

PACIFIC HS

transportation and advanced technology center

san bernardino city unified school district | san bernardino, california



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CUTIVE

Pacific High School is a comprehensive secondary institution in the San Bernardino City Unified School District (SBCUSD). Movement of goods via trucking and logistics hubs are pivotal to the success of the San Bernardino region. In a city that has recently overcome serious community misfortunes including a terrorist attack, school shooting, and municipal bankruptcy; students entering a high-wage job directly out of high school in their hometown will contribute to economic stability in a community where 33% of the citizens struggle with poverty.

Prior to the creation of the Diesel Systems Diagnostics and Service Pathway (also known as the Heavy Duty- HD- Diesel Program) at Pacific, students were able to enroll in a similar program at San Bernardino Valley College. As enrollment at that program reached capacity, giving priority to SBVC students over Pacific Students, the District saw an opportunity to bring the program into the District. This also allowed them to more efficiently provide concurrent academic instruction where students could participate in the Diesel program without detracting from common core academic study and A-G completion- the first program of its kind in any high school in the state. In alignment with the District's community engagement plan's strategy, Applied Learning, the Diesel/ Transportation program presents an exemplary opportunity to transition students from high school students to college students to career with a sustainable wage.

As part of the District's equity policies, they are focusing on culturally relevant pedagogy; this helps students uphold their identities and increase academic potential. SBCUSD provides their staff training to incorporate culturally relevant instructional strategies into daily instructions. Keeping this in mind, we looked for ways to help support that through the project's design. The planning and design process included visioning and concept charrettes to develop the vision around the student and community engagement. We focused on student learning areas, uplifting the community, affirming culture, and bolstering the Transportation Technology program. In turn, we are creating a space for educators to succeed by having the spaces they need.

SUMMARY

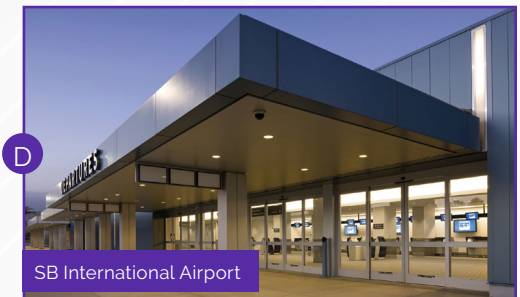
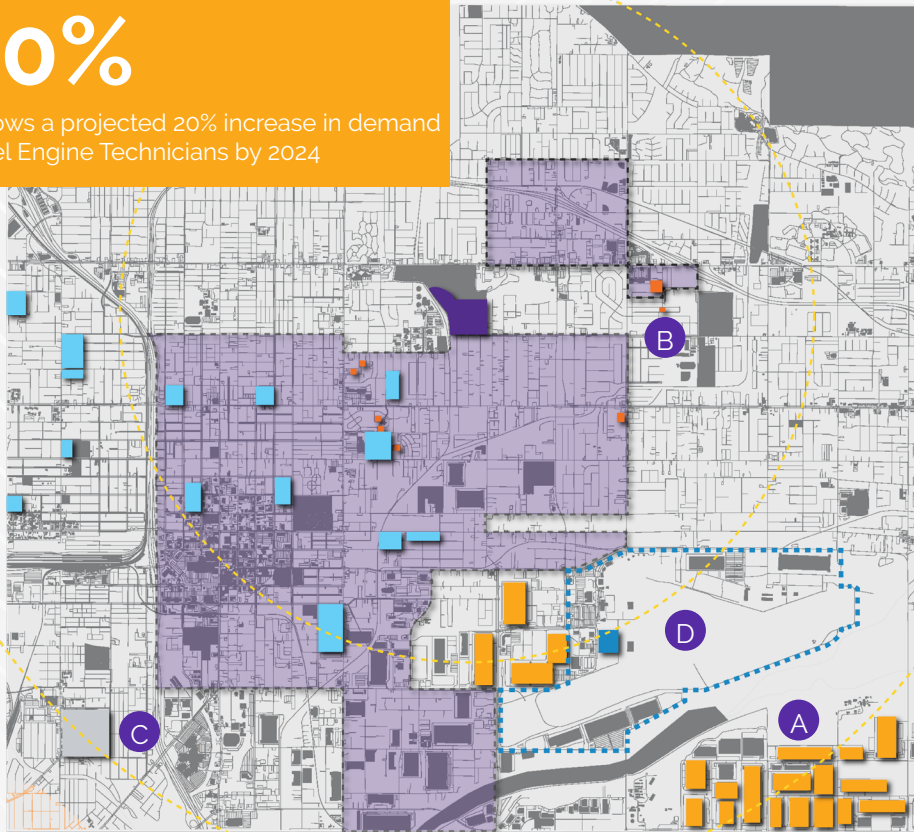
Visually captivating graphics lead students and faculty deeper into the building, instilling energy and movement in the space

CONTEXT SUPPLY & DEMAND

The San Bernardino region lies at the confluence of four primary freight corridors and is home to major distribution centers, including Amazon, and heavy duty (HD) Diesel technicians. The expanding growth of fulfillment centers in the area has facilitated an increased need in Diesel Automotive technical competence. The project and resulting program provides high-demand job skills to an economically challenged region, while helping to physically transform a school that has not seen major renovation since it was opened in the 1950's. This new program will provide a sense of pride and belonging to the Pirates, beloved school mascot, and the spaces educators need to implement their cultural relevant pedagogy training through student learning spaces, cultural competence, and community impact.

+20%

Data shows a projected 20% increase in demand for Diesel Engine Technicians by 2024



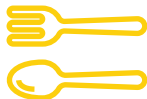


CLIENT	San Bernardino City Unified School District
LOCATION	San Bernardino, CA
BUILDING AREA	20,676 Square Feet
ACERAGE OF SITE	1.98 Acres
MARKET SECTOR	k-12 and CTE
PROJECT TYPE	New Construction
ELEMENTARY, MIDDLE, HIGH, OR SPECIALIZED SCHOOL	High School
STUDENT CAPACITY	120
BUILDING COST PER SQUARE FOOT	\$322.15
DATE PROJECT STARTED	February 2018
DATE PROJECT COMPLETED	January 2019
ESTIMATED ANNUAL CAPITAL COST PER STUDENT	\$3,048.37

The Diesel Technology Center at Pacific High School is designed to provide a certified program for comprehensive training in diesel mechanics, engine systems and diagnostics, brakes, suspension, electrical systems, diesel computer systems, and heavy-duty truck systems. Collaborative efforts define program origins, particularly between the San Bernardino City Unified School District, local business partners such as Velocity Truck Centers and San Bernardino Community College District. Students will almost immediately be able to move directly into industry jobs or advanced training at higher education facilities such as local San Bernardino Valley College which offers diesel technology courses to PHS students as a dual-credit option.



Total Economically
Disadvantaged
94%



Reduced-Price
Lunch Program
4%



Free Lunch Program
89%



Full-Time
Equivalent Teachers
54

SCOPE OF WORK

"...The amount of opportunity is staggering and a path to a lucrative career"

BILL FISHER
Customer Experience Trainer at Velocity Truck Centers

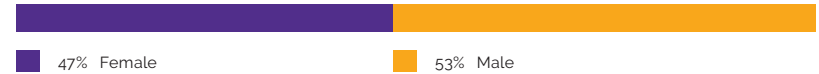
SCHOOL & COMMUNITY

THE CHALLENGE

The decision to move forward with an on-campus program was committed and vetted by a synthesis of industry focus groups, labor-market data, and anecdotal inputs from community stakeholders and other CTE advisories. In preparation for the project's CTE grant application (which garnered 136/141 points), curriculum and equipment lists were evaluated and approved through an industry-led advisory council to reflect what regional business requires in an employee's skill set. An iterative design process detailed project components and uncovered hidden needs.

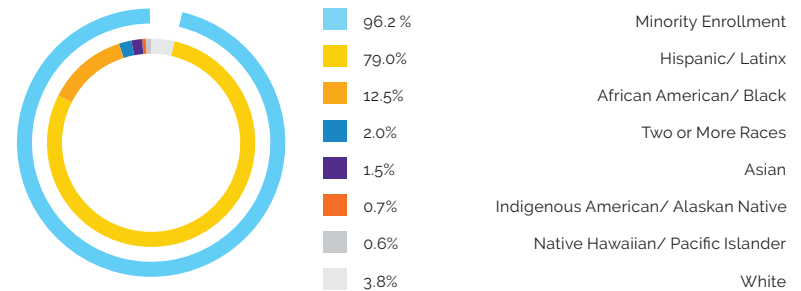
The project required a new facility to replace aging shop facilities that could not accommodate the vehicles or high-tech capabilities of a modern Diesel technology program. Each space within the building is designed to support a combination of learning modes to reflect the free-flowing nature of the design-fabrication-application process the students will follow. Classroom space engages theoretical understanding through direct instruction; open think-tank spaces promote research, brainstorming, problem solving and ideation. The design and prototyping labs bring ideas to life with integrated technology, including interactive media displays, 3D printers, and laser cutters. The Systems Testing and Fabrication Lab helps students further refine their ideas until they move to the high-bay diesel lab space- which features 44,000 lb vehicle lifts, 7.5-ton capacity overhead crane, hydraulic training system, diesel engine demonstration stations, and electronic training system- to develop real-world experiences on full size vehicles.

GENDER DISTRIBUTION*



* Data collected does not account for non-cisgendered student population, which is unknown at the time of the survey.

STUDENT DIVERSITY



Data are based on the 2020-2021, 2019-2020 and 2018-2019 academic years. Courtesy of: <https://www.usnews.com/education/best-high-schools/california/districts/san-bernardino-city-unified-school-district/pacific-high-school-3189>





Classrooms are now fitted with design elements to keep students engaged, and equipped with the tools they need to succeed

GEARING UP FOR SUCCESS

This facility supports the diesel technology program by providing space designed to meet the unique requirements for instruction and equipment. Considerations were given for the installation and placement of power lifts, diagnostic equipment, tire changers, floor cranes, other equipment, demonstration systems, and tools based on the unique requirements for each, such as slab thickness, space clearances, utility needs, exhaust requirements, and convenience of parts, attachments, and fluid disposal. The bays were designed to accommodate large diesel trucks, and as such, the building has characteristics such as high open to structure ceilings and aircraft hangar doors. In addition, classroom space was designed with the appropriate data and media infrastructure to support technology instruction, as well as to provide an open plan environment conducive to safety supervision and collaboration for up to 24 students in each classroom space.

Program Overview

(4) Certification Programs:

Automotive mechanics

- Auto maintenance and light repair
- Engine Repair
- Automatic Transmission / Transaxle
- Manual Transmission / Axle
- Engine Performance

Heavy Diesel

- Diesel Engines
- Electrical / Electronic Systems
- Structural Welding

Collision repair

- Painting & Refinishing
- Non-Structural Analysis / Damage repair

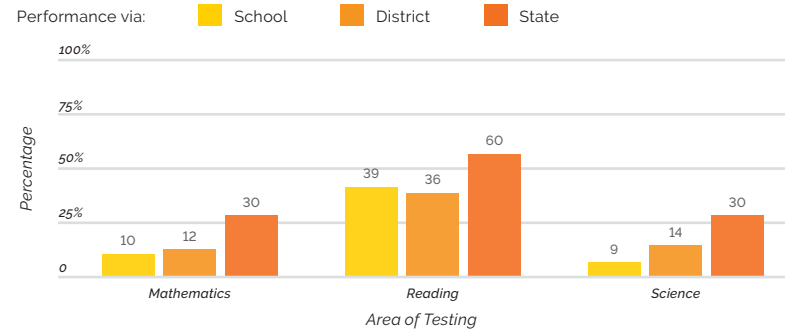
Welding

- Structural Steel
- Tubular Structures

SCHOOL & COMMUNITY

SUBJECT PROFICIENCY

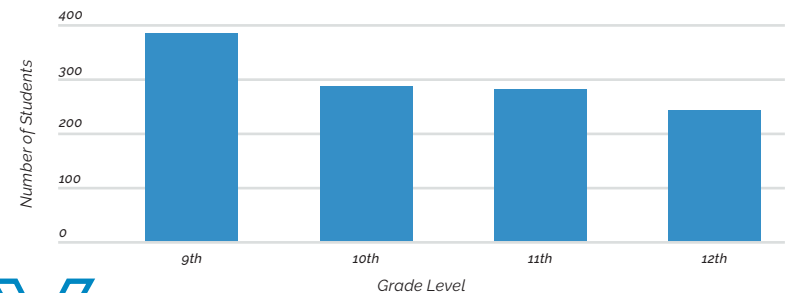
Data below shows how California students at Pacific High School tested in regards to reading, mathematics, and science.



ENROLLMENT

Total Enrollment 1188

Enrollment by Grade



Data are based on the 2020-2021, 2019-2020 and 2018-2019 academic years. Courtesy of: <https://www.usnews.com/education/best-high-schools/california/districts/san-bernardino-city-unified-school-district/pacific-high-school-3189>

EDUCATIONAL VISION

To design a more purposeful space to support the school and community's goals, we worked with various stakeholders to understand their vision and goals.

PACIFIC HIGH SCHOOL GOALS

San Bernardino City Unified School District approached this multi-phased campus revitalization project with a guiding question: How can we create a sense of belonging for students that live in an under served and under resourced community? Our design is centered around affirming the diversity of the surrounding community cultures, uplifting the achievements of both current and former students, and bolstering the Transportation Technology program.

1

Inspiring a love of life-long learning, prioritizing students first

2

Provide greater opportunities to an under resourced community

3

Enhance educational programming in a safe, orderly, and inviting learning environment

4

Create a sense of belonging by engaging and sustaining the trust and involvement of parents and community



Custom Environmental Graphics inspire students to "think BIG" and draws excitement to the program and classroom space

COMMUNITY IMPACT/ VALUE



Open garages connect the students to not only work, but to their community and outdoors

THE PROCESS

Transportation CTE



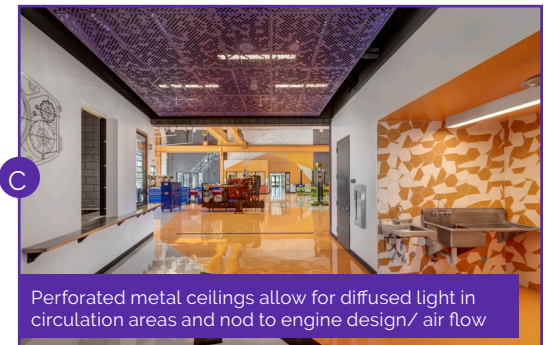
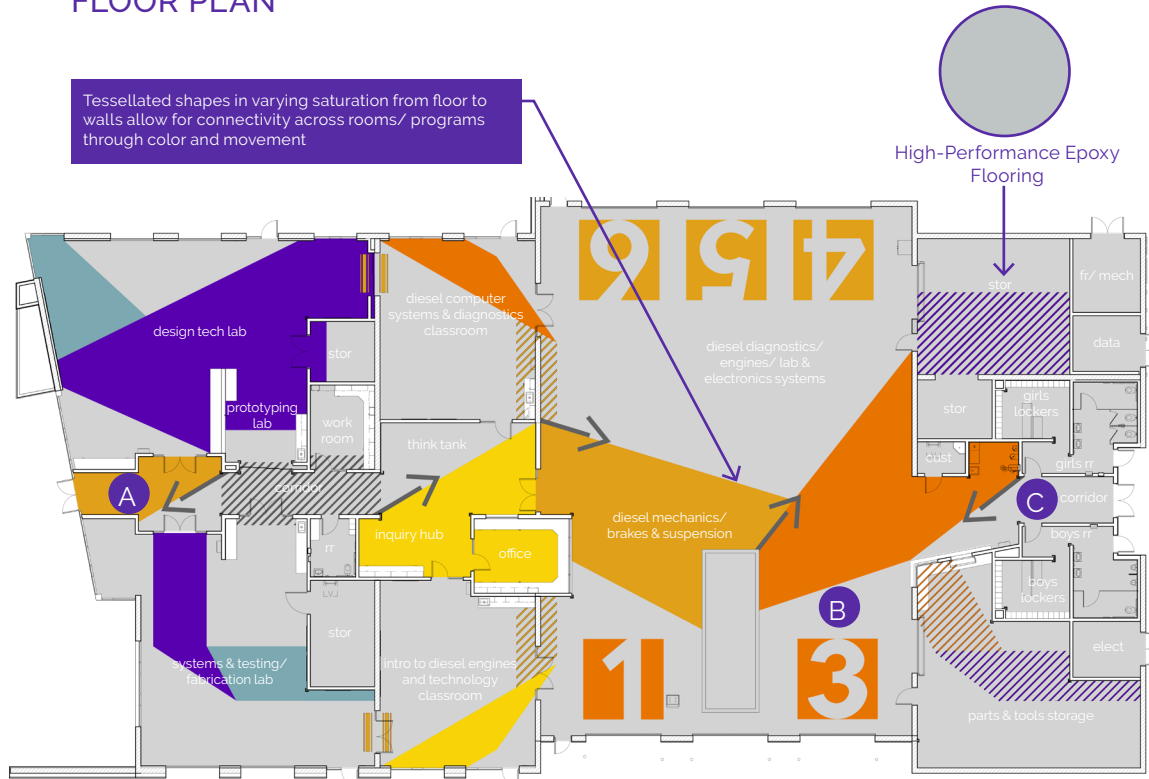
Campus Modernization

In conjunction with District provided industry and higher education partners, existing CTE teachers, site administrators, and the architect, major design components were identified and a schematic plan developed for the facility. Some changes made during the conceptual design phase included a reduction of the overall building footprint, as well as adding aircraft hangar-style roll-up doors for vehicle and equipment access. Consideration was given to providing a high tech, "clean" environment where students can feel that they are immersed in a sophisticated facility where state of the art learning and research can occur, as opposed to a repair garage/shop. The schematic plan was then reviewed with the District's industry partners and CTE Advisory Committee for their input and concurrence with the approach, methodology, and final configuration. Equipment needs were analyzed in a similar process based on the skills necessary in local and national industry sectors.

CREATING SYNERGY

Pacific High School's Diesel Technology Center is designed to be a state-of-the-art facility to support career technical education, in partnership with industry leaders in Diesel Automotive Technology. The space supports large group instruction, research and problem solving, prototyping, testing and hands-on application in a vibrant and flexible environment. The program is the result of, and has a direct impact on, the local economy in which a booming shipping and distribution economy has increased the demand for highly skilled Diesel Technicians.

FLOOR PLAN



EQUIPMENT LIST

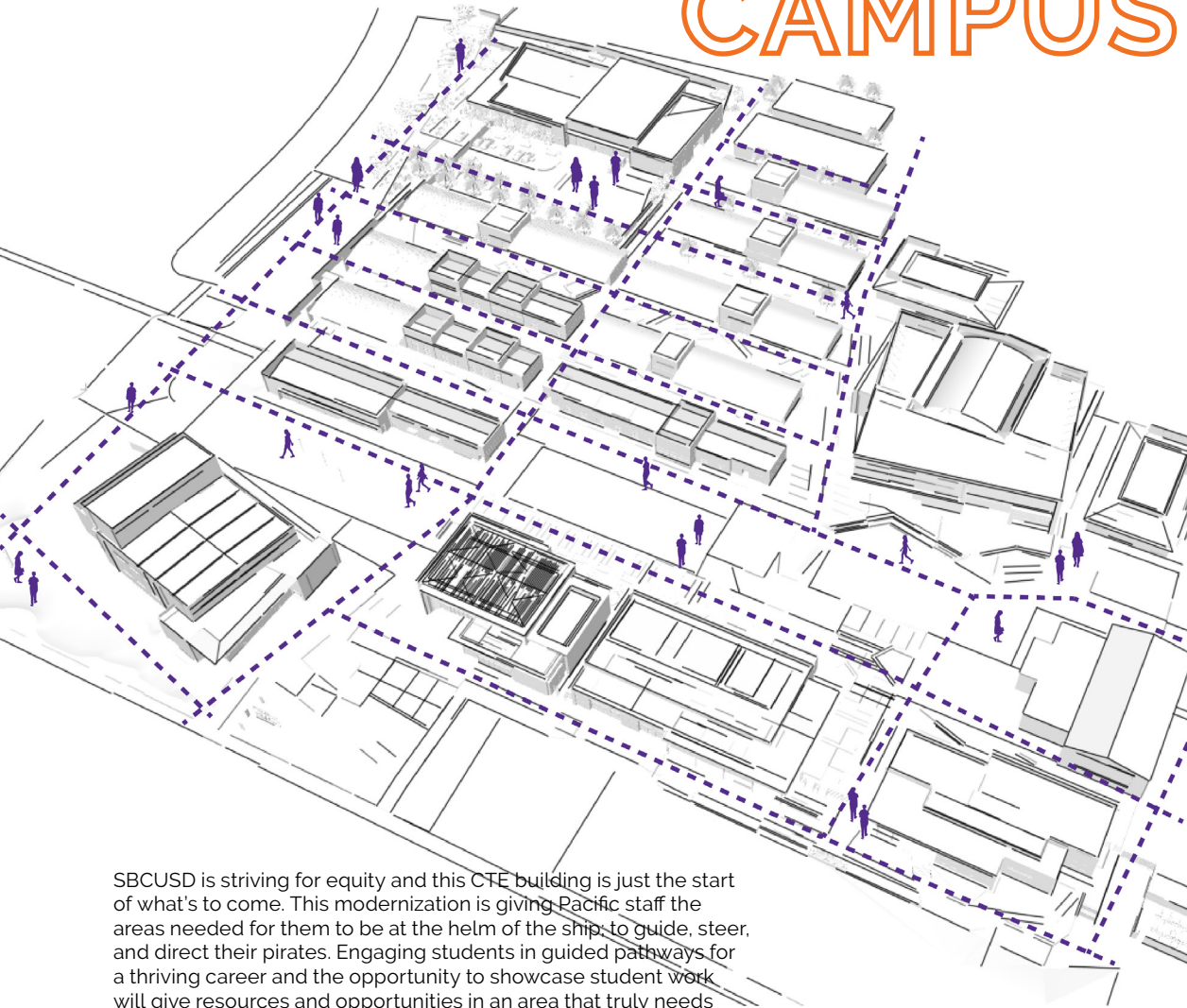
3D OBJECT SCANNER
OVERHEAD CRANE
GM SPECIALIZED ELECTRONIC TRAINING S.E.T.
COMPUTER ALIGNMENT SYSTEM & ACCESSORIES
REAR AXLE ALIGNER & ACCESSORIES
FRONT AXLE TOOLS - CHAIN ASSEMBLY
ON-THE-VEHICLE BALANCER COMPUTERIZED CONTROL SYSTEM
CUTAWAY TURBOCHARGER
CUTAWAY DIESEL ALTERNATOR
CUTAWAY DIESEL STARTING SYSTEM TRAINER
CUTAWAY DIESEL ENGINE
HYDROSTATIC TRANSMISSION TRAINING SIMULATOR
COMBINATION HEAVY TRUCK & MULTIPLEXED LIGHTING SYSTEM TRAINER
DIESEL ENGINE TRAINER
HYDRAULIC TRAINING SYSTEM
DESKTOP VACUUM FORMING MACHINE
HEAVY-DUTY CRANE
COMPRESSOR
DRIVE-ON LIFT

DRIVE-ON LIFT
WHEEL BALANCER
PARTS WASHER
HEAVY-DUTY TIRE CHANGER
AIR DRYER
3D PRINTER
WALL-MOUNTED AIR & WATER REELS
COLUMN LIFTS
FLAMMABLE LIQUIDS STORAGE CABINET
PRECISION LATHE
VERTICAL MILL MACHINE
INDUSTRIAL GRINDER
CARBIDE TOOL GRINDER
GRANITE SURFACE PLATE
SURFACE GRINDER
GRINDER BUFFER
BIG RED GRINDER
VERTICAL BANDSAW
DRILL PRESS

HORIZONTAL BANDSAW
KNEE MILL
CNC MACHINE
TIRE RACK
SAFETY POLE & CHAIN ASSEMBLY
ROLLING BRIDGE JACK
OVERHEAD POWER CORD REEL
WALL-MOUNTED POWER CORD REEL

Emphasis was given on industry standard equipment that is currently used in community college diesel technology instruction, such as those at California Council on Diesel Education and Technology (CCDET) member schools

SHIFTING ACROSS CAMPUS



SBCUSD is striving for equity and this CTE building is just the start of what's to come. This modernization is giving Pacific staff the areas needed for them to be at the helm of the ship, to guide, steer, and direct their pirates. Engaging students in guided pathways for a thriving career and the opportunity to showcase student work will give resources and opportunities in an area that truly needs it. Allowing students to have outdoor learning and representation spills out into the community. These young minds will be transformed to go back out into their community and do more.



Painted Numbers at bays serve as wayfinding



Interior 'tessellation' language carried into site hardscape

EXTERIOR VIEW

The Transportation and Advanced Technology Center stands proudly on the Northwest corner of the campus, anchoring the campus acting as a main community gateway and allows for proper vehicle access. The center's placement on the site and strategic glazing reduces exterior heat transfer into the building, optimizing comfort. Continuous insulation was added to the exterior of the building for increased thermal resistance and performance. Materials and patterns such as corrugated metal, perforated screens, striping and variable depth CMU reflect the industrial nature of the program while promoting energy and movement within and between spaces.

SITE PLAN



EXTERIOR VIEW



"leading students towards a path of generational wealth"

GINGER ONTIVEROS

Chief Communications and Community Engagement Officer at SBCUSD

Open spaces and seating allow students to collaborate and collect outdoors



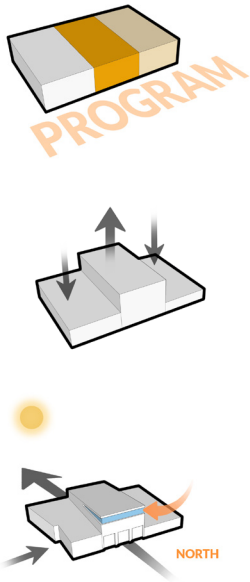
View from Street

SUSTAINABILITY

The District aimed for a minimum LEED Silver Certification with specific focus on energy, environmental comfort, and building life-cycle. High-efficiency electrical, lighting and mechanical systems and controls coupled with solar panels to generate power help regulate the building's total energy consumption. The interior and exterior lighting systems were designed utilizing the most energy-efficient LED fixture driver combinations to contribute to an overall target effort of achieving at least 20% below California Title 24 minimum requirements. Space heating and cooling is also served with High Efficiency VRF (Variable Refrigerant Flow) Heat Recovery systems.

CAMPUS

Providing equity for SBCUSD has been shown throughout this modernization but the core of this change for the community lies within the CTE center. We are providing collaboration areas, maker spaces, flexible classrooms, and a career resource center. These are the first community joint-use spaces for the District. We are excited for the opportunities for collaboration and growth that will take place within these walls.



We crafted our design around the three components of culturally relevant pedagogy: student learning, cultural competence, and critical consciousness while drawing inspiration from the deconstructed form of a pirate ship.



EDUCATIONAL ENVIRONMENT

Large garage bay doors provide opportunities for openness.



LEARNING STYLES

Flexibility in day-to-day instruction and adaptability to long-term programming needs was paramount in designing a facility that remains useful over time.



Individual and Group/Social

We sought out flexible furniture and multi-purpose spaces that can be used for focused solo projects or reconfigured for small and large groups during breakout sessions. Design features that support individual/group learning include:

- Flexible furnishings throughout the campus that can be reconfigured for individual work, small groups, and entire classrooms
- Spaces in classrooms for focused individual and focused group work
- Larger spaces with opportunities for socializing



Visual

Visual learners learn through sight and observation and tend to prefer colors, images, and visual aids. Design features that support visual learners include:

- Color & inspirational environmental graphics to spark curiosity
- Writable surfaces
- Marker Boards
- Interactive projectors and TVs



Aural

Aural learners prefer opportunities to listen and speak. These include lectures, stories, class discussions, and even conversations. Some features for aural learners include:

- Areas for lectures outside of the classroom
- Sound systems in the classrooms
- Noise attenuating materials to minimize distracting background noise

EDUCATIONAL ENVIRONMENT



Acoustic panels provide sound absorption and refraction to create a harmonious interior environment with increased NRC value.



An open to structure ceiling puts building systems on display while separating these components from instructional equipment in order to easily accommodate future changes.



"This building is an example of how a vision for enhancing opportunities for students combines with real-world practices that will spur and support strong economic growth. The excitement and awe it provides when people walk in allow them to see that high school truly is a place to explore college and career passions."

ALAN KAY

Assistant Director for SBCUSD CTE Programs

EDUCATIONAL ENVIRONMENT

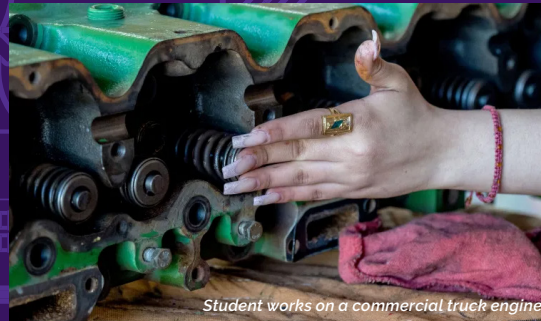
A NEW START

To provide a world class facility to train and showcase SBCUSD programs, we employed color and material play to communicate the intention of the space. Bright, bold color highlights entry points on the exterior while environmental graphics offer inspiration and an integrated way-finding system on the interior. Operable wall systems create permeable borders between spaces and mobile furniture allows interiors to be reconfigured according to the day's needs. Resin products made using R4 recycled and sustainable materials provide extreme clarity and natural UV resistance on a renewable surface that extends product life-cycle. Modified polyamine epoxy flooring with low VOC content protects against abrasion and frequent cleaning to increase durability. Air quality control through the use of low-emitting adhesives, paint and formaldehyde-free casework contributes to student comfort and increased productivity.

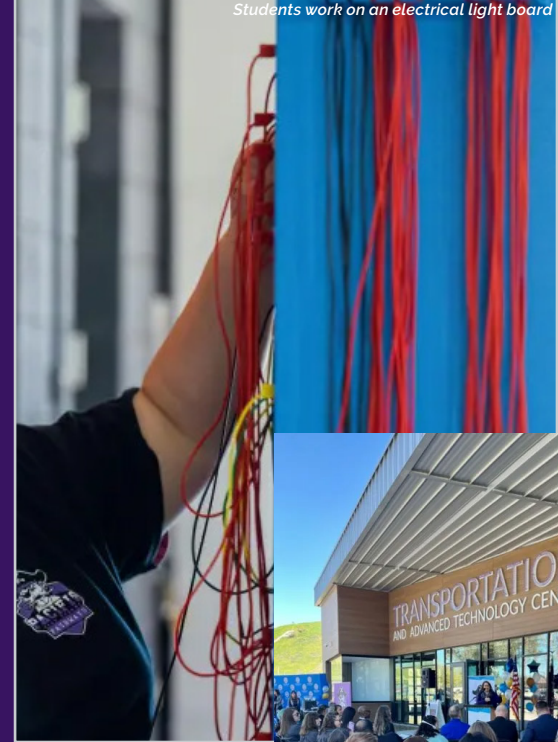


PROJECT OUTCOMES

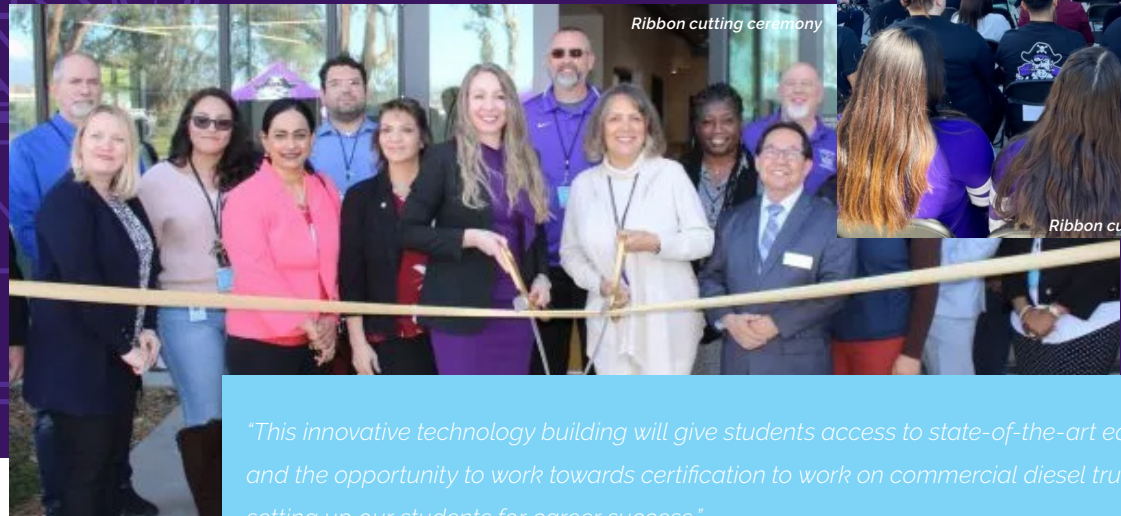
The academic benefits of nurturing students' critical consciousness is profound. By providing the spaces needed to talk about inequity in tandem with school-based programming designed to foster critical consciousness, this has been shown to increase academic engagement and achievement and enrollment in higher education. Through this modernization we are giving Pacific staff the areas needed for them to implement their training. We hope to see the academic transformation and achievement through years to come by providing equity to this deserving community through concurrent education. For us, it was an opportunity to connect more intimately with them and reminded us of the real humans who grow, learn, teach, and work in the spaces we help design. Above all, it re-affirmed our commitment to changing lives through the transformative potential of good design.



Student works on a commercial truck engine



Students work on an electrical light board



Ribbon cutting ceremony

Ribbon cutting ceremony

"This innovative technology building will give students access to state-of-the-art equipment and the opportunity to work towards certification to work on commercial diesel trucks, setting up our students for career success."

NATALIE RAYMUNDO

Principal at Pacific High School



PURPOSE
FUELS

Quotes line walls inspired by major automotive pioneers like Ford

+17%

SUCCESS STORY

In the center's first 4 months of inauguration, it attracted 190 students- 17% of the student body



RESULTS

The district is stepping in and aiding the community in a time where the city is failing it (i.e. the city was recently bankrupt and lost the majority of their services and police force). Thanks to this modernization, housing values for the low income area has increased. We developed a facility that supports the educational goals of the district, the needs of a community and is student-centered for active and dynamic learning.

"We are already engaging these students in guided pathways for a thriving career... to earn a living wage, support their families, and contribute to the local economy"

VANESSA THOMAS

San Bernardino Valley College Dean of Applied Technology, Transportation, and Culinary Arts



TRANSPORTATION
AND ADVANCED TECHNOLOGY CENTER