

**THE WORLD'S LEADING NATURAL GRASS  
ROOTZONE MANAGEMENT SYSTEM**



**PERFORMANCE DELIVERED**

# AIRPAT™

AirPAT™ is the most advanced natural grass rootzone management system in the world. Employing proprietary vacuum and ventilation technology to generate ideal growing conditions, AirPAT™ delivers superior results in any climate, in any location.

AirPAT™ is designed for total customisation, allowing the client to choose features most beneficial to their venue. These features can include vacuum drainage and forced air ventilation, heating, cooling, continuous rootzone monitoring, both onsite and remotely, and water conservation via water recycling and sub-irrigation.

HG Turf Group are a global leader in the design, construction, management and maintenance of high-performance sports fields and stadia pitches.

Constantly looking to innovate, and with a commitment to offering the very latest and best technology, HG Turf Group collaborate with respected local and international companies to find and deliver world class solutions to meet the needs of its clients throughout Asia Pacific and the Middle East.

Our partner network ensures our portfolio of proprietary systems have a global footprint. The AirPAT™ System, developed by our long-term partner, The Motz Group, is testament to this commitment.



## RESEARCH & DEVELOPMENT

AirPAT™ has been borne out of evolution, research and development, with an overarching ethos of continuous improvement and being the best in the field. When Motz decided to re-engineer the Prescription Athletic Turf (PAT) system to include subsurface rootzone aeration, it was a commitment to improve on what was already available in the market, and to push the boundaries. A team of civil, mechanical, drainage and software engineers were assembled with the goals set:

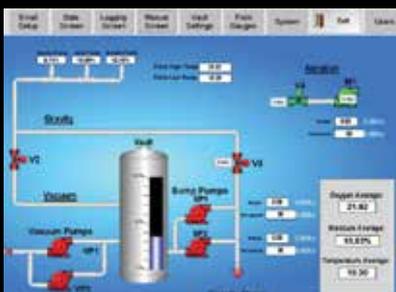
- Optimize the performance and uniformity of both drainage and air in the rootzone.
- Include features that support sustainability and functionality across a wide spectrum of venues globally.
- Design for efficient and affordable construction and maintenance.



## DESIGN & CONSTRUCTION

An AirPAT™ system can be designed and constructed under several scenarios:

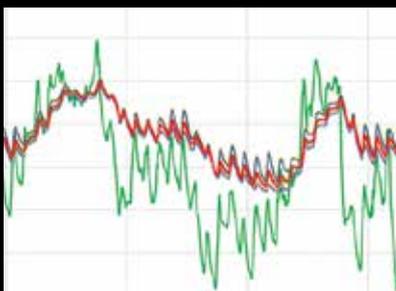
- As a fully integrated sports field builder, HG Turf Group can seamlessly take the project from concept to finished product under a formal design and construct contract.
- Placed in a design assist role, HG Turf Group can support project stakeholders by providing detailed design, written specifications and full construction services.
- HG Turf Group also offer the AirPAT™ system in situations where alternative field building contractors have been selected. We can supply and install the technology whilst ensuring that all contractors interface together to deliver the best outcome for the client.



## FUNCTIONALITY

AirPAT™ provides grounds managers with a variety of advanced tools to support agronomic and turf management decisions. As the world's leading natural grass rootzone management system AirPAT™ offers the following functions:

- Gravity and Vacuum enhanced drainage
- Moisture and Aeration porosity profile management
- Overhead and subirrigation
- Vertical and horizontal air flow through rootzone profile
- Capturing, conserving and recycling of water
- Continuous monitoring of the rootzone
- Additional heating and cooling options



## CUSTOMIZED REPORTING

The AirPAT™ System continually collects a wide array of agronomic and climatic data. Sensors placed in the rootzone log temperature, volumetric water content, oxygen levels and dielectric constant. The AirPAT™ weather station records temperature, relative humidity, rainfall, wind speed, solar radiation and evapo-transpiration. The systems brain and data logger can store months of continuous monitoring data in order to create valuable benchmarks and trends. The software can produce reports customised by the grounds manager and display results in a wide array of graphical formats, which allow decisions to be made based on precision turf management information.

# KEY R&D FINDINGS

During development of the AirPAT™ system, nothing was presumed. Design elements that were considered standard for other vacuum-ventilation systems were thoroughly tested. The vetting process led to some surprising findings and resulted in a far greater understanding of the complexities of moving air through large areas of sand rootzone profiles.

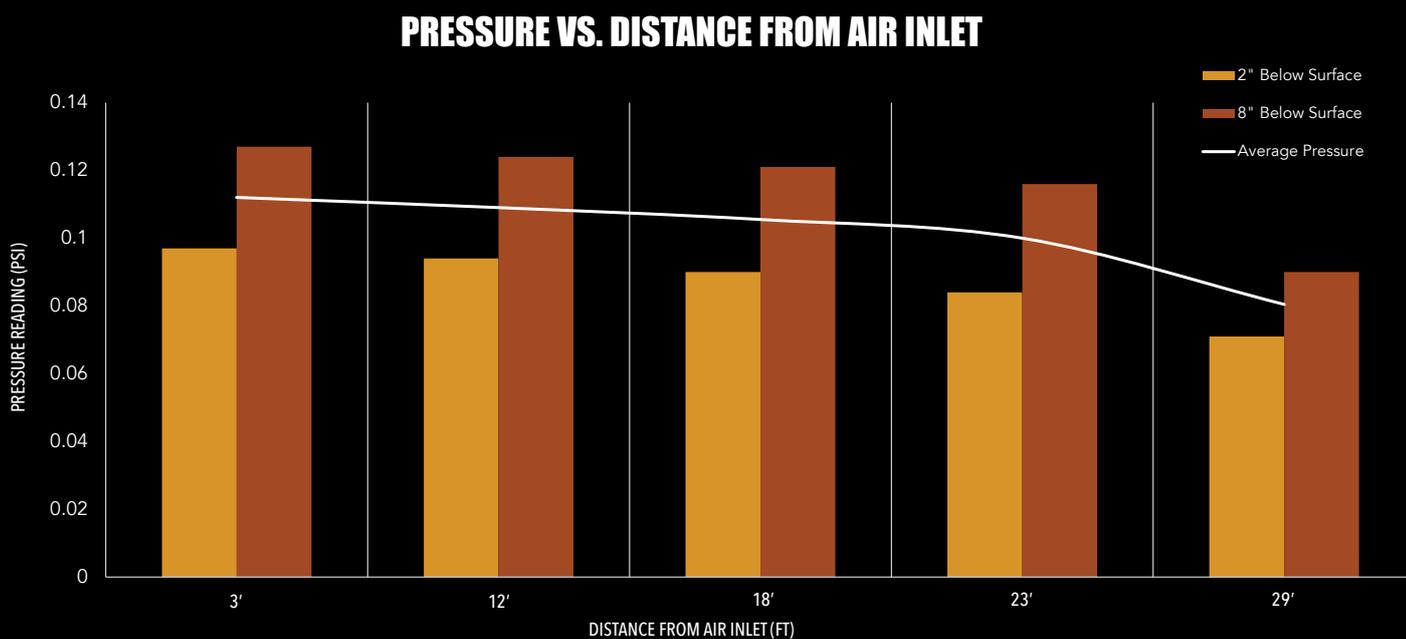
For example, standard perforated round pipe trenched into a subgrade and backfilled, proved far less efficient than flat panel pipe, laid horizontally on an impermeable barrier.

## PIPE SPACING

Moving air uniformly through the rootzone profile should be the primary objective of any field ventilation system. Achieving this objective requires a clear understanding of the maximum distance that air can be pushed through the system and into the rootzone before critical pressure loss takes place. Our trials consistently demonstrated that pressure losses are detectable using precision monitoring equipment within 4' of the supply outlet and that statistically significant pressure differentials are recorded starting at a distance of approx. 25'.

As seen in Figure 1; pushing air further than that results in lower distribution uniformity across the field. Understanding these relationships helps to guide design of the piping system on any shape or size of sports field and assures optimal performance for both drainage and aeration.

**FIGURE 1**



# PIPE SELECTION

Perforated round pipe has been an industry standard in field drainage systems, where flow capacities support high drainage rates and installation is straightforward. If moving water out of the field is the only objective, it's a good choice. However, when drain lines also need to convey air, custom designed flat panel drains prove to be far more effective. Figure 2 shows why; flat pipe has twice as much surface interface as compared to round pipe, which means greater contact/transfer area with the rootzone aggregate. The AirPAT™ System utilises custom perforated AdvanEDGE™ flat panel drains that are exclusively manufactured for AirPAT™ Systems and result in six times more inlet capacity than either 4" or 6" round pipe. Simply that translates to both highly efficient collection of water and far greater uniformity in the distribution of air.

**FIGURE 2**

PIPE CHARACTERISTICS			
	4" N-12	6" N-12	12" ADVANEDGE
WETTED SURFACE INTERFACE / 100LF	104 ft <sup>2</sup>	157 ft <sup>2</sup>	217 ft <sup>2</sup>
PERFORATION INLET CAPACITY / 100LF	0.7 ft <sup>2</sup>	0.7 ft <sup>2</sup>	4.5 ft <sup>2</sup>

# AIR FLOW

Uniform airflow through the rootzone profile is a functional result of both volume and pressure. Understanding the relationship between both is essential to optimising the aeration function. Uneven distribution of air across the field footprint cannot be over come simply by increasing the amount of air being delivered through the pipe system. Large diameter pipes and massive fans don't get the job done. Research has shown that when pushing air through a porous aggregate, more is not better. Controlled volumes are required because once the optimal threshold has been crossed, uniformity deteriorates proportionally with increasing the air flow. This is demonstrated clearly in Figure 3, when pressure probe readings start to diverge at 30Hz and continue to do so as volumes are increased further. A loss of uniformity results in rootzone conditions that are variable across the field, thus affecting agronomic and playability performance.

**FIGURE 3**



# CASE STUDY

## BANKWEST STADIUM

**Client:** Lendlease Construction and Infrastructure NSW

**Location:** Parramatta, Sydney, NSW, Australia

**Product:** AirPAT VV System

**Grass Surface:** Hybrid Grass

**Application:** Elite Stadium

**Sports:** Soccer, Rugby League and Rugby Union

### KEY CHALLENGES

As with any major stadia, the stadium bowl structure and the need for roof apertures to completely cover spectating patrons have a massive impact on the local environmental and climatic conditions found on the pitch. Shading, lack of sunlight, poor airflow and reduced temperature all have negative affects in the management of turf grass and its performance. This in turn, with increased moisture porosity and reduced aeration porosity, along with the risk potential of rainfall events, create poor agronomic conditions that can also impact severely the playing performance conditions of the playing surface.

### SOLUTION

The client and their consultants chose HG Turf Group to design and construct the field of play at Bankwest Stadium to meet the challenges created by the construction of the seating bowl. HG Turf Group were well positioned to meet the design brief requirements and the AirPAT Vacuum Ventilation System was chosen along with hybrid grass.

AirPAT is used by the stadium curators as a natural grass rootzone management system to ensure that the profile is managed to create the best possible growing environment for natural grass, all year round. The ability to manage the aeration and moisture in the profile is also greatly beneficial in managing the field for sports and non-sports events such as concerts.



*"It not only gives us the ability to control the moisture level in the profile, but it also gives us the ability to push air through the profile as well. Air flow is very important for us growing turf and the AirPAT system will do an amazing job for us underneath the surface."*

**Graeme Logan, Stadium Curator**



Suite 2, Level 1, 526 Whitehorse Road,  
Mitcham, Victoria 3132

T +61 3 9329 8154

[www.hgturf.com.au](http://www.hgturf.com.au)

**The Motz Group**

*Building Fields. Building Futures.*

"AirPAT™ is a proprietary Vacuum Ventilation System developed and licensed by The Motz Group. HG Turf Group are a licensed agent for the distribution, supply and installation of AirPAT™"