C	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78				$ 7,716.78						
ORCHARD RIDGE	BUILDING C	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43					$ 310,640.43					
ORCHARD RIDGE	BUILDING C	VARIABLE FREQUENCY DRIVE (20-25 HP)	$ 11,250.27					$ 11,250.27					
ORCHARD RIDGE	BUILDING C	HVAC CONTROLS SYSTEM - LABORATORY, WET	$ 472,005.11						$ 472,005.11				
ORCHARD RIDGE	BUILDING C	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34						$ 14,784.34				
ORCHARD RIDGE	BUILDING C	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68								$ 1,199.68		
ORCHARD RIDGE	BUILDING C	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70								$ 2,749.70		
ORCHARD RIDGE	BUILDING C	PLUMBING FIXTURE - SINK, KITCHEN	$ 927.32								$ 927.32		
ORCHARD RIDGE	BUILDING C	REVERSE OSMOSIS SYSTEM (<=5,000 GPD)	$ 8,424.83								$ 8,424.83		
ORCHARD RIDGE	BUILDING C	WATER SOFTENER (41 - 70 GPM)	$ 12,657.89								$ 12,657.89		
ORCHARD RIDGE	BUILDING C	FIRE ALARM SYSTEM - DEVICES	$ 146,927.06									$ 146,927.06	
ORCHARD RIDGE	BUILDING C	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 27,670.29							$ 27,670.29			
ORCHARD RIDGE	BUILDING C	STAIR SAFETY UPGRADES	$ 6,834.07			$ 6,834.07							
ORCHARD RIDGE	BUILDING C	INTERIOR PATH OF TRAVEL ACCESSIBILITY UPGRADES	$ 16,370.26		$ 16,370.26								
ORCHARD RIDGE	BUILDING C	TUNNEL ACCESSIBILITY IMPROVEMENTS	$ 5,780.21		$ 5,780.21								
ORCHARD RIDGE	BUILDING C	FIRE SPRINKLER SYSTEM INSTALLATION	$ 467,073.33										$ 467,073.33
ORCHARD RIDGE	**BUILDING C**	**BUILDING C TOTALS**	**$ 4,108,795.74**	**$ 20,242.55**	**$ 2,597,692.07**	**$ 6,834.07**	**$ 7,716.78**	**$ 321,890.69**	**$ 486,789.45**	**$ 27,670.29**	**$ 25,959.43**	**$ 146,927.06**	**$ 467,073.33**
ORCHARD RIDGE	BUILDING D	AIR HANDLING UNIT - INDOOR	$ 40,319.93		$ 40,319.93								
ORCHARD RIDGE	BUILDING D	CASEWORK - WOOD BASE AND WALL, TOP, LABORATORY	$ 160,934.56		$ 160,934.56								
ORCHARD RIDGE	BUILDING D	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 227,531.36		$ 227,531.36								
ORCHARD RIDGE	BUILDING D	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING D	DOORS, LOCKS, FRAMES AND PANIC HARDWARE - EXTERIOR & INTERIOR	$ 40,147.90		$ 40,147.90								
ORCHARD RIDGE	BUILDING D	FAN - PROPELLER WITH LOUVERS	$ 9,766.67		$ 9,766.67								
ORCHARD RIDGE	BUILDING D	GLASS, STOREFRONT	$ 303,236.01		$ 303,236.01								
ORCHARD RIDGE	BUILDING D	HVAC CONTROLS SYSTEM - LABORATORY, WET	$ 156,391.33		$ 156,391.33								
ORCHARD RIDGE	BUILDING D	HVAC DISTRIBUTION NETWORKS - LABORATORY, WET	$ 2,385,360.01		$ 2,385,360.01								
ORCHARD RIDGE	BUILDING D	LIGHTING - EXTERIOR	$ 9,819.62	$ 9,819.62									
ORCHARD RIDGE	BUILDING D	PLUMBING FIXTURES	$ 4,912.03		$ 4,912.03								
ORCHARD RIDGE	BUILDING D	ELECTRICAL DISTRIBUTION NETWORK - LABORATORY, WET	$ 567,232.19		$ 567,232.19								
ORCHARD RIDGE	BUILDING D	SUPPLY PIPING SYSTEM - LABORATORY, WET	$ 597,015.03		$ 597,015.03								
ORCHARD RIDGE	BUILDING D	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 1,302.22					$ 1,302.22					
ORCHARD RIDGE	BUILDING D	WALL FINISH - APPLIED, STANDARD	$ 135,427.58					$ 135,427.58					
ORCHARD RIDGE	BUILDING D	PUMP - ELECTRIC (<=10 HP)	$ 1,013.90						$ 1,013.90				
ORCHARD RIDGE	BUILDING D	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70								$ 2,749.70		
ORCHARD RIDGE	BUILDING D	FIRE ALARM SYSTEM - DEVICES	$ 157,598.82									$ 157,598.82	
ORCHARD RIDGE	BUILDING D	PUMP - ELECTRIC (<=10 HP)	$ 1,520.85									$ 1,520.85	
ORCHARD RIDGE	BUILDING D	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 13,602.66							$ 13,602.66			
ORCHARD RIDGE	BUILDING D	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 8,804.62		$ 8,804.62								
ORCHARD RIDGE	BUILDING D	STAIR SAFETY UPGRADES	$ 26,813.74		$ 26,813.74								
ORCHARD RIDGE	BUILDING D	STAIR CLIMBER OR WHEELCHAIR LIFT INSTALLATION	$ 12,894.66			$ 12,894.66							
ORCHARD RIDGE	BUILDING D	TUNNEL ACCESSIBILITY IMPROVEMENTS	$ 5,780.21		$ 5,780.21								
ORCHARD RIDGE	BUILDING D	FIRE SPRINKLER SYSTEM INSTALLATION	$ 500,998.28										$ 500,998.28
ORCHARD RIDGE	BUILDING D	INTERIOR DOOR SAFETY UPGRADES	$ 154,858.45				$ 154,858.45						
ORCHARD RIDGE	**BUILDING D**	**BUILDING D TOTALS**	**$ 5,529,469.48**	**$ 13,256.76**	**$ 4,534,245.59**	**$ 12,894.66**	**$ 154,858.45**	**$ 136,729.80**	**$ 1,013.90**	**$ 13,602.66**	**$ 2,749.70**	**$ 159,119.67**	**$ 500,998.28**
ORCHARD RIDGE	POWER HOUSE	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 8,584.23		$ 8,584.23								
ORCHARD RIDGE	POWER HOUSE	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	$ 10,610.51		$ 10,610.51								
ORCHARD RIDGE	POWER HOUSE	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 6,724.22		$ 6,724.22								
ORCHARD RIDGE	POWER HOUSE	CEILING FINISH - ATTACHED ACOUSTICAL TILE	$ 7,452.21		$ 7,452.21								
ORCHARD RIDGE	POWER HOUSE	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 9,590.10		$ 9,590.10								
ORCHARD RIDGE	POWER HOUSE	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
ORCHARD RIDGE	POWER HOUSE	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 97,917.46		$ 97,917.46								
ORCHARD RIDGE	POWER HOUSE	FIRE ALARM SYSTEM - DEVICES	$ 54,398.96		$ 54,398.96								
ORCHARD RIDGE	POWER HOUSE	HVAC CONTROLS SYSTEM - WAREHOUSE	$ 51,585.87		$ 51,585.87								
ORCHARD RIDGE	POWER HOUSE	PLUMBING FIXTURES	$ 7,090.06		$ 7,090.06								
ORCHARD RIDGE	POWER HOUSE	PUMP - ELECTRIC	$ 22,305.81		$ 22,305.81								
ORCHARD RIDGE	POWER HOUSE	THERMAL STORAGE EXPANSION TANK	$ 57,596.66		$ 57,596.66								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	POWER HOUSE	WALL FINISH - APPLIED, STANDARD	$ 23,670.24		$ 23,670.24								
ORCHARD RIDGE	POWER HOUSE	WATER HEATER - SHELL & TUBE (45-93 GPM)	$ 63,829.86		$ 63,829.86								
ORCHARD RIDGE	POWER HOUSE	BACKFLOW PREVENTER	$ 12,686.89		$ 12,686.89								
ORCHARD RIDGE	POWER HOUSE	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	$ 82,327.56		$ 82,327.56								
ORCHARD RIDGE	POWER HOUSE	HEATING SYSTEM, STEAM OR HYDRONIC	$ 53,784.32		$ 53,784.32								
ORCHARD RIDGE	POWER HOUSE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 113,850.85		$ 113,850.85								
ORCHARD RIDGE	POWER HOUSE	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 1,992.35		$ 1,992.35								
ORCHARD RIDGE	POWER HOUSE	SUPPLY PIPING SYSTEM	$ 202,708.17		$ 202,708.17								
ORCHARD RIDGE	POWER HOUSE	WATER SOFTENER (41 - 70 GPM)	$ 12,657.89		$ 12,657.89								
ORCHARD RIDGE	POWER HOUSE	VARIABLE FREQUENCY DRIVE	$ 97,185.11	$ 97,185.11									
ORCHARD RIDGE	POWER HOUSE	AIR DRYER - REFRIGERATED (11-25 CFM)	$ 2,264.63		$ 2,264.63								
ORCHARD RIDGE	POWER HOUSE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 5,139.88		$ 5,139.88								
ORCHARD RIDGE	POWER HOUSE	DOOR OPERATOR, OVERHEAD DOOR, COMMERCIAL, PADS	$ 5,004.38			$ 5,004.38							
ORCHARD RIDGE	POWER HOUSE	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 40,023.04			$ 40,023.04							
ORCHARD RIDGE	POWER HOUSE	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 50,823.38				$ 50,823.38						
ORCHARD RIDGE	POWER HOUSE	FAN - PROPELLER WITH LOUVER	$ 17,087.32				$ 17,087.32						
ORCHARD RIDGE	POWER HOUSE	COOLING TOWER (301-550 TONS)	$ 568,019.24					$ 568,019.24					
ORCHARD RIDGE	POWER HOUSE	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	$ 260,575.61					$ 260,575.61					
ORCHARD RIDGE	POWER HOUSE	MOTOR CONTROL CENTER VERTICAL SECTION	$ 1,275,065.82					$ 1,275,065.82					
ORCHARD RIDGE	POWER HOUSE	HVAC CONTROLS SYSTEM - WAREHOUSE	$ 109,424.58							$ 109,424.58			
ORCHARD RIDGE	POWER HOUSE	DOOR LOCK, COMMERCIAL-GRADE	$ 3,603.90								$ 3,603.90		
ORCHARD RIDGE	POWER HOUSE	VARIABLE FREQUENCY DRIVE (25-30 HP)	$ 13,017.45								$ 13,017.45		
ORCHARD RIDGE	POWER HOUSE	HVAC DISTRIBUTION NETWORKS	$ 563,364.64									$ 563,364.64	
ORCHARD RIDGE	POWER HOUSE	STAIR SAFETY UPGRADES	$ 40,220.60		$ 40,220.60								
ORCHARD RIDGE	POWER HOUSE	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	$ 1,672.61										$ 1,672.61
ORCHARD RIDGE	POWER HOUSE	TEAR DOWN AND REBUILD CHILLED WATER PUMPS	$ 29,405.46						$ 29,405.46				
ORCHARD RIDGE	POWER HOUSE	TEAR DOWN AND REBUILD CONDENSER WATER PUMP	$ 9,801.82						$ 9,801.82				
ORCHARD RIDGE	**POWER HOUSE**	**POWER HOUSE TOTALS**	**$ 4,303,704.12**	**$ 97,185.11**	**$ 1,259,629.75**	**$ 45,027.42**	**$ 67,910.70**	**$ 2,103,660.67**	**$ 39,207.28**	**$ 109,424.58**	**$ 16,621.35**	**$ 563,364.64**	**$ 1,672.61**
ORCHARD RIDGE	BUILDING F	AIR HANDLING UNIT - INDOOR	$ 25,465.22		$ 25,465.22								
ORCHARD RIDGE	BUILDING F	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 188,292.58		$ 188,292.58								
ORCHARD RIDGE	BUILDING F	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING F	DOOR, PANIC HARDWARE AND FRAME, EXTERIOR	$ 14,689.12		$ 14,689.12								
ORCHARD RIDGE	BUILDING F	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
ORCHARD RIDGE	BUILDING F	GLASS, STOREFRONT	$ 448,115.44		$ 448,115.44								
ORCHARD RIDGE	BUILDING F	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 714,384.58		$ 714,384.58								
ORCHARD RIDGE	BUILDING F	LIGHTING - EXTERIOR	$ 11,580.14	$ 11,580.14									
ORCHARD RIDGE	BUILDING F	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 408,973.01		$ 408,973.01								
ORCHARD RIDGE	BUILDING F	PLUMBING FIXTURE - LAVATORY, COUNTER	$ 8,272.97		$ 8,272.97								
ORCHARD RIDGE	BUILDING F	PUMP - ELECTRIC	$ 4,562.55	$ 4,562.55									
ORCHARD RIDGE	BUILDING F	WALL FINISH - APPLIED, STANDARD	$ 132,350.45		$ 132,350.45								
ORCHARD RIDGE	BUILDING F	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	$ 239,372.59		$ 239,372.59								
ORCHARD RIDGE	BUILDING F	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 1,992.35		$ 1,992.35								
ORCHARD RIDGE	BUILDING F	SUPPLY PIPING SYSTEM - CLASSROOM	$ 418,503.05		$ 418,503.05								
ORCHARD RIDGE	BUILDING F	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78	$ 7,716.78									
ORCHARD RIDGE	BUILDING F	HVAC CONTROLS SYSTEM - CLASSROOM	$ 200,050.20			$ 200,050.20							
ORCHARD RIDGE	BUILDING F	VARIABLE FREQUENCY DRIVE (40-50 HP)	$ 16,986.17				$ 16,986.17						
ORCHARD RIDGE	BUILDING F	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68					$ 1,199.68					
ORCHARD RIDGE	BUILDING F	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56					$ 3,255.56					
ORCHARD RIDGE	BUILDING F	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70								$ 2,749.70		
ORCHARD RIDGE	BUILDING F	FIRE ALARM SYSTEM - DEVICES	$ 156,048.27									$ 156,048.27	
ORCHARD RIDGE	BUILDING F	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 20,636.49					$ 20,636.49					
ORCHARD RIDGE	BUILDING F	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 32,458.07				$ 32,458.07						
ORCHARD RIDGE	BUILDING F	STAIR SAFETY UPGRADES	$ 22,388.33						$ 22,388.33				
ORCHARD RIDGE	BUILDING F	RESTROOM ACCESSIBILITY IMPROVEMENTS	$ 19,359.62						$ 19,359.62				
ORCHARD RIDGE	BUILDING F	INTERIOR PATH OF TRAVEL ACCESSIBILITY UPGRADES	$ 16,370.26							$ 16,370.26			
ORCHARD RIDGE	BUILDING F	TUNNEL ACCESSIBILITY IMPROVEMENTS	$ 5,780.21		$ 5,780.21								
ORCHARD RIDGE	BUILDING F	FIRE SPRINKLER SYSTEM INSTALLATION	$ 496,069.16										$ 496,069.16
ORCHARD RIDGE	BUILDING F	INTERIOR DOOR SAFETY UPGRADES	$ 82,591.17		$ 82,591.17								
ORCHARD RIDGE	**BUILDING F**	**BUILDING F TOTALS**	**$ 4,014,291.31**	**$ 27,296.61**	**$ 2,999,423.17**	**$ 200,050.20**	**$ 49,444.25**	**$ 25,091.73**	**$ 41,747.96**	**$ 16,370.26**	**$ 2,749.70**	**$ 156,048.27**	**$ 496,069.16**
ORCHARD RIDGE	BUILDING G	AIR HANDLING UNIT - INDOOR	$ 29,709.42		$ 29,709.42								
ORCHARD RIDGE	BUILDING G	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING G	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 18,124.53		$ 18,124.53								
ORCHARD RIDGE	BUILDING G	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56		$ 3,255.56								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	BUILDING G	GLASS, STOREFRONT	$ 394,206.81		$ 394,206.81								
ORCHARD RIDGE	BUILDING G	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 676,543.41		$ 676,543.41								
ORCHARD RIDGE	BUILDING G	LIGHTING - EXTERIOR	$ 17,824.01	$ 17,824.01									
ORCHARD RIDGE	BUILDING G	PUMP - ELECTRIC	$ 4,380.05	$ 4,380.05									
ORCHARD RIDGE	BUILDING G	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 3,984.71		$ 3,984.71								
ORCHARD RIDGE	BUILDING G	SUPPLY PIPING SYSTEM - CLASSROOM	$ 396,320.02		$ 396,320.02								
ORCHARD RIDGE	BUILDING G	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78	$ 7,716.78									
ORCHARD RIDGE	BUILDING G	HVAC CONTROLS SYSTEM - CLASSROOM	$ 189,446.41			$ 189,446.41							
ORCHARD RIDGE	BUILDING G	VARIABLE FREQUENCY DRIVE (40-50 HP)	$ 16,986.17				$ 16,986.17						
ORCHARD RIDGE	BUILDING G	WALL FINISH - APPLIED, STANDARD	$ 162,682.17				$ 162,682.17						
ORCHARD RIDGE	BUILDING G	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56					$ 3,255.56					
ORCHARD RIDGE	BUILDING G	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70								$ 2,749.70		
ORCHARD RIDGE	BUILDING G	FIRE ALARM SYSTEM - DEVICES	$ 147,776.83									$ 147,776.83	
ORCHARD RIDGE	BUILDING G	URINAL PARTITION WITH ACCESSORIES	$ 2,326.07									$ 2,326.07	
ORCHARD RIDGE	BUILDING G	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 14,067.63					$ 14,067.63					
ORCHARD RIDGE	BUILDING G	STAIR SAFETY UPGRADES	$ 20,110.30						$ 20,110.30				
ORCHARD RIDGE	BUILDING G	INTERIOR PATH OF TRAVEL ACCESSIBILITY UPGRADES	$ 12,894.66		$ 12,894.66								
ORCHARD RIDGE	BUILDING G	FIRE SPRINKLER SYSTEM INSTALLATION	$ 469,774.69										$ 469,774.69
ORCHARD RIDGE	BUILDING G	INTERIOR DOOR SAFETY UPGRADES	$ 216,801.84							$ 216,801.84			
ORCHARD RIDGE	BUILDING G	FIRE RATING COMPROMISE	$ 5,138.52		$ 5,138.52								
ORCHARD RIDGE	**BUILDING G**	**BUILDING G TOTALS**	**$ 2,819,513.01**	**$ 33,357.99**	**$ 1,540,177.66**	**$ 189,446.41**	**$ 179,668.34**	**$ 17,323.19**	**$ 20,110.30**	**$ 216,801.84**	**$ 2,749.70**	**$ 150,102.90**	**$ 469,774.69**
ORCHARD RIDGE	BUILDING H	AIR HANDLING UNIT - INDOOR	$ 19,098.92		$ 19,098.92								
ORCHARD RIDGE	BUILDING H	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 100,091.29		$ 100,091.29								
ORCHARD RIDGE	BUILDING H	DEAERATOR SYSTEM	$ 3,437.14		$ 3,437.14								
ORCHARD RIDGE	BUILDING H	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 21,749.44		$ 21,749.44								
ORCHARD RIDGE	BUILDING H	DOOR LOCK, COMMERCIAL-GRADE	$ 27,029.28		$ 27,029.28								
ORCHARD RIDGE	BUILDING H	DOOR OPERATOR, OVERHEAD DOOR, COMMERCIAL, PADS	$ 2,502.19		$ 2,502.19								
ORCHARD RIDGE	BUILDING H	DOOR PANIC HARDWARE	$ 77,928.48		$ 77,928.48								
ORCHARD RIDGE	BUILDING H	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 10,005.76		$ 10,005.76								
ORCHARD RIDGE	BUILDING H	FAN - AXIAL, RETURN	$ 79,056.66		$ 79,056.66								
ORCHARD RIDGE	BUILDING H	FAN - CENTRIFUGAL ROOF EXHAUST	$ 18,095.15		$ 18,095.15								
ORCHARD RIDGE	BUILDING H	HVAC CONTROLS SYSTEM - GYMNASIUM	$ 433,240.47		$ 433,240.47								
ORCHARD RIDGE	BUILDING H	KITCHENETTE UNIT WITH CABINETRY AND AMENITIES	$ 14,893.39		$ 14,893.39								
ORCHARD RIDGE	BUILDING H	LIGHTING - EXTERIOR	$ 20,566.96	$ 20,566.96									
ORCHARD RIDGE	BUILDING H	LIGHTING SYSTEM, INTERIOR - GYMNASIUM	$ 377,115.19		$ 377,115.19								
ORCHARD RIDGE	BUILDING H	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	$ 637,532.91		$ 637,532.91								
ORCHARD RIDGE	BUILDING H	PLUMBING FIXTURE - EMERGENCY EYEWASH	$ 1,299.04		$ 1,299.04								
ORCHARD RIDGE	BUILDING H	PLUMBING FIXTURES	$ 282,753.75		$ 282,753.75								
ORCHARD RIDGE	BUILDING H	PUMP - ELECTRIC	$ 2,027.80		$ 2,027.80								
ORCHARD RIDGE	BUILDING H	VARIABLE FREQUENCY DRIVE	$ 16,144.95	$ 16,144.95									
ORCHARD RIDGE	BUILDING H	WALL, EXTERIOR, SIDING, METAL, HORIZONTAL OR VERTICAL	$ 143,860.91		$ 143,860.91								
ORCHARD RIDGE	BUILDING H	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 45,552.96		$ 45,552.96								
ORCHARD RIDGE	BUILDING H	GLASS, STOREFRONT	$ 30,082.94		$ 30,082.94								
ORCHARD RIDGE	BUILDING H	MAIN SWITCHBOARD W/BREAKERS (600-800 AMP)	$ 69,746.71		$ 69,746.71								
ORCHARD RIDGE	BUILDING H	TRANSFORMER - DRY-TYPE, 3PH, 5-15KV PRIMARY (300-500 KVA)	$ 83,580.85		$ 83,580.85								
ORCHARD RIDGE	BUILDING H	WATER HEATER - SHELL & TUBE (>675 GPM)	$ 424,808.67		$ 424,808.67								
ORCHARD RIDGE	BUILDING H	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 93,744.53					$ 93,744.53					
ORCHARD RIDGE	BUILDING H	DOOR - OVERHEAD, INTERIOR	$ 50,028.80					$ 50,028.80					
ORCHARD RIDGE	BUILDING H	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (10"-18" DIAMETER)	$ 4,523.79					$ 4,523.79					
ORCHARD RIDGE	BUILDING H	HVAC DISTRIBUTION NETWORKS - GYMNASIUM	$ 2,092,697.34					$ 2,092,697.34					
ORCHARD RIDGE	BUILDING H	WALL FINISH - APPLIED, STANDARD	$ 123,660.09					$ 123,660.09					
ORCHARD RIDGE	BUILDING H	AIR HANDLING UNIT - INDOOR (23-27 HP)	$ 162,098.88							$ 162,098.88			
ORCHARD RIDGE	BUILDING H	PUMP - ELECTRIC	$ 6,083.40							$ 6,083.40			
ORCHARD RIDGE	BUILDING H	WATER HEATER - SHELL & TUBE (<=45 GPM)	$ 16,142.10								$ 16,142.10		
ORCHARD RIDGE	BUILDING H	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
ORCHARD RIDGE	BUILDING H	FIRE ALARM SYSTEM - DEVICES	$ 359,201.62									$ 359,201.62	
ORCHARD RIDGE	BUILDING H	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 85,830.36				$ 85,830.36						
ORCHARD RIDGE	BUILDING H	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 17,609.27				$ 17,609.27						
ORCHARD RIDGE	BUILDING H	STAIR SAFETY UPGRADES	$ 4,556.04		$ 4,556.04								
ORCHARD RIDGE	BUILDING H	EXTERIOR MASONRY CLEANING	$ 22,595.09			$ 22,595.09							
ORCHARD RIDGE	BUILDING H	FIRE SPRINKLER SYSTEM INSTALLATION	$ 1,137,831.44										$ 1,137,831.44
ORCHARD RIDGE	BUILDING H	BACKFLOW PREVENTER INSTALLATION	$ 8,536.52		$ 8,536.52								
ORCHARD RIDGE	**BUILDING H**	**BUILDING H TOTALS**	**$ 7,176,299.80**	**$ 36,711.91**	**$ 2,918,582.46**	**$ 22,595.09**	**$ 103,439.63**	**$ 2,364,654.55**	**$ -**	**$ 168,182.28**	**$ 16,142.10**	**$ 408,160.35**	**$ 1,137,831.44**

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	BUILDING J	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (>10 TOTAL HP)	$ 43,579.52		$43,579.52								
ORCHARD RIDGE	BUILDING J	AIR HANDLING UNIT - INDOOR	$ 301,913.97		$301,913.97								
ORCHARD RIDGE	BUILDING J	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 6,724.22		$6,724.22								
ORCHARD RIDGE	BUILDING J	DEAERATOR SYSTEM	$ 3,437.14	$3,437.14									
ORCHARD RIDGE	BUILDING J	DOOR, PANIC HARDWARE AND FRAME, EXTERIOR	$ 138,001.91		$138,001.91								
ORCHARD RIDGE	BUILDING J	DRINKING FOUNTAIN, DUAL-LEVEL	$ 3,211.30		$3,211.30								
ORCHARD RIDGE	BUILDING J	DUMBWAITER	$ 44,440.77		$44,440.77								
ORCHARD RIDGE	BUILDING J	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$310,640.43								
ORCHARD RIDGE	BUILDING J	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$310,640.43								
ORCHARD RIDGE	BUILDING J	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY	$ 11,011.09		$11,011.09								
ORCHARD RIDGE	BUILDING J	FAN - PROPELLER WITH LOUVER	$ 16,277.78		$16,277.78								
ORCHARD RIDGE	BUILDING J	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	$ 13,052.66		$13,052.66								
ORCHARD RIDGE	BUILDING J	GLASS, STOREFRONT	$ 1,547,315.89		$1,547,315.89								
ORCHARD RIDGE	BUILDING J	HVAC DISTRIBUTION NETWORKS - STUDENT UNION	$ 3,858,652.95		$3,858,652.95								
ORCHARD RIDGE	BUILDING J	LIGHTING SYSTEM, INTERIOR - STUDENT UNION	$ 295,078.70		$295,078.70								
ORCHARD RIDGE	BUILDING J	PLUMBING FIXTURES	$ 84,238.17		$84,238.17								
ORCHARD RIDGE	BUILDING J	PUMP - ELECTRIC	$ 2,027.80	$2,027.80									
ORCHARD RIDGE	BUILDING J	REFRIGERATION SYSTEM - WALK-IN	$ 81,872.40		$81,872.40								
ORCHARD RIDGE	BUILDING J	SEATING, FIXED, FOLDING, STANDARD	$ 188,490.13		$188,490.13								
ORCHARD RIDGE	BUILDING J	ELECTRICAL DISTRIBUTION NETWORK - STUDENT UNION	$ 1,668,675.36		$1,668,675.36								
ORCHARD RIDGE	BUILDING J	LIGHTING - EXTERIOR	$ 12,012.21	$12,012.21									
ORCHARD RIDGE	BUILDING J	SUPPLY PIPING SYSTEM - STUDENT UNION	$ 1,533,061.99		$1,533,061.99								
ORCHARD RIDGE	BUILDING J	DEAERATOR SYSTEM	$ 2,577.85	$2,577.85									
ORCHARD RIDGE	BUILDING J	VARIABLE FREQUENCY DRIVE	$ 19,984.40	$19,984.40									
ORCHARD RIDGE	BUILDING J	VARIABLE FREQUENCY DRIVE	$ 24,267.72				$24,267.72						
ORCHARD RIDGE	BUILDING J	HVAC CONTROLS SYSTEM - STUDENT UNION	$ 688,390.26					$688,390.26					
ORCHARD RIDGE	BUILDING J	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34					$14,784.34					
ORCHARD RIDGE	BUILDING J	BOILER - GAS (>2,000 MBH)	$ 150,465.21						$150,465.21				
ORCHARD RIDGE	BUILDING J	WALL FINISH - APPLIED, STANDARD	$ 149,223.95							$149,223.95			
ORCHARD RIDGE	BUILDING J	BACKFLOW PREVENTER (<=1 INCH)	$ 1,799.52								$1,799.52		
ORCHARD RIDGE	BUILDING J	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 33,621.12								$33,621.12		
ORCHARD RIDGE	BUILDING J	COMMERCIAL KITCHEN EQUIPMENT ESTIMATE BY SQUARE FOOT	$ 1,657,264.53								$1,657,264.53		
ORCHARD RIDGE	BUILDING J	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	$ 12,677.87								$12,677.87		
ORCHARD RIDGE	BUILDING J	HOOD, KITCHEN, COMMERCIAL WITH FIRE SUPPRESSION	$ 140,885.45								$140,885.45		
ORCHARD RIDGE	BUILDING J	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$48,958.73	
ORCHARD RIDGE	BUILDING J	FIRE ALARM SYSTEM - DEVICES	$ 579,881.19									$579,881.19	
ORCHARD RIDGE	BUILDING J	PTAC, DX/ HP COOL, ELEC HEAT (1.25-2 TON)	$ 6,450.38									$6,450.38	
ORCHARD RIDGE	BUILDING J	ELEVATOR CAB ACCESSIBILITY UPGRADES	$ 6,951.19		$6,951.19								
ORCHARD RIDGE	BUILDING J	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 37,988.54				$37,988.54						
ORCHARD RIDGE	BUILDING J	AUDITORIUM ACCESSIBILITY UPGRADES	$ 34,514.78			$34,514.78							
ORCHARD RIDGE	BUILDING J	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 15,522.47			$15,522.47							
ORCHARD RIDGE	BUILDING J	UNISEX RESTROOM INSTALLATION	$ 78,897.24										$78,897.24
ORCHARD RIDGE	BUILDING J	STAIR SAFETY UPGRADES	$ 46,924.04				$46,924.04						
ORCHARD RIDGE	BUILDING J	EXTERIOR CONCRETE WALL JOINT RENEWAL	$ 50,842.89		$50,842.89								
ORCHARD RIDGE	BUILDING J	FIRE SPRINKLER SYSTEM EXTENSION	$ 1,890,849.29										$1,890,849.29
ORCHARD RIDGE	**BUILDING J**	**BUILIDING J TOTALS**	**$ 16,175,796.55**	**$40,039.41**	**$10,514,673.74**	**$57,754.04**	**$109,180.29**	**$703,174.60**	**$150,465.21**	**$149,223.95**	**$1,846,248.49**	**$635,290.29**	**$1,969,746.53**
ORCHARD RIDGE	BUILDING K	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 6,438.17		$ 6,438.17								
ORCHARD RIDGE	BUILDING K	AIR HANDLING UNIT - INDOOR	$ 53,052.54		$ 53,052.54								
ORCHARD RIDGE	BUILDING K	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 14,793.29		$ 14,793.29								
ORCHARD RIDGE	BUILDING K	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING K	DOOR, PANIC HARDWARE AND FRAME, EXTERIOR	$ 53,004.90		$ 53,004.90								
ORCHARD RIDGE	BUILDING K	DOOR LOCK, COMMERCIAL-GRADE, INTERIOR	$ 3,603.90		$ 3,603.90								
ORCHARD RIDGE	BUILDING K	DOOR PANIC HARDWARE, INTERIOR	$ 5,667.53		$ 5,667.53								
ORCHARD RIDGE	BUILDING K	FAN - PROPELLER WITH LOUVER	$ 3,255.56		$ 3,255.56								
ORCHARD RIDGE	BUILDING K	FAN - UTILITY SET	$ 13,052.66		$ 13,052.66								
ORCHARD RIDGE	BUILDING K	GLASS, STOREFRONT	$ 481,808.33		$ 481,808.33								
ORCHARD RIDGE	BUILDING K	LIGHTING - EXTERIOR	$ 16,888.23	$ 16,888.23									
ORCHARD RIDGE	BUILDING K	MOTOR CONTROL CENTER VERTICAL SECTION	$ 295,173.21		$ 295,173.21								
ORCHARD RIDGE	BUILDING K	PLUMBING FIXTURE - LAVATORY, COUNTER	$ 18,614.18		$ 18,614.18								
ORCHARD RIDGE	BUILDING K	WALL, EXTERIOR, TILT-UP OR PRECAST CONCRETE PANELS - RESTORE NATURAL FINISH	$ 892.91		$ 892.91								
ORCHARD RIDGE	BUILDING K	ELECTRICAL DISTRIBUTION NETWORK - LIBRARY	$ 321,623.86		$ 321,623.86								
ORCHARD RIDGE	BUILDING K	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 3,984.71		$ 3,984.71								
ORCHARD RIDGE	BUILDING K	SUPPLY PIPING SYSTEM - LIBRARY	$ 240,874.03		$ 240,874.03								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	BUILDING K	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	$ 6,661.47	$ 6,661.47									
ORCHARD RIDGE	BUILDING K	PLUMBING FIXTURE - SINK, KITCHEN	$ 1,854.65		$ 1,854.65								
ORCHARD RIDGE	BUILDING K	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78	$ 7,716.78									
ORCHARD RIDGE	BUILDING K	HVAC CONTROLS SYSTEM - LIBRARY	$ 282,794.74				$ 282,794.74						
ORCHARD RIDGE	BUILDING K	VARIABLE FREQUENCY DRIVE	$ 29,568.69				$ 29,568.69						
ORCHARD RIDGE	BUILDING K	WALL FINISH - APPLIED, STANDARD	$ 61,441.18							$ 61,441.18			
ORCHARD RIDGE	BUILDING K	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70								$ 2,749.70		
ORCHARD RIDGE	BUILDING K	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
ORCHARD RIDGE	BUILDING K	FIRE ALARM SYSTEM - DEVICES	$ 215,501.28									$ 215,501.28	
ORCHARD RIDGE	BUILDING K	INTERIOR PATH OF TRAVEL ACCESSIBILITY UPGRADES	$ 3,475.59		$ 3,475.59								
ORCHARD RIDGE	BUILDING K	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 67,589.62			$ 67,589.62							
ORCHARD RIDGE	BUILDING K	STAIR AND RAILING SAFETY UPGRADES	$ 39,801.37			$ 39,801.37							
ORCHARD RIDGE	BUILDING K	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 92,864.18					$ 92,864.18					
ORCHARD RIDGE	BUILDING K	FIRE SPRINKLER SYSTEM EXTENSION	$ 625,292.70										$ 625,292.70
ORCHARD RIDGE	BUILDING K	FIRE RATING COMPROMISE	$ 7,709.62		$ 7,709.62								
ORCHARD RIDGE	**BUILDING K**	**BUILDING K TOTALS**	**$ 3,030,145.46**	**$ 34,703.62**	**$ 1,528,879.64**	**$ 107,391.00**	**$ 312,363.43**	**$ 92,864.18**	**$ -**	**$ 61,441.18**	**$ 2,749.70**	**$ 264,460.01**	**$ 625,292.70**
ORCHARD RIDGE	BUILDING L	AIR HANDLING UNIT - INDOOR	$ 31,831.53		$ 31,831.53								
ORCHARD RIDGE	BUILDING L	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 67,242.24		$ 67,242.24								
ORCHARD RIDGE	BUILDING L	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING L	DOOR, LOCKS, PANIC HARDWARE AND FRAME, EXTERIOR	$ 51,785.02		$ 51,785.02								
ORCHARD RIDGE	BUILDING L	DOOR PANIC HARDWARE, INTERIOR	$ 51,007.73		$ 51,007.73								
ORCHARD RIDGE	BUILDING L	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
ORCHARD RIDGE	BUILDING L	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56		$ 3,255.56								
ORCHARD RIDGE	BUILDING L	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	$ 6,526.33		$ 6,526.33								
ORCHARD RIDGE	BUILDING L	GLASS, STOREFRONT	$ 689,049.68		$ 689,049.68								
ORCHARD RIDGE	BUILDING L	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 1,159,558.79		$ 1,159,558.79								
ORCHARD RIDGE	BUILDING L	LIGHTING - EXTERIOR	$ 5,530.42	$ 5,530.42									
ORCHARD RIDGE	BUILDING L	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 119,612.00		$ 119,612.00								
ORCHARD RIDGE	BUILDING L	WALL, EXTERIOR, TILE OR GLASS BLOCK CLEAN, GROUT, AND REPAIR	$ 1,765.65		$ 1,765.65								
ORCHARD RIDGE	BUILDING L	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	$ 511,367.64		$ 511,367.64								
ORCHARD RIDGE	BUILDING L	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 19,923.53		$ 19,923.53								
ORCHARD RIDGE	BUILDING L	SUPPLY PIPING SYSTEM - CLASSROOM	$ 428,669.66		$ 428,669.66								
ORCHARD RIDGE	BUILDING L	DUST COLLECTION SYSTEM	$ 36,807.96		$ 36,807.96								
ORCHARD RIDGE	BUILDING L	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78	$ 7,716.78									
ORCHARD RIDGE	BUILDING L	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56			$ 3,255.56							
ORCHARD RIDGE	BUILDING L	HVAC CONTROLS SYSTEM - CLASSROOM	$ 204,909.98				$ 204,909.98						
ORCHARD RIDGE	BUILDING L	VARIABLE FREQUENCY DRIVE (30-40 HP)	$ 14,784.34	$ 14,784.34									
ORCHARD RIDGE	BUILDING L	WALL FINISH - APPLIED, STANDARD	$ 72,633.82					$ 72,633.82					
ORCHARD RIDGE	BUILDING L	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68						$ 1,199.68				
ORCHARD RIDGE	BUILDING L	AIR COMPRESSOR - UTILITY (< =5 HP)	$ 13,630.62								$ 13,630.62		
ORCHARD RIDGE	BUILDING L	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 165,258.21								$ 165,258.21		
ORCHARD RIDGE	BUILDING L	FAN - CENTRIFUGAL ROOF EXHAUST	$ 18,095.15								$ 18,095.15		
ORCHARD RIDGE	BUILDING L	FIRE ALARM SYSTEM - DEVICES	$ 159,839.12									$ 159,839.12	
ORCHARD RIDGE	BUILDING L	LOAD INTERRUPTER SWITCH - 15 KV	$ 143,253.91		$ 143,253.91								
ORCHARD RIDGE	BUILDING L	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 20,447.48			$ 20,447.48							
ORCHARD RIDGE	BUILDING L	STAIR SAFETY UPGRADES	$ 32,278.27						$ 32,278.27				
ORCHARD RIDGE	BUILDING L	ELEVATOR CAB UPGRADES AND CHAIR LIFT INSTALLATION	$ 16,370.26		$ 16,370.26								
ORCHARD RIDGE	BUILDING L	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 20,636.49			$ 20,636.49							
ORCHARD RIDGE	BUILDING L	TUNNEL ACCESSIBILITY IMPROVEMENTS	$ 11,560.42		$ 11,560.42								
ORCHARD RIDGE	BUILDING L	FIRE SPRINKLER SYSTEM INSTALLATION	$ 508,120.05										$ 508,120.05
ORCHARD RIDGE	BUILDING L	INTERIOR DOOR SAFETY UPGRADES	$ 103,238.96			$ 103,238.96							
ORCHARD RIDGE	BUILDING L	BACKFLOW PREVENTER INSTALLATION	$ 8,536.52		$ 8,536.52								
ORCHARD RIDGE	**BUILDING L**	**BUILDING L TOTALS**	**$ 5,023,776.93**	**$ 31,468.69**	**$ 3,668,764.85**	**$ 147,578.50**	**$ 204,909.98**	**$ 72,633.82**	**$ 33,477.95**	**$ -**	**$ 196,983.98**	**$ 159,839.12**	**$ 508,120.05**
ORCHARD RIDGE	BUILDING M	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 6,438.17		$ 6,438.17								
ORCHARD RIDGE	BUILDING M	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	$ 12,732.61		$ 12,732.61								
ORCHARD RIDGE	BUILDING M	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 2,689.69		$ 2,689.69								
ORCHARD RIDGE	BUILDING M	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	BUILDING M	DOOR, PANIC HARDWARE AND FRAME, EXTERIOR	$ 25,208.94		$ 25,208.94								
ORCHARD RIDGE	BUILDING M	DOOR PANIC HARDWARE, INTEREIOR	$ 7,084.41		$ 7,084.41								
ORCHARD RIDGE	BUILDING M	FAN - PROPELLER WITH LOUVER,	$ 6,511.11		$ 6,511.11								
ORCHARD RIDGE	BUILDING M	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	$ 6,526.33		$ 6,526.33								
ORCHARD RIDGE	BUILDING M	GLASS, STOREFRONT	$ 353,775.35		$ 353,775.35								
ORCHARD RIDGE	BUILDING M	HVAC DISTRIBUTION NETWORKS - OFFICE	$ 558,984.78		$ 558,984.78								

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	BUILDING M	KITCHENETTE UNIT WITH CABINETRY AND AMENITIES	$ 14,893.39		$ 14,893.39								
ORCHARD RIDGE	BUILDING M	LIGHTING - EXTERIOR	$ 3,575.75	$ 3,575.75									
ORCHARD RIDGE	BUILDING M	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (<=400A) W/STARTERS	$ 73,793.30		$ 73,793.30								
ORCHARD RIDGE	BUILDING M	PLUMBING FIXTURES	$ 44,066.38		$ 44,066.38								
ORCHARD RIDGE	BUILDING M	PUMP - ELECTRIC	$ 5,576.45	$ 5,576.45									
ORCHARD RIDGE	BUILDING M	ELECTRICAL DISTRIBUTION NETWORK - OFFICE	$ 389,949.55		$ 389,949.55								
ORCHARD RIDGE	BUILDING M	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	$ 3,984.71		$ 3,984.71								
ORCHARD RIDGE	BUILDING M	SUPPLY PIPING SYSTEM - OFFICE	$ 146,404.99		$ 146,404.99								
ORCHARD RIDGE	BUILDING M	HVAC CONTROLS SYSTEM - OFFICE	$ 158,175.64			$ 158,175.64							
ORCHARD RIDGE	BUILDING M	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78	$ 7,716.78									
ORCHARD RIDGE	BUILDING M	WALL FINISH - APPLIED, STANDARD	$ 122,679.46					$ 122,679.46					
ORCHARD RIDGE	BUILDING M	VARIABLE FREQUENCY DRIVE (40-50 HP)	$ 16,986.17	$ 16,986.17									
ORCHARD RIDGE	BUILDING M	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
ORCHARD RIDGE	BUILDING M	FIRE ALARM SYSTEM - DEVICES	$ 151,098.65									$ 151,098.65	
ORCHARD RIDGE	BUILDING M	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 23,616.72				$ 23,616.72						
ORCHARD RIDGE	BUILDING M	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 35,783.11				$ 35,783.11						
ORCHARD RIDGE	BUILDING M	STAIR SAFETY UPGRADES	$ 46,924.04						$ 46,924.04				
ORCHARD RIDGE	BUILDING M	RESTROOM ACCESSIBILITY IMPROVEMENTS	$ 19,359.62		$ 19,359.62								
ORCHARD RIDGE	BUILDING M	FIRE SPRINKLER SYSTEM INSTALLATION	$ 480,334.56										$ 480,334.56
ORCHARD RIDGE	BUILDING M	IMPROVE EGRESS PATHWAY DESIGNATION	$ 11,561.01		$ 11,561.01								
ORCHARD RIDGE	BUILDING M	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	$ 3,332.29		$ 3,332.29								
ORCHARD RIDGE	**BUILDING M**	**BUILDING M TOTALS**	**$ 2,792,159.84**	**$ 37,292.30**	**$ 1,687,296.64**	**$ 158,175.64**	**$ 59,399.83**	**$ 122,679.46**	**$ 46,924.04**	**$ -**	**$ -**	**$ 200,057.38**	**$ 480,334.56**
ORCHARD RIDGE	GROUNDS GARAGE	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 4,034.53		$ 4,034.53								
ORCHARD RIDGE	GROUNDS GARAGE	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 13,289.15		$ 13,289.15								
ORCHARD RIDGE	GROUNDS GARAGE	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 2,397.52		$ 2,397.52								
ORCHARD RIDGE	GROUNDS GARAGE	DOOR LOCK, COMMERCIAL-GRADE	$ 900.98		$ 900.98								
ORCHARD RIDGE	GROUNDS GARAGE	OVERHEARD DOOR & OPERATOR, EXTERIOR	$ 100,061.35		$ 100,061.35								
ORCHARD RIDGE	GROUNDS GARAGE	FAN - CENTRIFUGAL ROOF EXHAUST	$ 5,428.55	$ 5,428.55									
ORCHARD RIDGE	GROUNDS GARAGE	FENCING, PERIMETER SECURITY	$ 42,588.32		$ 42,588.32								
ORCHARD RIDGE	GROUNDS GARAGE	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	$ 8,142.99		$ 8,142.99								
ORCHARD RIDGE	GROUNDS GARAGE	HVAC CONTROLS SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 1,371.82		$ 1,371.82								
ORCHARD RIDGE	GROUNDS GARAGE	LIGHTING - EXTERIOR	$ 2,569.94		$ 2,569.94								
ORCHARD RIDGE	GROUNDS GARAGE	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	$ 30,064.88	$ 30,064.88									
ORCHARD RIDGE	GROUNDS GARAGE	PLUMBING FIXTURES	$ 15,079.44		$ 15,079.44								
ORCHARD RIDGE	GROUNDS GARAGE	PTAC, DX/ HP COOL, ELEC HEAT (0.5-1.25 TON)	$ 2,731.55		$ 2,731.55								
ORCHARD RIDGE	GROUNDS GARAGE	UNIT HEATER - INDOOR	$ 14,468.19	$ 14,468.19									
ORCHARD RIDGE	GROUNDS GARAGE	VEHICLE GATE, SLIDING OR SWINGING, MOTORIZED	$ 1,952.46		$ 1,952.46								
ORCHARD RIDGE	GROUNDS GARAGE	HVAC DISTRIBUTION NETWORKS - SHOPS / TRADES, DRY LABORATORY	$ 8,442.93	$ 8,442.93									
ORCHARD RIDGE	GROUNDS GARAGE	PTAC, DX/ HP COOL, ELEC HEAT (0.5-1.25 TON)	$ 2,731.55			$ 2,731.55							
ORCHARD RIDGE	GROUNDS GARAGE	ELECTRICAL DISTRIBUTION NETWORK - SHOPS / TRADES, DRY LABORATORY	$ 86,981.42					$ 86,981.42					
ORCHARD RIDGE	GROUNDS GARAGE	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 25,122.62					$ 25,122.62					
ORCHARD RIDGE	GROUNDS GARAGE	WALL FINISH - APPLIED, STANDARD	$ 12,443.78					$ 12,443.78					
ORCHARD RIDGE	GROUNDS GARAGE	AIR COMPRESSOR - UTILITY (< =5 HP)	$ 13,630.62							$ 13,630.62			
ORCHARD RIDGE	GROUNDS GARAGE	WATER HEATER - COMMERCIAL, GAS (<87-168 MBH INPUT)	$ 13,344.83	$ 13,344.83									
ORCHARD RIDGE	GROUNDS GARAGE	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73									$ 48,958.73	
ORCHARD RIDGE	GROUNDS GARAGE	FIRE ALARM SYSTEM - DEVICES	$ 13,021.59									$ 13,021.59	
ORCHARD RIDGE	GROUNDS GARAGE	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	$ 12,636.26									$ 12,636.26	
ORCHARD RIDGE	GROUNDS GARAGE	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 6,134.25				$ 6,134.25						
ORCHARD RIDGE	GROUNDS GARAGE	RESTROOM ACCESSIBILITY UPGRADES	$ 27,682.23		$ 27,682.23								
ORCHARD RIDGE	GROUNDS GARAGE	RAILING SAFETY UPGRADES	$ 6,830.65				$ 6,830.65						
ORCHARD RIDGE	GROUNDS GARAGE	BACKFLOW PREVENTER INSTALLATION	$ 8,536.52		$ 8,536.52								
ORCHARD RIDGE	**GROUNDS GARAGE**	**GROUNDS GARAGE TOTALS**	**$ 531,579.63**	**$ 71,749.37**	**$ 231,338.79**	**$ 2,731.55**	**$ 12,964.89**	**$ 124,547.82**	**$ -**	**$ 13,630.62**	**$ -**	**$ 74,616.58**	**$ -**
ORCHARD RIDGE	PUMP HOUSE	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	$ 3,255.56		$ 3,255.56								
ORCHARD RIDGE	PUMP HOUSE	FURNACE, OUTDOOR, NATURAL GAS (75-120 MBH)	$ 8,024.20		$ 8,024.20								
ORCHARD RIDGE	PUMP HOUSE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 7,168.07		$ 7,168.07								
ORCHARD RIDGE	PUMP HOUSE	MAIN SWITCHBOARD W/BREAKERS (<400 AMP)	$ 12,976.71		$ 12,976.71								
ORCHARD RIDGE	PUMP HOUSE	POTABLE WATER STORAGE TANK	$ 20,548.24		$ 20,548.24								
ORCHARD RIDGE	PUMP HOUSE	SUPPLY PIPING SYSTEM - WAREHOUSE	$ 15,484.56		$ 15,484.56								
ORCHARD RIDGE	PUMP HOUSE	WALL FINISH - APPLIED, STANDARD	$ 4,497.35		$ 4,497.35								
ORCHARD RIDGE	PUMP HOUSE	WATER HEATER - RESIDENTIAL, ELECTRIC (15-25 GAL)	$ 1,524.26		$ 1,524.26								
ORCHARD RIDGE	PUMP HOUSE	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	$ 15,636.48		$ 15,636.48								
ORCHARD RIDGE	PUMP HOUSE	SUPPLY PIPING SYSTEM - WAREHOUSE	$ 4,060.40		$ 4,060.40								
ORCHARD RIDGE	PUMP HOUSE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 1,284.97			$ 1,284.97							

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ORCHARD RIDGE	PUMP HOUSE	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 3,212.39							$ 3,212.39			
ORCHARD RIDGE	PUMP HOUSE	EXTERIOR WALL FINISH RENEWAL	$ 4,266.57				$ 4,266.57						
ORCHARD RIDGE	**PUMP HOUSE**	**PUMP HOUSE TOTALS**	**$ 101,939.75**	**$ -**	**$ 93,175.81**	**$ 1,284.97**	**$ 4,266.57**	**$ -**	**$ -**	**$ 3,212.39**	**$ -**	**$ -**	**$ -**
ORCHARD RIDGE	SMITH THEATER	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	$ 2,146.06		$ 2,146.06								
ORCHARD RIDGE	SMITH THEATER	DEAERATOR SYSTEM	$ 3,437.14	$ 3,437.14									
ORCHARD RIDGE	SMITH THEATER	DOOR, PANIC HARDWARE AND FRAME, EXTERIOR	$ 38,752.02		$ 38,752.02								
ORCHARD RIDGE	SMITH THEATER	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	$ 605.08		$ 605.08								
ORCHARD RIDGE	SMITH THEATER	MOTOR CONTROL CENTER VERTICAL SECTION,	$ 221,379.91		$ 221,379.91								
ORCHARD RIDGE	SMITH THEATER	PLUMBING FIXTURE - LAVATORY, COUNTER	$ 6,204.73		$ 6,204.73								
ORCHARD RIDGE	SMITH THEATER	UNINTERRUPTIBLE POWER SUPPLY - 120/208 VOLTS	$ 93,837.63		$ 93,837.63								
ORCHARD RIDGE	SMITH THEATER	WATER HEATER - RESIDENTIAL, GAS	$ 3,392.70		$ 3,392.70								
ORCHARD RIDGE	SMITH THEATER	DOOR LOCK, COMMERCIAL-GRADE	$ 12,613.66		$ 12,613.66								
ORCHARD RIDGE	SMITH THEATER	PLUMBING FIXTURES	$ 6,501.06		$ 6,501.06								
ORCHARD RIDGE	SMITH THEATER	VARIABLE FREQUENCY DRIVE (15-20 HP)	$ 28,695.56	$ 28,695.56									
ORCHARD RIDGE	SMITH THEATER	HVAC CONTROLS SYSTEM - THEATER	$ 136,746.91				$ 136,746.91						
ORCHARD RIDGE	SMITH THEATER	GLASS, STOREFRONT	$ 23,585.02					$ 23,585.02					
ORCHARD RIDGE	SMITH THEATER	SEATING, FIXED, FOLDING, STANDARD	$ 177,104.82					$ 177,104.82					
ORCHARD RIDGE	SMITH THEATER	WALL FINISH - APPLIED, STANDARD	$ 5,985.19							$ 5,985.19			
ORCHARD RIDGE	SMITH THEATER	FIRE ALARM SYSTEM - DEVICES	$ 76,874.85									$ 76,874.85	
ORCHARD RIDGE	SMITH THEATER	INTERIOR PATH OF TRAVEL ACCESSIBILITY UPGRADES	$ 32,363.70		$ 32,363.70								
ORCHARD RIDGE	SMITH THEATER	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 20,636.49						$ 20,636.49				
ORCHARD RIDGE	SMITH THEATER	AUDITORIUM ACCESSIBILITY UPGRADES	$ 5,942.62			$ 5,942.62							
ORCHARD RIDGE	SMITH THEATER	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 2,891.83			$ 2,891.83							
ORCHARD RIDGE	SMITH THEATER	STAIR AND RAILING SAFETY UPGRADES	$ 5,922.17			$ 5,922.17							
ORCHARD RIDGE	SMITH THEATER	UNISEX RESTROOM INSTALLATION	$ 18,893.01								$ 18,893.01		
ORCHARD RIDGE	SMITH THEATER	FIRE SPRINKLER SYSTEM INSTALLATION	$ 244,379.59										$ 244,379.59
ORCHARD RIDGE	**SMITH THEATER**	**SMITH THEATER TOTALS**	**$ 1,168,891.75**	**$ 32,132.70**	**$ 417,796.54**	**$ 14,756.62**	**$ 136,746.91**	**$ 200,689.85**	**$ 20,636.49**	**$ 5,985.19**	**$ 18,893.01**	**$ 76,874.85**	**$ 244,379.59**
ORCHARD RIDGE	SITE	REPLACE OLDEST WATER SERVICE LINES	$ 379,353.64			$ 379,353.64							
ORCHARD RIDGE	SITE	CCTV CRITICAL SANITARY SEWER LINES FOR DEFICIENCIES	$ 19,513.17		$ 19,513.17								
ORCHARD RIDGE	SITE	CCTV CRITICAL STORMWATER SEWER LINES FOR DEFICIENCIES	$ 66,370.49		$ 66,370.49								
ORCHARD RIDGE	SITE	REPLACE SELECT AGED/DEFICIENT STORMWATER STRUCTURES	$ 321,284.42				$ 321,284.42						
ORCHARD RIDGE	SITE	REMOVE AND REPLACE DAMAGED HW AND CW PIPE INSULATION	$ 348,846.08						$ 348,846.08				
ORCHARD RIDGE	SITE	REMOVE AND REPLACE PIPE AND VALVES	$ 3,962,954.79								$ 3,962,954.79		
ORCHARD RIDGE	SITE	REMOVE/REPLACE DIRECT-BURIED HW PIPE TO BUILDING ORH	$ 309,232.10							$ 309,232.10			
ORCHARD RIDGE	SITE	PERFORM ULTRASONIC PIPE THICKNESS TEST ON HW AND CW	$ 28,033.34		$ 28,033.34								
ORCHARD RIDGE	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	$ 36,961.07		$ 36,961.07								
ORCHARD RIDGE	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	$ 36,961.07							$ 36,961.07			
ORCHARD RIDGE	SITE	DOMESTIC WATER BOOSTER SYSTEM	$ 72,705.28		$ 72,705.28								
ORCHARD RIDGE	SITE	POTABLE WATER STORAGE TANK	$ 102,741.18		$ 102,741.18								
ORCHARD RIDGE	SITE	SANITARY SEWER PIPES	$ 370,084.50					$ 370,084.50					
ORCHARD RIDGE	SITE	SANITARY SEWER PIPE - 8" DIAMETER - STORMWATER	$ 82,462.81					$ 82,462.81					
ORCHARD RIDGE	**SITE**	**SITE TOTALS**	**$ 6,137,503.93**	**$ -**	**$ 326,324.52**	**$ 379,353.64**	**$ 321,284.42**	**$ 452,547.30**	**$ 348,846.08**	**$ 346,193.17**	**$ 3,962,954.79**	**$ -**	**$ -**
ORCHARD RIDGE	TUNNEL	FIRE ALARM SYSTEM - DEVICES	$ 17,018.05		$ 17,018.05								
ORCHARD RIDGE	TUNNEL	HVAC CONTROLS SYSTEM - WAREHOUSE	$ 9,577.64		$ 9,577.64								
ORCHARD RIDGE	TUNNEL	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 15,129.28		$ 15,129.28								
ORCHARD RIDGE	TUNNEL	ELECTRICAL DISTRIBUTION NETWORK - WAREHOUSE	$ 36,303.44		$ 36,303.44								
ORCHARD RIDGE	**TUNNEL**	**TUNNEL TOTALS**	**$ 78,028.41**	**$ -**	**$ 78,028.41**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
		ORCHARD RIDGE CAMPUS WIDE - GRAND TOTALS	**$ 72,609,386.60**	**$ 554,723.68**	**$ 41,155,082.26**	**$ 2,380,099.35**	**$ 1,781,899.64**	**$ 6,741,743.22**	**$ 1,258,844.92**	**$ 1,131,738.40**	**$ 6,136,306.96**	**$ 3,484,145.42**	**$ 7,984,802.75**

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ROYAL OAK	BUILDING A	AIR HANDLING UNIT - INDOOR	$ 168,465.18	$ 168,465.18									
ROYAL OAK	BUILDING A	DOOR, LOCK, PANIC HARDWARE AND FRAME, EXTERIOR	$ 10,984.55		$ 10,984.55								
ROYAL OAK	BUILDING A	DOOR PANIC HARDWARE, INTERIOR	$ 2,833.76		$ 2,833.76								
ROYAL OAK	BUILDING A	FAN - AXIAL, RETURN, 1.5" SP (10-15 HP) 27,000 CFM	$ 35,108.79	$ 35,108.79									
ROYAL OAK	BUILDING A	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY	$ 2,359.52	$ 2,359.52									
ROYAL OAK	BUILDING A	PUMP - ELECTRIC (<=10 HP)	$ 2,027.80	$ 2,027.80									
ROYAL OAK	BUILDING A	VARIABLE FREQUENCY DRIVES	$ 31,984.50	$ 31,984.50									
ROYAL OAK	BUILDING A	WALL FINISH - WALL COVERING, ROLL	$ 154,281.51		$ 154,281.51								
ROYAL OAK	BUILDING A	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 268,601.70		$ 268,601.70								
ROYAL OAK	BUILDING A	HVAC CONTROLS SYSTEM - CLASSROOM	$ 358,683.05	$ 358,683.05									
ROYAL OAK	BUILDING A	BACKFLOW PREVENTERS	$ 13,886.57		$ 13,886.57								
ROYAL OAK	BUILDING A	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 2,397.52			$ 2,397.52							
ROYAL OAK	BUILDING A	TRANSFORMER - DRY-TYPE, 3PH, 5-15KV PRIMARY (500-750 KVA)	$ 88,127.16			$ 88,127.16							
ROYAL OAK	BUILDING A	FIRE ALARM SYSTEM - DEVICES	$ 279,789.12					$ 279,789.12					
ROYAL OAK	BUILDING A	WALL FINISH - APPLIED, STANDARD	$ 97,825.71					$ 97,825.71					
ROYAL OAK	BUILDING A	LIGHTING - EXTERIOR	$ 19,863.69							$ 19,863.69			
ROYAL OAK	BUILDING A	WALL FINISH - APPLIED, STANDARD	$ 19,105.26							$ 19,105.26			
ROYAL OAK	BUILDING A	DRINKING FOUNTAIN, DUAL-LEVEL	$ 6,422.61							$ 6,422.61			
ROYAL OAK	BUILDING A	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (10"-18" DIAMETER)	$ 4,523.79							$ 4,523.79			
ROYAL OAK	BUILDING A	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 1,303,046.25								$ 1,303,046.25		
ROYAL OAK	BUILDING A	WATER HEATER - RESIDENTIAL, ELECTRIC (25-46 GAL)	$ 1,637.35									$ 1,637.35	
ROYAL OAK	BUILDING A	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 15,390.52				$ 15,390.52						
ROYAL OAK	BUILDING A	STAIR SAFETY UPGRADES	$ 6,703.43				$ 6,703.43						
ROYAL OAK	BUILDING A	EXTERIOR WALL PANEL REPAIR	$ 205,463.29										$ 205,463.29
ROYAL OAK	BUILDING A	IMPROVE EGRESS PATHWAY DESIGNATION	$ 1,541.49		$ 1,541.49								
ROYAL OAK	BUILDING A	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 3,321.43						$ 3,321.43				
ROYAL OAK	**BUILDING A**	**BUILDING A TOTALS**	**$ 3,104,375.58**	**$ 598,628.84**	**$ 452,129.58**	**$ 90,524.69**	**$ 22,093.96**	**$ 377,614.84**	**$ 3,321.43**	**$ 49,915.35**	**$ 1,303,046.25**	**$ 1,637.35**	**$ 205,463.29**
ROYAL OAK	BUILDING B	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 8,741.49		$ 8,741.49								
ROYAL OAK	BUILDING B	DOOR PANIC HARDWARE	$ 1,416.88		$ 1,416.88								
ROYAL OAK	BUILDING B	PLUMBING FIXTURE - SINK, KITCHEN	$ 927.32		$ 927.32								
ROYAL OAK	BUILDING B	WALL FINISH - WALL COVERING, ROLL	$ 483,826.83		$ 483,826.83								
ROYAL OAK	BUILDING B	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 190,152.95		$ 190,152.95								
ROYAL OAK	BUILDING B	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 2,397.52			$ 2,397.52							
ROYAL OAK	BUILDING B	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73					$ 48,958.73					
ROYAL OAK	BUILDING B	FIRE ALARM SYSTEM - DEVICES	$ 203,997.08					$ 203,997.08					
ROYAL OAK	BUILDING B	CONDENSER - REFRIGERANT, AIR-COOLED	$ 12,373.65						$ 12,373.65				
ROYAL OAK	BUILDING B	HVAC CONTROLS SYSTEM - CLASSROOM	$ 261,519.44							$ 261,519.44			
ROYAL OAK	BUILDING B	LIGHTING - EXTERIOR	$ 14,625.62							$ 14,625.62			
ROYAL OAK	BUILDING B	DOOR - OVERHEAD, INTERIOR	$ 2,501.44								$ 2,501.44		
ROYAL OAK	BUILDING B	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (10"-18" DIAMETER)	$ 4,523.79								$ 4,523.79		
ROYAL OAK	BUILDING B	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 1,693,670.14								$ 1,693,670.14		
ROYAL OAK	BUILDING B	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 4,124.55									$ 4,124.55	
ROYAL OAK	BUILDING B	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 61,342.46				$ 61,342.46						
ROYAL OAK	**BUILDING B**	**BUILDING B TOTALS**	**$ 2,995,099.91**	**$ -**	**$ 685,065.47**	**$ 2,397.52**	**$ 61,342.46**	**$ 252,955.81**	**$ 12,373.65**	**$ 276,145.06**	**$ 1,700,695.37**	**$ 4,124.55**	**$ -**
ROYAL OAK	BUILDING C	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	$ 28,539.54		$ 28,539.54								
ROYAL OAK	BUILDING C	WALL FINISH - APPLIED, STANDARD	$ 44,161.90		$ 44,161.90								
ROYAL OAK	BUILDING C	WATER HEATER - RESIDENTIAL, ELECTRIC (25-46 GAL)	$ 1,637.35	$ 1,637.35									
ROYAL OAK	BUILDING C	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 4,795.05			$ 4,795.05							
ROYAL OAK	BUILDING C	FIRE ALARM SYSTEM - DEVICES	$ 117,643.39					$ 117,643.39					
ROYAL OAK	BUILDING C	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 4,124.55						$ 4,124.55				
ROYAL OAK	BUILDING C	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 7,716.78						$ 7,716.78				
ROYAL OAK	BUILDING C	LIGHTING - EXTERIOR, STANCHION LUMINAIRE, 12-FOOT	$ 8,004.39							$ 8,004.39			
ROYAL OAK	BUILDING C	VARIABLE FREQUENCY DRIVE (25-30 HP)	$ 13,017.45							$ 13,017.45			
ROYAL OAK	BUILDING C	HVAC CONTROLS SYSTEM - CLASSROOM	$ 150,816.04								$ 150,816.04		
ROYAL OAK	BUILDING C	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 20,636.49				$ 20,636.49						
ROYAL OAK	BUILDING C	RAILING SAFETY UPGRADES	$ 2,049.21				$ 2,049.21						
ROYAL OAK	**BUILDING C**	**BUILDING C TOTALS**	**$ 403,142.15**	**$ 1,637.35**	**$ 72,701.45**	**$ 4,795.05**	**$ 22,685.70**	**$ 117,643.39**	**$ 11,841.34**	**$ 21,021.84**	**$ 150,816.04**	**$ -**	**$ -**
ROYAL OAK	BUILDING D	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 34,293.54		$ 34,293.54								
ROYAL OAK	BUILDING D	DOOR LOCK, COMMERCIAL-GRADE	$ 3,603.90		$ 3,603.90								
ROYAL OAK	BUILDING D	DOOR OPERATOR, OVERHEAD DOOR, COMMERCIAL, PADS	$ 7,506.57		$ 7,506.57								
ROYAL OAK	BUILDING D	DOOR OPERATOR, POWER-ASSIST	$ 32,355.42		$ 32,355.42								
ROYAL OAK	BUILDING D	DOOR PANIC HARDWARE	$ 9,918.17		$ 9,918.17								
ROYAL OAK	BUILDING D	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 37,521.60		$ 37,521.60								
ROYAL OAK	BUILDING D	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY	$ 9,438.07		$ 9,438.07								
ROYAL OAK	BUILDING D	HOOD, FUME	$ 23,388.08		$ 23,388.08								
ROYAL OAK	BUILDING D	PLUMBING FIXTURES	$ 14,651.51		$ 14,651.51								
ROYAL OAK	BUILDING D	PTAC, DX/ HP COOL, ELEC HEAT (0.5-1.25 TON)	$ 2,731.55	$ 2,731.55									
ROYAL OAK	BUILDING D	WALL FINISH - WALL COVERING, ROLL	$ 30,924.87		$ 30,924.87								
ROYAL OAK	BUILDING D	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68		$ 1,199.68								
ROYAL OAK	BUILDING D	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 9,590.10			$ 9,590.10							

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ROYAL OAK	BUILDING D	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	$ 275,775.85			$ 275,775.85							
ROYAL OAK	BUILDING D	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73					$ 48,958.73					
ROYAL OAK	BUILDING D	FIRE ALARM SYSTEM - DEVICES	$ 166,422.06					$ 166,422.06					
ROYAL OAK	BUILDING D	WALL FINISH - APPLIED, STANDARD	$ 129,476.20					$ 129,476.20					
ROYAL OAK	BUILDING D	CONDENSER - REFRIGERANT, AIR-COOLED (<=10 TON)	$ 2,749.70						$ 2,749.70				
ROYAL OAK	BUILDING D	HEAT EXCHANGER - PLATE FRAME (200-600 GPM)	$ 73,655.69							$ 73,655.69			
ROYAL OAK	BUILDING D	LIGHTING - EXTERIOR	$ 5,065.07							$ 5,065.07			
ROYAL OAK	BUILDING D	PUMP - ELECTRIC	$ 12,166.80							$ 12,166.80			
ROYAL OAK	BUILDING D	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	$ 80,352.45								$ 80,352.45		
ROYAL OAK	BUILDING D	HVAC DISTRIBUTION NETWORKS - CLASSROOM	$ 1,381,706.39								$ 1,381,706.39		
ROYAL OAK	BUILDING D	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 17,352.04		$ 17,352.04								
ROYAL OAK	BUILDING D	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 26,123.92		$ 26,123.92								
ROYAL OAK	BUILDING D	RESTROOM ACCESSIBILITY IMPROVEMENTS	$ 52,097.79				$ 52,097.79						
ROYAL OAK	BUILDING D	EXTERIOR WALL PANEL REPAIR	$ 248,947.59										$ 248,947.59
ROYAL OAK	BUILDING D	BUILDING EXTERIOR SAFETY UPGRADES	$ 15,146.04						$ 15,146.04				
ROYAL OAK	BUILDING D	FIRE RATING COMPROMISE	$ 5,786.88		$ 5,786.88								
ROYAL OAK	**BUILDING D**	**BUILDING D TOTALS**	**$ 2,758,906.27**	**$ 2,731.55**	**$ 254,064.26**	**$ 285,365.95**	**$ 52,097.79**	**$ 344,856.99**	**$ 17,895.74**	**$ 90,887.56**	**$ 1,462,058.85**	**$ -**	**$ 248,947.59**
ROYAL OAK	BUILDING E	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 24,207.21		$ 24,207.21								
ROYAL OAK	BUILDING E	DOOR LOCK, COMMERCIAL-GRADE	$ 900.98		$ 900.98								
ROYAL OAK	BUILDING E	DOOR PANIC HARDWARE	$ 5,667.53		$ 5,667.53								
ROYAL OAK	BUILDING E	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY	$ 4,719.04		$ 4,719.04								
ROYAL OAK	BUILDING E	WALL, EXTERIOR, PANEL JOINT RESTORATION	$ 441,416.34	$ 441,416.34									
ROYAL OAK	BUILDING E	BACKFLOW PREVENTER (<=1 INCH)	$ 1,199.68		$ 1,199.68								
ROYAL OAK	BUILDING E	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 21,577.72			$ 21,577.72							
ROYAL OAK	BUILDING E	SEATING, FIXED, FOLDING, STANDARD	$ 151,804.13			$ 151,804.13							
ROYAL OAK	BUILDING E	TRANSFORMER - DRY-TYPE, 3PH, 5-15KV PRIMARY (500-750 KVA)	$ 88,127.16			$ 88,127.16							
ROYAL OAK	BUILDING E	FIRE ALARM SYSTEM - DEVICES	$ 169,677.66					$ 169,677.66					
ROYAL OAK	BUILDING E	WALL FINISH - APPLIED, STANDARD	$ 109,829.91					$ 109,829.91					
ROYAL OAK	BUILDING E	HEAT EXCHANGER - PLATE FRAME (200-600 GPM)	$ 73,655.69							$ 73,655.69			
ROYAL OAK	BUILDING E	LIGHTING - EXTERIOR	$ 11,957.49							$ 11,957.49			
ROYAL OAK	BUILDING E	PUMP - ELECTRIC	$ 10,139.00							$ 10,139.00			
ROYAL OAK	BUILDING E	DOOR - OVERHEAD, INTERIOR	$ 83,673.17								$ 83,673.17		
ROYAL OAK	BUILDING E	HVAC DISTRIBUTION NETWORKS - THEATER	$ 1,908,113.61								$ 1,908,113.61		
ROYAL OAK	BUILDING E	TRANSFORMER - DRY-TYPE, 3PH, 5-15KV PRIMARY (1000-1500 KVA)	$ 162,510.43								$ 162,510.43		
ROYAL OAK	BUILDING E	INTERIOR PATH OF TRAVEL ACCESSIBILITY UPGRADES	$ 2,678.64		$ 2,678.64								
ROYAL OAK	BUILDING E	INTERIOR AMENITY ACCESSIBILITY UPGRADES	$ 10,318.23				$ 10,318.23						
ROYAL OAK	BUILDING E	AUDITORIUM ACCESSIBILITY UPGRADES	$ 5,942.62				$ 5,942.62						
ROYAL OAK	BUILDING E	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 25,559.35		$ 25,559.35								
ROYAL OAK	BUILDING E	STAIR SAFETY UPGRADES	$ 8,850.84						$ 8,850.84				
ROYAL OAK	**BUILDING E**	**BUILDING E TOTALS**	**$ 3,322,526.43**	**$ 441,416.34**	**$ 64,932.41**	**$ 261,509.02**	**$ 16,260.85**	**$ 279,507.57**	**$ 8,850.84**	**$ 95,752.18**	**$ 2,154,297.21**	**$ -**	**$ -**
ROYAL OAK	GROUNDS	DOOR AND FRAME, INTERIOR, NON-RATED	$ 5,296.34		$ 5,296.34								
ROYAL OAK	GROUNDS	DOOR OPERATOR, OVERHEAD PANEL DOOR, RESIDENTIAL, PADS	$ 2,144.23		$ 2,144.23								
ROYAL OAK	GROUNDS	DOOR, EXTERIOR, OVERHEAD PANEL OR SECTIONAL, PAINTED, LOCK	$ 19,604.58		$ 19,604.58								
ROYAL OAK	GROUNDS	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	$ 5,040.90		$ 5,040.90								
ROYAL OAK	GROUNDS	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 2,569.94		$ 2,569.94								
ROYAL OAK	GROUNDS	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	$ 11,641.89		$ 11,641.89								
ROYAL OAK	GROUNDS	MAIN SWITCHBOARD W/BREAKERS (<400 AMP)	$ 19,964.17		$ 19,964.17								
ROYAL OAK	GROUNDS	PLUMBING FIXTURES	$ 2,397.57		$ 2,397.57								
ROYAL OAK	GROUNDS	UNIT HEATER - INDOOR, GAS, SUSPENDED (>180 MBH)	$ 5,902.58		$ 5,902.58								
ROYAL OAK	GROUNDS	WALL FINISH - APPLIED, STANDARD	$ 10,685.42		$ 10,685.42								
ROYAL OAK	GROUNDS	WALL FINISH - WOOD PANEL, STANDARD	$ 19,852.66		$ 19,852.66								
ROYAL OAK	GROUNDS	WALL, EXTERIOR, SIDING, WOOD BOARD, STANDARD	$ 1,480.89		$ 1,480.89								
ROYAL OAK	GROUNDS	LIGHTING - EXTERIOR, WALL FLOOD	$ 6,424.85		$ 6,424.85								
ROYAL OAK	GROUNDS	WATER HEATER - RESIDENTIAL, ELECTRIC (25-46 GAL)	$ 2,183.13		$ 2,183.13								
ROYAL OAK	GROUNDS	CEILING FINISH - ATTACHED ACOUSTICAL TILE	$ 13,879.74			$ 13,879.74							
ROYAL OAK	GROUNDS	DOOR OPERATOR, OVERHEAD PANEL DOOR, RESIDENTIAL, PADS	$ 1,072.11			$ 1,072.11							
ROYAL OAK	GROUNDS	LIGHTING SYSTEM, INTERIOR - SHOPS / TRADES, DRY LABORATORY	$ 9,001.46						$ 9,001.46				
ROYAL OAK	GROUNDS	DRAIN PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 25,857.86								$ 25,857.86		
ROYAL OAK	GROUNDS	ELECTRICAL DISTRIBUTION NETWORK - SHOPS / TRADES, DRY LABORATORY	$ 66,492.46								$ 66,492.46		
ROYAL OAK	GROUNDS	SUPPLY PIPING SYSTEM - SHOPS / TRADES, DRY LABORATORY	$ 17,249.86								$ 17,249.86		
ROYAL OAK	GROUNDS	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 2,641.38		$ 2,641.38								
ROYAL OAK	GROUNDS	EXTERIOR MASONRY WALL RENEWAL	$ 21,689.39				$ 21,689.39						
ROYAL OAK	GROUNDS	IMPROVE EGRESS PATHWAY DESIGNATION	$ 5,302.64		$ 5,302.64								
ROYAL OAK	GROUNDS	FIRE ALARM SYSTEM INSTALLATION	$ 16,899.63									$ 16,899.63	
ROYAL OAK	GROUNDS	FIRE SPRINKLER SYSTEM INSTALLATION	$ 44,840.21									$ 44,840.21	
ROYAL OAK	GROUNDS	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	$ 3,836.02					$ 3,836.02					
ROYAL OAK	**GROUNDS**	**GROUNDS TOTALS**	**$ 343,951.89**	**$ -**	**$ 123,133.16**	**$ 14,951.85**	**$ 21,689.39**	**$ 3,836.02**	**$ 9,001.46**	**$ -**	**$ 109,600.18**	**$ 61,739.83**	**$ -**
ROYAL OAK	MALL	AIR HANDLING UNIT - INDOOR	$ 82,761.97		$ 82,761.97								
ROYAL OAK	MALL	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	$ 21,749.44		$ 21,749.44								
ROYAL OAK	MALL	DOOR LOCK, COMMERCIAL-GRADE	$ 1,801.95		$ 1,801.95								

Major Renovation / Maintenance Program

Oakland Community College

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ROYAL OAK	MALL	DOOR LOCK, SECURITY	$ 10,509.51		$ 10,509.51								
ROYAL OAK	MALL	DOOR PANIC HARDWARE	$ 5,667.53		$ 5,667.53								
ROYAL OAK	MALL	DRINKING FOUNTAIN, DUAL-LEVEL	$ 12,845.21		$ 12,845.21								
ROYAL OAK	MALL	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	$ 310,640.43		$ 310,640.43								
ROYAL OAK	MALL	PLUMBING FIXTURES	$ 40,342.87		$ 40,342.87								
ROYAL OAK	MALL	WATER HEATER - RESIDENTIAL, ELECTRIC (25-46 GAL)	$ 1,637.35		$ 1,637.35								
ROYAL OAK	MALL	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	$ 4,795.05			$ 4,795.05							
ROYAL OAK	MALL	FIRE ALARM SYSTEM - DEVICES	$ 163,122.31					$ 163,122.31					
ROYAL OAK	MALL	VARIABLE FREQUENCY DRIVE	$ 15,433.57					$ 15,433.57					
ROYAL OAK	MALL	WALL FINISH - APPLIED, STANDARD	$ 3,381.46					$ 3,381.46					
ROYAL OAK	MALL	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (10"-18" DIAMETER)	$ 4,523.79						$ 4,523.79				
ROYAL OAK	MALL	HVAC CONTROLS SYSTEM - OFFICE	$ 170,762.46							$ 170,762.46			
ROYAL OAK	MALL	LIGHTING - EXTERIOR	$ 13,349.50							$ 13,349.50			
ROYAL OAK	MALL	HVAC DISTRIBUTION NETWORKS - OFFICE	$ 1,094,461.27								$ 1,094,461.27		
ROYAL OAK	MALL	VARIABLE FREQUENCY DRIVE	$ 33,972.35								$ 33,972.35		
ROYAL OAK	MALL	ELEVATOR CAB ACCESSIBILITY UPGRADES	$ 3,475.59		$ 3,475.59								
ROYAL OAK	MALL	DRINKING FOUNTAIN ACCESSIBILITY UPGRADES	$ 14,041.55			$ 14,041.55							
ROYAL OAK	MALL	INTERIOR DOOR HARDWARE UPGRADES	$ 10,565.56				$ 10,565.56						
ROYAL OAK	MALL	STAIR ACCESSIBILITY AND SAFETY UPGRADES	$ 13,406.86									$ 13,406.86	
ROYAL OAK	**MALL**	**MALL TOTALS**	**$ 2,033,247.56**	**$ -**	**$ 491,431.83**	**$ 18,836.60**	**$ 10,565.56**	**$ 181,937.34**	**$ 4,523.79**	**$ 184,111.96**	**$ 1,128,433.62**	**$ 13,406.86**	**$ -**
ROYAL OAK	POWER HOUSE	AIR DRYER - REFRIGERATED (11-25 CFM)	$ 2,264.63		$ 2,264.63								
ROYAL OAK	POWER HOUSE	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	$ 582.14		$ 582.14								
ROYAL OAK	POWER HOUSE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 13,024.24		$ 13,024.24								
ROYAL OAK	POWER HOUSE	VARIABLE FREQUENCY DRIVE	$ 27,701.18	$ 27,701.18									
ROYAL OAK	POWER HOUSE	AIR HANDLING UNIT - INDOOR (12-17 HP)	$ 116,248.21	$ 116,248.21									
ROYAL OAK	POWER HOUSE	DOOR LOCK, COMMERCIAL-GRADE	$ 1,801.95	$ 1,801.95									
ROYAL OAK	POWER HOUSE	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY, 2.5" SP (<=30 HP)	$ 15,730.12	$ 15,730.12									
ROYAL OAK	POWER HOUSE	PLUMBING FIXTURE - EMERGENCY EYEWASH	$ 1,299.04	$ 1,299.04									
ROYAL OAK	POWER HOUSE	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	$ 8,994.79	$ 8,994.79									
ROYAL OAK	POWER HOUSE	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (6-10 TOTAL HP)	$ 23,150.11		$ 23,150.11								
ROYAL OAK	POWER HOUSE	VARIABLE FREQUENCY DRIVE (10-15 HP)	$ 15,433.57		$ 15,433.57								
ROYAL OAK	POWER HOUSE	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73				$ 48,958.73						
ROYAL OAK	POWER HOUSE	FIRE ALARM SYSTEM - DEVICES	$ 12,755.18				$ 12,755.18						
ROYAL OAK	POWER HOUSE	HVAC CONTROLS SYSTEM - WAREHOUSE	$ 19,207.86				$ 19,207.86						
ROYAL OAK	POWER HOUSE	BACKFLOW PREVENTERS	$ 17,300.08						$ 17,300.08				
ROYAL OAK	POWER HOUSE	LIGHTING SYSTEM, INTERIOR - WAREHOUSE	$ 13,524.66						$ 13,524.66				
ROYAL OAK	POWER HOUSE	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	$ 201,572.14						$ 201,572.14				
ROYAL OAK	POWER HOUSE	AIR COMPRESSOR - UTILITY (< =5 HP)	$ 5,452.25							$ 5,452.25			
ROYAL OAK	POWER HOUSE	EXTERIOR MASONRY WALL RENEWAL	$ 6,155.50								$ 6,155.50		
ROYAL OAK	POWER HOUSE	REMOVE AND REPLACE PURGE PUMP ASSEMBLIES AT CHILLERS	$ 13,700.28			$ 13,700.28							
ROYAL OAK	POWER HOUSE	PERFORM HYDRAULIC ANALYSIS	$ 63,257.78			$ 63,257.78							
ROYAL OAK	POWER HOUSE	MODIFY CONDENSER WATER SYSTEM	$ 20,609.44					$ 20,609.44					
ROYAL OAK	**POWER HOUSE**	**POWER HOUSE TOTALS**	**$ 648,723.89**	**$ 171,775.30**	**$ 54,454.69**	**$ 76,958.06**	**$ 80,921.77**	**$ 20,609.44**	**$ 232,396.87**	**$ 5,452.25**	**$ 6,155.50**	**$ -**	**$ -**
ROYAL OAK	SITE	LOAD INTERRUPTER SWITCH, FUSED - 15 KV	$ 94,597.27			$ 94,597.27							
ROYAL OAK	SITE	LOAD INTERRUPTER SWITCH, FUSED - 15 KV	$ 94,597.27			$ 94,597.27							
ROYAL OAK	SITE	MC SWGR ENCLOSURE VERT STACK SECT (<800 AMP)	$ 18,097.40			$ 18,097.40							
ROYAL OAK	SITE	MC SWGR METERING AND INSTRUMENT SYSTEMS	$ 57,399.27			$ 57,399.27							
ROYAL OAK	SITE	REMOVE AND REPLACE OLDER VALVES THROUGHOUT CAMPUS	$ 133,032.76				$ 133,032.76						
ROYAL OAK	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	$ 15,216.06		$ 15,216.06								
ROYAL OAK	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	$ 15,216.06							$ 15,216.06			
ROYAL OAK	SITE	REMOVE AND REPLACE AGING ELECTRICAL CONDUCTOR	$ 117,746.10						$ 117,746.10				
ROYAL OAK	**SITE**	**SITE TOTALS**	**$ 545,902.18**	**$ -**	**$ 15,216.06**	**$ 264,691.20**	**$ 133,032.76**	**$ -**	**$ 117,746.10**	**$ 15,216.06**	**$ -**	**$ -**	**$ -**
		ROYAL OAK CAMPUS WIDE - GRAND TOTALS	**$ 16,155,875.86**	**$ 1,216,189.38**	**$ 2,213,128.92**	**$ 1,020,029.94**	**$ 420,690.24**	**$ 1,578,961.40**	**$ 417,951.23**	**$ 738,502.26**	**$ 8,015,103.02**	**$ 80,908.59**	**$ 454,410.88**

Campus	Asset Name	Item	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
SOUTHFIELD	BUILDING A	AIR HANDLING UNIT - INDOOR	$ 57,296.75		$ 57,296.75								
SOUTHFIELD	BUILDING A	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	$ 8,069.07		$ 8,069.07								
SOUTHFIELD	BUILDING A	DOOR OPERATOR, OVERHEAD DOOR, COMMERCIAL, PADS	$ 2,502.19		$ 2,502.19								
SOUTHFIELD	BUILDING A	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 12,507.20		$ 12,507.20								
SOUTHFIELD	BUILDING A	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY, 2.5" SP (<=30 HP)	$ 1,573.01		$ 1,573.01								
SOUTHFIELD	BUILDING A	LIGHTING - EXTERIOR WALL FLOOD	$ 8,994.79		$ 8,994.79								
SOUTHFIELD	BUILDING A	DOOR OPERATOR, POWER-ASSIST	$ 64,710.84		$ 64,710.84								
SOUTHFIELD	BUILDING A	GLASS, STOREFRONT	$ 857,484.05		$ 857,484.05								
SOUTHFIELD	BUILDING A	WALL FINISH - APPLIED, STANDARD	$ 365,569.92					$ 365,569.92					
SOUTHFIELD	BUILDING A	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	$ 48,958.73						$ 48,958.73				
SOUTHFIELD	BUILDING A	FIRE ALARM SYSTEM - DEVICES	$ 410,988.72						$ 410,988.72				
SOUTHFIELD	BUILDING A	LIGHTING - EXTERIOR LOTS	$ 29,166.96								$ 29,166.96		
SOUTHFIELD	BUILDING A	LIGHTING SYSTEM, INTERIOR - CLASSROOM	$ 571,535.04								$ 571,535.04		
SOUTHFIELD	BUILDING A	VARIABLE FREQUENCY DRIVE	$ 15,433.57								$ 15,433.57		
SOUTHFIELD	BUILDING A	FIRE RATING COMPROMISE	$ 15,603.44	$ 15,603.44									
SOUTHFIELD	BUILDING A	DRINKING FOUNTAIN ACCESSIBILITY IMPROVEMENTS	$ 9,739.71			$ 9,739.71							
SOUTHFIELD	BUILDING A	STAIR ACCESSIBILITY IMPROVEMENTS	$ 5,692.08			$ 5,692.08							
SOUTHFIELD	BUILDING A	EXTERIOR MASONRY WALL RENEWAL	$ 14,661.11										$ 14,661.11
SOUTHFIELD	BUILDING A	EXTERIOR WALL PANEL REPAIR	$ 78,554.24									$ 78,554.24	
SOUTHFIELD	BUILDING A	INTERIOR DOOR ACCESSIBILITY UPGRADES	$ 17,609.27				$ 17,609.27						
SOUTHFIELD	**BUILDING A**	**BUILDING A TOTALS**	**$ 2,596,650.69**	**$ 15,603.44**	**$ 1,013,137.89**	**$ 15,431.79**	**$ 17,609.27**	**$ 365,569.92**	**$ 459,947.45**	**$ -**	**$ 616,135.57**	**$ 78,554.24**	**$ 14,661.11**
SOUTHFIELD	BLDG. A ADDITION	LIGHTING - EXTERIOR	$ 6,805.49	$ 6,805.49									
SOUTHFIELD	BLDG. A ADDITION	VARIABLE FREQUENCY DRIVE	$ 15,433.57	$ 15,433.57									
SOUTHFIELD	BLDG. A ADDITION	FIRE ALARM SYSTEM - DEVICES	$ 66,219.59	$ 66,219.59									
SOUTHFIELD	BLDG. A ADDITION	HVAC CONTROLS SYSTEM - LIBRARY	$ 86,897.64	$ 86,897.64									
SOUTHFIELD	BLDG. A ADDITION	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (>10 TOTAL HP)	$ 32,684.64		$ 32,684.64								
SOUTHFIELD	BLDG. A ADDITION	BACKFLOW PREVENTER	$ 26,221.06		$ 26,221.06								
SOUTHFIELD	BLDG. A ADDITION	DOMESTIC WATER BOOSTER SYSTEM	$ 45,440.80		$ 45,440.80								
SOUTHFIELD	BLDG. A ADDITION	LIGHTING SYSTEM, INTERIOR - LIBRARY	$ 91,674.53		$ 91,674.53								
SOUTHFIELD	BLDG. A ADDITION	WALL FINISH - APPLIED, STANDARD	$ 35,234.84					$ 35,234.84					
SOUTHFIELD	BLDG. A ADDITION	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (10"-18" DIAMETER)	$ 4,523.79							$ 4,523.79			
SOUTHFIELD	BLDG. A ADDITION	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	$ 273,228.39							$ 273,228.39			
SOUTHFIELD	BLDG. A ADDITION	DEAERATOR SYSTEM	$ 1,718.57								$ 1,718.57		
SOUTHFIELD	BLDG. A ADDITION	DOOR, EXTERIOR, OVERHEAD ROLLING METAL, LOCK	$ 22,512.96								$ 22,512.96		
SOUTHFIELD	BLDG. A ADDITION	VARIABLE FREQUENCY DRIVE	$ 56,066.02								$ 56,066.02		
SOUTHFIELD	BLDG. A ADDITION	BOILERS - GAS	$ 1,289,701.83									$ 1,289,701.83	
SOUTHFIELD	BLDG. A ADDITION	EXTERIOR WALL PANEL REPAIR	$ 49,040.30										$ 49,040.30
SOUTHFIELD	**BLDG. A ADDITION**	**BUILDING A ADDITION TOTALS**	**$ 2,103,404.02**	**$ 175,356.29**	**$ 196,021.03**	**$ -**	**$ -**	**$ 35,234.84**	**$ -**	**$ 277,752.18**	**$ 80,297.54**	**$ 1,289,701.83**	**$ 49,040.30**
SOUTHFIELD	BUILDING B	WALL FINISH - APPLIED, STANDARD	$ 841,984.19					$ 841,984.19					
SOUTHFIELD	BUILDING B	DEAERATOR SYSTEM	$ 1,374.86								$ 1,374.86		
SOUTHFIELD	BUILDING B	LIGHTING - EXTERIOR	$ 68,993.26								$ 68,993.26		
SOUTHFIELD	BUILDING B	EXTERIOR WALL PANEL REPAIR	$ 168,330.53									$ 168,330.53	
SOUTHFIELD	**BUILDING B**	**BUILDING B TOTALS**	**$ 1,080,682.83**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 841,984.19**	**$ -**	**$ -**	**$ 70,368.11**	**$ 168,330.53**	**$ -**
SOUTHFIELD	SITE	PERFORM HYDRAULIC ANALYSIS	$ 22,140.22	$ 22,140.22									
SOUTHFIELD	SITE	MODIFY CONDENSER WATER SYSTEM	$ 20,609.44	$ 20,609.44									
SOUTHFIELD	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 1-5	$ 9,815.10	$ 9,815.10									
SOUTHFIELD	SITE	IMPLEMENT MAINTENANCE/TESTING PROGRAM YEARS 6-10	$ 9,815.10							$ 9,815.10			
SOUTHFIELD	SITE	REMOVE AND REPLACE MISCELLANEOUS ISOLATION VALVES	$ 96,026.41			$ 96,026.41							
SOUTHFIELD	**SITE**	**SITE TOTALS**	**$ 158,406.27**	**$ 52,564.76**	**$ -**	**$ 96,026.41**	**$ -**	**$ -**	**$ -**	**$ 9,815.10**	**$ -**	**$ -**	**$ -**
		SOUTHFIELD CAMPUS WIDE - GRAND TOTALS	**$ 5,939,143.80**	**$ 243,524.49**	**$ 1,209,158.92**	**$ 111,458.20**	**$ 17,609.27**	**$ 1,242,788.96**	**$ 459,947.45**	**$ 287,567.28**	**$ 766,801.23**	**$ 1,536,586.60**	**$ 63,701.42**