

# CASE STUDY TENNIS

Exhibit "A"

## [ U-INDY TENNIS CENTER ] INDIANAPOLIS, IN



**APPLICATION:**.....INDOOR TENNIS FACILITY  
**SIZES:**.....125' W x 346' L (43,250 SQ. FT.)  
**FEATURES:**.....DIRECTLY CONNECTS TO CONVENTIONAL BUILDING  
ENERGY EFFICIENT ARIZON SKYLIGHT  
GRAY EXTERIOR FABRIC

### CHALLENGE

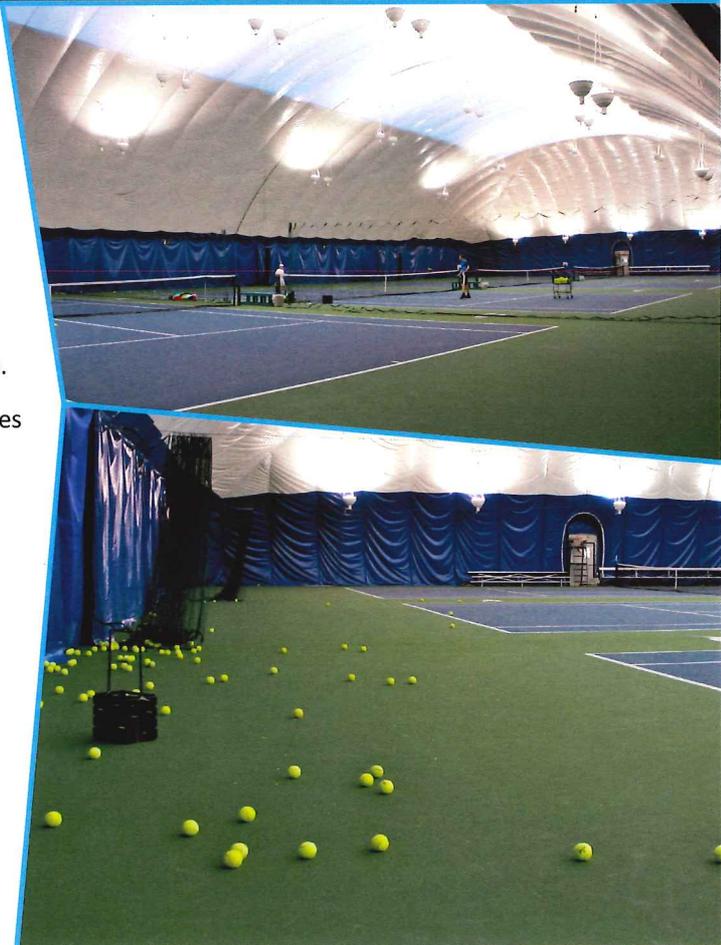
- Enclose seven outdoor tennis courts with an air-supported building that can directly attach to a conventional building that houses changing rooms and other amenities.

### SOLUTION

- Arizon designed, manufactured and installed an open-span air-supported structure to serve as an indoor competition and training venue for the University of Indianapolis tennis program.
- The facility features Arizon's energy-efficient mechanical equipment which uses an Air-Rotation System® to provide optimum temperatures throughout the year.
- The fabric skylight allows management to significantly decrease the need for artificial lighting during daytime hours, resulting in further energy savings.

### RESULT

- The University of Indianapolis was able to construct a permanent indoor tennis facility for the Greyhounds for roughly 1/3 of the cost of a conventional building.
- The university is also able to provide an indoor facility to the local tennis community by offering daily court time to the public for recreational play and lessons.



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# Air Structures & Building Codes

Listed under chapter 31 of the International Building Code, air supported structures have many unique features and benefits as compared to buildings constructed with conventional building materials.

**International Building Code** Air supported structures are covered in the International Building Code (IBC) in chapter 31, "Special Construction."

**Fire Safety Features** The building code requirements are constantly changing, but depending on the application, a sprinkler system is still not required for some projects. For example, an air structure with A-4 occupancy classification can be accepted without a sprinkler system if certain conditions are met and approved by the local building authority. Quite often, equivalent offsetting design features are incorporated into the dome design that not only enhances but highlights the generally safe nature of the clear-span air supported structure. [Fire alarm pull boxes, fire extinguishers, easy access to plenty of emergency egress doors, on-site generated power for operation of systems during power outages, smoke and fire detection systems and even state-of-the-art water cannon systems](#) have been incorporated into a fire protection package acceptable to building commissioners and fire marshalls alike.

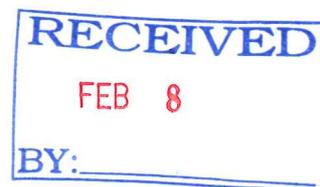
There are thousands of air supported structures in use today without any type of water-based fire protection systems. Even so, [the industry track record is unblemished without a single fatality due to fire in the history of the industry. No other building type can even come close to this stellar performance history.](#)

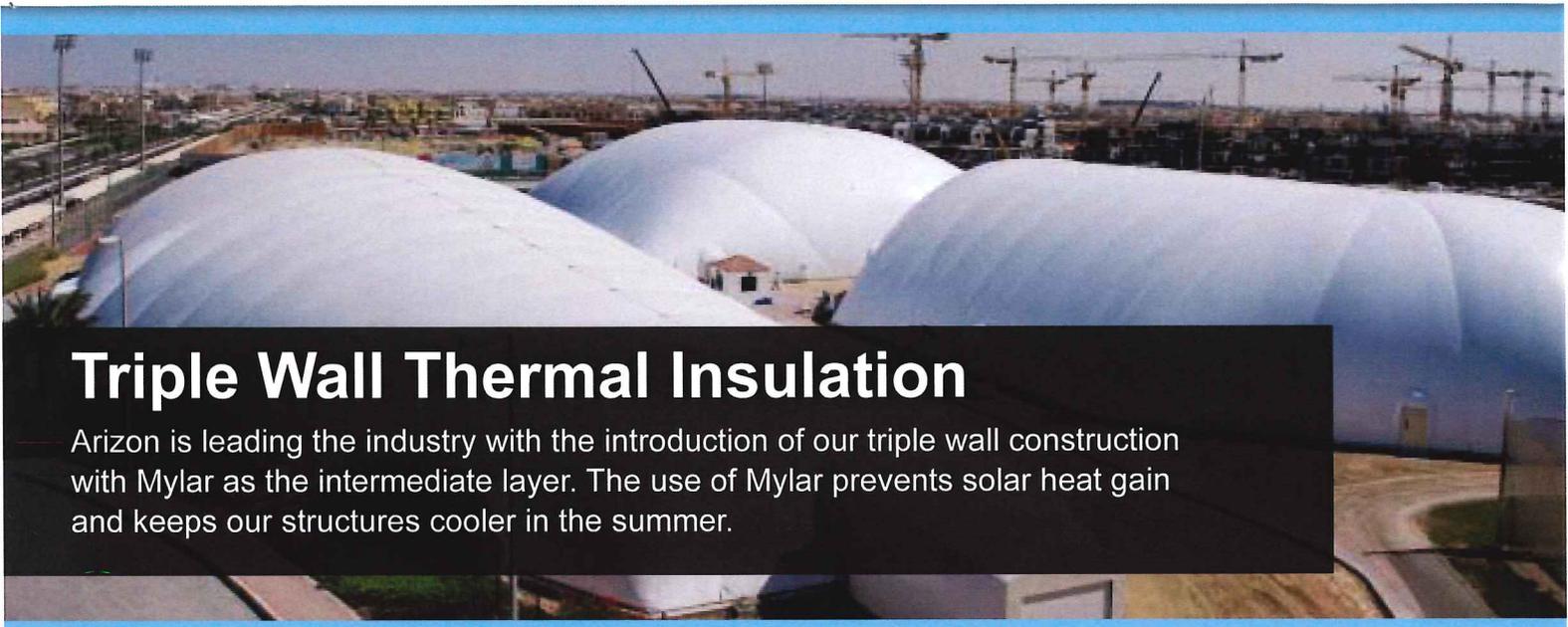
**Fire Performance Testing** Air supported structures use non-traditional building materials, primarily fabric, for its buildings. These building materials are not considered truly "non-combustable," but they do meet all requirements of NFPA 701 and so are allowed (see IBC paragraph 3102.3.1). The only reason that the materials used are not considered "non combustable" as defined in section 703.4 is the requirement of ASTM E136. The flame spread requirement in paragraph 703.4.2 of not greater than 50 is easily met (in fact, our materials have a flame spread of 15!). The base material does not pass the requirements of ASTM E136 simply because the % mass remaining after the test. The

test requirements have two parts: first, the material shall not catch fire (which Arizon's material does not), and second, the material should have at least 50% of its original mass left (which it does not, it vaporizes). Given the choice from a purely safety sake, it is better to have the fabric vaporize rather than burn. The exception in paragraph 3102.3.1 allowing materials that pass NFPA 701 indicates the true requirements of the materials used in air structures: they should not burn when exposed to flame.

On extremely rare cases, a fire has occurred within an air structure (on landfill sites, specifically). The result was that when the fire did reach the building, it melted a hole in the fabric and the immediate opening blew out the fire at the building envelope, relieved the heat build up at the roof, allowed the smoke to escape, and allowed safe extinguishing of the fire by crews while the building stayed fully inflated. The make-up air system increased its output automatically to overcome the air loss through the opening in the building. The materials self extinguished, and the building needed only minor repairs.

**Arizon Building Code Support** Each project is unique, as well as local building codes and requirements. Arizon can work with your professional consultant to design an air supported structure and fire protection system suitable for almost any application. Additionally, Arizon will provide structural drawings and calculations sealed by a Professional Engineer for the owner's use in obtaining a building permit.





# Triple Wall Thermal Insulation

Arizon is leading the industry with the introduction of our triple wall construction with Mylar as the intermediate layer. The use of Mylar prevents solar heat gain and keeps our structures cooler in the summer.

Insulation Calculation	Triple Wall
Exterior Surface, 15 MPH wind	0.17
Exterior Fabric	0.79
Dead-Air Space	1.86
Fiberglass Insulation	---
Thermal Liner	0.62
Dead-Air Space	1.86
Thermal Liner	0.62
Inside Surface, still air	0.62
<b>TOTAL R-Value</b>	<b>6.54</b>

## About Triple Wall Construction

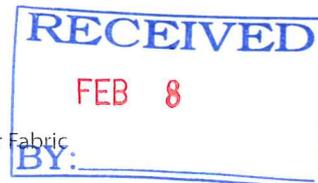
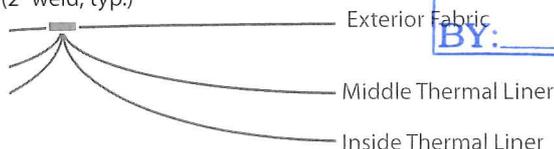
Summer use of the air supported structure usually means air conditioning or uncomfortable conditions inside the dome. In addition to the warmer temperatures of summer, the solar heat gain on all buildings creates a significant demand for more air conditioning. One solution used for years has been reflective Mylar as a building component. Arizon has incorporated that concept into our air supported structure systems.

There are two properties of roof coatings that keep roof surfaces cool in the sun: High reflectivity to reflect away the sun's energy instead of absorbing it, and high emissivity to radiate away any energy they do absorb.

Any locations where solar heat gain is a significant part of the cooling load of this building will greatly benefit from this design. Unlike other insulation types that must be installed in the field, triple wall Mylar construction is factory-installed and still delivers exceptional insulative results. Arizon's team can analyze your application and help determine if our triple wall with reflective mylar is advantageous for your project.

## Triple Wall Construction Detail

Radio frequency welded seams (2" weld, typ.)



# FABRIC OPTIONS

## EXTERIOR ARCHITECTURAL FABRIC - 28oz

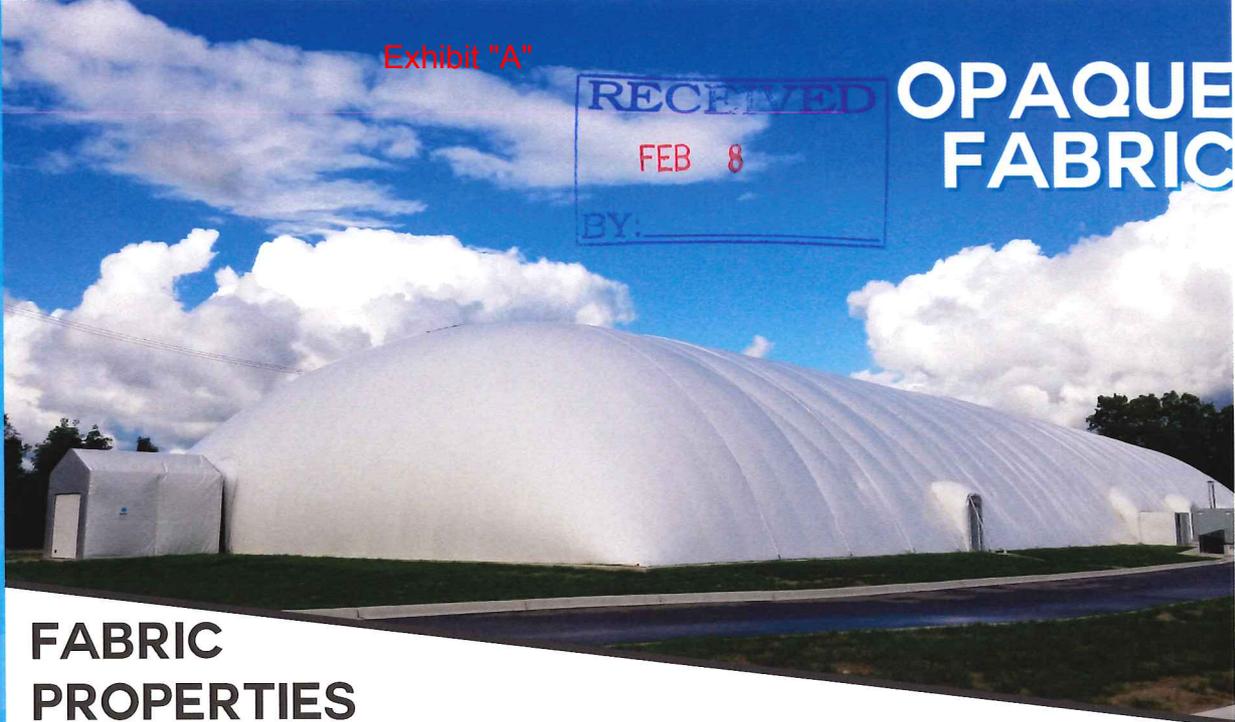
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Exhibit "A"



# OPAQUE FABRIC



## FABRIC PROPERTIES

### PVDF

The PVDF top coating provides outstanding protection as opposed to being laminated, it is a chemical that becomes an integral part of the PVC finish, allowing for long-term durability without potential delamination.

### DURABLE & WEATHER RESISTANT

The base cloth is woven from high tensile strength polyester yarn and is anti-wick treated. The flexible PVC coating also provides exceptional weather resistance.

### CLEANABLE & NON-STICK

PVDF-coated exterior top coating also has excellent resistance to dirt, dust and mildew.

### LIGHT TRANSMISSION & ENERGY EFFICIENCY

Arizon's PVDF-coated exterior architectural fabric is available in translucent (which allows up to 5-12% light transmission, reducing the need for artificial daytime lighting) or opaque (which helps block radiant heat in warmer climates).

### FABRIC AS A BUILDING MATERIAL

Using heavyweight, high strength, coated fabric helps to ensure a long-life structure. In order to extend the fabric life and help maintain the cleanest possible building, specialty top-coatings are used in the exterior fabrics. These topcoats are designed to protect the PVC from degradation by UV rays, weather, direct and pollution.

### SAFETY & BUILDING CODES

This fabric meets standard building codes, passes NFPA 701 requirements for building materials, is fire resistant, self-extinguishing and has extremely low smoke development ratings. UV inhibitors have extended the life of these fabrics up to 20+ years.

### COLORS & TRANSLUCENCY

Arizon's exterior fabrics come in a number of colors at a premium upon request. Our clients may also choose between translucent fabric, opaque fabric or a combination of the two in our skylight feature.

## SPECIFICATIONS PVDF-II COATED OPAQUE EXTERIOR FABRIC

PROPERTY	METRIC	IMPERIAL
COLOR	White (Other colors available upon request)	
WIDTH (ASTM D-751)	2.04 m	80.3 in
ROLL LENGTH	100 m	110 yd
UNIT MASS	940 g/m <sup>2</sup>	28 oz/yd <sup>2</sup>
THICKNESS	.75 mm	30 mil
GRAB TENSILE STRENGTH	360 x 370 daN	810 x 840 lbs
ELONGATION AT BREAK PERCENTAGE	23 x 32	23 x 32
STRIP TENSILE STRENGTH	450 x 450 daN/5cm	514 x 514 lbs/in
TEAR STRENGTH	55 x 53 daN	123 x 119 lbs
COATING ADHESION	12 daN/5cm	14 lbs/in
TEMPERATURE EXTREMES	-30oC + 60oC	-22oF to + 140oF
LIGHT TRANSMISSION	0%	0%
ANTI-WICKING	Yes	Yes
FUNGAL RESISTANCE	Treated	Treated
FIRE RETARDANT	Yes, NFPA701, CSFM, ASTM E-84, CAN/ULC S109, and others	
UV RESISTANT	Yes	Yes
WARRANTY	20-Year Pro-Rated Warranty	

# FABRIC OPTIONS TIMBERWOLFE GREY EXTERIOR

## Exhibit "A" EXTERIOR ARCHITECTURAL FABRIC



### TIMBERWOLFE GREY

#### BLEND INTO SKYLINE

The Timberwolfe Grey fabric enables the facility to blend into the skyline much easier than that of a stark white dome.

#### CLEANABLE & NON-STICK

PVDF-coated exterior top coating also has excellent resistance to dirt, dust and mildew. The special fluorine lacquer top coating that makes our PVDF unique provides superior production and is designed to provide enduring beauty. The Timberwolfe Grey Fabric color also enhances the long term beauty of the dome, providing less visible dirt accumulation over longer periods of time.



### GREY EXTERIOR FABRIC



### WHITE EXTERIOR FABRIC



## SPECIFICATIONS PVDF COATED TIMBERWOLFE GREY EXTERIOR FABRIC

PROPERTY	METRIC	IMPERIAL
COLOR	Timberwolfe Grey	
UNIT MASS	904 gsm	28 oz/yd <sup>2</sup>
THICKNESS	.075 mm	30 mil
GRAB TENSILE STRENGTH	3100 x 3100 N	697 x 697 lbs/in
ELONGATION AT BREAK PERCENTAGE	23 x 32	23 x 32
STRIP TENSILE STRENGTH	4500 x 4500 N/ 50 mm	514 x 514 lbs/in
TEAR STRENGTH	550 x 530 N	124 x 119 lbs
COATING ADHESION	120 x 110 N/50	14 x 12 lbs/in
TEMPERATURE EXTREMES	-30oC + 60oC	-22oF to + 140oF
LIGHT TRANSMISSION	0%	0%
ANTI-WICKING	Yes	Yes
FUNGAL RESISTANCE	Treated	Treated
FIRE RETARDANT	Yes, NFPA-701, ASTM-E84, CSFM, AS1530 (results available)	
UV RESISTANT	Yes	Yes
WARRANTY	20-Year Pro-Rated Warranty	

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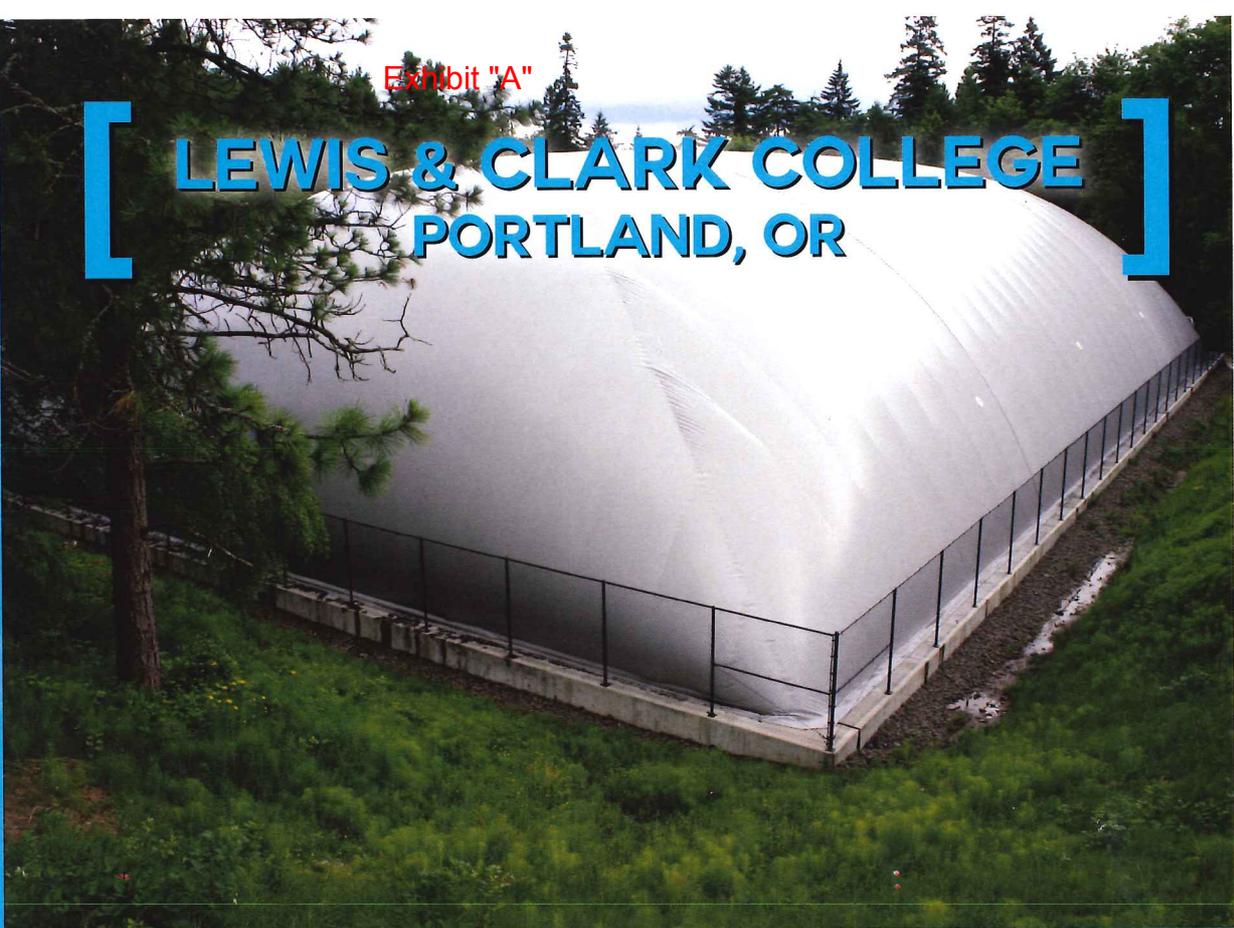
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# CASE STUDY TENNIS

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## [ LEWIS & CLARK COLLEGE PORTLAND, OR ]



APPLICATION:.....TENNIS DOME  
 SIZES:..... 118' W x 223' L (26,314 SQ. FT.)  
 FEATURES:.....CUSTOM-DESIGNED GRAY EXTERIOR FABRIC  
 HIGH-TECH CENTER SKYLIGHT SYSTEM  
 SEASONAL DOME FOR WINTER ONLY

### CHALLENGE

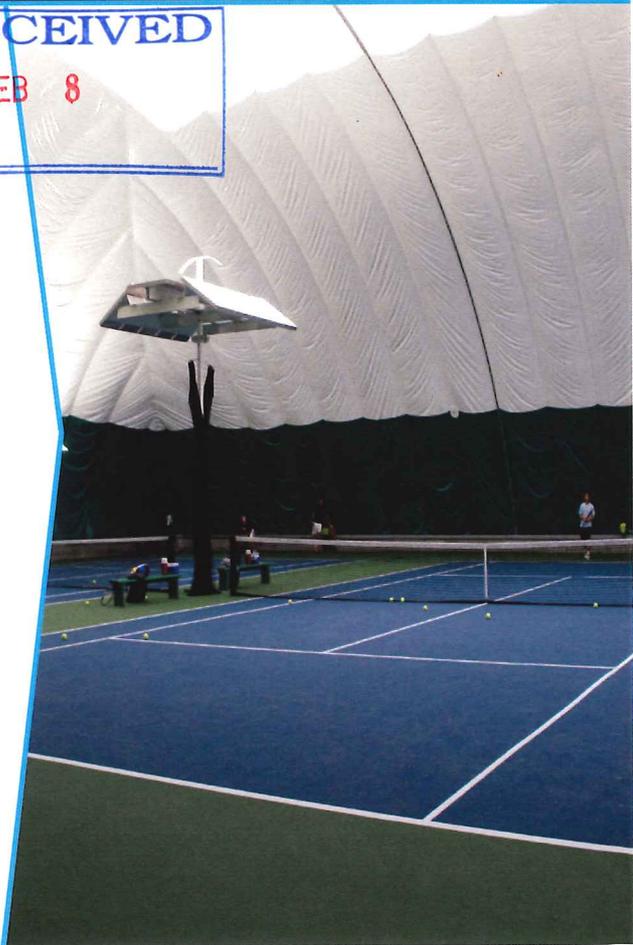
- Cover the Lewis & Clark College outdoor tennis courts with an energy-efficient and "green" enclosure during the winter

### SOLUTION

- Arizon designed an air-supported building to fit over the existing tennis courts at Lewis & Clark College during the winter months.
- A LEED-certifiable and energy-efficient mechanical system, overhead skylight and ample insulation were incorporated into the dome's design to greatly reduce operating costs.
- Gray exterior fabric was used as requested by the college as an aesthetic preference.
- The dome features a cable system to offer extra stability, safety & support during possible inclement weather.

### RESULT

- Lewis & Clark is able to offer year-round training & practice capabilities- a major draw for prospective students.
- Typically the first stop on recruitment tours, the dome draws top talent from across the country.
- The Pioneers womens team boasted several top ten recruiting classes after being installed.



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