

RE | BUILD

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[03 . 06] PROJECT DESCRIPTION

[07 . 10] SITE RESEARCH

[11 . 16] PRECEDENT ANALYSIS

[17 . 26] DESIGN

[27 . 28] REFERENCES



| case statement

This project was developed because of the damage left in the wake of the EF-5 tornado that hit the area in May 2011. One of the hardest hit areas of Joplin was the city's southeast side, which is comprised of mainly private residences and commercial buildings. The nearly one-mile wide tornado cut a path almost 22 miles in length, destroying over 7,000 homes and about 2,000 other buildings. Developing a comprehensive plan for the area will allow the city to rebuild the community better than ever.

Among the buildings completely destroyed during the storm was Joplin High School. The rebuilding of the school is an important step for the community to heal and grow from the devastation. Since education plays a key role in the success of any individual's future as well as the community as a whole, a major focus of this plan will be on the high school.

In addition to the planning and design proposal, there will also be crucial developments and implementation of innovative structural concepts in order to help benefit the high-risk community of Joplin, Missouri.



| project goals

The key goal of this project is to not only rebuild the school, but also the hope and spirit for the residents of Joplin, Missouri. The idea is important because it helps establish an effort to heal the area and provides a way for the community to grow in the future.

| guiding principles

The plan must possess the ability to inspire residents to stay in the area and to rebuild their lives. The school environment must have the ability to encourage the children to focus on their education and provide them an opportunity for a successful future. All design decisions of the facility must be sensitive to the area it exists. A careful focus on safety and preventative measures will be crucial.

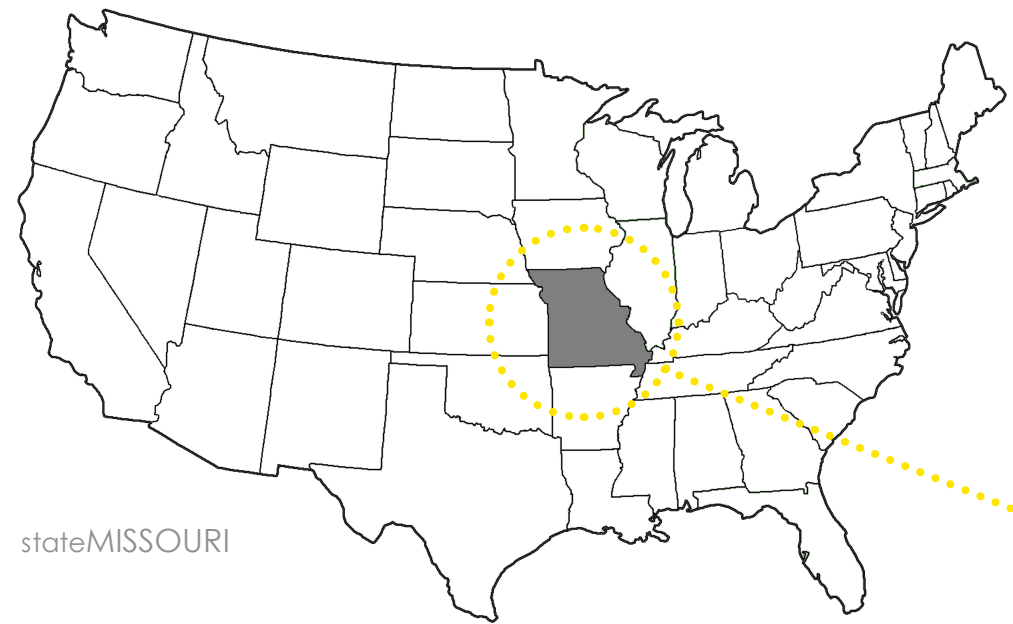


hope

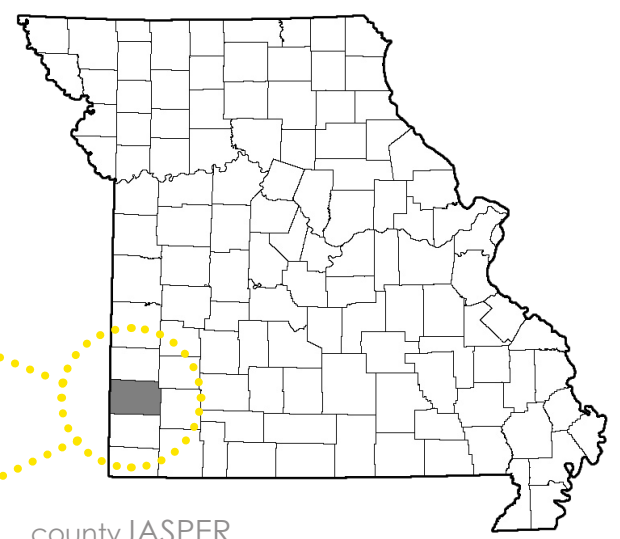
After the tornado struck the school's campus, the sign that originally read "Joplin High School" was only left with an O and P. Citizens taped up an H and E, so that it read "Hope High School". This image helps to paint the picture of the damage sustained as well as display the positive attitude driving the community.



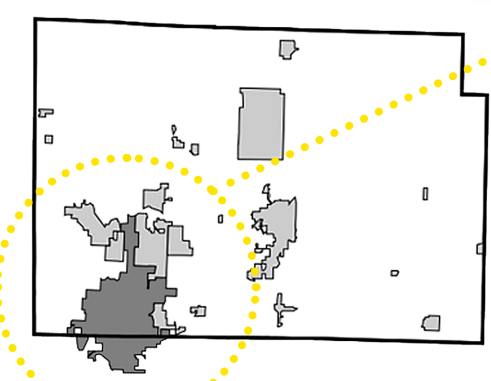




stateMISSOURI



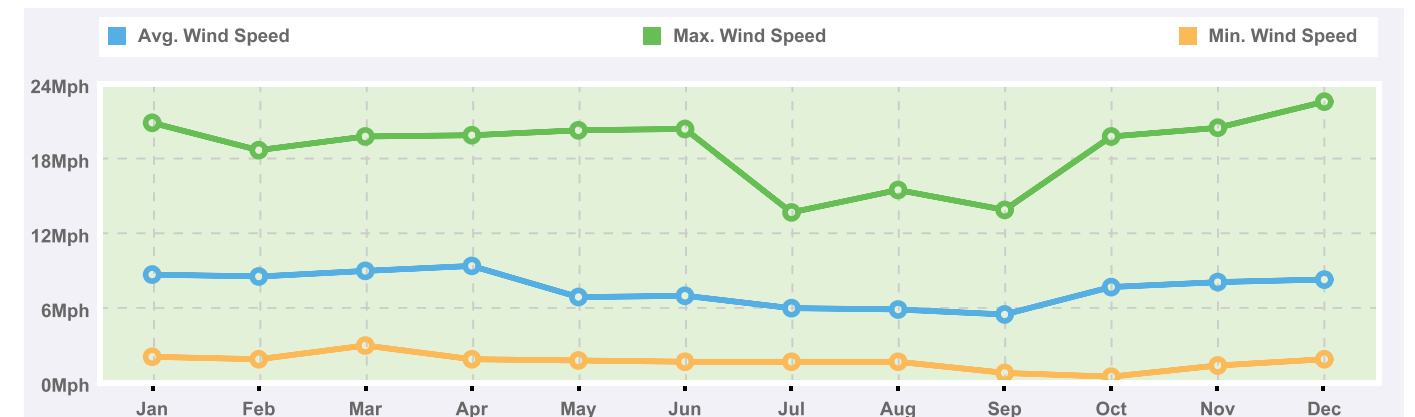
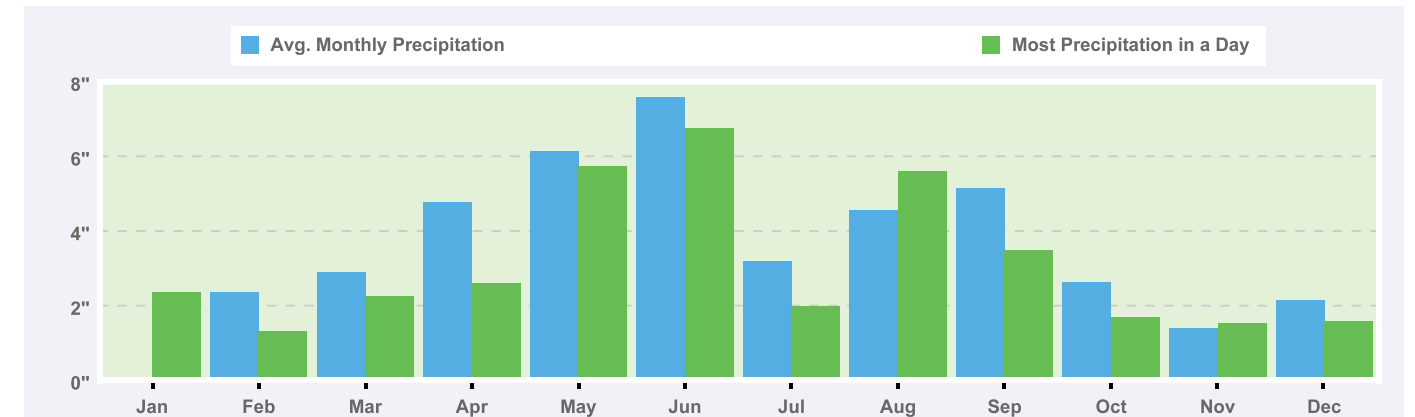
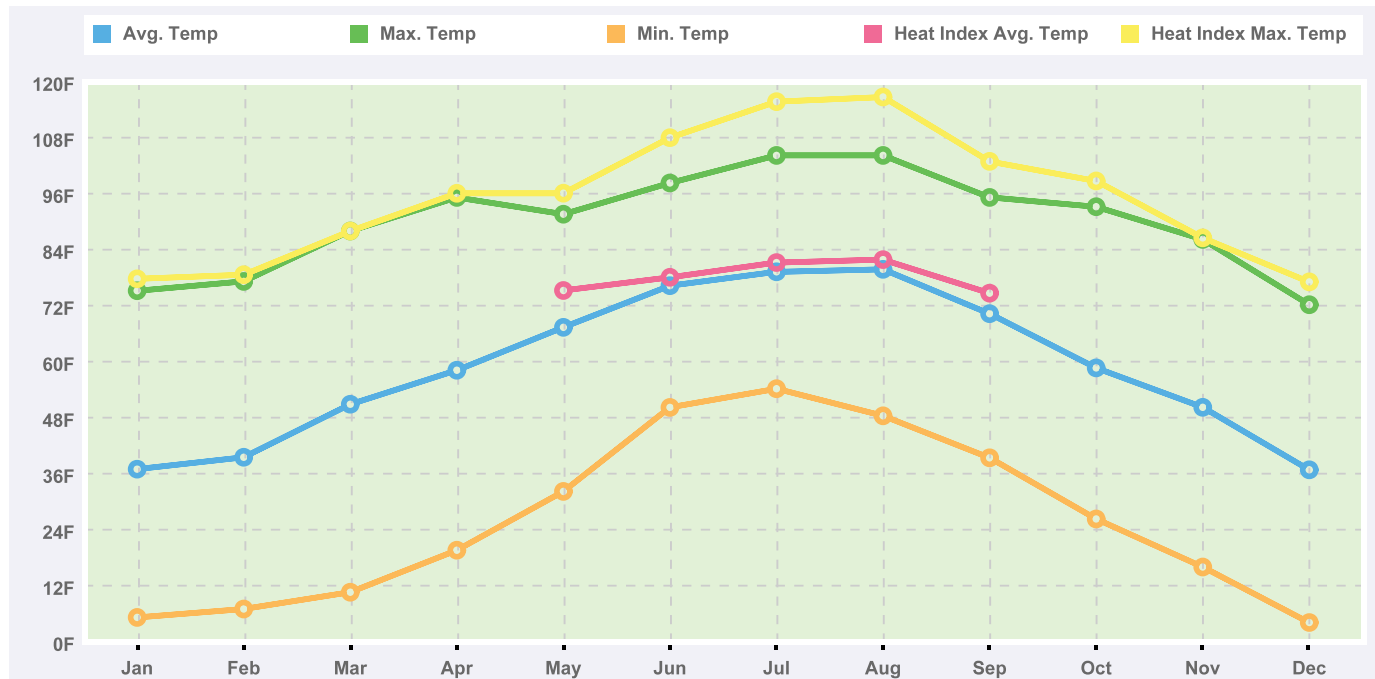
countyJASPER



cityJOPLIN

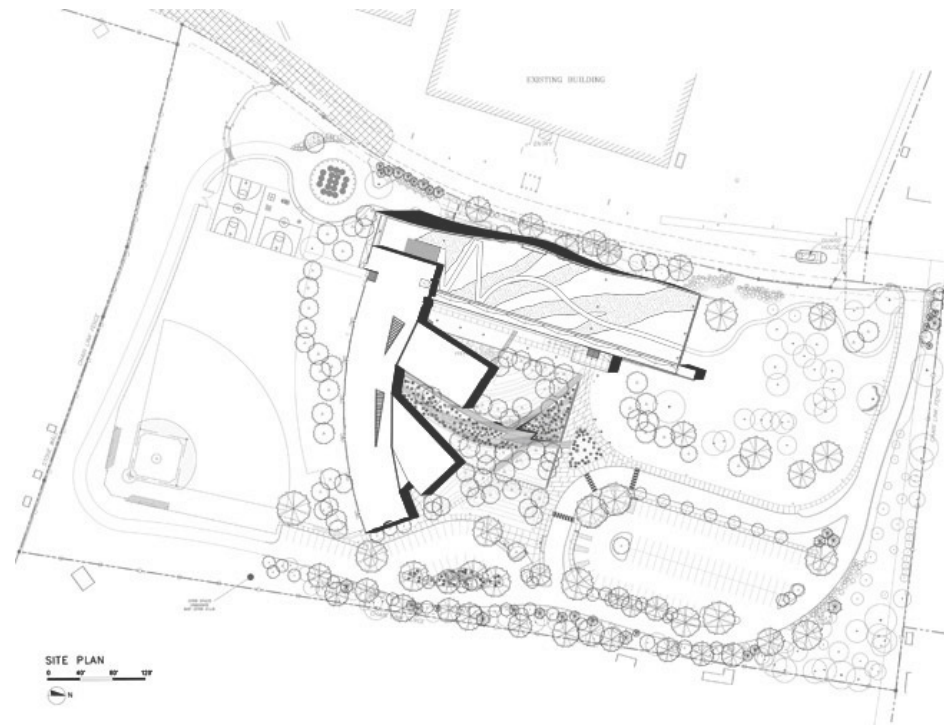
| site/context

Joplin is located in southwest Missouri in the "four states" region encompassing Oklahoma, Kansas, Missouri and Arkansas. At the edge of the Ozark Mountain region, Joplin has a current population of 49,024. The daytime population swells to 270,000 while the population within a 40-mile radius of Joplin is 400,000, making it Missouri's fourth largest metropolitan area. Joplin combines the beauty and hospitality of country living with the convenience and commerce of city vitality.



| climate data

Joplin has a humid subtropical climate, with mild to cold winters and hot, humid summers. Joplin is situated in "Tornado Alley", a broad region where cold air from Canada collides with warm, moist air from the Gulf of Mexico and dry air from the lee of the Rocky Mountains, leading to the formation of powerful supercell thunderstorms from which the tornadoes spawn.



*rogers international environmental magnet school
tai soo kim partners architects
stamford, connecticut
completed 2009*

Rogers International School (RIS) was originally the International School at Rogers Magnet, an authorized International Baccalaureate (IB) World School, and the IB program's philosophy is still at the center of the school curriculum. The environment is used as an integrating context for learning across all subject areas and students engage in inquiry-based units focusing on building global awareness and the application of scientific skills in all subject areas. IB learners are encouraged to ask challenging questions, to discover new ways of learning, and to develop a sense of identity as global citizens in the 21st century. As a Stamford Public School, Rogers International offers a rigorous curriculum based on the National Standards.

The mission of the International Baccalaureate (IB) is "...to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect."

The lower school is an authorized IB World School. The IB Primary Years Program is designed to foster the development of the whole child, encompassing social, physical, emotional, cultural and educational needs of students in an academic setting.

The upper school began the authorization process for the IB Middle Years Program in 2009. The IB Middle Years Program helps students develop the knowledge, understanding, attitudes and skills to actively and responsibly participate in an ever-changing world.

In the Fall of 2009, RIS moved into a new 105,000 square foot building with a Silver LEED (Leadership in Energy and Environmental Design) rating in the Cove area of Stamford. The state-funded facility includes a green roof, ice storage for the HVAC system, a rain garden, a wind turbine for power development, and water saving technologies.



machias elementary school
nac architects
snohomish. washington
under construction

The Machias Elementary School sits on a rural site in the Pilchuck River valley, north of Seattle, Washington. The goal was to replace the existing elementary school with a new school that connects with the community's agricultural roots through an exploration and expression of their rural identity.

The rural identity explored in the design found expression through the following values:

A connection to the land: The school is orientated with all classroom neighborhoods facing the woods to the north. The open playfield in front of the school follows the historic rural development patterns in which the farmhouse is located behind the fields.

Frugality, the use of materials at hand: Curved beams salvaged from the original school are reused as arching columns, generating a curvilinear form reminiscent of your grandfather's barn. This curving and arching form links the historical past to the present, while also connecting the wings of the school. The library, the interdisciplinary learning lab, and resource classroom all reside within the free-flowing core.

Self sufficiency and independence: A super-insulated building envelope with triple glazed windows and spray foam wall insulation, ground loop heat exchangers, and a 100Kw photovoltaic array estimated to generate enough electricity for approximately 18% of the building's energy needs are constitute a significant start towards energy independence. No fossil fuels are consumed in the operation of a building estimated to use require only 17 Kbtu/sq ft/year.





buffalo academy for visual + performing arts
cannon design
buffalo. new york
completed 2008

A dynamically transformed auditorium is the centerpiece of the new Buffalo Academy for Visual and Performing Arts building, an early-1960s facility renovated and augmented to reflect the values expressed daily by the Academy's students and faculty. Featuring a new fly loft, newly raked seats, excellent sightlines, "tunable" acoustic walls, a portable sprung floor for dance, and a state-of-the-art projection system, the 720-seat auditorium facilitates the learning of performance arts and stagecraft at the highest level. A new blackbox theater adjacent to the auditorium accommodates avant-garde theatrical explorations.

A 40,000 sf addition clusters the school's major performance and display venues around a reimaged arrival point that serves as the feature event entrance for the facility and, by virtue of its positioning along a major east-west artery, enhances the building's public presence. Four new dance studios were created from former technology shops; a fitness room became a double-height dance studio for the practice of lifts. Construction of a two-story link and entrance on one side of a former service court enclosed the space and enabled its transformation into a landscaped outdoor classroom and performance venue featuring an open-air café.

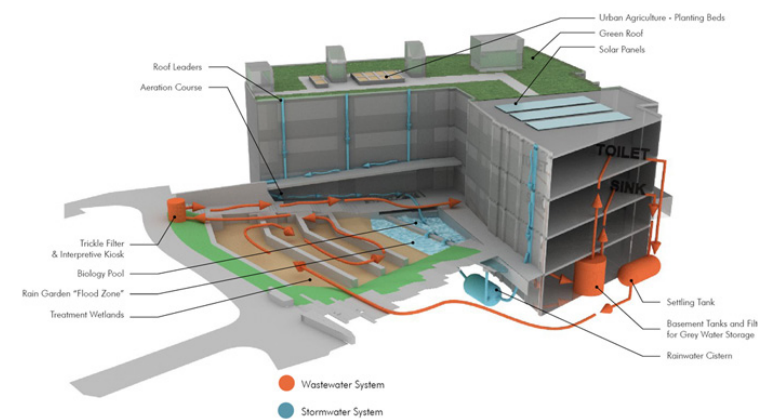
sidwell friends school
 kieran timberlake
 washington, d.c.
 completed 2006

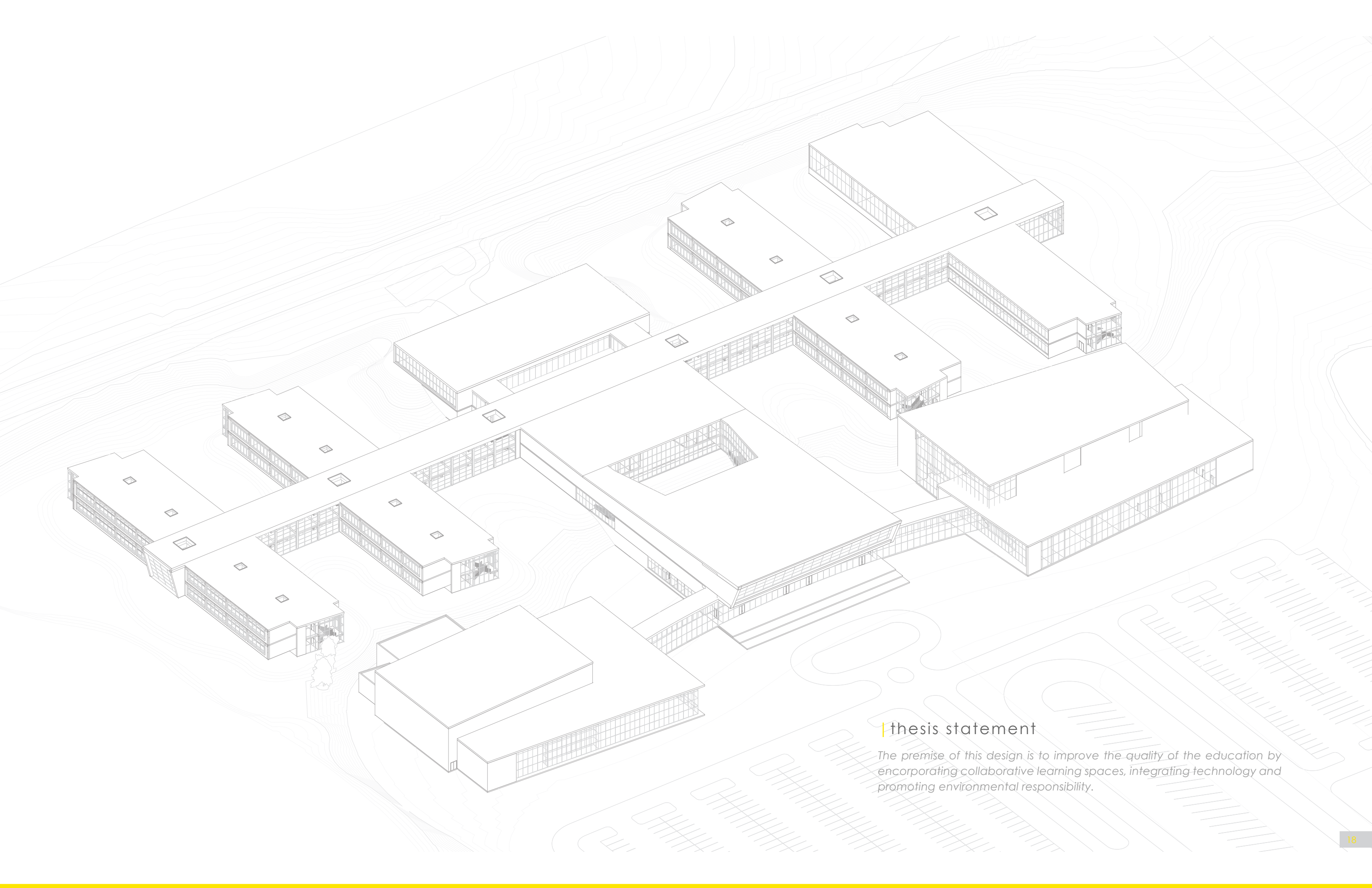
Designed to foster an ethic of social and environmental responsibility in each student, the facility demonstrates a responsible relationship between the natural and the built environment.

Bicycle storage and showers are available, and the building is located within walking distance of a subway stop and several bus stops. Parking is available in an underground lot. A green roof and constructed wetland reduce stormwater runoff, improve the quality of infiltrated runoff, and reduce municipal water use. The wetland treats wastewater for reuse in the toilets and cooling towers.

The building was sited to take advantage of passive solar design. Together with high-efficiency electric lighting, photosensors, and occupancy sensors, daylighting minimizes lighting energy use. Solar-ventilation chimneys, operable windows, and ceiling fans minimize the need for mechanical cooling. Rather than develop a utility plant for this building alone, a central plant was created to serve the entire campus. A photovoltaic array generates about 5% of the building's electricity needs.

Reclaimed materials include exterior cladding, flooring and decking, and the stone used for landscaping. Interior finishes were selected for their high levels of recycled content, low chemical emissions, and use of rapidly renewable materials.





| thesis statement

The premise of this design is to improve the quality of the education by incorporating collaborative learning spaces, integrating technology and promoting environmental responsibility.



original property

flood plain

new site [including acquired property]

| site

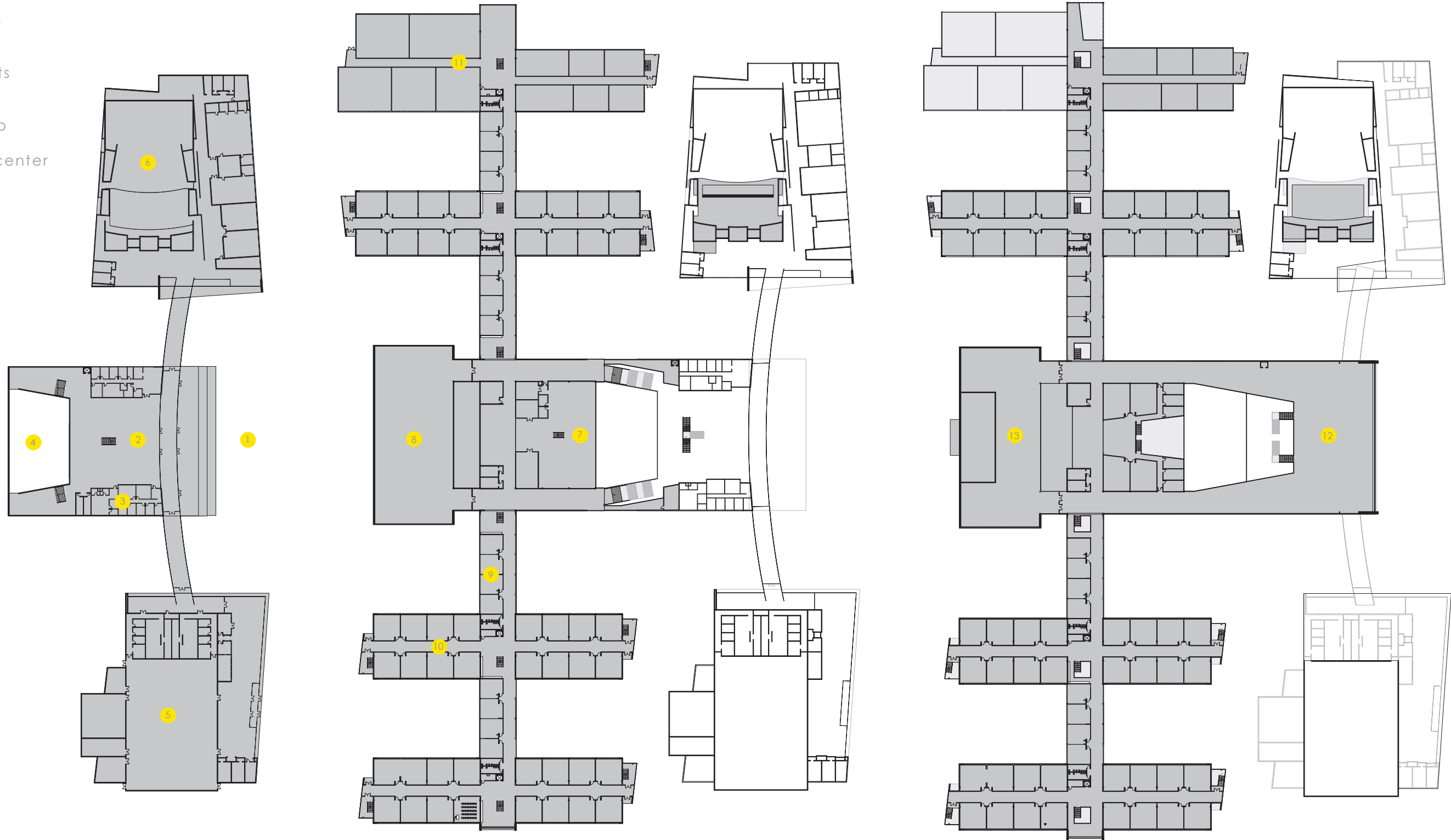
A major challenge surrounding the rebuilding effort of the school was acquiring additional land. Joplin High School is currently located in a flood plain and must be relocated to a portion of the property out of the flood plain. Doing so will make Joplin Schools eligible for millions of dollars in potential federal aid for the construction of a new school.

| project brief

LOCATION | JOPLIN, MISSOURI, USA
PROGRAM | PUBLIC HIGH SCHOOL
GRADE LEVELS | 9-12
ENROLLMENT | 2,500 STUDENTS
SITE AREA | 2,767,198 S.F.
BUILDING AREA | 450,000 S.F.



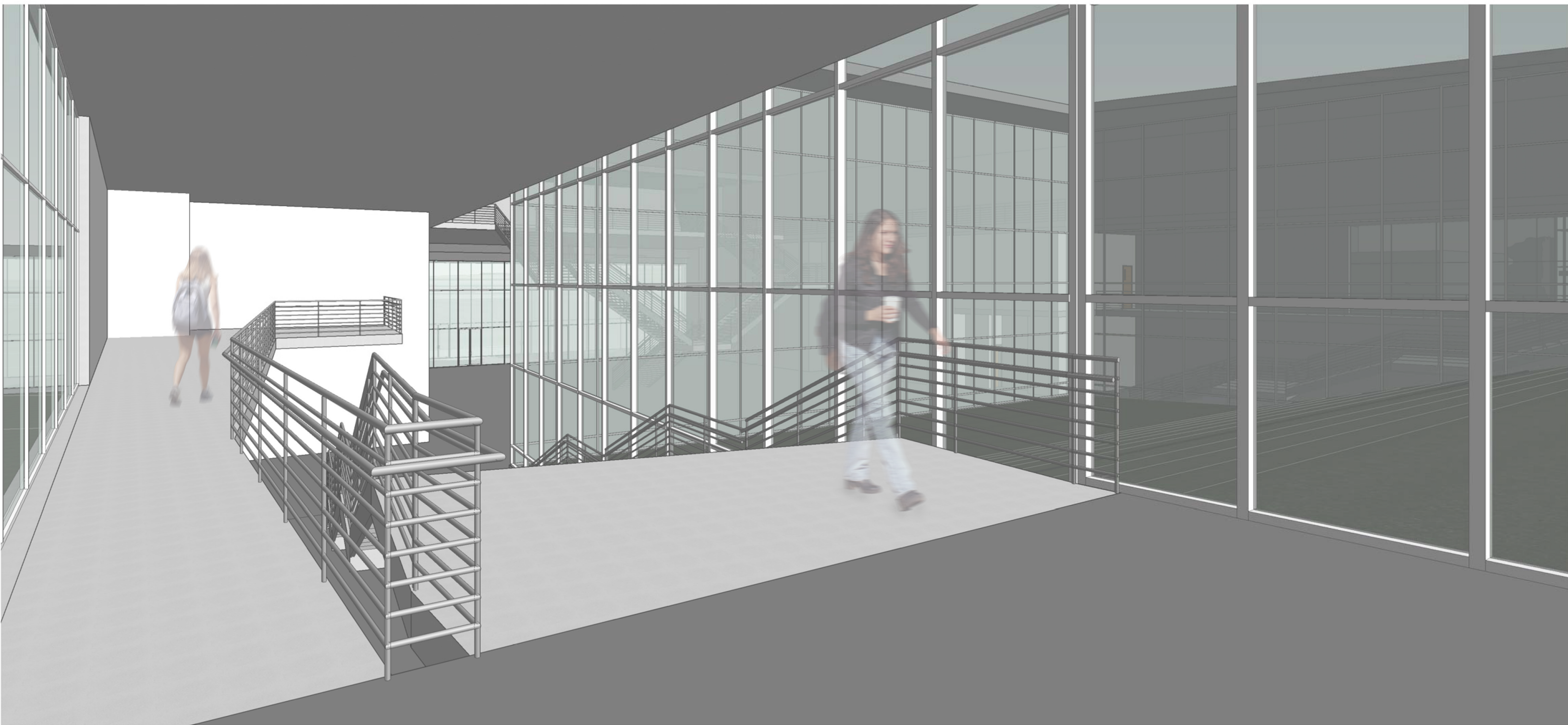
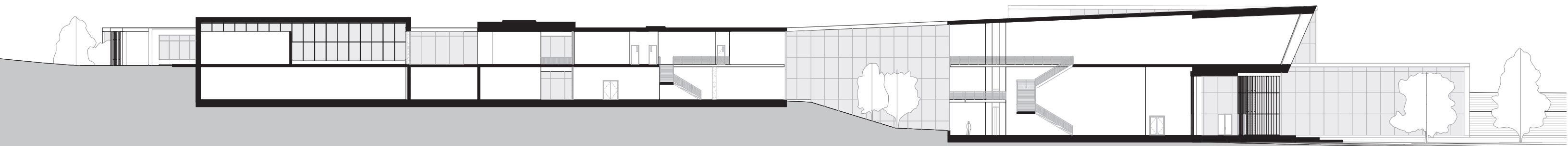
- 1 main entry
- 2 lobby/atrium
- 3 administration
- 4 courtyard
- 5 gymnasium
- 6 performing arts
- 7 media center
- 8 support
- 9 learning studio
- 10 classroom
- 11 technology center
- 12 commons
- 13 cafeteria



| first level

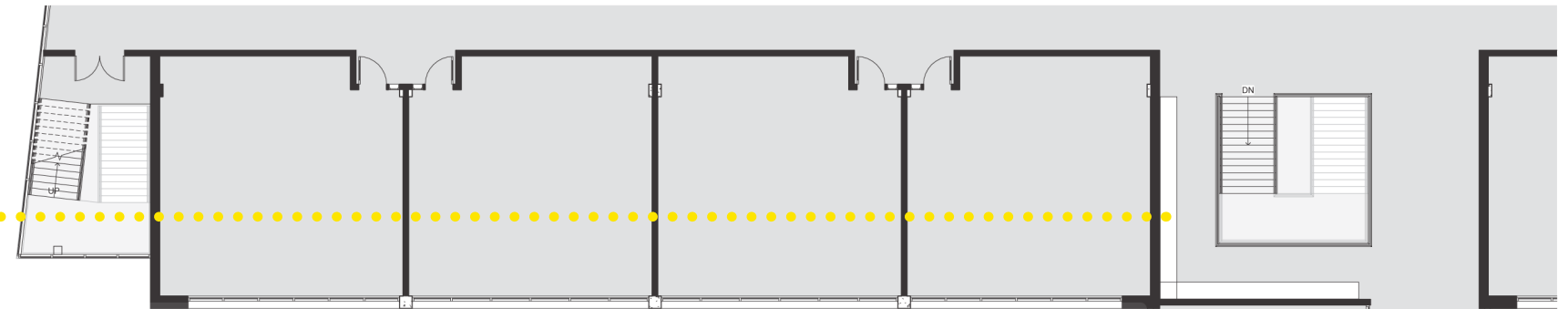
| second level

| third level



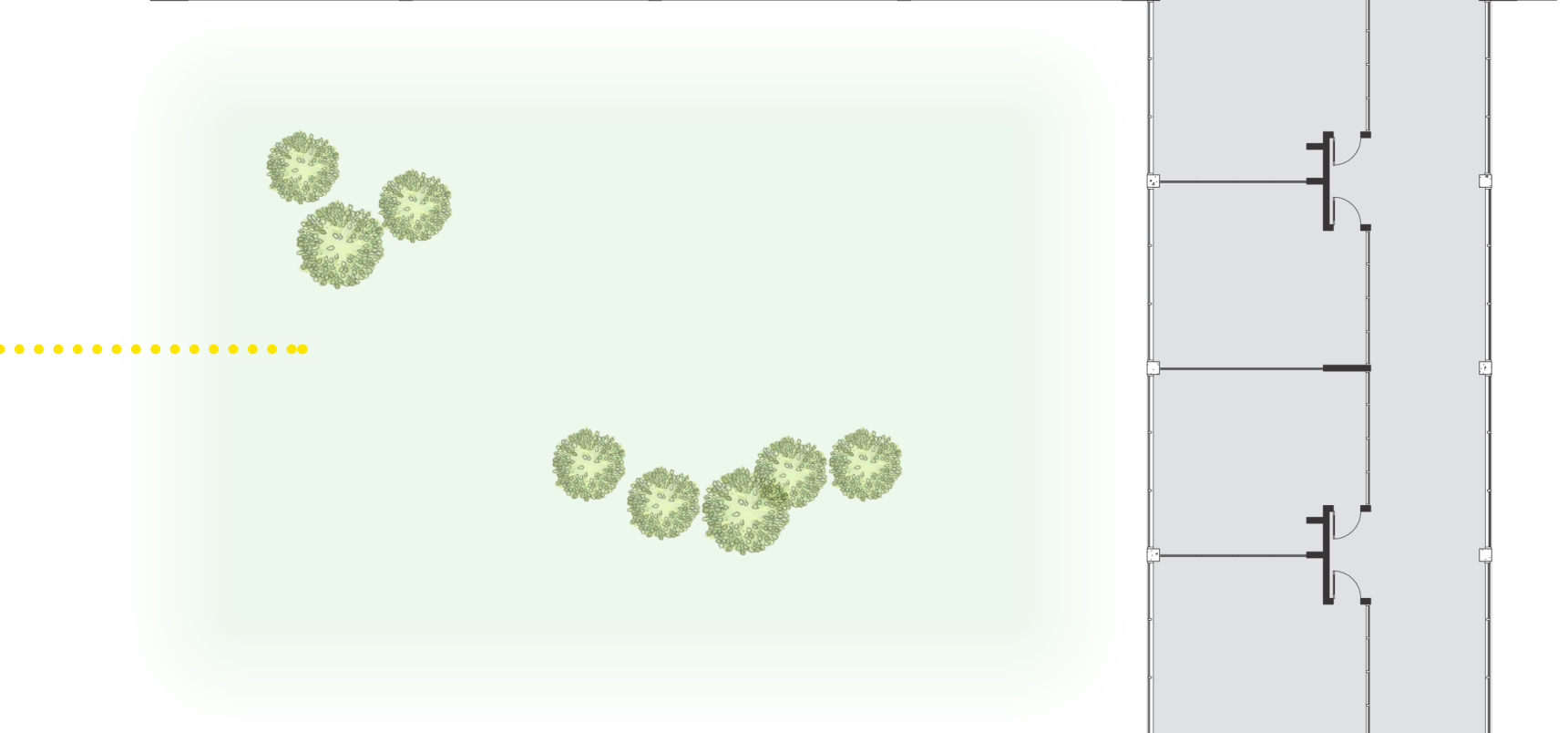
integrating technology

the recharging wall provides a space for students to plug in their laptops and work



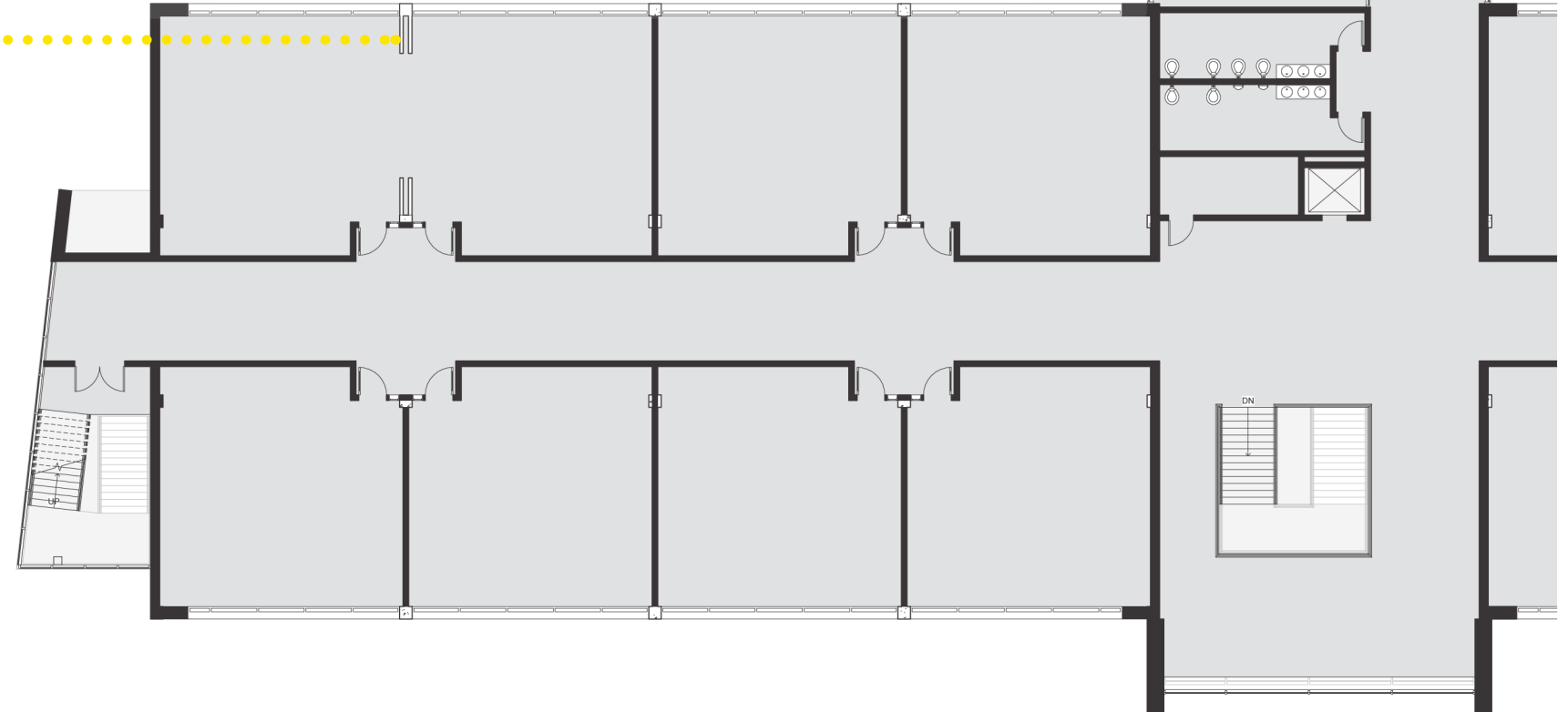
environmental responsibility

the outdoor classroom allows for learning to continue beyond the traditional classroom



collaborative learning spaces

moveable wall panels in between classrooms allow for more flexible, transformable learning spaces





| recharging wall



| learning studios

| project summary

LOCATION | JOPLIN, MISSOURI, USA

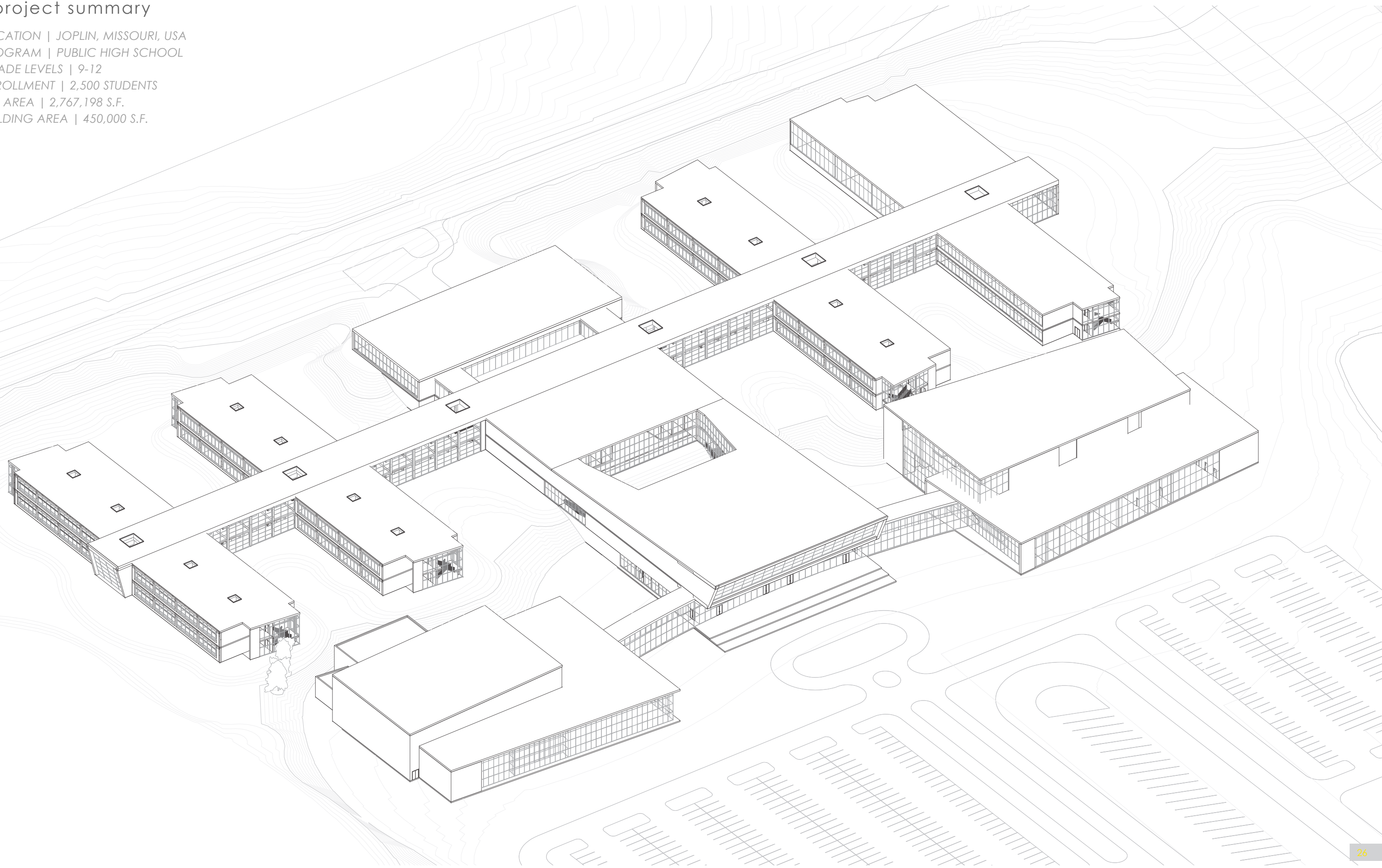
PROGRAM | PUBLIC HIGH SCHOOL

GRADE LEVELS | 9-12

ENROLLMENT | 2,500 STUDENTS

SITE AREA | 2,767,198 S.F.

BUILDING AREA | 450,000 S.F.



annotated bibliography

Simpson, Leslie. Joplin. Charleston, South Carolina: Arcadia Publishing, September 2011. Print.

This resource provides a vast history of the city of Joplin, Missouri. Starting with information from the incorporation of the city in 1873, author Leslie Simpson documents various significant events and develops a timeline of the past. This resource will inform my work by providing a crucial understanding of site data.

“NWS Central Region Service Assessment Joplin, Missouri Tornado – May 22, 2011.” National Weather Service, Central Regional Headquarters. July 2011. Web. 16 September 2011. http://www.weather.gov/os/assessments/pdfs/Joplin_tornado.pdf.

This resource provides information on the destructive EF-5 tornado that struck Joplin, Missouri on May 22, 2011. The National Weather Service produced a service assessment of this storm due to the rare nature of the natural disaster. The release provides information to help lower the number of fatalities in the event a storm of this magnitude hits again. This resource informs me on the facts of the tornado as well as provides knowledge of the issue enabling me to better design my facility.

Perkins, Bradford and Bordwell, Raymond. Building Type Basics For: Elementary and Secondary Schools, Second Edition. New York: John Wiley & Sons Inc., April 2010. Print.

This resource provides the essential information for the design of elementary and secondary schools. The author communicates firsthand knowledge in order to familiarize me with the entire process of designing a school. This book will enable me with the structural, mechanical, acoustical information that is unique to school design.

“Whole Building Design Guide.” FEMA 424 Design Guide for School Safety Against Earthquakes, Floods, and High Winds. January 2004. Web. 16 September 2011. <http://www.wbdg.org/ccb/DHS/fema424.pdf>.

This resource provides an extensive guide for improving school safety in earthquakes, floods, and high winds. The design guide outlines a risk management for protecting schools and their occupants against natural hazards. This source informs me on certain building codes that are used to help provide protection from high winds and tornadoes. It also discusses the importance of proper site selection and layout in which I will use in order to help mitigate the threat of flood damage for my project.

Lippman, Peter C. Evidence-Based Design of Elementary and Secondary Schools: A Responsive Approach to Creating Learning Environments. New York: John Wiley & Sons Inc., September 2010. Print.

This resource provides an in-depth, evidence-based design approach to the design of elementary and secondary schools. The author examines the current research and learning theories that exist in education today and how that applies to school design. This book will help inform my project by providing me with unique strategies for responsive evidence-based design.

online resources

<http://www.joplinmogis.com/PDF/zonecode.pdf>

<ftp://ftp.wcc.nrcs.usda.gov/>

<http://jhs.joplinschools.org/>

<http://stamfordpublicschools.org/content/64/76/3886/3913/default.aspx>

http://www.worldarchitecturenews.com/index.php?fuseaction=wanappln.projectview&upload_id=13543

http://www.cannondesign.com/##%2Fexpertise%2Fproject_catalog%2F333%23gallery

http://www.sidwell.edu/middle_school/ms-green-building/index.aspx

<http://www.aiatopten.org/hpb/overview.cfm?ProjectID=775>

<http://joplinmo.org/>

<http://www.areavibes.com/joplin-mo/weather/>

<http://www.wbdg.org/>

<http://www.iccsafe.org/Pages/default.aspx>

<http://www.reedconstructiondata.com/building-codes/missouri/joplin/>

