TECHNICAL BUILDING ASSESSMENT

LPA

November 30, 2012

SAN BERNARDINO VALLEY COLLEGE

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INTRODUCTION

The purpose of this evaluation of the Technical Building Complex is to identify potential and existing hazards and deficiencies as measured by codes and standards for the use and occupancy required by the San Bernardino Valley College program needs. The examination is based on current 2010 California building codes and the Federal American Disabilities Act. The specific building elements including the West Building, East Building, Modular Building and various sheds and ancillary structures are reviewed by each engineering discipline of architecture, structure, mechanical, plumbing and electrical. With-in those categories the deficiencies are categorized by the following criteria to prioritize their importance.

Life Safety – Issues that represent hazards to life safety of the building occupants.

Code Compliance – Issues that are not compliant with current building codes and standards that may not represent a life safety concern.

Suitability and Function – Issues that affect the usefulness of the building to the program uses and maintenance.

The Buildings

The original buildings were built in 1963 and provide approximately 58,952 square feet of covered and enclosed space. The Division of the State Architect (DSA) records show there were four modifications to the original building including structural upgrades in 2003, fire alarm upgrades in 2004 and changes to the refrigerator shop spaces in 2008. Modifications to the welding shops were constructed but not certified by DSA in 2000. The modular buildings were added in 2008 and closed with certification. This complex of buildings houses lecture spaces, technical shop spaces for automotive, aviation, machine, refrigeration and electronics technical vocation training. In addition there are faculty offices and the division dean.

The West Building is a single story masonry shear wall building with a small mezzanine near the center of building. The roof structure consists of plywood roof sheathing, wood sub-purlins and purlins, and tapper steel beams. The plan dimension is 200’ x 240’ with a North Wing extension on the north-east corner of the building. Wall anchors of various type and spacing were added during the voluntary seismic strengthening from 2002 to 2005. The East Building is a long narrow one story masonry shear wall building. The plan dimension is 240’ x 32’. Construction type and voluntary seismic strengthening are the same as that of the Main Building. A steel canopy structure is situated west of the East building at the southern end of this building. The east edge of the canopy structure overhangs the East Wind building. Steel posts, diagonal bracing and tension rod bracing tie the canopy structure to the East Wing building. Steel columns on the west end support the canopy roof. The Modular Classroom buildings are typical modular buildings. This buildings sit on a raised concrete platform. The Hazardous materials building is a one story masonry shear wall building.

The existing campus power utilities to the facility are accommodated by a campus owned 5kV, 3-phase, 3-wire distribution system located in the equipment yard at the rear of the facility. The 5kV system is stepped down to 208/120 volt, 3-phase, 4-wire via a 300kVA transformer located in the same area. This 300kVA transformer supplies a distribution board to service the 208/120 volt, 3-phase, 4-wire panels located throughout the facility. The medium voltage distribution and associated transformer/distribution board were all installed new in 2009 and are in good working condition

Life Safety Performance Level

The seismic analysis and design of buildings has traditionally focused on one performance objective: reducing the risk to life and property loss from a code determined earthquake design value. The evaluation of the Technical Building Complex is based on a Life-Safety (LS) Performance Level as defined in ASCE 31. The definition of LS Performance Level is given in ASCE 31 as follows:

After a design earthquake, Building performance includes damage to both structural and nonstructural components such that: (a) partial or total structural collapse does not occur, and (b) damage to nonstructural components is non-life threatening.

This Life-Safety performance objective is only meant to ensure that the building will not collapse and that exist paths from the building will not be blocked after a major earthquake. However, the building may undergo severe damage and leave the building in a state where it is not safe for occupation and not repairable

EXECUTIVE SUMMARY

The conglomeration of buildings that comprise the Technology building originally built in 1964 are now nearly 50 years old and have met their anticipated life. Over the years modifications have been done to assist the program to continue to serve students. The evaluation shows there are a significant number of life safety deficiencies, code deficiencies, features and systems that are no longer suitable or functional for the program today.

Life Safety Deficiencies: (23 Identified)

Structural connections in the west and east buildings are not capable of transmitting seismic loads as prescribed by todays building codes. In the event of a significant earthquake it is likely the building would be rendered unusable and require major rennovation or total demolition.

Fire suppression is compromised by the lack of a coordinated fire access plan that provides clear and unobstructed access to the buildings. In addition, not all the structures are provided with an automatic fire suppression system. When evalutated as a single complex they would be required by code. In the event of a fire, there is significant potential for excessive loss of property.

The welding shop's use of updraft hoods place the students in direct exposure of toxic gases and fumes as they are removed over head. In combination with the hazards of hot metals, there is significant potential risk to injury to the students and faculty.

The domestic water system is not adequately separated from the industrial uses in the building and could potentially contaminate the water source to the building occupants or other buildings on campus.

Code deficiencies: (18 Identified)

Accessibility is a major problem found universally in these buildings. This condition exposes the district to legal action and denyes access to all students. This issue is wide spread from the access and availability of restrooms, operation of door hardware, clearances into and out of rooms and signage.

In general equipment anchorage is not adequate or compliant with current codes and standards. This would allow equipment to shift in the event of an earthquake and cause unnecessary collateral damage to the building and its occupants.

The building plumbing and electrical systems are not current technology resulting in inefficient; excess consumption of natural resources driving higher operational and maintenance costs.

Suitability and Function Deficiencies: (20 Identified)

The building structural system and age is not suitable to accommodate the program and its growth. The result is an inefficient arrangement of spaces and functions, split spaces and disjointed uses. The spaces are not conducive to education and in some instances are a potenially hazardous to the student's health and well being.

The building mechanical systems are outdated and exhausted their useful life. The multiple structures, types and manufactures of systems requires extensive maintenance and often replacement parts will no longer be commercially available, hendering the college's ability to further maintain the buildings.

The lack of proper cooling and ventilation is not suitable to an educational environment. Instructional spaces exceeding 95 degrees with poor ventilation are not conducive to learning. This is compounded by the local seasonal temperatures and compromise the educational program at the campus.

CONCLUSIONS

Architectural

As stated in prior sections of this assessment, the existing buildings have significant life safety concerns, code complications and are not functionally suitable for the program any longer. Also noted the building systems are outdated, non-compliant and at the end of their useful life. It is our opinion including the structural, mechanical, plumbing and electrical systems nearly 75% of this project is in need of replacement or rehabilitation to meet current codes and energy standards. With the inclusion of appropriate contingencies for unknown conditions, modernization of this type could easily reach 85-90% the cost of complete replacement. The anticipated difference in cost between a modernization or replacement is roughly 10%. Efficiency in space utilization, increased capacity in FTE and lower energy consumption could offset that cost with-in 15 years. A project of this type, built of steel and concrete could be expected to cost $300.00 per square foot for a new building. In making this evaluation the District must also consider the secondary costs that would include interim housing of the program, moving costs, furniture, fixtures and equipment as well as long term energy savings and lower maintenance costs.

Structural

For the Main Building structure, implementation of the Voluntary Seismic Strengthening (2002-2005) lessened the possibility of catastrophic failure to some of the most critical structural elements. However, some of the structural elements are still inadequate in resisting the prescribed lateral loads. Insufficient sub-diaphragm depth, eccentrically loaded wall anchorage tie members, thin wood top plates on top of CMU walls and insufficient shear capacity of roof diaphragm are some of the elements that do not meet the prescribed loads. Failure of any of these elements would mean that the building does not meet the Life Safety objectives. There are similar issues with the canopy structures and wood framed shed structures as well. In summary, the existing building is constructed to outdated standards and requirements. Current codes and regulations provide much higher levels of safety for the building occupants. As time passes these requirements will become more restrictive and informed further outdating this building. Due to the potential for earthquakes in this region, the long term risks could be significant resulting in a loss of use, property and potentially life.

Mechanical

Significant life safety issues exist as a result of improper ventilation and modifications to the buildings. These risks are direct source at the welding shops and indirect in the automotive and aeronautic shops. In addition to poor ventilation, the multiple types of cooling systems are inefficient and require higher maintenance stock and service contracts. The mechanical systems in the Technical Building Complex have out lived there functional life span. Proper heating and cooling, exhaust ventilation are required for user safety and increased comfort. Current codes require the use of more energy efficient equipment and digital controls to allow the College better management of energy consumption.

Plumbing

The existing plumbing system and cross connections are a serious life safety risk to the building user group and campus water systems. Current codes and regulations require the separation of domestic water sources, irrigation and fire water to prevent accidental contamination. The emergency wash stations are seriously corroded and were not functioning well due to a lack of maintenance. The outdated fixtures through out the building use significantly more water than is currently allowed. Storm water management is now required on all sites and should be provided here to reduce the risk of contamination of storm water and potential fines and legal action by local governmental agencies. To bring this facility into compliance with current codes and standards will require nearly 100% replacement of above and below ground systems.

Electrical

The major electrical systems of these buildings in general have met their useful life. Technology has increased over the years and new systems are more energy efficient and digitally controlled allowing better energy management to occur. The use of power and data in instructional spaces have significantly changed and should be incorporated into the classroom environment and technical labs and shop spaces to allow technical training on the current systems being used in todays market place. Properly sized electrical systems would eliminate life safety issues as a result of the use of extension cords and over loaded circuits. Emergency lighting could be provided that is efficient and not susceptible to student and maintenance misalignment increasing the long term safety of the egress system. A well engineered electrical system will clearly separate power sources to high use labs and by program to allow partial shutdowns and keep the majority of the building operational during maintenance to increase the suitability and function of the program.

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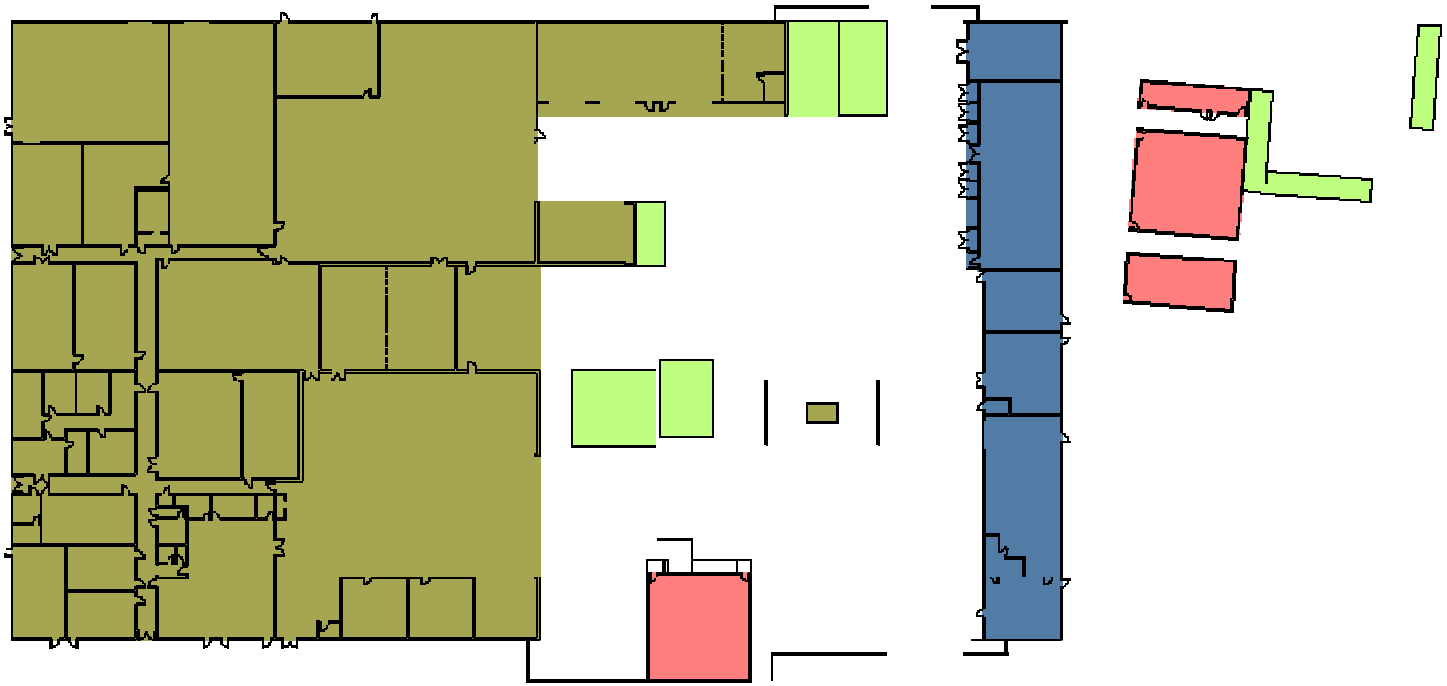
Key Plan



West Building

East Building

Modular Buildings

Sheds & Misc. Structures

DEFICIENCY MATRIX

Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Architectural								
Fire Site Access	■	■	■	■	■			Fire access around the site is provided by public streets and parking areas. The interior fire lane to the project is obstructed by overhead structures and additions blocking the required 20 feet clear unobstructed to the sky access.
Fire Suppression		■	■	■	■			Automatic fire suppression is not provided in these buildings. In the event of a fire there is significant risk to the District for loss of property and potentially life. Current building codes would require automatic fire protection in these structures.
Fire Extinguishers	■	■		■	■			Fire extinguishers are not adequately placed through out the buildings. They are required to be in the egress path of travel and with-in 75' travel distance. In the lab spaces where flammable liquids are used chemical base extinguishers should be provided locally to the use of the liquids.
Access to Fire Extinguishers	■	■		■		■		Fire extinguishers are required to be mounted with the handles at 40 inches above the finish floor to be with-in reach ranges established by accessible codes.
Fire Separation	■				■			Fire separation is required between storage uses over 100 square feet and educational spaces. 1hr separation including self closing doors, smoke protected ventilation is not provided.
Exit Access	■		■		■			Exit access is required to be maintained at all times. The required 60 inch by 48 inch clear floor space was not provided at all exit path doors. Doors were blocked by partition systems furniture and or equipment.
Site Access General	■	■	■	■		■		An accessible path is required to all buildings from a accessible parking area and public transportation. There is a campus master access plan in progress, however, at this time this is a deficiency.
Pedestrian Yard Access	■	■	■	■	■			Pedestrian access in vehicular areas is required to be separated or delineated with curbs, contrasting colors and textural warning zones. The existing yard space does not provide compliant vehicle and pedestrian separation
Site Access Ramps			■	■				Accessible ramps are required to have compliant hand rails, warning stripes, 8% maximum slope and level landings. The ramp adjacent to the modular building serving that structure and providing access to the yard is not compliant.

DEFICIENCY MATRIX

Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Exterior Doors	■	■	■	■		■		All exterior doors are required to be accessible and provided with a 60 inch by 60 inch level landing and accessible path to grade. Doors shall operate with 5lbs pressure. The West building main door auto door operator was not working.
Interior Doors	■	■		■		■		All doors are required to be operable with no special knowledge or grasping. Doors with old style knobs do not comply. It was observed only doors with-in remodel scope of work were corrected.
Storage Mezzanine Access	■					■		The storage mezzanine is now defined as a second story and would be required to have two legal egress stairs and elevator access.
Restroom Configurations	■	■				■		The existing restroom configurations do not provide sufficient number of fixtures for the building occupant load. A total of 14 fixtures are required equally split between men and women. 7 total are provided.
Restroom Fixtures	■	■						The single compartment restrooms do not have the required accessible accessories. The fixtures providded are not mounted a code required heights to allow for access.
Restroom sinks	■	■				■		The in-the-round sinks are no longer compliant with accessible requirements. Sinks with proper under sink clearances and insulated piping should be provided.
Signage	■	■	■	■		■		Current codes requires signs at all doors identifying the space and or egress path in contrasting color and with California Grade II Braille. These signs are to be mounted at 60 inches to the centerline above the floor. Very few of the signs in these buildings comply.
Asbestos laden materials	■	■				■		Due to the age of the buildings and interior finishes, this building is likely to have asbestos. This would not be allowed in new construction, however, if left undisturbed is not considered a life safety issue at this time.
Wall Cracks	■						■	Several interior walls were cracked and showing signs of settlement, abuse and poor maintenance. Although they do not represent a life safety or code issue, they affect the function and appearance of the building and weather enclosure.

DEFICIENCY MATRIX

Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Roof Access	■						■	Roof access is restricted via the storage mezzanine an illegal stair to the wall hatch and illegal roof access ladder on the roof. These are not compliant with Occupational Safety and Health Administration requirements. In addition, the building parapet is not 42 inches tall and represents a fall hazard to regular roof drain maintenance.
Finish Roofing	■	■		■			■	The existing buildings are a combination of multi-ply built up bitumen roofing and metal deck sheds. These roofs are nearing their expect life span and will need replacing. This roofing material is not suitable to low maintenance nor does it meet current cool roof requirements by California Energy Codes.
Roof Drainage	■						■	The current roof drains are not fully functioning due to debris and sagging wood decking. Roof mounted equipment condensation drains are not properly maintained or connected and flooding the roof system.
Drinking Fountains	■	■	■			■		Drinking fountains are required in all buildings and must be accessible. The existing drinking fountains are not complaint and insufficient in number.
Configuration Flexibility	■		■				■	Due to the nature of the structural system of load bearing walls, the buildings ability to easily be changes affects the compatibility to grow with program changes. This has resulted in smaller rooms, program spaces that are disjointed and inefficient. For example the welding shops are at opposite ends of the complex. Faculty offices are created through the use of low level partitions. The automotive program is split between multiple buildings. The result is inefficient use of space and disjointed program spaces.
DSA Certified Modifications	■					■		The existing building has three DSA certified modifications including: 04-103663 Structural Upgrades, 04-105933 Fire Alarm Upgrades, 04-109769 Refrigeration Modifications. There are several modifications that do not appear to have been review and approved by DSA such as added interior partitions in the aeronautics lab and the splitting of the electronics lab and some enclosures in the automotive shops. All modifications are required to be reviewed by the California Education code by DSA if the spaces are used or house students and faculty.

DEFICIENCY MATRIX

Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Overhand Clearances	■				■			Overhead clearance is required unless the obstruction is less than 4" from the wall surface or lower than 27" from the floor. In the building corridors the display cases are not compliant. In the refrigeration lab a significant portion of equipment and ductwork is below the required clearances. In some instances this equipment is blocking the egress path.
Equipment Anchorage	■	■				■		Equipment is required to be secured to the building structure to prevent sliding or overturn in a seismic event. In the machine shop most of the equipment was not bolted to the floor. In the tool storage supply area the shelving should be overhead braced to prevent overturn.
Lecture Room Size	■	■	■				■	Building code standards allocate 20 square feet per occupant in classroom space. Several of the lecture rooms were seated closer to 15 square foot per student station. With the use of tables and chairs and a teaching station this is insufficient space for adequate circulation and accommodation of today's larger students.
Combined Lab Lecture Space	■	■	■				■	The use of combined lab lecture spaces creates dedicated rooms that are not suitable to increase utilization and reporting to the State Chancellors Office. These rooms become dedicated use and filled with junk. Combined lab / lecture spaces restrict flexibility and capacity for joint use by the college and other programs.
Natural Day Light	■						■	U.S. Green Building Council recommends the use of natural day light in interior spaces. This has been proven to enhance the learning environment and reduce energy consumption. The building's use of concrete masonry units and solid construction has limited the possibility for natural daylight.
Faculty Offices	■	■					■	Faculty offices should be provided with acoustic privacy to allow confidential student faculty meetings and reviews. The current configuration of low modular walls does not provide this. Standardization of office size and shared use will increase efficiency in building utilization reporting.
Division Dean	■						■	The division dean office should be equitable with other division deans on the campus and match campus standards. The division suite typically would include reception, assistant and conference meeting space. This configuration does not accomodate that function.

DEFICIENCY MATRIX

Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Structural								
Roof to Wall connections	■				■			Available construction document and field visit indicate that the connection of the roof diaphragm to the CMU walls, where CMU walls stop below the roof diaphragm, are achieved by nailing the roof sheathing to 2x wood top plates connected to the top of the walls with countersunk anchor bolts. Analysis indicates that the 2x wood plates do not have the capacity to resist the seismic load as prescribed in the ASCE 31. This could cause a shear failure in the wood plate and result in roof diaphragm displacement.
Wall Anchorage Loads	■				■			The wall anchorage loads, as prescribed by Equation 4-14 of ASCE/SEI 31-03, exceed the capacity of in place wall anchors. These wall anchorages are not compliant with design standard and could fail.
Strap Connections	■					■		The steel straps, shown in Details 1/S3.00, 3/S3.00, 4/S3.00, & 6/S3.00 in Arup's Voluntary Seismic Strengthening Drawings, are nailed to the bottom of added 3x10 or existing 4x or 6x purlins. The distance, from the bottom of the wood members (where the wall anchorage forces are delivered to the roof structure) to the roof diaphragm (where the wall anchorage forces are resisted), results in an eccentric load condition. This eccentrically loaded condition will cause one end of 3x10 or purlins to move down and the opposite end to move up. The downward side movement can be resisted by the existing metal hanger. However, these existing metal hangers do not have capacity to resist load due to the upward movement at the opposite end of these members. Upward movement must be resisted by mechanically connecting the ends of these members to the supporting elements.
Sub Diaphragms Loads	■				■			Sub-diaphragms are required to have the capacity to resist the out of plane wall anchorage loads. Some of the existing sub-diaphragms are not deep enough in resisting the prescribed wall anchorage loads. Failure of the sub-diaphragms does not meet the Life Safety objective.
Roof Diaphragms Proportions	■					■		The north wing, an extension on the north east corner of the main building, has roof dimensions of 96' x 36'. The resultant seismic shear force at east end of the wing exceeds the capacity of the roof diaphragm.
Cracks in Concrete Masonry Walls	■						■	Minor cracks in the CMU walls were noticed. The size of the cracks does not indicate a structural degradation. However, the cracks should be sealed to prevent moisture penetration.

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Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Concrete Masonry Shear Walls		■			■			The CMU shear wall on the west side of the building (starting at Grid 5) is towards the southern end of the building. The northern portion of this building (about 40% of this building) must be tied to this shear wall. The available design drawings show a connection detail where 1-#5 drag bar is used to tie the northern portion to the shear wall. 1-#5 drag bar, as shown in Detail M/S6 of the 1962 record drawings, is inadequate in resisting the prescribed lateral load. Damage to the drag connection could result in failure.
Length of Shear Wall		■			■			The distance between the two East/West CMU shear walls towards the southern end of this building is about 88'. The diaphragm shear at these walls, resulting from the prescribed lateral load in the East/West direction, exceeds the diaphragm capacity. Failure of the roof diaphragm does not satisfy the Life Safety objective. Internal seismic load resisting element (braced frame or CMU shear wall), as recommended in Ove Arup & Partner's 2006 report, would relieve this diaphragm overstress condition.
Diagonal Member Connections					■			There are diagonal bracing members on the east end of the canopy structure connecting steel channels under the steel beams supporting canopy structure to the roof structure of the East Wing building. These bracing members and steel channels if connected properly are there to deliver the east-west lateral load of the canopy structure to the East Wing building. However, the canopy diaphragm is not connected to the steel channels. This disconnect prevents the proper load transfer from the canopy roof diaphragm to the East Wing building. The steel columns on the west end must resist gravity load and lateral load. The columns do not have adequate capacity to resisting the prescribed lateral loads. Failure of these columns will cause Life Safety hazard.
Steel Canopy Anchorage		■			■			The steel canopy, adjacent to the East Wing Building, does not have an adequate lateral load resisting system. The steel columns are inadequate in resisting the prescribed lateral loads. This structure in its current condition does not meet the Life Safety objective .
Roof Top Equipment Anchorage	■	■				■		Many roof top mechanical units, on the roof of the Main Building, are not properly anchored to the structure. Severe seismic event will cause the units to shift or overturn which will cause damage to the mechanical system and possible damage to the roof structure.

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Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Machinery Anchorage	■	■	■		■			Machinery in different shops and storage cabinets are not properly anchored to the slab on grade. Severe seismic event will cause these elements to shift or overturn. Overturned machinery and storage cabinets could cause harm to occupants of the building and interfere with proper egress.
Modular Classrooms			■				■	The Modular Classrooms are typical modular buildings. This buildings sit on a raised concrete platforms. Design and construction documents were not available for review. Review of foundation design was not performed due to lack of design drawings. Site visit did not uncover any visible deficiencies.
Wood Shed Structural Members				■	■			The shed next the Hazardous Materials Storage building is a stand-alone structure. The wood columns at the four corners act as cantilevered columns to resist all loads. The prescribed loads would cause overstress in these columns. This structure does not satisfy the Life Safety objective .
Sheds Structural Frame				■	■			The shed attached to the east end of the North Wing is built with metal deck roofs over steel beams and steel columns. The west end of the shed is attached to the CMU wall at the east end of the North Wing. The seismic lateral load from the shed structure is resisted by the connection of the shed roof to the CMU wall. The shed next to the Hazardous Materials Storage Building is built with standing seam roof over wood joist, wood beams and wood columns. This shed is not attached to any other structure. The wood columns do not have the capacity to resist the prescribed lateral loads.
Plumbing								
Storm Drainage	■	■	■	■		■	■	Currently the site does not meet the California Plumbing Code requirements code requirements for storm drainage water quality control. With more environmental awareness , recent code requirements now require parking areas to filter storm water runoff and retain it on site prior to discharging into the public sewer. Current parking areas do not have adequate surface drainage or storm water treatment and retention. This issue is especially important with the auto shop. Many of the vehicles coming in and out of the auto shop are leaking or leak while being worked on. Currently there is no system to keep these chemical from the public storm water system.

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Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Water Conservation Measures	■	■	■	■		■	■	Original plumbing fixtures (Toilets, Urinals, Lavatories, Sinks, Etc.) are not compliant with the California Plumbing Code for water consumption. These fixtures use excessive amounts of water and need to be replaced. This would reduce the operating cost for the college and benefit the environment.
Condensate Drainage	■	■	■			■	■	Roof mounted HVAC equipment Condensate drainage does not comply with the California Plumbing Code. Currently condensate drains directly on the surface of the roof and ends up in the storm water system. Current code requires the condensate drain to the sewer system and connection to the sewer be accomplish indirectly with a air gap. Drainage to the sewer in lieu of the storm water system helps to protect the storm systems from any contaminates in the condensate.
Sewer System	■	■	■	■			■	The main sewer line is leaking and should be connected to the new sewer line installed in 2011. RE-configuration of the sewer point of connection will alleviate the potential of blockage . This will reduce emergency maintenance cost to the college.
Potable Water System	■	■	■		■			The potable water (drinking water) system is not properly separated from other water uses in the building. This does not comply with the California Plumbing Code. The reliance on the potable water system to perform none potable functions like industrial water and irrigation is a serious health risk and could allow contaminates and chemicals to "Back Flow" into the drinking water supply for the Building, Campus, and even the public water supply. This could lead to serious illness or even death of a user. Separate systems with proper backflow and anti-siphon protection are needed.
Eyewashs and Showers	■	■	■	■	■			Current eyewash stations are heavily corroded and not functioning properly. This is a life safety risk. Chemicals are used throughout the Technical Building Complex, the number, location and distance of travel to an eyewash and or showers is not sufficient for good life safety practice. The Eyewashes need to be clearly labeled, maintained, and sanitized to ensure proper operation. Currently the lack and poor state of the existing eyewashes could lead to serious injury and legal liability for the college. Maintenance of the eyewashes needed to be incorporated into the campus regular maintenance program for the Technical Building Complex.

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Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Chemical Waste Treatment	■	■	■	■			■	The existing sewer systems do not have any oil interception or chemical neutralization systems in place. This allows dangerous chemicals to enter the public sewer system and may cause damage to the campus sewer system as well as the public sewer system. Legal action could be taken against the District if hazardous dumping is occuring.
Fire Suppression Systems	■	■	■	■	■	■		The fire suppression system is original to the building complex. Its adequacy for the current program of courses being taught should be reviewed by a qualified fire protection professional.
Mechanical								
Ventilation	■	■	■	■	■			The current mechanical systems do not provide proper amounts of ventilation (Fresh Air). Current ventilation rates do not meet California Mechanical Code requirements. Proper ventilation will insure occupant health and comfort. Low or no ventilation has been shown to reduce student performance and attendance.
Welding Exhaust Systems	■	■			■			Welding is being preformed under up draft hoods. This approach to welding exhaust draws the toxic welding gasses across the welders face . Breathing in these gases is a health risk to the welder and could lead to injury. A downdraft welding table or a point of use system is needed for all welding tasks.
Vehicle Exhaust Systems	■	■			■			Indoor maintenance of running vehicles is being performed with no vehicle exhaust systems in place. Carbon Monoxide poisoning is a major concern in these areas. Exhaust systems connecting directly to the vehicle exhaust pipe are required to safety during indoor vehicle maintenance. Vehicle exhaust systems are required at each vehicle maintenance station indoors or in a covered area.
Control systems	■	■	■	■			■	The current mechanical temperature control system is a collection of different systems (mostly pneumatic) controls. There is no complex wide direct digital control system. Current industry standards utilize Direct Digital Control (DDC) systems to improve occupant comfort and reduce energy consumption.
Central Plant	■	■	■	■			■	The Technical Building Complex needs to be connected to the campus central plant for cooling this will increase comfort levels, reduce energy use, and save on maintenance.

DEFICIENCY MATRIX

Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Equipment Mounting	■	■					■	The multiple roof top evaporative coolers and condensors on the roof tops are in poor condition and not properly secured to the roof structure. These pieces of equipment have reached their expected useable life and maintenance periods. Replacement parts for these units will increasingly be harder to procure reducing the ability of the college to maintain the units.
Electrical								
Panel boards	■	■	■	■	■			All panel boards and electrical equipment throughout the facility; however, are originally installed equipment which have reached their operable life expectancy. Due to the age, the equipment is more prone to failure, nuisance tripping, and malfunctioning. As with all electrical equipment there is a danger of injury or fire if these pieces of equipment/components do not operate properly. Most of the equipment is no longer in production thus making availability limited. Maintaining this equipment and locating replacement parts will become more and more challenging.
Classroom Power	■	■	■				■	Typical classrooms are equipped with 120 volt receptacles that have been added via receptacle extension boxes, and through the extension of existing branch circuits. Current building wiring is incapable of supporting new equipment loads given the minimal 120 volt power available from original receptacle branch circuits. Additional electrical loads added to existing branch circuits will likely overload the branch circuits, trip circuit breakers, and add additional stress to the existing electrical equipment. All of which will compound the maintenance and operation concerns of the existing electrical equipment.
Typical Classroom Lighting	■	■	■				■	Typical classroom and corridor lighting utilizes surface mounted wrap around type fixtures with fluorescent lamping and prismatic lenses. Shop area lighting is accommodated utilizing pendant mounted fluorescent lighting fixtures. Currently rooms are controlled via single local wall switch and do not contain any motion or occupancy sensors for automatic control.
Lighting Controls	■	■	■			■		Lighting controls are dated and do not meet current California Title-24 requirements for automatic control and diming devices to reduce energy consumption and operational costs.

DEFICIENCY MATRIX

Deficiency	Project Location				Category			Comments
	West Building	East Building	Modular Buildings	Sheds & Misc. Structures	Life Safety	Building Code	Suitability / Function	
Emergency lighting	■	■	■		■			Egress lighting throughout the facilities is accommodated utilizing “bug-eye” type lighting fixtures. These fixtures are point sources which are required to be aimed/directed in at specific angles to achieve optimal performance. As a result these fixtures provide poor uniformity and are seldom positioned/maintained in the ideal aiming and therefore provide poor and inadequate emergency egress illumination. If fixtures are not aimed properly or have been tampered with by students, it is possible the emergency path of egress may not be properly illuminated causing a person or persons to become disoriented and unable to locate the exit in the event of a fire or other emergency.
Fire Alarm	■	■	■			■		The existing fire alarm system is a manual addressable system consisting of audible horns at interior and exterior spaces, with partial smoke detection and manual pull stations at interior spaces. The main FACP is located in building MPOE which is in a room adjacent to the Aeronautics Lecture. The existing system has been upgraded at least once in the buildings history, is fully operational, and in working condition. All classrooms, shop areas, corridors, etc. are equipped with the required horns/strobes to provide notification in the event of a fire or emergency. This existing system is outdated and does not meet current DSA standards and regulations as a result of out of date CSFM listings for the installed devices.
LAN System	■	■	■				■	The main building MDF/IDF is located in the building MPOE which is small, has poor ventilation, and lacks adequate space for future expansion. The campus currently utilizes Corning LAN-Scape Cisco Switches. The existing devices meet the current educational needs for the facility, but lack adequate spare capacity to accommodate future growth and expansion. Furthermore, the size of the room is not large enough to accommodate the installation of the additional data equipment/racks that would be necessary to meet the growing technological needs. The poor ventilation or lack of conditioning in the space will reduce the usable life of the electronic products and devices currently installed in this room and will ultimately lead to premature system failure.

APPENDEX

The following standards and sources of information were used in developing this assessment:

Steinberg Architect/Ove Arup & Partners California, 2006, Voluntary Seismic Strengthening design drawings by Thomas Blurock Architects/Building Engineers ARUP,

2002 and record drawings by Jones, Poper, Armstrong, Associated Architects/Bole & Wilson Structural Engineers 1963 indicated possible deficiencies in the structural system. A Tier Two analysis, as prescribed in ASCE 31, was used to determine the adequacies of the structural members

Technology Building Concerns Document, Jim Hanson, VP Administratvive Services 7/17/2012

San Bernardino Municipal Water District Fire Flow Report number 3272

Red Star Fire Protection Pre-Engineered System Inspection Report July 19, 2012

DSA record set of original approved drawings from 1963.

DSA records available in the San Diego Office and on Tracker

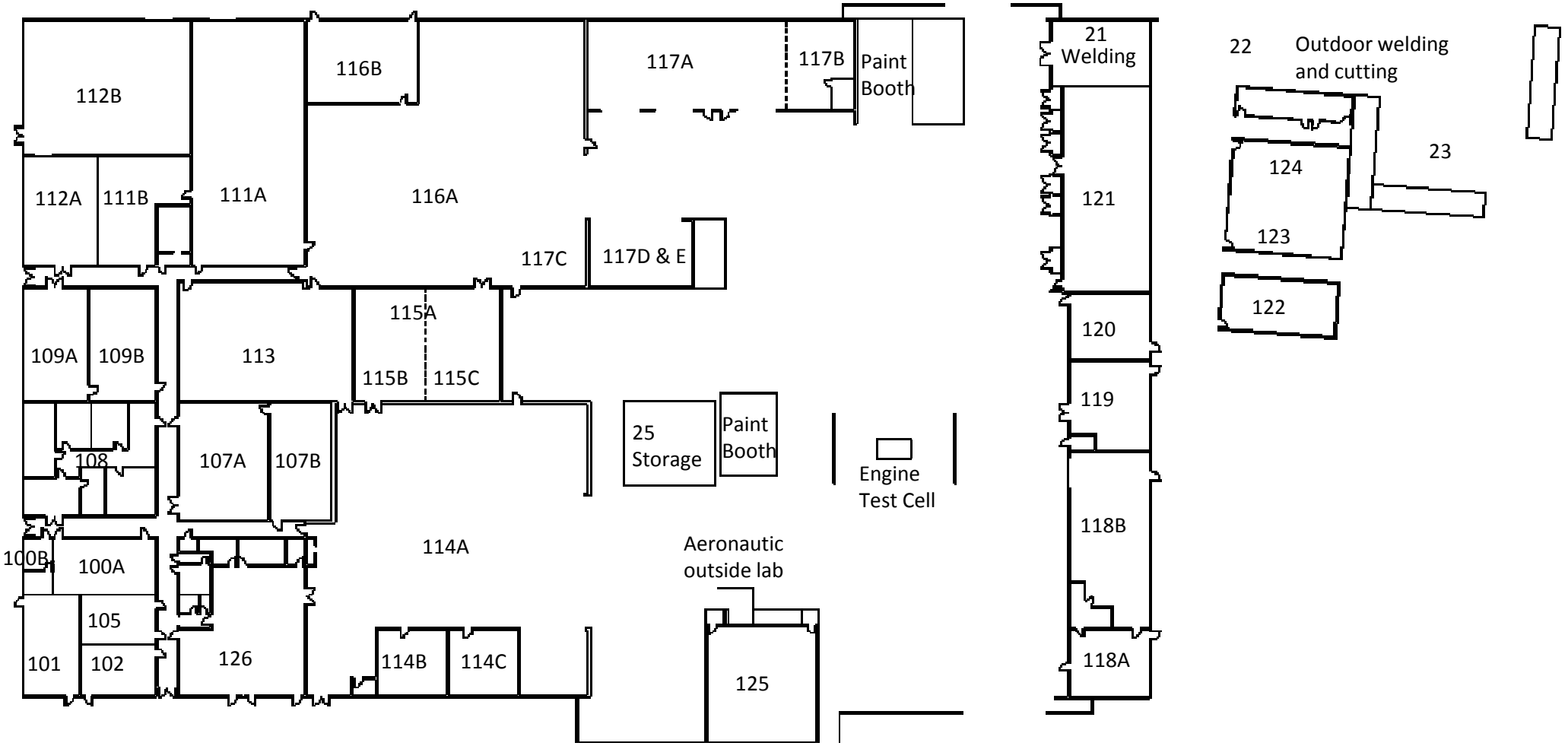
2010 California Building Codes and standards.

Americans with Disabilities Act (ADA)

Site visit conducted on September 11, 2012 providing visual observations without destructive demolition to investigate concealed areas.

U.S. Green Building Council green building practices.

Utilization Key Plan



Space Utilization Matrix

	Room #	Use	Division	Program Use													Comments
				Aeronautics	Automotive Repair	Automotive Collision	Culinary	Diesel	Electrical Electronics	Food & Nutrition	HVAC / Refrigeration	Inspection	Machine Technology	Tool Room	Water Technology	Welding Technology	
	21	Welding lab, storage														■	Three booths for welding, one cutting torch is located here. It is also used to store portable welding equipment.
	22	Outdoor area														■	Outdoor space used for cutting and practice welding of metal shaded by mature pine trees. Routine maintenance to clean pine needles is required to reduce fire hazard risk. Space is also used to store scrap metal for instruction.
	23	Weld consumable storage														■	Welding program goes through lot of supplies and it is stored in a conex storage containers that are housed in this fenced off area that is not convenient to instruction use.
	24	Mach. Weld consumable storage														■	Machining program supplies are stored in one of the conex storage containers. Scavenged furniture, shelving and chairs are also stored here.
	25	Storage		■													A blockhouse stores flammable items - jet fuel, gasoline, etc.
	25	Storage			■	■											One room has a unit that removes paint by abrasion.
	25	Storage				■											On room stores paint for the auto collision program.
	100A	Learning Ctr.	■														A room equipped with computers for student use. Adjunct faculty occasionally use the room to prepare lessons since there are no assigned adjunct faculty space for the division's 54 adjunct faculty. No acoustic separation between adjacent uses prevents this space from being utilized for other functions.
	101	Class/lab													■		Classroom and Backflow Prevention lab for water classes. Largest classroom in the division
	102	Class			■								■			■	General purpose classroom used by several departments
	105	Class			■				■		■		■			■	General purpose classroom used by several departments
	107A	Lab/class							■								Lecture lab in one classroom for Electrical. Secure storage for specific equipment reduces available space in classroom. Centralized storage of equipment may result in loss of property. Reduction in room size by storage cage reduces efficiency of space.
	107B	Laboratory							■								Lab for Electrical. It is a small room that is connected to the 107A
	108A	Secretary	■														Two secretaries occupy space that serves as access to faculty offices with reduced acoustic privacy and security due to student accessibility. Telephone conversation (Sometimes confidential) can easily be heard by faculty and students who visit the faculty.
	108B	Storage	■														Insufficient storage space for division needs to store supplies and files.

Space Utilization Matrix

	Room #	Use	Division	Program Use													Comments
				Aeronautics	Automotive Repair	Automotive Collision	Culinary	Diesel	Electrical Electronics	Food & Nutrition	HVAC / Refrigeration	Inspection	Machine Technology	Tool Room	Water Technology	Welding Technology	
	108C	Aero Faculty Office		■													Space allocation between faculty is inequitable, offers little to no acoustic privacy for faculty student interaction. Space utilization is based on "squatter's rights" and is inefficient.
	108D	Auto Faculty Office			■	■											Space allocation between faculty is inequitable, offers little to no acoustic privacy for faculty student interaction. Space utilization is based on "squatter's rights" and is inefficient.
	108E	Elec, Cul. Art Faculty Office	■				■		■								Space allocation between faculty is inequitable, offers little to no acoustic privacy for faculty student interaction. Space utilization is based on "squatter's rights" and is inefficient.
	108F	Mach Weld Faculty Office											■			■	Space allocation between faculty is inequitable, offers little to no acoustic privacy for faculty student interaction. Space utilization is based on "squatter's rights" and is inefficient.
	108G	Break Room	■														Break room is in left over circulation space with no sink or water. This does not allow for washing of hands or proper sanitation for food preparation. Due to lack of storage some Division files are stored in this area.
	109A	Lab/class							■								The lab is configured for electrical wiring class. A functional class.
	109B	Lab/class							■								This lab is configured for telecommunication class. Secure storage cage was added to the room making it less efficient for instruction.
	110B	Dean's Office	■														Room sizes do not provided for adequate layout out of furniture and storages to properly function as an office and meeting space. Acoustic separation between adjoining instructional space does not provide adequate privacy required for a Division Dean function.
	111A	Laboratory											■				Machine Technology lab. The roll up door open to the street which is good for pulling heavy machinery in and out of the building for servicing and repair or replacement. Security of room has been compromised as a result and equipment lost.
	111B	class											■				The room has poor acoustic performance and is further compromised by the ceiling hung air-conditioning system. Adjacency to the restroom and plumbing issues has led to odors which make the room unusable at times.
	112A	Lab/class											■				Adjacency to the welding lab and poor seals on the roll up door allow fumes from the welding lab into this room rendering it unusable at times.

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				Aeronautics	Automotive Repair	Automotive Collision	Culinary	Diesel	Electrical Electronics	Food & Nutrition	HVAC / Refrigeration	Inspection	Machine Technology	Tool Room	Water Technology	Welding Technology	
	112B	Welding Laboratory														■	Access to this space is not secure and the general public has been found using the equipment and tools resulting in losses for the campus. There is inadequate secure storage for tools and materials. Current configuration does not provide for adequate line of sight by the instructor reducing the function of the space. The compressor should be located outside for acoustic reasons.
	113	Tool Room	■	■	■	■			■				■	■	■	■	The configuration of the tool room does not work well as it serves students from multiple disciplines. Separation and inventory control is difficult as currently configured with 2 staff and student helpers. Access to the space by students and vendors compromises safety and interrupts instruction in the Auto Bay. There is no break area with a sink and work space for this area.
	114A	Aero Lab		■													This lab is a combination space where students work on aircraft engines as well as attend lectures. The combination of the two creates fumes that must be properly exhausted.
	114B	Aero Upholstery		■													This a small room that houses sewing machines to work on upholstery.
	114C	Aero chemical storage		■													This is mainly used for storing chemicals and supplies.
	116A	auto bay			■												The current configuration of this space results in its use as a circulation element to access the tool room by multiple discipline user groups. This is disruptive to the instructional program and creates a safety hazard.
	116B	Auto Trans lab			■												Room is utilized for transmission class as left over space that is not functional for its current use.
	117A	Auto Smog Lab			■												Use requires a roof that does not leak to prevent damage to equipment.
	117B	Smog Check Station			■												Public use the space for smog check. It doesn't have a place for patrons to sit while waiting for smog check
	117C	Street Rod, Car Lift			■												Room is utilized for storage of 1929 car and tools as street rod course is currently not being offered. Loss of productive use of space and space utilization efficiency.
	118A	Auto Collision Classroom				■											This space suffers from rainwater damage due to openness. Location of equipment and file storage should be on curbs to allow for wash down and cleaning.
	119	Weld material laboratory														■	This lab is utilized for two courses. There is not enough space to house the equipment and seating for all students, so chairs are stacked in the corner requiring reconfiguration for each use.

Space Utilization Matrix

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	120	Weld classroom														■	This room functions as a lecture room and is used by students as a break space from welding labs.
	121	Welding lab														■	This space is poorly laid out and currently has 12 oxy-acetylene welding stations that are not currently being used. This space houses 24 welding booths with MIG, TIG and SMAW equipment. Other equipment in the spaces includes laser cutter, cooling tank, grinding wheel, cutting bench and teacher station. A water cooler is provided as there are inadequate drinking fountains in the facility.
	122	classroom				■	■	■		■		■			■		A portable unit which houses several different classes.
	123	HVAC class									■						A portable unit which houses HVAC class with a small trainer and mainly used for classroom
	124	Auto class, Machine lab			■												A portable classroom that houses Auto lecture class and machining lab class. It also contains a makeshift office by one Auto faculty as a result of the available faculty office space in T108.
	125	Aero class and flight trainer		■													A portable classroom that houses a lecture class and a flight trainer unit.
	118B	Auto Collision				■											Use and access to this space spills over into circulation space at the height of use. Functions of welding, grinding and cleaning are often conducted in the exterior spaces due to limited size for cars in various stages of repair. This overflow often blocks access to the yard for other users as well as emergency access.
	118C	Auto Collision faculty office				■											This space is currently used as two faculty offices and tool supply storage room. Between the classroom and lab. This shows the current consolidated tool storage room does not function well.
		Attic Storage area												■			There is an attic storage area mainly used by tool room staff to squirrel away items considered too valuable to be discarded.