

AWAKING WATERS: CENTRAL LAKES LIMNOLOGY SCIENCE CENTER

WE NEVER KNOW THE WORTH OF WATER UNTIL THE WELL RUNS DRY

-THOMAS FULLER
HISTORIAN

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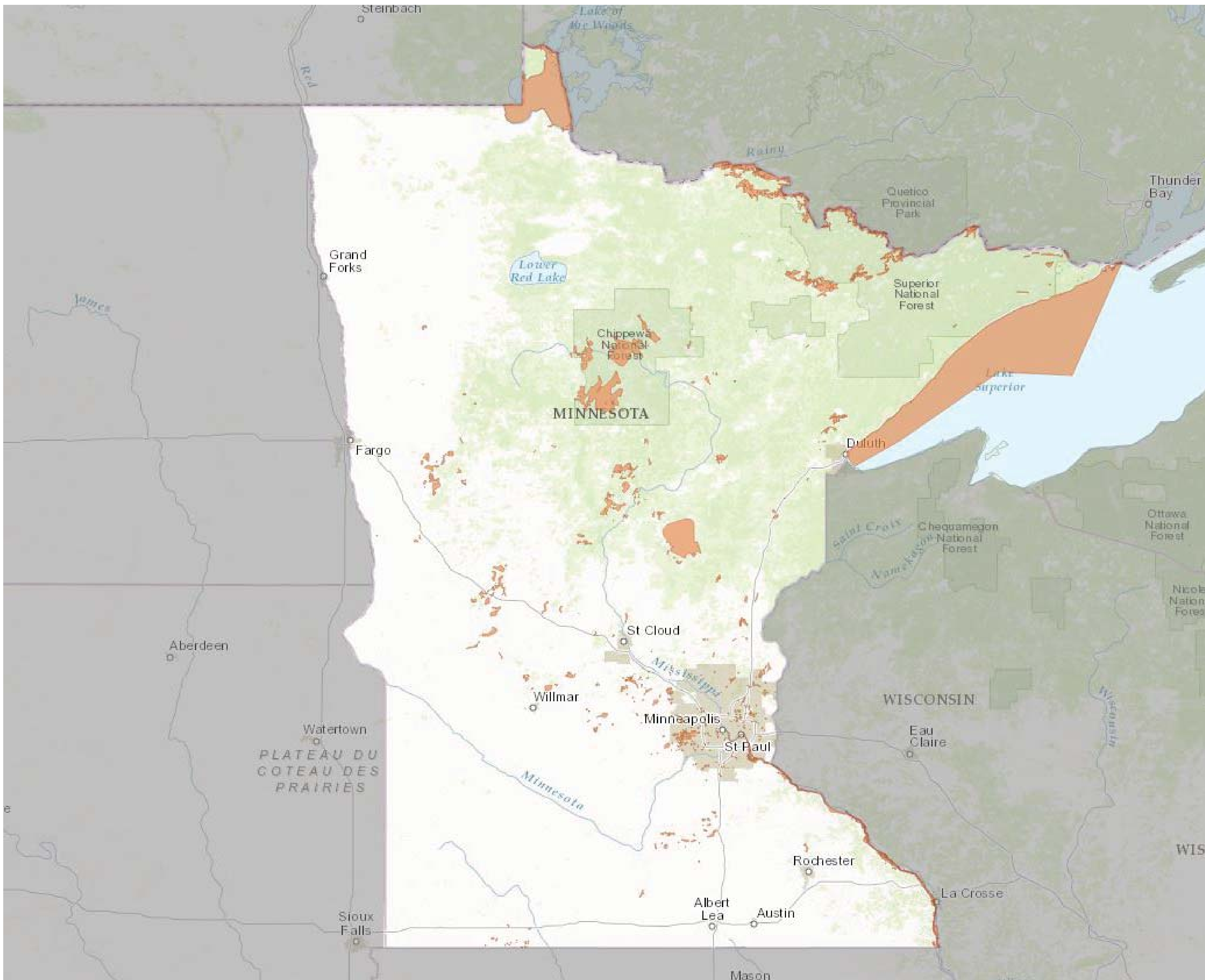
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MSUM REGIONAL SCIENCE CENTER
BUFFALO RIVER STATE PARK- GLYNDON, MN



LAKE SUPERIOR

EURASIAN WATER MILFOIL
 -GROWS EARLY IN YEAR
 -DIES OFF EARLY
 -SATURATES WATER WITH NUTRIENTS CAUSING ALGAE BLOOMS

FAUCET SNAIL
 -HOST OF VIRUSES THAT CAUSE DEADLY DISEASES IN WATERFOWL

NEW ZEALAND MUD SNAIL
 -OUT COMPETE IMPORTANT FOOD SOURCES FOR NATIVE FISH
 -DO NOT PROVIDE NUTRIENTS FOR FISH

ROUND GOBY
 -COMPETE FOR FOOD AND HABITAT
 -EAT EGGS AND YOUNG OF NATIVE FISH

RUFFE
 -COMPETE FOR FOOD AND HABITAT
 -EAT EGGS AND YOUNG OF NATIVE FISH

SPINY WATERFLEA
 -DEplete ZOOPLANKTON
 -OUT COMPETE NATIVE FISH SPECIES

VIRAL HEMORRHAGIC SEPTICEMIA
 -DEADLY INFECTIOUS FISH DISEASE
 -WIDESPREAD HEMORRHAGING

WHITE PERCH
 -COMPETE WITH NATIVE FISH SPECIES
 -EAT FISH EGGS

ZEBRA MUSSELS
 -EAT ALGAE AND PLANKTON
 -INCREASE WATER CLARITY ALLOWING FOR INCREASED VEGETATION GROWTH
 -CHANGES HABITAT ALLOWING SIGHT FEEDING FISH TO OUT COMPETE FISH THAT DO WELL IN MURKY WATER

MISSISSIPPI RIVER

BIGHEAD CARP

- FILTER FEEDERS
- MATURE QUICKLY
- JUVENILES DIRECTLY COMPETE WITH SMALL FISH SPECIES

EURASIAN WATER MILFOIL

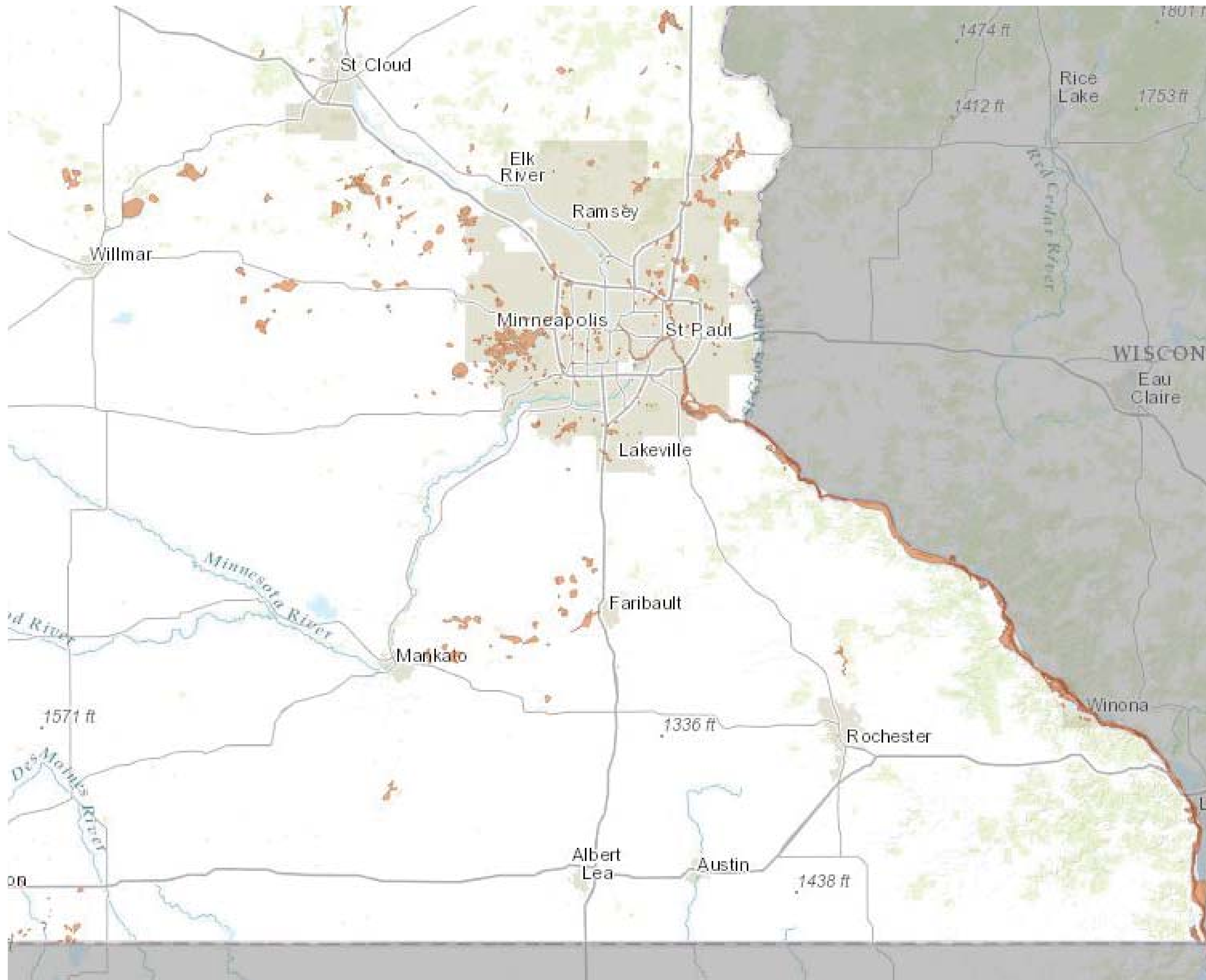
- GROWS EARLY IN YEAR
- DIES OFF EARLY
- SATURATES WATER WITH NUTRIENTS CAUSING ALGAE BLOOMS

SILVER CARP

- EAT A LOT
- GROW AND MATURE FAST
- GOOD BREEDERS
- NO NATIVE PREDATORS
- JUMP OUT OF WATER WHEN AGITATED
- DANGEROUS

ZEBRA MUSSELS

- EAT ALGAE AND PLANKTON
- INCREASE WATER CLARITY ALLOWING FOR INCREASED VEGETATION GROWTH
- CHANGES HABITAT ALLOWING SIGHT FEEDING FISH TO OUT COMPETE FISH THAT DO WELL IN MURKY WATER



MILLE LACS

EURASIAN WATER MILFOIL

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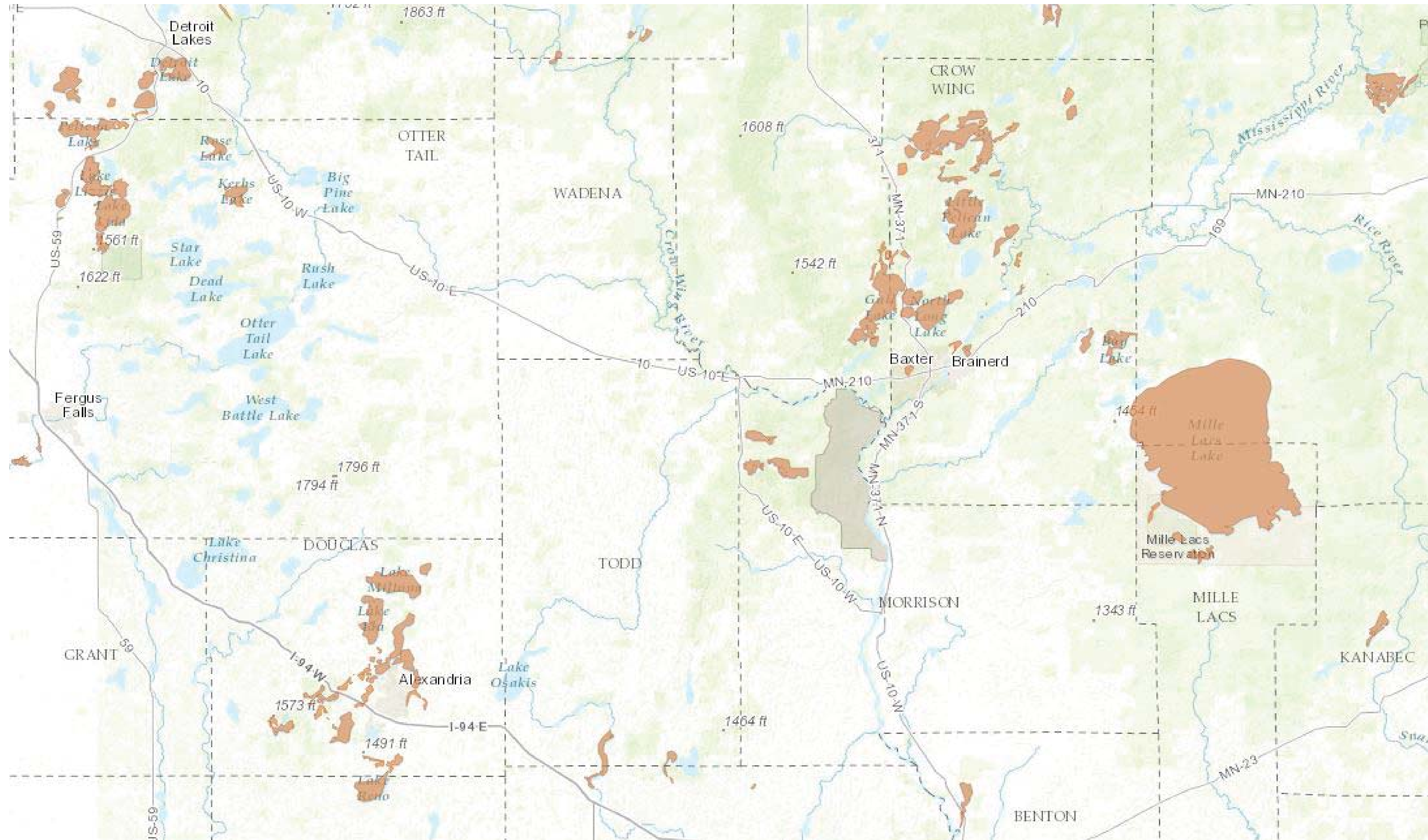
SPINY WATERFLEA

- DEplete ZOOPLANKTON
- OUT COMPETE NATIVE FISH SPECIES

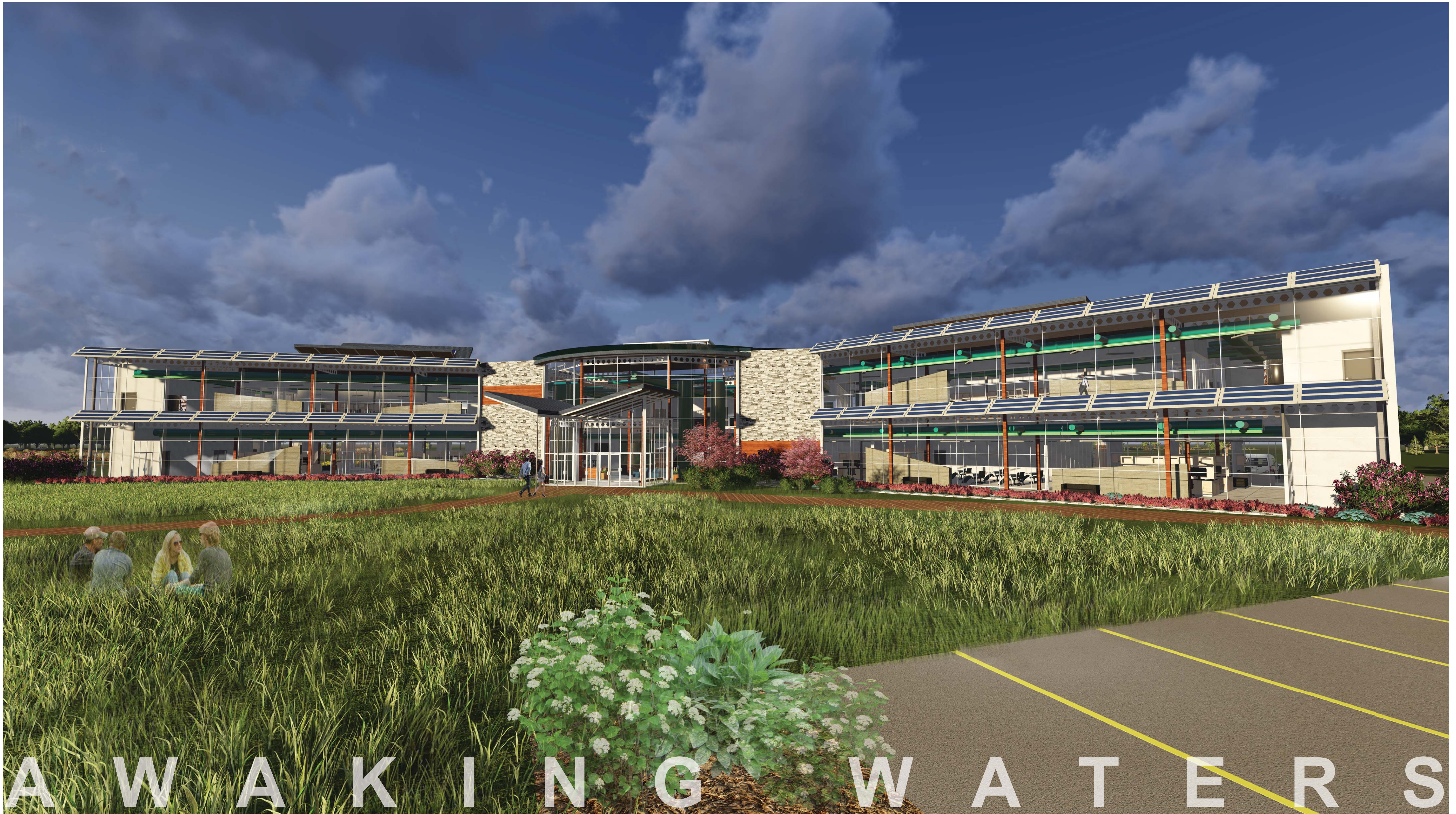
ZEBRA MUSSELS

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THE WALLEYE SEASON ENDED EARLY ON LAKE MILLE LACS THIS YEAR DUE TO OVERFISHING RESULTING IN ECONOMIC DECLINE IN THE REGION. THE DNR CURRENTLY MUST STOCK THE LAKE WITH MUSKELLUNGE BECAUSE OF THE CHANGING HABITAT.

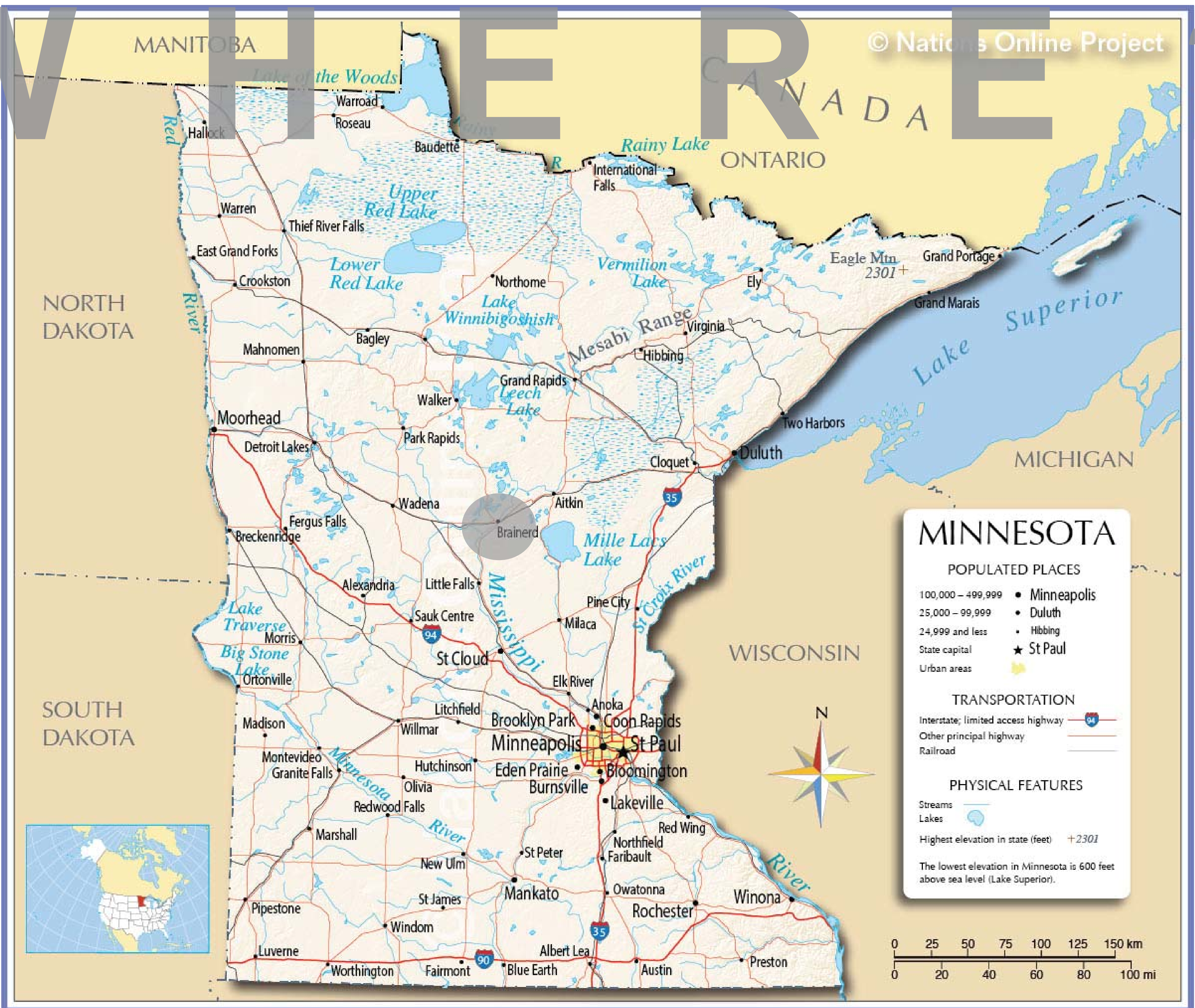


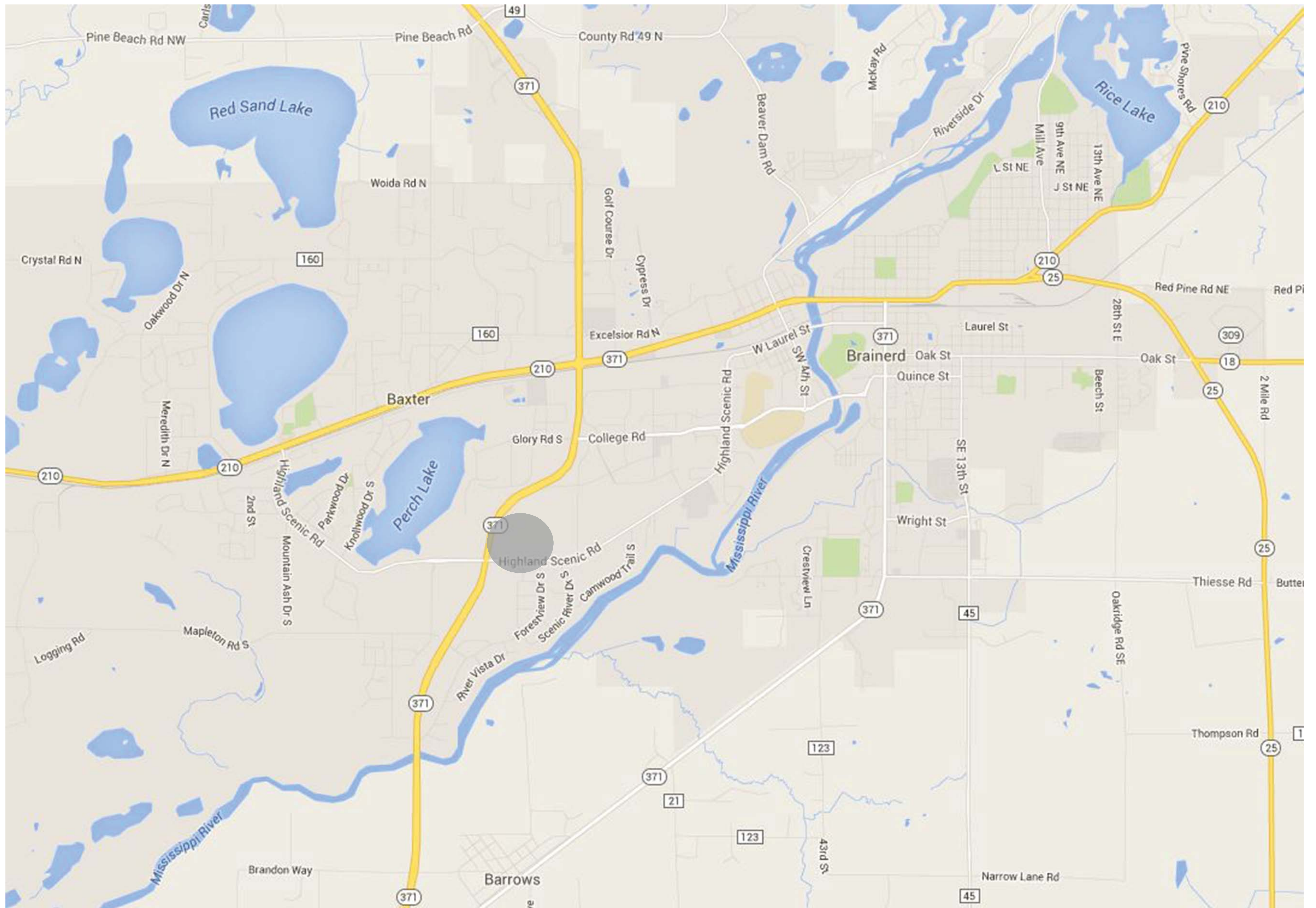
CENTRAL LAKES LIMNOLOGY SCIENCE CENTER



A W A K I N G W A T E R S

WHERE?







SITE ATTRIBUTES

- PROXIMITY TO LAKES
- PROXIMITY TO MAJOR CONFLUENCE OF MISSISSIPPI AND CROW WING RIVERS
- PROXIMITY TO TECHNICAL COLLEGE WHICH DOES NOT HAVE LARGE RESEARCH FACILITY
- EXISTING UTILITIES
- SET PRECEDENT OF DESIGN FOR SUBURBAN SPRAWL
- REGIONAL HEADQUARTERS OF MPCA AND MN DNR OFFICES
- NOT DAMAGING TO NATURE BEING RESEARCHED
- INTERSECTION OF TWO MAJOR HIGHWAYS
- EASY FOR PUBLIC TO GET TO
- LARGE SPACE AND OPPORTUNITIES FOR PRAIRIE AND WETLAND RESTORATION

SITE DETRIMENTS

- CONTRIBUTING TO SUBURBAN SPRAWL
- REMOVED FROM RESEARCH LOCATIONS
- CHALLENGING OF GETTING PUBLIC OUT TO EXPERIENCE THE SITES THE CENTER RESEARCHES



LOOKING NORTH



LOOKING EAST

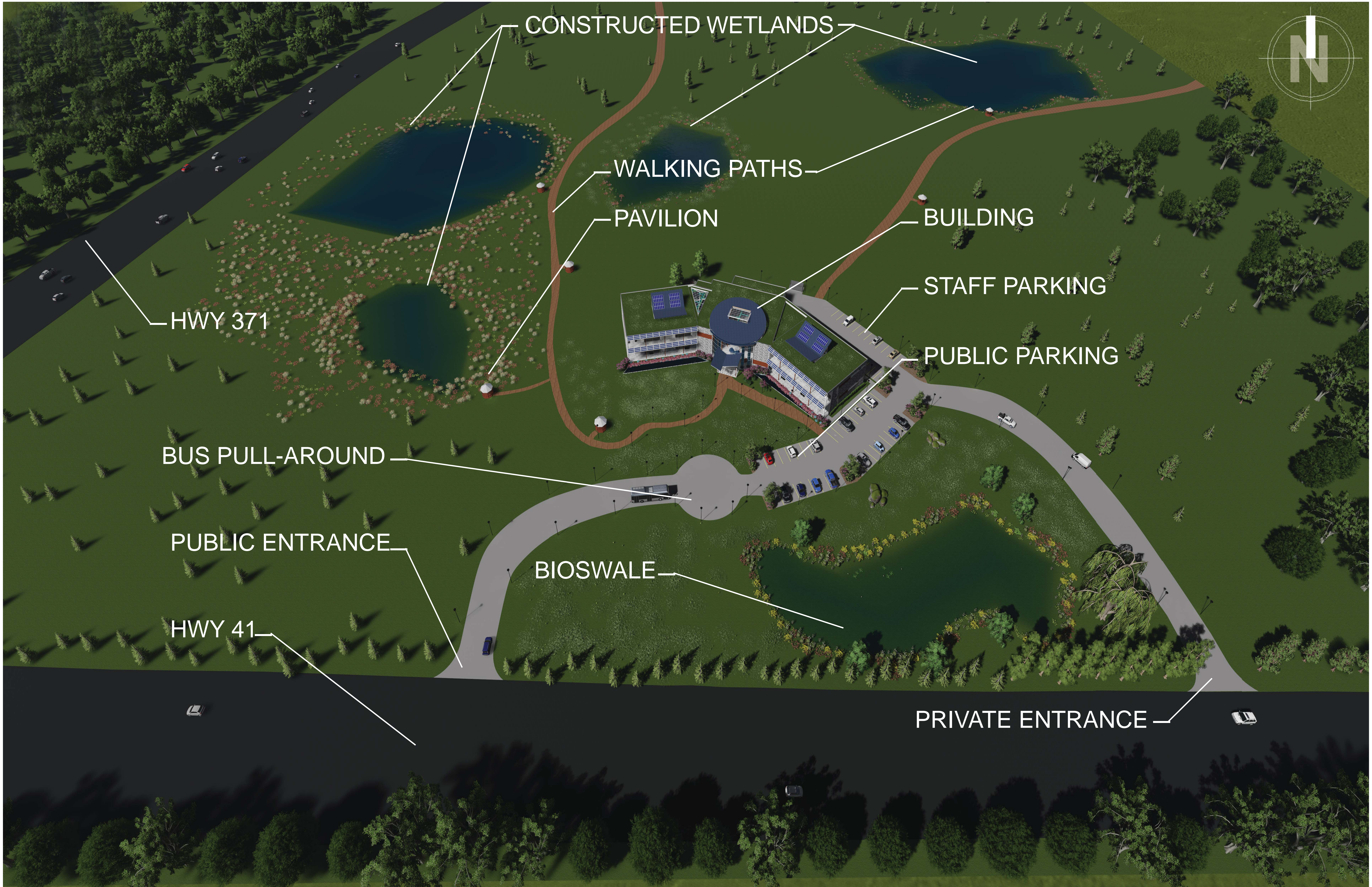


LOOKING WEST ALONG HWY 48



LOOKING EAST FROM HWY 371

SITE PHOTOS



CONSTRUCTED WETLANDS

WALKING PATHS

PAVILION

BUILDING

STAFF PARKING

PUBLIC PARKING

HWY 371

BUS PULL-AROUND

PUBLIC ENTRANCE

BIOSWALE

HWY 41

PRIVATE ENTRANCE





LIFE IN A WATER WISE WETLAND

KEY:

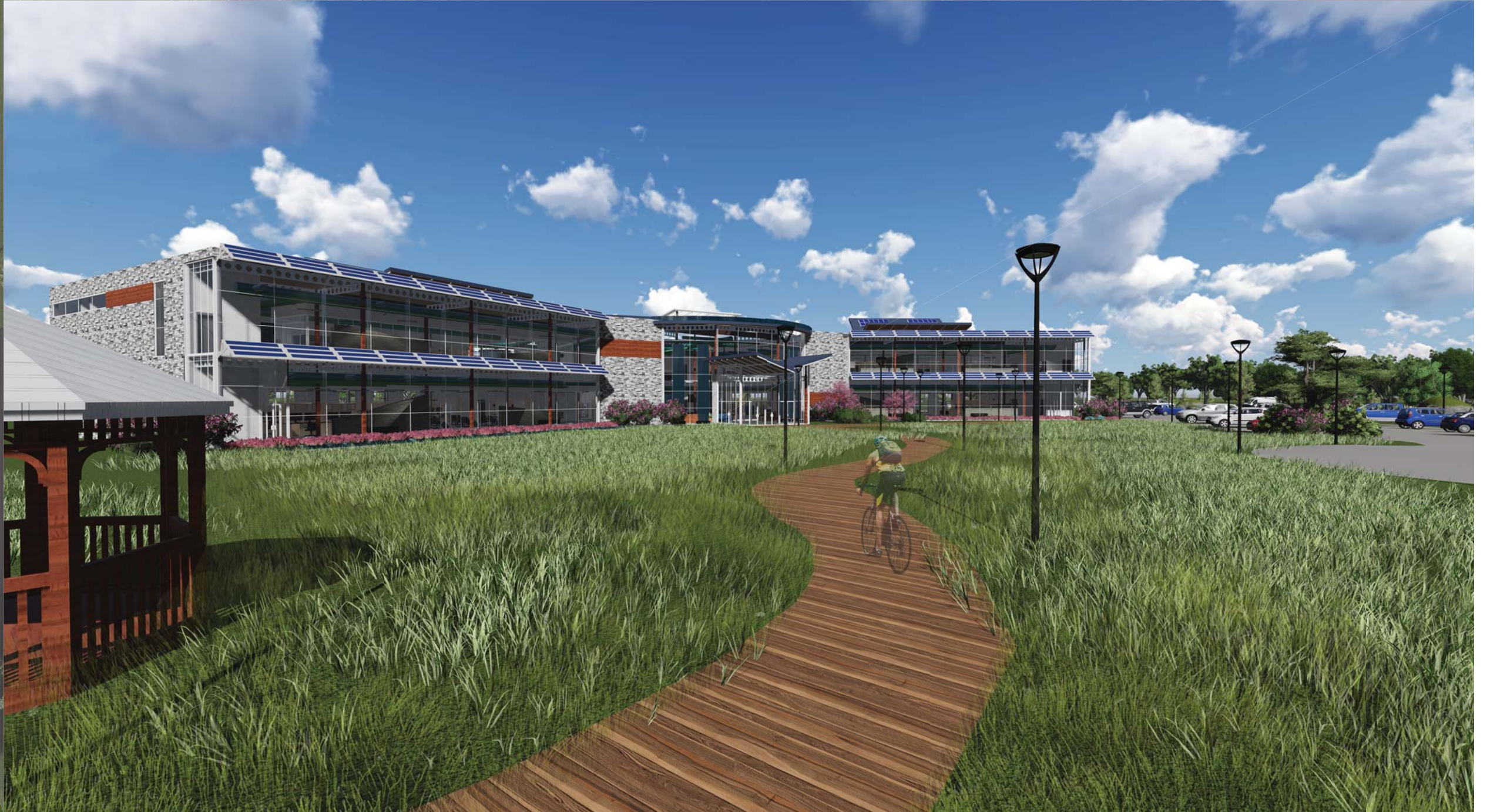
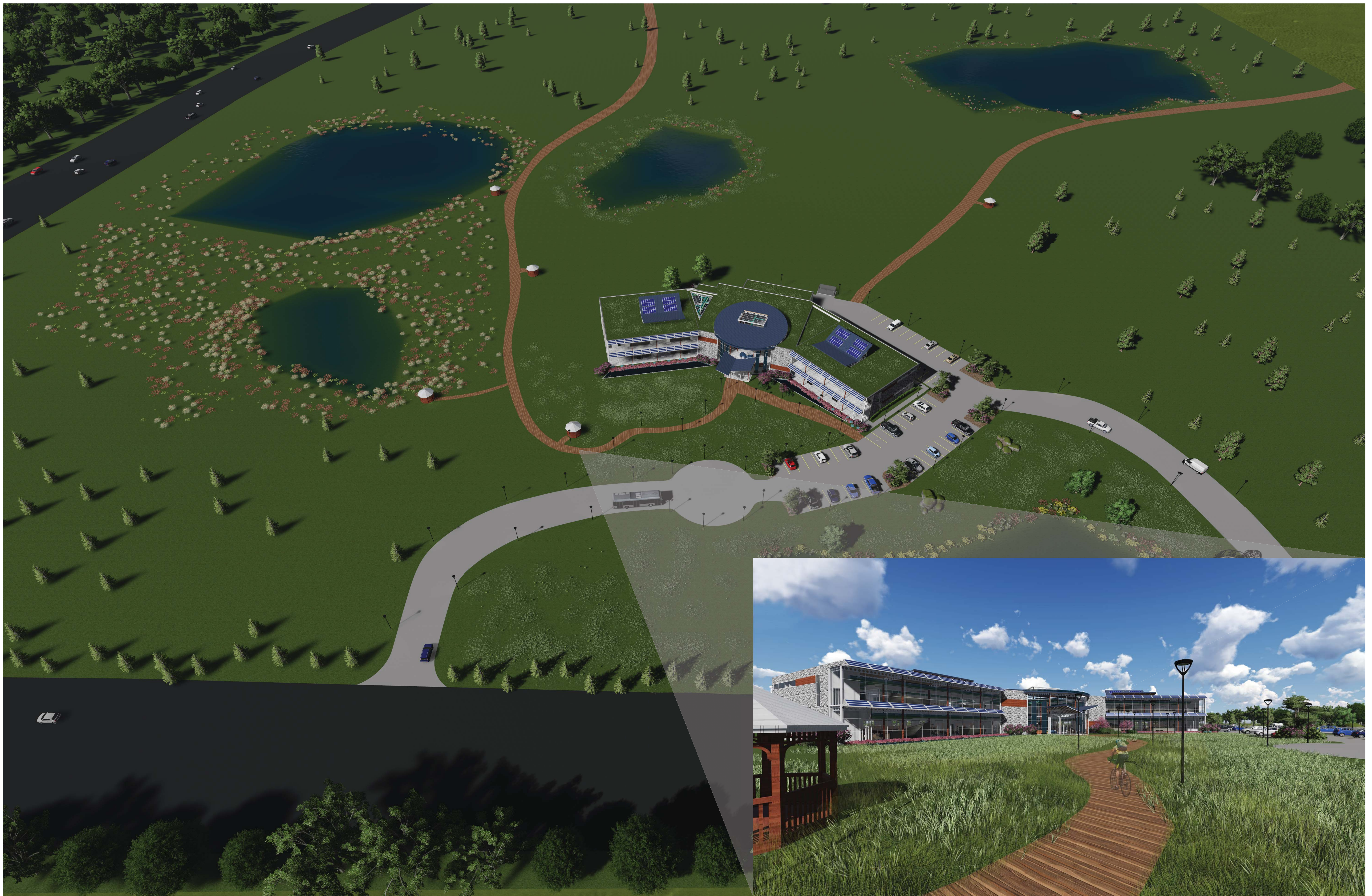
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|-----------------|--------------------|------------------|-----------------|-------------------|--------------------|
| WATER LAYER | WETLAND VEGETATION | WETLAND SOILS | WETLAND ANIMALS | WETLAND PLANTS | WETLAND BIRDS |
| WETLAND CHANGES | WETLAND FUNCTIONS | WETLAND SERVICES | WETLAND VALUES | WETLAND RESOURCES | WETLAND PROTECTION |

The Mississippi River



Informational text and graphics on the boardwalk display.





B A S E M E N T

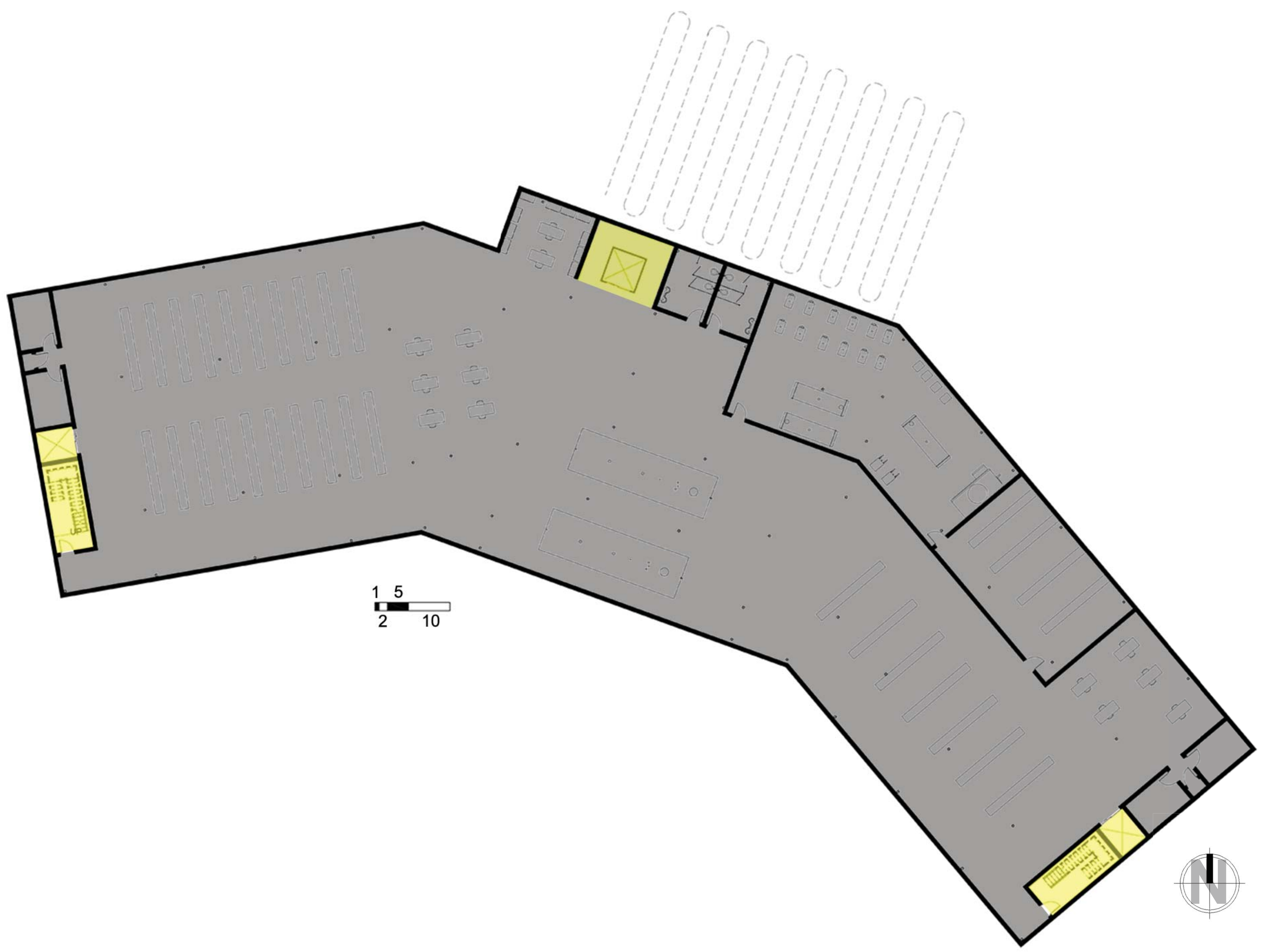
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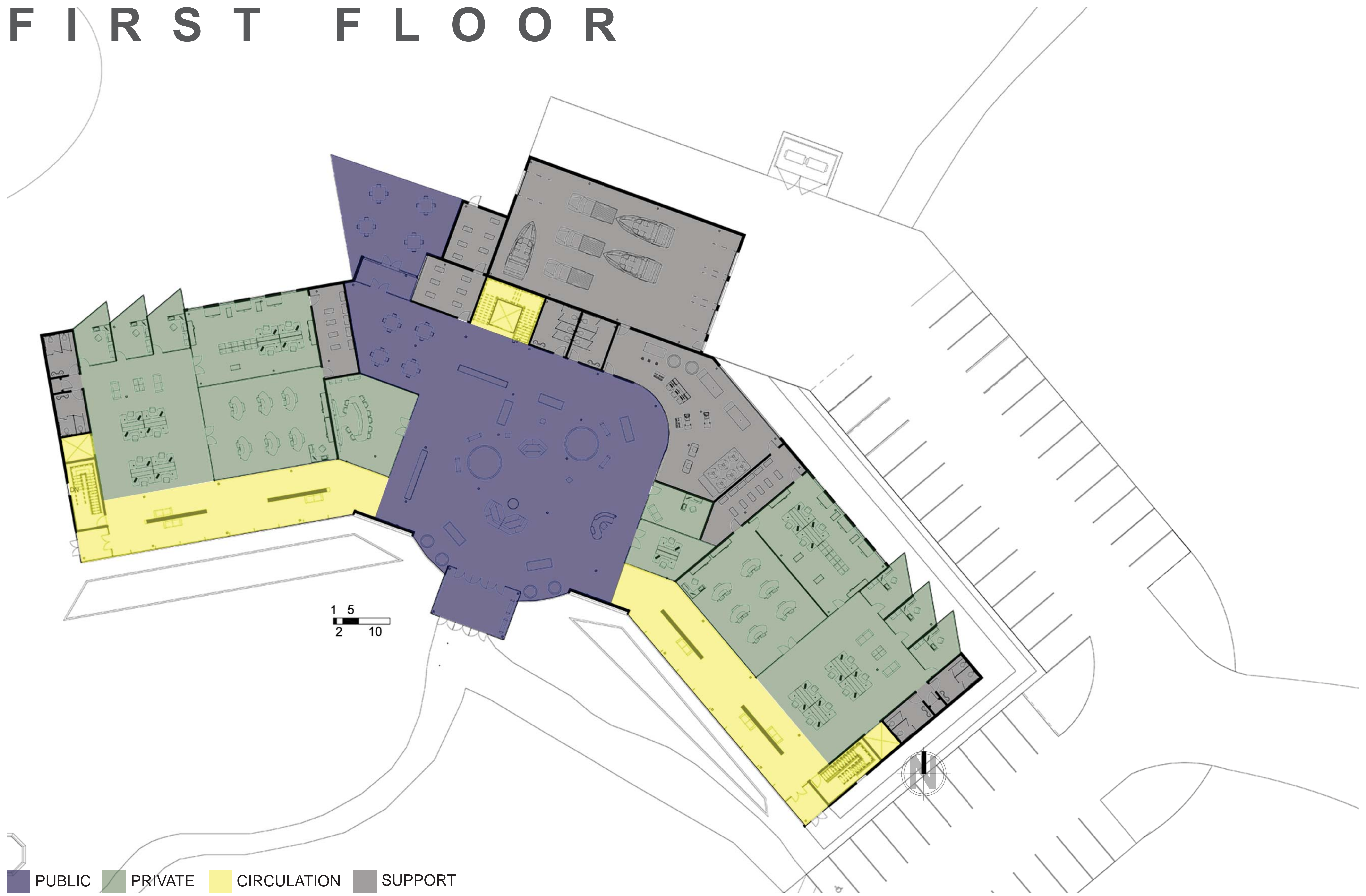
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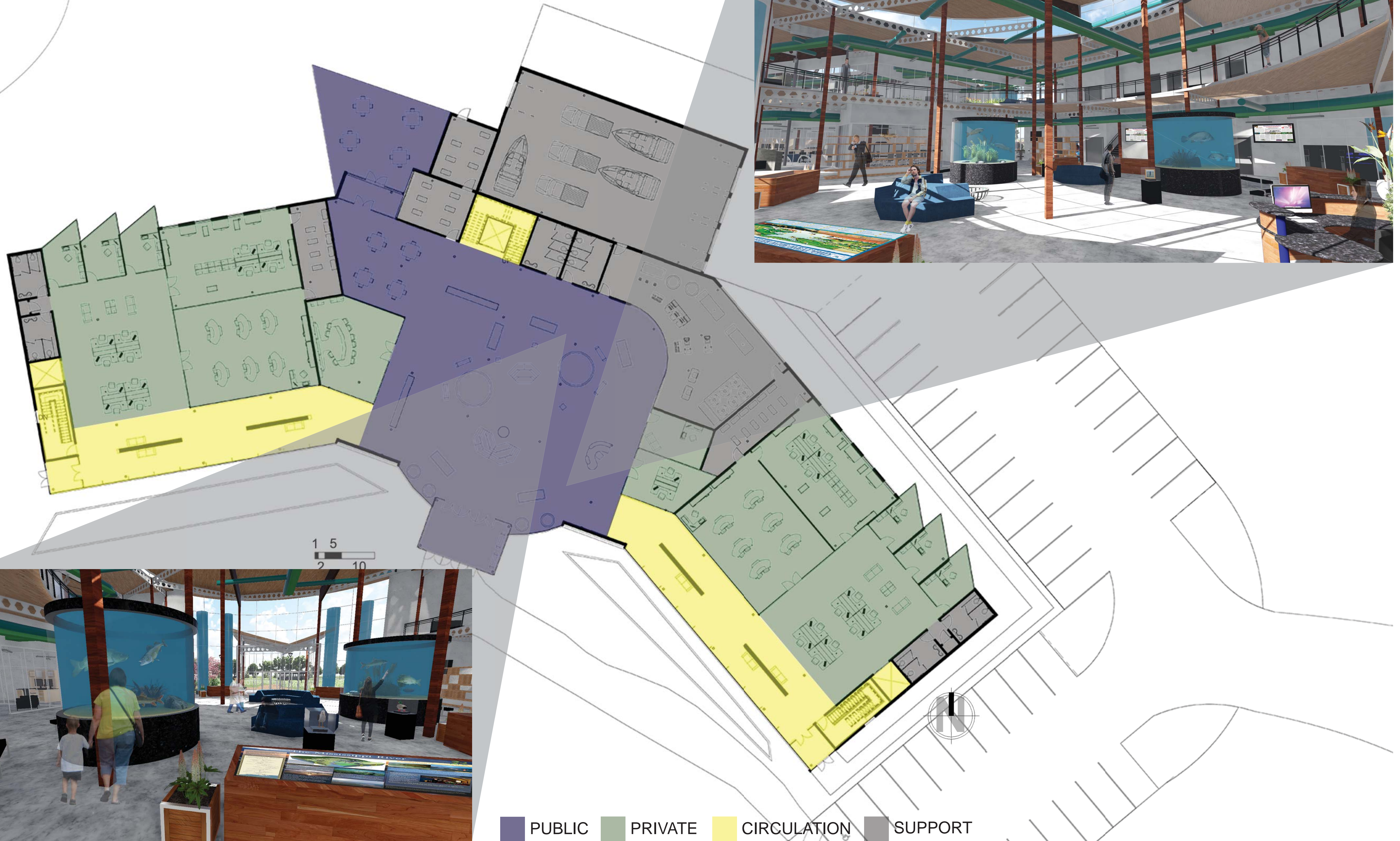
PUBLIC PRIVATE CIRCULATION SUPPORT

FIRST FLOOR



PUBLIC **PRIVATE** **CIRCULATION** **SUPPORT**

FIRST FLOOR



PUBLIC

PRIVATE

CIRCULATION

SUPPORT

FIRST FLOOR



PUBLIC PRIVATE CIRCULATION SUPPORT

FIRST FLOOR



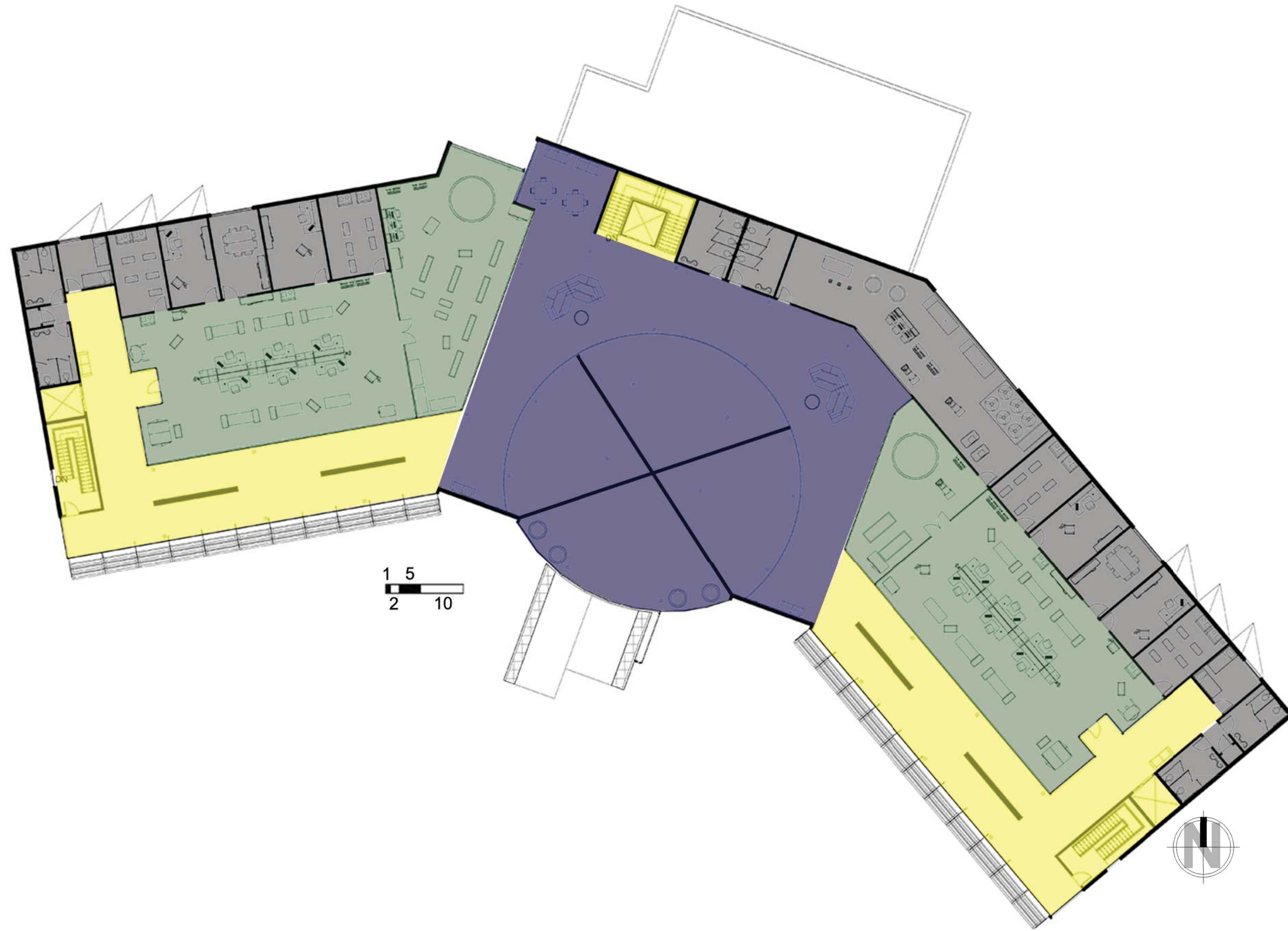
PUBLIC PRIVATE CIRCULATION SUPPORT

FIRST FLOOR



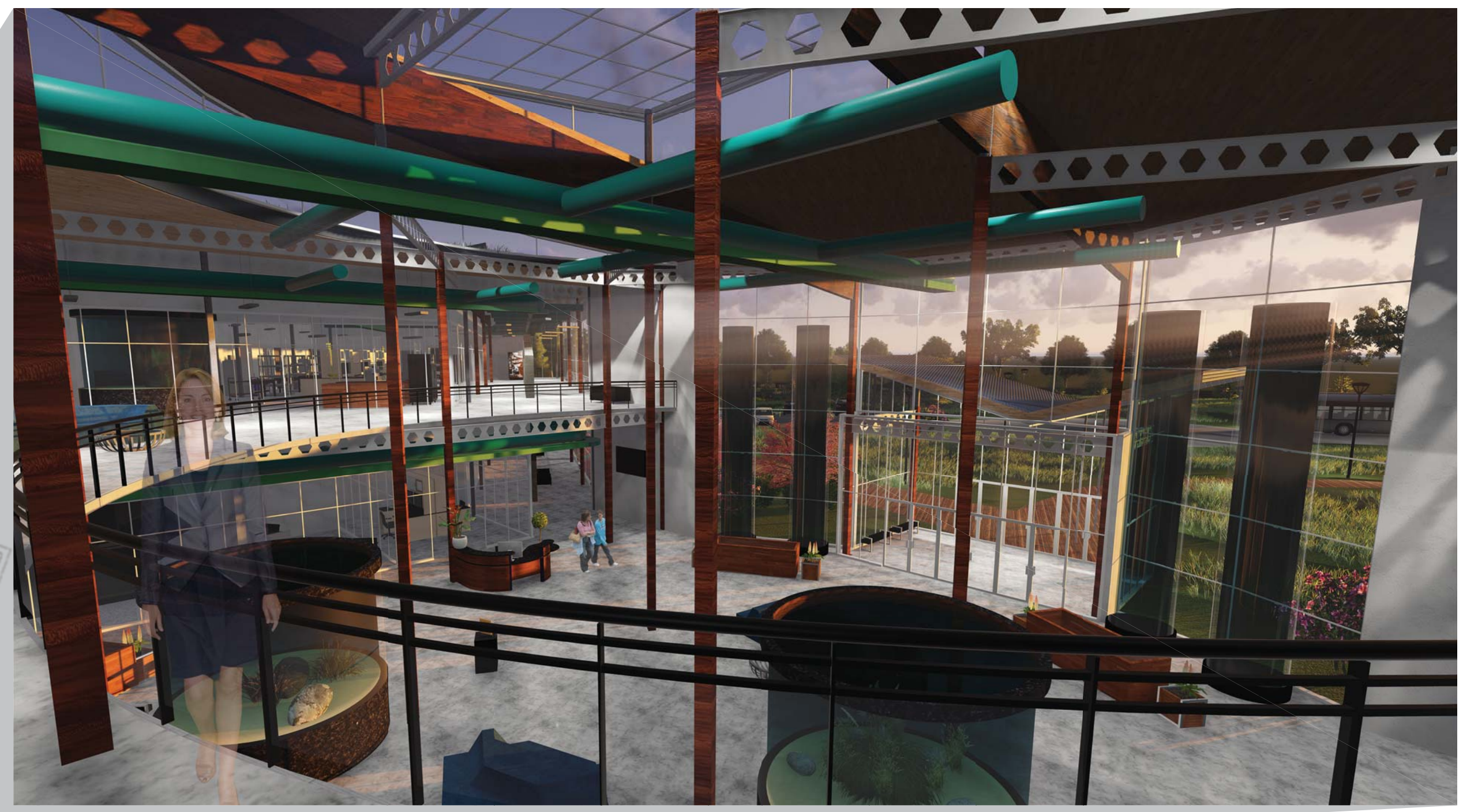
PUBLIC PRIVATE CIRCULATION SUPPORT

S E C O N D F L O O R



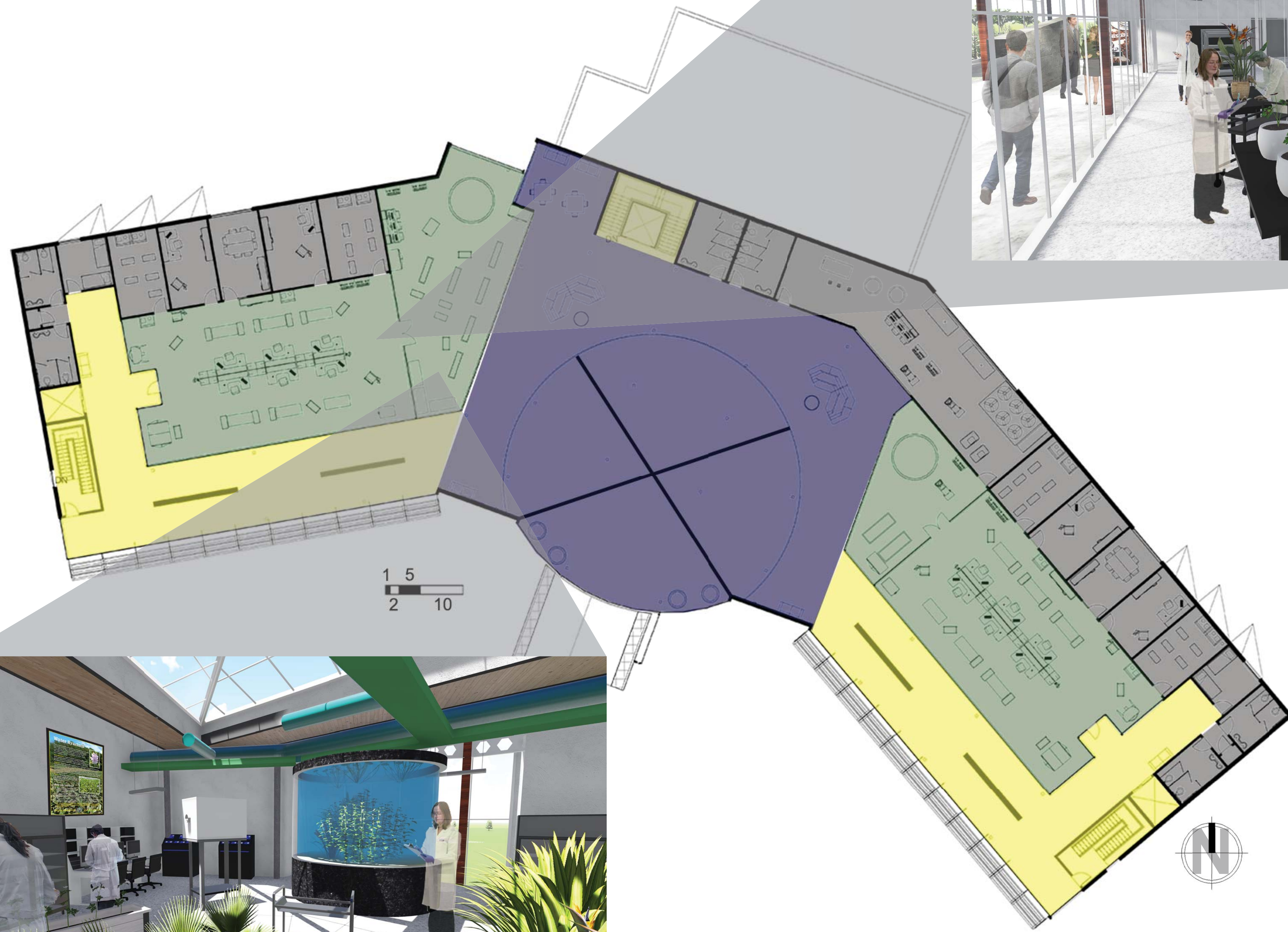
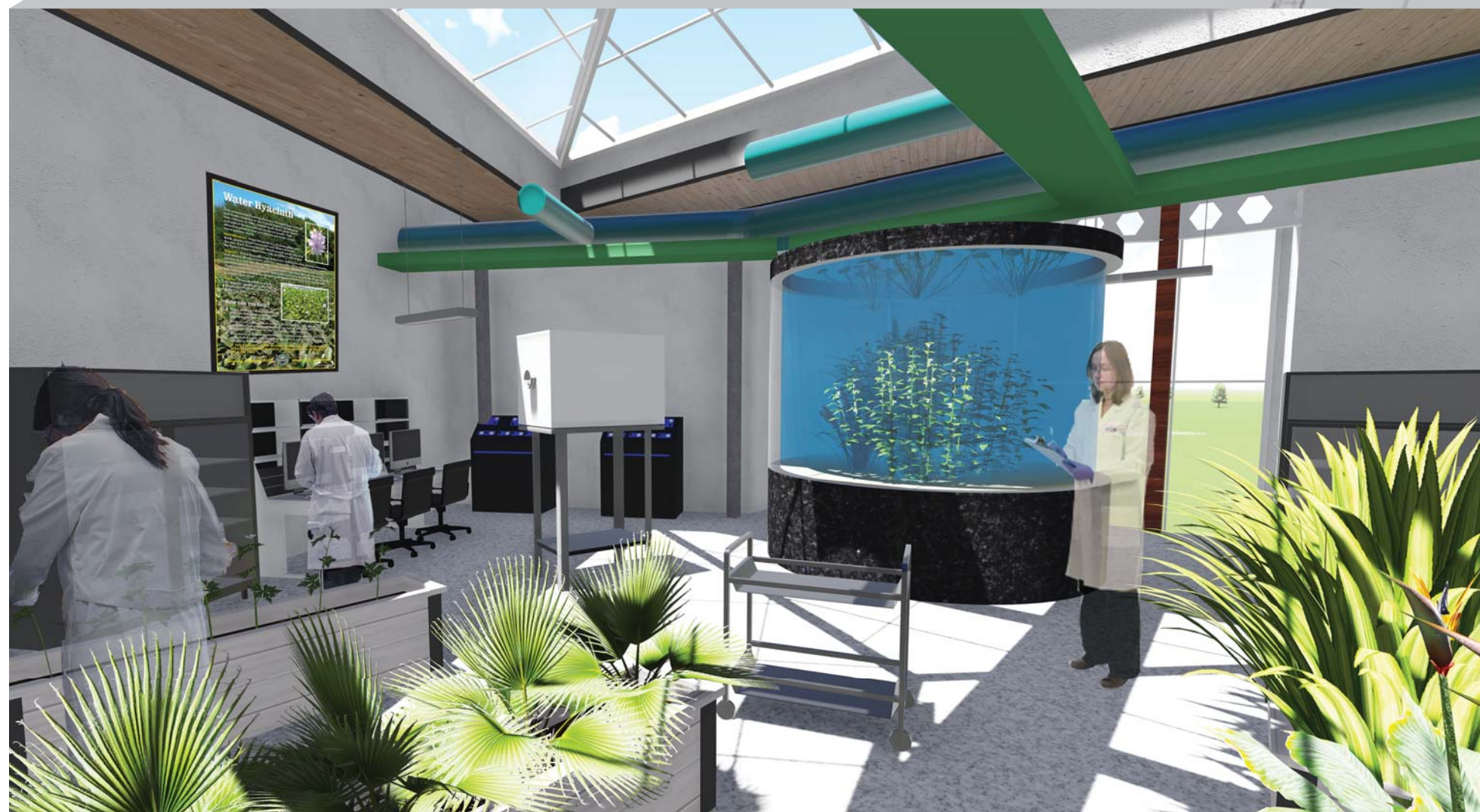
 PUBLIC  PRIVATE  CIRCULATION  SUPPORT

S E C O N D F L O O R



PUBLIC PRIVATE CIRCULATION SUPPORT

SECOND FLOOR



PUBLIC PRIVATE CIRCULATION SUPPORT

BUTTERFLY ROOF WATER COLLECTION SYSTEM

PHOTOVOLTAIC SUN SHADE

ASHLAR QUARRY TAILINGS SIPS PANELS
TRIPLE-INSULATED THERMAL WINDOWS

PHOTOVOLTAIC PANELS

OPERABLE VENTING CLERESTORY

STRUCTURAL GLASS WIND SUPPORTS

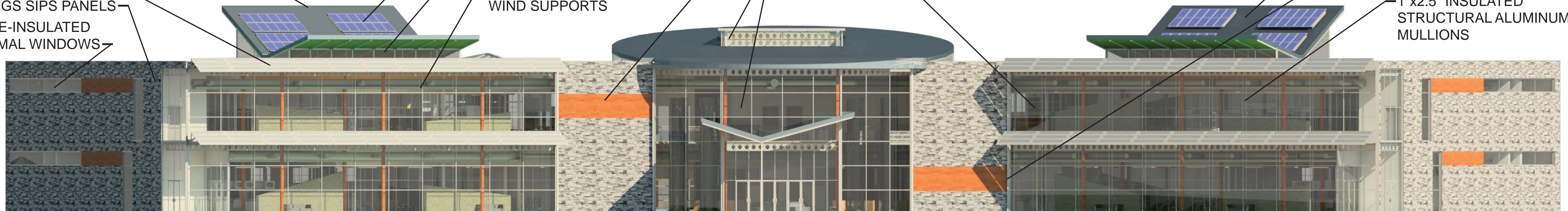
WALNUT BOARD SIPS PANELS

PHOTOCHROMIC, LOW-E COATED, TRIPLE-INSULATED STRUCTURAL GLAZING SYSTEM

INSULATED METAL STANDING SEAM ROOFING PANELS

2.5"x5" INSULATED STRUCTURAL ALUMINUM PERIMETER MULLIONS

1"x2.5" INSULATED STRUCTURAL ALUMINUM MULLIONS

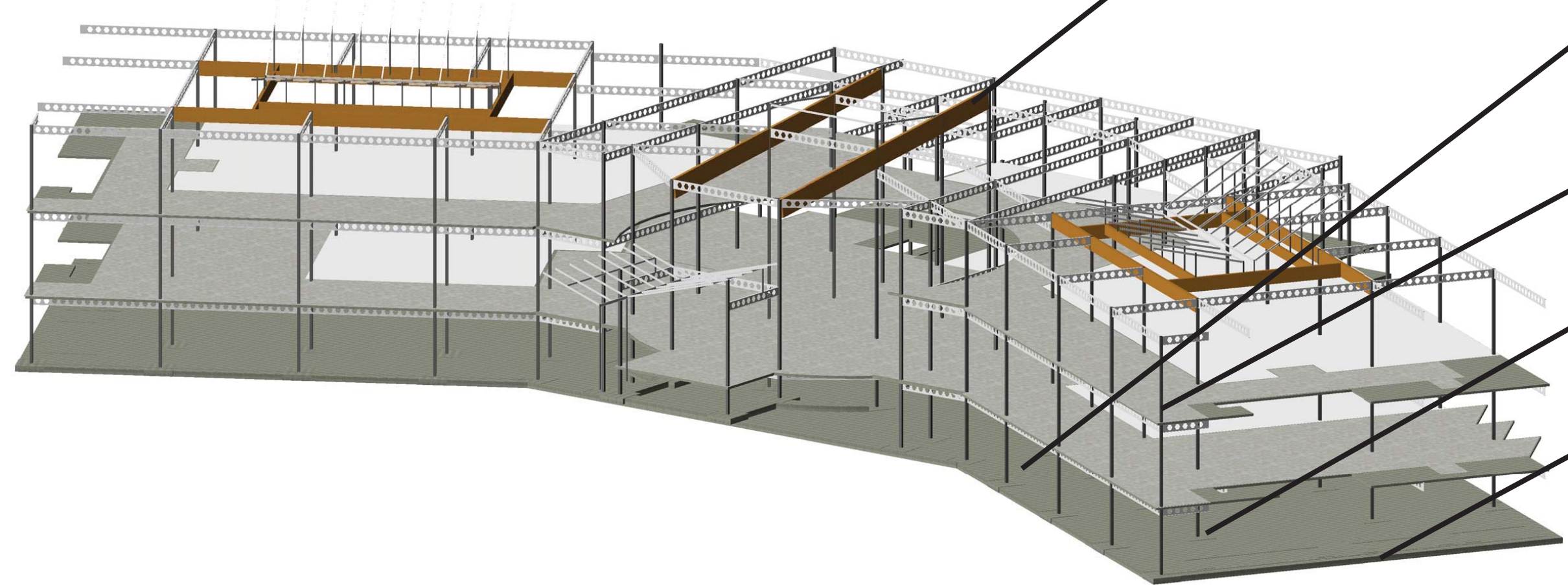
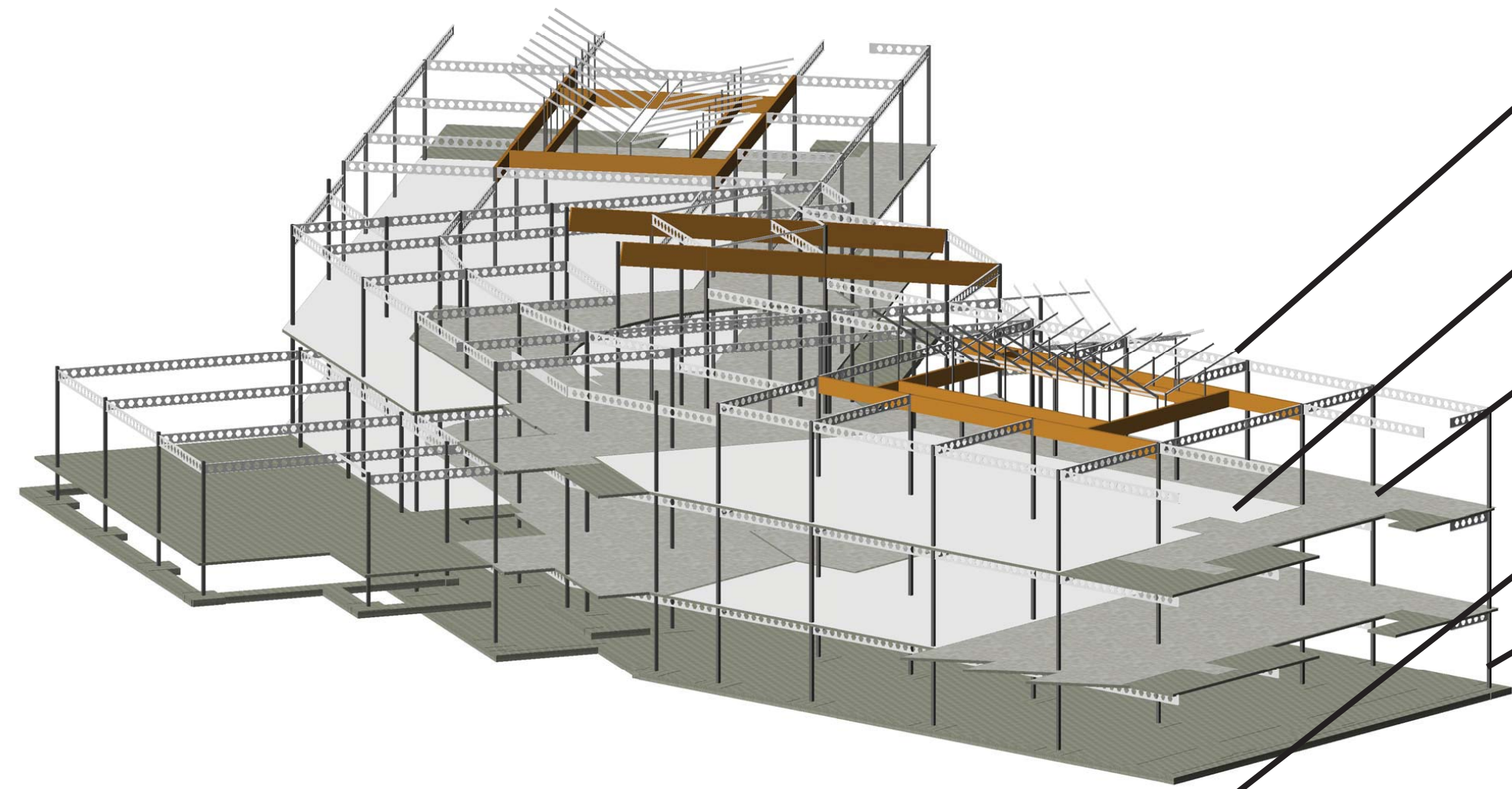
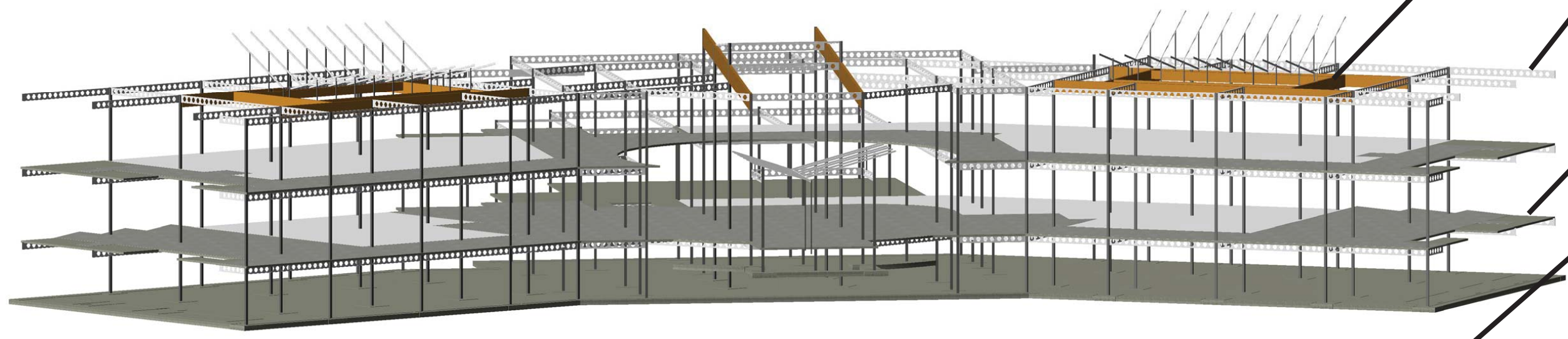
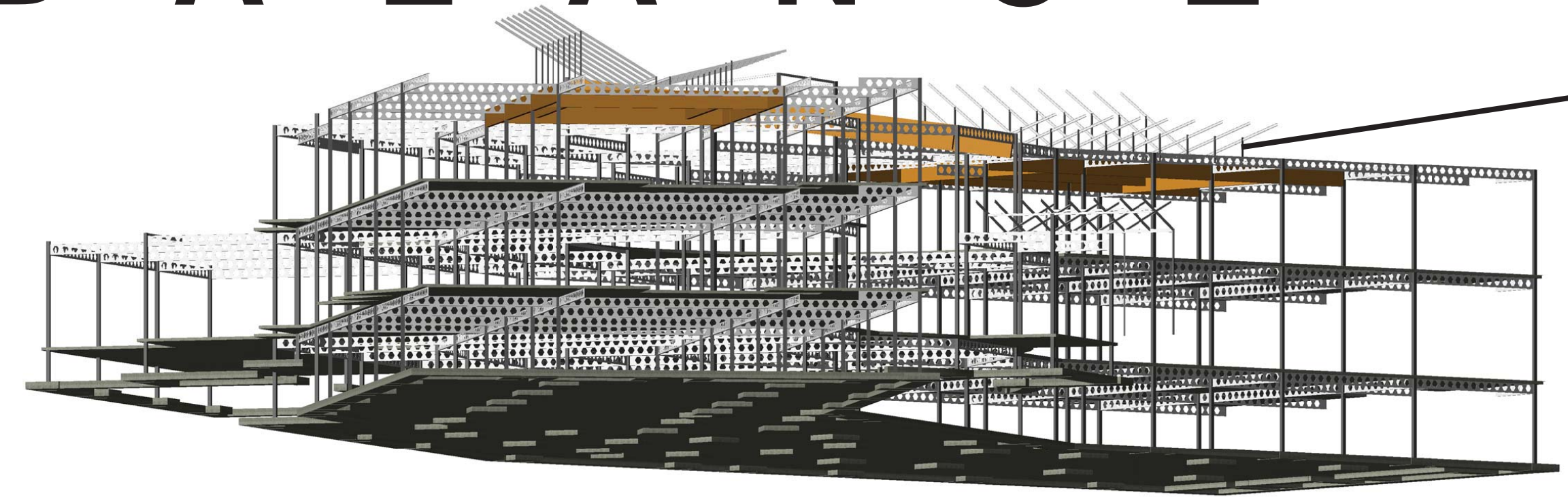


MATERIALS

H O W ?

MUCH LIKE AN ECOSYSTEM IN NATURE, A BUILDING MUST BE A SUM OF ITS PARTS. AWAKING WATERS DRAWS INSPIRATIONS FROM THE PASSIVE QUALITIES OF A WETLAND, THE ACTIVE QUALITIES OF A RIVER, AND THE SYSTEMS REQUIRED IN A FUNCTIONAL BUILDING DESIGN. BY DOING SO, THE CENTER PROVIDES STATE-OF-THE-ART RESEARCH FACILITIES AND INVITES THE PUBLIC IN TO LEARN ABOUT NATURE WHILE LIMITING THE BUILDING'S IMPACT ON THE LANDSCAPE.

B A L A N C E



4" WIDE-FLANGE
STEEL COLUMN

22" GLUE-LAMINATED
BEAM

18" CASTELLATED STEEL
BEAMS
(PAINTED WHITE)

5" HOLLOW CORE
CONCRETE DECKING

4" WIDE-FLANGE STEEL
BEAM

1/4" EPOXY
FLOORING FINISH

1/4" TERRAZZO
FLOORING FINISH

32" GLUE-LAMINATED
BEAM

6"x6"
HOLLOW STEEL
COLUMN
(NATURAL FINISH)

4" SLAB ON GRADE
STRUCTURAL
CONCRETE

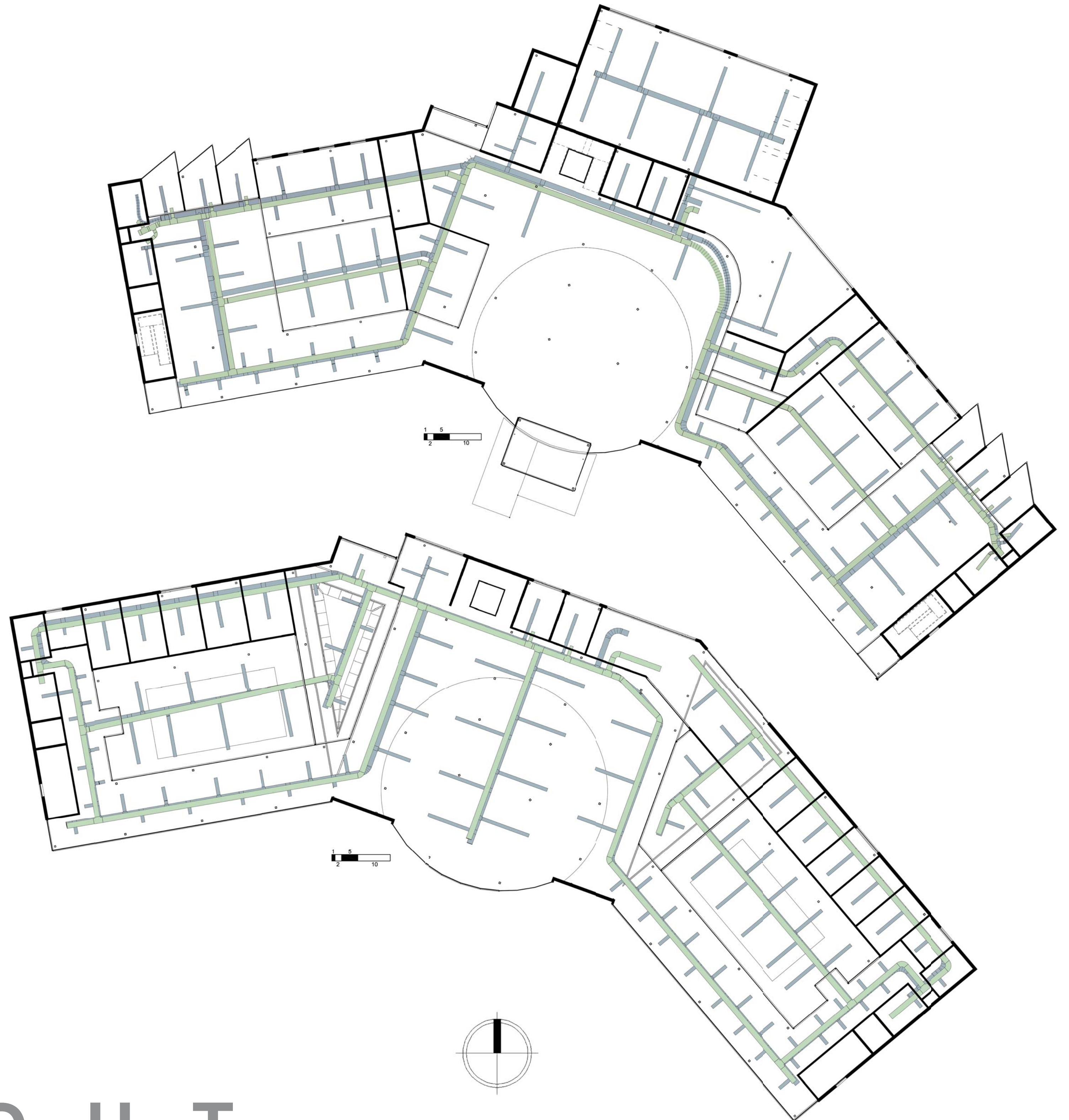
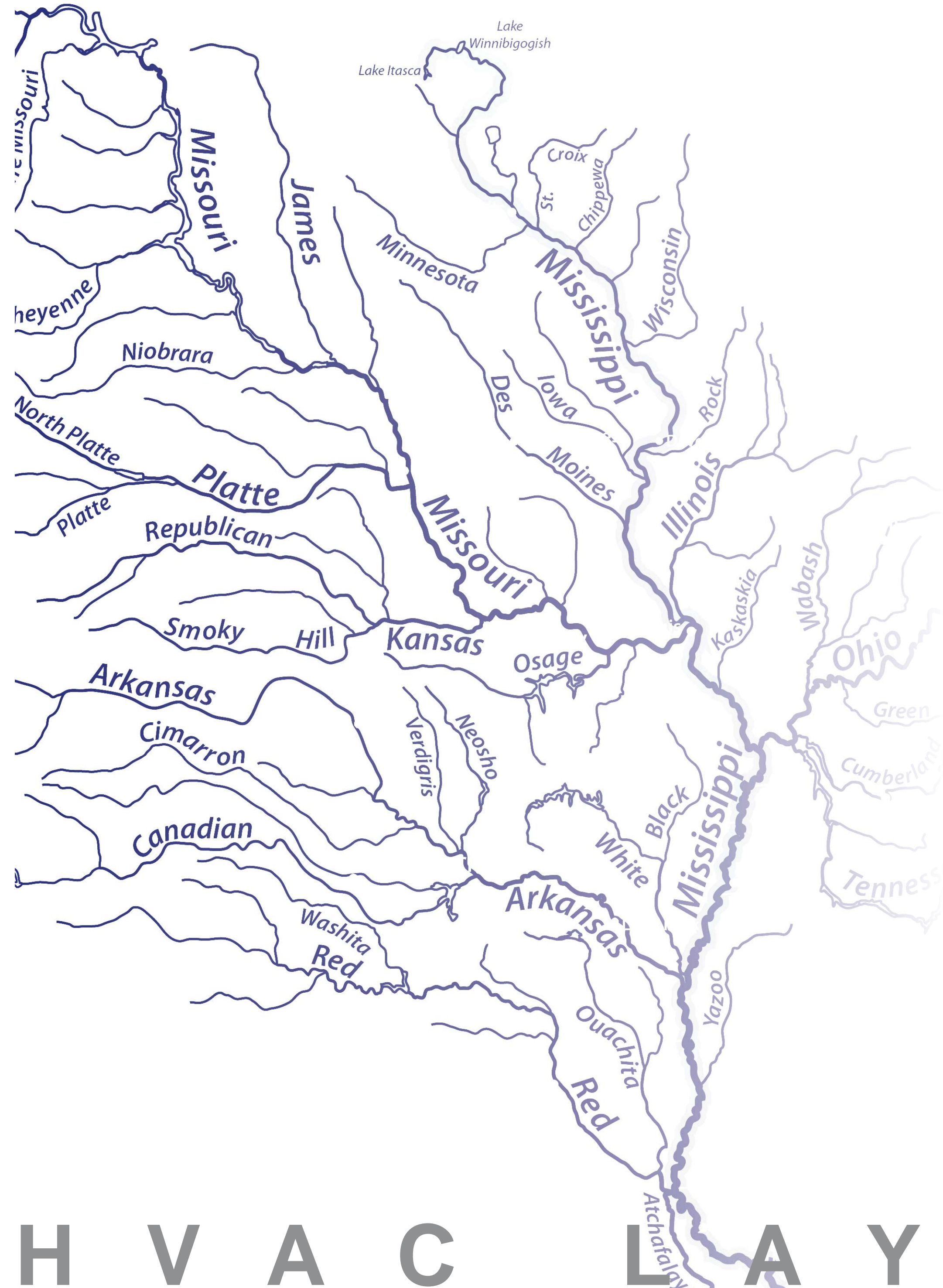
6"x6" STEEL COLUMN
(FURRED OUT WITH WOOD PANELING)

6'x6'x1' CONCRETE
PAD FOOTING




3'x1' CONCRETE STRIP
FOOTING

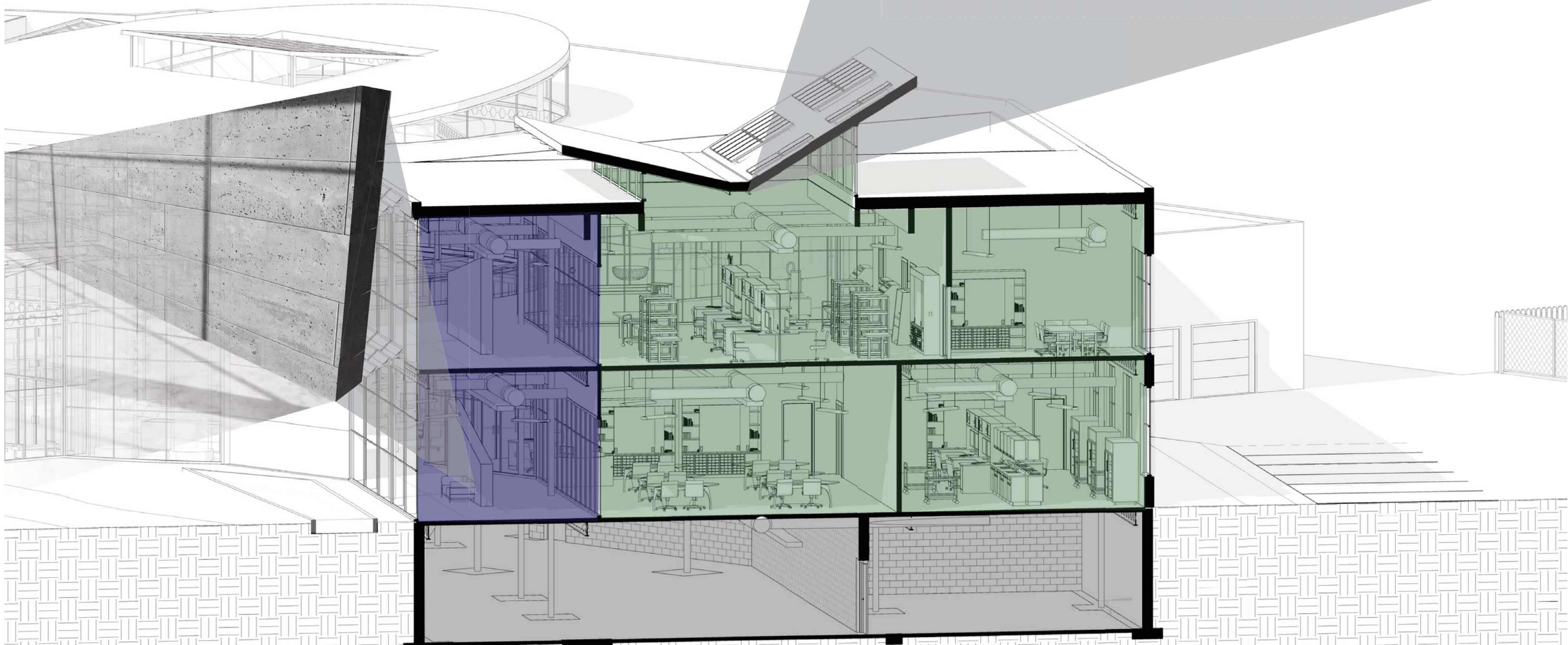
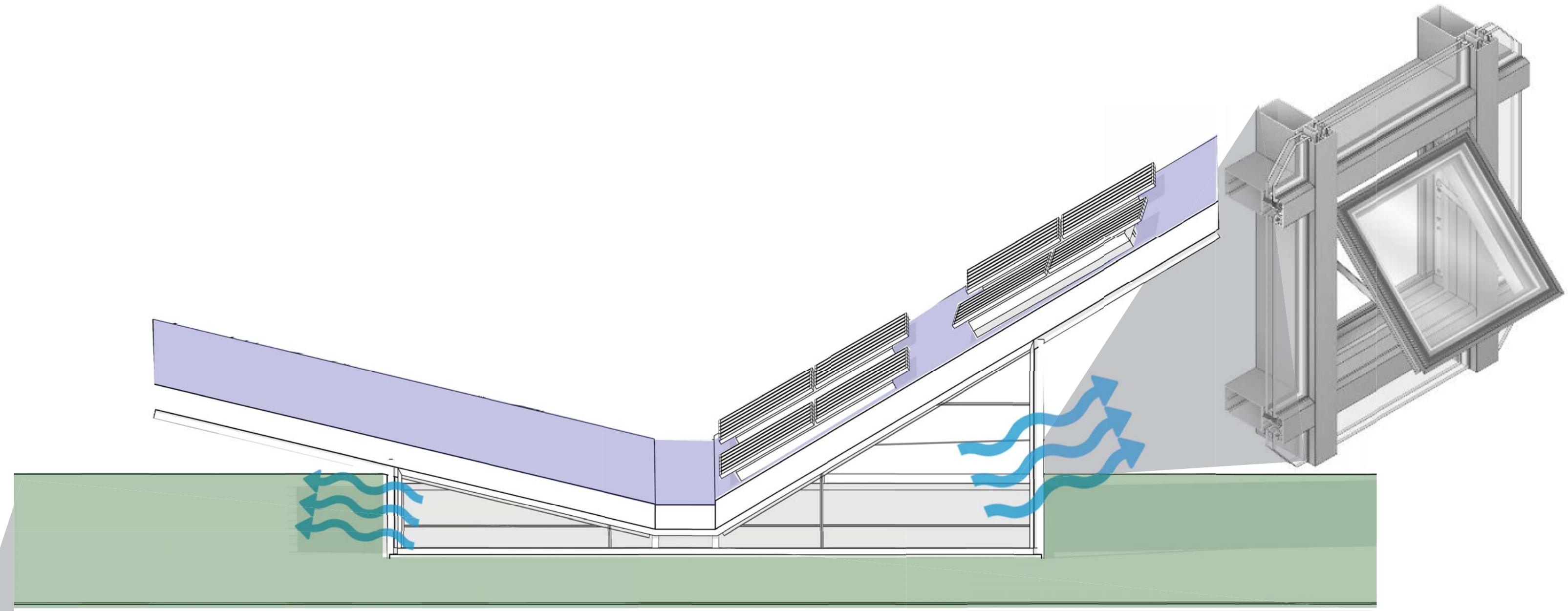
S T R U C T U R E

TRIBUTARIES






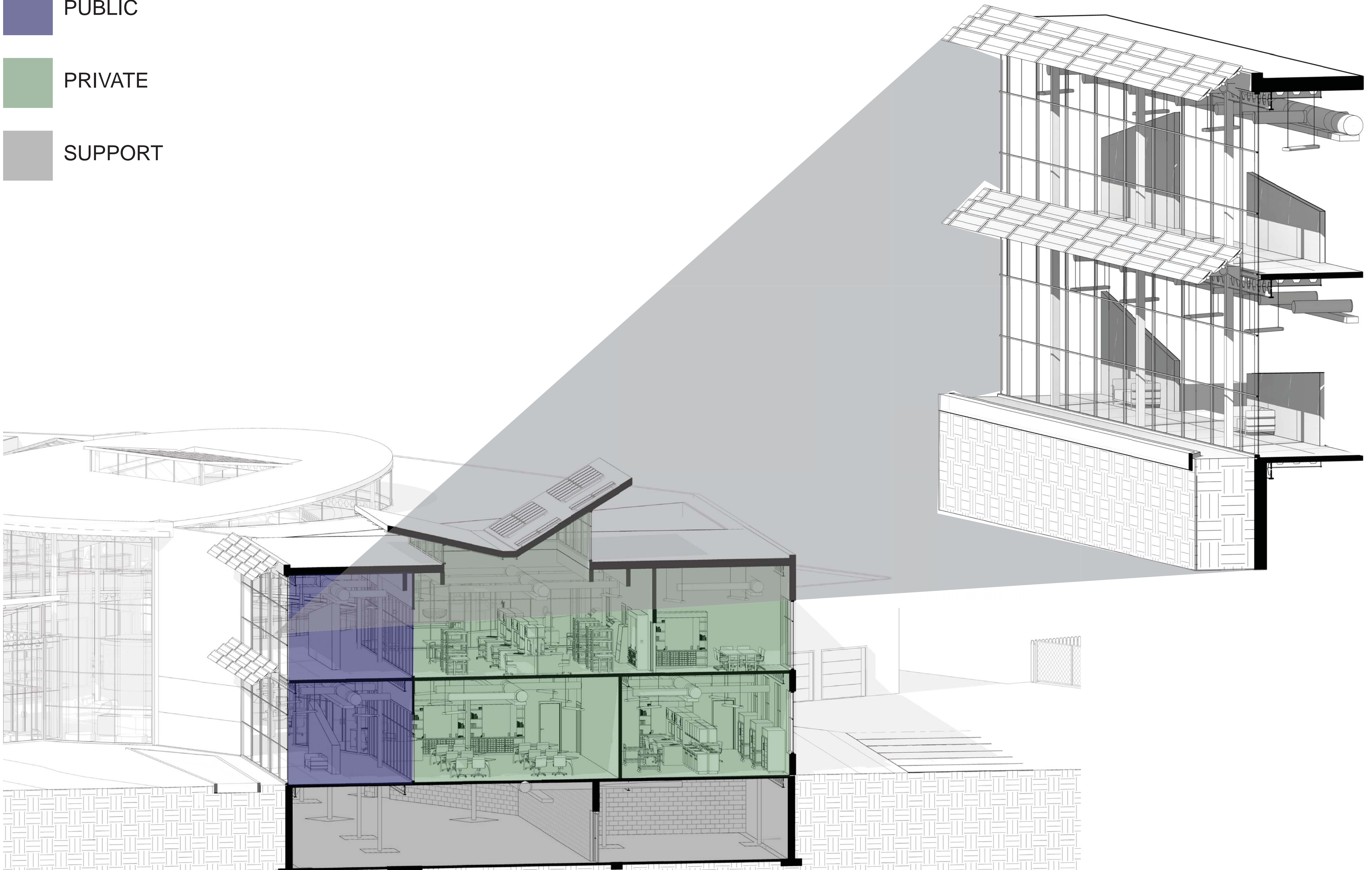
H V A C L A Y O U T

-  PUBLIC
-  PRIVATE
-  SUPPORT






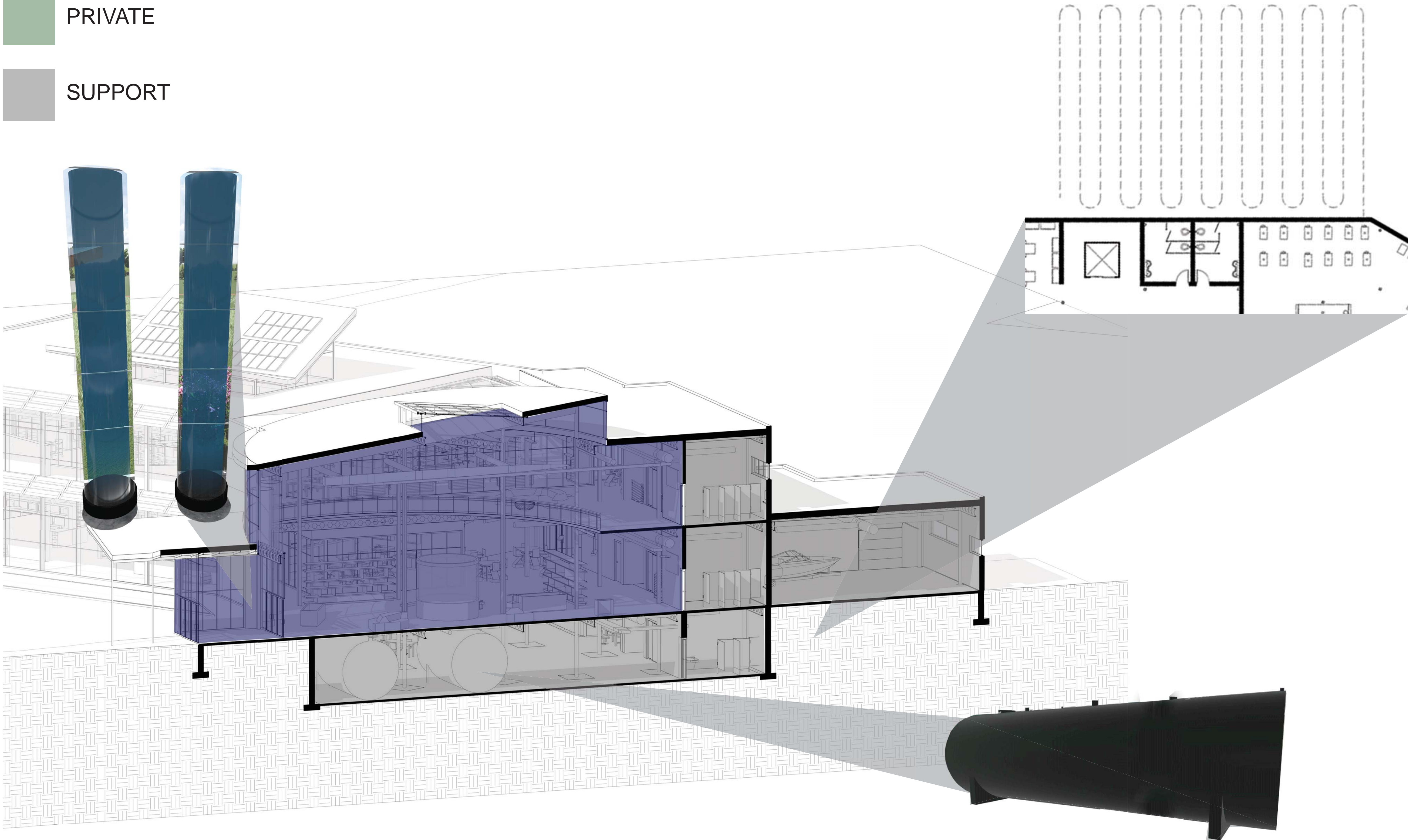
S U S T A I N A B L E S T R A T E G I E S

-  PUBLIC
-  PRIVATE
-  SUPPORT



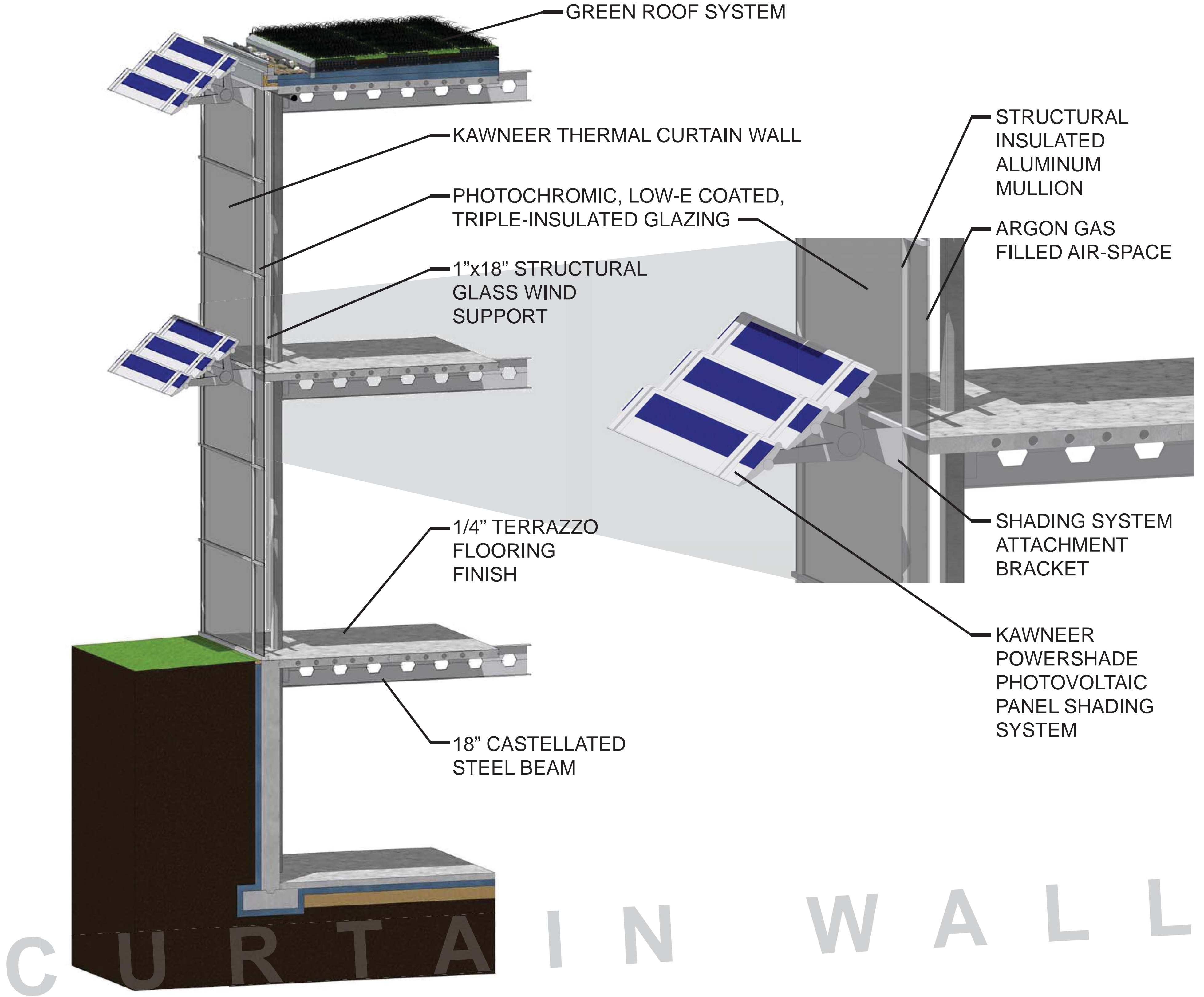
S U S T A I N A B L E S T R A T E G I E S

-  PUBLIC
-  PRIVATE
-  SUPPORT



S U S T A I N A B L E S T R A T E G I E S

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GREEN ROOF SYSTEM

KAWNEER THERMAL CURTAIN WALL

PHOTOCHROMIC, LOW-E COATED, TRIPLE-INSULATED GLAZING

1"x18" STRUCTURAL GLASS WIND SUPPORT

1/4" TERRAZZO FLOORING FINISH

18" CASTELLATED STEEL BEAM

STRUCTURAL INSULATED ALUMINUM MULLION

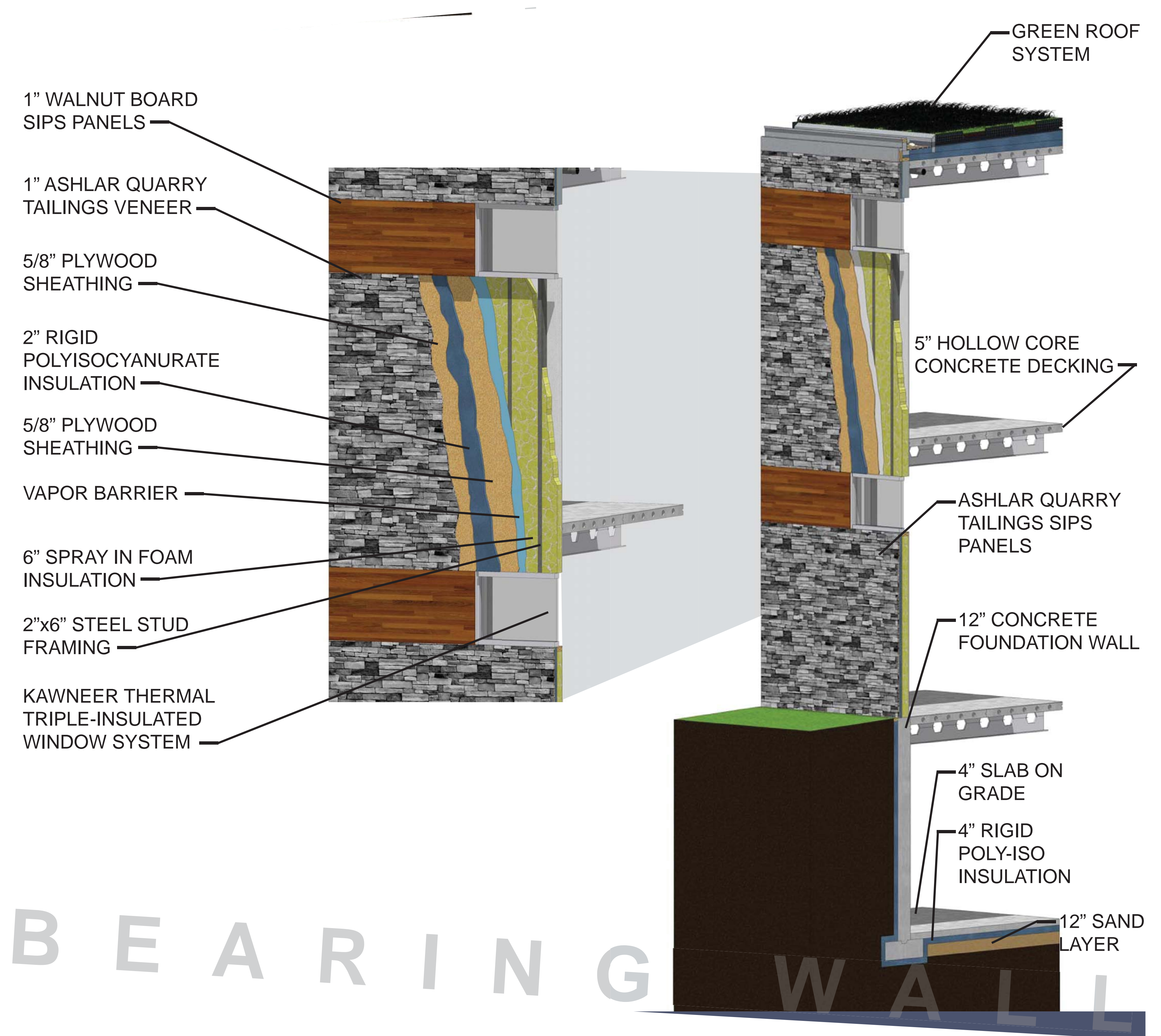
ARGON GAS FILLED AIR-SPACE

SHADING SYSTEM ATTACHMENT BRACKET

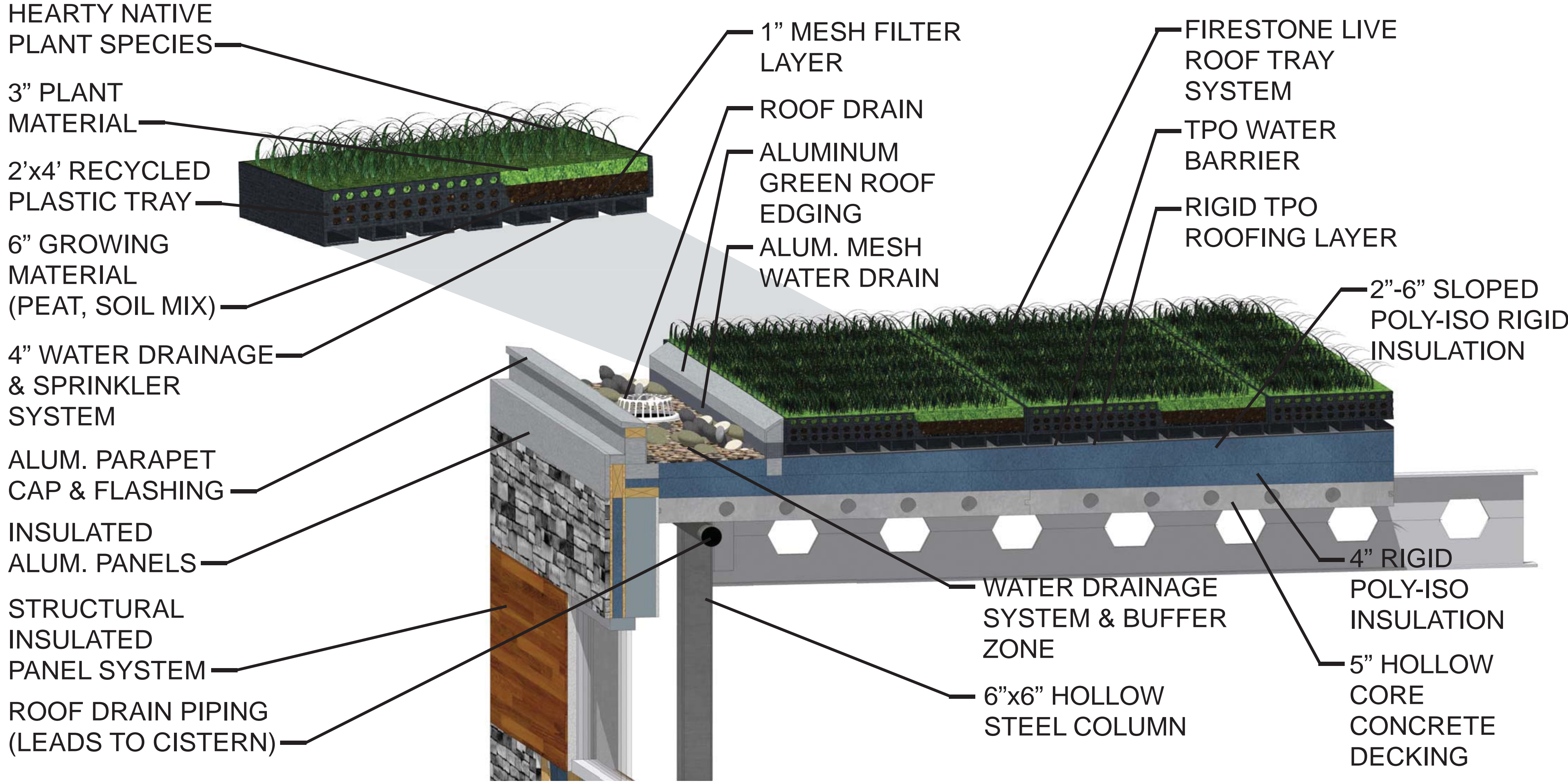
KAWNEER POWERSHADE PHOTOVOLTAIC PANEL SHADING SYSTEM

C U R T A I N W A L L

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GREEN ROOF ASSEMBLY
RETENTION

CENTRAL LAKES LIMNOLOGY SCIENCE CENTER



WHAT HAVE I LEARNED?

AWAKING WATERS

AWAKING WATERS
CENTRAL LAKES LIMNOLOGY SCIENCE CENTER

ADVISOR- STEVE MARTENS, ARCHITECT, PROFESSOR

PROGRAMS USED- REVIT, SKETCHUP, AUTOCAD, LUMION, PHOTOSHOP, INDESIGN

CHARLOTTE HAUGH