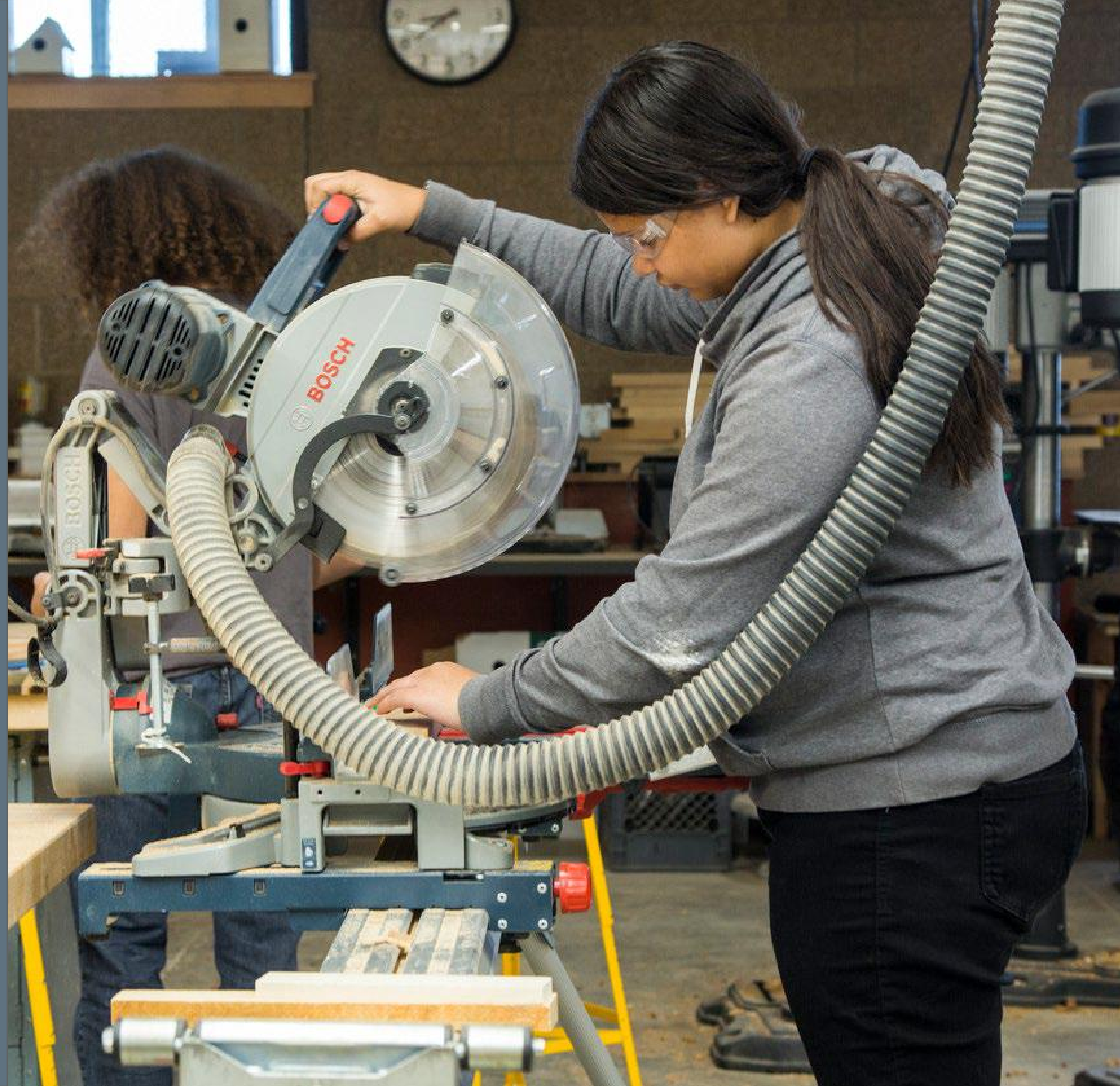


A CASE STUDY IN COURAGE:

THINKING OUTSIDE THE BOX
TO RE-DEFINE THE FUTURE OF
CTE EDUCATION





LYDIA BURNS AIA
Associate Principal/
Director of Project
Management

Bassetti Architects





CURTIS WILSON, JR.
Principal

Benson Polytechnic
High School,
Portland Public
Schools





DIANNA MONTZKA
LEED AP B + C

Designer

Bassetti Architects





BRIAN GERBER
Engineering Teacher

Benson Polytechnic
High School,
Portland Public
Schools



AIA COURSE CREDITS

Bassetti Architects is a registered provider of AIA-approved continuing education under Provider Number C208. All registered AIA CES Providers must comply with the AIA Standards for Continuing Education Programs. Any questions or concerns about this provider or this learning program may be sent to AIA CES (cessupport@aia.org or (800) AIA 3837, Option 3).

This learning program is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

AIA continuing education credit has been reviewed and approved by AIA CES. Learners must complete the entire learning program to receive continuing education credit. AIA continuing education Learning Units earned upon completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

AIA LEARNING OBJECTIVES

- + Learn about various planning concepts for arrangement of CTE programs in a high school setting
- + Understand importance of robust stakeholder and industry engagement
- + Gain understanding of key features and attributes necessary for a co-located, interdisciplinary approach
- + Learn about the organization, implementation and coordination a successful CTE design



AGENDA

VOCATIONAL EDUCATION / CAREER TECHNICAL EDUCATION (CTE)

- + Looking Back
- + Recent Evolution

A CASE STUDY FOR THE FUTURE OF CTE: BENSON POLYTECHNIC HIGH SCHOOL

- + Background of the Program / School
- + Visioning / Future-Forward Engagement
- + Design Approach
- + Implementation

Q & A



LOOKING BACK

VOCATIONAL EDUCATION IN AMERICA

- + Evolved further as a result of significant growth post-WWI
- + Largely remained pre-dominant approach for much of the 20th C.



LOOKING BACK

VOCATIONAL EDUCATION IN AMERICA

- + Developed in early 20th C.
- + Influenced by German-style industrial education model part of “dual” system



LOOKING BACK

ATTRIBUTES & CHALLENGES

- + Created a narrow-focused alternative track
- + Largely for high-schoolers that were not going on to college
- + Students tracked into trades that were “gender-appropriate”



LOOKING BACK

ATTRIBUTES & CHALLENGES

- + Resulted in some students not graduating with a standard high school diploma
- + Limited future possibilities
- + Did not keep up with ever-changing technology / careers



A professional kitchen setting with stainless steel counters and hanging pots and pans. A chef in a white uniform is visible on the right side of the frame. The text is overlaid on a semi-transparent dark grey background.

**“College isn’t for everyone,
but education is.”**

- Michael Bloomberg, Mayor of New York; 2008

WHY CTE?


- + Provides hands-on experience and training in high school
- + Provides core academic skills AND technical job-related skills = College AND Career ready
- + Allows students to engage with relevant, real-world opportunities



WHY CTE?

- + Provides post-graduate opportunity beyond the “traditional” 4-year college or university
- + Can connect with ALL learners
- + Reduces drop-out rate
- + Invests in the future of our community, workforce & economy





“81% of dropouts say relevant, real-world learning opportunities would have kept them in high school.”

- #CTEMonth

THE EVOLUTION TO STEM, STEAM, & CTE

- + Desire to bring curriculum 'alive' to students
 - » Passion and interests
 - » Accept differing learning styles
 - » Offer hands-on and real-world experiences
- + Connect technical education with academics
- + Connect curriculum with problem-solving, critical thinking and other 21st c. skills

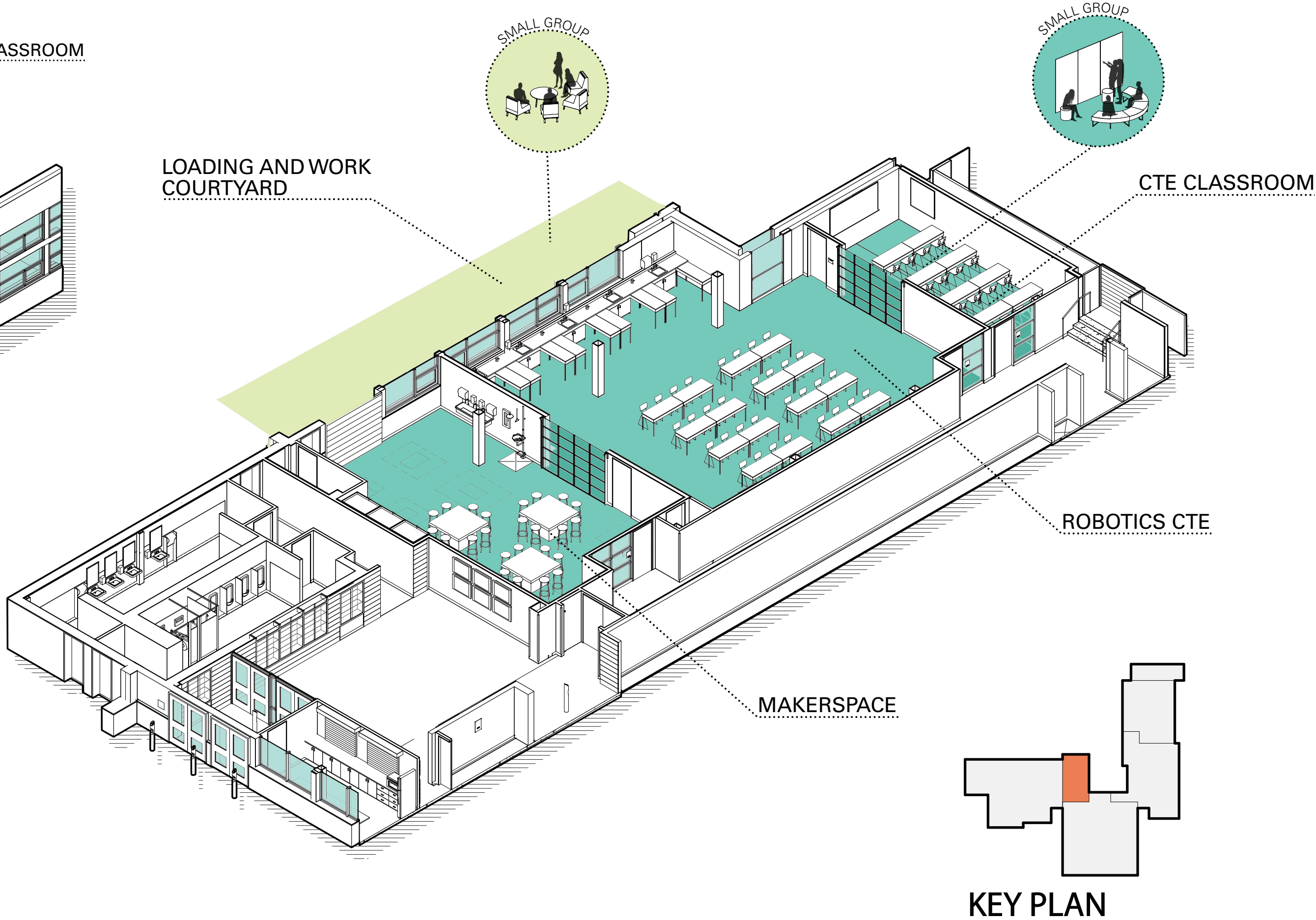
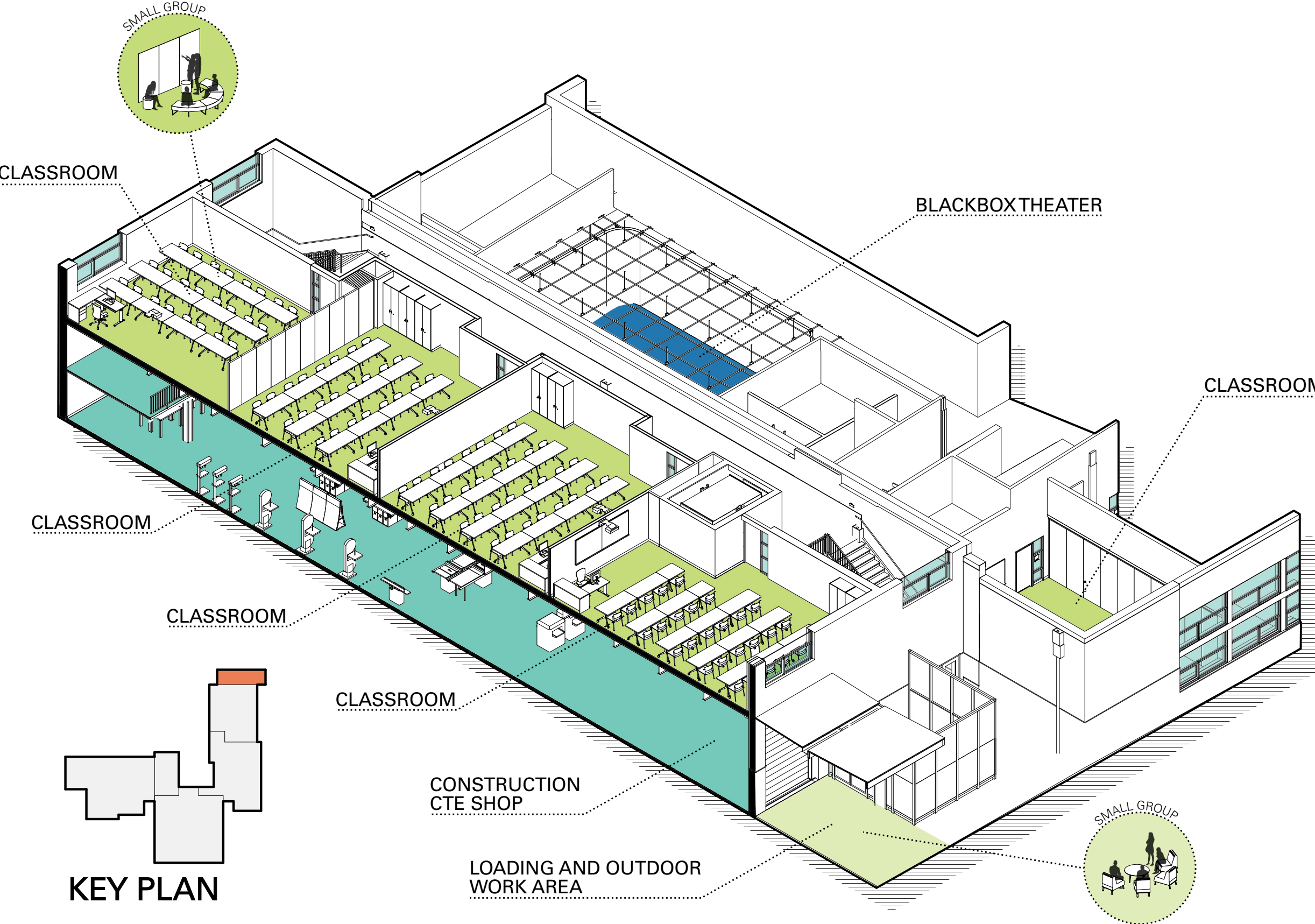


Roosevelt High School, Portland, OR



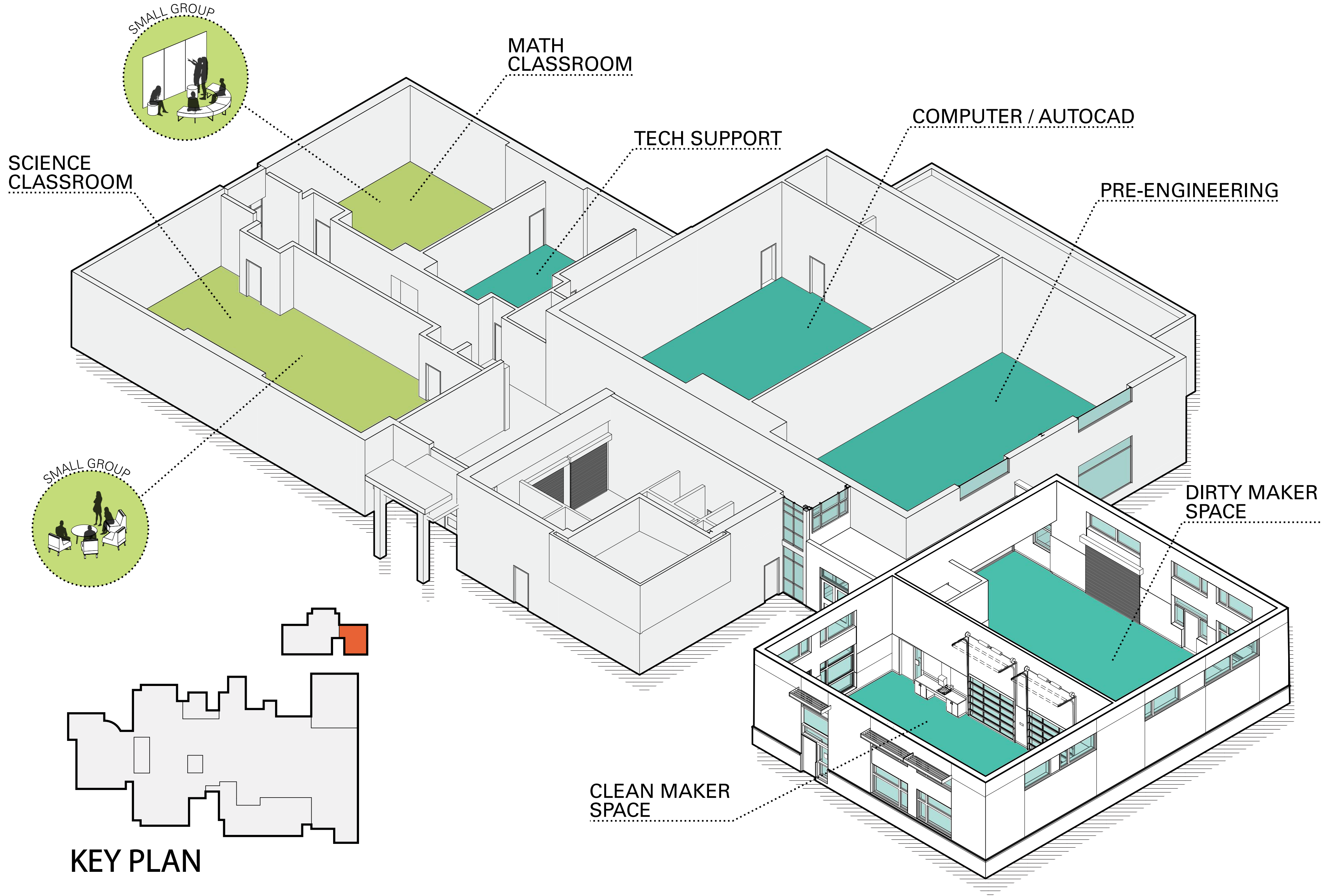
Roosevelt High School, Portland, OR

ROOSEVELT HIGH SCHOOL





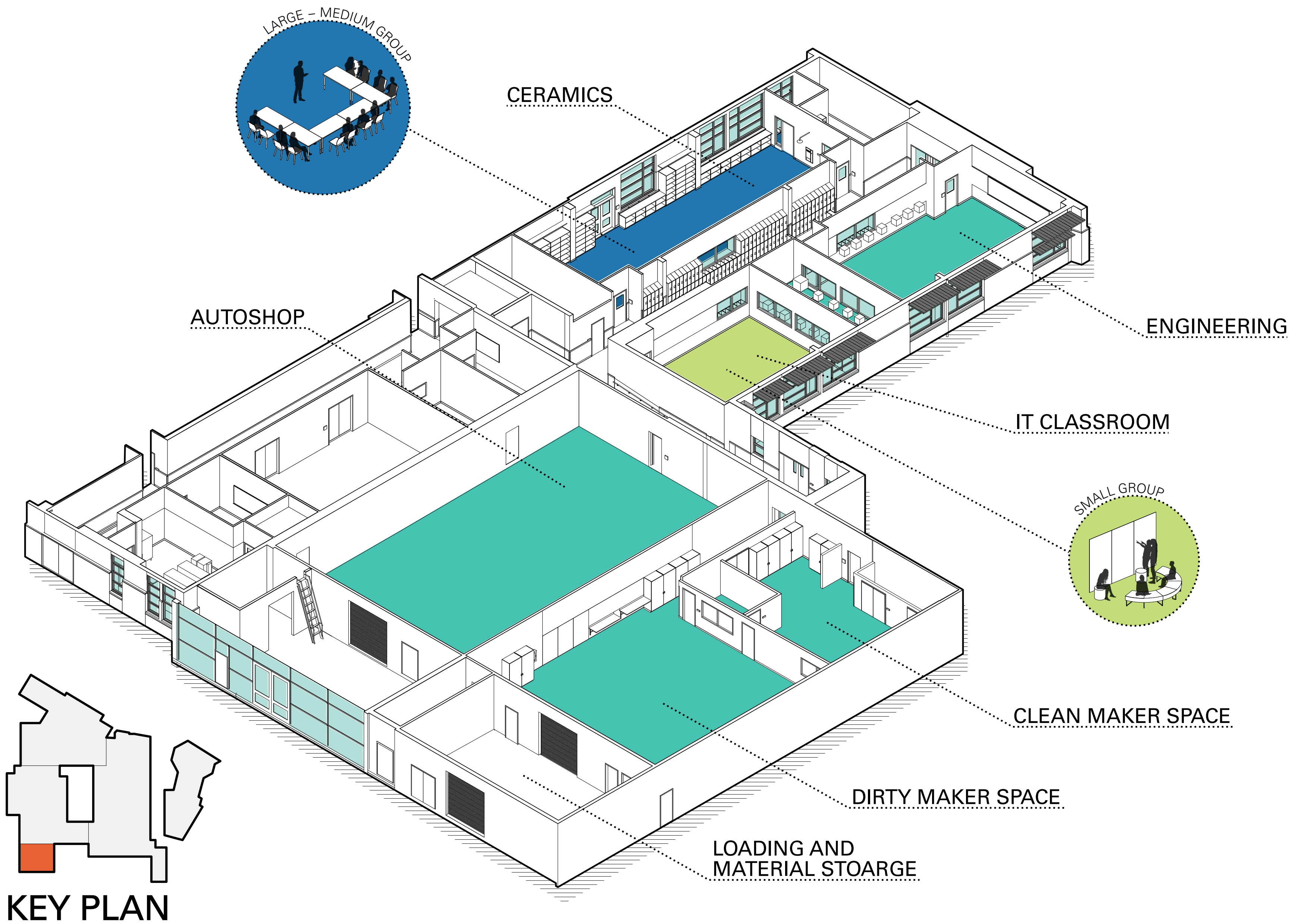
TUALATIN HIGH SCHOOL





Tigard High School, Tigard, OR

TIGARD HIGH SCHOOL

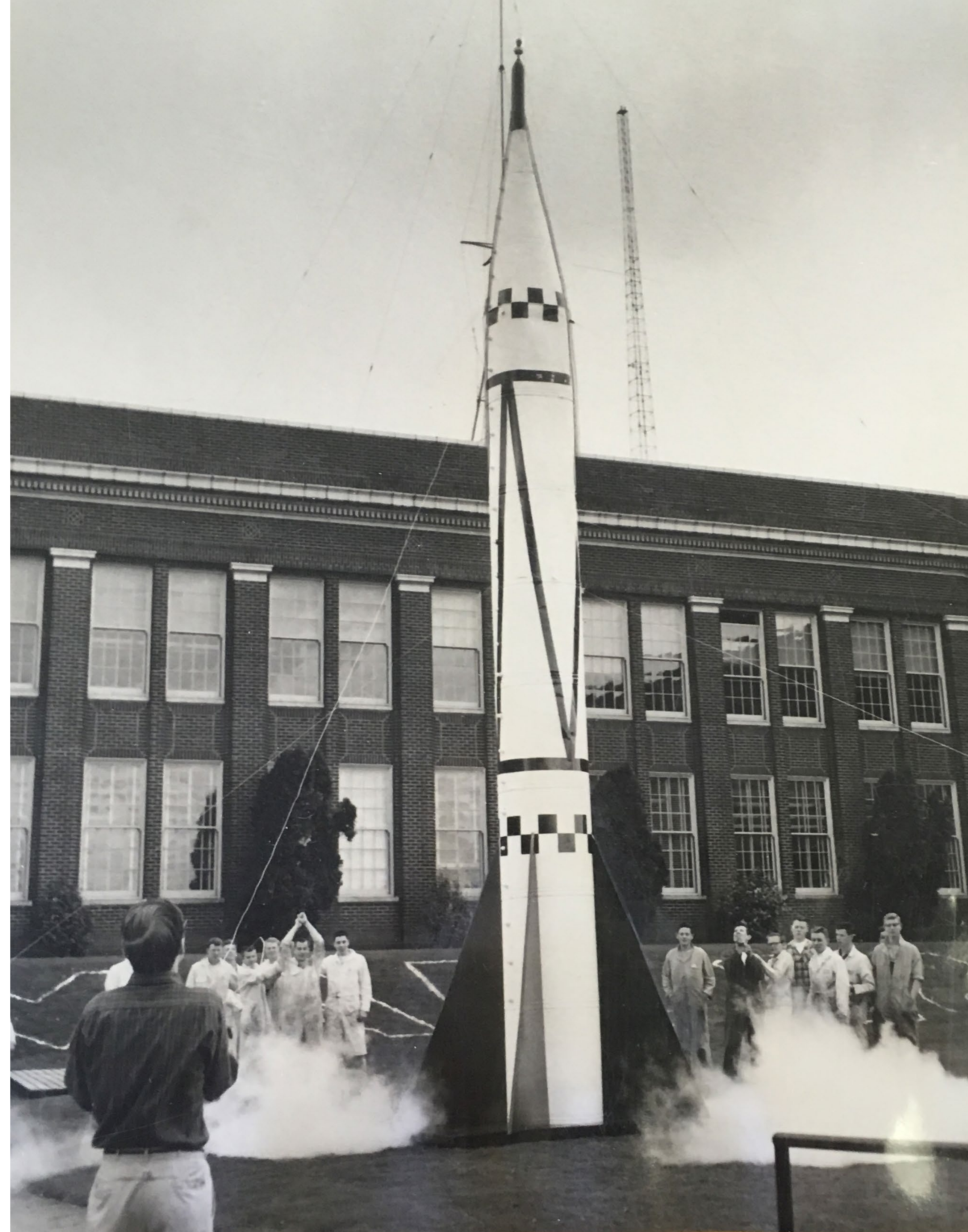


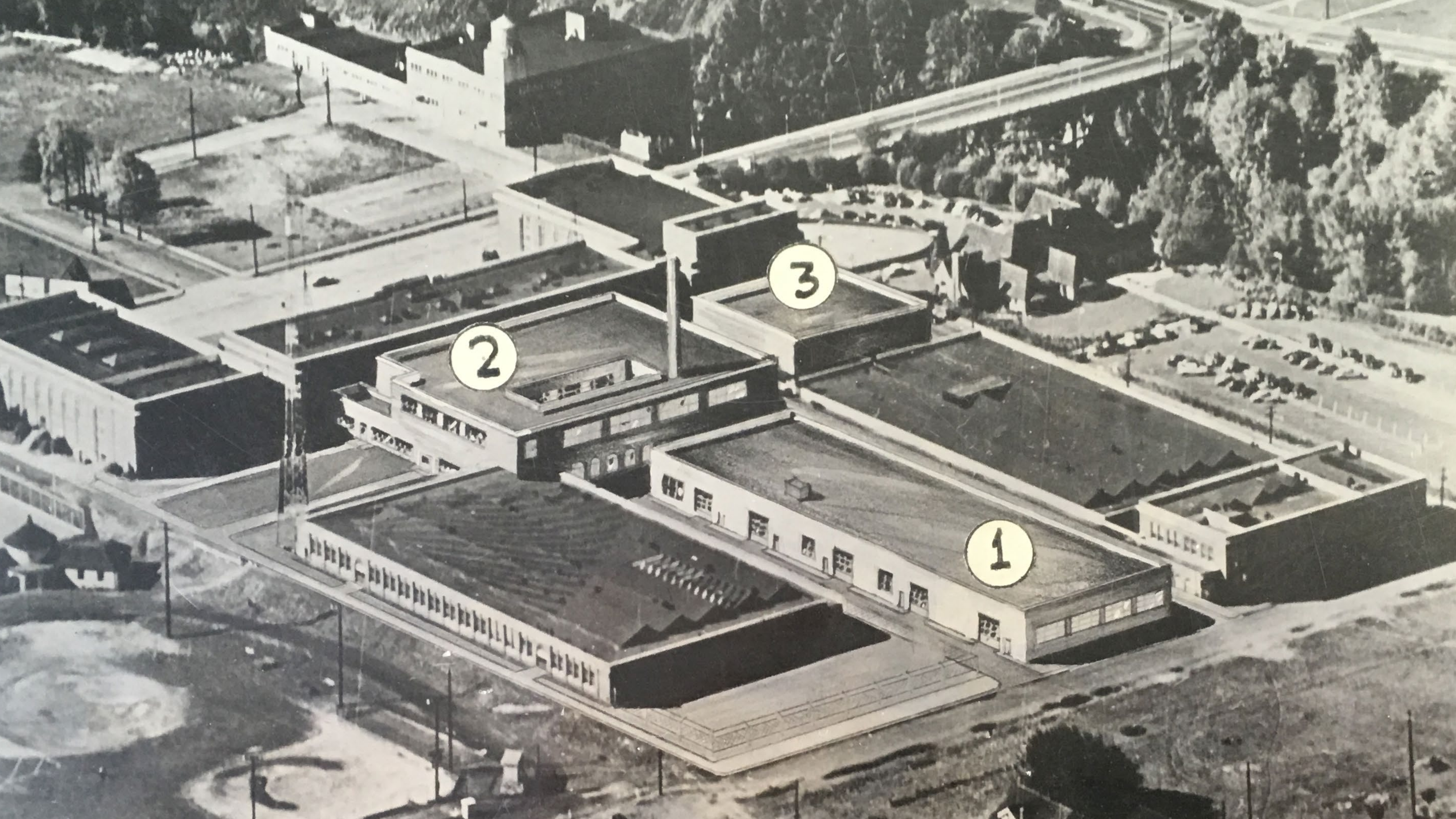
KEY PLAN



CASE STUDY: BENSON POLYTECHNIC HIGH SCHOOL

546





2

3

1

PROGRAM BEFORE MASTER PLAN

CTE

- + Automotive
- + Building Construction
- + Math Tech
- + Manufacturing
- + Engineering
- + Electric
- + Design And Applied Arts
- + Architecture
- + Computer Science
- + Digital Media
- + Health Occupations
- + Radio



ACADEMICS

- + Math
- + Science
- + Social Studies
- + English
- + Foreign Language
- + Health / PE

ENVISIONING A FUTURE BENSON

+ Master Planning

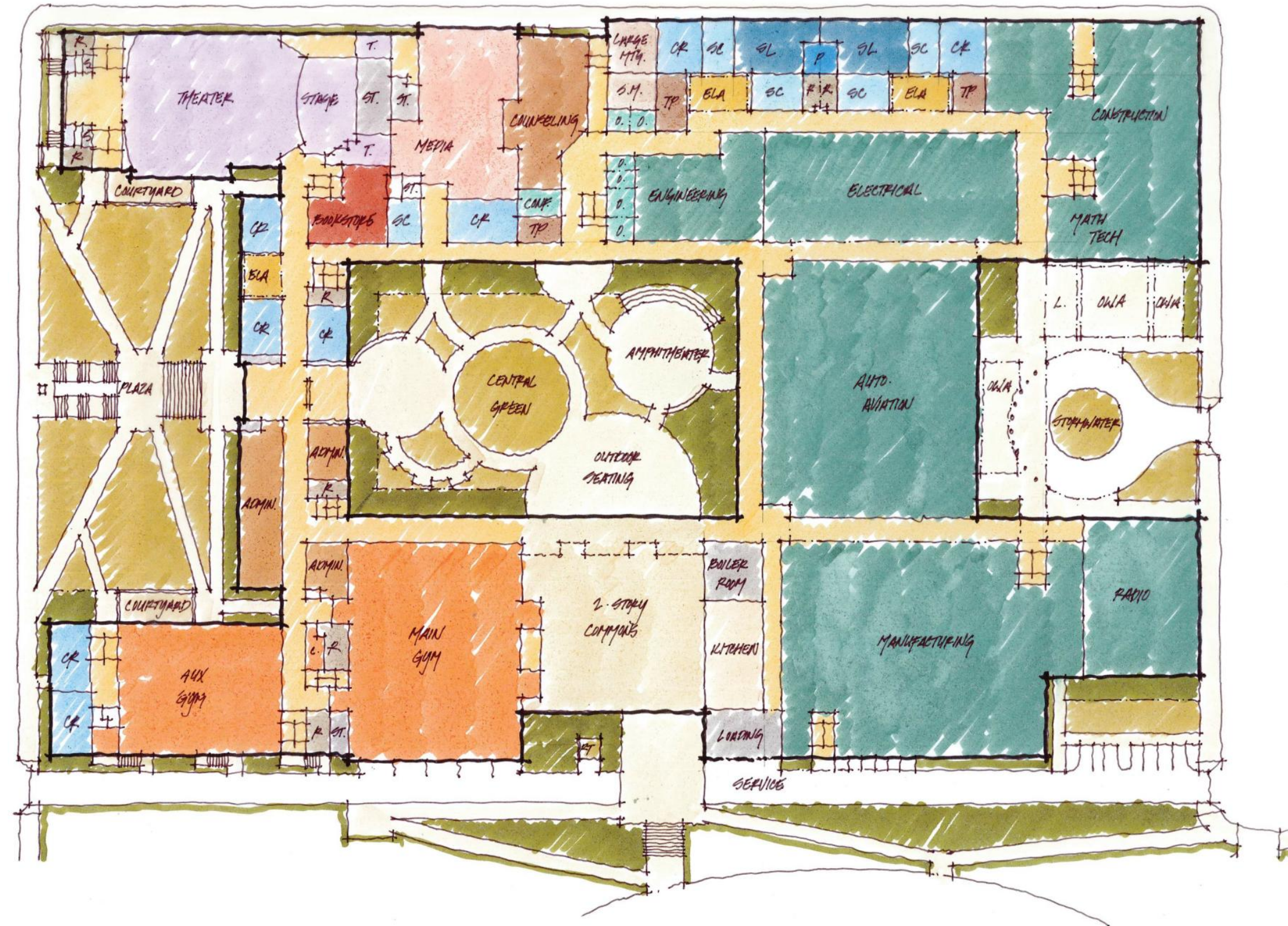
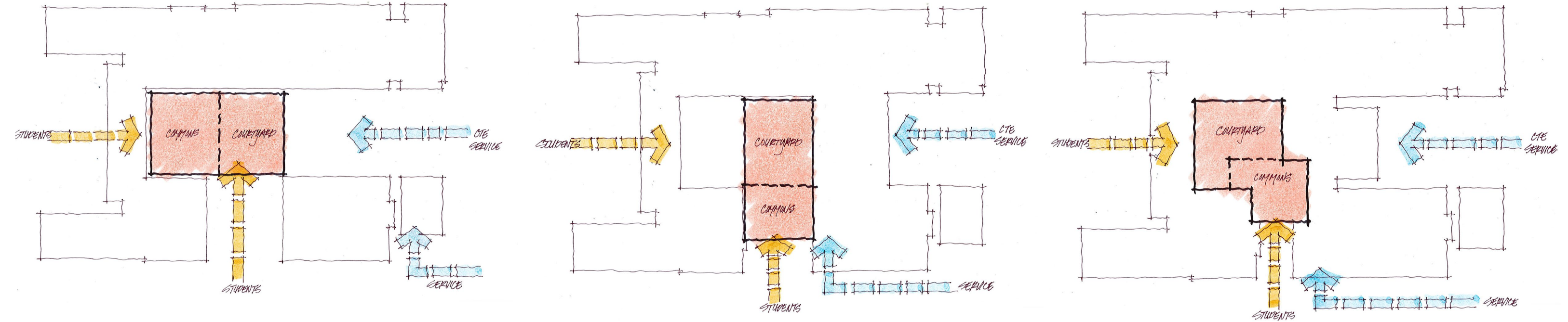
- » Master Planning Committee
- » Development of Ed Spec
- » Initial user group meetings

+ Industry Outreach & Stakeholder Engagement

- » Development of Co-location
- » Development of Ed Spec
- » Respect traditional skills and equipment, strive for future innovation

+ Student engagement

+ Extensive user group engagement



MASTER PLANNING COMMITTEE

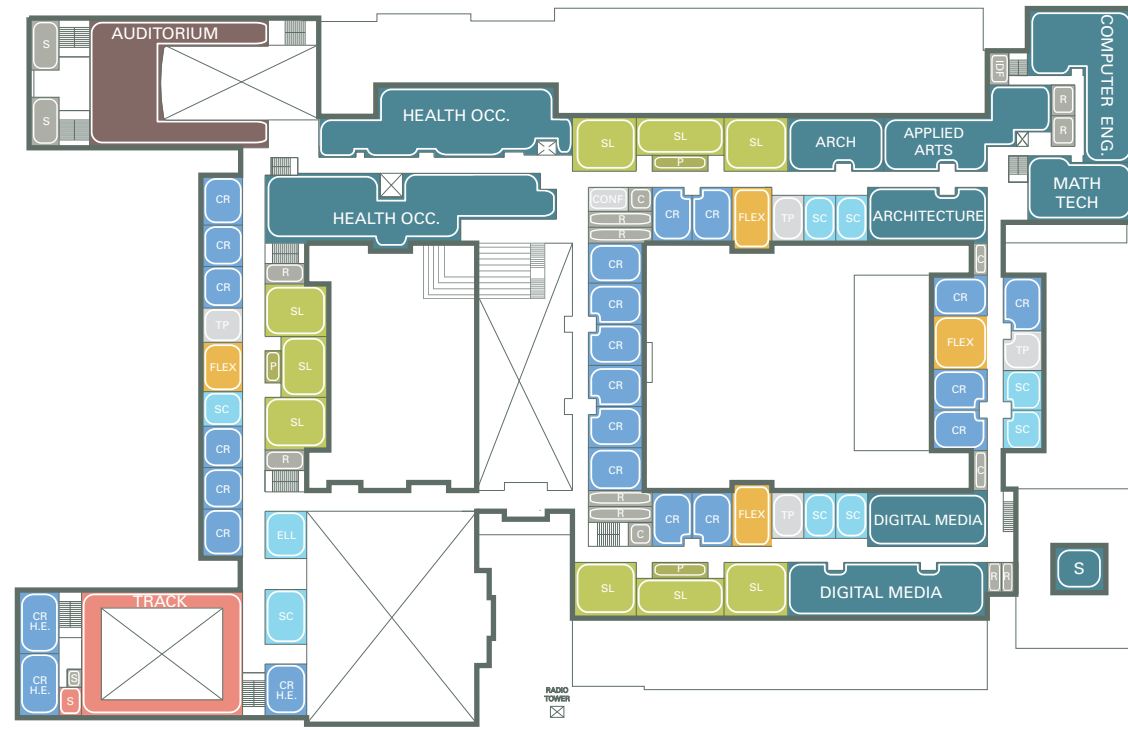
+ 10 meetings over 1 year, analyzing, reviewing, and modifying the masterplan through 12+ distinct design iterations

+ Diverse group of teachers, staff, alumni, students, and neighborhood stakeholders

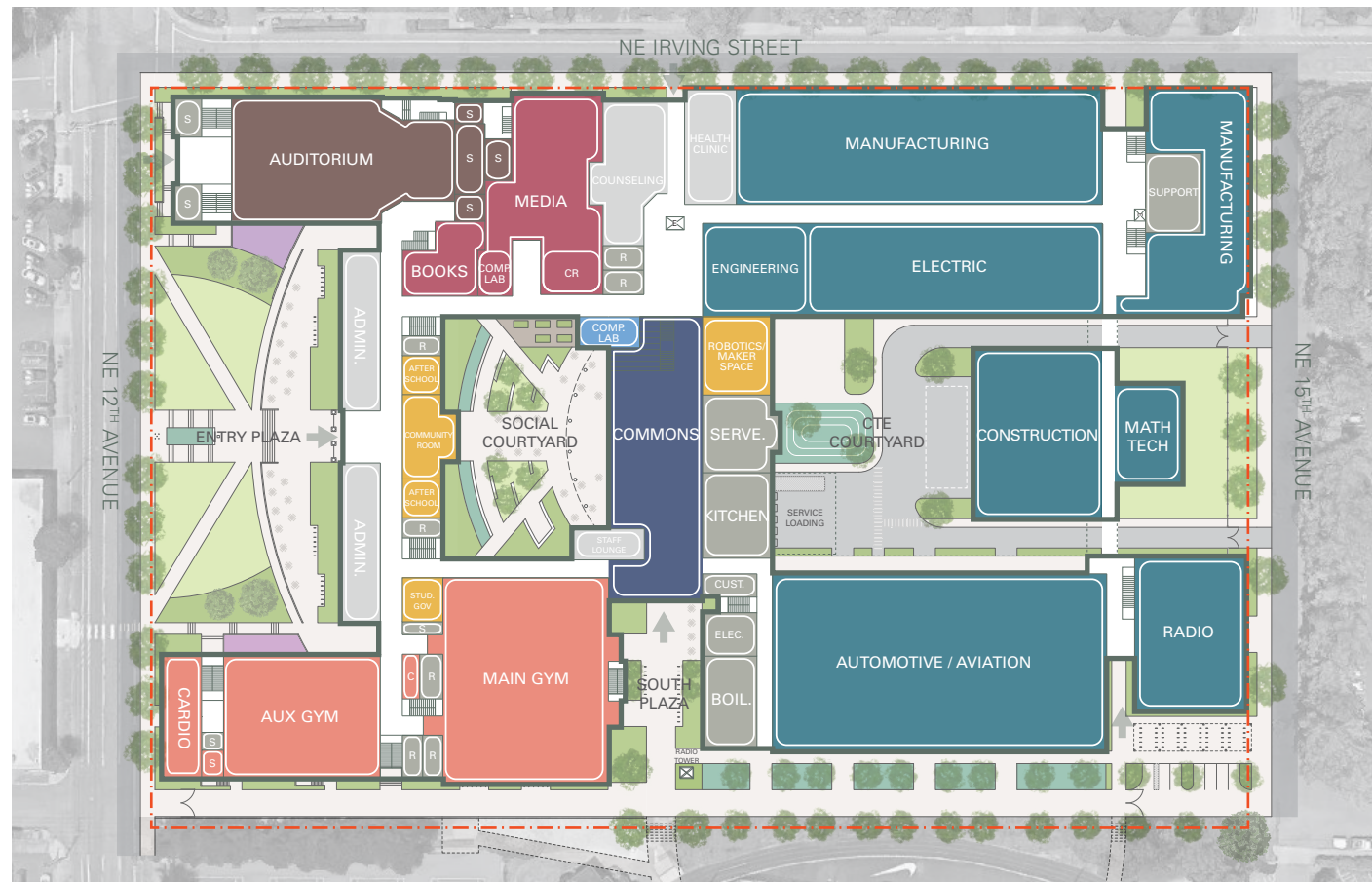


MASTER PLANNING COMMITTEE

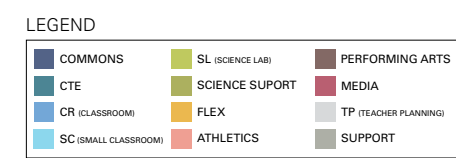
BUILDING STUDIES / SCHEME L.1



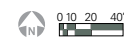
SECOND FLOOR



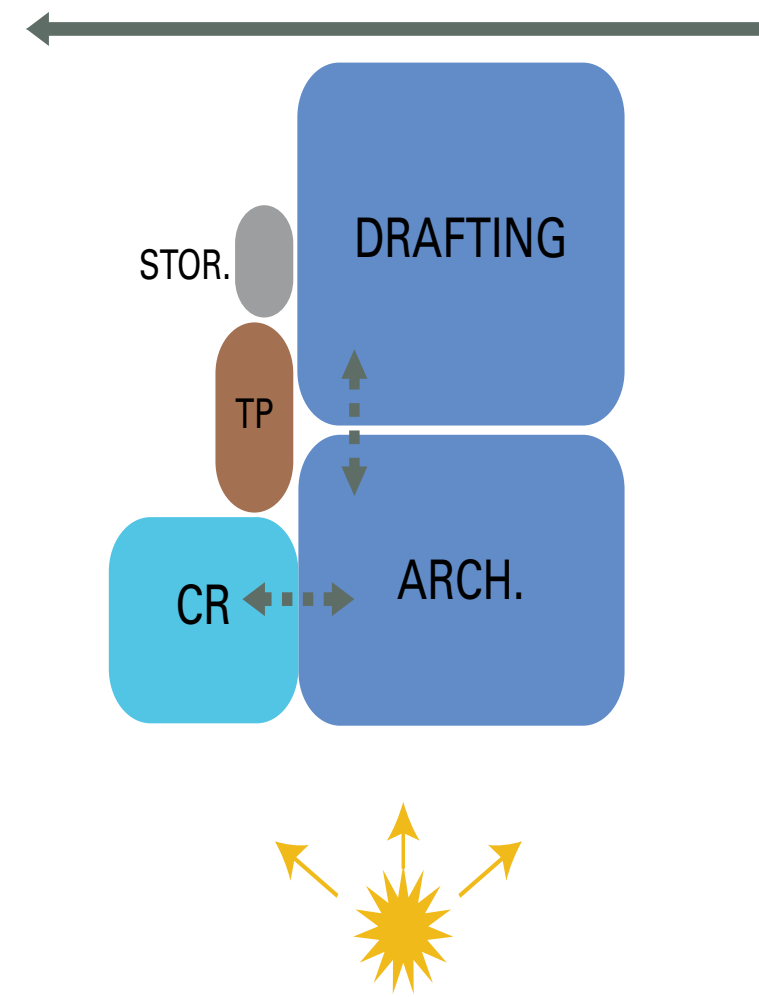
GROUND FLOOR



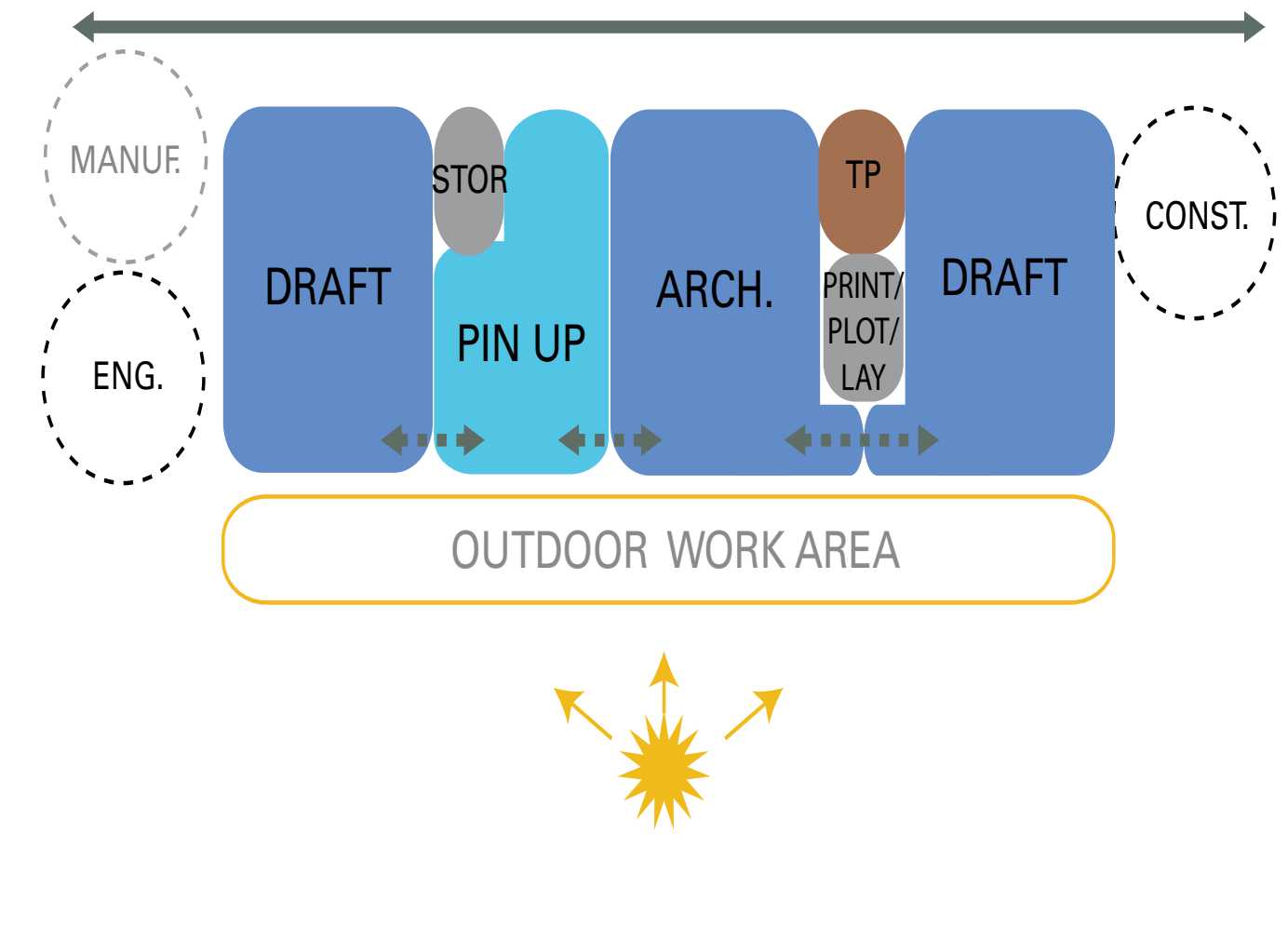
BENSON POLYTECHNIC HIGH SCHOOL / 201705.04



EXISTING: +/- 3,400 SF



PROPOSED: +/- 4,800 SF



EXISTING DRAFTING ROOM: +/-1,500 SF

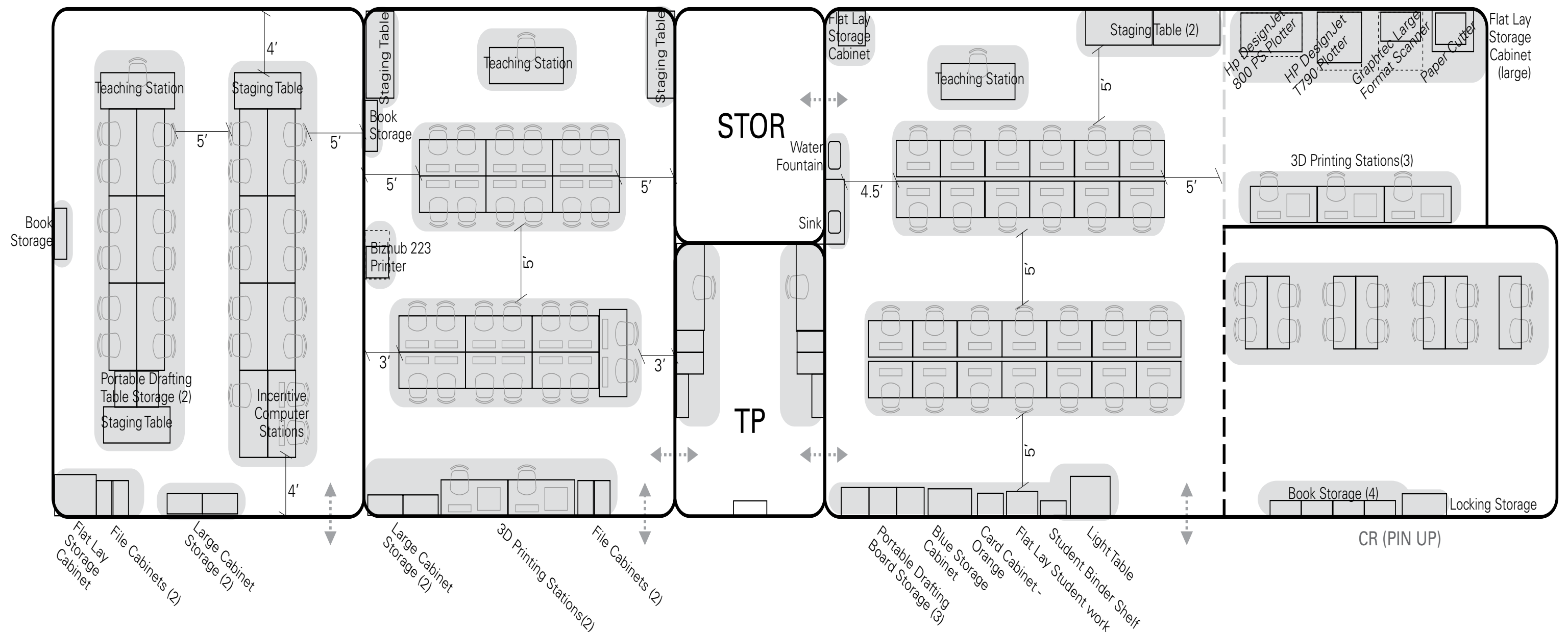
PROPOSED DRAFTING ROOM: +/- 950 SF

PROPOSED SOPH COMPUTER LAB: +/- 950 SF

EXISTING ARCHITECTURE ROOM: +/-1,150 SF

PROPOSED ARCHITECTURE ROOM: +/- 2,025 SF

PRINT/PLOT/LAYOUT & STORAGE



CR (PIN UP)

INDUSTRY OUTREACH AND PARTNERSHIPS

- + Clark College
- + Columbia Helicopter
- + Oregon Health and Science University
- + Oregon Institute of Technology
- + Mt. Hood Community College Auto Shop
- + CTEC - Career and Technical Education Center
- + Nike
- + Mt Hood Community College
- + Portland Community College Auto Tech
- + PSU Engineering
- + Sabin - Schellenberg Professional Technical Center



DEVELOPMENT OF ED SPEC & CO-LOCATION

Portland Public Schools
Benson Polytechnic High School
Site Specific Educational Specification

3.0 PROGRAM

3.1 PROGRAM DELIVERY COMPONENTS

The first step in breaking down the wide range of program needs at Benson Tech is to identify and define the building blocks of the program or components that make up the various spatial needs of each activity.

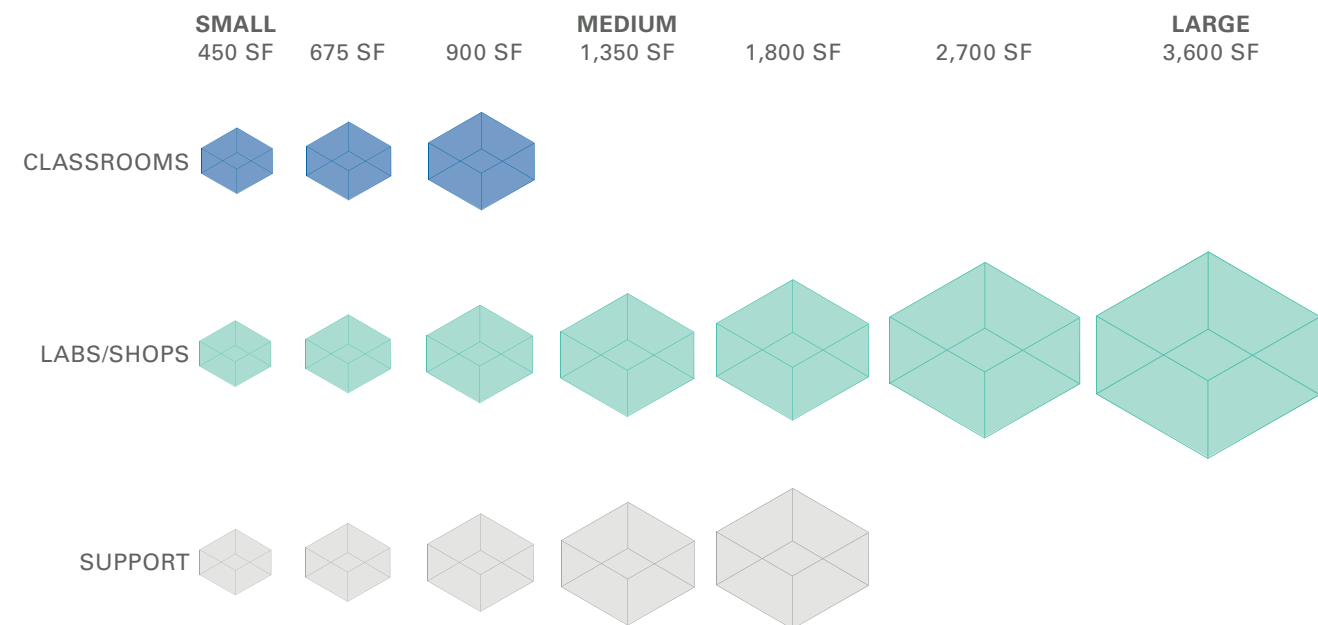
Classrooms
Classrooms are versatile spaces that support team learning for a wide range of program needs. Classrooms should all be similar in nature for use by multiple programs, and have easy access to flex areas such as break out spaces and other shared spaces. Adjacency of Classrooms to Labs/Shops for collaboration and shared use promotes a project-based learning pedagogy. Classrooms include: General Classrooms, SPED, CTE Classrooms.

Labs/Shops
Labs and Shops enable project-based learning and are flexible in their design so they are easily adaptable to new technology for years to come. Labs/Shops include: Science Labs, Computer Labs, CTE Shops.

Support Spaces
Support Spaces provide the secondary level of resources needed for programs to function. Support Spaces include: Teacher Planning, Conference Rooms, Storage, Restrooms.

Gathering Spaces
Gathering Spaces are the spaces that foster collaboration. Gathering spaces include: Commons, Flex / Breakout.

Once the components have been defined, we then look at sizing them appropriately based on current activities and industry examples of similar type of spaces. Space components have been sized appropriately in the program, using a modular format to provide consistency and regularity for efficient use of space. Components can be combined when needed for larger spaces.



SUITE C - 7,200 SF

CURRENT CTE PROGRAMS:

- + Digital Media
- + Health Occupations
- + Electric

OTHER EXAMPLE PROGRAMS:

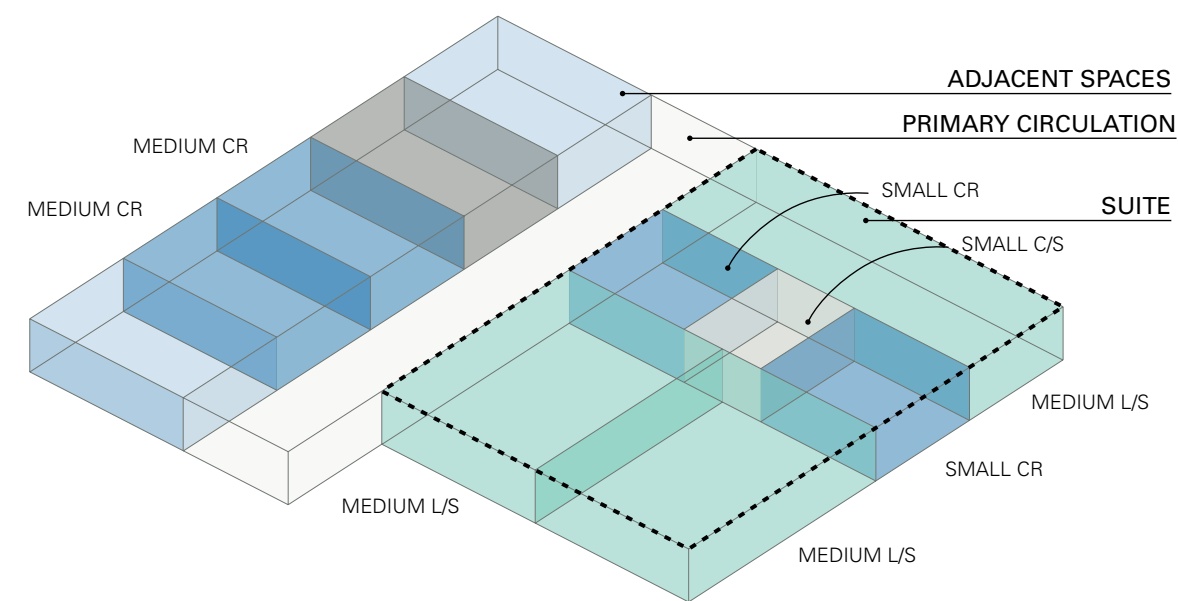
- + Alternative Energy & Sustainability
- + Robotics

EXAMPLE LAYOUT:

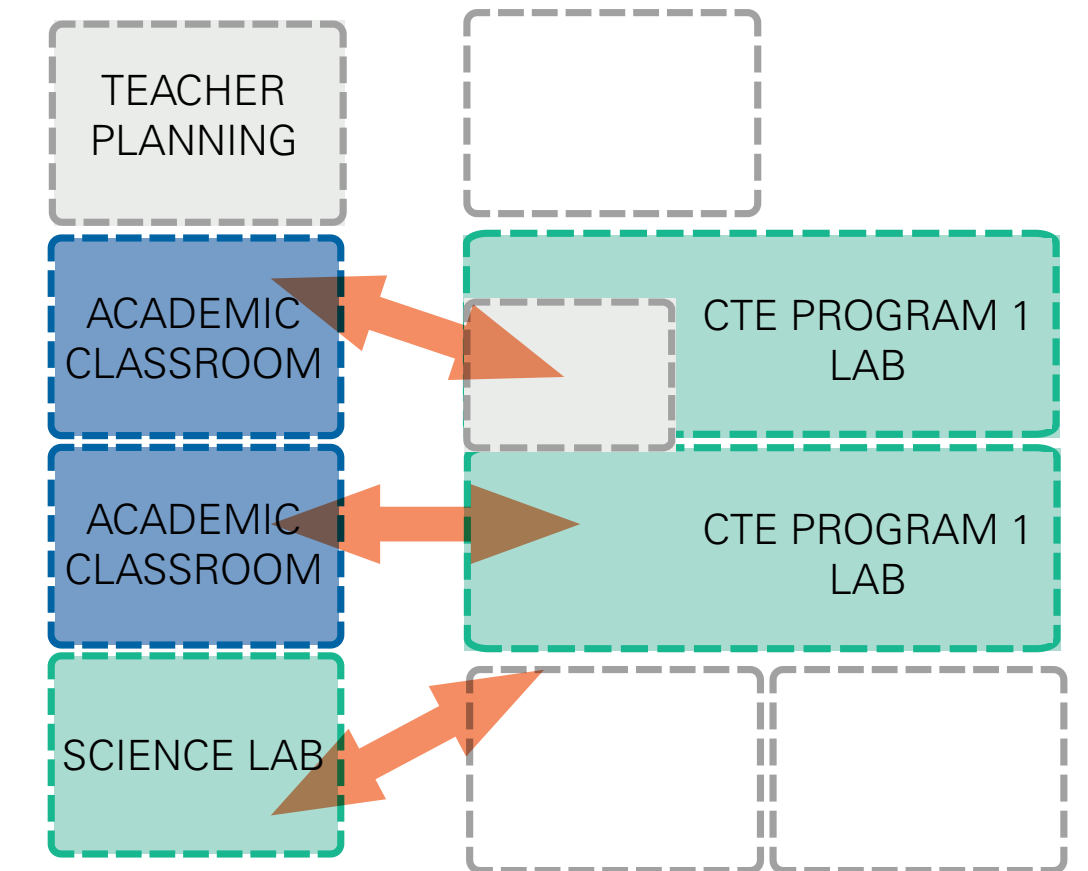
Portland Public Schools
Benson Polytechnic High School
Site Specific Educational Specification

LEGEND

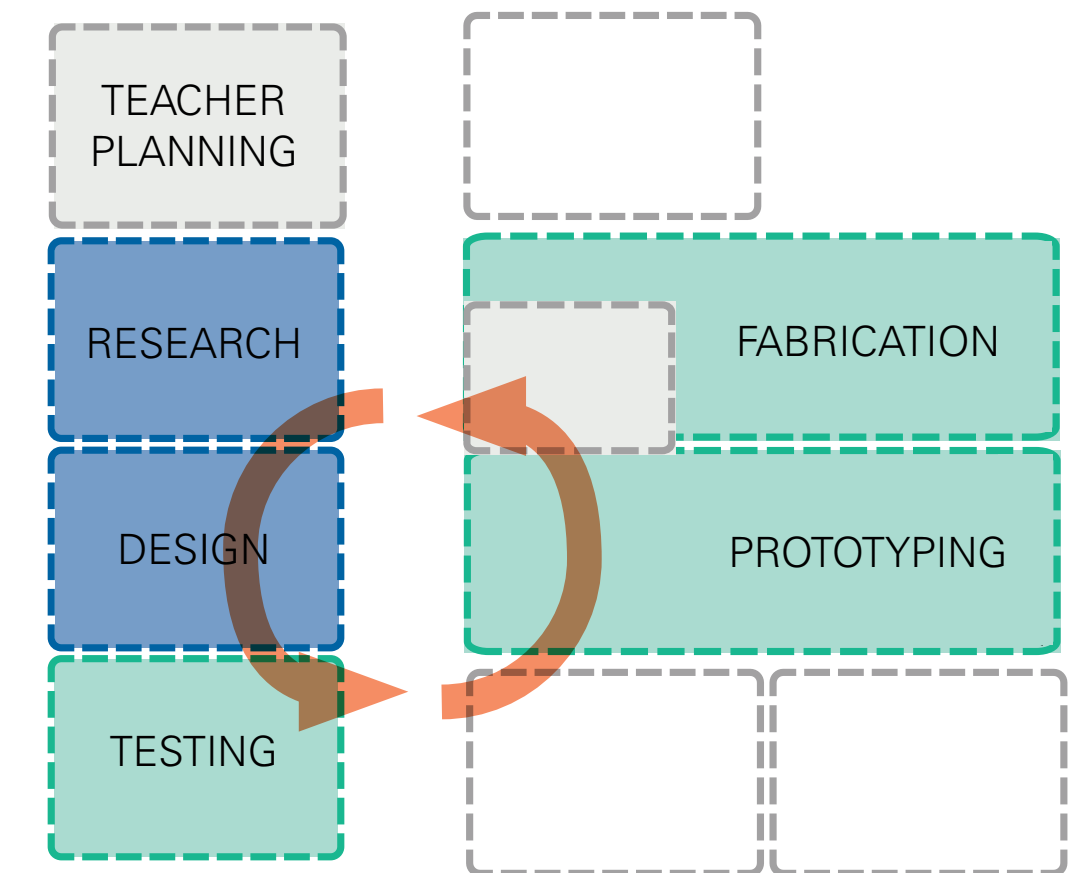
- CLASSROOMS
- LABS / SHOPS
- COMPUTER LABS
- CIRCULATION / SUPPORT



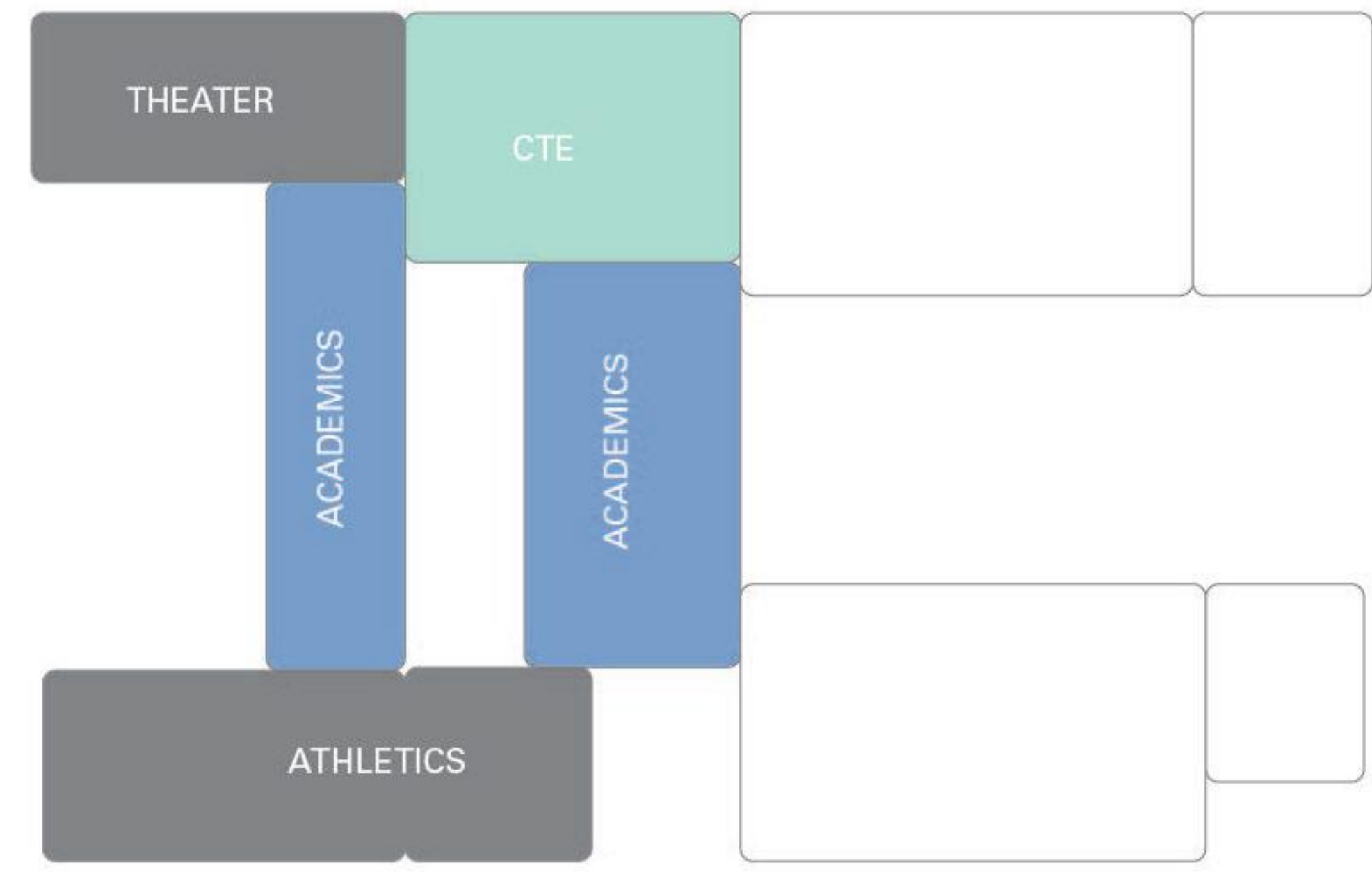
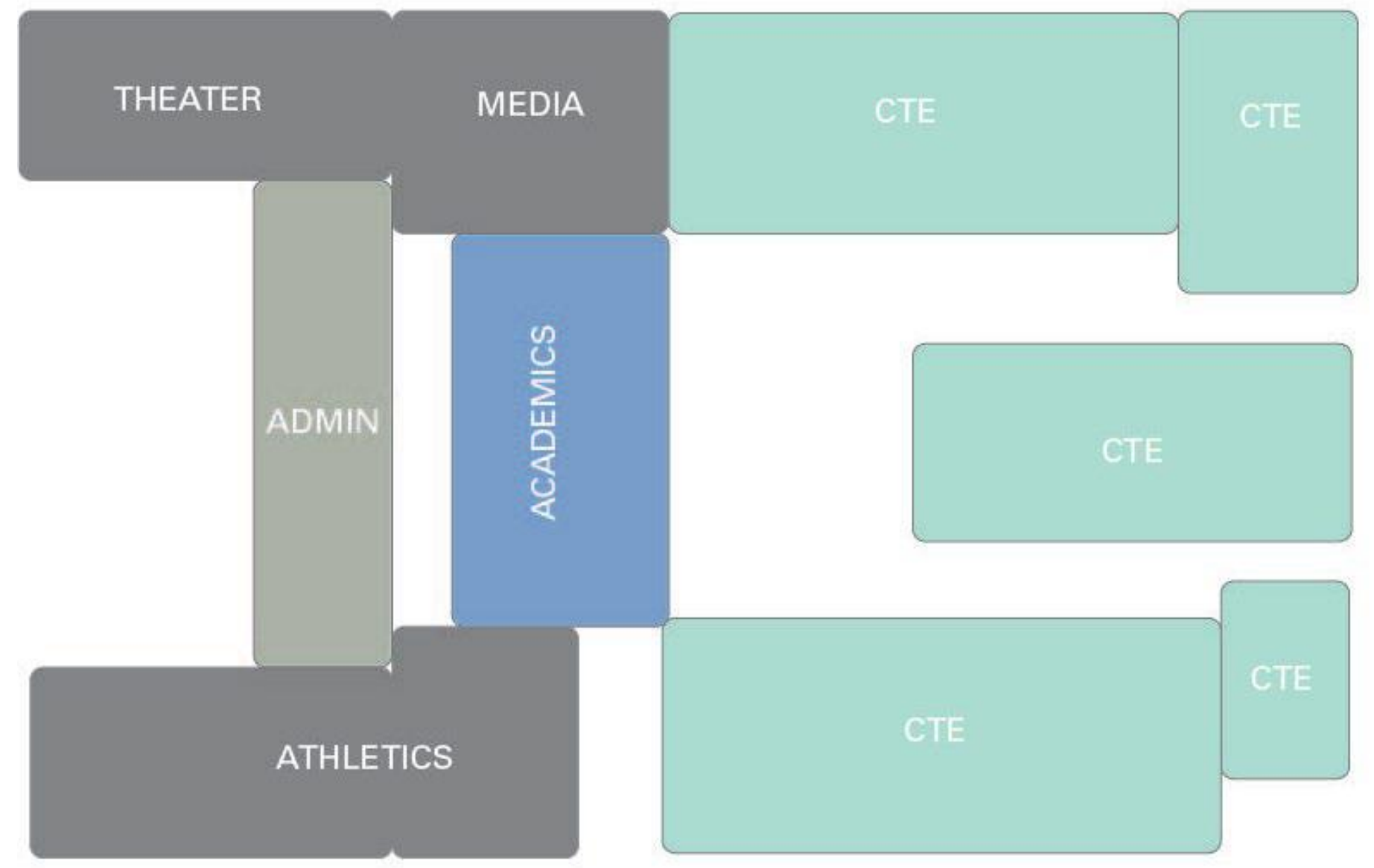
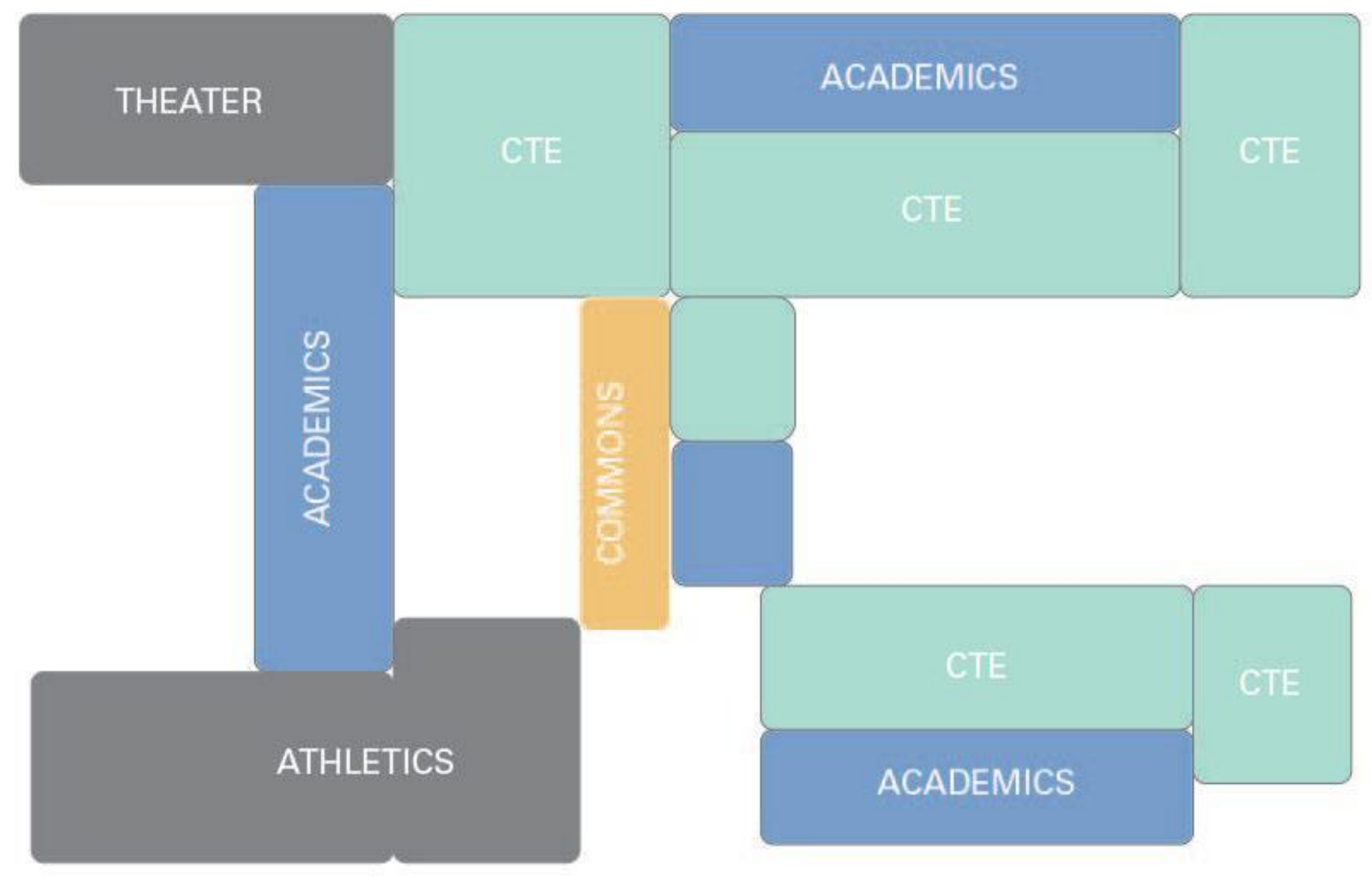
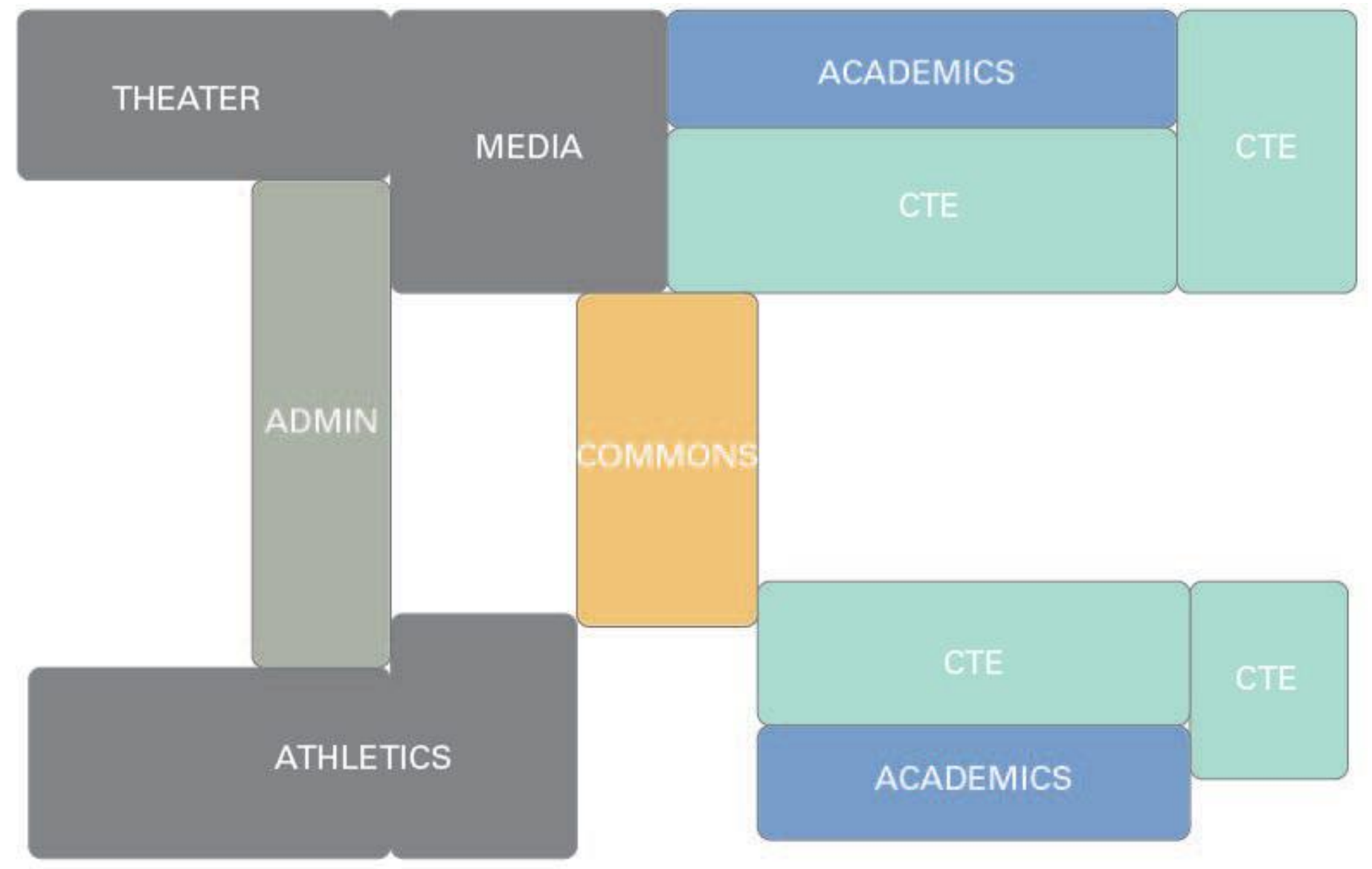
EXAMPLE PROGRAM BASED APPROACH:



EXAMPLE PROJECT BASED APPROACH:



DEVELOPMENT OF ED SPEC & CO-LOCATION

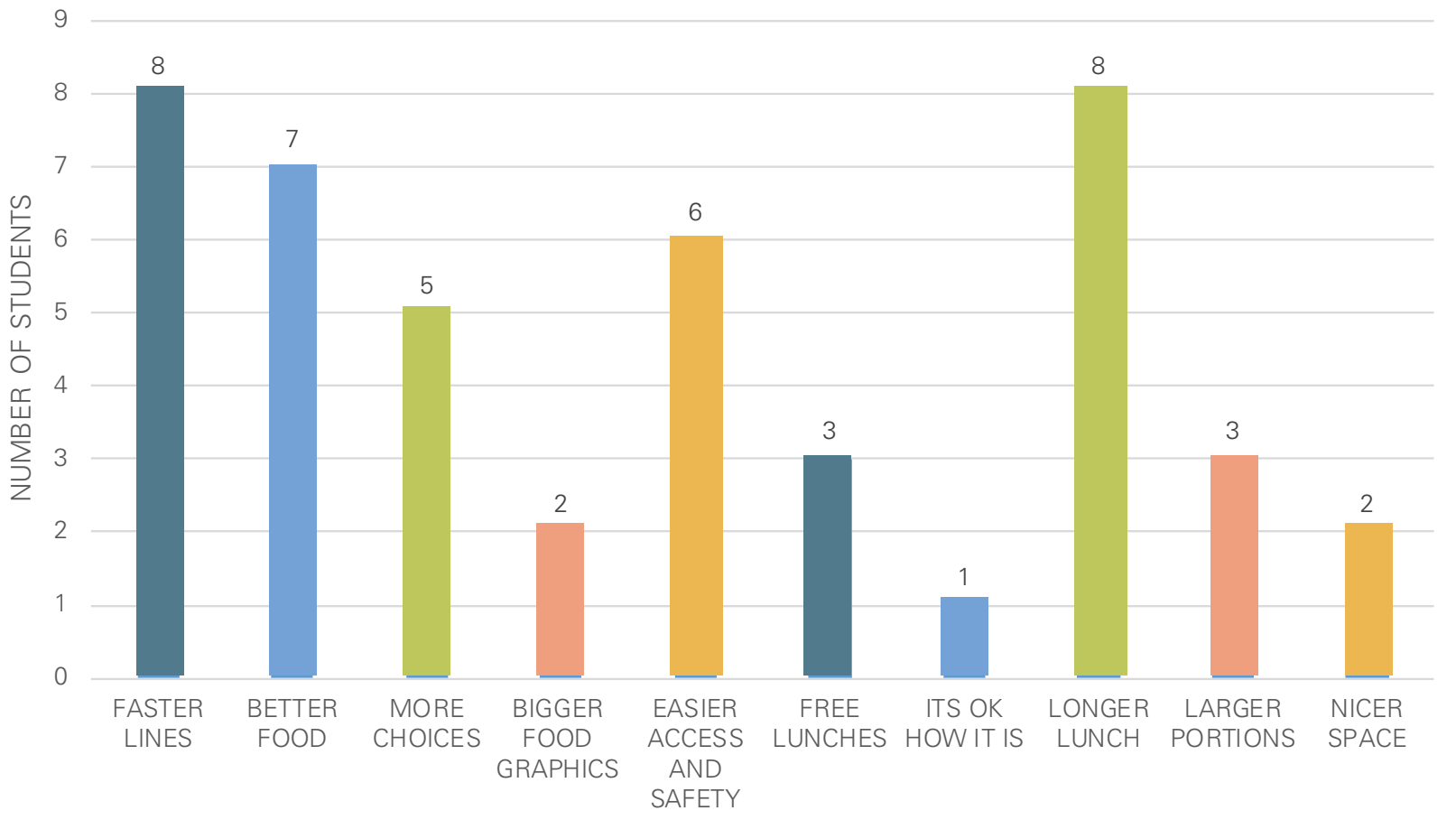


STUDENT ENGAGEMENT

- + Student survey
- + Lunchtime engagement

STUDENT SURVEY / OVERVIEW

WHAT WOULD MAKE YOUR LUNCH EXPERIENCE MORE ENJOYABLE AND CONVENIENT?

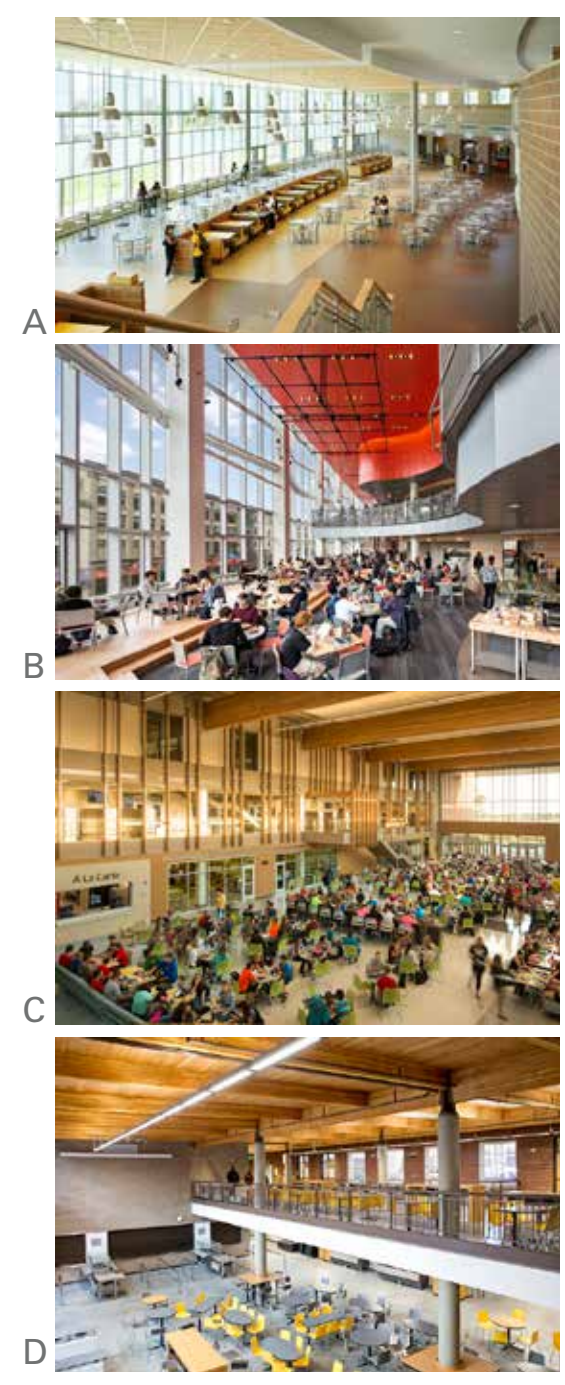


FACTORS THAT WOULD MAKE LUNCH MORE ENJOYABLE

- OTHER:
- + If the food wasn't from school
 - + If the space was more sanitary
 - + If microwaves were provided
 - + It was less crowded



STUDENT SURVEY / OVERVIEW



WHAT DO YOU LIKE OR DISLIKE ABOUT THE IMAGES OF THE COMMONS?

- MOST POPULAR ANSWERS FOR: I LIKE...**
- + The open space (10)
 - + The big windows (4)
 - + The modern look (3)
 - + Image A (3)
 - + The booths (2)
 - + Image C (1)
- OTHER ANSWERS FOR: I LIKE...**
- + "When there aren't too many people and enough tables"
 - + "That there are multiple levels and you can see stuff out the windows. It seems cool"
 - + "How it's very open and welcoming and it looks like a comfortable environment"
 - + "How the first thing you see is the cafeteria"
- MOST POPULAR ANSWERS FOR: I DISLIKE...**
- + How crowded it looks (5)
 - + Nothing (4)
 - + The modern look (1)
 - + Small tables (1)
 - + Image A (1)
 - + Image B (1)
 - + Image C (1)
- OTHER ANSWERS FOR: I DISLIKE...**
- + "Too much wood, not enough glass or metal"
 - + "How we don't have the budget to create this vision. Even if we do, it's under the Auditorium and if we really want to have a bigger common area, we need to have space for it!"
- MOST POPULAR ANSWERS FOR: I THINK IT'S MISSING...**
- + More tables (3)
- OTHER ANSWERS FOR: I THINK IT'S MISSING...**
- + A hot lunch line
 - + A trash system
 - + Vending machines
 - + Microwaves
 - + Outside opportunities
 - + Some entertainment
 - + Glass and metal
- OTHER COMMENTS...**
- + "Feels like most of them would run out of space quickly."
 - + "Make our lunch commons like picture B."
 - + "If we were to build a common area for Benson, we either have to redo the whole cafeteria OR locate it to a new location, but then again, that would be difficult finding the space for that."



STAKEHOLDER ENGAGEMENT PROCESS

+ Design Advisory Group

- » 43 students, staff, alumni, and parents were selected from the 75 applicants and represented age, race/ethnicity, and gender diversly
- » 12 meetings over 4 years

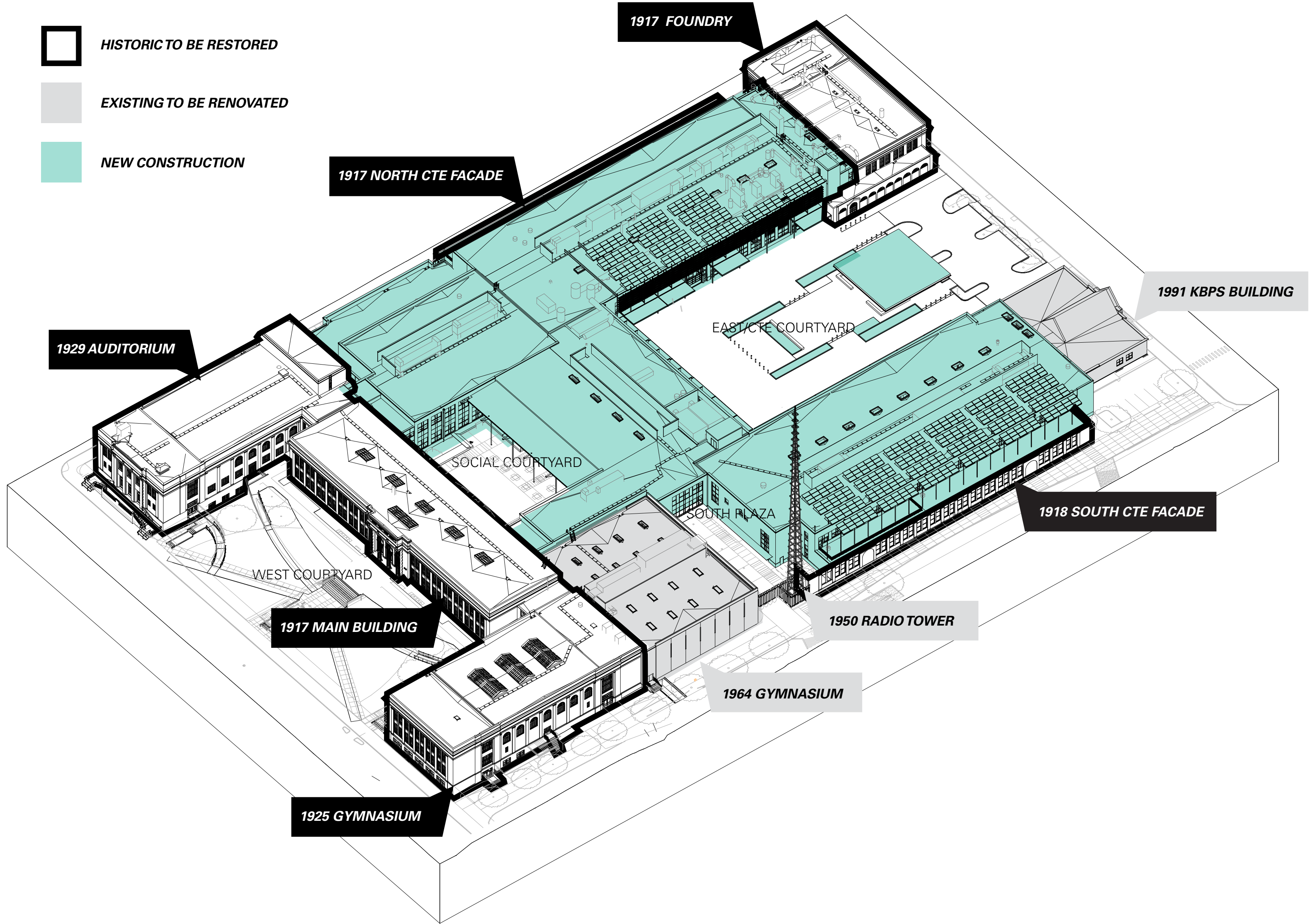
+ Alumni Association



GUIDING PRINCIPLES

1. Honor the unique history and culture of Benson Polytechnic High School
2. Support a comprehensive educational experience for students
3. Engage with the local business, government, and post-secondary partners to create strong connections between education and industry
4. Provide agile, flexible, and adaptable facilities that support changing educational and industry needs
5. Provide hands-on, project based learning opportunities that are imbued with rigor and relevancy
6. Position Benson Polytechnic as the national model for STEAM and CTE
7. Provide learning environments that inspire creativity and collaboration among students

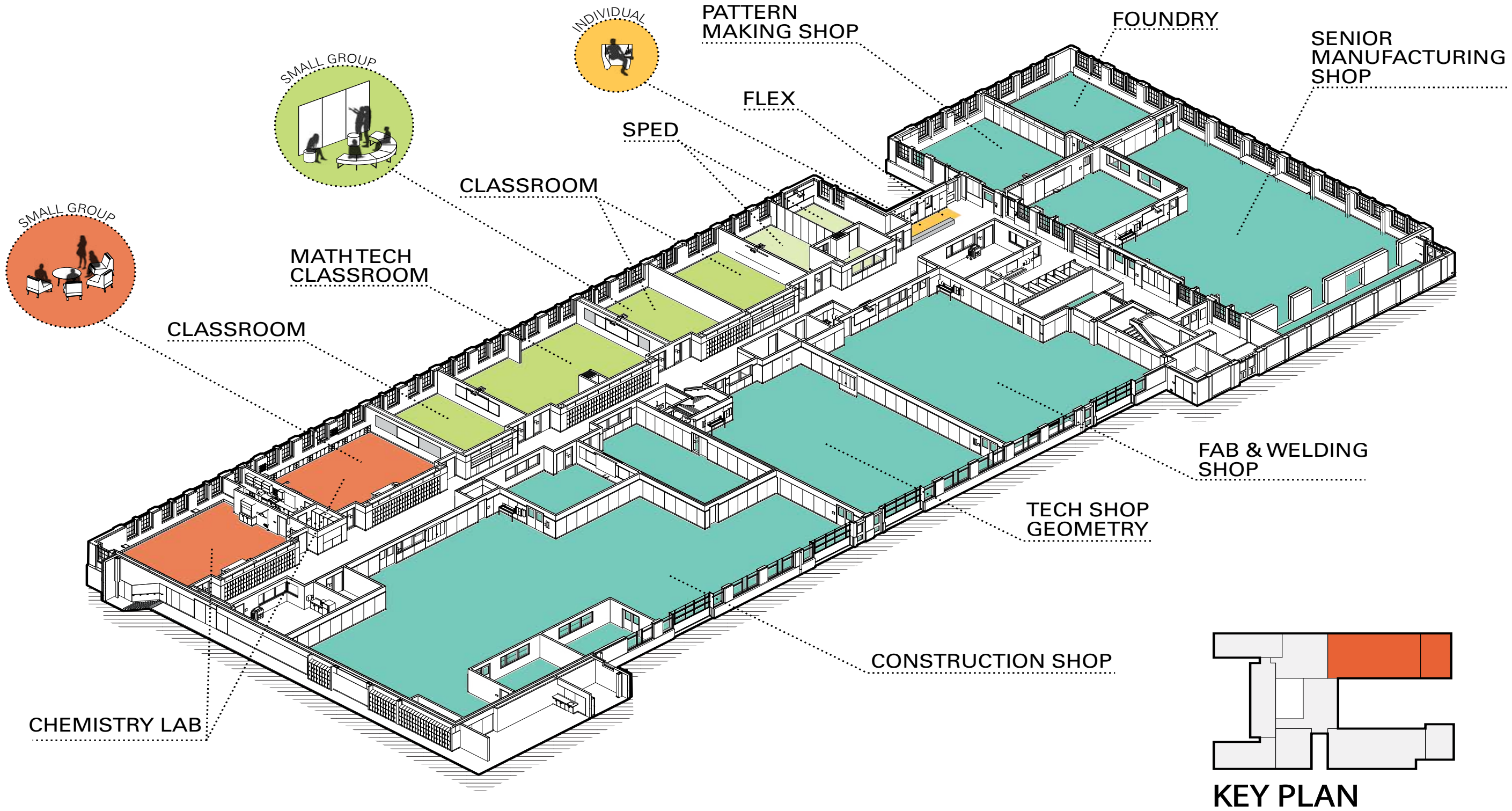
HISTORIC SIGNIFICANCE



CO-LOCATION

- + Opportunities for cross-disciplinary teaching and learning
- + Differentiation of space, to allow the right space for the right activities
- + Transparency between spaces for supervision, showcase programs and to allow students to be exposed to other programs/ work of their peers
- + Built-in flexibility to allow buildings to adapt over time, as programs change

BENSON POLYTECHNIC HIGH SCHOOL



PROGRAM AS ACADEMIES

Benson Academies

Students choose an academy at the end of their freshman year

And then

Students choose a major at the end of their sophomore year



Communication Design

- ★ Computer Science
- ★ Digital Media Production
 - Photography & Web Design
 - Video Production
- ★ Radio Broadcasting
 - Partnered with Modern World History and English teachers



Health Sciences

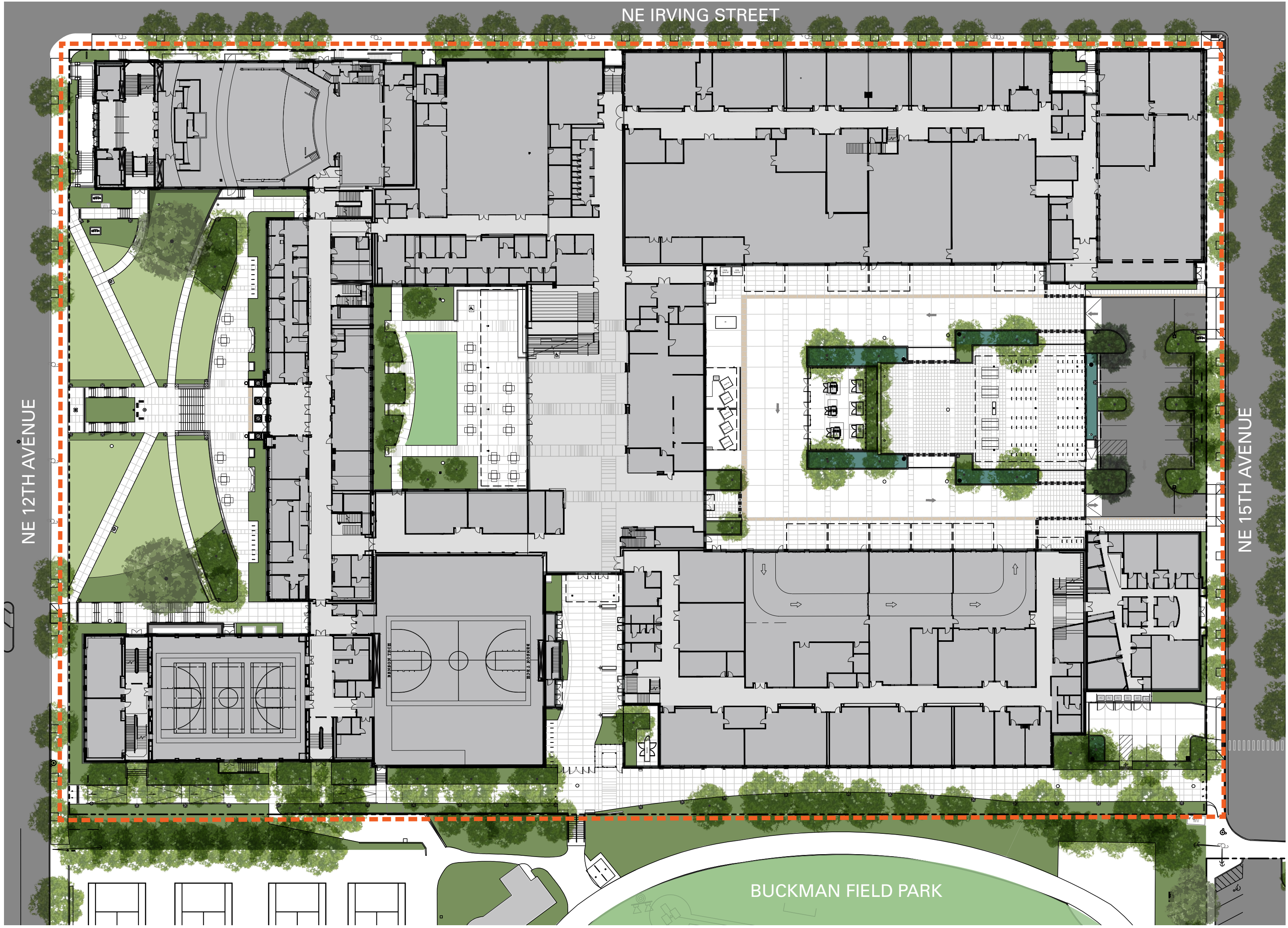
- ★ Dental
- ★ Nursing
- ★ Emergency Medical
 - Partnered with Chemistry and English teachers



Tech Skills

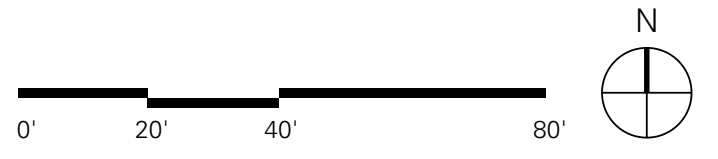
- ★ Automotive Technology
- ★ Building Construction
- ★ Electric Technology
- ★ Manufacturing Technology
 - Partnered with Chemistry and Modern World History teachers

ACCESS TO OUTDOORS



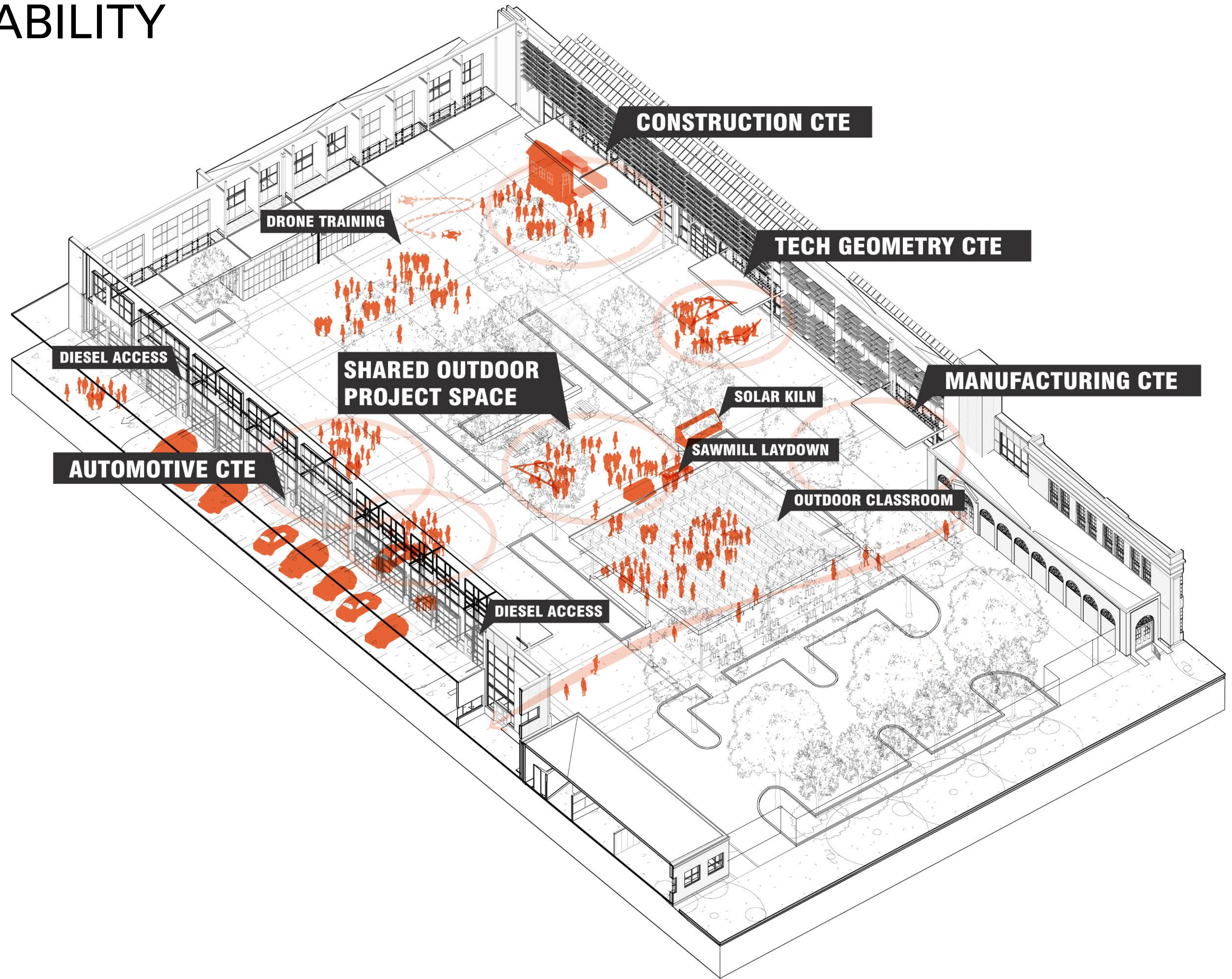
LEGEND

PROPERTY LINE	
FENCE	
LAWN	
SYNTHETIC TURF	
SHRUB PLANTING	
STORMWATER PLANTING	
CONCRETE PAVING	
COLORED CONCRETE PAVING	
ASPHALT PAVING	
PROPOSED LIGHT POLE	
PROPOSED TREE	

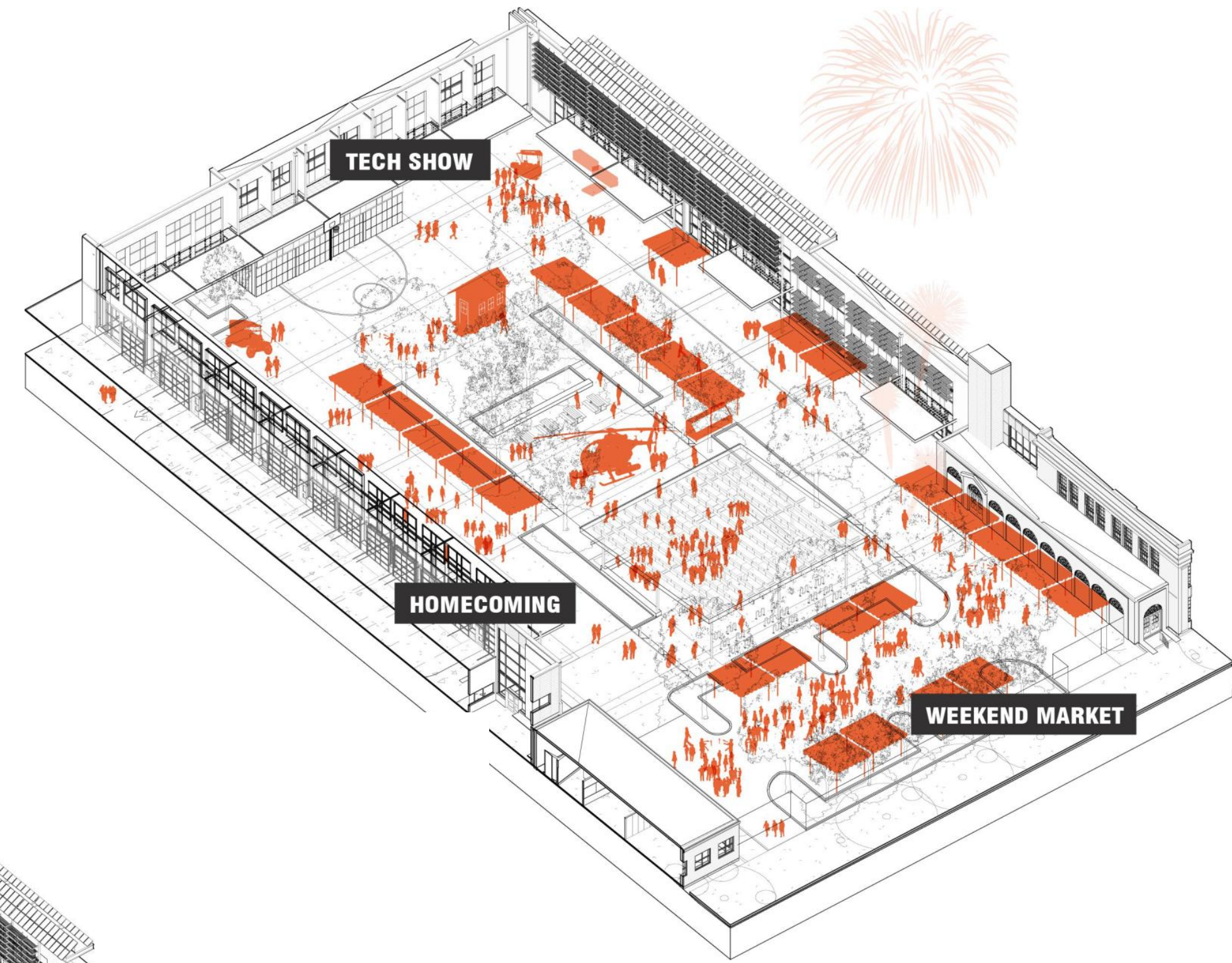
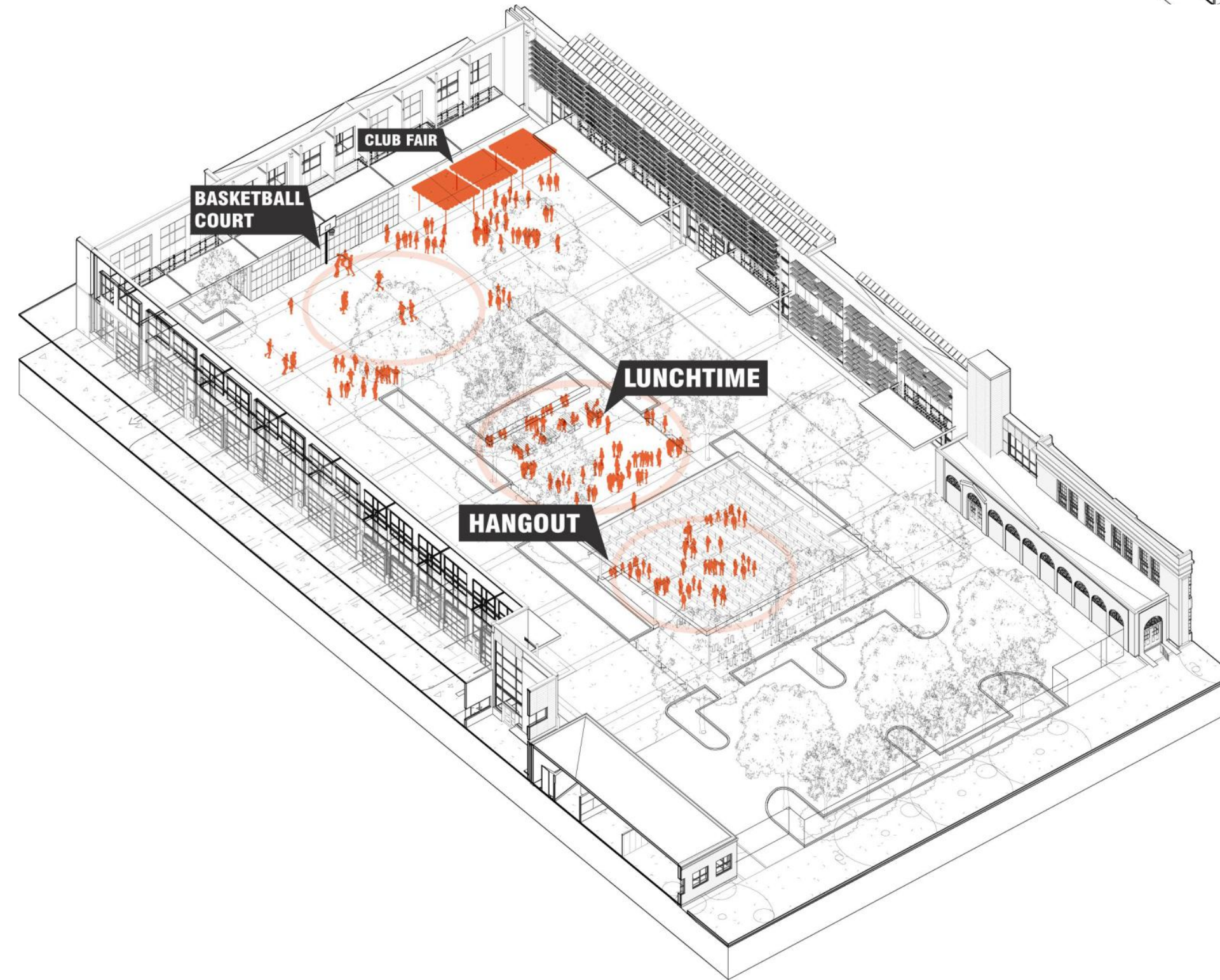
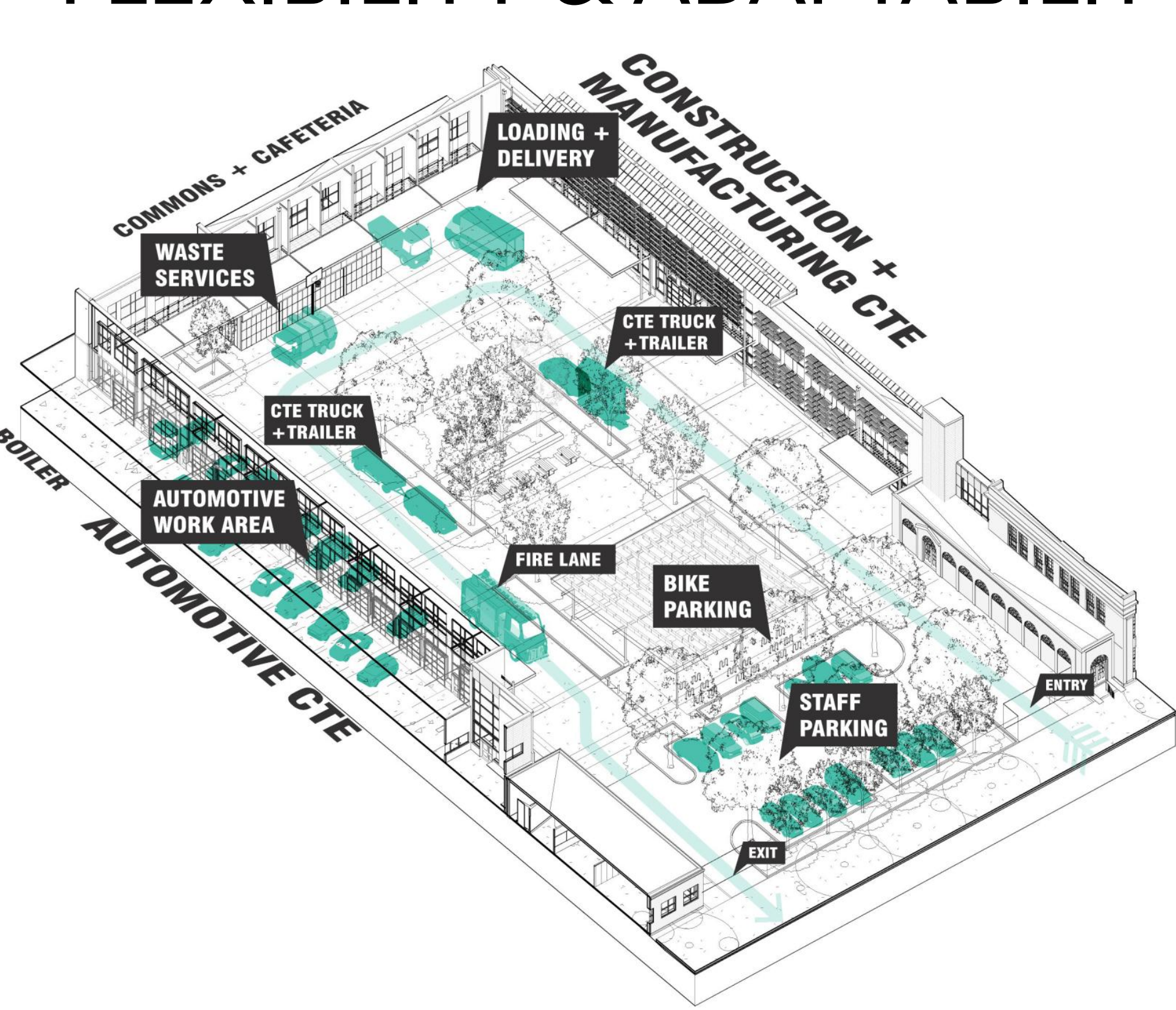


FLEXIBILITY & ADAPTABILITY

- + Access to outdoors, safe and secure work areas
- + Service areas to main the CTE programming

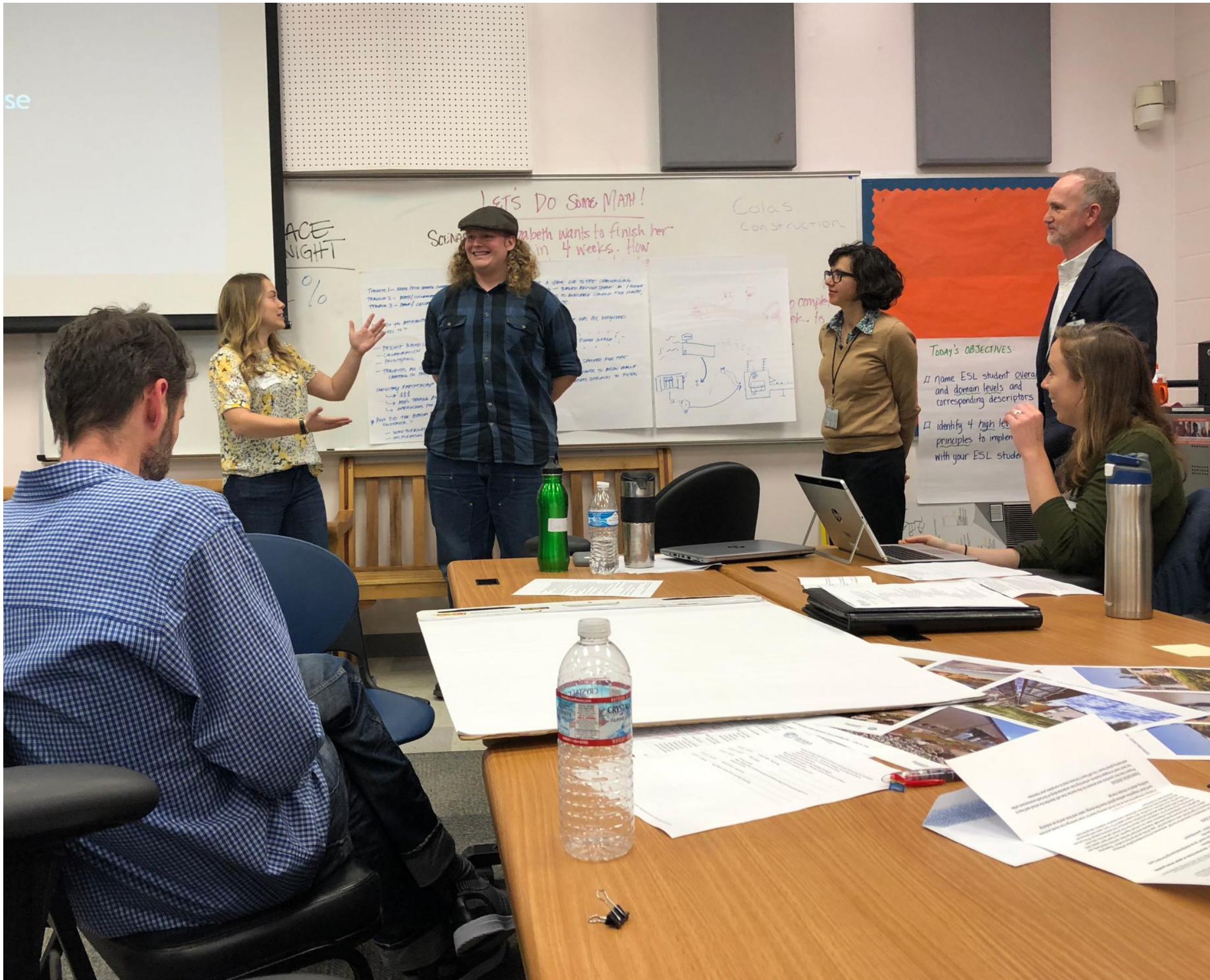
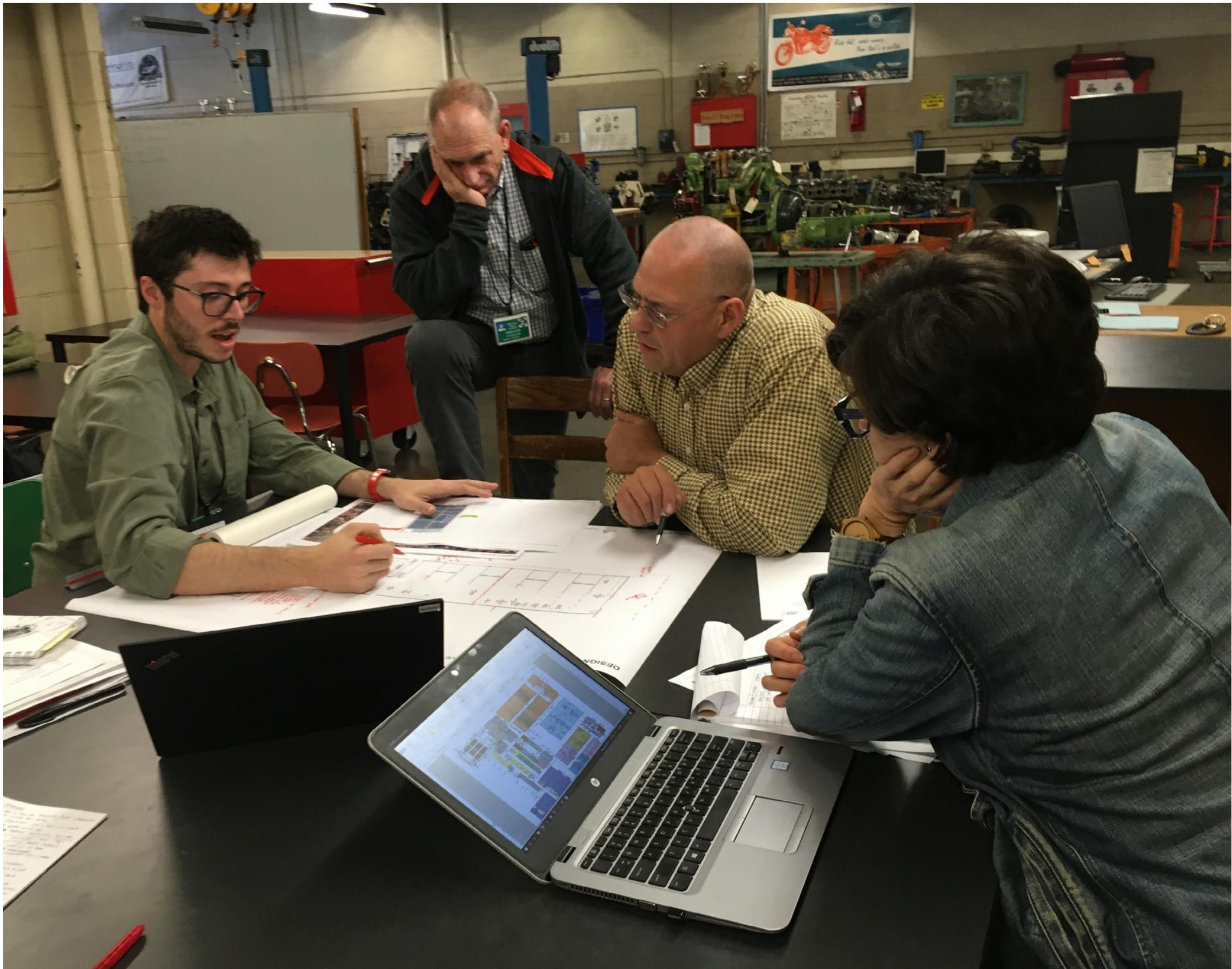


FLEXIBILITY & ADAPTABILITY



STAKEHOLDER ENGAGEMENT WITH INSTRUCTORS

+ Over 150 meetings with 40+ individual groups within CTE, Academics, Athletics, Performing Arts, Educational Support, and more.



EQUIPMENT INVENTORY

- + Equipment Catalog
- + Tagging of equipment
- + New vs. refurbished
- + Procurement of new equipment
- + Challenges with changing staff
 - » Flexibility
 - » Adaptability



CTE Equipment Schedule

Equipment	Location	Status	ID tag	Notes
				for this space
		REMOVE		
		REMOVE NOW - REPLACE FOR BENSON		
		KEEP FOR MARSHALL - THEN REMOVE		
		KEEP FOR MARSHALL - REPLACE FOR BENSON		
		KEEP FOR MARSHALL - RETURN TO BENSON		
		replacement already purchased, see M139-N in the green section	M139-E (14)	Furnace -small Neycra
		replacement already purchased, see M140-N in the green section	M140-E (38)	Vacuum sealer-CentraCaster Vanim
		Move to Marshall	M138-E (13)	Drill press-standalone Powe
		Move to Marshall	M138-N	Drill Press Standalone Jet
		ON TRUCK	M137-E (10,11)	Buffer-small
		Move to Marshall	M145-E (19-26)	Wood Lathe
		Move to Marshall	M148-E (4)	App

bassetti architects

GETTING PERMITTED

- + Dust Hazard Analysis
- + Hazardous Materials

BLDG/ROOM NUMBER

**CTE Equipment Schedule
Portland Public Schools
Benson Polytechnic High School**

In reference to IFC table 5003.1.1 or IBC table 307.1, there are currently no known quantities of materials that are classified as: Combustible Fibers, Cryogenic Flammable, Cryogenic Inert, Cryogenic Oxidizing, Explosives, Organic Peroxide, Pyrophoric, or Unstable (reactive). All other known materials are listed below. This list is in process.

HAZARDOUS MATERIAL SIGNAGE

INDIVIDUAL CONTAINER MARKINGS ARE REQUIRED FOR ALL MATERIALS AND MUST BE IN ACCORDANCE WITH NFPA 704.

DANGER
NO KNOWN SOURCES WITHIN 6 FT OF FLAMMABLE OR COMBUSTIBLE LIQUIDS

DANGER
COMPRESSED AIR

HEALTH HAZARD (Blue)
4 - Deadly
3 - Extreme Danger
2 - Hazardous
1 - Slightly Hazardous
0 - Normal Material

SPECIFIC HAZARD (White)
Acid - ACID
Alkali - ALK
Corrosive - COR
Oxidizer - OX
Radiation Hazard - ☼
Use No Water --W--

FIRE HAZARD (Red)
Flash Points
4 - Below 73° F
3 - Below 100° F
2 - Below 200° F
1 - Above 200° F
0 - Will Not Burn

ACID

INSTABILITY HAZARD (Yellow)
4 - May Detonate
3 - Shock and Heat
2 - Violent Chemical
1 - Unstable if Heated
0 - Stable

GENERAL NOTES - HAZARDOUS MATERIALS

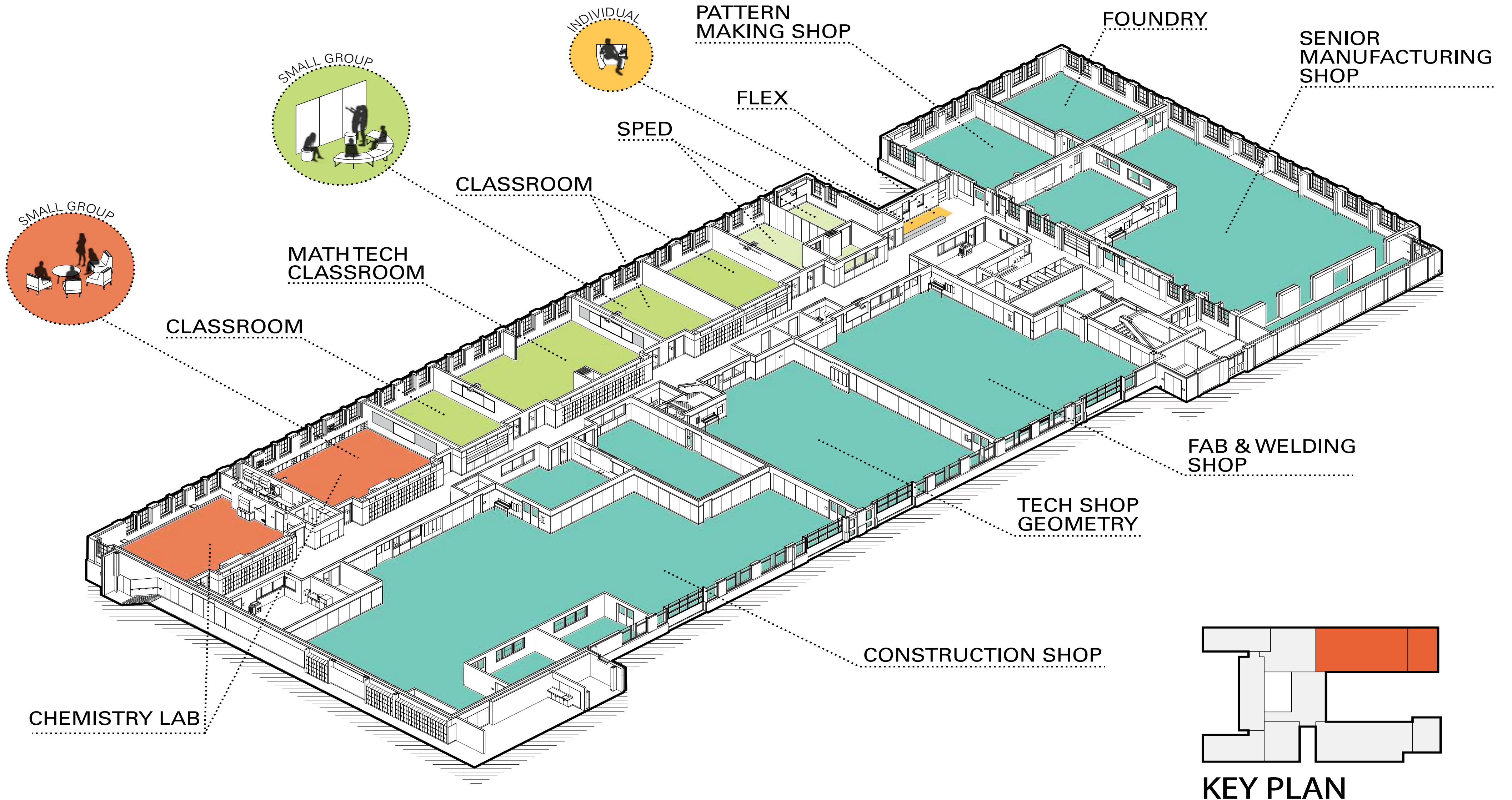
- SPILL RESPONSE KIT AND SIGNAGE TO BE PROVIDED IN SHOP SPACES AND SCIENCE LABS WHERE INDICATED ON PLANS. OWNER PROVIDED. MUST MEET BES SOURCE CONTROL REQUIREMENTS.
 - SAFETY DATA SHEETS (SDS) FOR ALL MATERIALS IN SHOP SPACES OR SCIENCE LABS / SCIENCE PREP / CHEMICAL STORAGE AREAS WILL BE MAINTAINED ON SITE AND READILY AVAILABLE.
 - PERSONNEL TRAINING AND WRITTEN PROCEDURES WILL BE PROVIDED IN SHOP SPACES, SCIENCE LABS, AND ASSOCIATED SPACES IN ACCORDANCE WITH OFC 5003.9.1
 - HAZARDOUS IDENTIFICATION SIGNS IN ACCORDANCE WITH NFPA 704 REQUIRED FOR ALL HAZARDOUS MATERIALS. SIGNAGE WILL BE OWNER PROVIDED.
 - THERE SHALL BE NO IGNITION SOURCES NEAR FLAMMABLE OR COMBUSTIBLE LIQUIDS IN ANY SHOP OR LAB SPACE.
 - SHELF STORAGE OF HAZARDOUS MATERIALS TO BE IN ACCORDANCE WITH OFC 5003.9.9
- *SIGN TO BE VISIBLE FROM ALL ACTIVITY AREAS
SIGN TO BE WATER RESISTANT
INCLUDE SAFETY PRECAUTIONS
INCLUDE IMMEDIATE SPILL RESPONSE PROCEDURES
LIST EMERGENCY CONTACT PHONE NUMBERS, INCLUDING 911 AND CITY (BES) SPILL RESPONSE NUMBER (503) 823-7180 AND PPS CONTACT INFO

Product Name	CAS Number	Location	Container >55 gal	Haz Class 1	Haz Class 2	Haz Class 3	Haz Class 4	Stored (lb)	Stored (gal)	Stored (cubic feet)	Closed (lb)	Closed (Gal)	Closed (cubic feet)	Open (lb)	Open (gal)	MAQ	Quantity
Acetic Acid	64-19-7	Control Area 1: 123A1 in chemical cabinet				F1A		< 1									
Acetone	67-64-1	Control Area 1: 123A1 in chemical cabinet			F1A			< 1									
Ammonium Nitrate	6484-52-2	Control Area 1: 123A1 in chemical cabinet				OX2								1			
Ethyl Alcohol	64-17-5	Control Area 1: 123A1 in chemical cabinet			F1A					1							
Hexanes	110-54-3	Control Area 1: 123A1 in chemical cabinet			F1A			< 1									
Magnesium	7439-95-4	Control Area 1: 123A1 in chemical cabinet					FLS	< 1									8 ounces
Methanol	67-56-1	Control Area 1: 123A1 in chemical cabinet						< 1									
Sodium Metal	7440-23-5	Control Area 1: 123A1 in chemical cabinet															8 ounces
Sodium Nitrate	7631-99-4	Control Area 1: 123A1 in chemical cabinet													1		
Xylenes	95-47-6	Control Area 1: 123A1 in chemical cabinet															
Algon - dont need to list in HMIS	7440-37-1																
Buffing Wax - Rouge - no physical hazard - dont need to list in HMIS	1309-37-1	Proprietary															
Iron Oxide - Yellow dehydrated	74-86-2																
Acetylene	7782-44-7																
Oxygen	7782-44-7																
Acetylene	74-86-2																
Oxygen - in cylinders	7782-44-7																
Propane Torches	115-07-1																
Propylene	74-98-6																
Spray Paint - Rustoleum Crystal Clear Enamel	67-64-1																
Acetone	67-64-1																
n-Butyl Acetone	123-86-4																
Propane	74-98-6																
n-Butane	106-97-8																
1-methoxy-2-Propyl Acetate	108-85-9																
Ethyl 3-Ethoxypropionate	763-69-9																
Xylenes	1330-20-7																
Ethylbenzene	100-11-4																
Acetone	67-64-1	Control Area 4: Flammable Storage Room 142C															
Paint - dont need to list in HMIS		Control Area 4: Flammable Storage Room 142C															
Polycrylic - dont need to list in HMIS		Control Area 4: Flammable Storage Room 142C															
Acetic Acid	64-19-7	Control Area 5: 231A1 in chemical cabinet				F1A		< 1									
Acetone	67-64-1	Control Area 5: 231A1 in chemical cabinet			F1A			< 1									
Ammonium Nitrate	6484-52-2	Control Area 5: 231A1 in chemical cabinet				OX2				1							
Ethyl Alcohol	64-17-5	Control Area 5: 231A1 in chemical cabinet			F1A					1							
Hexanes	110-54-3	Control Area 5: 231A1 in chemical cabinet			F1A			< 1									
Magnesium	7439-95-4	Control Area 5: 231A1 in chemical cabinet					FLS	< 1									8 ounces
Methanol	67-56-1	Control Area 5: 231A1 in chemical cabinet			F1A			< 1									
Sodium Metal	7440-23-5	Control Area 5: 231A1 in chemical cabinet					FLS	< 1									8 ounces
Sodium Nitrate	7631-99-4	Control Area 5: 231A1 in chemical cabinet				OX2				1							
Xylenes	95-47-6	Control Area 5: 231A1 in chemical cabinet				F1C		< 1									



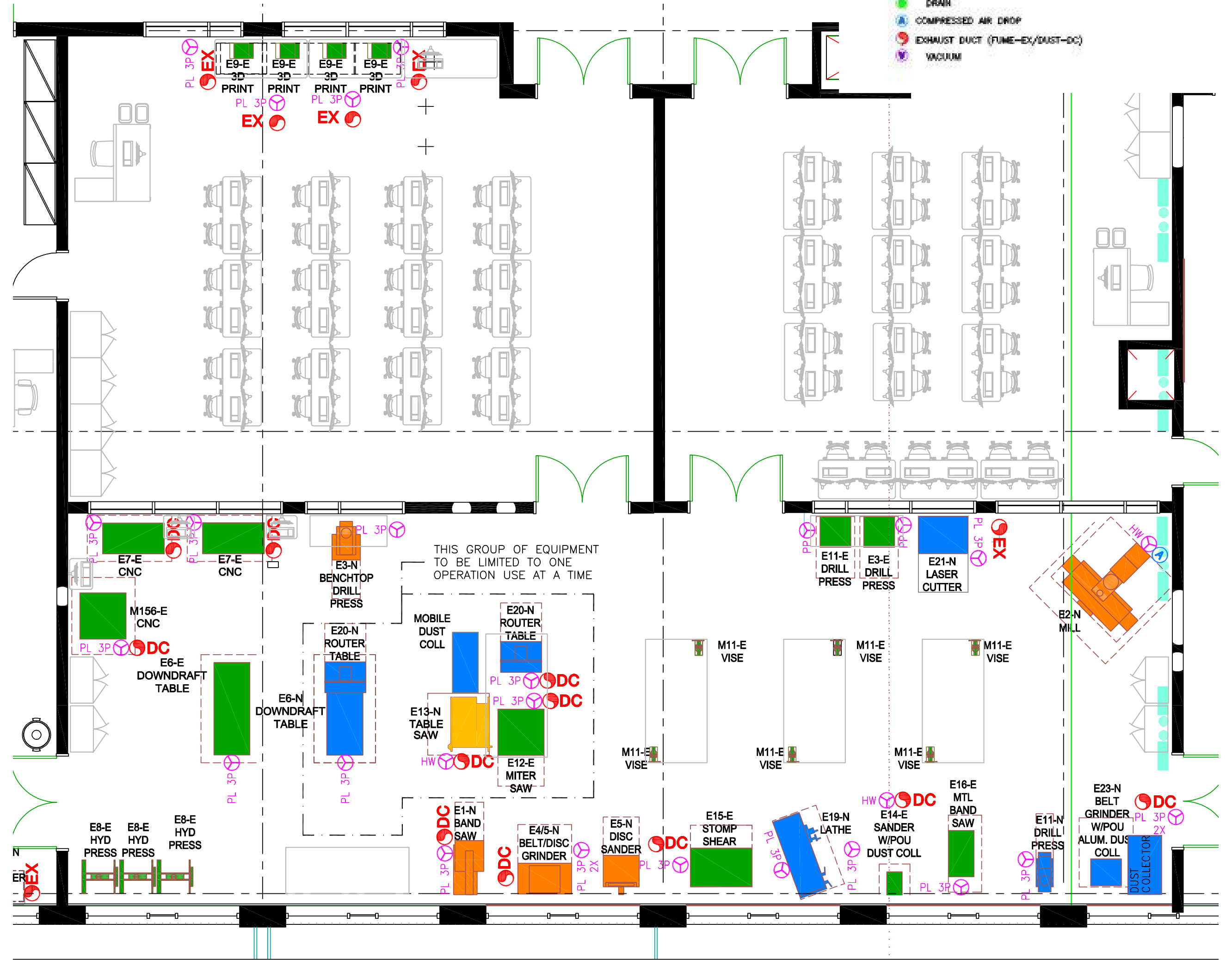
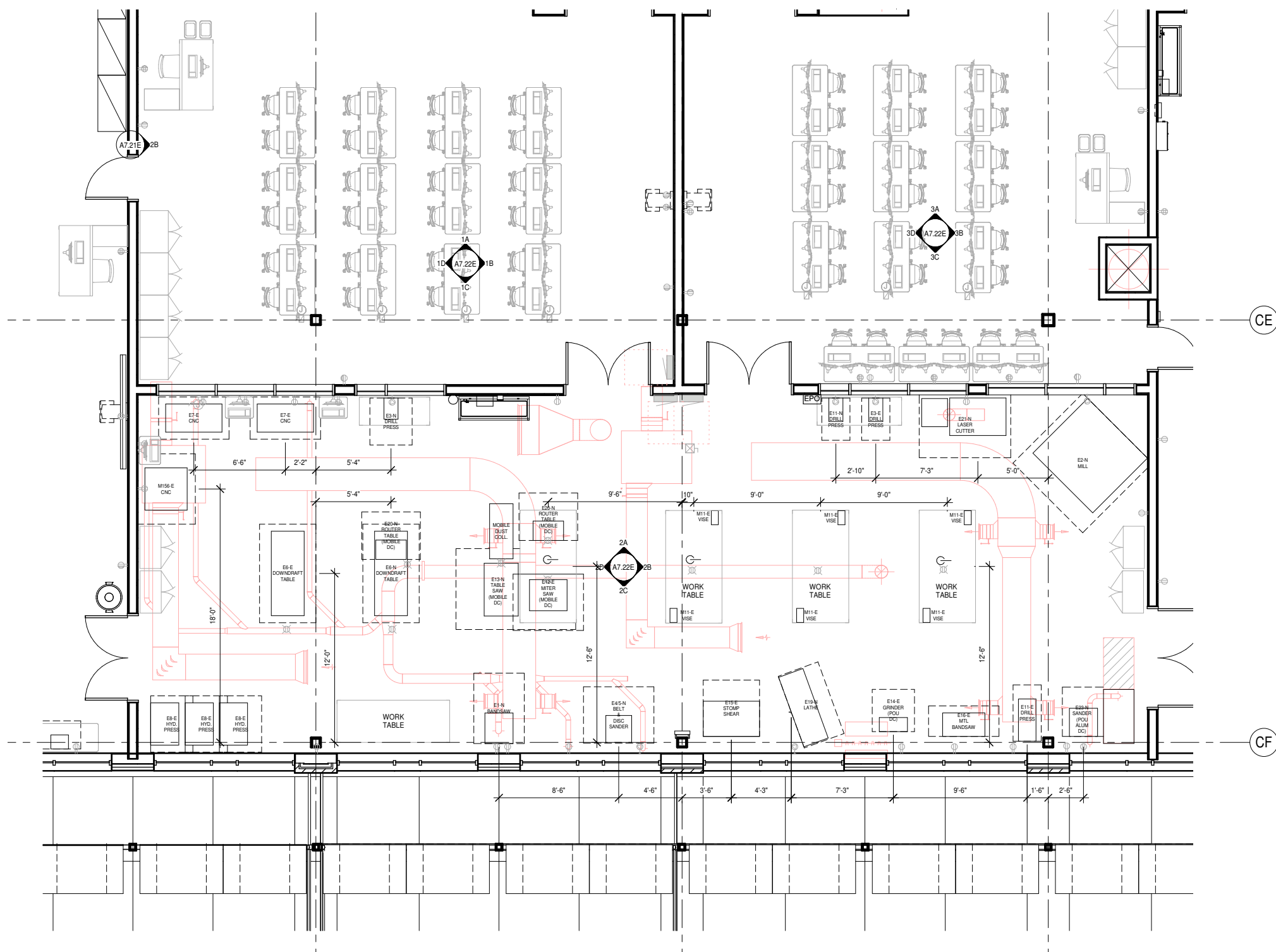
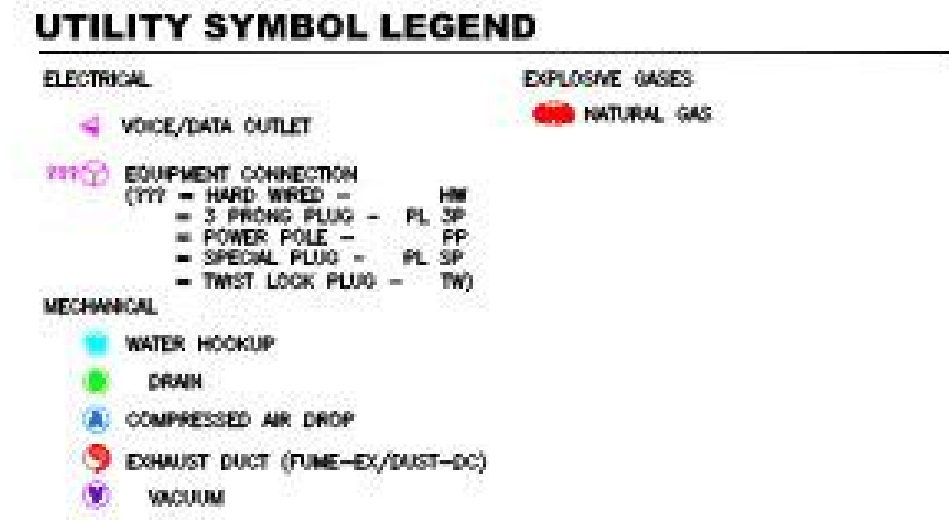
LAYOUT OF SHOPS

BENSON POLYTECHNIC HIGH SCHOOL



LAYOUT OF SHOPS

- + Workflow, Safety, Sightlines
- + Infrastructure needs and code requirements
- + Electrical needs/ compressed air/ dust collection
- + Storage - materials and student projects

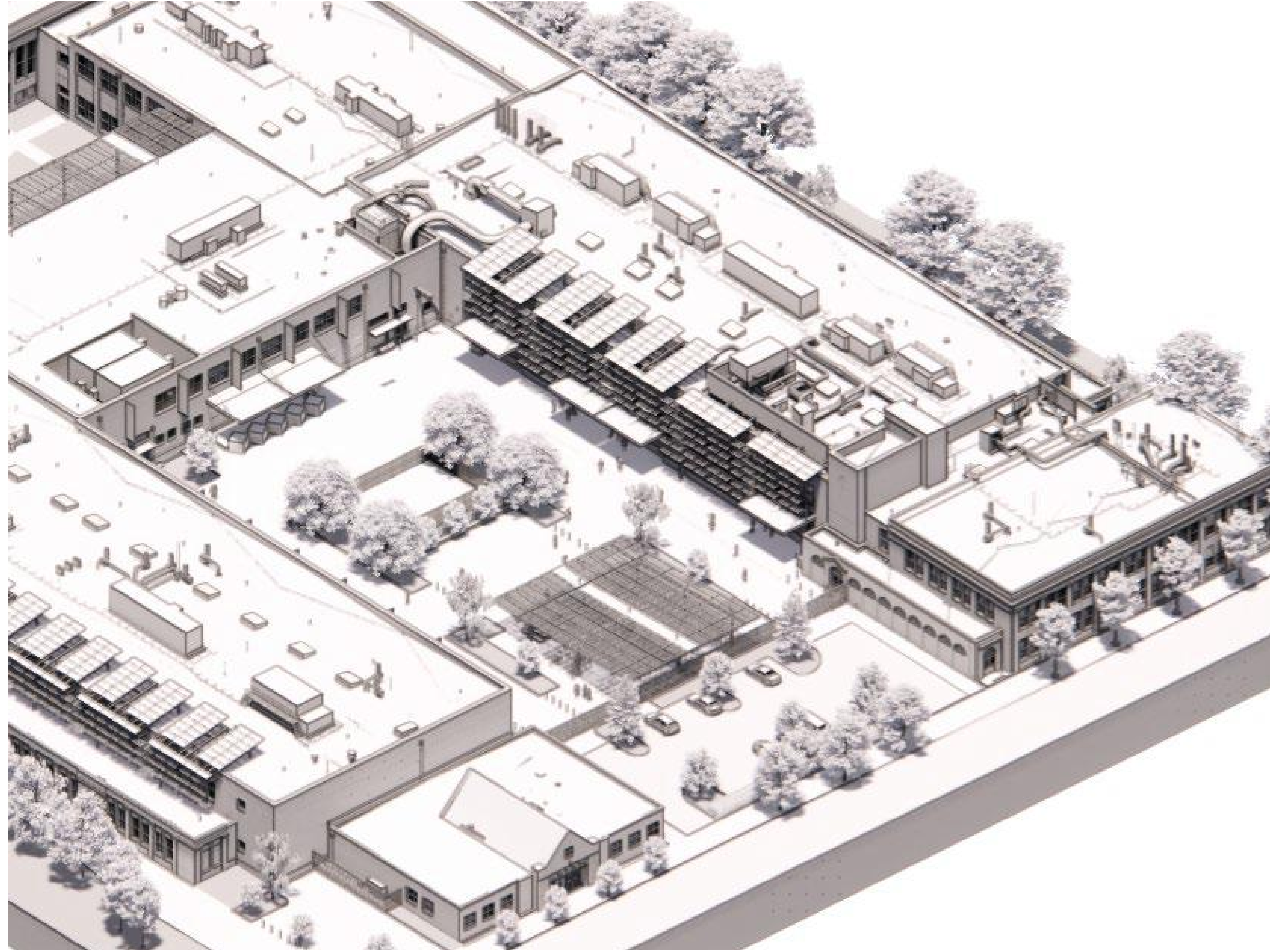


WOOD SHOP 242/242A / METAL FABRICATION SHOP 244/244A

E: 1/4"=1'-0"

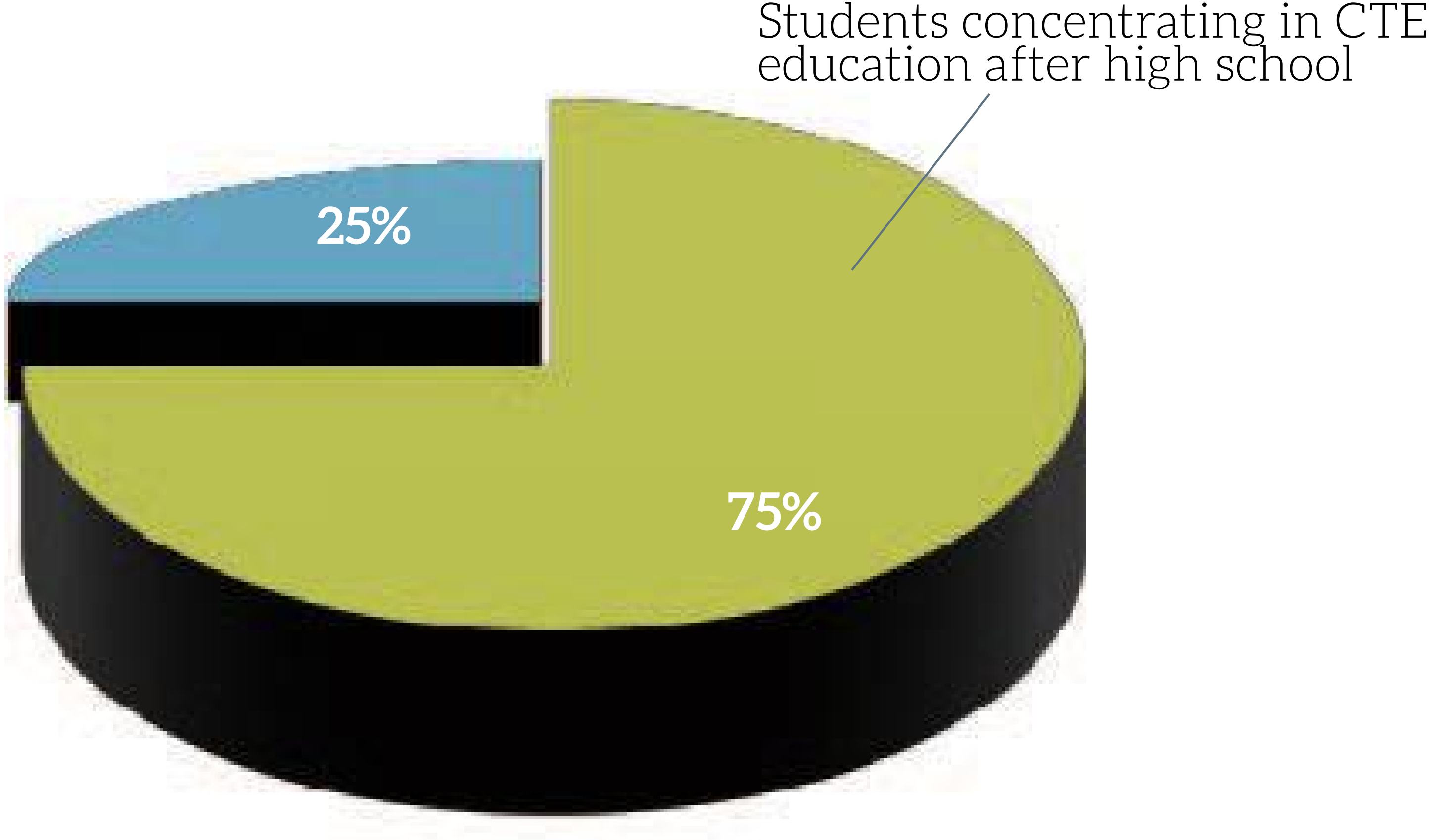
OPERATIONS

- + Housekeeping plan/ Disposal of materials
- + Dedicated person at District for maintenance of equipment



PROVEN RESULTS OF CTE

- + Average high school graduation for CTE concentrators is 94 percent, compared to 85 percent
- + Progressive CTE course-taking in high school is associate with higher wages
- + Helping to fill the skills gap - in the US 53 percent of all jobs require more than a high school diploma but less than a four-year degree



Contact

Lydia Burns
lburns@bassettiarch.com

Dianna Montzka
dmontzka@bassettiarch.com

Curtis Wilson
cwilson@pps.net

Brian Gerber
bgerber@pps.net



Questions?