

New Context and Connections



**THE FAIRCHILD WHEELER
INTERDISTRICT MAGNET CAMPUS
BRIDGEPORT, CONNECTICUT**

**ASSOCIATION FOR LEARNING ENVIRONMENTS
2016 MACCONNELL AWARD SUBMITTAL**

Vision

In 2003, a small group of individuals began discussions regarding the status of educational opportunity for children in Bridgeport, Connecticut. Their early conversations crystallized into a concept that became the basis for a decade-long journey to:

Reduce and prevent racial, ethnic and economic isolation of public school students in the region;

Create educational opportunity by supporting personalized discovery and interdisciplinary learning;

Prepare students for advanced education and/or direct placement in rewarding employment;

Create a place responsive to a rigorous and exploratory science and technology curriculum.

What these individuals could not have foreseen was the thousands of hours and the decade they would invest in building consensus with legislators, educators, administrators, area school districts, parents, students, members of the regional business, industry, institutional and higher education community, and design and construction professionals around a school for 1,500 students known as the Fairchild Wheeler Interdistrict Magnet Campus.

Responding to intractable issues with ingenious logic and bureaucratic obstacles with entrenched persistence, this group created a community around overriding beliefs that context is not destiny and guided learning can open the door to new connections and possibilities.

As stated in the original state grant application, the mission of the Fairchild Wheeler Interdistrict Magnet Campus (FWiMC) *“is to reduce and prevent the racial, ethnic and economic isolation of public school students in the region while offering a unique and very high-quality science and technology laden curriculum.”* In practice, this goal represents but a small part of the beliefs and objectives underlying the Fairchild Wheeler project.

- worthwhile employment;
- Instill confidence and a lifelong love of learning in students;
- Engage with regional institutional, business and industry stakeholders on dynamic and relevant learning opportunities;
- Create a school that reflects and celebrates the region’s cultural diversity by integrating resilient and striving migrant, immigrant and primarily minority

- Provide seats for approximately 1000 Bridgeport students through a lottery-based selection process;
- Access additional education funding through the State of Connecticut’s Office of Educational Equity;

Fairchild Wheeler was initially conceived and formulated by an unusual mix of private individuals and regional educators. The development process involved a grass roots campaign of persuasion and consensus building around a STEM curriculum that would bring students and valuable regional resources together in an integrated program rich in educational and occupational opportunities. An impressive array of advocates were brought into alignment with the vision for the school, including regional business and industry leaders—along with regional education professionals, this group collaborated in the development of educational specifications that outlined the curriculum for three 500-student STEM high schools to be co-located in a single building within the City of Bridgeport.

Executive Summary

The overriding goals of the project were to:

- Provide a highly engaging science, mathematics and technology curriculum set within small learning communities* that would serve as a vehicle for acquiring advanced academic and social skills;
- Develop educational programming to prepare all students for further education or immediate entry into

- families from the urban context with affluent, educated, established and primarily majority suburban families;
- Provide students with a campus-like setting and responsive building environment that will seamlessly support teaching and learning, as well as promote interdisciplinary collaboration and connections;



As the project took shape, educators looked to create life-changing learning experiences through hands-on laboratory work; designers sought to create a responsive and engaging environment to support collaboration and interdisciplinary connections; industry stakeholders desired a place to engage in realistic problem solving and mentorship of the next generation of professionals. All envisioned dynamic and state of the art technology resources and instructional programs that would correspond with innovative educational practices and supportive physical spaces in order to create environment with a high degree of engagement and relevance.

Based on these concepts, planning and design decisions were made to create an interactive, flexible, mature, and creative place for students to develop their personal identity and collective capabilities. But while there was a great deal of energy around the

program's potential and the facilities' design, the project faced significant obstacles and required a great leap of faith that it would fulfill its promise and potential. Would the project attract students from participating suburban districts? Would these small individual magnets coalesce into a larger school community, particularly with students coming from such diverse backgrounds and circumstances? Would students flourish in an environment that required they radically elevate their social and academic behavior? Would the school function as a flexible and integral extension of the curriculum as had been intended?

Ten years after planning began, Fairchild Wheeler began the phased process of enrolling 1050 students from Bridgeport and 450 from 8 surrounding school districts. In an area that represents one of the most economically unequal regions in the United States, the school is set within a host district

that currently graduates 65 out of every 100 students from its general curriculum high schools. After three years of operation, the results have been clear. Applications for placement far exceed the available number of seats; students are performing at or above academic expectations; student and teacher retention remains exceptionally high; project stakeholders continue their active participation in the program, and, the most powerful and compelling indicator of success, nearly 100% of students in the school's first senior class are expected to graduate in the spring of 2016.

** In all documentation created by the district and associated partners, the term "small learning community" is synonymous for small school. Throughout this document the term "learning community" or "community of practice" will be used to describe the 500-student magnet programs of Fairchild Wheeler.*





Context



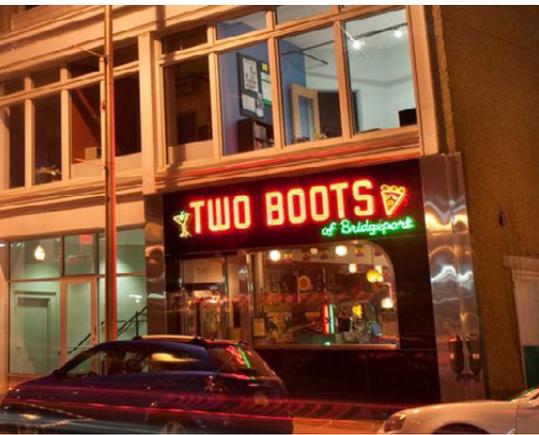
Bridgeport is the largest city in Connecticut and the 5th largest in New England. Located on Long Island Sound and at the mouth of the Pequonnock River, the city has 144,229 residents according to the 2010 census. The Greater Bridgeport area is the 48th largest urban area in the United States and forms part of the Greater New York Area.

Starting with settlement in 1644, what is now Bridgeport began as an English farming community that became a center of trade, shipbuilding, and whaling. With the advent of railroads, the city became a regional junction and was rapidly industrialized. From 1870 thru 1910, the city was the major center for manufacturing and attracted diverse immigrant populations who could find employment in the large-scale industries that included sewing machines, corsets, automobiles, locomotives and fire arms. By the eve of the Great Depression, this bustling

city had more than 500 factories. Starting after the mid-20th century, restructuring of heavy industry resulted in the loss of thousands of jobs and residents. Like other urban centers in the United States, the city experienced further losses due to the ongoing development of new suburban housing that attracted middle and upper class residents away from the city, leaving behind a higher proportion of poor and disadvantaged residents.

Known as the Park City, Bridgeport is renowned for its 1,300 acres of public parks that make up nearly 11% of the city's total area. Bridgeport is a city of diverse ethnic neighborhoods and significant historic architecture, with more than 3,000 structures listed on the National Register of Historic Places, more than any other Connecticut municipality. While numerous indicators point to decline, the City is

fortunate to sit within Fairfield County and a region that is economically diverse and intellectually vibrant, with numerous multinational corporations, institutions of higher education, innovators in finance, manufacturing and aerospace as well as a variety of community and non-profit organizations. In 1992 Fairfield County housed the headquarters of over 25 major multinational corporations, giving it the third largest concentration of those companies in the United States after New York City and Chicago. As significant players in the global economy, these institutions and corporations require an adaptable and educated workforce. Opportunities for compelling employment in a variety of industries are right within reach for a new generation of workers if they have they have access to education that will set them on a pathway for success.



In 2001, internal discussions began within the City regarding urgent facility needs. With a highly urbanized environment, most of the existing schools were landlocked and there was a great reluctance to add on to these already large schools. There were questions about “creating just another box to do the same thing” and few sites were feasible...

Like many post-industrial American cities, Bridgeport has a vibrant and distinguished past but faced significant issues and challenges at the beginning of the 21st century. With a system of approximately 20,800 students, Bridgeport Public Schools was the second largest school system in Connecticut but ranked #158 out of the 164 Connecticut school districts; graduation rates hovered at or around 65%; school facilities ranged from recently renovated to over 100 years old, with the last new school being built in 1990. Bridgeport had not taken advantage of the higher level of state funding for magnet schools—like the majority of area districts and all of Connecticut’s largest cities. While the district was losing large numbers of non-minority students to themed interdistrict magnets as well as private schools, enrollment was growing for those students coming from socially and economically challenging circumstances



—with enrollment projections showing the need for 1,000 seats to be made available in the next decade.

In 2001, internal discussions began within the City regarding urgent facility needs. With a highly urbanized environment, most of the existing schools were landlocked and there was a great reluctance to add on to these already large schools. There were questions about “creating just another box to do the same thing” and few sites were feasible within the city that weren’t highly urbanized or environmentally problematic.

Around the same time, quiet but earnest conversations began between a group of regional professionals and educators—Claire Gold, former superintendent of schools in Westport; Lois Libby, PhD, an award winning professor of education and director of student teaching at Sacred Heart

University; and Terry Dworkin, Director of Research and Evaluation, City of Bridgeport. They talked about the possibility of a new high school where a diverse and rigorous science-focused curriculum could be harmoniously combined into a single school; they talked about their experience of seeing students from Bridgeport flourish and succeed when placed in suburban programs, and they talked about the possibilities for Bridgeport to address financial constraints by accessing funding from the State’s magnet school program. In 2003, just as internal discussions at the City of Bridgeport had failed to take hold, Claire Gold approached the city with an idea.

It was in this context that discussions began that would set Fairchild Wheeler on a pathway through a circuitous and finally successful pathway to completion.

220,000 TOTAL SQUARE FEET, NEW CONSTRUCTION

1,500 STUDENTS, GRADES 9-12

4 FLOORS (PLUS LEVEL BELOW GRADE PARKING)

AUG 2013 COMPLETION

\$125,000,000 TOTAL PROJECT COST

\$90,000,000 CONSTRUCTION COST

\$0 COST TO CITY OF BRIDGEPORT

Scope & Budget



STUDENT / BUS ENTRY

Part of Bridgeport Public Schools, Fairchild Wheeler brings together 1500 students from Bridgeport and 8 surrounding districts into three 500-small learning communities focused around a rigorous and interactive STEM curriculum. The three programs—Information Technology and Software Engineering, Biotechnology Research and Zoological Sciences, Aerospace/Hydrospace Engineering and Physical Sciences—utilize project based learning and direct partnerships

with educational and industry experts in the delivery of relevant and compelling learning experiences. The project received 100% reimbursement from the State of Connecticut through its magnet school program and at the time of construction was the largest and most sustainable school building in Connecticut. Completed in 2013, Fairchild Wheeler is set on 25 acres within a larger 100-acre park that was transferred as part of the project's development from the Town of Trumbull to the City of Bridgeport.

The school draws 70% of it's enrollment from the City of Bridgeport (1050 students) and the rest (450) from the towns of Easton, Fairfield, Milford, Monroe, Shelton, Stratford and Trumbull. The school is now in its third year of operation and prepares to graduate its first class of students in June of 2016.



Consensus Building and Community Engagement

Consensus building for the FWIMC could best be described as a circuitous, iterative and ongoing process. In each phase, not only did the project face challenges that threatened to halt its development but a new group of stakeholders needed to be engaged in dialogue and consensus building. In this regard, the “community” varied widely depending on where the project was in the course of its development. Initial conceptualization and

curriculum development brought together educators, city officials and administrators and external institutional stakeholders; site selection, program definition and design involved professional service firms working with the existing network of supporters; student recruitment and work of the school’s Advisory Groups involves a process of continual improvement and community engagement.

The phases of consensus building can be broken into general but by no means simplistic steps, as shown on the following page.

ORIGINAL STAKEHOLDERS – INVOLVED DURING PLANNING AND DEVELOPMENT



Sacred Heart
UNIVERSITY



ADDITIONAL STAKEHOLDERS – WHO HAVE JOINED THE ORIGINAL GROUP IN ONGOING CURRICULUM DEVELOPMENT AND HAND-ON LEARNING OPPORTUNITIES



UNIVERSITY OF
BRIDGEPORT

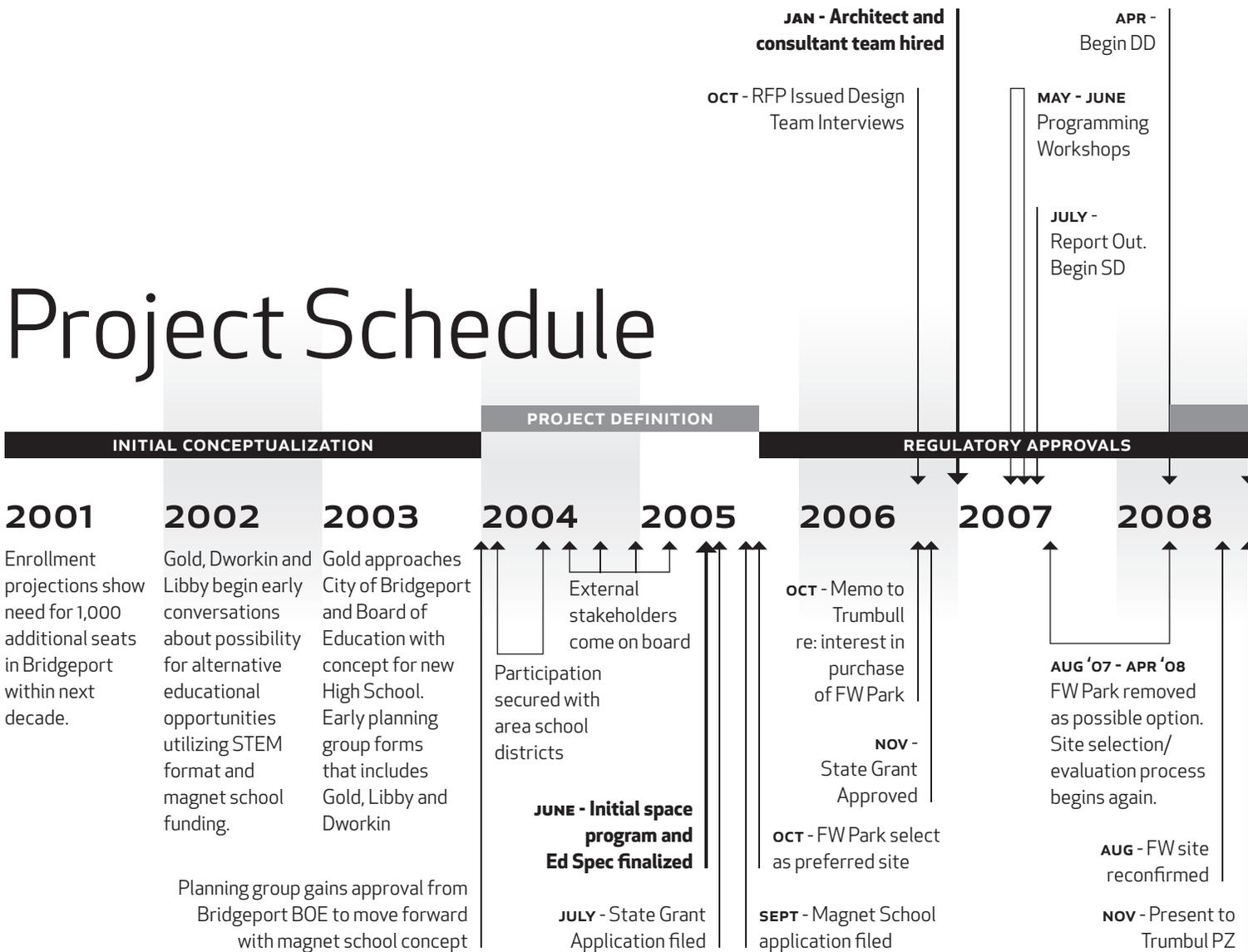


MYSTIC
AQUARIUM



KONGSBERG

Project Schedule



1 - INITIAL CONCEPTUALIZATION:

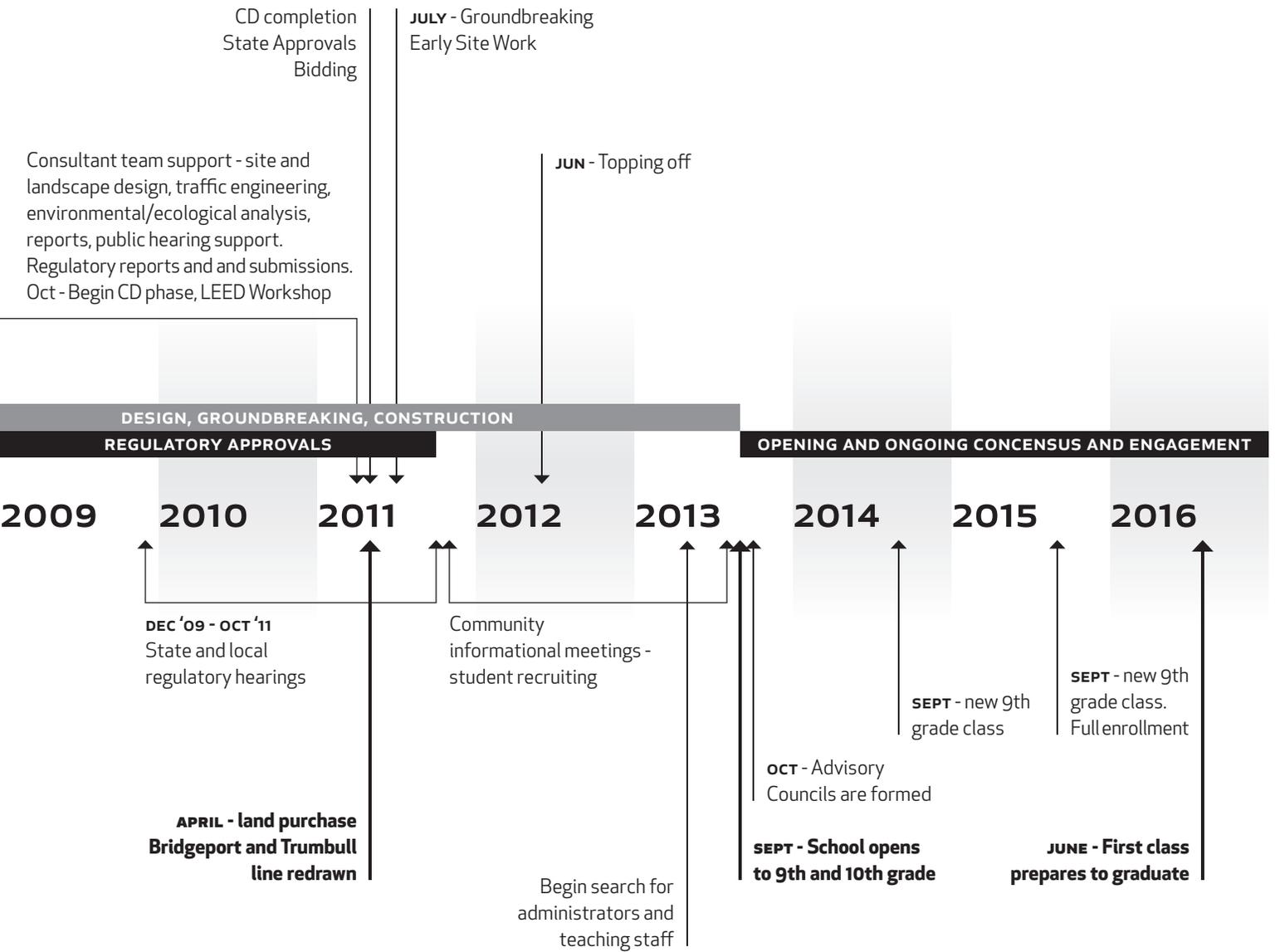
including, consensus on concept between Dworkin-Gold-Libby; agreement within the City of Bridgeport to take steps to pursue the project as defined; agreement with area districts to participate; interest in contributing to curriculum development by regional leaders in the areas of higher education, educational institutions, business and industry. The success of this process hinged on robust and transparent engagement with representatives from the 9 districts, city officials and stakeholders, in small group and one-on-one discussions regarding the vision, need and potential for success.

2 - PROJECT DEFINITION:

including, development of the educational specifications; state school facilities grant application; preliminary site review; selection of the professional services team; programming and schematic level design, site evaluation and selection; benchmarking. This effort of formalizing the shape and character of the school was a giant leap forward. As a wider and consistent group of champions were aligned (in addition to the continuing presence of Dworkin, Gold and Libby), the process moving forward continued to involve a fluid collection of groups and individuals—depending on the phase of work and challenges being encountered.

3 - REGULATORY APPROVALS:

including, negotiations with the Fairchild Wheeler family; local approvals at both Trumbull and Bridgeport Planning and Zoning and Inland Wetlands; state hearings and legislative approvals for redrawing the boundary between Bridgeport and Trumbull. Within this phase of engagement and consensus building the project stakeholders advocated at the local and state level to keep the project alive. Twice, the project was put on hold for an extensive period where the design team halted work, except to attend public meetings in support of the project. Finally, the project cleared its last major regulatory hurdle and design and documentation began in earnest.



4 – DESIGN, GROUNDBREAKING, CONSTRUCTION

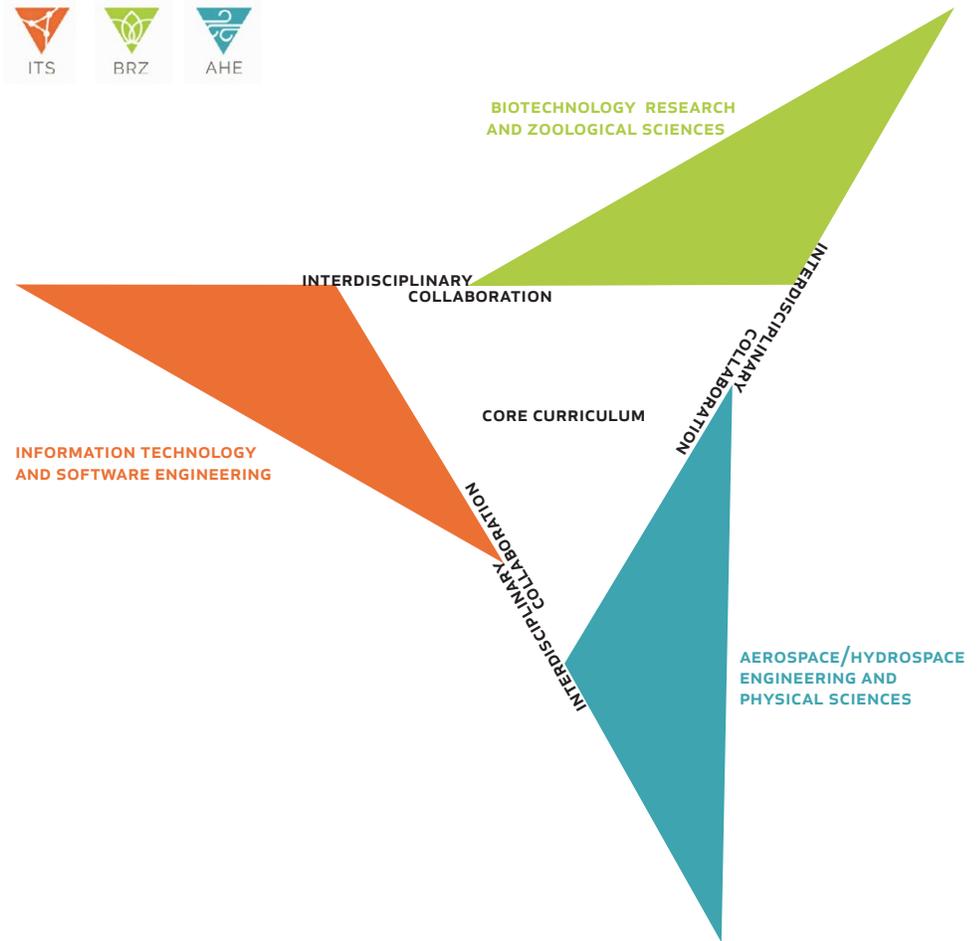
including design development, construction documents, state project approvals, bidding, groundbreaking and full construction. In this phase, the Design team engaged the growing “Fairchild Wheeler Community” into consensus around features of the design and its responsiveness to curriculum and project goals. As design progressed into construction, the project’s stakeholders began the process of talking to parents and students about the new school and encouraging enrollment through lottery; they began to interview potential administrators and teachers.

5 – OPENING, ONGOING CONSENSUS AND COMMUNITY BUILDING

as the project opened and the work of educating students began, there were changes and adjustments required, however it became evident the program was gaining traction. At first students clustered themselves by their home district or by their racial makeup, quickly students began to create new relationships—encouraged by the broad array of opportunities and activities. Advisory Councils were formed—one for the school overall and one for each magnet. Comprised of representatives of each school district, educators, parents, students, representatives from the collaborating institutions, each Council works to monitor performance of students and the program—addressing issues within the school community.

Since its opening in 2013, administrators, teachers, participating districts, collaborating businesses and institutions have continued to work together to refine the school’s programs and curriculum—embracing the concept of continual consensus building and community building.

In May of 2007, the Architect facilitated 4 three-hour programming workshops attended by interested parties aligned with the Fairchild Wheeler project and with experts in relevant fields of study. During the workshops, participants recommended ways in which the student's sense of responsibility could be encouraged and school community fostered. The groups were composed of seven to ten participants who discussed issues and concerns about educational program and its implementation. Each workshop began with a PowerPoint presentation that documented the evolution of school design and current environments designed around pedagogies of exploratory and experiential learning. The workshop focused on the specific practice community and what types of activities were anticipated to occur. Concepts were reviewed such as *school climate, venues for promoting optimal student learning, campus-like environments, culturally diverse populations, community-supported environments, the mindset of problem based inquiry, defining interactive and engaging environments, characterizing cooperative and collaborative learning programs.*



Building Consensus: Programming

FINDINGS

Based on analysis of the workshops, the following primary themes emerged

1. Flow of activity
2. Flexible environments
3. Sense of responsibility
4. Exhibition spaces
5. Technology
6. Green Principles

FLOW OF ACTIVITY:

A central theme for these learning environments. Workshop participants indicated that each magnet school should “not be confined to classrooms” and that there should be a “flow between spaces.” The optimal building was understood to be integrated, where instructional spaces support group learning and the spaces adjacent to these rooms would promote opportunities for independent learning

activities. These thoughts not only pertained to how the places in the facility were related but also to the opportunities that might occur externally. There was a perspective that learning and mastery of practical skills was not confined to specific instructional spaces, but rather all areas of the school and campus were part of the educational facility. The external environment was identified as having to support the pedagogy and student skill acquisition.

While it was understood that the building would support and allow learning to extend throughout the facility, the building also required separate instructional spaces to support specific learning activities. Settings were required such as laboratories, seminar rooms and learning studios. Design would need to consider how learning occurred within these spaces—where students and

“non-traditional teachers” were actively engaged in exploratory learning. Teachers would move around the space—not fixed at the front of the classroom—but moving around the classroom and fluidly into other spaces as required. Technology would be used throughout to connect teachers and students with a variety of learning opportunities—the sentiment expressed in the Physical Sciences focus group was “...science and technology cannot be separated.” The overall parti for the building looked at the relationship and integration of technology systems to advance fluid and project based learning.

FLEXIBLE ENVIRONMENTS:

According to the participants, the educational facility need to be “flexible and adaptable”, it needed to provide “a variety of environments” ... “breakout spaces”



PROGRAMMING WORKSHOP

“reconfigurable spaces,” and spaces of “similar use” that might be combined. For example, the cafeteria(s) may be designed with opportunities for multiple activities similar to the *School of the Future in Philadelphia* where students can meet for lunch as well as work independently. The main assembly space might not have fixed seating so it can serve multiple functions such as exercise, yoga or music room. This area might serve as exhibit space or double as a mentoring hub.

The interest in flexibility extended to possible future uses. Could the building be designed to ensure its adaptability to future trends in pedagogy? What if the building someday wasn't a school? Could it become a corporate headquarters? Could an environment be created that spoke science, collaboration and creativity before it spoke teaching, learning and grades?

SENSE OF RESPONSIBILITY:

The social communities of these specialized learning environments would promote “responsibility for all.” Students would be motivated because their transactions would be “goal-oriented, authentic and relevant.” These ideas for project based learning environments reflect the notion that students would acquire knowledge as they work independently and others in goal-directed tasks. By “appropriating knowledge for themselves” learning would be understood as a practice where “identities are created as meaning emerge[s] and are reinforced from individuals.” This concept extended to the external environment where students might become “stewards of [the] property.”

EXHIBITION SPACES:

Exhibition spaces would provide opportunities to display student work, inform students of current research in their field of interest and allow students and teachers to view the work of others in their community. In order to promote interdisciplinary awareness, these spaces for exhibition would need to be available within the magnets and in more open, public spaces. The process of exhibition and display would provide meaningful experiences that supported development of student identity and encouraged younger students entering a particular field of interest.

TECHNOLOGY AND ITS USE:

It was felt that the current use of technology “was not integrated into the learning” and that current models were more aligned with the prior century than the present and future of teaching. For example, the white board had only replaced the blackboard as the focal point of the instructional space. Participants saw limitless potential for creating “flexible [settings for encouraging] flow of activity.” Opportunities were seen in computer tablets, teleconferencing, video-streaming, laboratories and classrooms that promoted exploratory and student-centered learning. Since the “human dimensions makes the technology,” innovative settings should be designed to support “instantaneous connections.”

GREEN PRINCIPLES:

Participants stated an aspiration to LEED Platinum but also supported a balanced and fiscally appropriate approach to achieving sustainability goals. Participants commented on several characteristics of these buildings including daylighting and natural ventilation.

CONCLUSIONS:

Design for the Fairchild Wheeler Interdistrict Magnet Campus would embrace the concept of **Connections and Context**. The building would be designed to encourage, enhance and showcase connections at all levels and would leverage key moments when the human senses interact with the surrounding world (physical or virtual), with the belief that it is at this moment that learning occurs.

With Connections are key to the primary theme of the school, interest was expressed in Context taking a number of physical and organizational forms, including:

- School to Community:
 - approach, entry, major public spaces
- School to Partners:
 - partner labs, project spaces
- School to Nature:
 - visual connection and minimal impact to the site
- Magnets to the School:
 - commons, media center, black box theater, gymnasium
- Magnet to Magnet:
 - covered walks, green roofs
- Student to Staff/Admin:
 - student work to staff work spaces
- Student to Student:
 - work spaces, commons, media center
- Student to Information:
 - entire campus environment



Site Overview

As early as 2005, the Fairchild Wheeler Park had been identified by project stakeholders as the preferred site for construction of the new high school. In early due-diligence studies, the design team reviewed over a dozen different sites and studied three in detail. Ultimately, the team concurred that the Fairchild Wheeler Park was the most appropriate location. The site had been developed in 1826 as the Fairchild Paper Mill and in 1922 was donated by the family for the establishment of the Fairchild Memorial Park, with the stipulation that if the parcel was not used as parkland the property it would revert to the heirs. While the parcel sat within the boundaries

of the Town of Trumbull, it was decided to the City of Bridgeport. After some initial test fits and analysis, it was determined that the park was not only a dramatically underutilized natural resource but, in its current condition, the park perpetuated a “lost zone” between the City of Bridgeport and the City of Trumbull.

Efforts were undertaken to contact the surviving heirs, with a proposal of using the development of the school as a catalyst for revitalization of the entire park. Approval was attained, provided the majority of the park remain undeveloped. By siting the building at the furthest eastern portion of the

site, along the edge of Route 25, over 75% of the site was left undisturbed. The plan called for comprehensive improvements to the existing trail system and formalized connections for students to utilize the site for outdoor learning opportunities. Through an extensive and multi-year process, boundary lines were redrawn to bring the Fairchild Wheeler Park within the boundaries of the City of Bridgeport.

In establishing the location for the building, mitigating environmental impact was paramount. The team undertook planning that minimized the building footprint and maximized verticality. The covered parking



AERIAL PHOTOGRAPH OF SITE

at the base and the photovoltaic panels at the highest point at each wing's roof define the extremes that encompass the design elements—helping to minimize the site impact and maximize the effectiveness of the green features. Understanding that the footprint needed to “tread lightly,” the design team set out to raise the three magnet wings off the ground and for each one to span from the podium into the park at varying angles allowing them to touch down ever-so-lightly within the park itself. This simple organizational decision opened up possibilities for precise interventions to the park. Selective tree removal and land clearing allowed the site to closely align

with the building and between the magnet wings. The decision was made for students to access athletics within the “home school” in order to eliminate the need to clear additional land for fields.



While this process create challenges during construction and site work, the final effect is a strong physical and visual connection to the surrounding environment. Today, the students can sit in the commons eating lunch or studying with classmates and look up between the wings into the park where full grown specimen trees were preserved. This visual connection to the park is reinforced by a series of new paths integrated into the site that function as outdoor learning elements as well as passive recreational trails accessible to the school and wider community.

AERIAL VIEW OF THE SITE IMMEDIATELY BEFORE CONSTRUCTION COMMENCED

With a directive to preserve and revitalize parkland while simultaneously balancing all other educational, programmatic and regulatory requirements, the team set about the task of compressing and configuring the building on the site.

A substantial percentage (29%) of the required parking is located under the building in the garage; the remaining parking has been configured to take advantage of rain gardens

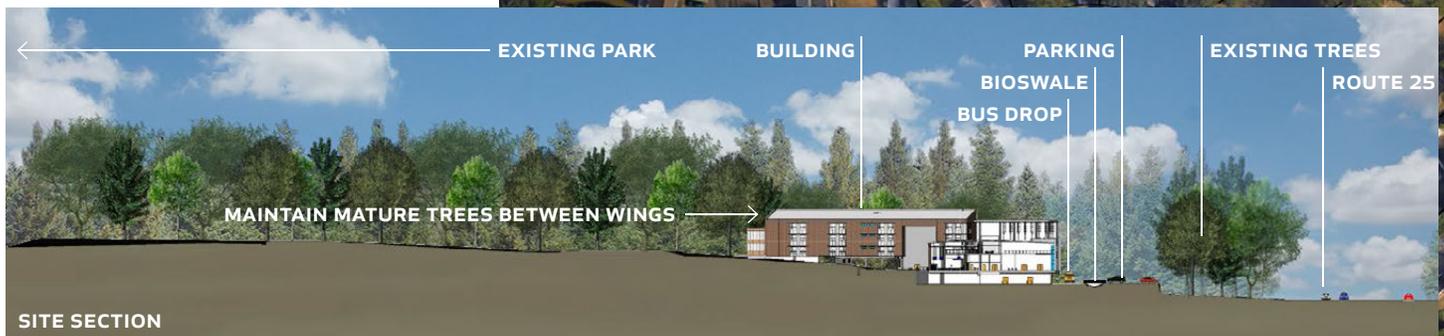
Site Plan

to help filter the ground water runoff and provide outdoor learning opportunities for the students. The clear separation of the buses from the parent loop has helped to make the site safe for students, staff and visitors. The secondary access from Old Town Road was designed to limit access to the school but provide a safe access point to the park for the public to encourage greater use of the rejuvenated asset.

Indigenous plants were used all around the site. In consideration of the Biology magnet's curriculum focus, these native plants have played a critical role in extending the learning environment outside onto the site. Students regularly take "field trips" out the back door of the magnet wing onto the new paths and into the park. These experiences extend to wetlands areas that were preserved as part of the site planning efforts and documented in the rigorous regulatory process the project underwent. In addition to the native plants, the design team preserved and highlighted the existing rock outcroppings in close proximity to the building in hopes of further enhancing the built element's connection to the natural environment.

SITE

100 ACRES TOTAL SITE SIZE
23.6 ACRES DEVELOPED AREA



SITE SECTION





PRESERVED WETLANDS

VISITOR PARKING

PARENT DROP-OFF / MAIN ENTRY

NATIVE VEGETATION

RAIN GARDENS

NATURE TRAIL

PRESERVED WETLANDS

OVERFLOW PARKING

ACCESS ROAD UNDER ROUTE 25

ROUTE 25 SOUTH

ROUTE 25 NORTH

ABANDON EXISTING DRIVE

ENTRY TO STAFF PARKING UNDER BUILDING

BIOSWALE

BUS DROP-OFF / STUDENT ENTRY

SERVICE

PARKING

144 SPACES UNDER BUILDING

321 SPACES SURFACE PARKING

465 SPACES TOTAL PARKING



**INFORMATION TECHNOLOGY
AND SOFTWARE ENGINEERING**

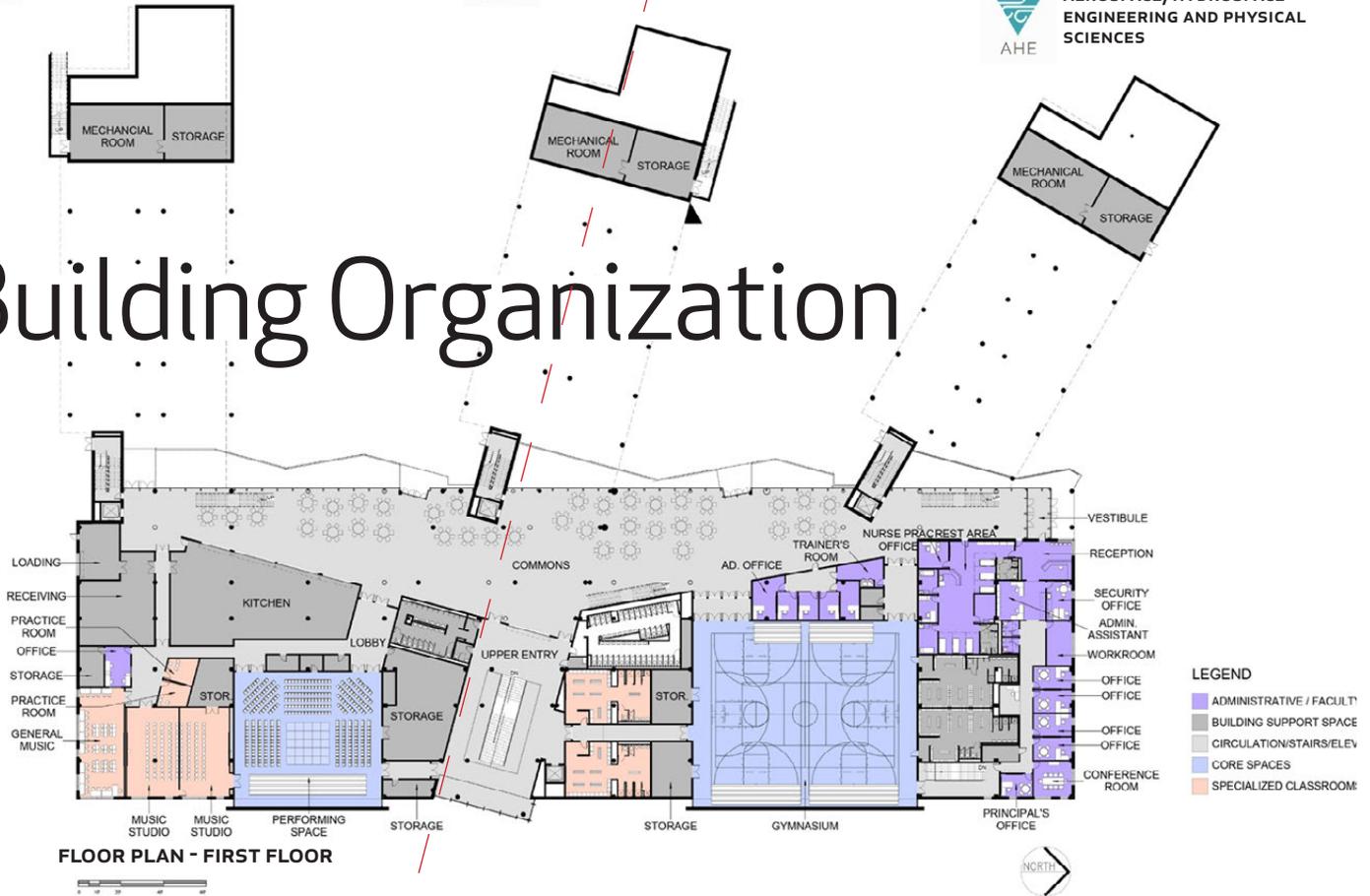


**BIOTECHNOLOGY RESEARCH
AND ZOOLOGICAL SCIENCES**

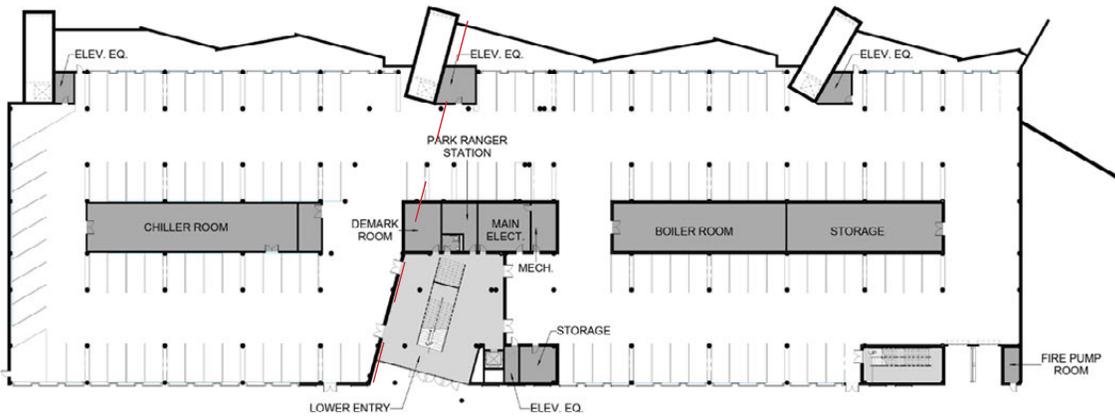


**AEROSPACE/HYDROSPACE
ENGINEERING AND PHYSICAL
SCIENCES**

Building Organization



FLOOR PLAN - FIRST FLOOR



FLOOR PLAN - LOWER FLOOR





With educational, programmatic and site related objectives clearly defined, the project team sought to configure the building in such a way as to support dynamic communities of practice as well as development of a Fairchild's unique school culture and climate. The complex interactions of these requirements and objectives were the underlying considerations that drove decisions regarding the building's organization.

The Lower Level includes student bus drop off and access to sub-structure/below grade parking for 120 vehicles. The First Floor organizes all core functions along the eastern edge of the building including visitor entrance/parent drop off, main office administration, guidance, student health services, gymnasium, black-box theater, food service, music and student commons. The student commons is the school's largest gathering area and includes a 28' high curtain

wall that runs the entire length of the west facing edge and provides views and access to an outdoor plaza, the three magnet wings, wetlands and walking trails. Moving up the main stair to the school's Second Floor provides access to the first level of academic spaces. An open walkway wraps around the commons and is open to below. Project rooms, media center and art rooms are all organized along the eastern edge of the building, including access to three green roofs through large project rooms that function as flexible maker spaces.

Bridges provide access to each of three distinct magnet schools: Information Technology and Software Engineering High School, Biotechnology Research and Zoological Sciences High School, Aerospace/HydroSpace Engineering and Physical Sciences High School. Each school includes specialized lab spaces that are required to support the program's curriculum,

however each school includes similar design elements, furnishings, materials and organizational structure. Each academic level is similar, with general academic learning studios, student workstations, flex rooms, laboratory classrooms, administration and teacher work rooms; the upper level includes additional partnership labs and access to green roofs.

Students are not organized in grade clusters but move vertically through the wing depending on the academic focus and activity requirements. Running up through each level is an expansive circulation artery. Lined with student lockers, this space functions both as a circulation pathway and as available classroom breakout and student work space and includes flexible furnishings such as community tables. The LEED Gold Certified project is the largest and most sustainable secondary school ever undertaken by the State of Connecticut.



**INFORMATION TECHNOLOGY
AND SOFTWARE ENGINEERING**



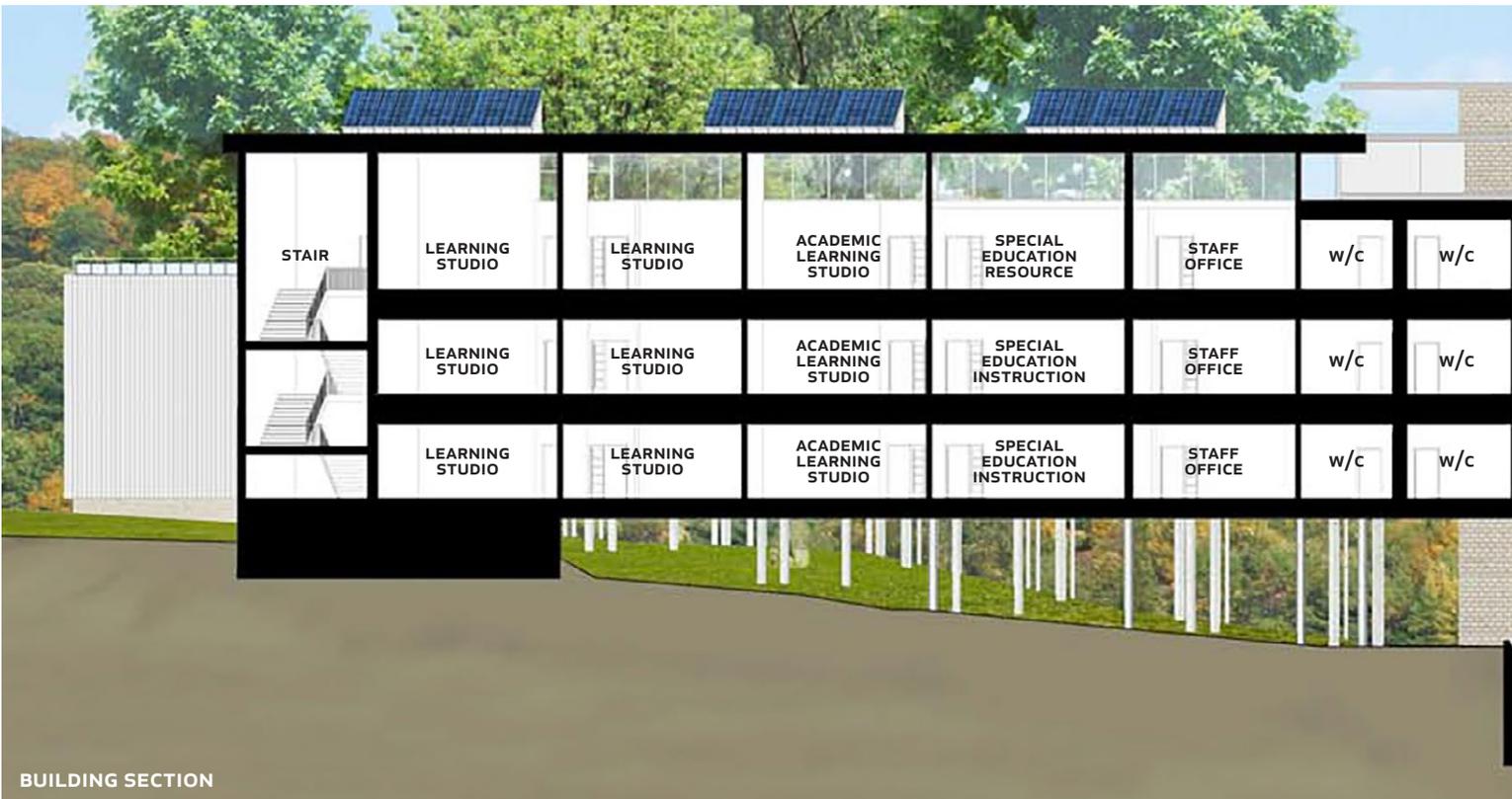
**BIOTECHNOLOGY RESEARCH
AND ZOOLOGICAL SCIENCES**



**AEROSPACE/HYDROSPACE
ENGINEERING AND PHYSICAL
SCIENCES**



FLOOR PLAN - THIRD FLOOR



BUILDING SECTION



**INFORMATION TECHNOLOGY
AND SOFTWARE ENGINEERING**



**BIOTECHNOLOGY RESEARCH
AND ZOOLOGICAL SCIENCES**

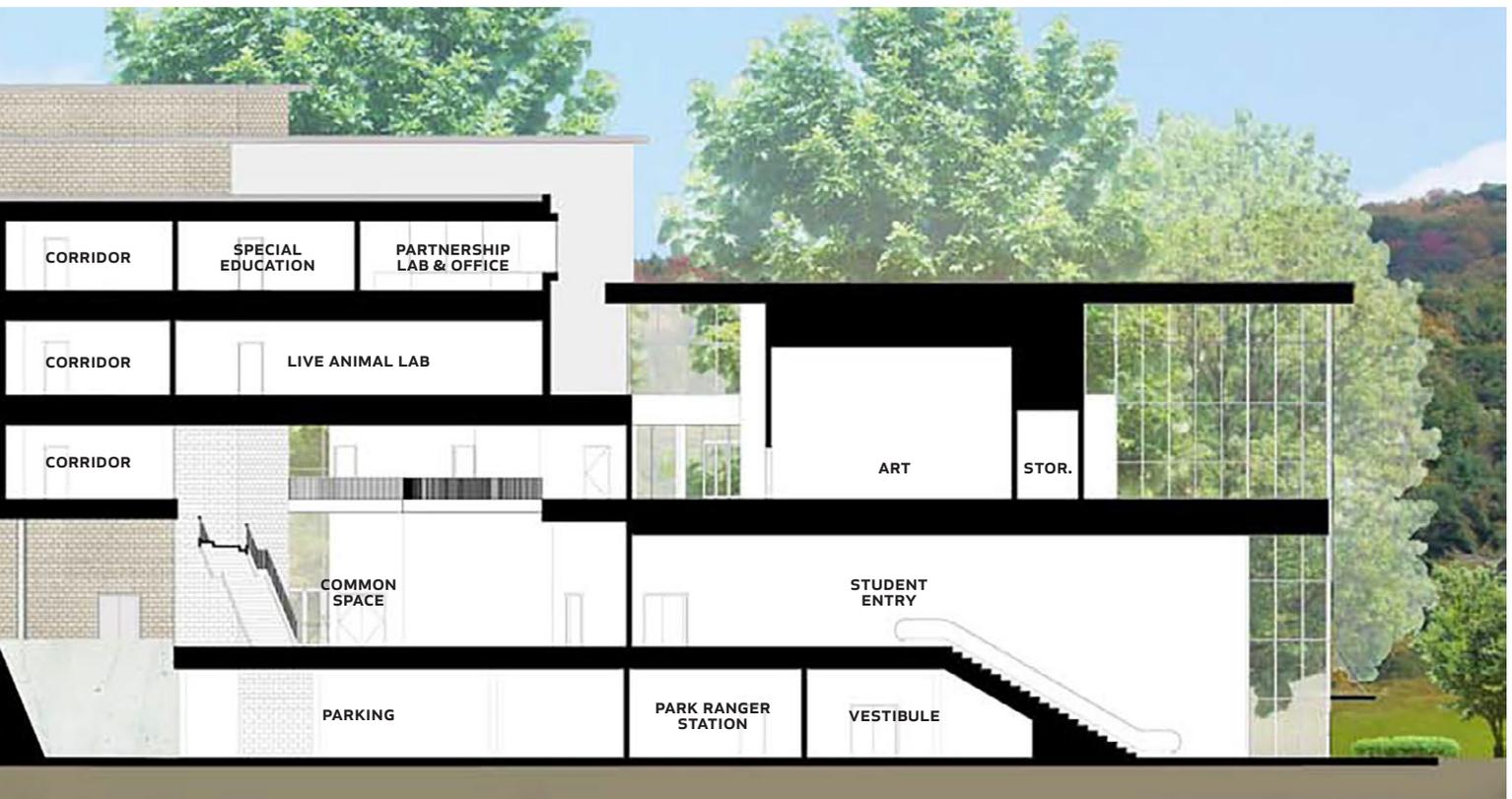


**AEROSPACE/HYDROSPACE
ENGINEERING AND PHYSICAL
SCIENCES**



FLOOR PLAN - FOURTH FLOOR

- LEGEND**
- ADMINISTRATIVE / FACULTY
 - BUILDING SUPPORT SPACES
 - GENERAL CLASSROOMS
 - GREEN ROOF
 - SPECIALIZED CLASSROOMS



Educational and Physical Environment



**BIOTECHNOLOGY RESEARCH
AND ZOOLOGICAL SCIENCES**

BRZ



**INFORMATION TECHNOLOGY
AND SOFTWARE ENGINEERING**

ITS



**AEROSPACE/HYDROSPACE
ENGINEERING AND
PHYSICAL SCIENCES**

AHE

In three thematic variations, students at Fairchild Wheeler (FWiMC) explore science, mathematics, engineering and technology in a project-based environment that shows relevance through real-life applications and problem solving. This approach lays the groundwork for not only STEM related careers but also an important level of literacy in these disciplines.



VISIT TO SIKORSKY AIRCRAFT



STUDENT INSTRUCTION AND INDEPENDENT WORK



STUDENTS IN AHE MAGNET AT WORK ON SAIL CAR CHALLENGE: APPLIED FLUIDS, MECHANICS



COMMONS AS SEEN FROM BRIDGE TO BRZ MAGNET WING

While each of the three schools focuses on a different branch of the sciences, students experience unique combinations of subjects and instructional techniques. For all students, the curriculum is designed around project-based learning (PBL) via inquiry, the engineering design cycle, collaborative projects, internships and other work-based learning. With a 4x4 block schedule, each class and all subjects are 80-minute installments of PBL. Projects are exercises in applied learning and design in association with local universities and the region's leading aero- and hydro-space, software design and bioengineering firms in order to insure their relevance to real world problems. As was originally planned, partnerships with various institutions, businesses and industries provides access to voluntary services and support

including expert assistance on curriculum development implementation and evaluation; participation in advisory councils and boards; visiting professionals and lecturers; student mentoring and tutoring; shadowing opportunities, summer jobs and internships; access to stakeholder's state-of-the-art facilities and guidance on development on practical skills. Classes run on a half-year rather than full-year cycle. This compressed methodology to curriculum delivery requires that teachers work with students in groups as well as individually to ensure they stay current with all coursework. Teachers are relieved of additional daytime school duties such as study hall and lunch supervision, and instead use all non-instructional time for inter-disciplinary lesson planning. Agility within the school environment is matched by agility by the teaching staff.



KEEPING BEES ON BRZ MAGNET GREEN ROOF



VIEW OF BRZ WING AND OUTDOOR LEARNING PLAZA FROM COMMONS

The Environment Supports the Curriculum



SMALL LEARNING COMMUNITIES

There were many goals and objectives that went into the initial definition and design development for the school, however the overriding goals that drove program and physical development were:

- Create a highly engaging and relevant program organized around STEM focused project-based learning;
- Create a highly interactive and responsive environment that supports cross disciplinary activity and discovery;
- Create energetic small learning communities within a larger and equally vibrant school community;
- Prepare students to immediately step into worthwhile employment or further education upon graduation;

- Bring together students from a variety of different backgrounds and circumstances around a rigorous program that promotes skill building, collaboration and personal as well as collective achievement.

Programming brought consensus regarding six overriding themes that would be expressed in the design and organization of the building:

1. Flow of activity
2. Flexible environments
3. Sense of responsibility
4. Exhibition spaces
5. Technology
6. Green Principles



ENTRANCE TO MAGNET WING

AREAS FOR DISPLAY AND EXHIBIT GENERATE PRIDE, SCHOOL COMMUNITY AND SHARED EXPERIENCES

Multiple settings are provided that put on display the range of student activities and create opportunities for interdisciplinary collaboration and awareness. Monitors placed at the entry to each magnet allow for customized display of the specific work, announcements, activities and events happening within the program. In the student commons, large monitors feature dynamic information related to work of each magnet as well as all-school activities.

PROJECT LABS FOR COLLABORATION AND PROJECT BASED LEARNING WITH STAKEHOLDERS

Maker spaces located in the upper level commons are flexible and transparent learning labs where external stakeholders come in to engage in project based learning with students. With abundant technology and provisions for power and safety, these labs have flexible furnishings and large doors that make the lab an extension of the wrap around corridor—putting student activity on display for the entire school.

MATURE SPACES SIMILAR TO COLLEGIATE OR OPEN OFFICE ENVIRONMENTS

Within each magnet are areas designated as student workstations. These spaces provide each individual student with a small but personal workspace and project locker (in addition to their standard school locker). Located outside classroom and lab areas within each magnet, the space feels like a contemporary open-office environment with abundant light, mature finishes and a variety of work surfaces.



STUDENT COMMONS DURING OPEN HOUSE



GREEN ROOF AT REAR OF MAGNET WING



PERSONAL STUDENT WORKSTATIONS

The student commons is a flexible multipurpose space that is used not only for morning arrival and lunch, but also for student wide exhibits and presentations. Located immediately off the commons, the black-box theater provides flexible space to do live demonstrations and collaborate with remote partners using holographic presentation technology. Digital media and multiuse spaces provide opportunities to showcase the work and efforts of students in flexible and innovative ways; they provide welcoming spaces for the school community to gather and to collaborate on a wider and, sometimes more global, level.

Access to the east facing green roofs comes through the labs so project work and learning can extend to the exterior. These labs strengthen the curriculum by providing space for students to work on skill building and collaboration with stakeholder partners; they provide space for applied learning that is highly engaging and has real world relevance; they put activity on display creating awareness among all members of school community; they provide spaces for learning through demonstration, personal and group interaction, presentation and group problem solving.

In this space, students must practice appropriate “workplace” social skills related to sharing of space including staying on task, maintaining self awareness and collaborating appropriately. These spaces support the curriculum through skill building and social development, by foreshadowing environments students will encounter in higher education or the working world, and by creating places that elevate hands-on activities as a serious endeavor. The nature of the space reinforces respectful behavior among peer groups.



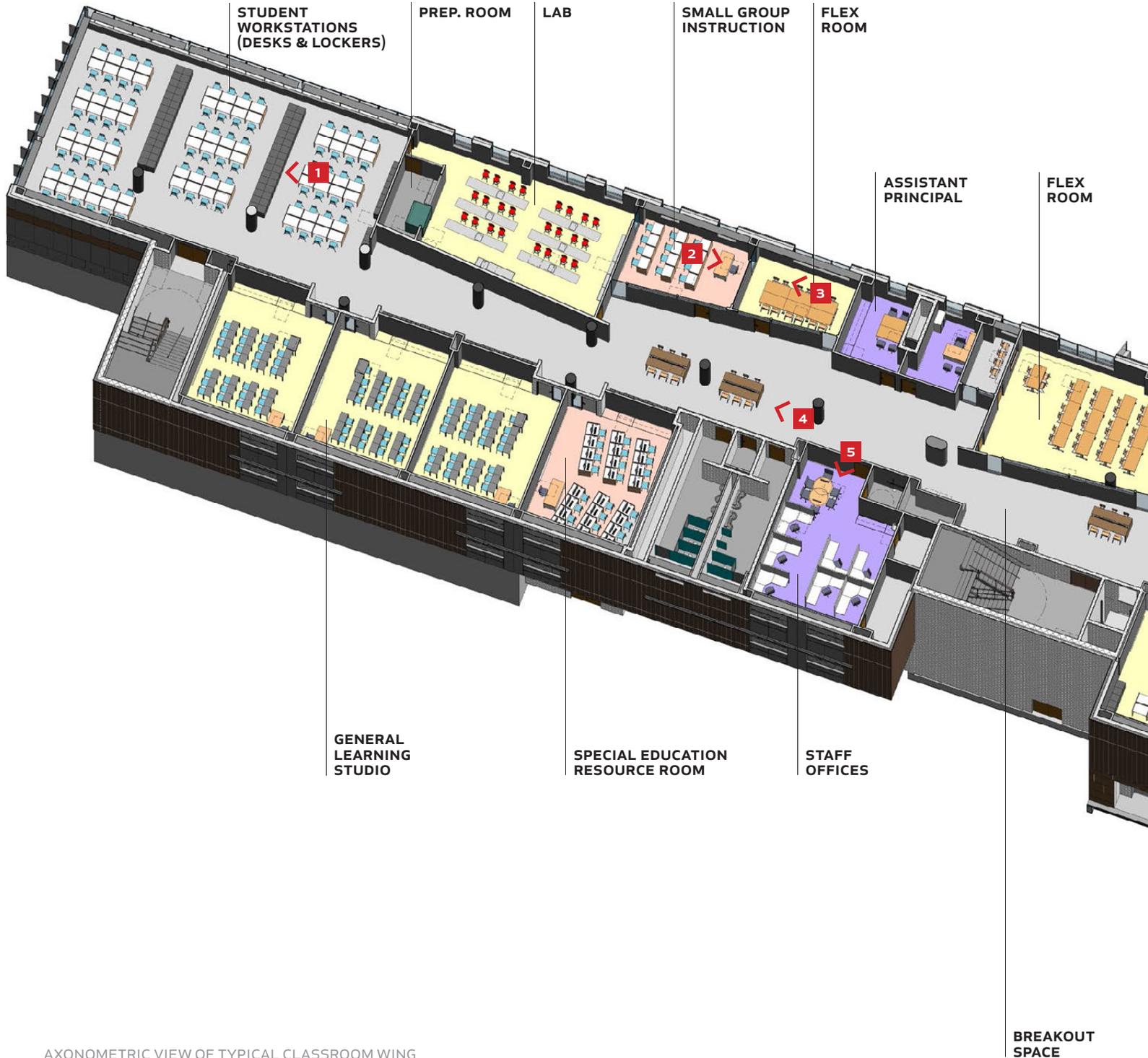
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AXONOMETRIC VIEW OF TYPICAL CLASSROOM WING

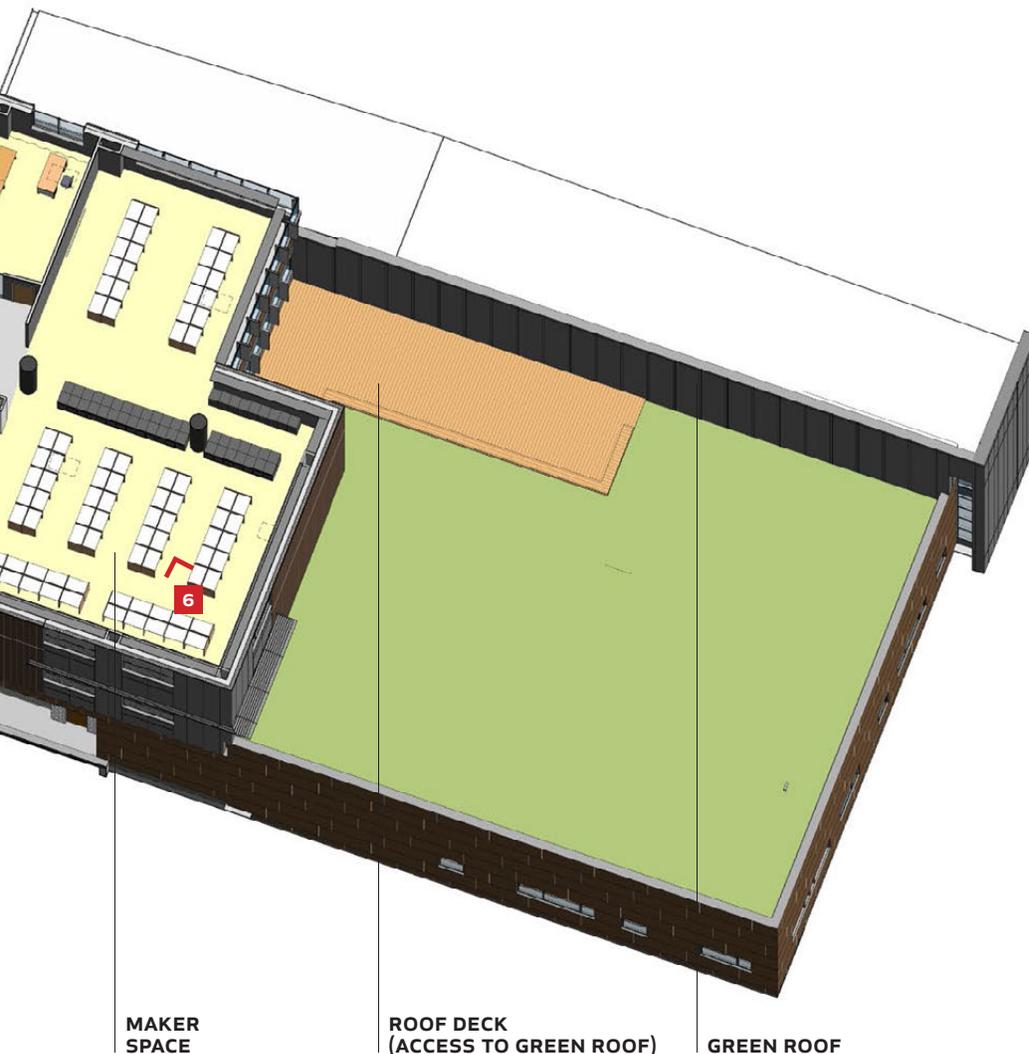


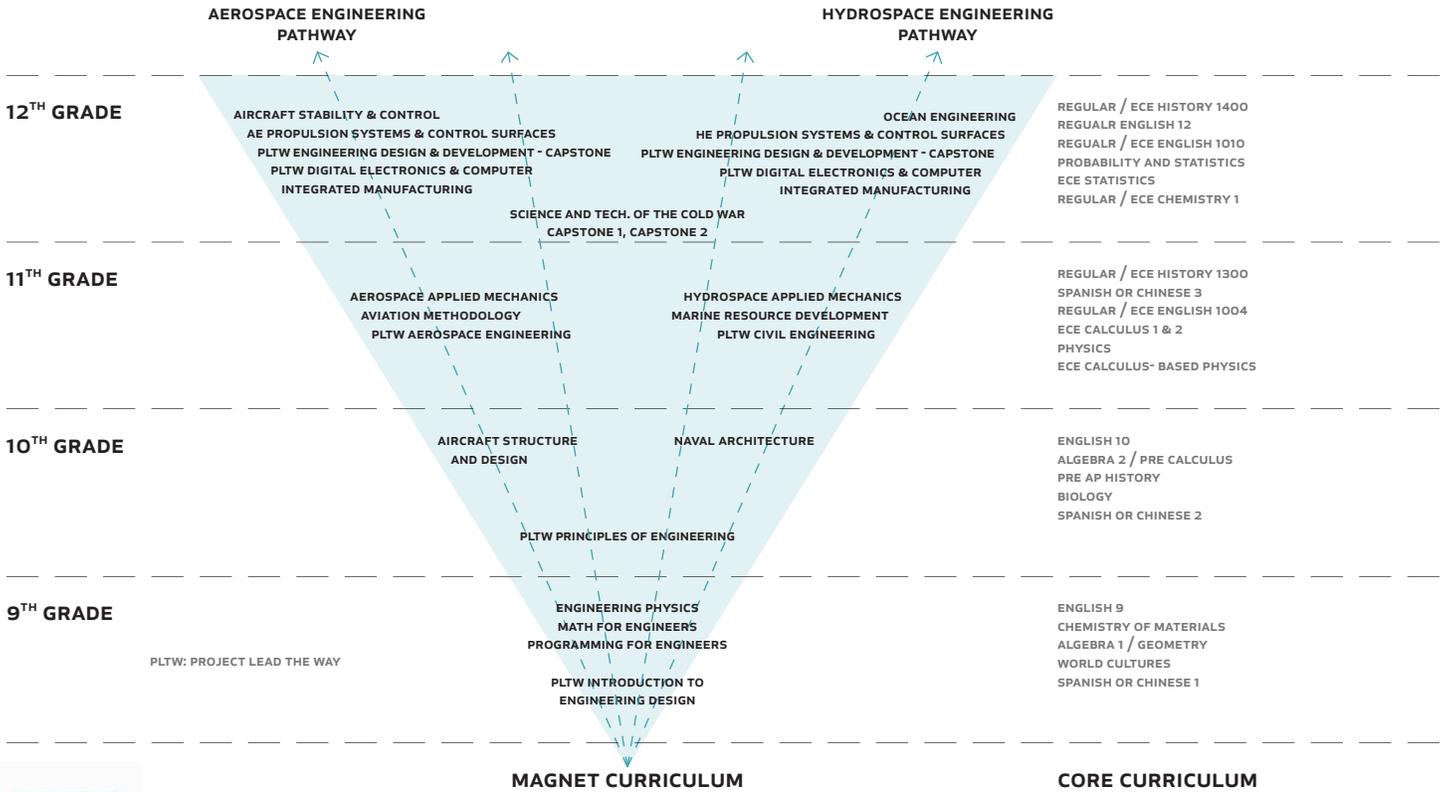
All spaces are available for academic and social activities. Common spaces in the academic wings are located adjacent to lab and classroom spaces so the flow of activity into these spaces can be immediate and spontaneous.

ACTIVATED, AVAILABLE AND AGILE SPACES

Public spaces such as the commons and black-box theater are flexible and adaptable to multiple uses. These spaces increase opportunities for interdisciplinary collaboration and skill building; they allow for the development of school culture and community by providing multiple flexible settings for gathering; they provide spaces to support after school and community functions.

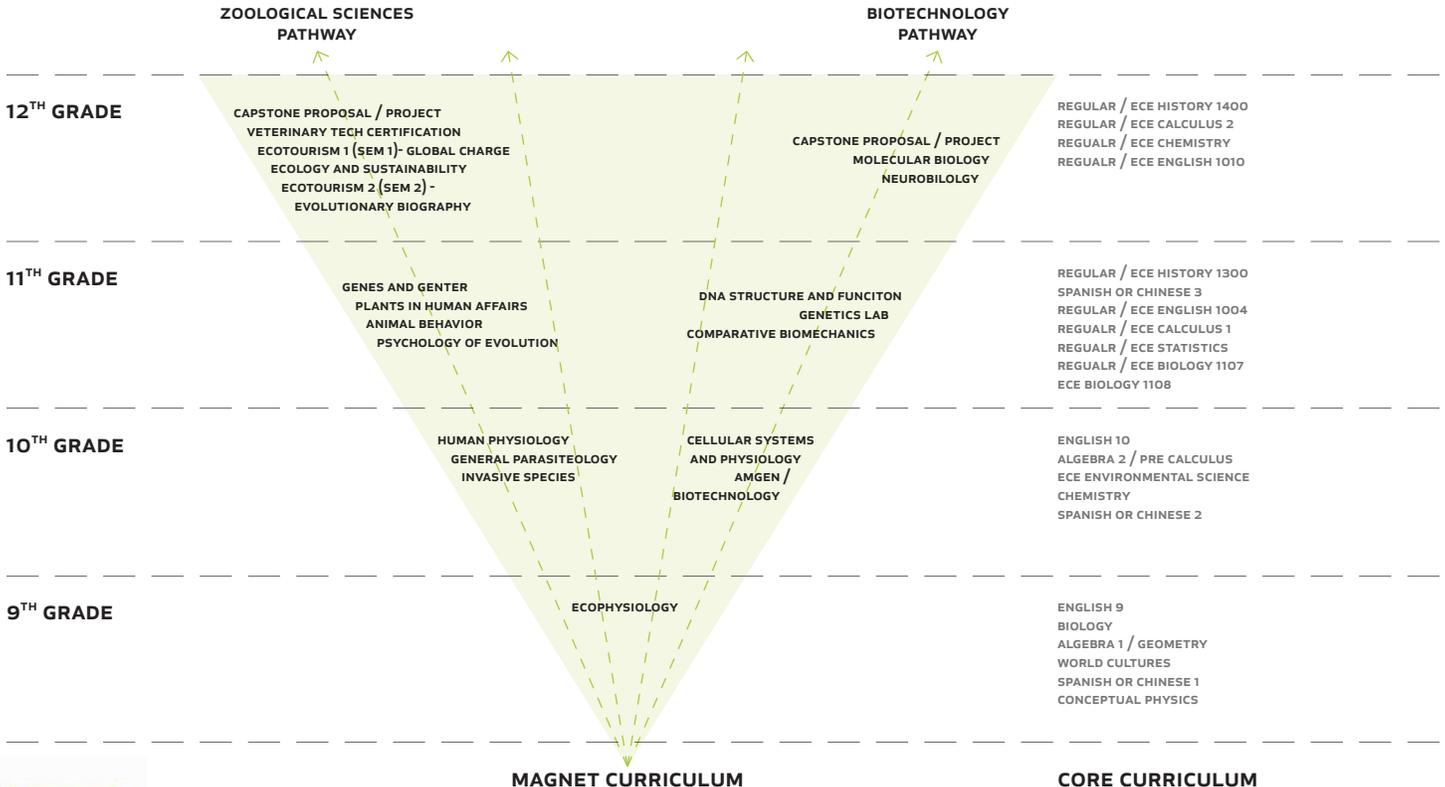
Students track activity through the building's dashboard including energy use and generation process by which green roofs cool the building and rainwater harvesting for water conservation. As part of each of the magnet programs, students in the IT School monitor rainwater collection, water usage and energy generation. Data collection is used to assist students in the other two schools in looking at ways to increase energy efficiency and reduce the school's carbon footprint. Students in the Physical Sciences School measure energy consumption/generation from solar and wind turbines and students explore different turbine blade designs that will maximize energy generation. Architectural strategies and materials used to increase energy efficiency are studied as well as the benefits achieved by green roofs. In the Biotechnology School, students measure soil filtration of rainwater using the green roofs. They also study the campus ecosystem including native frog species, bird and bat species and bee habitat. Students have become involved in the keeping of bees and in promoting habitat preservation for other campus species.



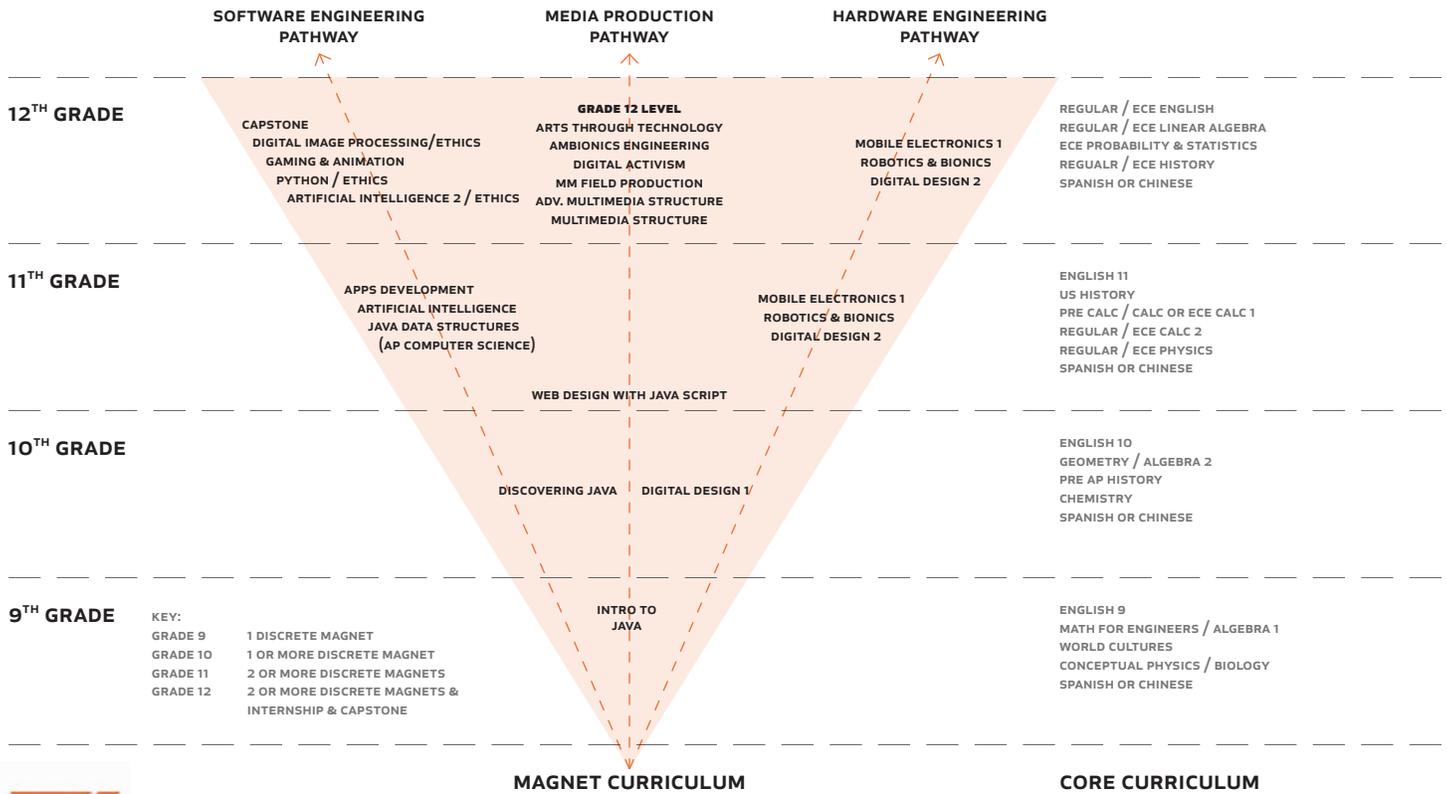


AEROSPACE ENGINEERING PATHWAYS

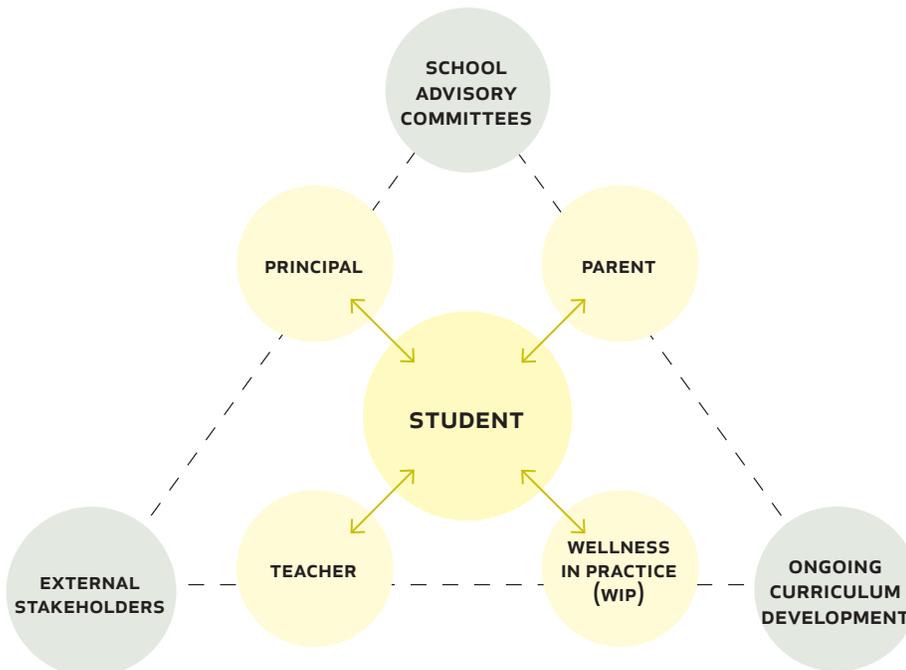
FWiMC Curriculum



ZOOLOGICAL SCIENCES PATHWAYS



INFORMATION TECHNOLOGY PATHWAYS



PATHWAY FOR LEARNING PLAN

PATHWAY FOR LEARNING PLAN (PFL)

The PFL represents a complete set of professional services in place for every student from grade 9 through 12. The pathway journey begins with summer orientation and continues through graduation.

The Pathway for Learning Plan is an individualized student-centered plan that engages every student based on their unique interests and strengths, helping them to understand the relevancy of education and the steps necessary to achieve postsecondary educational and career goals.

To reach the level of complete success, the student, who is the central focus, will need to recognize his/her responsibilities and to engage in ownership of the pathway.

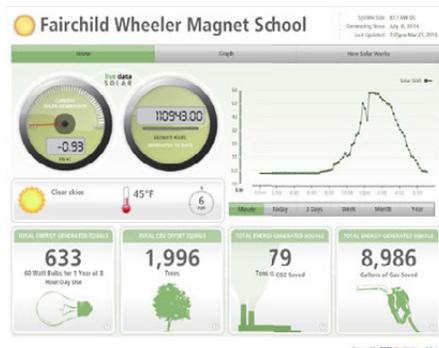
This program is supported by continuous dialogue with School Advisory Committees and external stakeholders as well as ongoing curriculum development that engages education professionals at Sacred Heart University and project stakeholders.



SAMPLE SUSTAINABLE FEATURES

The Building and Site as Teaching Tools

To strengthen a sense of connection and responsibility in students, there was great interest in developing green/sustainable building features that could be incorporated into the curriculum. Given the school's unique campus environment, the site immediately around the school was designed to offer multiple ecosystems to incorporate into the curriculum. These green sustainable features provide opportunities for cross-disciplinary collaboration; the work has a special level of relevance and the information available is in real time; the process allows students to consider real world problems and discover possible solutions, across many different dimensions.



The school achieved LEED points for design of curriculum based on the high-performance features of the building, including exploration of the relationship between human ecology, natural ecology and the school.



In the first year of operation, students from Biotechnology Research and Zoological Sciences High School examine one of three new bee colonies established on the roof of Fairchild Wheeler. CT POST - MAY 2014



VIEW OF BRZ WING FROM WALKING PATH



The project has achieved LEED Gold Certification by the USGBC, and it is the most environmentally friendly school in the state.

- OPEN SPACE

76.4% of the site has been maintained as open space with special attention given to preservation of native habitats and protection of mature trees

- WATER CONSERVATION

Water efficient fixtures will reduce potable water use by 44%

An 80,000 gallon cistern will provide an additional 2,692,656 gallons of greywater; Comprehensive stormwater management system

- ENERGY EFFICIENCY

Energy efficient design will save +/- \$150,000/year in utility costs

- SOLAR & WIND POWER

17,000 sf (106kw) array of pv panels and 10 (12kw) vertical axis wind turbines

- RECYCLING

83% or 115.6 tons of construction was recycled and diverted from landfill

- Building materials used contained a total of 44% of recycled content

- LOCAL & SUSTAINABLE MATERIALS

16% of the materials were locally harvested and manufactured

90% of the wood used was fsc certified

- SITE PRESERVATION

70,000 square feet of underground parking and utility

Additional features/leed points were gained for alternative transportation and parking capacity encourages bicycle transportation and mass transit usage

Light pollution reduction

Joint use facility



PROJECT PARTNER MAKER SPACE

Environments that Support a Variety of Learning and Teaching Styles

One of the original concepts that drove the school to have multiple programs was the desire to support interdisciplinary collaboration and cross pollination of the sciences. It was believed that by having a harmonious blending of STEM disciplines contained under one roof and providing interactive settings, students would have greater access to academic and intellectual connections and opportunities.

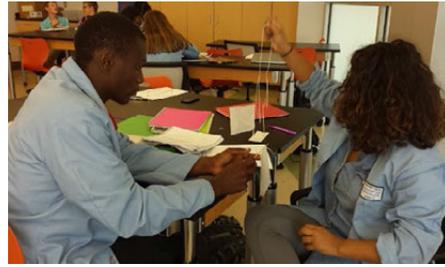
LEARNING THROUGH VISUAL CONNECTIONS

Students and teachers have a great deal of information on what is happening around the school and a heightened connection to activity in the larger environment. The building supports exhibition, display and presentation of work in multiple ways—through creation of open spaces to accommodate large and small groups,

strategic adjacencies, spaces that support a range of activities, and by creating layers of transparency. Extensive use of glass and curtain wall ensures connection to the progression and functions of the outdoor environment. Utilization of the building as a teaching tool thru the sustainable features, such as green roofs and wind turbines, is combined with access to an environmentally rich location. By incorporating the site into the curriculum, students—many of whom have spent their lives in a highly urbanized environment—have been inspired to create projects and activities based on observation of wetlands, rain gardens, and woodland habitat. The environment supports a broad discourse on student endeavors and supports the process by which teachers can leverage the broader range of studies available in the school.

LEARN BY DOING. TEACHING THROUGH DEMONSTRATION AND MENTORSHIP

Learning and teaching happens through a process of demonstration, individual and collaborative problem solving, presentation and group dialogue. Maker spaces and project labs support student initiative and experimentation while also providing an environment for visiting experts and stakeholders. Interaction with stakeholders provides a high degree of relevance in hands on work, and labs spaces support demonstration and mentoring through a process of problem solving and experimentation. Having breakout spaces available adjacent to these labs promotes working in large and small groups.



BRZ STUDENTS ON SITE WALK

Each senior is responsible for completing a capstone project as part of their final year. These projects define a problem or opportunity with a specific area of the student's interest, examines the issue, synthesizes information on the problem and possible means to address the issue. The school provides support and facilities to support these projects, including all the facilities as well as external sources if needed.

SUPPORT FOR TEACHING AND ADAPTING CURRICULUM

Each academic floor has teacher workrooms to support a process of ongoing and continuous dialogue with teachers and academic/institutional/industry partners regarding curriculum and lesson planning. Teachers do not engage in non-academic work such as supervising study or lunch periods and out of class time is spent on interdisciplinary curriculum and project work development. The workrooms have workstations for each teacher and team meeting space. The half-year course schedule requires teachers work across discipline in a creative, proactive manner.



WOMEN IN ENGINEERING INTRODUCTORY LECTURE



Mature Spaces that Promote Socialization and Skill Building

Within each magnet are areas designated as student workstations. These spaces provide individual students with a small but personal workspace and project locker (in addition to their standard school locker). Located outside instruction areas, the space feels like a contemporary open-office environment with abundant light, mature finishes and a variety of work surfaces. Students must practice appropriate “workplace” social skills related to sharing of space including staying on task, maintaining self-control and collaborating appropriately. These spaces support the curriculum through skill building and social development—by foreshadowing environments students will encounter in higher education or the working world—and by creating places that elevate hands-on activities as a serious endeavor. The nature of the space reinforces respectful behavior amongst positive peer models.





Personal Growth & Identity

In each of these spaces, students have the opportunity to keep the focus on their efforts, achievements and actions rather than allowing space for characterization based on personal circumstances or background. The program and the building have been called “the great leveler” – allowing a place for students to develop their individual identity and capabilities. With a dynamic curriculum and a supportive physical environment, students are able to focus on developing skills and self awareness so they can take the next crucial steps in their lives.



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COMMUNITY TABLES OUTSIDE LABS AND FLEX ROOMS



VIEW INTO LARGE FLEX ROOM

DAYLIGHTING AND TRANSPARENCY

The design team incorporated multiple strategies to link the school's internal and external context—both to promote the transmission of natural light into the interior and to create a more transparent connections within the learning environment.

- The project incorporates 3 types of solar shading in order to ensure penetration of daylight into the interior without the need for shades;
- Multiple strategies were used to increase transparency, including clerestory windows that bring light from exterior classrooms into the main hallway of the magnets, glass panels between classrooms, sidelights around doors;
- A 28' high curtain wall spans the length of the commons and connects the school's largest interior space to the outdoor plaza and site;
- Project rooms feature large storefront windows that can be pushed aside and connect the project rooms to the upper level commons corridor;
- Glass walls connect corridor and lab spaces to the school's 5 green roofs.

SUSTAINABILITY AND TECHNOLOGY

FWiMC includes an incredible array of technology, some very expected and some extraordinary.

- Fairchild Wheeler incorporates numerous types of green technology, much of which can be monitored through the building dashboard. Energy generation from wind turbines and photo voltaic units can be monitored alongside volume of rainwater harvesting and building cooling. Sustainable features are expected to save the district \$300,000 in energy and water costs. The building is a highly integrated and relevant part of the learning environment;
- With LEED Gold certification, the school is the most sustainable and efficient school in Connecticut;
- Preserved parkland, limiting of impermeable surfaces, constructed wetlands, rain gardens, bioswales were incorporated into the site planning. All elements contributed to the reclaiming of Fairchild Wheeler as active parkland;

- Wireless technology is available throughout the building. Each student is issued a laptop computer at the start of the year. All resources are available online, however students without internet access at home are issued a set of textbooks;
- Digital displays at the entry to each magnet and in the student commons promote energy, excitement and awareness of what is happening around the school;
- The School of Information technology program specifically looks at hands on and creative applications of STEM related content including digital video production, coding and application development and robotics. The school has taken space originally intended for music classrooms and has converted them to green screen and digital production studios.

OUTDOOR LEARNING

FWiMC has multiple settings for outdoor learning and collaboration. The outdoor environment is highly integrated into the program, with multiple features accessible for learning. Students undertake projects either inspired by interactions with the site or outdoors in the environment.

INTEGRATED SUSTAINABILITY

The depth, variety and integration of sustainable elements provides another dynamic resource for students and teachers. Though a digital building dashboard, students and teachers can access information on building performance and can directly connect this information to principles and connection of the indoor and outdoor environment, building and site as a teaching tool.

SMALL LEARNING COMMUNITIES

Students have the advantage of working within a small 500-student program but have access to wider opportunities and a larger school community. There is a deep variety in the programs offered by each magnet, this provides opportunities for exciting collaboration between the schools on projects but also the opportunity for students from one magnet to cross over and take classes at another magnet. The co-location of these programs allows students (working with their advisors) to further customize and personalize their course of study.

AGILE AND INCLUSIONARY SPACES

FWiMC was designed to bring a school together around learning and student development. In order to achieve the long list of goals and objectives, it was important that the school be able to respond day by day and year over year to the demands of students, teachers and an evolving curriculum.

- The design team minimized the number of spaces for fixed uses; these spaces included specialized project labs where there were specific safety and the physical requirements (example Chemistry lab);
- Spaces were configured to maximize collaborative opportunities, whether by providing flexible furnishings or proper adjacencies. A variety of settings were created, all that can be used in a variety of ways—student work stations, seminar, flex and project rooms. Maker spaces located on the upper level commons have large glass doors that open out to circulation, connecting the activity inside to the wider school community;
- Shared spaces were developed at the magnet and school wide level to create patterns of use and respect for gathering and exhibiting of student work;
- Large volumes, such as the black-box theater and commons, do not have fixed purposes and are rich with technology and flexible furnishings;



SMALL GROUP INSTRUCTION
WITH VIEW TO FLEX ROOM

The Physical Attributes of the Environment



SMALL FLEX ROOM WITH
VIEW BACK TO SMALL
GROUP INSTRUCTION

While located in Bridgeport, the FWiMC is part of a larger regional community, with a diverse group of students coming from Bridgeport and 8 surrounding districts. The student population is representative of the cultural and ethnic diversity that is found in these districts.

Development, design and ongoing work at the school involves regional institutions, businesses and industry stakeholders.

They include: The University of Bridgeport, the University of Connecticut and Sacred Heart University provide curriculum support, teaching assistance and student mentorship; Beardsley Park Zoo, Mystic Aquarium, the Discovery Museum provide curriculum support, internships, and hands on learning instruction; Sikorsky Aircraft, Kongsberg Gruppen and General Electric are multinational corporations that provide support on curriculum and hands on learning instruction.

Each one of these organizations provides engagement and support in maintaining a program that is exciting and relevant.

The school and each of the magnets have advisory committees made up of parents, students, district leaderships, school administration, community members and school stakeholders. These groups contribute to addressing issues and communicating to the wider community about the Fairchild Wheeler program.

The school is fortunate to have a student health services center. There are students that do not have regular access to medical services and the health center is a place where issues can be addressed in a timely and expedient manner.

The Larger Context of Community



The location of the school on the grounds of the Fairchild Wheeler Park has rehabilitated what was formerly an underutilized resource. With the opening of the school, the park has become an active part of the community, with new walking trails, greater visitation and a greater sense of safety and security for the public.

With a variety of large and flexible spaces, Fairchild Wheeler is in use by community groups far after the school day is finished.

Rather than working in isolation, the FWiMC is an active, connected and productive part of the Greater Bridgeport region and community.





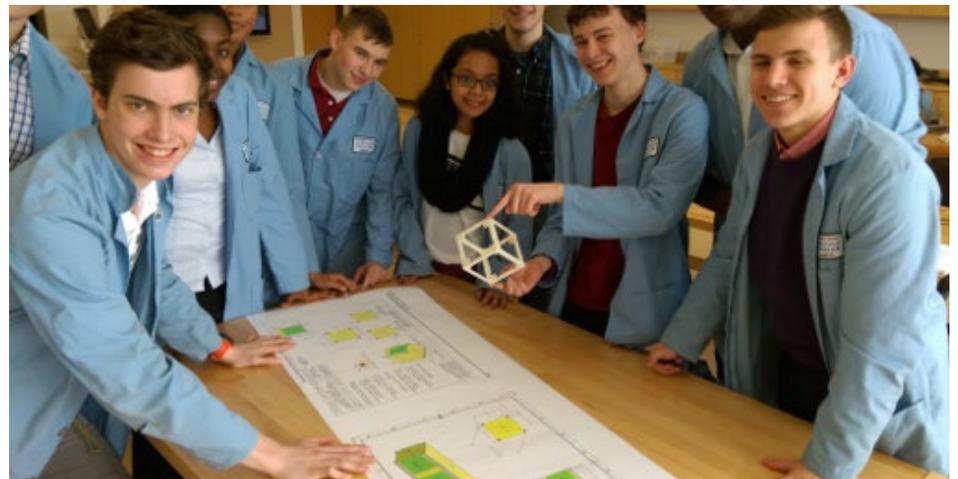
WIND TURBINES ABOVE STUDENT ENTRY

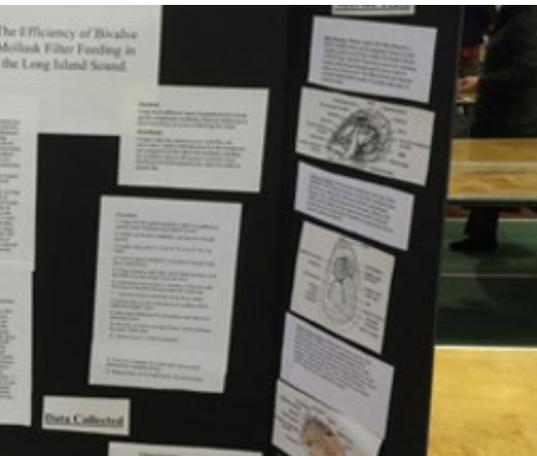


Inspiration & Motivation

THE SCHOOL INSPIRES AND MOTIVATES BY

- Celebrating student effort and success
- Providing a place where peer-to-peer interaction and peer-to-teacher/mentor interaction is cultivated and valued
- Creating a mature environment for serious learning and endeavor
- Providing a highly relevant curriculum with hands on learning opportunities and connection to recognized experts
- Creating small learning communities where students can focus on academic and personal development
- Supporting development of larger school that provides opportunities for cross disciplinary studies and social collaboration
- Creating a place that is responsive to student needs that allows them to take control of their learning and socialization
- Providing access to a rich natural environment, which for some is unlike anything they have experienced
- Involving the regional community in a process of dialogue, consensus building and ongoing improvement





For the second year in a row, students from Fairchild Wheeler are headed to Chicago next month to participate in MathCON, a prestigious academic math competition. Last year, two students from Fairchild represented. This year, five from the Aerospace School at the inter-district magnet complex were among 564 student chosen for the competition which will be held April 23 at the University of Illinois at Chicago. The students include Anubhav Dhar, a junior and sophomores Shubham Singh, Alec Mehra, Erik Koether, and Kenny Wright. They were among 44,000 students across 41 states who took the intitial exam to qualify for Chicago event.

- Linda Conner Lambeck / March 2016 - CT Post



Results

HOW DO YOU MEASURE RESULTS?
WHAT IS THE BENCHMARK FOR SUCCESS?

For every student at Fairchild Wheeler, there is a unique and personal story - for some the story is of persistence and determination, some of perseverance and hard work, others of new connections and opportunities.

One way to measure the impact of the school on students and families in the region is to look at some of the numbers coming ahead of the first graduating class.

Of the 1500 students attending Fairchild Wheeler, 205 of them are seniors. Of those students, 144 are from Bridgeport, where typical graduation rates hover at 65%. As of mid April, 2016:

- 205 students in senior class
- 202 students anticipated to graduate* 98.5% graduation rate
- 185 students pursuing further education 90.2% seeking higher education
Out of these, 5 students graduated early and went immediately on to further education
- 11 students entering full employment 5.4% going on to immediate employment
Out of these, 4 students graduated early and have gone on to STEM-related fields
- 106 students pursuing STEM 57.3% will continue in their fields of study
- 128 students have earned college credits 62.4% will take credits into their first year of higher education

Fairchild Wheeler's more personal and less definable story is the impact it has had on individual empowerment and social development; readiness for additional education and future employment; development of future workforce and exposure to relevant problem solving situations; ability to embrace personalized discovery and interdisciplinary learning.

Above all, it can be said the school is living up to its mission:

"To create a culture for passionate investigators to develop solutions for the global community!"

*3 students are anticipated to finish the program following completion of summer school



DESIGN DEVELOPMENT RENDERING OF THE COMMONS