AIA Leadership Summit

February 24–26, 2025
Washington, DC

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Colorado's December 2021 Marshall Fire

- Most destructive fire in Colorado history, destroying nearly 1,000 homes.
- Spread due to drought conditions and 115 mph winds.
- Occurred in Boulder County, part of the Denver metro area, and outside areas considered a risk for wildfires.
- Heavy snowfall ~36 hours after the fire started limited the damage.

Recent Resiliency Policy efforts in Colorado

HB19-1292

Colorado Resiliency Office Reauthorization Funding

Concerning the reauthorization of the Colorado resiliency office, and, in connection therewith, making an appropriation.

SESSION: 2019 Regular Session

SUBJECT: State Government

BILL SUMMARY

Emergency management - resiliency office - continuation - appropriation. The act continues the Colorado resiliency office, which administers the resiliency and community recovery program as part of the state's disaster recovery and response functions. The requirement that the office be funded solely through grant funding is repealed, making general funds available to pay for the work of the office. The office is repealed effective September 1, 2022, and is scheduled for a sunset review prior to its repeal.

The act appropriates $249,454 to the department of local affairs from the implementation of the act.

(Note: This summary applies to this bill as enacted.)

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https://coresiliency.colorado.gov/

SECTION 1. Legislative declaration. (1) The general assembly hereby finds and declares that:

(a) In response to floods affecting the state in 2013, the governor's office created the Colorado resiliency and recovery office by executive order to coordinate long-term recovery efforts, connect communities with state and federal resources, and support communities to reduce the impacts of future disasters. The office was later transferred to the department of local affairs.

Recent Resiliency Policy efforts in Colorado

SB23-166

Establishment Of A Wildfire Resiliency Code Board

Concerning the establishment of a wildfire resiliency code board, and, in connection therewith, requiring the wildfire resiliency code board to adopt model codes, requiring governing bodies with jurisdiction in an area within the wildland-urban interface to adopt codes that meet or exceed the standards set forth in the model codes, and making an appropriation.

SESSION: 2023 Regular Session

SUBJECT: State Government

BILL SUMMARY

The act establishes a wildfire resiliency code board (board) in the division of fire prevention and control (division) within the department of public safety (department) for the purposes of ensuring community safety from and more resiliency to wildfires by reducing the risk of wildfires to people and property through the adoption of statewide codes and standards. The board consists of 21 appointed voting members with specific government or industry qualifications and 3 non-voting members. The board is required to promulgate rules concerning the adoption of codes and standards for the hardening of structures and reducing fire risk in the defensible space surrounding structures in the wildland-urban interface in Colorado, including rules that:

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24-33.5-1236. Wildfire resiliency code board - powers and duties - rules - cash fund - legislative declaration - definitions. (1) **Legislative declaration.** (a) THE GENERAL ASSEMBLY HEREBY FINDS AND DECLARES THAT:

(I) COLORADO'S WILDFIRE RISK HAS CONTINUED TO INCREASE OVER THE YEARS AND MORE COMMUNITIES ARE AT RISK OF WILDFIRES;

(II) COLORADO WILDFIRES HAVE GROWN IN INTENSITY, FREQUENCY, AND DEVASTATION SINCE THE YEAR 2000;

(III) A COMBINED APPROACH OF STRUCTURE HARDENING AND REDUCING FIRE RISK IN THE DEFENSIBLE SPACE SURROUNDING STRUCTURES IS NECESSARY TO REDUCE THE RISK OF DAMAGE TO COLORADO COMMUNITIES FROM THE EFFECTS OF WILDFIRES. THIS RISK INCLUDES THE LOSS OF LIFE, HOMES, BUSINESSES, AND OTHER STRUCTURES AND THE LOSS OF JOBS AND ECONOMIC VITALITY. RISK EVALUATION IS BASED ON MANY FACTORS, INCLUDING PROXIMITY TO STRUCTURES. HARDENING STRUCTURES IS THE PROCESS OF MAKING STRUCTURES MORE RESILIENT TO IGNITION AND INVOLVES BEST PRACTICES TO PROTECT A STRUCTURE FROM THE RISK OF WILDFIRE AND TO PREVENT A STRUCTURE FIRE FROM STARTING A WILDFIRE.

Recent Resiliency Policy efforts in Colorado

HB24-1091

Fire-Hardened Building Materials in Real Property

Concerning prohibiting restrictions on the use of fire-hardened building materials in residential real property.

SESSION: 2024 Regular Session

SUBJECT: Housing

BILL SUMMARY

The act generally prohibits covenants and other restrictions that disallow the installation, use, or maintenance of fire-hardened building materials in residential real property, including in common interest communities. However, the act allows a unit owners' association of a common interest community to develop reasonable standards regarding the design, dimensions, placement, or external appearance of fire-hardened building materials used for fencing within the community.

APPROVED by Governor March 12, 2024

EFFECTIVE March 12, 2024

(*Note: This summary applies to this bill as enacted.*)

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38-30-168. Unreasonable restrictions on renewable energy generation devices or fire-hardened building materials - definitions. (5) (a) A COVENANT, RESTRICTION, OR CONDITION CONTAINED IN ANY DEED, CONTRACT, SECURITY INSTRUMENT, OR OTHER INSTRUMENT AFFECTING THE TRANSFER OR SALE OF, OR ANY INTEREST IN, REAL PROPERTY THAT EXPLICITLY OR EFFECTIVELY PROHIBITS OR RESTRICTS THE INSTALLATION, USE, OR MAINTENANCE OF FIRE-HARDENED BUILDING MATERIALS IS VOID AND UNENFORCEABLE. THIS SUBSECTION (5) DOES NOT APPLY TO BONA FIDE SAFETY REQUIREMENTS REQUIRED BY AN APPLICABLE BUILDING CODE FOR THE PROTECTION OF PERSONS AND PROPERTY.

Recent Resiliency Policy efforts in Colorado

HB24-1267

Metropolitan District Covenant Enforcement Policy

Concerning requiring a metropolitan district engaging in covenant enforcement activities to comply with certain policies related to covenant enforcement.

SESSION: 2024 Regular Session

SUBJECTS: Housing, Local Government

BILL SUMMARY

A metropolitan district is a type of special district that provides at least 2 types of services and may perform covenant enforcement similar to the role of a homeowners' association. The act requires a metropolitan district engaging in covenant enforcement and design review services to comply with certain procedural requirements, including:

- Adopting a written policy governing the imposition and collection of fines;
- Adopting a written policy governing how disputes between the metropolitan district and a resident are addressed; and
- Refraining from prohibiting residents from engaging in certain activities regarding the use of their property, including displaying flags and signs; parking a motor vehicle in a driveway; removing certain vegetation to create a defensible space for fire mitigation purposes; performing reasonable property modifications to accommodate disabilities; using xeriscape, nonvegetative turf grass, or drought-tolerant landscaping; using a rain barrel; operating a family child care home; using renewable energy generation devices; and installing or using an energy efficiency measure. Additionally, a metropolitan district is prohibited from requiring residents to use cedar shakes or other flammable roofing materials.

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(7) (a) NOTWITHSTANDING ANY PROVISION IN AN INSTRUMENT TO THE CONTRARY, A METROPOLITAN DISTRICT SHALL NOT:

(I) EFFECTIVELY PROHIBIT RENEWABLE ENERGY GENERATION DEVICES, AS DEFINED IN SECTION 38-30-168;

(II) REQUIRE THE USE OF CEDAR SHAKES OR OTHER FLAMMABLE ROOFING MATERIALS ON A UNIT; OR

(III) EFFECTIVELY PROHIBIT THE INSTALLATION OR USE OF AN ENERGY EFFICIENCY MEASURE ON A UNIT.

(b) SUBSECTION (7)(a)(III) OF THIS SECTION DOES NOT APPLY TO:

(I) REASONABLE AESTHETIC PROVISIONS THAT GOVERN THE DIMENSIONS, PLACEMENT, OR EXTERNAL APPEARANCE OF AN ENERGY EFFICIENCY MEASURE. IN CREATING REASONABLE AESTHETIC PROVISIONS, A METROPOLITAN DISTRICT SHALL CONSIDER:

(A) THE IMPACT OF THE PURCHASE PRICE AND OPERATING COSTS OF THE ENERGY EFFICIENCY MEASURE;

(B) THE IMPACT ON THE PERFORMANCE OF THE ENERGY EFFICIENCY MEASURE; AND

(C) THE CRITERIA CONTAINED IN ANY INSTRUMENT.

(II) BONA FIDE SAFETY REQUIREMENTS, CONSISTENT WITH AN APPLICABLE BUILDING CODE OR RECOGNIZED SAFETY STANDARD, FOR THE PROTECTION OF PERSONS OR PROPERTY.

Resilience Design Toolkit

Resilience Design Integration
For Architectural Projects

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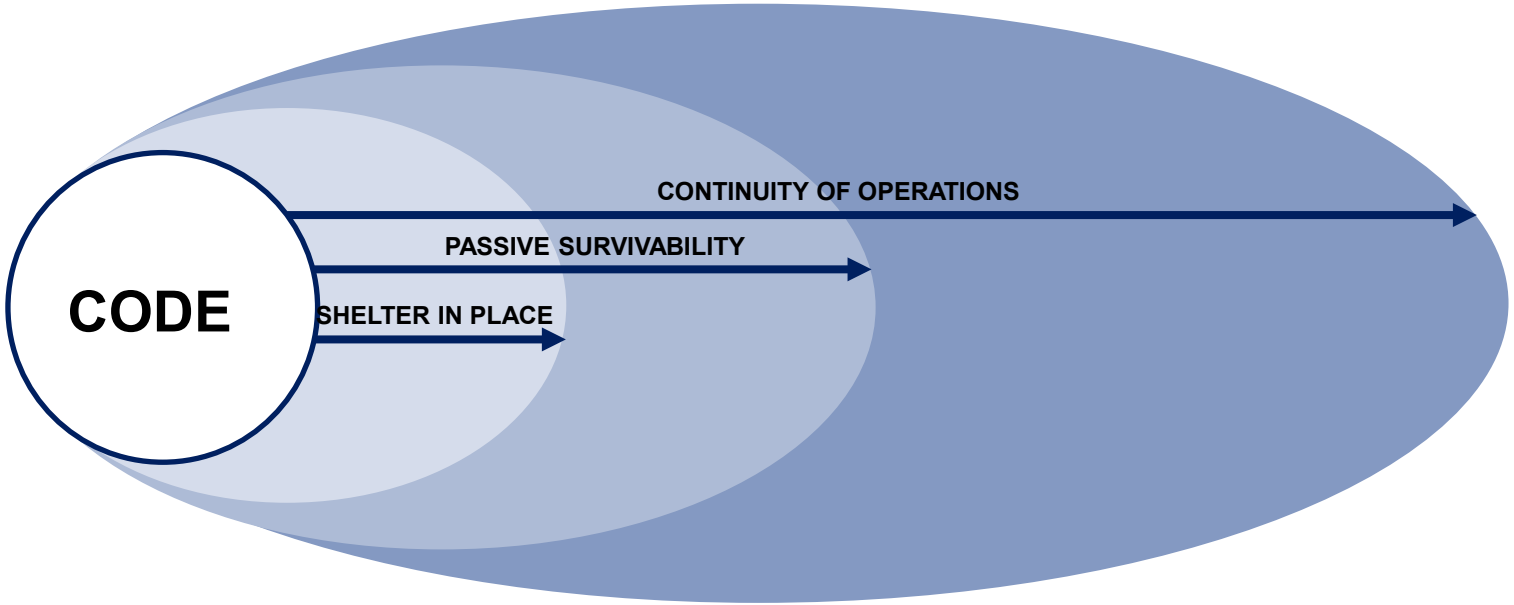
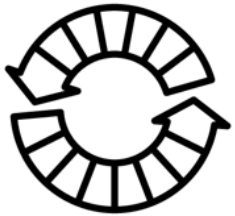
Designing Beyond Code





Sustainable design follows an additive model

The gains from each sustainable design choice are not explicitly dependent on all other choices.

Resilient design follows a weak-link model

All systems work together to maintain the building's essential functions across all aspects.

5-Forms of Resilience

Health Resilience
refers to the physical, mental, and social health of individuals of a place.

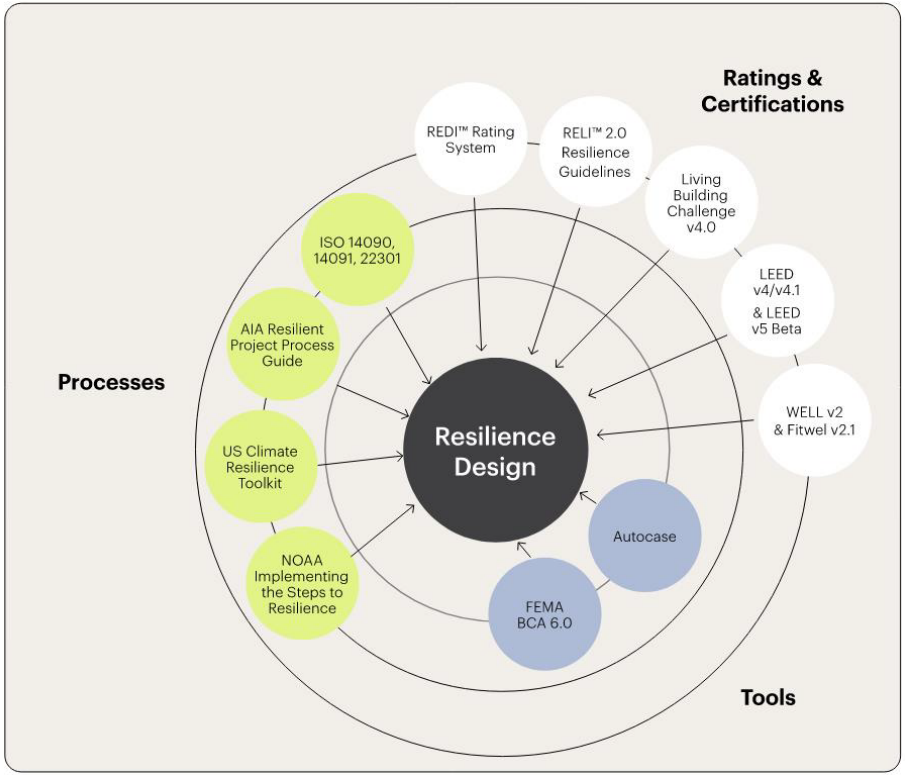
Social Resilience
health of a community to maintain cultural and historical traditions that can define a sense of a place.

Infrastructure Resilience
focuses on the physical infrastructure of a place.

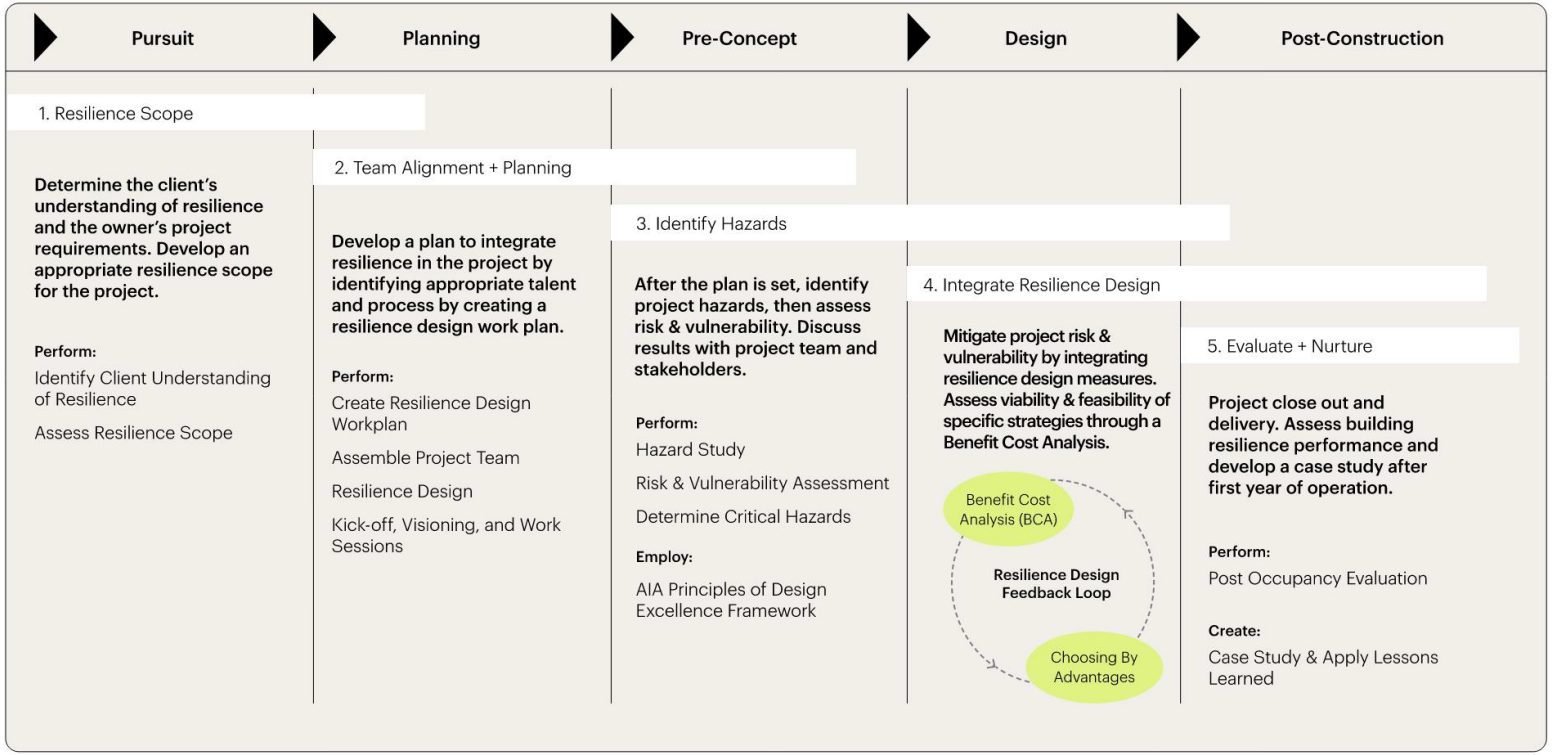
Environmental Resilience
includes climate and weather impacts on an ecosystem as well as all the native flora and fauna species of a place.

Economic Resilience
Ability to prepare, endure, and operate through adversity.

Resilience Design Landscape



Resilience Design Toolkit



Resilience Scope Assessment

Private Conversations

Embedded in an RFP/RFQ

Added to an Existing Project

Stakeholder Meeting

Client Characteristics

Unaware	Unaware of resilience as an issue Resilience may have not been mentioned in an RFP/RFQ or come up in conversation. Opportunity to lead with knowledge May not have an appetite for resilience
Exploring	Aware of resilience as a concern but may not know what it is totally about or how it is performed Needs guidance in understanding on how hazards might put their project at risk Could be an opportunity to lead with knowledge Need to understand client's position on resilience
Evaluating	Client has a position on resilience and understands base concepts Client has an idea on what they want in the project Project team needs to build confidence in the client that they can provide resilience design services
Embedded	Client is familiar with resilient design and knows what the final deliverable should be Project team should determine the capabilities of the team and ability to provide desired services for the client

What does this mean for my project?

Task 01 – Determine the Resilience Scope

Detect Resilience Scope from Client
- Private Conversations
- RFP/RFQ
- Added Scope
- Stakeholder Meetings

Define & Refine Resilience Scope

+

Task 02 – Assemble the Team

Determine
- Who to include?
- What is their task?
- How much fee needed?

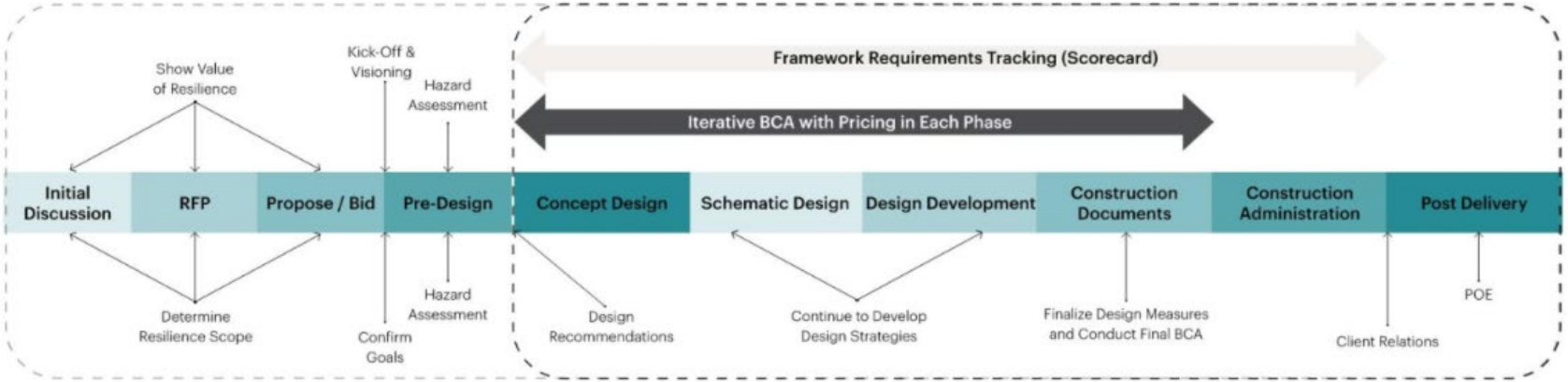
Deliverables

Work Plan

Job Cost

Manage Client Expectations

Aligning the Team



Aligning the Team

Avalanche

	A large mass of snow traveling down an inclined slope
Causes	Snowstorms, heavy snowfall, human activity, vibration, steep slopes, warm temperatures
Concerns	Recreational activity, property damage, burial
Damaging Components	Velocity, weight

Coastal Flooding

	Sea water flooding of coastal, low lying regions
Causes	Waves, tides, storm surge, heavy rainfall, sea level rise
Concerns	Reoccurring minor flooding, property / infrastructure damage, water contamination
Damaging Components	Depth of water, flood inundation duration, velocity of surge

Cold Wave

	A rapid fall in temperature within a 24-hour period affecting much larger areas than blizzards, ice storms, and other winter hazards
Causes	Winter temperatures, polar vortexes, shift in jet stream
Concerns	Pipes bursting, livestock harm, ice and frost, fuel and electric demands, dangerous roads, agriculture harm
Damaging Components	Rapid freezing, ice on roads, winter weather

Earthquake

	A sudden and violent shaking of the ground, due to tectonic movement
Causes	Volcanic Activity, Tectonic Movement, Geological Faults, Landslides, Explosions
Concerns	Structural Damage, Tsunami, Rockfalls, Liquefaction
Damaging Components	Landslides/Mudslides, Avalanches, Shaking Vertical/Horizontal Displacement, Compromised Adjacent Structures with Fall Risk

Hail

	Pellets of frozen rain
Causes	Strong updrafts, cold upper region of thunderstorm
Concerns	Vehicle/ roofing/ window/ gutter damage, agriculture, bodily harm
Damaging Components	Size of hail stone, frequency, amount in a given storm

Heat Wave

	A period of time where there are abnormally high temperatures compared to the average
Causes	Trapped air circulation, high pressure system, heated, stagnant air
Concerns	Lack of awareness, outdoor work related tasks/jobs, health issues
Damaging Components	High heat, extreme exertion on body, drought conditions

Ice Storms

	A storm of freezing rain that leaves a coating of ice
Causes	Freezing rain, near freezing temperatures
Concerns	Road conditions, weight on trees/roofs, utility damages
Damaging Components	Weight of ice, slick conditions for roads, freezing

Landslide

	The sliding down of a mass of earth or rock from a mountain or cliff
Causes	Disturbances on slopes, rapidly accumulated water, destruction of vegetation
Concerns	Disruption of Utilities, Road Blockage, Rapidly Moving Water and Debris
Damaging Components	Mass and Velocity of Debris, Rockfalls

Lightning

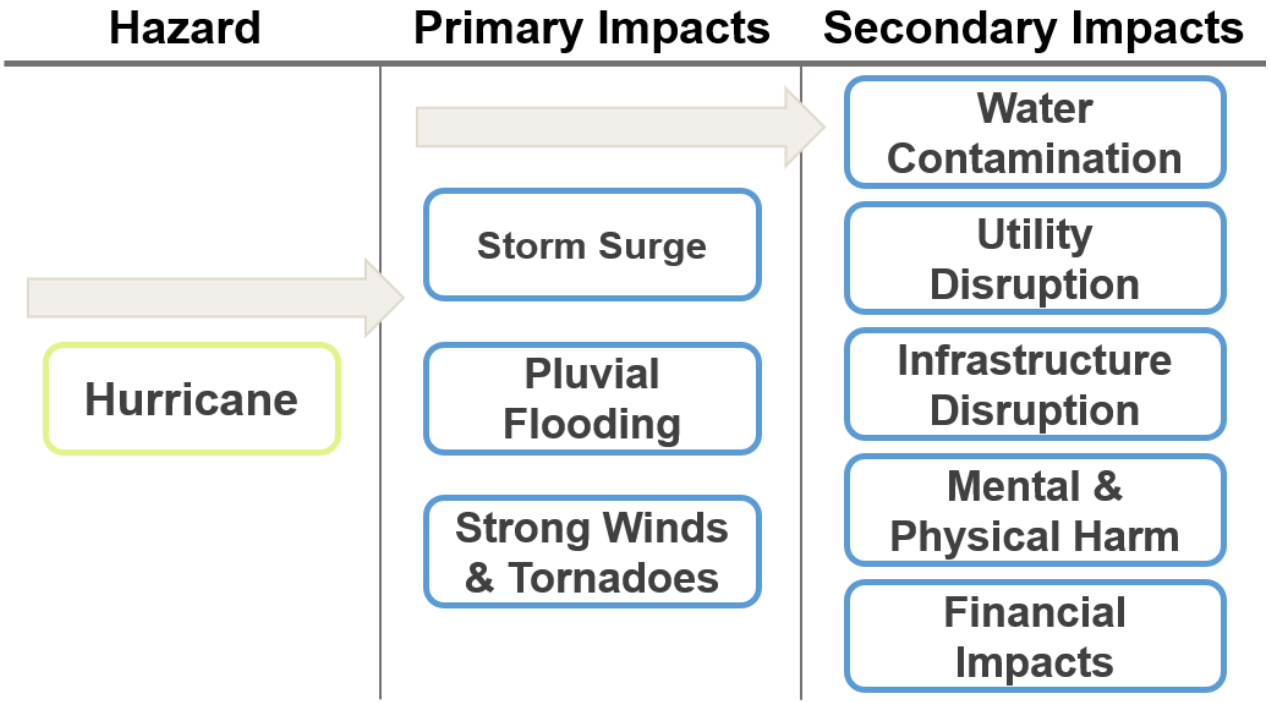
	An electrical discharge caused by imbalances between storm clouds and the ground
Causes	Electrical imbalances, thunderstorms
Concerns	Fires, utility interruption
Damaging Components	Fires, direct strikes to humans, electrical malfunction

+ 10 more Hazards in the FEMA National Risk Index

Earthquake

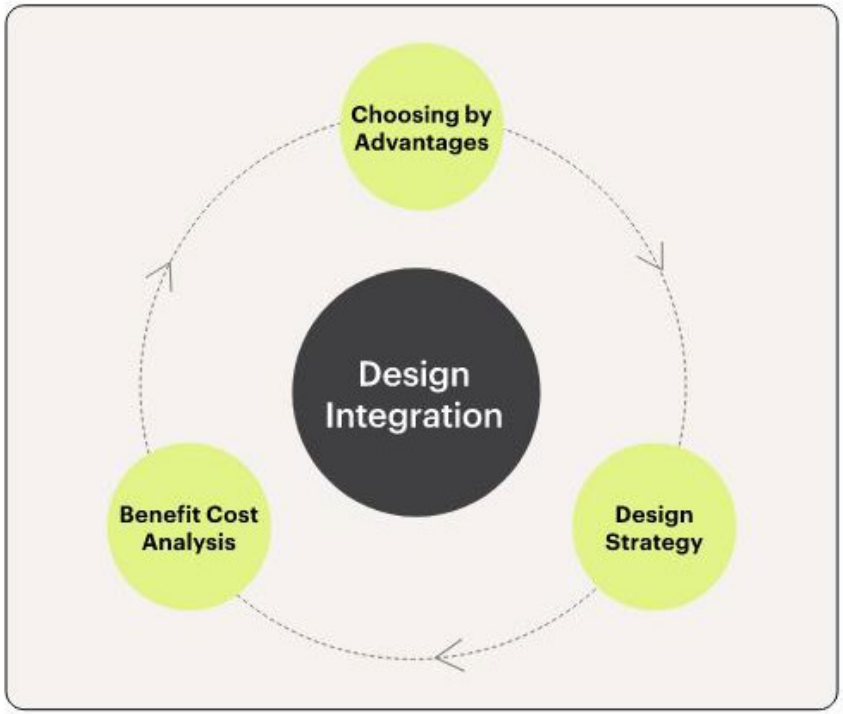
	A sudden and violent shaking of the ground, due to tectonic movement
Causes	Volcanic Activity, Tectonic Movement, Geological Faults, Landslides, Explosions
Concerns	Structural Damage, Tsunami, Rockfalls, Liquefaction
Damaging Components	Landslides/Mudslides, Avalanches, Shaking Vertical/Horizontal Displacement, Compromised Adjacent Structures with Fall Risk

Critical Hazards & Impacts

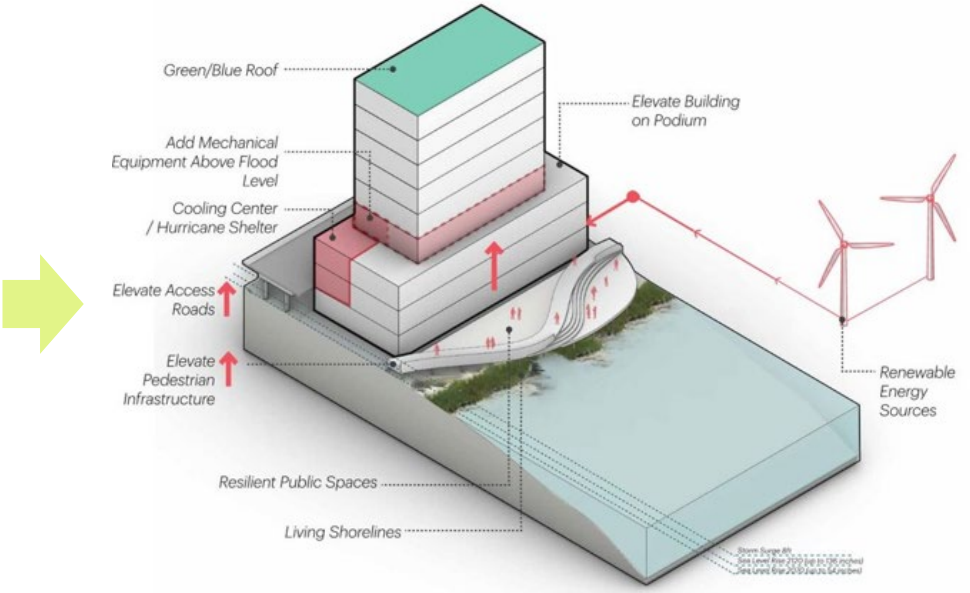


When Developing Solutions...

Resilience Design Feedback Loop



Resilience Design Feedback Loop



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Benefit Cost Analysis (BCA) Steps

Step 1
Data Collection and Project Information

Step 2
Determine value of building and its assets

Step 3
Characterize Hazard Impacts and determine Damages

Step 4
Identify mitigation alternatives and associated benefits

Step 5
Calculate Benefit Cost Ratio (BCR)

Benefit Cost Analysis (BCA)

Damages from Potential Hazards > **Cost for Resilience Strategies**

$$\frac{\text{Damages}}{\text{Cost of Resilience Strategies}}$$

Benefit Cost Ratio (BCR) >1.0 → **The Resilience Strategy Should be Considered**

Owner's Project Requirements (OPR)

Document that outlines the project's scope, goals, and requirements, including the desired end state.

Details the functional requirements of a project and the expectations of the building's use and operation as it relates to building systems.

Assessment Rubric

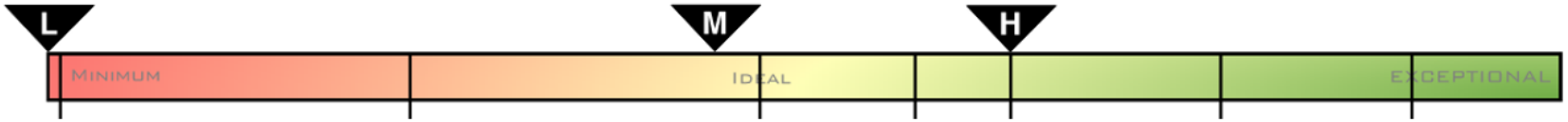
Criteria to assess the effectiveness of proposed design strategies to meet the project requirements and goals.

List of 5-10 criteria with weighted ranking.

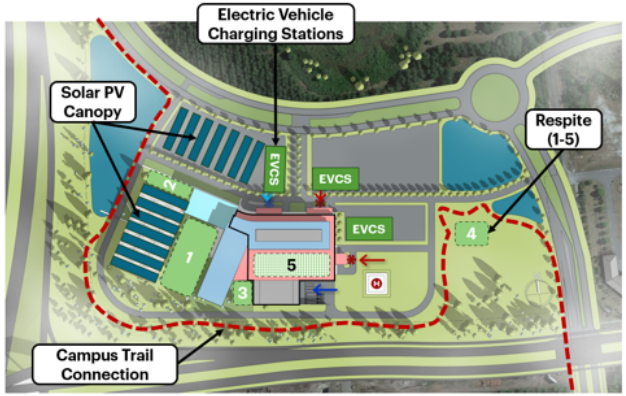
Pairs with cost information if available.

OPR to Design

1. Determine Appropriate Range of Performance for the Project



2. Develop Strategies to connect OPR to Design

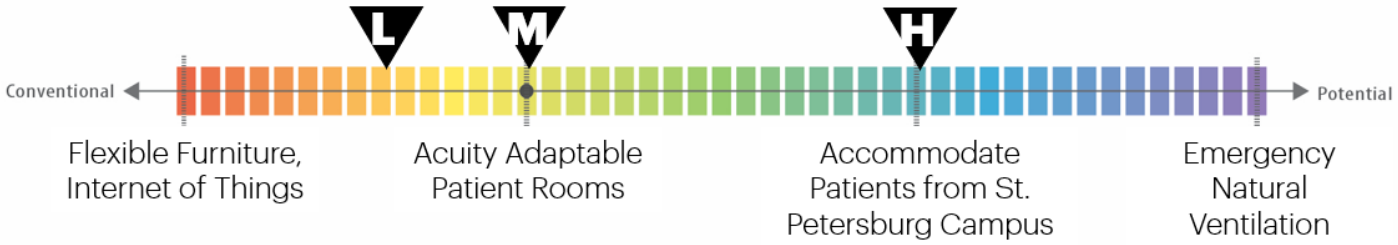


3. Assess Design Strategies for Effectiveness

	4	3	2	1
Weight	Excellent	Satisfactory	Adequate	Poor
20%	0-5 Years	6-10 Years	11-15 Years	16+ Years
20%	20% +	11-19%	0-10%	Negative Impact
20%	20% +	11-19%	0-10%	Negative Impact
15%				
5%				
20%	20% +	11-19%	0-10%	Negative Impact

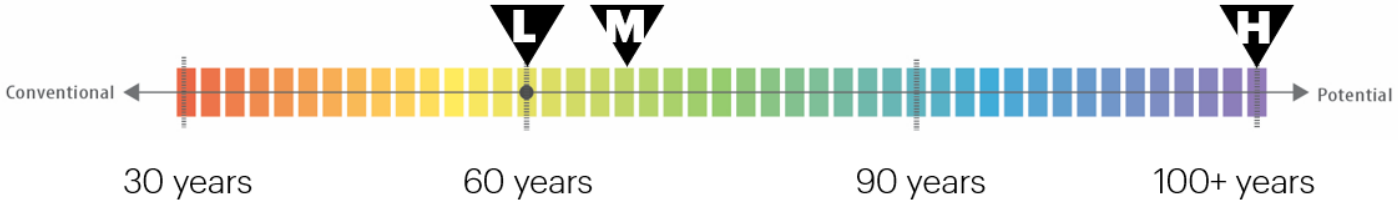
Flexibility

The facility will provide the flexibility for opportunities for future use. Consider modularity (walls, furniture), standardization, future expansion, etc.



Building Lifespan

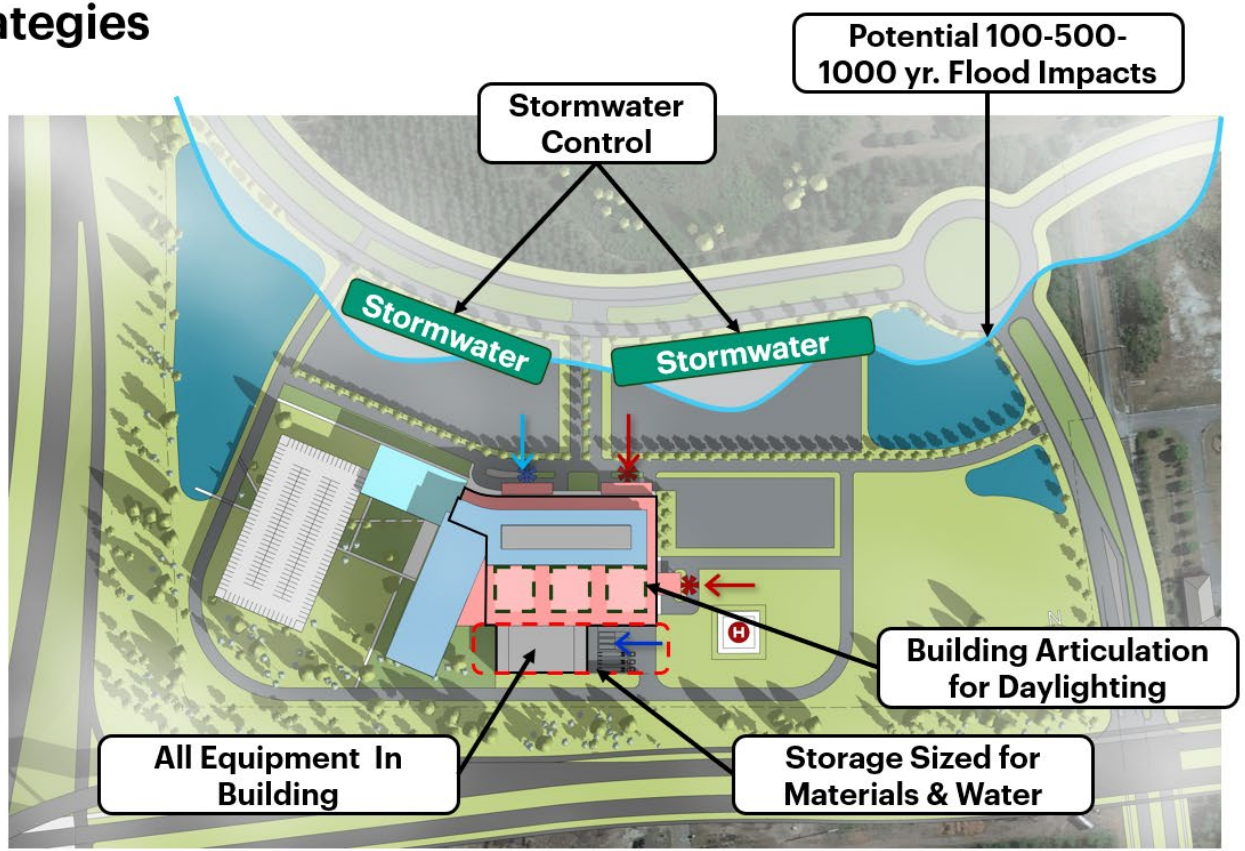
Expected lifespan of the building to operate and serve the community on this site.



Resilience Strategies

05 | Pocket Garden

- Place for emergency water, materials (food, medicine, toiletries, etc.)?
- Generators and Equipment Inside or Outside?
- Building Articulation for Daylighting?
- Stormwater Control & Storage (Bioswales, Porous Paving)?



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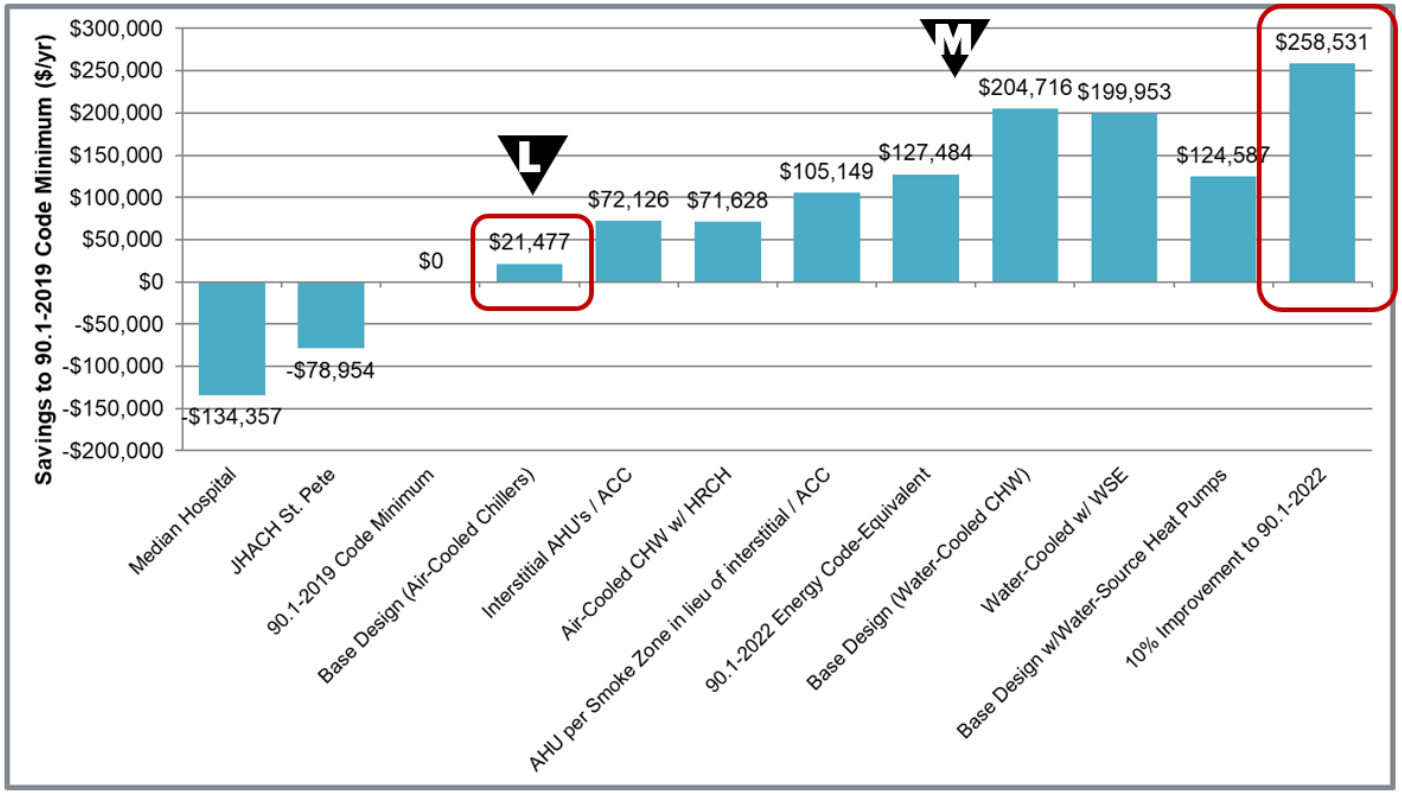
Energy Reduction Strategies



Rubric Assessment

Main	Criteria	Weight	Excellent	Satisfactory	Adequate	Poor
Economics	First Costs	25%	Below Budget	On Budget	0-10%	11% +
Carbon	Embodied Carbon Reduction	10%	20% +	11-19%	0-10%	Negative Impact
Environmental	Carbon/Energy Reduction per LEED Reduction Metrics	25%	20% +	15-19%	10-14%	5-9%
Environmental	Water Reduction per LEED Reduction Metrics	15%	30% +	20-29%	11-19%	0-10%
Operational	Operational Cost & Labor Reduction	25%	20% +	11-19%	0-10%	Negative Impact

- Assess design strategies or packages with rubric to determine effectiveness for project.
- Guides decision making and strategy development.
- Comparative options would select the highest score
- Yes / No decision would set a minimum score of at least 3.0 (Satisfactory)

1. Heat Recovery System

Initial Cost: $$

Lifecycle Cost: $$

Heat Recovery System

Pros

- Recover energy that would otherwise be rejected to the cooling tower
- Reduce simultaneous heating and cooling by disparate systems

Cons

- Added first cost
- Need to keep system loaded for proper operation

Notable Characteristics

- A small DHW preheat system is typically required by the energy code
- Larger systems that offset heating in lieu of DHW can provide greater savings with more predictable load profiles
- Several size options with various first cost and operational savings

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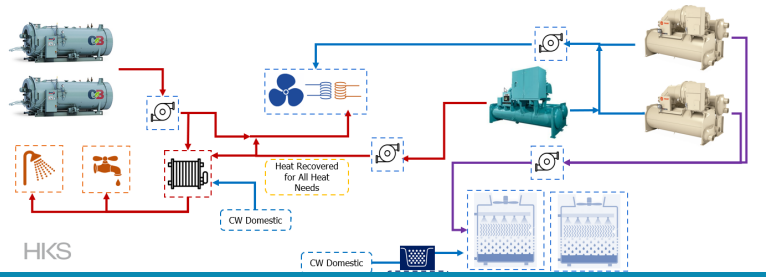
1. Heat Recovery System

Initial Cost: $$$

Lifecycle Cost: $

Heat Recovery System – Optimized Sizing for Heat (12% CHW)



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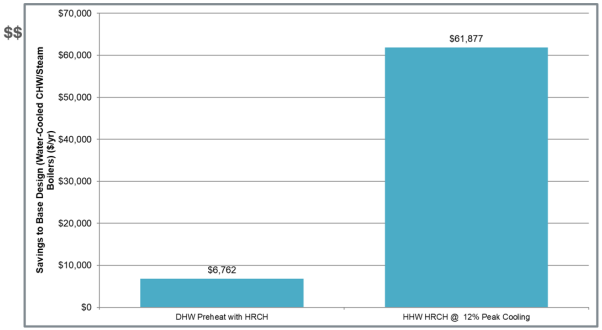
1. Heat Recovery System

Initial Cost: $$

Lifecycle Cost: $$



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1. Heat Recovery System

Initial Cost: $$ to $$$

Lifecycle Cost: $ to $$

1.0 Heat Recovery System - Domestic Hot Water			4	3	2	1	
Main	Criteria	Weight	Excellent	Satisfactory	Adequate	Poor	Score
Economics	First Costs	20%	Below Budget	0-10%	10%-15%	15% +	3
Carbon	Operational Carbon Reduction (LEED Reduction Metric)	10%	5% +	2-5%	0-2%	Negative Impact	2
Environmental	Energy Savings Absolute (LEED Reduction Metrics)	25%	5% +	2-5%	0-2%	Negative Impact	3
Environmental	Water Reduction / Savings	10%	10% + Savings	No Change	-10%-0%	<10%	3
Economics	Energy Cost - Operational	15%	5% +	1-4%	No Change	Negative Impact	3
Operational	O&M Cost to Maintain and Difficulty	20%	Easy / Low Cost	Standard / Standard	Learning Curve	New / High	3
						Final Score	2.9

1.0 Heat Recovery System - Heating Right-Sized			4	3	2	1	
Main	Criteria	Weight	Excellent	Satisfactory	Adequate	Poor	Score
Economics	First Costs	20%	Below Budget	0-10%	10%-15%	15% +	2
Carbon	Operational Carbon Reduction (LEED Reduction Metric)	10%	5% +	2-5%	0-2%	Negative Impact	3
Environmental	Energy Savings Absolute (LEED Reduction Metrics)	25%	5% +	2-5%	0-2%	Negative Impact	4
Environmental	Water Reduction / Savings	10%	10% + Savings	No Change	-10%-0%	<10%	4
Economics	Energy Cost - Operational	15%	5% +	1-4%	No Change	Negative Impact	4
Operational	O&M Cost to Maintain and Difficulty	20%	Easy / Low Cost	Standard / Standard	Learning Curve	New / High	2
						Final Score	3.1

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Table of Strategies

Strategy	Score	Study	Yes	No	M	Notes
1.1 Heat Recovery System - Domestic Hot Water	2.9	C		X		40T Unit (Energy Code Min.) Cost study needed
1.2 Heat Recovery System - Heating Right-Sized	3.1	C	X			150T Unit (Beyond Energy Code)
2.0 Solar Thermal w/ Storage	2.75	C		X		
3.0 Decoupling of DHW & Heating	2.9	C			X	Base Price (Coupled)
4.0 Water Loop & Management Plan	3.15	X	X			To be studied further
5.0 Fan Power Design Level	2.95	X			X	Adjust Fan Power in design
6.1 DOAS Dehumidification - No ERV	3.2	C		X		Base Price, Central vs multiple DOAS units.
6.2 DOAS Dehumidification – Dual Path	2.9	C		X		Not in Base Price
6.3 DOAS ERV					X	
7.1 Steam Generation - Steam Boiler	2	C		X		Large Boilers being phased out
7.2 Steam Generation - Electric POU	2.85	C	X			Base Case
8.0 Level of Potable Water, Energy, & Materials Storage	3.6	X	X			To be studied, is a well available? Well for Cooling Tower. Additional Capacity with a Buffer tank.
9.0 Envelope Sensitivity	NS	X				Glazing location to be studied further
10.0 Window to Wall Ratio (WWR)	NS					To be studied further in SD's
11.0 Geothermal		X			X	Waiting on Site Survey
12.0 EV Charging Stations		X			X	Determine the amount of charging needed, metering recommended.
13.0 Solar PV		X			X	To be updated after building systems types selected. Location(s) to be determined.
14.0 Micro-Grid System w/ Batter Back-up for Resiliency		X		X		Additional Redundancy for Back-up Power, Generators still needed.
15.0 Condenser Domestic Pre-Heat		C		X		Recommended Option if not using HRC.
1.0 Stormwater Management Plan / Strategies	3.5	X				Potentially add pervious surfaces
2.0 Pervious Surfaces	3.1	X				Not critical path
3.0 Activity Canopy	3.3	X				Size / location / scope to be determined
1.1 LEED Certification	3.8	C		X		Official certification not pursued
1.2 Design to LEED Standards	3.2	C	X			Track project alignment with LEED

Document Decision Making with A3s

A3 #	Title	Champion	Collaborators	Sign Off
SR101	Water-side Heat Recovery Option Evaluation	SSR (Andy Brophy)	R&M (Kyle Davis)	Name of Final Approver(s)
	Wesley Chapel	Date Opened: 10.22.24	HKS (Sammy Shams)	Status: Defined
	Johns Hopkins All Children's Hospital	Issued: 11.19.24	SSR (Kyle Selvy)	

BACKGROUND: The base pricing budget did not include any provisions for the prescriptive energy code requirement for condenser heat recovery. Condenser heat recovery is a good strategy for realizing energy cost savings and there are two options with different levels of energy cost savings but different implementation costs. A decision needs review to determine which water-side heat recovery system should be incorporated into the project.

The recommendation will conclude with the 150-ton supplemental heat-recovery chiller (HRCH) option due to the relatively low simple payback and positive impact on energy consumption.

(CURRENT STATE) DESCRIPTION OF BASELINE AND OPTIONS:
The project at its current state would not include any heat recovery. There are multiple options available to incorporate heat-recovery into the chilled water system:

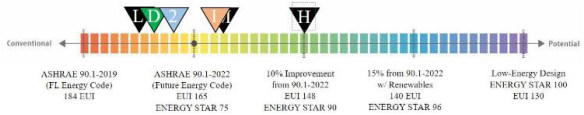
1. Condenser bundle heat exchanger: A heat exchanger and additional piping, controls and valving are provided to pull warm condenser water off of the condenser and use it to pre-heat incoming water for the domestic heating system. This diverts flow from the cooling towers to use the warm 95 degree condenser water to preheat incoming 65-75 degree potable city water.
2. Heat-recovery chiller (150 tons): An additional small chiller sized at 150 tons is provided along with additional piping, valving, and controls set up as a base load chiller where it generates chilled water that feeds into the chilled water loop and the resulting higher temperature heat rejection water is utilized on the heating hot water side (in summer months the heat recovery chiller provides most of the heating). This system is piped in sidecar

(ROOT CAUSE ANALYSIS) EVALUAITON CRITERIA AND ASSUMPTIONS:
An energy model has been developed by SSR to outline the building heating and cooling load expectations and anticipated energy consumption for the future hospital. The model was developed with the base budget design systems with additional iterations for the water-side systems outlined in each option. The heat-recovery chiller option was evaluated against multiple potential sizes for an optimal selection point (150 tons). Optimal was determined by the highest amount of energy cost savings. A second iteration was then simulated to reflect the domestic hot water preheat on the incoming city water. This provision will take

Measure	Energy Cost Savings	ROM Cost Impact	Simple Payback
#1: 150-ton HRCH	$59,800	$345,000	5.9 years
#2: Condenser HR	$11,200	$92,000	8.2 years

By providing chilled water and heating water at a greater capacity than the limited heat transfer at the heat exchanger for the condenser DHW preheat, there are much greater savings for nominal cost comparatively with an improved simple payback for the heat recovery chiller than the simple condenser heat exchanger.

FUTURE STATE/ANALYSIS:
Adding heat recovery contributes to achieving the OPR targets for energy savings / GHG Reduction. D represents the base design. 1 represents measure #1 150-ton HRCH, 2 represents Condenser HR.



- 150-ton HRCH results in an EUI of 159.8
- Condenser heat exchanger results in an EUI of 169.5
- The base design without water-side heat recovery is 174.5

IMPLEMENTATION PLAN/RECOMMENDATION:
It is recommended the project includes provisions to add the 150-ton heat-recovery chiller option to the design.

FOLLOW-UP/HOMEWORK:

What	Who	When
Finalize CEP space impact and design requirements	SSR	
Confirm ROM price with design update for final cost impact	R&M	

PARTICIPANTS:

Client Name
Name
Name

HKS
Name
Name

SIGNATURE:

Approver

_____
_____
_____
_____

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TO ADOPT MANDATORY MEASURES IN BUILDING CODE
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for two building code changes to limit embodied carbon emissions

in the construction, remodel, or adaptive reuse of commercial buildings larger than 100,000 sq feet and school projects over 50,000 sq ft.

How do we shift culture and habit in the building industry?

How do we get beyond the volunteer sustainability efforts?

…that activists have been demanding on for decades

It requires changing the code - **BUILDING CODES DEFINE BUSINESS AS USUAL**

What it took to beat the odds against us,

and get to the finish line with success

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Code change is complex, slow, and messy.

To be effective, AIA California implemented strategy and tactics along a long, winding and uncertain path that **required year over year dedication and commitment**. This is somewhat contrary to typical AIA models.

Mike Malinowski
FAIA Consultant,
American Institute of Architects California

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A WIDE RANGE OF EXPERTISE AND SPECIALIZED RESOURCES

Just like when we lead complex construction projects, these kinds of complex and sustained efforts require a wide range of specialized resources. We had dozens of entities and people involved. The biggest challenge was curating that set of resources to align with our strategy, which, at the highest level, was to shift the building industry's culture and habits toward sustainability and climate action.

THE PUBLIC HEARING PROCESS IS DIFFICULT TO MANAGE OR PREDICT

The final approval hearing before the Building Standards Commission was tilted toward denial.

We curated two dozen expert speakers to utilize 3-minute time slots with no repetition, relentlessly compelling testimony, and a cadence and story that built to a crescendo.

This was only possible via painstaking planning and effort.

BE WILLING TO RUFFLE SOME FEATHERS ALONG THE WAY

Significant changes in well-established systems will always have opposition, indifference, fear, and behind-the-scenes actions to overcome.

We kept our fingers on the pulse and eyes on the prize, tapping every available resource with intense focus and relentless effort.

CALGreen Embodied Carbon Options

Lifecycle Analysis

Scope: 60-year cradle-to-grave WB LCA (ISO 14044), excluding operating energy. Show GWP analysis.

Components: Primary and secondary structural members, glazing, insulation, exterior finishes.

Prescriptive Path

Components: Structural steel, rebar, flat glass, light and heavy duty mineral wool insulation, and ready mix concrete

Exception: Concrete mixes can use a weighted average for all mixes

Building Reuse

Components: Existing primary structural elements, enclosure, window assemblies, and insulation.

Exceptions: Additions 2x+ the area of existing building

Exclude: Windows, insulation, portions structurally unsound or hazardous, and hazardous materials that are remediated as part of the project shall not be included in the calculation.

Choose one:

	Lifecycle Analysis	Prescriptive Path	Building Reuse
Mandatory	10% reduction from baseline	175% of IW-EPD GWP Limits	45% of the structure and enclosure to be reused
Tier 1	15% reduction from baseline	150% of IW-EPD GWP Limits	75% of the structure and enclosure to be reused
Tier 2	20% reduction from baseline	IW-EPD GWP Limits	75% of the structure and enclosure to be reused AND 30% of interior non-structural elements to be reused

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