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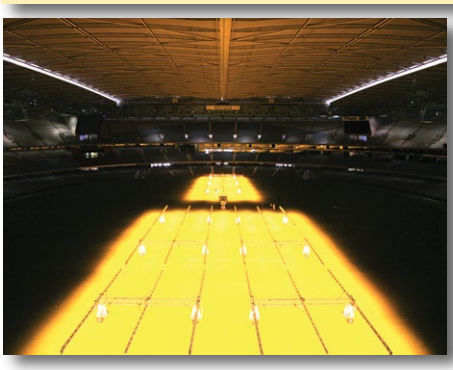
contents

COVER:
New South Wales Golf Club: The stunning par 5 5th at New South Wales Golf Club, which will host its very first Australian Open this December.

Photo: *Brett Robinson.*



ENVIRONMENTAL MANAGEMENT

Regenerating Victoria 48

Superintendent Ian Todd reports on the massive revegetation programme which is helping to create a modern interpretation of what one of Melbourne's iconic sandbelt courses must have looked like when it was first formed in the 1920s.

IN EVERY EDITION

Contributors to Australian Turfgrass Management Volume 11.6 (November - December 2009)

Brendan Allen (Auckland GC, NZ); Andrew Abbott (Murray Downs G&CC); Louise Barton (University of Western Australia); Gary Bass (Yering Meadows); Andy Blacker (SAGCSA); Nathan Bradbery (The Links Shell Cove); Malcolm Caddies (STA QLD); Brett Chivers (VGCSA); Rob Christie (Marysville Community G&BC); Tim Colmer (University of Western Australia); Gavin Darby (Etihad Stadium); Gary Dempsey (New South Wales GC); Robin Doodson (Sanctuary Cove G&CC); Barry Fraser (Chisholm Institute); Kym Fuller (Jack Nicklaus GC, Korea); John Geary (AGCSA); Tony Gordon (MCG); Jodie Grainger (Yering Meadows); Tony Guy (TGAA WA); Brett Hawkey (Neangar Park GC); Dean Henderson (Hyatt Coolum); Cameron Hodgkins (MCG); Peter Jans (Sandhurst Club); Graeme Logan (STA NSW); Peter Lonergan (GCSAQ); Rob Millington (Vines GC of Reynella); John Neylan (AGCSA); Andrew Peart (AGCSA); Jon Penberthy (DEEDI); Adam Robertson (Kew GC); Luke Spartalis (Royal Melbourne GC); Nigel Taylor (The Empire Hotel & CC Brunei); Ian Todd (The Victoria GC); Nathan Tovey (TGAA VIC); Darren Wilson (GCSAWA).

Tools of the trade

I've seen some tools on the golf course in my time and I'll be the first to confess to having had a few 'toolish' moments myself. I shamefully admit when I was 12 to sinking my putter deep into the second green at Omaha Beach Golf Links after rushing a sitter. My father, having done his best to repair the gaping chasm I had inflicted, refused to talk to me for the rest of the round. I was young, dumb and didn't know any better.

The imbecile I'm about to tell you about, however, should have. The setting was the iconic par 3 6th hole at Sydney's New South Wales Golf Club one Thursday afternoon in early October. The temperature was in the low 30s, the sky and sea were different shades of sapphire and there was a slight zephyr coming off the ocean. If there was a more perfect moment in time to play golf on one of the world's most breathtaking courses this was it.

There I was working – if you call it that – camped in the bushes between the 6th green and 7th tee, camera mounted on the tripod waiting for a foursome of 30-something chaps to play out the hole. All were dressed in various states of homage to Ian Poulter and the first chap up seemingly had the game to match, putting his shot from the hole's unique island tee to within 15 feet. The other two blasted short and right but safe, while the fourth was way left and nearly on the rocks.

Approaching the green the three who were safe were gentling ribbing their playing partner who, along with one of the others, was consuming a stubbie. You could tell he wasn't happy and the jibes of his mates were starting to wear thin. As he went in search of his ball, the two who were short played up and waited for their wayward companion to join them on the green.

Cue the antics. First shot – a wedge-full of turf. "F**k!" he proclaimed. Second shot – over the green, over the cart path and into the bushes about six feet in front of me. Another 'F**k', this one so loud that I'm sure the seamen standing on the deck of the cargo ship drifting through the Botany Bay heads at that very moment would have heard.

That wasn't the end of it. After storming across the green, he slammed his carry bag on the ground and proceeded to bury the blade of his Vokey into the green surround. The sideshow continued on the seventh tee after a textbook hook into the banksia. As I said, a tool.

It was quite an ironic incident to witness given that a few hours earlier I had been sitting in the palatial surrounds of course superintendent Gary Dempsey's office (yes, all the stories are true) listening to him lament the current state of golf. For someone who honed a passion for the game as a kid and has devoted his entire working life to preparing golf courses, it's episodes like the above which have started to take the shine off it for him.

Dempsey isn't a fan of the modern game. An unabashed traditionalist, he bemoans how corporate the management of the game has become and, as the above anecdote so aptly demonstrates, how the essential ingredient of etiquette is continually being eroded. Such a culture change is pervading other parts of the industry too and as Dempsey eloquently points out there must be something wrong when expert practitioners such as Peter Frewin and Jim Porter start leaving the profession.

Those who have had the pleasure of spending any amount of time in Gary's company know that he is a man who doesn't tolerate amateurs, calls a spade a spade and a dickhead a dickhead. He can be irritable at the best of times, but for all his lamenting of the game and the direction it is heading, the love he has for presenting his patch of turf still burns strong. In the 20 years he has been ensconced at New South Wales, Dempsey has shown what passion and dedication can produce and come December, when the course hosts just it's first Australian Open, all within the industry will get to see how he has transformed a club known as having one of the most unique settings in world golf, to a club that can proudly boast one of the great courses as well.

Enjoy the read.

Brett Robinson, Editor

JOHN NEYLAN, AGCSA GENERAL MANAGER

Collective vision required to ensure sustainable future

During September the Australian golf industry was very fortunate to have Steven Isaac (Director – Golf Course Management of The R&A) in Australia undertaking a series of seminars on Sustainable Golf. At a time when golf courses have never been better conditioned and presented, and where the demand and expectation is that the golf course will always be in 'perfect condition', it has been an ideal time to discuss the concept of what is sustainable.

Daryl Sellar (AGCSA HR and Best Practice manager) provided a critical ingredient to the discussion of sustainable golf by outlining the process of how golf clubs can review the strengths and limitations of their facilities and the importance of establishing clear goals as it relates to the preparation and presentation of the golf course.

In addition to the high expectation surrounding golf courses, climate change, weather extremes, the global economy and environmental pressures have created new challenges for clubs to maintain these standards. It is a time when the term sustainability has never been more apt.

Steven made the statement that sustainability is about your ability to adapt to the challenges posed by a changing world. From my perspective, the key aspects in these statements are about preparing good golfing surfaces while working in harmony with the environment, not exhausting the natural resources available (mainly water) and operating within realistic economic restraints.

The important point to consider is that 'one size does not fit all'. That is, all golf courses are different and that being sustainable is about understanding what is achievable within the site limitations and available resources. The extreme example is that the playing surfaces on a coastal links style golf course on sand cannot be compared to an inland, heavily wooded course on clay soils. These are just the site limitations let alone considering the variation in budgets from club to club.

Golf course maintenance is frequently being compromised and modified so as to accommodate the golfing programme and to provide minimal inconvenience to the golfer. A missed renovation, maintaining low cutting heights during periods of stress, keeping greens dry and hard are just a few examples of what is often done to accommodate the golfer but has the potential to result in turf damage.

The question is do turf managers know what the upper limit is in terms of how far the turf can be pushed? I suspect that the answer is yes, but we are not very good at saying 'no' to unreasonable or uninformed requests regarding surface preparation. It is this 'can do' mentality that has raised the bar in many instances and pushing golf courses to the edge of what is sustainable.

During the presentations, Steven introduced the concept of benchmarking. The R&A's website www.bestcourseforgolf.org has created this management tool in recognition that the golf course is the "prime asset of the golf club and that keeping a full record of greenkeeping activity is the first step towards analysing past operations – and getting the best from future decisions and actions". At a time where the climate is uncertain, the economy has hit a pot hole and there are increasing concerns over water supplies and pesticide availability, benchmarking is a means of monitoring the effect of these changes.

It also provides a means of assessing how adjustments to your maintenance strategy are affecting playing quality, cost and environmental footprint. The major benefits come from being able to benchmark your course and review its economic, playing and environmental performance over time.

Collecting information is one thing, however, as Daryl emphasised in his presentation, the first step is to understand what your golf course is about, what is the vision and expectation for turf quality and what are the resources currently available to achieve this vision. Is your vision for the golf course the same as the president's and other key players in the organisation? The vision needs to be a consensus document from which a strategic plan and a business plan can be developed. It is important to utilise the expertise surrounding you to help develop this vision.

The term benchmarking is often a flag for concern because of the implication of being compared to everyone else. The primary purpose is to use it as a means of monitoring how your work programmes are going. It does not need to be complicated and can utilise much of the data already being recorded.

AGCSA CONTINUES TO DEVELOP ONLINE RESOURCES

The AGCSA is continuing to update and expand information available through the AGCSA's environmental and water web portals which can be accessed through the AGCSA home page. The aim is to have both these portals as an online hub where golf course superintendents and turf managers can access a range of information to aid them in their water and environmental management practices.

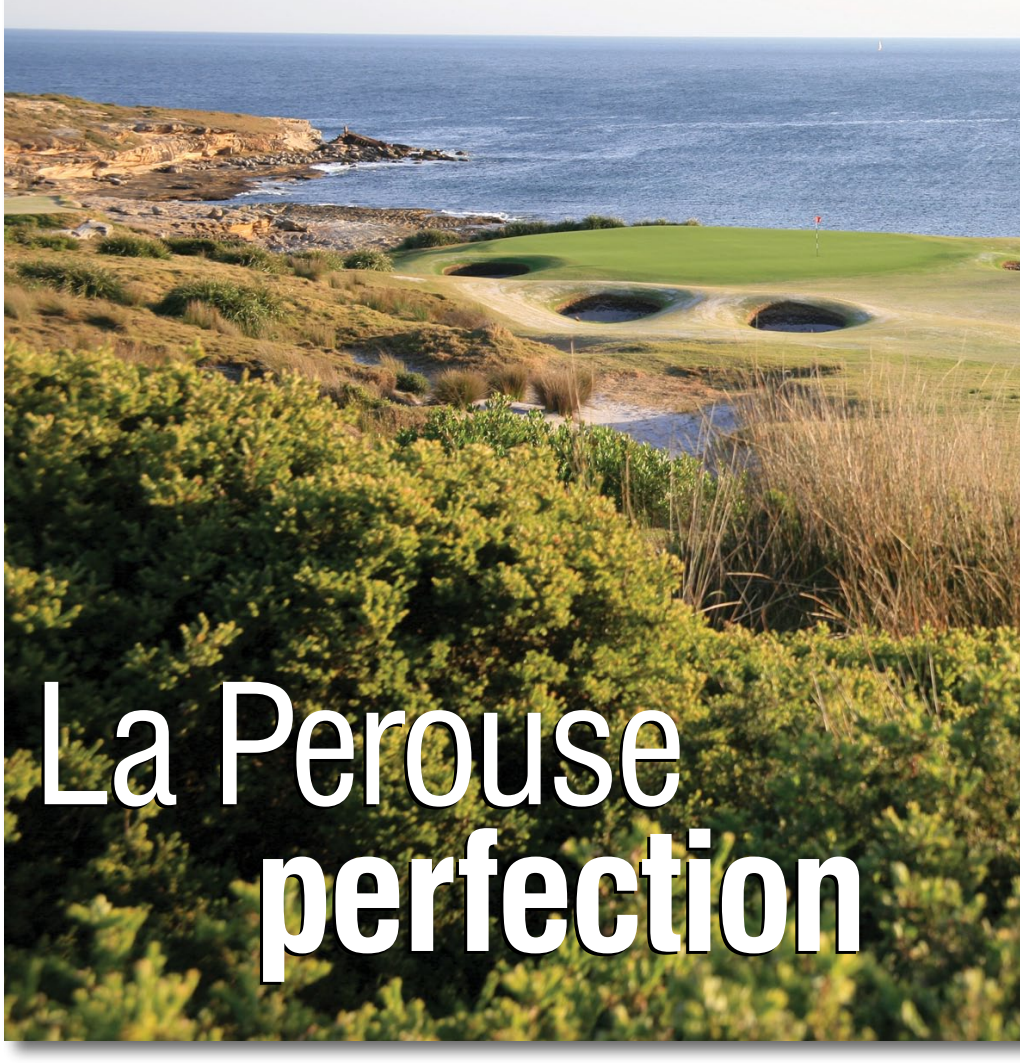
The 'Resources' tab in the Environmental Initiative website (http://environment.agcsa.com.au/resources) now contains a host of information on a wide variety of environmental issues. Using the 'Improving the Environmental Management of NSW Golf Courses' manual as a template, the resources section is divided into 11 separate categories:

- Environmental principles
- Water management
- IPM
- Pesticide storage and application
- Fertiliser practices
- Grass selection
- Soil management
- Native vegetation and wetlands
- Facility management
- Machinery operations
- Education and training

The AGCSA's online Water Management Review was officially launched at the 25th Australian Turfgrass Conference in Hobart in July and over the next couple of years the aim is to get as many golf clubs to use this free resource. The Water Management Review can be viewed through http://water.agcsa.com.au

In the coming months the AGCSA will be hosting a series of workshops at TAFE colleges in Victoria to explain how the Water Management Review works and how superintendents/turf managers can get the most out of it and use it as an essential tool in their water management practices. Venues and times are yet to be determined but announcements will be made through the AGCSA website and in The Cut. As well as the workshops, the AGCSA is in the process of compiling a comprehensive list of all water restriction information from around the country and information on current water grants available

For more information on the Water Initiative and Australian Golf Environmental Initiative, contact John Geary on (03) 9548 8600 or email jgeary@agcsa.com.au.



La Perouse perfection

Few superlatives do justice when describing the parcel of land on which New South Wales Golf Club resides. Located on the La Perouse headland, the course tumbles into Sydney's historic Botany Bay and provides the setting for one of this country's most unique golfing experiences. Today it is regarded as one of the world's great golf courses, but back in 1989 it was far from anything special. Enter a young talented superintendent by the name of Gary Dempsey, who over the past two decades has dragged the club out of the dark ages and expertly nurtured a course to accentuate its stunning natural beauty.

BY BRETT ROBINSON

One must have wondered what was going through the mind of Alister MacKenzie when he first set foot on the dramatic headland of La Perouse in early December 1926. Invited by the foundation members of the then fledgling New South Wales Golf Club, the good Doctor was paid the handsome sum of 250 pounds and asked to provide the blueprint for what many hoped would be one of the country's most prominent golf courses.

The sight that greeted MacKenzie would provoke this comment which appeared a year later in Golf Illustrated: "This is a sand duned peninsula which overlooks Botany Bay and presents, I think, more spectacular views than any other place I know with the possible exception of the new Cypress Point golf course I am doing on the Del Monte Peninsula in California."

High praise indeed and as MacKenzie would do countless times during an esteemed career, he crafted a course that would become one of the greats. His creation, which came to be known as 'La Perouse' (after Frenchman Jean Francois Galaup de la Perouse who landed on the headland in 1788 while on a scientific voyage), swept its way through the native *banksia serrata* scrub before tumbling down to the Pacific Ocean. Australian architect and noted amateur Eric Apperly would also play a significant hand in later years, making necessary changes to MacKenzie's layout in the 1930s and 1950s following the advent of steel-shafted clubs.

Since its official opening in July 1928, by Governor General Baron Stonehaven, the club has been a playground for many of Australia's most influential and prominent names in politics, business and sport. Despite such off-course stature, however, on course it was a different story.

Its unique location meant the course was notoriously difficult to manage and for many years the club accepted just about any grass or weed that grew on the fairways. Tee-up during summer was commonplace, greens were constantly being lost due to a lack of water, while substandard machinery and poor staff numbers meant it was always a struggle to maintain the course. When combined with little or no forward planning, it was no surprise that the course had never realised its full potential.

Enter a no-nonsense, slightly cantankerous diabetic with one of the best eyes in the turf management game – Gary Dempsey. Growing up in the western suburbs of Sydney, Dempsey had cut his teeth at a few courses in the district and in 1989 was duly appointed as the new course superintendent of New South Wales Golf Club.

While the good Doctor had waxed lyrical over the sight which greeted him when he first visited La Perouse all those years earlier, Dempsey had a far more frank and less flattering opinion of the course that he was about to take charge of.

"You wouldn't have tied your dog up there," erupts Dempsey in a fit of laughter. "It was that bad. I didn't put in for the job when it first came up because the club had such a bad reputation. But after talking to a few people I found out the club was serious about getting the place fixed up. To its credit the club knew it had a great piece of land, all it needed was a great golf course to match. Hopefully that's what I've been able to give the club over the past 20 years."

NOT JUST A 'DUMB' GREENKEEPER

Son of a garbageman and a shop assistant, Dempsey, in his own words, was never destined to be an academic. Growing up in the tough environment of the commission

There are few better sights than the sweeping par 5 5th at New South Wales Golf Club at La Perouse in Sydney. Tumbling down to the Pacific Ocean, it's natural settings like this which make it one of the most endearing courses this country has. Come December it will play host to the Australian Open for the very first time

housing estates of Cabramatta, golf proved to be an escape for the young Dempsey and he would spend endless hours down the road at Cabramatta Golf Club either hitting golf balls or scouring the roughs for them.

Leaving school in Year 10, Dempsey visited the well-meaning folk at Vocational Guidance who put him through a test to ascertain where he should best direct his skills. Asked to select his three preferred trades, Dempsey scribbled down electrician, plumber and greenkeeper. The results came back that he was too dumb for the first two (their words!) and that his focus should be on the latter.

So greenkeeping it was and after writing a letter to then Cabramatta course superintendent Peter Stig, Dempsey was duly signed on as an apprentice. Stig moved on not long after and handed over the reins to Bob Chessell who would prove to be one of Dempsey's early mentors.

Dempsey saw through is apprenticeship and ended up staying at Cabramatta for eight years before being offered the superintendent post at the neighbouring Orange Grove nine-hole course. With just two others on staff, Dempsey further fine-tuned his skills and work ethic over a four year period before moving to the much larger scale operation at Cumberland Country Club.

About four years into that role, the job at New South Wales Golf Club was advertised. Dempsey knew he would be taking a step backwards to go forwards but the job ended up being his and he was looked forward to the challenge of dragging the club out of the dark ages and presenting a course befitting its regal location.

Before he started, the club had already committed to reconstruct the greens so Dempsey's first task was to oversee the project. All greens were ripped up, reconstructed and resurfaced with Dempsey adding his own personal touches here and there. A new irrigation system was the next big ticket item, followed by converting all fairways to native couch from the motley combination of native couch, kikuyu and blue couch. All that work was completed by the end of 1993 and with the course given a new lease of life the club enthusiastically signed up for four Australian PGA championships between 1994 and 1998 to showcase its new pride and joy.

One of the things that quickly became apparent to Dempsey during those early years at La Perouse was that many of the greenkeeping practices he had learnt previously wouldn't apply there. The course had its own unique climate with the wind and ocean having a huge bearing on the surfaces.

As Dempsey delights in explaining, the wind can get so strong that it "blows oysters off the rocks", while during the height of summer the stifling heat and humidity make managing the *Poa* greens one of the toughest turf management gigs in town.

"It is a unique place," ruminates Dempsey. "And the longer I've been here the more I appreciate it. It's special because it is an experience every time you play the course and that also applies to when you come to work. It changes every day. One day it can be the ▶

Since 1989 Gary Dempsey has ruled the roost at New South Wales Golf Club and over time has presented the club with a course which ranks among the best in the world

most horrendous place on earth – in the old workshop we used to back the tractor into the roller door to stop the wind from blowing it in – then on other days, like during May, it's the most beautiful place in the world.

"*Poa* is almost impossible to get rid of in such a temperate climate so we live with it rather than kill it and that's why we still have *Poa* greens today. Some of them are getting up to 20 years old now and, like me, they are starting to feel the pinch.

"What we had to do was try and make the place survive the summers and take advantage of the good times, but initially it was hard to determine how we were going to do that given the site and the limitations we had with water. We didn't want to have tee-up every summer which had become the norm. We wanted to have good fairways, but attempting to grow a uniform cover on sand dunes without any water was always going to be a tough call.

"The theory I came up with was to thatch the fairways right up which in doing so would knit the surface together and essentially cap off the sand dunes. And that's what we have here today – bad thatchy fairways which are a little spongy under foot, but they can go all summer long without water and will always come back.

"One of the big problems here is that if you dig a hole and you get a drought you'll end up with a bunker. Wind erosion is so severe and that's one of the reasons why we had to cap the dunes off.

"And it has been a success. We use all the bad greenkeeping practices to keep them good, but they are very tight and provide a good surface to play off. I like to think of it as a little seaside golf – a bit of bump and run."

RISING TO THE CHALLENGES

Dempsey has certainly had his share of challenges over the journey, most of which have been forced upon him by the prevailing conditions of the site. Whether it's the bunkers, disease management or disasters out of left field, Dempsey's memoirs, when they eventually get published, will make for a riveting read.

By the late 1990s the high-faced bunkers introduced by a number of well-intentioned architects during the 80s and 90s, were starting to erode badly and collapse, undermining sections of greens in the process. Dempsey's answer was to revet the bunkers and in doing so created a feature which has become synonymous with the club. (See page 12 for more on NSWGCs distinctive hazards).

Maintaining a course within the highly sensitive and heavily regulated environment of a national park has also required judicious attention, but through canny management and a few old school techniques Dempsey has managed to maintain a balance which has seen the headland's prominent stands of protected banksia scrub thrive.

From a turf management perspective, managing 20-year-old *Poa* greens on sand has become increasingly like trench warfare. Over the past three years in particular, nematodes (primarily stubby root and spiral) and anthracnose have taken great delight in attempting to undermine the New South

BATTLING THE 'BF1'

While the vagaries of the weather and ongoing parry and thrust of nematode and anthracnose control conspire to keep Gary Dempsey on his turf management toes, a more ominous threat has made its home at La Perouse over the past few years.

About nine years ago while showing a friend around the course, Dempsey spotted a discoloured ring-like patch in the couch beside the 12th green. Nine years and numerous attempts to control it later, the ring is still there and Dempsey has watched helplessly as this mystery affliction has spread unabated across most of the course, all except for the extremities.

Appearing at certain times of the year – generally heading into summer which is perfect timing given the Australian Open is about to land in early December – some of the rings now measure up to five metres across and when they "light up", as Dempsey describes it, it looks as though UFOs have landed overnight.

New South Wales isn't the only club to have been struck down with the new disease. Dempsey's eastern suburbs counterparts John Odell (Royal Sydney Golf Club) and David Scaife (Bonnie Doon) have seen the disease take root at their courses and together the trio and their clubs are investing significant amounts of money to try and not only identify it but come up with some way of controlling it.

While intellectual property issues prohibit Dempsey from going into detail on what has been achieved to date, what he can say is that disease does have a name – 'BF1' or 'Black Fungus 1' – and to date it still hasn't been identified despite some of the big names of the Australian turfgrass scientific community on the case. It only attacks couch, doesn't spore and is spread vegetatively, which means golfers and, more significantly, maintenance machinery are aiding in its proliferation. Chemical control trials that have proved successful in the laboratory have failed out in the field and although success has been achieved with one organic product, control has only been very minor.

Having worked with Dempsey on chemical resistance trials to assist in his management of anthracnose, Dr Percy Wong from the University of Sydney is now heading up the programme to identify this mystery disease and together with Dr Peter Martin they have recently concluded their first round of trials.

"BF1' or 'Black Fungus 1' manifests as discoloured ring-like patches which 'light up' at certain times of the year. With outbreaks now prominent at New South Wales, Bonnie Doon and Royal Sydney, the three clubs have pooled their resources to try to identify and control the mystery disease

"There's no doubt that other clubs will get it," warns Dempsey. "Hopefully by the time they do we will have come up with some answers. All three clubs are committed to keep working on the trials but unfortunately I don't think there will be a silver bullet. As John Neylan commented when he was here recently, and I agree with him, more than likely an organic competitor or antagonist will eventually come along and wipe it out.

"You can mask the rings with nitrogen, but quite a lot of luck is involved. Golf Australia is aware of it so I'm not going to lose any sleep over it come the Open. One thing about New South Wales Golf Club is that it doesn't suit the colour green so I'm quite happy to let the fairways go natural for the tournament which will naturally mask them.

"It's just another challenge we have to deal with. It's not something that practitioners like David, John or I are going to cure. We all do our own trials here and there, but this is a science thing and is well above my level of knowledge – I'm just a 'dumb' greenkeeper remember! But we have the right people working on it and they are doing a terrific job."

Not a bad place to work, but as this photo hints at, the elements can conspire to make NSW Golf Club one of the toughest courses to not only play, but manage as well

Wales playing surfaces and from Dempsey's war room numerous campaigns have been devised and subsequently waged with a mixture of outcomes.

If nematodes and anthracnose weren't enough to contend with, Dempsey has for the past nine years also watched as an unidentified disease has spread unchecked across his fairways. Fortunately, or rather unfortunately if you're the others, Dempsey is not alone in his plight and together with fellow practitioners David Scaife (Bonnie Doon Golf Club) and John Odell (Royal Sydney Golf Club) have pooled their resources to try and identify this insidious pest (see page opposite for more on this mystery couch disease).

Dempsey would also add to the list of challenges as having to work out of a dilapidated shed for the best part of 17 years, but when given the chance to do something about it he didn't drop the ball. His many trips overseas to work at some of the game's biggest tournaments provided him with plenty of ideas on how to design a maintenance facility and the resulting $2.2 million 'Taj Mahal' is indeed a work of art. While many rib him mercilessly about the dimensions of his office, it's more importantly the facility as a whole which provides Dempsey's staff of 16 with a much more comfortable and productive working environment.

Of all the challenges which have confronted Dempsey, however, none could top the bizarre situation that greeted him when he answered the phone early one morning in July 2006. The words 'dam' and 'collapse' are all that Dempsey can remember of the call and the sight that confronted him after tearing up to the dam made his jaw drop. Spewing through the collapsed dam wall was all 35ML of the club's sole water supply, disappearing down into neighbouring St Michael's Golf Club.

Dempsey admits for the first time in his turf management career he didn't know what to do. Although no stranger to disasters – in 1998, just five weeks out from the Australian PGA, he watched in horror as a deliberately lit fire razed the course – this particular catastrophe rendered him speechless and somewhat helpless. While much of the attention focussed on the damage inflicted on St. Michael's, the dam burst had serious consequences for Dempsey and his turf management operations.

"It was unbelievable," recalls Dempsey. "It was just such a random event – one minute it was there, the next it was gone. As soon as I heard about it I was terrified that someone might have got hurt. Thank God

CONTINUED ON PAGE 13 ▶

Reviving the revet

Aside from its striking location, if there's one standout feature of New South Wales Golf Club which intrigues many, it's the course's unique revetted bunkers. One of the few courses in Australia to embrace this distinctive style of hazard, over the past two summers Dempsey and his dedicated crew have completed a labour of love which has been more than a decade in the making.

Bunkers have always been an issue at La Perouse and over the years various architects have had their hazards undermined and partially destroyed by the harsh prevailing winds which buffet the site. Dempsey takes great delight in showing newcomers to the course the fairway bunker on 12 which once upon a time was just a foot deep. The bunker is now large enough to accommodate a B-Double and Demspey reckons he has poured more than 300 tonnes of sand into it over the years only to see most of it end up as topdressing sand.

Bunker issues came to a head in the late 1990s when some started to collapse, threatening to take sections of greens with them. The time had come to act. Earlier that decade, around the same time as the club was reconstructing greens, Dempsey, with the permission of the board, constructed a revet bunker as part of the 9th green complex.

That tiny pot created more discussion than anything else Dempsey had done up until that point and gained true folklore status when the then club captain took 14 shots to extricate his ball! It polarised opinion but it soon became an accepted, although somewhat feared, addition to the course.

"We had such thatchy old turf in that green that I put it to the board that we should construct a revetted bunker," recalls Dempsey. "I knew it would fit the golf course aesthetically and in terms of playability, and ultimately it would have an impact on maintenance too.

"Back then we didn't have the Internet so I did some reading up on how the European courses constructed theirs and gave it a crack. I remember showing the guys how to do it before heading off to a superintendent meeting, only to come back later in the day to find they had built the face straight up rather than on an incline. They had to rip it down and start over again!"

That small pot was it until the other bunkers on the course started to decline and it was purely by chance that Dempsey stumbled across the solution to rectify the worst of them – it was literally right under his feet!

When hosting the four Australian PGAs between 1994 and 1998, which were held in November, Dempsey would oversow the heavily trafficked couch surrounds with ryegrass to aid with wear and tear. Over time they had thatched up beautifully and by the late 1990s, when it had come time to make a decision about what was to be done with the course's bunkers, it occurred to Dempsey that he had thousands of square feet of perfect revet sod growing in the surrounds.

With the board's approval he drew up a plan to revet the worst of the bunkers, but was thrown the additional challenge of having to construct the new revetted bunkers within the perimeter of the existing bunker. Dempsey and his crew would rise to that challenge and transform around 30 bunkers in that initial period which would ultimately set up the club to embark down the path of a full conversion a decade later.

With the 2009 Australian Open on the horizon and with many of the remaining high-faced bunkers in various states of deterioration, in 2007 the club gave Dempsey the green light to knock the rest off. In May 2009, after two summers worth of hard work, the final slab of revet sod was laid. The club now boasts 61 of these formidable hazards and while it was an incredibly labour intensive project, the result according to Dempsey is worth it and adds further character to an already unique course.

The revetted style of bunker is now synonymous with New South Wales Golf Club and adds another unique feature to the course

"It has been a massive undertaking to do all 61 in-house and over the years, at different times, I have been lucky to have a couple of guys from the UK who loved doing them and who had a knack for them," says Dempsey.

"Depending on the bunker, its aspect and its usage, we can get between 7-10 years out of them before having to renovate. We do regular maintenance to the tops of them but apart from that they are extremely easy to maintain, although you have to be mindful of couchgrass roots and earthworms.

"The members have a love-hate relationship with them – they love the look of them and hate to play out of them – but they are now synonymous with New South Wales and I would think it highly unlikely the club would ever change them."

Over two construction periods, all 61 NSWGC bunkers have been revetted in-house

◀ CONTINUED FROM PAGE 11

no one did, but it made a dreadful mess of St Michael's and left us without water through until December. We ended up getting a temporary system set up whereby we could run two or three hoses at a time to hand water greens. The greens suffered terribly and we had the tendency to over water them because we weren't sure when we would be able to give them their next drink.

"It was a very trying period. I don't know how to explain it. It was more shock than anything – what was I going to do now? I've seen the course burnt down before which was a horrible feeling. But the dam burst? Well, no amount of planning could prepare you for something so far out of left field. It was just another hurdle to overcome and the club's support during that time was most important."

One of the significant implications of the dam burst was that it threw the club's works programme into disarray. Reconstruction of the 10th, 18th and practice fairway all had to go on hold and throw into the mix the 2007 Australian Amateur Championships the following March, and the NSW crew had its work cut out. Some good did come out of the dam collapse, however, and as well as coming away with a new rock-solid dam, storage capacity was increased by 10ML to around 45ML.

Dempsey has introduced square tees in the lead up to the Open and although causing consternation among a few members, will add another unique element to course come December

OPEN DEBUT

No sooner had the dam been finished and reconstruction began in earnest on the 10th, 18th and practice fairway, the club approached Dempsey with the prospect of hosting the 2009 Australian Open. You can imagine his response! Although no stranger to hosting tournaments, NSW Golf Club has never entertained the men's open championship, and after agreeing to host the event, a further spate of course improvement works were scheduled.

First and foremost was revetting all the remaining sand-faced bunkers which was completed in May this year. Several greens also needed subtle re-contouring, areas of strategic rough were transformed into sandy waste areas and more than 750m of rubber rock cart paths were laid.

To add a touch of length to the course and to assist with spectator movement come the tournament, new tees have been constructed, such as on the par 5 5th. Dempsey has also started cutting square tees in the lead up and although causing consternation among a few members, will add another unique visual element to course come December. Part of that tee work included extending the island tee on the course's dramatic par 3 6th.

Add to the above the constant environmental considerations that must be factored in when hosting such a tournament on the site, as well as a late change of tournament promoter, and you soon understand why Dempsey would never succeed in regrowing any hair.

"Tournaments themselves are exhausting, but it's all the work leading up that is hard," says Dempsey. "We have been bashing and building since 2005 and it has only been since May this year that we have actually started to 'maintain' the course again. I'm actually learning things all over again! All of these projects, with the exception of the dam reconstruction, have all been done in-house and it has required a monumental effort by the staff to get it all done."

CONTINUED ON PAGE 15 ▶

Henderson hones new-look Hyatt Coolum

Above: As part of the major redevelopment of Hyatt Coolum's front nine ahead of this year's Australian PGA, existing holes 4-8 (pictured is the old 7th) have been replaced with six new holes (1-6)

While Gary Dempsey begins the countdown to his first Australian Open this December, up on the Sunshine Coast his counterpart Dean Henderson is also in tournament mode with the Australian PGA Championships due to touch down at Hyatt Regency Coolum a week later.

In what will be his first PGA since taking over as course superintendent back in March, Henderson will be preparing a vastly altered course with six new holes making up the revitalised front nine.

As reported in Volume 10.6 of ATM (November-December 2008) property owners Lend Lease decided to develop the coastal track of land that houses the existing 4th, 5th, 6th, 7th and 8th holes. To compensate losing those holes, six new holes have been constructed. The original 1st has been transformed from a straightforward par 4 into a heavily bunkered par 3 (now the 6th), the old 2nd and 3rd holes play as 7 and 8, while 9 remains untouched.

The new holes (1-6) work their way around a central pocket of environmentally protected rainforest and were designed by the course's original architect Robert Trent Jones II. As well as attaining his services, the new holes have also had the expert touch of the original shaper. They will be open to the public the day after the 2009 PGA concludes while existing holes 4-8 will then be closed and the residential development will start.

While Henderson says he has slotted in nicely to his new lifestyle on the Sunshine Coast, the job has certainly provided its fair share of challenges to date. On top of getting used to his new surrounds, Henderson has had the added pressure of getting the new holes grown in and up to championship condition for this year's tournament.

Above: Nearly a metre of rain during Dean Henderson's first four months as Hyatt Coolum superintendent severely hampered construction and grow-in of the new holes, with the 1st (pictured) suffering the worst flooding

The weather has done him and the course no favours and in his first four months a total of 948mm rain lashed the region which significantly hampered construction. The new 1st, in particular, suffered major flooding forcing a redesign of the course's weir system. Over two kilometres of extra drainage was also installed to combat small springs and run off from surrounding hillsides.

The final two holes – The par 5 5th and par 3 6th – were solid turfed in early autumn and since August Henderson has dumped close to 1000 tonnes of topdressing sand predominantly on the fairways with good results. With the usual slow down in couch growth over winter, the height of cut was lifted and mowing frequency reduced to promote maximum root growth. Staff also hand-weeded and wick wiped rather than apply selective herbicides to allow the couch to grow unimpeded.

The final two holes – 5 (pictured) and 6 – were solid turfed in early autumn

Henderson has had up to six casuals – a combination of Canadian, English, French and Australian greenkeepers – working on the new six holes with 3IC Scott Howes working full-time since the new holes were handed over to coordinate daily works.

"This part of the Sunshine Coast is a beautiful place to live and work and I've had great support from the local superintendents since starting here," says Henderson, who was superintendent at Sanctuary Cove Golf & Country Club before taking on the Hyatt post. "We have a good crew in place and although it has been a challenge to bring the new holes into play we are looking forward to showcasing them come the tournament."

New South Wales' iconic par 3 6th. Nothing more needs to be said

◀ CONTINUED FROM PAGE 13

As for the playing surfaces, Dempsey renovated greens in mid-August and scarified all fairways, tees and greens surrounds and topdressed in late September/early October. Since then it has been an agonising wait as a cool Sydney spring has thwarted a full recovery and only added to the management challenges ahead of the Open.

Dempsey is also a little nervous about the likely weather conditions come the tournament and he has history to back him up. Green speed figures will be somewhat irrelevant if it blows and as Dempsey points out if the greens are cut at 4mm and a 30-knot southerly descends, balls will be rolling 15 foot to the north and three feet the other way.

"If it doesn't blow then they should all shoot 30 under, but I don't think that'll happen," says Dempsey. "The greens will always worry me, but that's the way things are here. They're thatchy old *Poa* greens, sand on sand, but they've been living here for 20 years without too much issue so hopefully they'll do the right thing by me and hang around for another few months until the pros come and go.

"You have to be realistic and live with the fact that you can't have fast greens at NSW. At the 1996 PGA play was postponed three times because balls were blowing of the greens. It was a highly stressful and frustrating time, especially because we were only cutting greens once a day and watering them like crazy. But when it's blowing 40 knots, there's not much you can do about it. You can't plan for the weather, but anything over 30 knots and Golf Australia will have to be prepared for some trouble."

At this stage, Dempsey plans to cut the whole golf course, except for rough, in just 1.5-2 hours every evening after the final group has walked off 18. Six fairways units will be in operation, while greens and tees will all be cut with walk-behinds by two teams of six. Greens only will be cut in the morning, and rolled if required, and fairways dewed off. Toro will be providing some extra equipment for the tournament while for those lucky enough to be on bunker detail, Dempsey has imported more than 100 rakes from the US in recent months. (Since their arrival Dempsey has had his staff shaving down the teeth of the rakes with pencil sharpeners!)

On the Sunday before the pros arrive, Dempsey will assemble his 30-strong tournament crew and go through a full dress rehearsal of cutting the course. Among this year's crew, Dempsey has the services of three UK greenkeepers who are staying for the summer, while former assistants Andy Hugill (Mona Vale Golf Club) and Shane Brogan (ex-Torquay Golf Club, now a firefighter with the MFB) will return to help their former boss out.

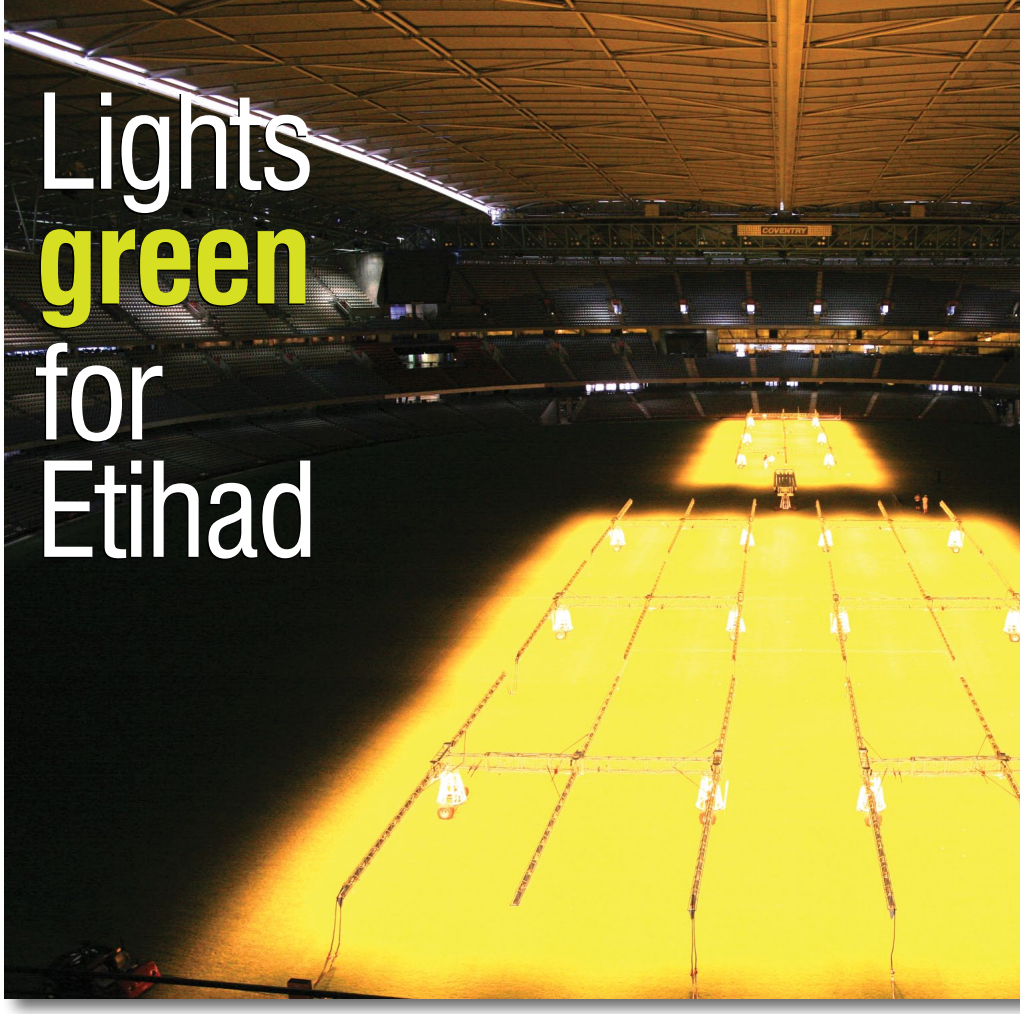
Dempsey will also have an American, Mike Scott, on his team. Dempsey met Scott, who was then assistant at Merion, while working at the 1997 US Open at Congressional Country Club and immediately the two hit it off. A few months later Scott was winging his way Down Under for the 1997 Australian PGA and now 12 years later will head back with family in tow to help out his mate for the Open.

To ensure everyone enjoys themselves in between the hard grind of presenting a championship course, Dempsey is taking a leaf out of some of the US tournaments he has attended over the years and setting up a designated hospitality area in the maintenance facility during the Open. There superintendents and course maintenance personnel visiting to watch the golf can catch up with the crew and get a glimpse of what goes on behind the scenes of a major tournament.

"I think more than anything I want this tournament to be fun," enthuses Dempsey. "That was paramount in my mind when it was announced we were hosting the tournament. I know how tired everyone gets and thought this would be a good way of getting everyone involved. It can be a real anti-climax when the tournament actually hits because you're so focused on the job at hand, but if we can have a bit of fun during the week it'll make it enjoyable for everyone."

No matter what happens come tournament week though, you can guarantee that come Sunday evening the biggest celebration will be happening down at the 'Taj'. Dempsey happens to turn 52 the very next day and along with the staff he will hopefully be raising a glass of his favourite red and toasting what has been another successful milestone in a has long, distinguished and ultimately rewarding career as a 'dumb' greenkeeper.

Lights green for Etihad



Two years ago Etihad Stadium, as it is now known, became the first major sporting arena in Australia to adopt growth lights to help improve surface quality, recovery from wear and tear and ultimately reduce costly turf replacement programmes. With two AFL seasons now complete since the lighting rigs were first employed, arena manager Gavin Darby looks back at how they have helped to transform one of the most-talked about surfaces into one of the best.

Following the bold decision by Etihad Stadium chief executive Ian Collins (AM) to back our quantified judgement in 2007 and spend $2.2 million on implementing an artificial lighting system, it is very satisfying to be in a position to write a follow-up article on their success over the last two years.

Our initial research and budget forecasts (***see Gavin Darby's article that appeared in ATM Volume 9.6, November-December 2007 - Ed***) painted a bright picture that has been exceeded in financial terms and more importantly turf quality.

The payback period on our capital expenditure was reduced to less than two years as we have limited our turf replacement to approximately 500m² each year (2008 and 2009). Given that in 2007 a total of about 8700m² of replacement turf was used, which was less than 30 per cent of the quantity used in some of our previous seasons, and you can see the dramatic benefits the lights have brought.

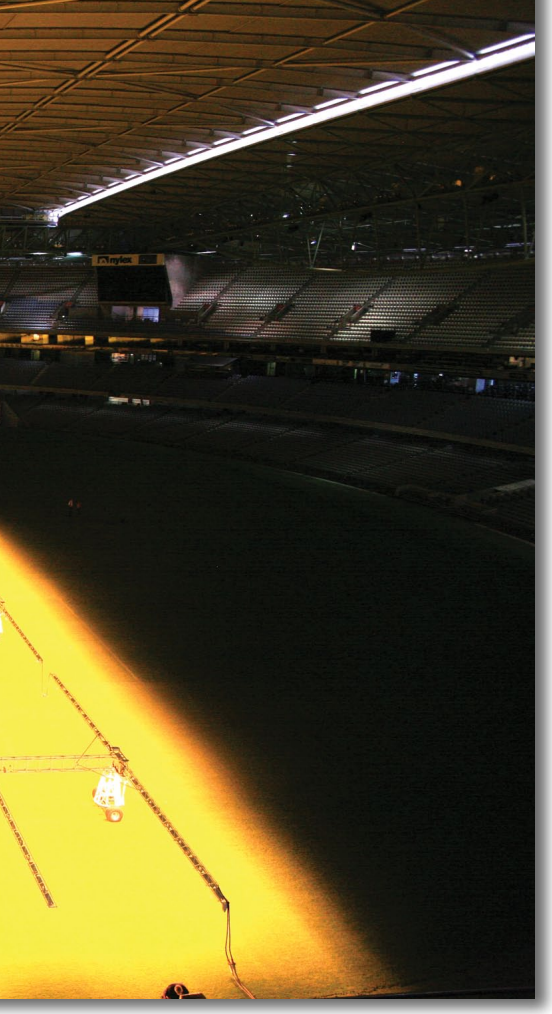
Deployment plans for the lighting rigs are based on a combination of light data, experiences based on the visual results of their first season of operation (2008) and the wear characteristics of the Etihad Stadium surface.

The flow on effect of this reduction has been greater continuity providing improved aesthetics for both patrons and users alike. The improved visual uniformity of the playing surface has removed the seed of doubt from the athletes' minds and the consistent sward and profile provide the continuity of key performance characteristics, such as traction and hardness.

Our initial research and subsequent purchase of the lighting rigs from Dutch company SGL Concept relied heavily on independent light analysis provided by the Sports Turf Research Institute in England, which has proved to be very accurate in those terms.

What this data did not take into calculation was the significant influence of wear, whether it be from sport-specific wear patterns such as AFL's use of the central corridor or total use in terms of events per month, when comparing our venue to say European football venues, a number of which have been using similar lighting rigs since the mid-2000s.

We have since developed our own rig deployment plans based on a combination of light levels, our own experiences based on the



visual results of 2008 (their first full season in employment) and the wear characteristics of our surface.

SGL PROJECT PORTAL

These deployment plans rely on information obtained through our SGL Portal with the arena broken into zones with each 'zone' representing a single lighting rig.

We have 13 of the SGL Concept's MU360 rigs and as the name suggests each of these illuminates an area of 360m² (24m long and 15m wide). Each MU360 has six arms of 10 light fittings for a total of 60 600watt lights. We also purchased two smaller MU18 units, consisting of a single boom carrying 12 600watt lights to treat high wear areas such as goal squares and the centre circle area.

In early 2008 Etihad Stadium took delivery of 15 lighting rigs from Dutch company SGL Concept to help remedy issues with the playing surface. In just two years of operation the growth lights have exceeded all initial expectations and seen turf replacement fall to just 500m² in each of the 2008 and 2009 AFL seasons

The SGL Portal provides us with light data from external and internal venue sensors (Figure 1) and from this we are able to see the total light received into the venue in real time and cumulatively over each day, week or month. This data is measured in micro mol (μmol) and then converted to megajoules of Photosynthetically Active Radiation (MJPAR).

This data, when combined with our shade analysis which shows the percentage of natural light reaching each zone for the given month (shown here for June in Figure 2), provides the total natural light energy available to the plant in each zone.

Our deployment positions and hours for each zone are also entered into the portal (shown here for June in Figure 3). This then provides us with the total light energy figure, both natural and artificial, for each zone in terms of MJ/PAR/m² (Figure 4).

Subtract from this our roof closures and we have a number which we can align with visual ratings of turf quality in each zone. We have over the last two years used this data to determine our optimum parameters for the addition of artificial lighting hours.

RESULTS

The results have exceeded our expectations for the simple fact that the effectiveness of the SGL Concept is far greater than statistically represented by the light level output of the globes alone. The key additional factors are:

- The efficiency of light at these low levels is very high;
- Night time operation creates a more favourable vapour pressure deficit in Melbourne;
- Overnight use allows the plant to make full use of morning light energy by already being 'switched on'; and
- An increase in soil temperature of 2-3°C.

Each MU360 rig illuminates an area of 360m² (24m long and 15m wide) and has six arms of 10 light fittings for a total of 60 600watt growth lights

LIGHT EFFICIENCY

As the amount of light increases, the rate of plant response reflected as growth also increases, but only until it reaches a saturation point where any additional light is valueless in terms of photosynthesis and perhaps even considered a negative input.

We believe this saturation point for ryegrass is around 1300 μmol/m²/s at which point the potential plant response in terms of fresh growth production measured in grams/m²/hour has reached its maximum.

Melbourne has extremely high levels of light in global terms and in our initial work this was all calculated as a positive input. Through pure statistical analyses this then dilutes the value of adding small quantities of artificial light, however, when the efficiency of various light levels is taken into consideration the true value of artificial light increases significantly. ▶

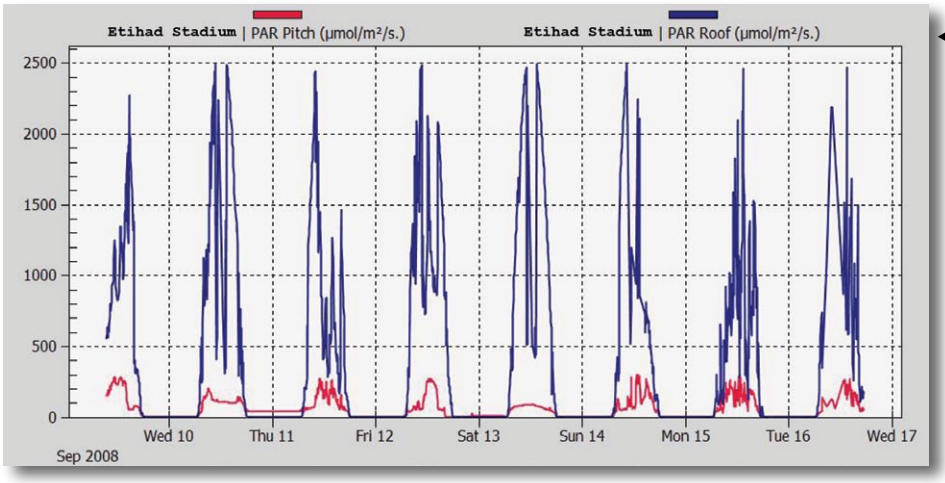


Figure 1. Light data from external and internal sensors measure total light received (in micro mols/m²/s) into Etihad Stadium in real time and cumulatively over each day, week or month. The blue line represents the sensor located in the roof, the red line the sensor at pitch level

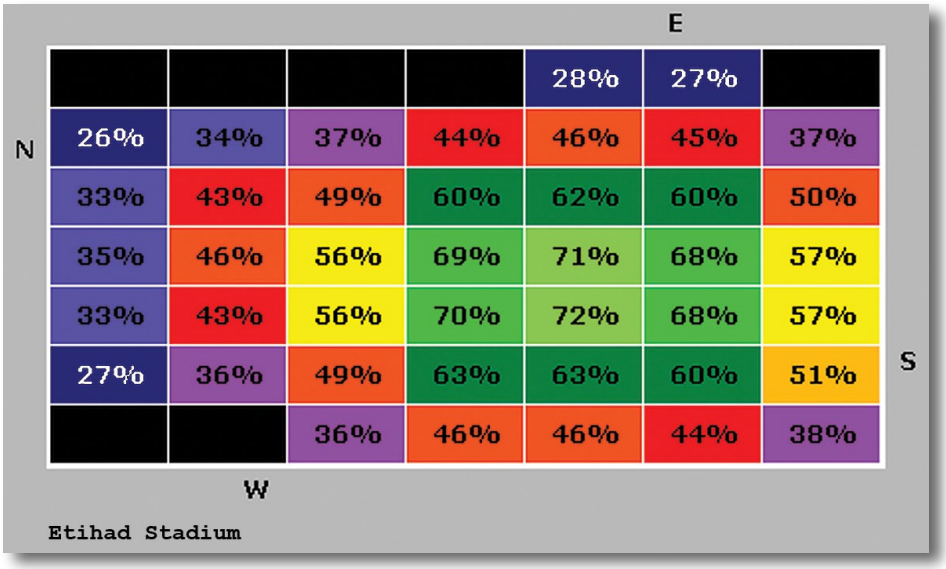


Figure 2. Shade analysis for June 2009 showing the percentage of natural light reaching each zone of Etihad Stadium's arena floor

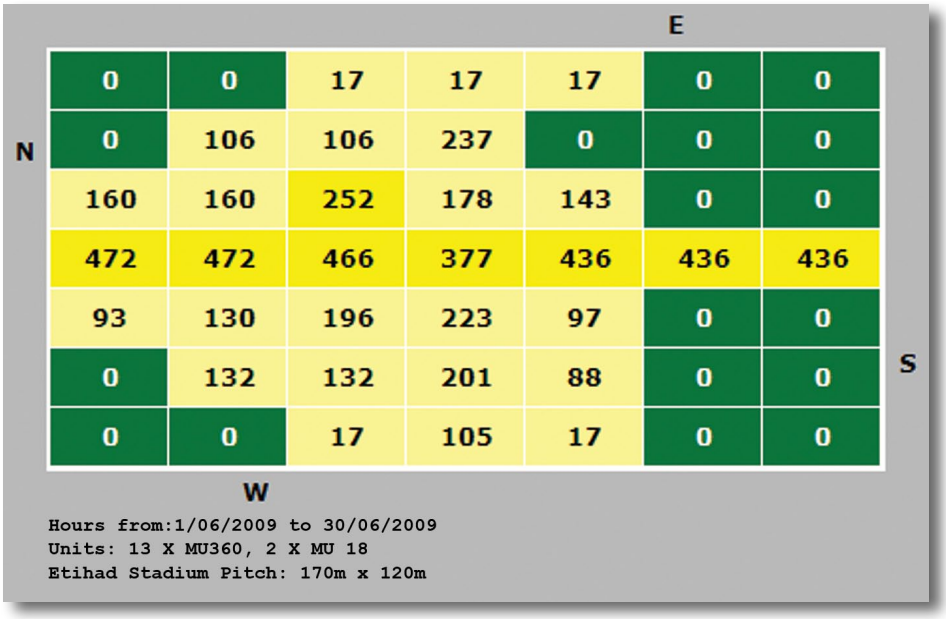


Figure 3. Deployment positions and hours for each zone (June 2009). Each zone is equivalent to one SGL Concept MU360 light rig

This is depicted in Figure 5. The graph is for indicative purposes only but we believe it to be reasonably accurate in our environment. The pink line is representative of grass growth increasing on the left 'y' axis as light levels increase on the 'x' axis. The blue line is representative of the decreasing efficiency of light measured on the right 'y' axis in terms of resulting growth.

VAPOUR PRESSURE DEFICIT

Relative humidity (RH) is the common measure of water vapour in the air, the presence of which has a direct effect on the plant's ability to transpire and hence grow. Another measure which is commonly used in the glasshouse industry is Vapour Pressure Deficit (VPD). VPD combines both temperature and RH into one reading that more accurately reflects the plant's wellbeing. VPD values run in the opposite direction to RH, so when RH is low VPD is high and vice-versa.

When humidity is low, or high VPD, as is most often the situation in Melbourne, the plant will close stomata to reduce transpiration and limit wilting. However, in closing stomata the plant has also limited its ability to intake CO_2 and therefore reduced its rate of photosynthesis and efficient use of the available light.

Unfortunately VPD is extremely difficult to determine accurately as it is necessary to know the leaf tissue temperature. However, by measuring the temperature and relative humidity within the turf canopy, the calculated VPD is a useful measure as it combines both temperature and humidity into a single measure.

As a general rule, most plants grow well at VPDs of between 0.8-0.95Kpa. The following table shows the effect of varying RH at the same temperature, the bold VPD values are all outside ideal parameters.

Temp °C	RH	VPD
15	50	0.85
20	64	0.84
20	**50**	**1.17**
25	73	0.85
25	**60**	**1.26**
30	80	0.85
30	**70**	**1.27**

In Melbourne's climatic conditions, higher temperatures are typically associated with low humidity, which are then both negative factors in terms of growth response for C_3 grasses. A broad but accurate statement is that in Melbourne the VPD is most favourable typically in the hours of darkness or early morning when light levels are not adequate for photosynthesis. With the use of artificial

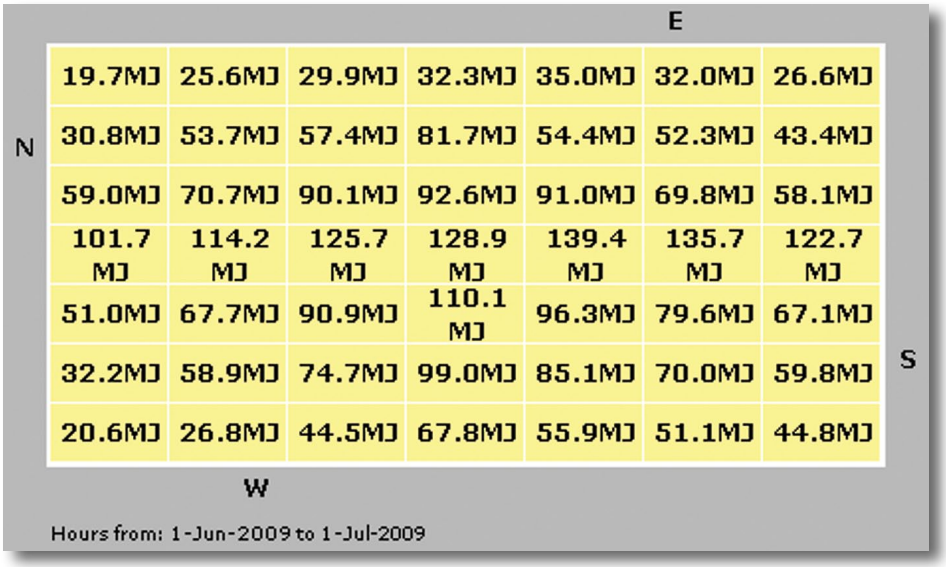


Figure 4. The total light energy figure, both natural and artificial, for each zone of the Etihad Stadium arena of MJ/PAR/m² (June 2009).

lighting we are now able to maximise the plant growth in these hours of optimum VPD conditions.

Therefore the effectiveness of an SGL Concept MU360 producing only 190μmol/m²/s at 3am with an air temperature of 15°C, RH of 50 per cent and a VPD of 0.85 is perhaps more beneficial than the natural conditions which may occur at 3pm the following day with the sun producing 2500μmol/m²/s, an air temperature of 25°C, RH of 60 per cent and a VPD of 1.23.

The overnight factors depicted are all positive growth factors and combined will allow for a healthy rate of photosynthesis to occur. Conversely, the day conditions depicted are all individually negative and collectively they will ensure that photosynthesis is significantly hindered.

SOIL TEMPERATURE

We have also been utilising 'Evergreen' turf covers to further enhance the VPD values in Melbourne's dry climate by creating a mini-glasshouse with increased humidity under the covers.

We have found a further 2-3°C rise in soil temperature through their use over consecutive days, so in combination with the SGL Concept we can achieve up to a 5°C soil temperature increase through winter by using both products simultaneously. The turf covers have also enhanced our mid-winter overseeding results as they also retain surface moisture to ensure the seed remains viable through germination.

PHOTOSYNTHESIS – A TWO STAGE PROCESS

With the SGL Concept working through the night, we also gain the added benefit of these plants being 'switched on' when the first energy from the natural light enters the venue each morning.

With the initial light-dependent processes of photosynthesis having already been completed hours or days earlier under artificial light, the plant is able to continue the secondary processes or the more productive phases of photosynthesis utilising all available natural light for the day.

This allows the plants under artificial light to maximise the total energy available from natural light on any given day. In comparison, a plant without artificial light may take some 2-3 hours from receiving its first photo signal to start full carbohydrate production.

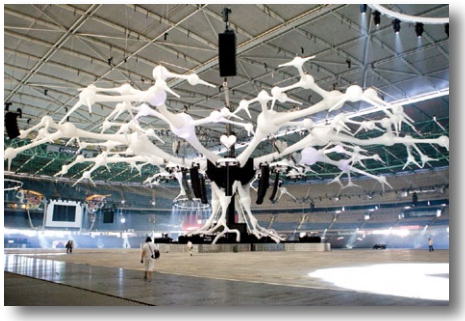
BRIGHT FUTURE

The combination of all the above factors has seen the results achieved at Etihad Stadium far exceed the modelled response which was based solely on total solar radiation data. Examples of this can be clearly seen where an area that receives a combination of artificial and natural light to a total of 1.8MJPAR/m²/day exhibits significantly improved turf quality over an area that receives only natural light to a greater total of 2.0MJPAR/m²/day.

As one of only two independently owned venues in Australia we continue to demand more from the arena surface and 2010 will be no exception. We start the year with the New Year's Eve celebration 'Sensation' (see photo below). Bigger and better than the 2008 version, it will include the construction of a 100 metre long water feature down the central corridor. We then have a minimum of four A-League matches before three AC/DC concerts spread over five days in February, possibly only a week before the NAB Cup preseason competition kicks off.

So as we review our use of the system over the last two years and contemplate the surface with which we will start the 2010 AFL season with, we do have a level of confidence in our processes and indeed the SGL Concept.

We also currently have a proposal before our board to extend our infrastructure and purchase a further two MU360 units and a smaller MU36, just to make sure we keep pace with the ever-increasing demands on the surface and the expectations of our hirers.



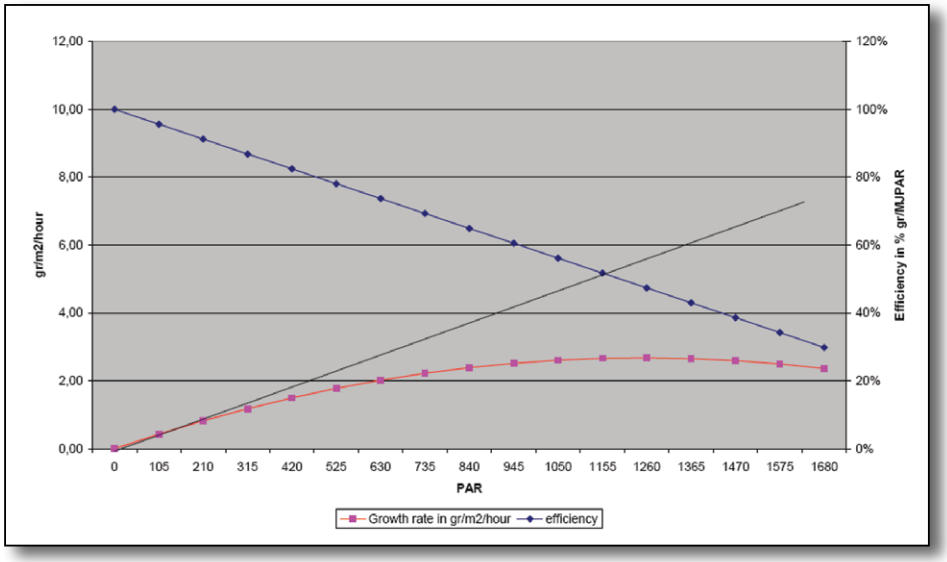


Figure 5. The pink line is representative of grass growth increasing on the left 'y' axis as light levels increase on the 'x' axis. The blue line is representative of the decreasing efficiency of light measured on the right 'y' axis in terms of resulting growth

MCG on P.A.R

While Etihad Stadium now has two seasons' worth of data from using its growth lights, across town at the Melbourne Cricket Ground arena management staff have come to the end of their first season experimenting with their new lighting rigs. BY CAMERON HODGKINS AND TONY GORDON

In the pursuit of a safe, durable and multi-use playing surface, the Melbourne Cricket Ground (MCG) has seen, in recent years, the conversion to a sand profile perched water table, the re-invention of portable pitch technology and the country's first installation of a MOTZ stabilised turf system.

As the arena surface has evolved, so has the MCG's grandstands. With the hosting of the Commonwealth Games in 2006, the Melbourne Cricket Club (MCC) redeveloped the Northern Stand which featured a large overhanging roof to protect spectators from the elements.

However, it quickly became evident that the shadow it casts, well beyond the centre of the ground in the busy winter months, would be the greatest challenge to the maintenance and presentation of the highest quality surfaces expected at such an elite sporting venue.

When compounding the shadow cast by the roof with the reduction in air circulation through the arena, the northern half of the venue breeds a cold, damp and dark microclimate requiring new and specialised maintenance practices just to survive the winter months, notwithstanding the weekly staging of multiple AFL matches.

To overcome this problem, a supplemental lighting system was sought to meet the basic photosynthetic needs of the shaded turf area and increase the durability and recovery of the highly trafficked corridor. After much research, an investment was made by the MCC in 11 large and two small SGL Concept rigs to provide this Photosynthetically Active Radiation (PAR light).

A driving factor behind the purchase was the reduction of turf replacement costs. Approximately 10,000m^2 of turf was being replaced annually on the shade-affected areas at great expense financially and environmentally. It was determined that with the investment in the light rigs, that this figure could be reduced by half, remembering that returfing of the centre following the wicket removal was an annual process. Additionally, the supplemental lighting would increase the playability and presentation of the surface.

MAJOR IMPACT

The rigs arrived in early May 2009 and were being used in earnest by the start of June. The introduction of the lights not only had an immediate impact on the shade-affected surface at the venue, but on the turf maintenance programme as a whole. It was expected that the rigs would be an additional tool in the management of a major shade issue, when in reality they quickly formed the nucleus around which the arena is managed during the winter months.

The lights work well in isolation, but when combined with modifications to conventional turf management practices their impact is accentuated. The substantial investment made in the light technology prompted all current inputs and processes to be re-evaluated – fertilisation, irrigation, dusting, surface venting, overseeding, mowing, turf replacement strategy and even resource allocation in relation to the deployment and storage of the large, sometimes cumbersome rigs.

The MCG took delivery of its new SGL Concept lighting rigs in May 2009 and they quickly formed the nucleus around which the arena was managed during the past winter

The transition from a conventional NPK programme to a weekly spoon feeding process through the winter months has played a major role in this season's initial success. The reduced amount of light causes an increase in gibberlic acid (GA) production and a decrease in natural energy production, resulting in a thin weak elongated leaf blade. With the addition to our tank mix of GA-inhibiting PGRs and nutrient supplements containing amino acids, carbohydrates and potassium silica to counter these effects, a tighter, more hard-wearing surface has been achieved.

Automatic irrigation is not practical with the light rigs deployed. A reliance on hand watering has resulted in much greater control over surface moisture levels, which in combination with weekly dusting has resulted in greater surface traction for players. This reduction in free surface water has also reduced disease pressure over the past season.

Having a well thought out strategy for the weekly duration and location of rig deployment has proven to be important for the execution of a weekly surface venting procedure to penetrate the MOTZ backing layer to increase water and air movement, overseed and cut.

Going forward, manipulation of the deployment pattern to provide additional treatments in high wear areas will further reduce the reliance upon large mid-season turf replacements. Having the light rigs at the MCG ahead of the 2010 AFL season, will enable their proactive use as the days shorten and the shadow from the Northern Stand migrates out from the boundary. The surface will then be in the best position to survive the rigorous winter fixture from the start, rather than trying to adopt a recovery strategy after the season is already underway.

During the upcoming cricket season, informal trials will also be conducted with the use of the SGL Concept on the portable cricket pitches, to both accelerate pre-season growth and expedite post-match recovery of used pitches.

The SGL Concept has been the catalyst for the review and adaptation of existing and new maintenance practices at the MCG and the initial results from this partial season of use have been very positive. With a focus over the summer months on preparing the surface for the demanding winter period, even greater successes should be realised.

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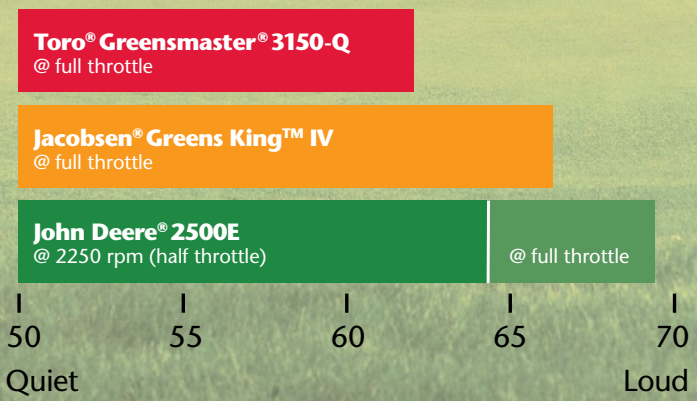

Sound Pressure Level (Decibels) @ 75 feet (22.9 meters) from Mower.*

*An increase of 3 decibels represents an approximate doubling of the sound pressure level.

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Five years ago the Croydon Golf Club made the big call to relocate the club to a new site at Yering in the stunning Yarra Valley Ranges north east of Melbourne. Ross Watson was appointed course architect and his brief was to design a course that would mirror the surrounding contours and undulations of the ranges. Pictured is the new par 4 6th

Greener pastures call Croydon

Some four years in the making, Yering Meadows is now the new home of Melbourne-based Croydon Golf Club. Construction of the 27-hole facility gave the club a unique opportunity to incorporate best practice environmental management techniques, as well as significantly improve the environmental value of the site which had become degraded over time. Course superintendent Gary Bass and environmental officer Jodie Grainger, a finalist in this year's AGCSA Claude Crockford Environmental Award, look back at the substantial works to bring one of the country's newest course developments to fruition.

The Croydon Golf Club, situated in Melbourne's outer east, was established in 1925. After 80 years of operation, the decision was made to relocate to help secure the club's economic future. With such a decision came the challenge of finding a new site, a course architect and a construction company to build the new course that was to be ready for play the day after the existing course was to close.

The 330 acre (132 hectares) Coowerp property at Yering was chosen as the new site, a heritage homestead overlooking the Yarra Ranges which had been used primarily for rural grazing. Yering is nestled in the wine-growing region of the Yarra Valley and classified in a Green Wedge zone (designated by the State Government as part of the Melbourne 2030 plan) which prohibits dense urban developments and restricts certain land uses.

To use the land for outdoor recreation, an agricultural component had to be incorporated in the club's application and course architect Ross Watson's initial 36-hole course design was amended to 27 holes and a 16ha walnut plantation included.

The site, which is about 12.5km north east of the existing course and adjacent to Lilydale Airport, is environmentally sensitive due to the close proximity of four important water bodies – the Yarra River, Olinda Creek, Stringybark Creek and Muddy Creek.

Muddy Creek traverses through the course, once part of the old irrigation channelling system and was incorporated as a vital component of the hydrologically-engineered wetlands system which was designed to cope with the high volume of rainfall that the pre-existing floodplain receives annually (699mm Coldstream mean average).

The upper region of the Yarra Valley between Warburton and Warrandyte is classified a Victorian Heritage River magnifying how important it is for water exiting the site via Muddy Creek (then into Olinda Creek and finally reaching the Yarra River) to be of the highest quality possible.

The ongoing grazing and agricultural practices that had been carried out on the site for decades meant the site had become highly degraded. The decision to relocate the club to the site therefore provided a great opportunity to substantially improve the environmental value of the site and significantly reduce the impact on existing waterways which passed through the property.

Ross Watson's vision for the course was that it mirror the surrounding contours and undulations of the Yarra Valley ranges and during construction we would always stand back from any finished product to make sure it blended into the environment. This followed recommendations from the National Trust "that the development proposal not destroy the landscape values of this area" and aspects of the course were designed to maintain view lines enjoyed by the community.

The car park and clubhouse were to be recessed into the natural slope of the land to minimise interruption of nearby neighbouring views and reduce light pollution emissions. The use of native and locally indigenous plants on the course and a combination of native and exotic species around the clubhouse and homestead were to be used to visually integrate the development with its surrounding environment.

NEW BEGINNING

Part of the council's permit conditions upon opening were that 18 holes had to be ready for play and landscaping on the course, clubhouse, car park, driveway, front entrance

and one of the proposed walnut orchards, all had to be completed. This was achieved by the opening date of 21 June, 2008.

Construction of the walnut orchards started early in 2007 with the soil excavated from the car park and clubhouse site utilised in the first orchard. With little or no expertise in this field we enlisted the help of consultant Harold Adems, a senior scientist (agriculture) from the Department of Natural Resources in Tatura.

Planting of the first orchard started in November 2007 and we now have three orchards around the course featuring Howard, Tulare and Chandler cultivars. A total of 6700 trees were planted at 3m spacings in rows 6m apart. Half of these trees were root stock and have been budded and grafted in the field. This has delayed our expected harvest by a year but we expect to be picking walnuts within the next 4-5 years.

Grove's tender to construct the course proved successful and construction of the course's main 38 megalitre irrigation dam started in November 2006. Water supply was initially from the Yarra River under stringent restrictions and recycled supply will be available in December 2009. A further 10ML can be pumped into the main irrigation dam via water harvesting from the wetland system on course if needed. Changes to course landscape were implemented with large islands deleted to increase water holding capacity.

A&M Irrigation were contracted to install the Toro Site Pro decoder system designed by David Hanby, with three Grundfos variable speed pumps delivering both water and wetting agent via an injection system when the need arises.

After our agronomic consultant John Neylan (AGCSA) walked the site and gathered information for the agronomy specification, the club decided to use the existing topsoils for fairway construction, unlike a lot of other courses where sand is imported at a high cost. Careful stripping and stockpiling was required to maintain soil structure for re-application onto the finished product.

Bulk earthworks on the course began in February 2007 and the first 18 holes were open for play in June 2008 and final nine in mid-September 2009. Bulk earthworks, shaping, irrigation and topsoiling were staggered, finishing 3-4 holes per zone to allow final shaping, hydroseeding, turfing of tees, landscaping and grow-in tasks of watering, fertilising and mowing. Shaping and bulk earthworks were completed by Grove construction and fine shaping and finishing completed by Ben Chambers working closely with Ross Watson on site.

Work started on holes 6, 7 and 8, situated some two kilometres from our brand new maintenance facility, before progressing across Muddy Creek and finishing on 9, 10, 1, 18 and practice fairway. The 2.5ha couch nursery was also sprigged with the 6th, 7th and 8th fairways in September 2007. This enabled us to use the 1.5ha of Legend and 1ha of Santa ana on course in January of 2008, solid turfing tees and approaches to greens on the last few holes to be completed.

TALE OF THE TURF

Grass selection was a crucial decision in the course being able to withstand the rigours of the Yering site, being in one the coldest, driest, windiest and hottest parts of Melbourne depending on the time of year.

All two hectares of greens were hydroseeded with Penn G2 creeping bentgrass at a rate of 500g/100m^2, with the exception of the 10th green which was seeded in February 2009 at an increased rate of 1kg/100m^2 as the course was to open in June leaving only 13 weeks from time of sowing to opening.

Green surrounds, totalling another 2ha, were sown with a creeping red and hard fescue blend at a rate of 3kg/100m^2 and are mown at 10mm. Mowing frequencies started around 10-12 weeks from seeding, initially rolling then cutting at 10-12mm before slowly reducing the height of cut.

All tee complexes were solid turfed with washed Santa ana on tee tops, which total 2.2ha. Tee surrounds were hydroseeded with a fescue blend (chewings, hard and red) of 1:1:1 at 3kg/ha.

How the 132ha Coowerp property looked before course construction. The ongoing grazing and agricultural practices that had been carried out on the site for decades meant the site had become highly degraded

Fairways were line planted with Legend couch 20:1 and once root establishment had taken place a weekly fertilising regime started, including raw chicken manure much to the delight of everybody working in the immediate vicinity! It was decided by the club not to use any pre-emergent herbicides as an initial cost-saving measure, but in doing so cost time in establishment of the couch surfaces.

The 50ha of roughs were drill seeded with a 1:1:1 blend of hard, sheeps and red fescues at a rate of 3kg/100m^2. The biggest challenge of the grow-in was the continual high winds and the impact this had on newly seeded areas. Maintaining moist soil conditions onsite was especially difficult around mounds, ridge lines and bunker edges where hydroseeded areas would be continually stripped back by the strong northerly winds we encountered.

Seeding of bunker faces was also hampered by high winds and temporary irrigation networks were established to maximise chances of germination and establishment. The purchase of our own hydroseeding unit proved invaluable too as we had to return to areas numerous times until grass was established.

Grow-in equipment was purchased from Toro and using second-hand gear proved to be the way to go due to the wear and tear on such an unforgiving site. Having a great mechanic also proved to be critical as the machinery got flogged to death.

Weekly fertilising and fungicide control was the norm to generate rapid growth and in some instances grow mats were used to assist germination and reduce erosion caused by the high winds that hampered the grow-in. Kangaroos, rabbits and even stray cows all added to the challenge and continual rectification works were required during this stage.

Dusting and/or topdressing of all turf areas started very early on and today the putting surfaces are dusted fortnightly during optimal growing conditions and monthly during winter. *Poa* control has started with Endothal the preferred product at 20ml/100m^2.

With a deadline of June looming the clubhouse precinct was shaping up with all landscaping of the driveway, car park and clubhouse gardens successfully completed between Buxton finishing the construction of the clubhouse and Grove carrying out curbing, drainage and surfacing works.

All labour was kept in-house and with more casual staff employed our numbers peaked at 30 during some weeks. (We currently number 16, with one casual and six apprentices.) While all this was taking place we had a small team back at the old site maintaining the course for play as the club's commitment was to close the old site one day and open the new one the next. We almost pulled it off but developers Australand acquired the old site two weeks early which meant the members had a two-week break prior to the opening of the new site.

Construction of the third nine rolled on after the first 18 and final seeding and sprigging completed in December 2008. The summer of 2008/2009 proved to be the hottest on record and temperatures at Yering soared into the high 40s on numerous days, peaking at 46 degrees on Black Saturday.

The fires, which devastated large parts of Victoria, came to within 500m of our northern boundary and put our irrigation pump at the Yarra at risk. Ironically, the very same pump is currently under threat due to flooding! It's amazing what a difference eight months and some spring rain makes.

Heavy water restrictions meant we were only able to water putting surfaces from late February onwards and a lot of newly established rough was lost to the heat – yet another battle with the elements we had to deal with. With a high weed burden on the site and surrounding areas, this was to challenge the team but with persistence we are now winning the battle.

Challenging windy conditions are now a part of the golf course and provide a stern test when playing the site. Pin positions are set more central for windy conditions and undulating surfaces, green speeds are monitored closely and height of cut is set at 4mm to assist with the true firm surfaces.

Aaron Baddeley, a life member of the club, came out to inspect the site just after winning the 2007 Mastercard Masters and Channel 10 interviewed him on the newly constructed 6th green. The surface was only 12 to 13 weeks old and he displayed his awesome putting ability by draining three separate puts from different lengths in front of the rolling cameras. It was a nice feeling to know we were heading in the right direction with so much work still ahead of us!

ENVIRONMENTAL BEST PRACTICE

The design of the site not only encompasses 27 holes of golf and the walnut groves, but includes large areas not in play which form

Grass selection was a crucial decision in the course being able to withstand the rigours of the Yering site. Greens were hydroseeded with Penn G2 creeping bentgrass, tees were solid turfed with washed Santa ana and the 50ha of roughs were seeded with a blend of hard, sheeps and red fescues

The 4th and 13th holes during grow-in. All fairways were line planted with Legend couch

the new environment. Because of the minimal natural remnants on the site, due to pastoral use of the land, no native vegetation was actually lost and a substantial amount has been and will continue to be gained as the site matures.

Initial landscape plans had the quantity of trees, shrubs and grasses totalling 300,000. These numbers will be achieved in the next year as areas are thickened with supplement plantings, following changes made by Ross Watson, and also the landscape being used to shape the holes as it matures. The landscape will continue to evolve, self-seeding and being worn to achieve a more natural effect. It is hoped that with maturity an entire new habitat will emerge and encourage a greater range of flora and fauna to populate within the Yarra Valley region.

From the outset of the project, the club had a rare opportunity to implement environmental best practices. During construction and grow-in vast amounts of water and fertiliser were vital to establish grass surfaces. Run off was addressed in the form of silt traps and co-ordinating planting of adjacent wetlands and roughs. Areas were then left to mature with follow up weed control and removal of protective covers once grass was well established.

The use of wetland species to strip nutrients before entering waterways exiting the property was integral to improve water quality. This practice is evident throughout the entire site, with species such as *Juncus amabilis* to aid in filtering and reducing the residual wetland nutrient level build up as water moves through the hydrologically-engineered site, reducing risk of algal blooms as water levels drop and temperatures increase seasonally. Quarterly water quality testing by Meinhardt at numerous points across site occurs keeping us abreast of any nutrient levels registering outside the allowable parameters set by the EPA.

The installation of a propagation polyhouse will enable us to propagate species from seed collected and cuttings taken from now on. All tubestock and cells were grown on by Candlebark Community Nursery who will in turn then collect from our site to propagate plants for the local community, enabling them to revegetate their sites with plants of local provenance.

We are also working in conjunction with Candlebark to build up numbers of *Caesia calliantha* (Blue Grass Lily) via propagation. This species is particularly rare in Maroondah Shire and existed on the old Croydon Golf Club site. Numerous species have been salvaged from the old course site and either transplanted or retained for propagation purposes. These would otherwise have been lost due to the old site being turned into a major housing development. Such species include:

- Pale vanilla lily (*Arthropodium milleflorum*);
- Matted flax lily (*Dianella amoena*) – an endangered species that no longer exists in the wild within Maroondah Shire; and
- Swamp wallaby grass (*Amphibromus* spp.) – an endangered grass species found in wetland areas.

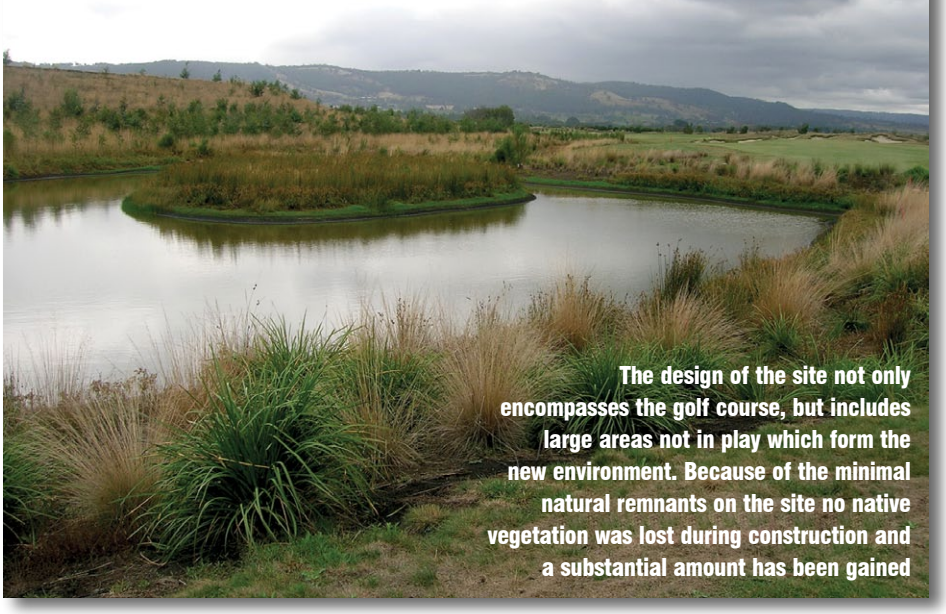
Less showy species, but nonetheless valuable for their biodersity, include five- ▶

The Yering site contains a series of hydrologically-engineered wetlands, such as this one between holes 12 and 17, which are designed to cope with the high volume of rainfall that the pre-existing floodplain receives annually

EASTERN GC HEADS FURTHER EAST

Yering Meadows is set to have a new neighbour in the not too distant future following Eastern Golf Club's (EGC) decision earlier this year to also relocate. Currently situated in the eastern Melbourne suburb of Doncaster, EGC will sell off its existing site in order to fund the new development which is a kilometre down the road from Croydon Golf Club's new Yering Meadows facility.

EGC's current Doncaster Rd site is on the market via an 'expressions of interest' campaign and the club will continue to operate until the new site is ready to open which is envisaged to be 3-5 years. EGC, home to course superintendent Clayton Howell, has selected a 242 hectare property which is currently used for cattle grazing and horse agistment. It also has 12 modern, self-contained private cabins that are used for tourist accommodation which the club intends to continue operating. Greg Norman Golf Design has been engaged, with Bob Harrison as chief architect, and has come up with a 27-hole course design and a nine-hole par 3 course that blends with the existing terrain.



The design of the site not only encompasses the golf course, but includes large areas not in play which form the new environment. Because of the minimal natural remnants on the site no native vegetation was lost during construction and a substantial amount has been gained

awned spear-grass (*Pentapogon quadrifidus*), common wheat-grass (*Elymus scabrous*) and reed bent-grass (*Deyeuxia quadriseta*).

Another condition imposed by the council in development of the new course was a compulsory acquisition of Eucalyptus crenulata (Buxton Gum), which is listed as an endangered species under Commonwealth law and a threatened species under state law. There are only two populations left in the wild – the sites are in Buxton and Yering – and total less than 670 trees.

Seed will be collected from these trees and propagated to increase the population in Yering. The trees have been planted in their required habitat close to water, although not within close range of *Eucalyptus ovata* to avoid cross pollination and reduction of the genotype.

Significant plantings were also implemented to assist in the prevention of erosion below the first and second walnut orchards where the north/south orientated rows converge onto the 9th and 23rd holes.

GREEN FUTURE

With such a new facility and the dynamics of a new staff who have come from diverse backgrounds bringing different experiences with them, it was and still is a huge task to co-ordinate work programmes and steer them toward a more environmentally aware way of operating.

We are endeavouring to do so by further implementation of the e-par environmental management system and continually educating and training staff (e.g: spill response training which was undertaken by Active Hazard Management Australia).

We are installing rainwater tanks (150,000 litres) off the maintenance facility to help supplying the wash bay for tank filling, washing down machinery and flushing toilets. Future recycled water plans are also in place to decrease our need to draw from the Yarra and we will also look at integrating the propagation house into the course's irrigation system. The washdown bay is equipped with a triple interceptor system which enables waste water to be filtered out through wetlands on course after exiting the washdown facility.

Other ways we have demonstrated our commitment to the protection of the existing natural environment, environmental best practice and environmental stewardship include:

- Designated green waste areas where a majority of clippings, soil and turf are dumped to minimise impact on course environment and planted areas;
- Implementing environmentally beneficial methods when working, such as the application of Rainsaver crystals and soil wetting agents after planting and prior to watering, mulching high irrigation areas to minimise weed germination;
- Attempting to control weedy areas when they are establishing by means of manual removal or, if not efficient, chemical application. Bi-active glyphosate is used when in close proximity to wetland areas and Basta used on elm suckers, so poison is not systemically taken up by established trees;
- High priority to control umbrella sedge which has germinated in wetlands from the enormous existing seedbank;
- Plant out northern boundary to deter weed seed from blowing in from adjacent paddocks with species that don't obscure views to the Yarra Ranges;
- Traffic control measures to allow created bushland areas to evolve naturally;
- Continuous removal/controlling of non-indigenous plant species such as blackberry along fencelines with Olinda Creek and elm suckers gradually creeping further out from Muddy Creek;
- Gradual rehabilitation of Muddy Creek over time, protecting remnants by selectively handweeding and spot spraying and eventually increasing numbers with enrichment plantings of species suited to the environment. Part of this includes initiating a waterway strategy for its rehabilitation and for it to become an integral and healthy feature of the course. Remnant flora and fauna include *Poa ensiformis, Carex appressa* and Shield shrimp (*Triops australiensis australiensis*);
- Continue to work in conjunction with Yarra Ranges Shire in the upkeep of remnants remaining outside our perimeter boundary, on the median strip adjacent to McIntyre Lane, ensuring no drift when spraying to keep fenceline tidy;
- The introduction of newer species to increase biodiversity once weed control measures have been successful. Currently grasslands are establishing but it will only be when seasonal pasture grasses such as Yorkshire Fog Grass (*Holcus lanatus*) and others are controlled, that we can introduce the wildflowers and lilies that occur in open woodlands, without the competition;
- Initiate contact with local Landcare group and Land For Wildlife to monitor/document bird species starting to migrate to site and apply for Land For Wildlife status.
- Habitat trees placed in wetlands providing perches for birds and cover for frogs.

Building a new course and opening it not long after the old course closes its doors was a huge concept to bring to fruition. The actual construction and grow-in were probably the more straight forward stages of the project. Soil specification data collection began in 2004, so it has been a lengthy project with much time elapsed before soil was even turned over in 2006.

Now in 2009 with 27 holes of golf open and three walnut orchards, it is with great hope that the Croydon Golf Club can build on its existing legacy and improve and grow along with its new course.

The use of wetland species to strip nutrients before entering waterways exiting the property was integral to improve water quality

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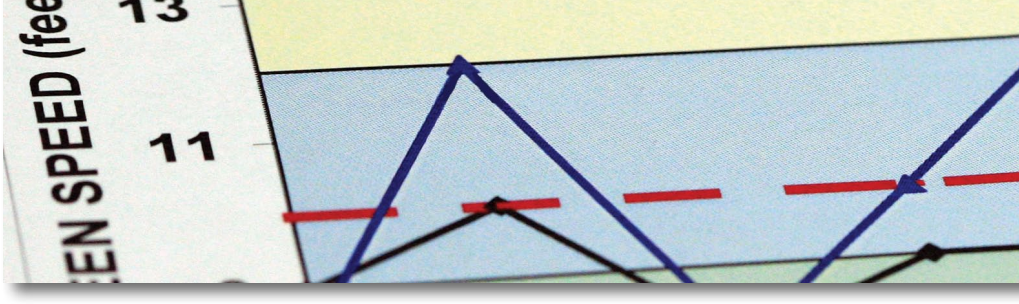

The Pulse

At the recent Sustainable Golf workshops conducted by the AGCSA, The R&A's Director of Golf Course Management Steve Isaac discussed the concept of course benchmarking. In this instalment of The Pulse, ATM wanted to get a feel for what superintendents thought about the concept and whether it would be something that would aid them in improving their course operations.

"Benchmarking does appear to have some value and could provide information for clubs as a guide, but I think it would be of little value to us. We have no recognised benchmarking format in place, however, the club is constantly assessing its position daily. We have many statistics to guide the club in the right direction. We also share information between neighbouring clubs, motels, restaurants and retailers in a similar environment assisting us with decision-making via email or phone.

As far as the golf course is concerned, the economic climate dictates most of our decisions. In recent times our financial turnover has been dictated by a strong global financial position, then a global meltdown, two stimulus packages, the peaks and troughs of local farmers, fuel prices and terrorist attacks which saw retired couples' visitations increase rather than go overseas. Benchmarking would need to be incredibly diverse and detailed to absorb all the information that has an impact on statistics that affect our club's statistics alone." **Andrew Abbott, Murray Downs G&CC**

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I signed up to The R&A benchmarking website (www.bestcourse.forgolf.org) about 12 months ago. There is a fair bit of time involved in putting the information into the system and I have to admit I haven't yet found the time to complete it. I really believe that if enough clubs got involved, especially in your local area, then it would be a fantastic management tool. Maybe the state associations should assist clubs in getting set up on the system, therefore providing a valuable database of information to local superintendents." **Robin Doodson, Sanctuary Cove G&CC**

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"We haven't seriously gone into benchmarking to any degree, but I certainly feel the concept has great merit if used in a positive context from within. The benefits as I see it are the setting of specific goals that are based on internal research and site specific quality guidelines that transcend the changes with management personnel and, in particular, committee personnel. Benchmarking enables everyone within the organisation to know and understand the requirements of the course, helps to simplify training of new staff, provides facts to aid with decision-making at all levels, which can help to settle any conflict during that process, and gives you a knowledge base to determine realistic budgeting.

I think there are some dangers, however, comparing course against course or organisation against organisation, even when comparison is kept to climatic zones or similar course types. All clubs/courses provide the same basic venue to play the game but each stands alone with its differences in location, member requirements, rounds per year, financial position, staffing levels, focus and so on. Something as simple as water availability and quality might create a huge difference in maintenance at two closely situated courses. Benchmarking comparisons in this instance may have a more negative impact." **Rob Millington, Vines Golf Club of Reynella**

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"I use the condition of my own course as a yearly benchmark, taking into consideration influencing factors such as seasonal conditions, yearly budget restraints, etc. The ultimate aim is to improve quality when compared with previous years and we all know that members will soon tell you if something is 'not as good as it was last year'.

I do not make comparisons with other courses, even with the clubs we call our neighbours, as there are too many variables to distort that comparison. Budget, climate, staff numbers, soil conditions, etc make it impossible to get an accurate comparison between clubs. At the end of the day, I think we all just try to provide the best possible playing surface that all these constraints will allow us." **Rob Christie, Marysville Community Golf and Bowls Club**
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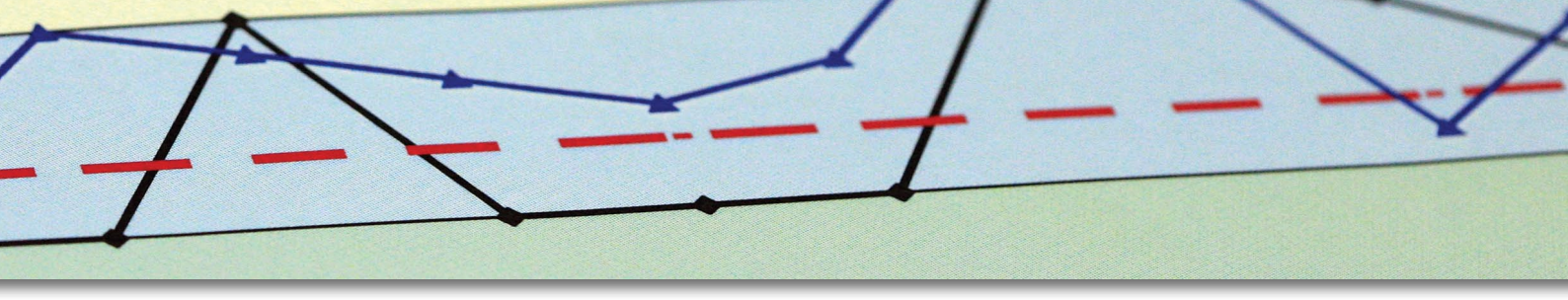

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"Absolutely, benchmarking must be carried out, not only for a new facility but on an annual basis at least. It not only keeps you up to date on the latest standards but can also introduce you to new products and management techniques, it can change your way of thinking or the way you carry out certain tasks, or simply change the way you are managing your facility. It can stimulate you to improve or give satisfaction you are going in the right direction. Benchmarking also shows how your facility shapes up to the competition.

When planning on a benchmarking visit, contact the facility you are visiting well in advance. Help them understand who you are, what you want to do, who you want to meet and the time you will need. Request what you can and cannot do – can you take photos or video for example – as some facilities have very strict policies on such visits. Many people are also wary of the competition who want to "benchmark" their facility and may generally see it as spying, so you need to reassure the contact person.

Be sure you have a list of questions and know the items you want to see before you go. Sometimes it makes sense to go with other managers from your facility, but this can be a little overwhelming to the visiting club if there are too many people. Ask in advance what they can manage and request a quiet time of the week. If possible, give some token of gratification to the manager and the people responsible at the visiting facility and invite them to your facility.

Benchmarking trips should not only be restricted to your local area. Try and incorporate interstate or overseas trips, conferences or even holidays; it shows your board or client your professionalism and may even help pay a part of your trip.

Your benchmarking trip should always include a full report to your board or client. Be sure you know the quality of the facilities you will be visiting, which should be equal or superior to your facility or what you are trying to achieve." **Kym Fuller, Jack Nicklaus GC, Korea**

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"Broadly speaking I think that benchmarking is a very valuable part of golf course management. It is very hard to have a clear path for the future if you can't quantify the results of the past. At Auckland Golf Club (New Zealand) we measure organic matter levels, root depth and surface firmness to validate our renovation and topdressing programmes. Detailed records are kept of nutrient use, pesticide use, water use and energy use in an effort to get year on year comparisons (weather adjusted) of the success or failure of our practices in relation to long-term agronomic goals.

I think that most of this is just the type of good management that shows the club that we make every effort to use the resources we are given effectively, and then when we want more we can provide very clear justification for it. These types of benchmarking have certainly helped us determine whether our surfaces respond better to coring, verti-draining, dethatching, topdressing and various combinations of these, and have helped us dramatically reduce our fertiliser and pesticide usage which is great given the sensitivity of our surrounding environment.

I tend to view benchmarking measures as a set of internal performance review tools and am sceptical about cross course or country comparisons for a number of reasons. I think that the level of detail needed for meaningful comparisons and the weight given to factors such as staffing levels, soil profiles, historical drainage works, the number of rounds played and localised weather conditions make interclub comparisons problematic.

As a well-resourced private golf club we have clear advantages in staff levels and other resources over most other New Zealand clubs, yet our soil profile is atrocious in places and I'm not sure how you can balance opposing factors such as those in a way that allows for good course comparisons. However, the bottom line for us is that the benchmarking tools that we use have allowed us to better allocate our resources and improve the golf course." **Brendan Allen, Auckland Golf Club, NZ**

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"The concept of benchmarking can be extremely beneficial in terms of opening and improving the lines of communication between the superintendent, management and committee. It establishes a standard in which all agree, understand and work towards.

I do, however, feel that the benchmarking basis lies primarily with the club's financial position (budget) and should be judged accordingly. Without this clubs may demand a higher benchmark but not possess the necessary resources (money) to acquire such a standard therefore placing unnecessary and unfair burden on the superintendent. Benchmarking on a financial basis at least compares apples with apples and provides the incentive and kudos for superintendents that are achieving above average results for the resources provided. **Peter Jans, Sandhurst Club and Sanctuary Lakes**

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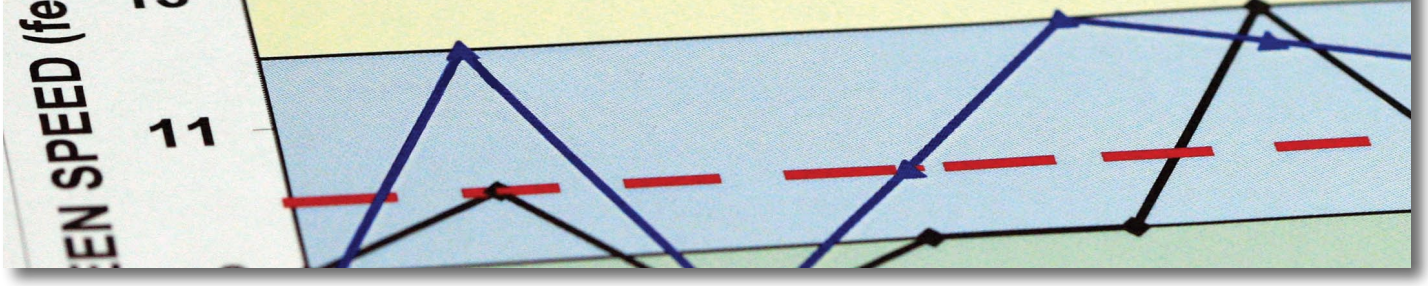
"When I was at trade school I always saw it as they were teaching us the basic skills required to be a part of the industry. From there it was our own personal passion, talent and ability to succeed which would progress our careers over the journey. As I sit here watching the President's Cup, I wonder 'Can we do such a thing like compare and set a standard for our course!' The answer is of course yes, but by someone else's standards and how they run their course, no! This is not even taking into consideration weather conditions and budgets.

To be honest I don't believe in benchmarking. Why? Because it would give ▶

superintendents and golf clubs course maintenance practices



me less satisfaction in getting up and doing what I do every day. For me it's about pride and passion. I am a young superintendent in this industry because it is something I have dreamed of since I was a young tacker. I have learnt from some of the best in the business and travelled to some of the best courses in the world. Through that I have seen many different operational skills used.

For me it is more about being an individual and to do that you need to set yourself goals, be creative and stand up and be different. In these tough economic times it is the perfect chance to do that, especially as clubs tighten up their budgets but still look to have premium quality turf surfaces for members and guests.

It is possible to benchmark yourself against a neighbouring club, but against an international club would be impossible. When I think of benchmarking I think of how I can just go one better and not be the same. In an industry that has very limited opportunities, why when you get one opportunity would you want to be the same as the guy next to you?" **Nathan Bradbery, The Links Shell Cove**

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"At present I do not have a course benchmarking or evaluation system in place, however, I have long thought that this would be a very useful programme to undertake. I have seen a few clubs in the region implement benchmarking or regular evaluation and it seems to work well, limiting the misunderstandings about why some things are the way they are at certain times of the year. I noticed at these clubs that the key lies in involving your committee and/or general manager to ensure all parties are on the same page and understand how the system works and what its intended application is.

To me it seems that that this could be done on a monthly or even quarterly basis, with a course tour. Whether it is done as individuals or as a group I am not sure which would work best, but as the system is implemented I am sure bugs could be ironed out taking into consideration the needs of all the parties involved. As would the structure of such an evaluation, starting off small and then adding to the template as time and need arises – no need to over promise and under deliver, just let evolution take over! It could also be the case that outside, independent evaluation be conducted based on the agreed schedule.

Appropriately, the first stages of such a system would likely hinge upon the all important annual budget and how much a club has or wants to spend. Once you and the committee/members know that, you could then go about agreeing on the value each area of the golf course would have and its priority. I think this would be the single most important part in developing a system to be used to not only validate the work of yourself and your team but to also help justify the need for projects, the reduction in a particular task being done, the need to increase attention in areas of concern and, to some degree, the need for equipment purchases. Obviously the committee is going to have its own needs based on where it would like to position itself and these need to be considered.

An additional tool that could be useful in conjunction with the benchmarking/evaluation process is that of recording the hours spent on each job per day/week/month/year. This will show you (and others that may be unaware) where you are using most of your man power and help guide you through the tough decisions involved with cutting back on tasks or reducing the frequency that the task is being done.

I currently do keep records of hours spent on jobs on a daily basis and it is interesting to see where the bulk of work is being carried out each month. If you have this information you can compare it to the number of rounds you receive and this can help in being economical with your scheduling of tasks, particularly if you put it against each day. By doing this you can then assess whether you need to do some tasks each day – if there are only a handful of golfers on Mondays, is it really necessary to rake all the bunkers every Monday or cut the greens?

All in all benchmarking is beneficial and can help provide direction that is sometimes lacking for whatever reason. It would give you goals that should be agreed upon by yourself and your management and realistically achievable, and helps focus on areas that are key to the entire club, not just your own ideas. It also ensures you don't forget about the important and current key issues such as environmental management and water management and highlights strengths and weaknesses within your operation that you can then plan to improve and work on for the betterment of the club and your own career." **Nigel Taylor, The Empire Hotel & Country Club , Brunei**

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"I am not that comfortable with the concept of benchmarking from a course maintenance and presentation point of view. I do agree that some areas of a club's business can be fairly assessed and benchmarked. Working with nature has too many variables and it is not conducive to good plant health to say that you will hold a set standard or that benchmark all the time. Our professionalism as a practitioner will drive us to achieve the best possible standard regularly.

I don't think it's healthy to have a piece of paper waved in front of a superintendent saying "there's the benchmark you need to achieve", especially if he doesn't have the budget or resources at hand. Benchmarking is a tool that if not used well or in the means that is intended then it could be dangerous. I feel our courses are benchmarked constantly now, with pennant season, guest days, VGA and WGV events and the like." **Adam Robertson, The Kew Golf Club.**

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Autumn 2009 saw the AGCSA embark on a new three-year research project to evaluate a number of new bentgrass cultivars which have recently hit the market. The aim of the project is to assess their management and performance under Australian conditions and in this instalment of AGCSATech Update senior agronomist Andrew Peart examines the initial establishment results across the three trial sites.

Cromer Golf Club in Sydney is one of three sites where the AGCSA has established a new three-year bentgrass variety trial. The Cromer plots are pictured at 23 days after sowing

Establishment results emerge from bentgrass trials

In Volume 11.3 (May-June 2009) of Australian Turfgrass Management, the Australian Golf Course Superintendents Association (AGCSA) outlined details of a new bentgrass variety trial to be conducted at three sites around the country.

Since its inception, the AGCSA's technical division AGCSATech has been involved in a number of turfgrass cultivar trials, and between 2000 and 2005 undertook an extensive project evaluating a range of bentgrass cultivars that were then available on the market. Since the completion of that project, the results of which can be viewed in full through the AGCSA website, several new bentgrass cultivars have been bred and some of these are now being utilised on golf courses around Australia.

As part of its research activities, the AGCSA has established a new bentgrass trial in Victoria, NSW and South Australia to objectively assess the growth and performance characteristics of these new grasses under local conditions. The project is jointly funded by AGCSATech and Horticulture Australia Ltd (TU08002) and over the next three years will evaluate the performance and maintenance requirements of the new strains compared to the established industry standards.

Working with the Australian Seed Federation (lawn and turf seed group), the AGCSA contacted a number of seed companies and gave them the opportunity to submit cultivars for the trial. The companies involved and varieties submitted were: Advanced Seed (varieties Tyee, 007, Dominant Xtreme, SR1150 and SRP1RH93); Simplot (T-1); Heritage (Penn G2, Authority and Penn A1); DLF Seeds (Cobra 2 and CY 2); Seed Force (Shark); and PGG Wrightson (Declaration, Mackenzie, SRP1GMC and Mariner). A vegetative selection, called AGCSA1, has also been included as part of the trial.

Over a two week period in April the three trial sites were established. Keysborough Golf Club (Melbourne) was sown on 9 April, Cromer Golf Club (Sydney) 15 April and Royal Adelaide Golf Club (Adelaide) 17 April. The seeding rate for the trial was based on 5 grams per square metre for the seeded varieties, while the AGCSA1 vegetative selection was planted at a rate equivalent to 0.28m^3/100m^2.

The seeding rate for each variety was adjusted following results of a germination test conducted by Assure Quality (generally between 85 per cent and 98 per cent) as well as their seed count due to some varieties being coated, namely Penn A1, Penn G2, 007, Tyee and Mackenzie.

Plot layout across the three sites is generally a replicated block design with the exception of Cromer Golf Club which is a completely randomised design due to the size of the trial area. Plot sizes range from 3.5mx1.0m at Keysborough Golf Club to 3.0mx1.5m at Royal Adelaide Golf Club.

At Royal Adelaide there are two varieties not included at either of the other two trial sites. One of these is Mariner, which has been renowned for its tolerance of higher salinity water, while the other is an RAGC blend which consists of Seaside, Highland, Penn G2 and Penncross bentgrasses.

The Keysborough Golf Club plots at 70 days after sowing

RESULTS

Establishment data was collected over winter and early spring at each site with initial germination rate (0-5 scale), initial turfgrass vigour (0-5 scale) and per cent cover (%) measured.

INITIAL GERMINATION

At Cromer Golf Club there was a significant difference observed in initial germination at nine days after sowing (DAS). Authority showed the most seedling germination after nine days than any other variety with the exception of Penn G2, Penn A1 and SRP1GMC. At nine days after sowing 007 had the least amount of seedlings to germinate, however, this was not significantly less than another nine varieties.

At the Keysborough Golf Club and Royal Adelaide Golf Club trial sites there was no significant difference between any of the varieties for seedling germination over the

TABLE 1. GERMINATION (0-5) KEYSBOROUGH GC

Variety	7 DAS	11 DAS	14 DAS
007	1.3	3.7	3.7
Penn A1	1.3	3.7	3.7
Authority	1.3	4.0	4.0
CY 2	1.0	3.7	3.7
Cobra 2	1.7	4.0	4.0
Declaration	2.0	4.3	4.7
Dominant Xtreme	2.0	3.3	3.7
Penn G2	1.7	4.3	4.0
Mackenzie	3.0	4.7	4.7
Shark	1.7	4.3	4.3
SR1150	1.3	4.0	4.0
SRP1GMC	3.0	4.3	4.3
SRP1RH93	1.7	4.0	4.0
T-1	1.7	3.7	3.7
Tyee	2.0	4.3	4.3
LSD (P<0.05)	**ns**	**ns**	**ns**

TABLE 2. GERMINATION (0-5) CROMER GC

Variety	6 DAS	9 DAS
Authority	1.9	3.3
Penn G2	2.3	3.0
Penn A1	1.5	2.8
SRP1GMC	2.1	2.4
Cobra 2	2.0	2.3
Declaration	1.5	2.1
Tyee	1.2	2.0
SRP1RH93	1.3	2.0
CY 2	1.4	2.0
T-1	1.5	1.9
MacKenzie	1.6	1.8
SR1150	1.3	1.8
Dominant Xtreme	1.2	1.6
Shark	0.9	1.5
007	0.8	1.3
LSD (P<0.05)	**ns**	**0.9**

TABLE 3. GERMINATION (0-5) ROYAL ADELAIDE GC

Variety	8 DAS	14 DAS	21 DAS
007	0.7	3.0	4.3
Penn A1	1.7	3.5	4.8
Authority	1.3	3.7	5.0
CY 2	1.7	4.0	5.0
Cobra 2	1.7	4.2	5.0
Declaration	1.3	3.7	4.8
Dominant Xtreme	1.7	3.7	4.8
Penn G2	1.7	3.7	4.8
RAGC Blend	0.7	3.8	4.8
MacKenzie	1.5	3.5	4.8
Mariner	2.3	4.0	5.0
Shark	0.5	3.2	4.8
SR1150	1.0	3.0	4.7
SRP1GMC	1.7	3.8	5.0
SRP1RH93	1.5	3.8	4.8
T-1	1.7	3.2	4.7
Tyee	1.7	3.8	5.0
LSD (P<0.05)	**ns**	**ns**	**ns**

three assessment dates. Germination results for each location can be viewed in Tables 1-3.

INITIAL VIGOUR

At Cromer Golf Club there was a significant difference observed in initial vigour at nine days after sowing. Authority had the quickest vigour after this time than all other varieties with the exception of Penn G2 and Penn A1. At nine days after sowing 007 had the least amount of initial vigour, however, like the germination results above this was not significantly less than another six varieties.

At Royal Adelaide Golf Club there was a significant difference observed in initial vigour at 14 days after sowing. Mariner was significantly more vigorous after 14 days than 007, SR1150, Shark and the RAGC blend but was not significantly more vigorous than any of the other varieties. At 21 days after sowing Mariner and Penn G2 were significantly more vigorous than 007, Declaration, T-1, SR1150, Shark and the RAGC blend, but was not significantly more vigorous than any of the other varieties.

At Keysborough Golf Club there was no significant difference between any of the varieties for initial vigour over the three assessment dates. Initial vigour results for each location can be viewed in Tables 4-6.

PERCENTAGE COVER

At Cromer Golf Club there has been no significant difference in turf cover between any of the seeded bentgrass varieties or the vegetatively planted bentgrass apart from the initial assessment at 21 days after sowing. At that stage the vegetative planted variety had significantly more cover than all other varieties, however, since then the seeded varieties have not had significantly less cover.

The percentage cover at Keysborough has illustrated that the vegetative variety has had significantly less coverage than all of the seeded bentgrass varieties since 82 days after seeding with the exception of one assessment date (119 DAS) when it did not have a significantly less turfgrass coverage than T-1. T-1 has produced the least amount of coverage compared to the other seeded varieties since the first assessment date and was significantly less at 108 and 119 DAS.

At Royal Adelaide there has been no significant difference in turf cover between any of the seeded bentgrass varieties or the vegetatively planted bentgrass. However, the overall maturity of the plots at Royal Adelaide in terms of a percentage cover has been slower than at either Cromer or Keysborough. Percentage cover results for Keysborough and Cromer can be viewed in Tables 7-8. ▶

TABLE 4. INITIAL VIGOUR (0-5) KEYSBOROUGH GC

Variety	14 DAS	19 DAS	31 DAS
007	2.0	1.2	3.0
Penn A1	2.7	2.0	4.0
Authority	3.3	2.0	4.3
CY 2	3.3	2.0	3.3
Cobra 2	3.0	2.0	3.7
Declaration	3.7	1.7	4.0
Dominant Xtreme	2.3	2.0	4.0
Penn G2	2.7	2.3	4.3
Mackenzie	3.3	2.7	4.0
Shark	3.0	2.3	4.3
SR1150	2.7	1.7	4.7
SRP1GMC	3.0	1.7	4.3
SRP1RH93	3.0	1.3	4.0
T-1	2.3	1.3	3.0
Tyee	3.3	2.0	4.0
LSD (P<0.05)	**ns**	**ns**	**ns**

TABLE 5. INITIAL VIGOUR (0-5) CROMER GC

Variety	15 DAS
Authority	3.8
Penn G2	3.5
Penn A1	3.3
Tyee	2.6
SRP1GMC	2.4
Cobra 2	2.4
MacKenzie	2.3
CY 2	2.3
SR1150	2.2
SRP1RH93	2.2
Declaration	2.2
T-1	1.9
Dominant Xtreme	1.8
Shark	1.7
007	1.5
LSD (P<0.05)	**0.7**

TABLE 6. INITIAL VIGOUR (0-5) ROYAL ADELAIDE GC

Variety	14 DAS	21 DAS
Penn G2	2.8	4.2
Mariner	3.0	4.2
SRP1RH93	2.7	4.0
Penn A1	2.7	4.0
Tyee	2.3	3.8
SRP1GMC	2.7	3.8
Cobra 2	2.8	3.8
Authority	2.3	3.8
CY2	2.5	3.5
MacKenzie	2.0	3.3
Dominant Xtreme	2.2	3.3
SR1150	1.7	3.2
Shark	1.7	3.2
RAGC Blend	1.7	3.2
T-1	2.2	3.0
Declaration	2.2	2.8
007	1.0	2.0
LSD (P<0.05)	**1.0**	**0.9**

DISEASE INCIDENCE

Incidence of damping off disease (*Pythium* spp.) was recorded at both Cromer and Keysborough around one month after sowing. At Cromer the seeded varieties in general had more incidence of disease than the vegetatively planted bentgrass with all varieties, with the exception of 007, having a significantly greater area affected.

At Keysborough the percentage area affected was not nearly as great and there was no significant difference between any of the seeded varieties (see Tables 9-10).

FUTURE ASSESSMENTS

Now that a full coverage has been achieved, the trial sites will continue to be assessed on a regular basis for the following parameters;

- Turf quality (bi-monthly);
- Turf density (bi-monthly);
- Turf colour (bi-monthly);
- Incidence of disease and pests (as they occur);
- Thatch depth (four times per year);
- Wear tolerance (four times a year, Vic site only);
- Spiking tolerance (four times a year, Vic site only);
- Green speed using a modified stimpmeter (four times per year); and
- Surface hardness (four times per year).

Regular updates on these assessments will be provided in future editions of Australian Turfgrass Management and field days are also planned at the three trial sites.

VICTORIA AND OFF-LABEL USE OF PESTICIDES

At the Hobart conference the issue of off-label use of pesticides in Victoria was again raised and it is fair to say that it still causes consternation among turf managers and chemical suppliers. It is worth reviewing what are the general principles governing the use of off-label pesticides in Victoria.

In Victoria, pesticide laws allow the use of a pesticide for any purpose, whether that use is registered or not, so long as:

- The pesticide is registered for at least one use (e.g., a crop) in Victoria;
- The pesticide is not one of about 25 prescribed restricted pesticides, or is a Schedule 7 poison;
- The intended use is not specifically prohibited in Victoria, or if it is at a greater rate, or shorter interval between uses; and
- The intended use does not lead to a residue which exceeds the MRL for that crop.

This regulatory regime allows a great deal

TABLE 7. % COVER KEYSBOROUGH GC

Variety	19 DAS	40 DAS	60 DAS	82 DAS	108 DAS	119 DAS	131 DAS
Declaration	47	82	83	88	95	97	99
SRP1GMC	40	80	88	87	93	95	98
Shark	40	77	87	87	93	95	98
CY 2	38	73	80	87	93	95	98
Penn G2	38	80	82	87	93	95	98
Mackenzie	43	78	82	85	91	93	98
Authority	42	85	83	87	93	93	98
SRP1RH93	32	77	82	85	90	93	97
Cobra 2	43	77	82	82	92	87	97
Tyee	33	75	82	82	89	93	96
SR1150	32	80	83	82	90	92	96
Penn A1	37	75	78	83	90	92	96
Dominant Xtreme	33	80	77	82	91	92	96
007	25	73	78	82	89	88	95
T-1	22	67	73	80	87	83	94
AGCSA 1	-	-	72	65	75	75	85
LSD (P<0.05)	**ns**	**ns**	**ns**	**8**	**6**	**10**	**5**

TABLE 8. % COVER CROMER GC

Variety	21 DAS	36 DAS	53 DAS	70 DAS	84 DAS	98 DAS	126 DAS
Authority	73	75	78	81	82	88	97
AGCSA 1	72	78	83	77	84	86	96
Penn A1	56	75	80	81	83	90	99
Penn G2	40	67	73	74	75	83	99
Cobra 2	38	63	71	73	71	78	97
CY 2	35	63	72	73	76	81	96
Tyee	34	65	73	73	79	86	99
MacKenzie	33	62	73	75	78	85	99
SRP1GMC	33	66	75	80	79	88	99
Shark	28	58	72	72	77	85	98
Dominant Xtreme	28	53	63	67	68	77	96
SRP1RH93	27	59	71	73	76	81	96
SR1150	25	58	67	72	72	77	97
T-1	24	53	63	68	68	74	95
007	24	58	68	74	74	87	98
Declaration	22	57	68	73	77	84	99
LSD (P<0.05)	**17**	**ns**	**ns**	**ns**	**ns**	**ns**	**ns**

TABLE 9. DISEASE INCIDENCE (% AFFECTED) KEYSBOROUGH GC

Variety	32 DAS
007	6.7
Penn A1	5.0
Authority	0.0
CY 2	6.7
Cobra 2	5.0
Declaration	5.0
Dominant Xtreme	0.0
Penn G2	0.0
Mackenzie	3.3
Shark	3.3
SR1150	5.0
SRP1GMC	3.3
SRP1RH93	0.0
T-1	13.3
Tyee	3.3
LSD (P<0.05)	**ns**

TABLE 10. DISEASE INCIDENCE (% AFFECTED) CROMER GC

Variety	25 DAS
Penn G2	60
Authority	56
Declaration	55
CY 2	53
Cobra 2	50
MacKenzie	47
Tyee	46
Shark	43
SRP1RH93	43
T-1	41
SRP1GMC	41
Dominant Xtreme	36
Penn A1	33
SR1150	31
007	27
AGCSA 1	4
LSD (P<0.05)	**25**

At the Royal Adelaide Golf Club trial site (pictured here at 14 days after sowing), there are varieties not included at either of the other two trial sites – Mariner and an RAGC blend consisting of Seaside, Highland, Penn G2 and Penncross bentgrasses

of freedom to the pesticide user in Victoria in that he/she does not have to apply for a permit to use a pesticide for most off-label uses, as the regulations render a permit unnecessary. So what are the responsibilities of the user?

- This places the responsibility for minimising public health and environmental risk squarely on the shoulders of the user, who is probably the least informed and least able to make a value judgment on the relative risk he/she is undertaking;
- Risk assessments – because of off-label use, a risk assessment must be made. It must be both a safety/health and an environmental risk assessment. In Victoria the pesticide user (is it the sprayer, the super who told him to spray or the employer?) is responsible to do so before any proposed off-label use;
- Any person who chooses to use these chemicals in an off-label manner does so accepting total responsibility for efficacy (whether the chemical achieves the desired result or not), residues in the environment and OH&S issues;
- Re-entry – if the product is used off-label and has re-entry holding periods they must be enforced to keep staff, the public and golfers out until the re-entry time has elapsed. While registered products may also have re-entry periods, the off-label use requires a higher degree of diligence to enforce this requirement. This may require signage saying "off-label chemical product in use". This is not a legal requirement, but if there is an event the superintendent will have to demonstrate he/she did everything reasonable to keep people from re-entering the site, and that includes staff.

This approach has the effect of minimising the potential liability to the state government of any adverse outcomes arising from the use of pesticides. The responsibility is entirely with you and the club.

It is important to note that registered turf chemicals have passed a rigorous testing programme that ensures the products are fit for use and that manufacturers of registered chemical products are providing a warranty when their products are used according to the label instructions.

Registered turf chemical products are priced to include the cost of all the testing and ▶

the cost of the registration process, and in the end it is the testing and registration process that provides assurance of quality and efficacy.

SOIL TESTING

Soil testing is a routine activity undertaken in the management of most turf areas, whether it is a golf course, sportsfield, racetrack or other sports turf surface. Whether it is soil physical testing for a construction project or routine nutrient testing, both play an important role in establishing and maintaining high quality turf surfaces.

The fundamentals of soil testing are well documented, however, with a multitude of testing laboratories, different methodologies and data interpretation there is an increased opportunity for confusion and misuse of the data. One of these areas of confusion has been in the selection and testing of sands and organic amendments for the construction of golf greens.

The selection and testing of soils used in the construction of turf areas is a critical factor in ensuring that the surface meets the requirements for the particular application. Good drainage, a high degree of aeration and adequate moisture retention are typical factors that determine the suitability of a soil as a rootzone material.

Sands used for the construction of golf greens need to meet a very specific set of criteria and these have been well documented by the USGA Greens Section. Problems often arise where only some of the key selection parameters (other than particle size distribution) are tested. All sands for greens construction must be tested for the following physical criteria;

Physical properties	Preferred range
Total Porosity (%) (at 30cm tension)	35 – 55
Volumetric Water (%) (at 30cm tension)	15 – 25
Aeration Porosity (%) (at 30cm tension)	15 – 30
Hydraulic conductivity on a compacted sample (mm/hr)	> 150

The test criteria that appears to be most neglected is the determination of the volumetric water content (VWC) which is a measure of how much water the soil profile will hold at or near field capacity. In the first instance it is important to determine whether the particular sand has adequate moisture retention, whether it holds too much water and if the moisture content is too low how much amendment is required.

In recent experience, sands holding too much moisture has been an issue and it particularly relates to the addition of organic amendments. If the VWC is low and an organic amendment has to be added to raise the VWC, it is essential that the organic matter and sand mix is tested at various ratios before determining the rate of amendment.

The two most commonly used organic amendments are peat moss and coco-fibre. It is important that any organic matter has a minimum of 85 per cent by weight organic matter based on a loss on ignition test. It is important to remember that what is required is the organic matter and not the extraneous matter (i.e. fine soil particles) that can come with it. There are 'dirty' peats where there is a high proportion of silt and clay particles, which if added to a sand can result in an excessively high VWC.

Where other amendments may be added to increase moisture retention it is essential that the characteristics of the amendments are well known and that the sand/amendment mix is at the very least tested for VWC and saturated hydraulic conductivity. It is not good enough just to check the effect on the drainage rate of the mix.

Determining the moisture release curve of sands and sand/organic mixtures are some times undertaken as a double check against the sand and organic matter mix. This is particularly useful where the characteristics of the amendment are not well known. The addition of fine particles can dramatically increase the capillary fringe where the perched water table can extend well into the rootzone, the result being a wetter and poorly aerated profile.

Testing of soils used in construction and interpretation of the data is a critical step in the construction of any turf profile. The basic criteria for rootzone mixes are well known and should always be followed. The use of any new sand sources or amendments must be thoroughly tested before use and then check tested during construction.

COURSE STANDARDS

During the recent Sustainable Golf seminars given by Steven Isaac and Daryl Sellar, it was often repeated that many of the confusions and conflicts that occur around golf clubs relating to course preparation relate to the club having no course standards policy document.

This issue was again recently raised in relation to the maintenance of bunkers and what to do with the rakes! The ensuing discussions came up with a multitude of 'solutions' and again reinforced the fact that there is no one answer and that every golf course/club can have different philosophies that work for them.

It is unfortunate that too few clubs have a course standards policy document and tend to make statements such as "We want firmer and faster greens" or "The course needs to be the best presented in the district". These may be admirable sentiments and ambitions but are they achievable within the limitations of the site and the available resources? There is little to be gained from arguing at a committee meeting without being armed with the facts. The onus is going to be on the superintendent initially to define a standard and then detail the resources that are required to meet that standard.

Understanding what that standard may be can be a challenge to define, however, it may be as simple as observing the golf course and picking a point in time when you believe that it is representative of what is achievable most weeks of the year. This standard should allow for room for improvement where with additional inputs the standard can be lifted for special events.

For that selected standard, manpower and equipment requirements to undertake each particular task must be defined and costed and then presented to management. At that point, reasonable decisions can be made based on facts. The high cost and labour input areas of maintenance need to be highlighted in this process.

When it comes to deciding on a particular requirement for the golf course, such as what to do with the bunker rakes, this should be decided by the club and then documented in the course preparation document. This then tells the members what the procedure is and gives a clear direction for the ground staff to follow. If nothing else it provides a reference point where people can be referred to rather than getting involved in circular and unresolved discussions.

ACKNOWLEDGEMENTS

The AGCSA wishes to thank the three golf clubs and their superintendents for being part of the bentgrass variety trial research project – Brett Chivers (Keysborough Golf Club), Mark Couchman (Cromer Golf Club) and Jeff Kaines (Royal Adelaide Golf Club). For more information about the project contact Andrew Peart at the AGCSA on (03) 9548 8600.

Thanks to Terry Muir (e-par) for providing information for this article. Decisions on the off-label use of pesticides should not be based on this article and reference must always be made to the relevant legislation.

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In the last instalment of Tech Talk, AGCSATech agronomist John Geary examined the role of turf root systems. In this edition he looks at the range of environmental and cultural factors that can have a significant impact on the health of root systems.

There are a range of environmental and cultural factors that turf managers can manipulate which influences the overall health and depth of turfgrass root growth

Maximising root health

Understanding the dynamics of a healthy turfgrass root system is vital in the establishment and production of high quality sports turf. In the previous issue of ATM (Volume 11.5, pg 36-37), Tech Talk outlined that two of the major functions of a turf root system are water absorption and nutrient uptake. To maintain adequate water and nutrient absorption it is important to maximise rooting depth by encouraging roots to draw water and nutrients from as much of the soil profile as possible.

So how can turf managers promote increased root depth? Well, there is a range of environmental and cultural factors (Table 1) they can manipulate which influence the overall health and depth of root growth. In isolation, these factors may have little influence, however, when combined they can have a dramatic impact, both positive and negative.

PLANT SPECIES

Different turf species have different potentials for root depth and root:shoot ratios. This genetic characteristic is most evident when comparing annual plants with perennial plants. The survival of annual plants is dependent on the species successfully producing enough seed to carry over from one year to the next. As a result, the root systems of annual plants are shallow with nutrients and carbohydrates prioritised towards seed production.

On the other hand, perennial plants invest in deep and extensive root systems as it improves the survival prospects of the plant. The take-home message here is to select the grass species/variety that is best suited to your needs and environmental conditions.

PROFILE MOISTURE

Probably the most important role turf roots perform is water absorption. If you were to observe a soil profile over several weeks, whereby one half of the profile received double the volume of water, you would see a changing pattern of root growth and density through the profile with roots growing in the moist profile proliferating, while roots in the drier zone would be reduced.

In effect, roots will 'chase' water deep into the profile if allowed. Infrequent deep watering which promotes deeper root depth should be adopted while the management of excessive thatch is also vital in promoting deeper rooting. Excessive thatch causes an increased percentage of roots to be concentrated in the upper root zone, limiting the area from which water uptake occurs.

PLANT HORMONES

The interaction of hormones controls the way a plant divides up its carbohydrates and nutrient resources, particularly between roots and shoots. In effect, a priority system is adopted whereby each part of the plant is given a priority. Seedhead production is always given the highest followed by the youngest leaf shoot, the second youngest leaf shoot and so on. Root tips and those roots locating water successfully have middle priority.

When the plant is under stress or lacking in resources (water and nutrients) this priority system means the root system will only receive carbohydrates and nutrients after areas of higher priority such as seedheads and leaf shoots are satisfied.

TEMPERATURE

While there is little the turf manager can do to influence the temperature of soil, it is helpful to regularly monitor soil temperature. Use soil temperature readings to gauge what part of the life cycle the root system is experiencing.

SOIL PH

Soil tests should be conducted every one to three years to check soil pH trends. Turf managers should be aware that each turf species has an optimum soil pH and maintain that pH accordingly. Root growth and function is severely restricted at soil pH levels below 5.6 and above 7.4.

COMPACTION

Soil compaction can be caused by a number of factors, resulting in the closure of non capillary pore spaces within the soil profile. Given that these larger pore spaces are the conduits for root growth and air and water movement into, through and out of the soil, it is important to alleviate any compaction via soil cultivation methods such as coring, verti-draining, slicing and backfilling/topdressing with a coarse, free-draining sand.

TABLE 1. FACTORS INFLUENCING ROOT GROWTH

Environmental Factors	
Plant species	Waterlogging
Profile moisture	Lack of Oxygen
Plant hormones	Toxicities
Temperature	Pests and disease
Soil pH	Saline and sodic soils
Compaction	Microbial environment
Cultural Practices	
Mowing height	Nutrients - fertiliser practices
Thatch accumulation	

WATERLOGGING

Waterlogging is a condition where the soil porosity is saturated with water leading to the elimination of adequate oxygen for root growth and general turfgrass health (i.e.: anaerobic conditions). To promote adequate root growth, turf managers should ensure that aerobic conditions exist in the soil at all times.

Don't forget that anaerobic conditions can easily develop in sand profiles if thatch is allowed to accumulate. The same can be said for perched water table constructions whereby the wrong sand/gravels are selected.

LACK OF OXYGEN

Turfgrass roots require oxygen for continued growth. Soil compaction and waterlogging can seriously limit the soil oxygen level. The USGA recommends the following parameters for greens construction

- Total porosity (%V/V): 25-55
- Volumetric water (%V/V): 15-25
- Aeration porosity (%V/V): 15-30

PESTS AND DISEASE

There is a range of pests which can feed actively on turfgrass root systems and cause damage. Subterranean pests such as mealy bugs and plant parasitic nematodes have the potential to feed on root tips leading to a reduction in root depth.

Root-borne diseases such as ectotrophic root infecting (ERI) fungi has been observed throughout Australia and is a common problem associated with warm-season grasses. The ERI fungi consist of spring dead spot (*Leptosphaeria* spp.) and Take-all patch (*Gaeumannomyces graminis*) with turf damage tending to occur when there are other stresses such as high temperatures, high humidity, low light and wear. If Take-all patch is considered extensive, it is recommended the following action be undertaken;

- Check soil pH. Alkaline soils are conducive to the presence of *Gaeumannomyces* spp and acidifying fertilisers should be applied to lower pH.
- Apply manganese as a foliar spray. Manganese is tied up by the *Gaeumannomyces* spp fungi and becomes unavailable to the plant.
- Soils low in potassium make turfgrasses more susceptible to the disease.
- Make sure that the thatch is kept under control. Thatch not only harbours the disease organism it also reduces the effectiveness of fungicides that are applied.
- Apply a fungicide such as azoxystrobin (e.g. Heritage) as a preventative treatment. The fungicide needs to be applied about six weeks before the disease is likely to appear. Also, apply in late summer/early autumn while there is good growth.

Cultural practices, such as dusting, can limit the build-up of thatch

TOXICITIES

Root growth can be severely restricted by a range of different toxicities. Anaerobic soil conditions can quickly lead to black layer, producing gases and related compounds that are toxic to roots.

Turf managers using treated effluent need to also closely monitor the build-up of copper, boron, chlorine and aluminium within the soil profile as these elements can reach toxic levels harming root and plant health. Turf managers need to also be cautious when using pre-emergent herbicides as many such compounds are known to cause root pruning, severely restricting root growth.

SALINE AND SODIC SOILS

Increased salinity not only severely restricts root growth, but can also have adverse effects on overall plant health. Regular soil and water tests should be undertaken monitoring electrical conductivity levels.

Managing increased salinity levels is very complex, however, it is vital to promote leaching of the salts through the profile. This is best achieved through the careful management of irrigation practices and aerating the top 200-300mm of the soil profile as often as possible. The selection of grass varieties that tolerate higher salinity levels such as the seashore paspalums may also need to be investigated.

A build-up of sodium in the soil profile should also be closely monitored. Any imbalances should be corrected by the incorporation of gypsum.

MICROBIAL ENVIRONMENT

There is no doubt that the diversity and activity of the soil microflora play an important role in the health of the turfgrass root system. Some soil scientists believe that the increasing use of free-draining sands due to their excellent drainage and porosity characteristics has been to the detriment of the soil biology, resulting in nutrient and microbial imbalances that harm the root system.

An example is the group of *Pythium* species involved in the disease complex known as Pythium Root Dysfunction. The incidence of these problems is strongly associated with the poor nutritional and microbiological status of new sand greens and it seems apparent that more emphasis should be placed on the use of organic and microbe enhancements such as molasses and composts in free-draining sand greens.

CULTURAL PRACTICES

While the above environmental factors play a critical role, there are also a number of cultural factors which play their part as well, most prominently cutting height, nutrition and thatch management.

Mowing practices, in particular very low mowing, can be especially detrimental to deep rooting. Turf managers should observe the 'one-third rule' which refers to not removing more than one third of the above ground grass height in any one time. This is particularly important as carbohydrates which are normally available to the roots are redirected to restore damaged shoots.

There is also a strong correlation between increased nitrogen levels and reduced turf grass root depths. While nitrogen is essential for turfgrass root growth, excessive nitrogen promotes shoot growth at the expense of root development. As a result, carbohydrates are drawn from the roots which in extreme cases can lead to carbohydrate exhaustion of the roots and root senescence.

It is important to only apply enough nitrogen to aid sustainable plant growth and recovery, while avoiding infrequent, heavy applications of nitrogen. It is also important to avoid deficiencies of phosphorus and potassium as both nutrients play a major role in root development and enhancement.

Regular soil testing and/or tissue testing should be carried out to establish base levels of both nutrients. A general rule of thumb for potassium is to apply at a rate which is 50 to 75 per cent that of nitrogen.

As discussed earlier, thatch accumulation increases the percentage of roots to be concentrated in the upper root zone, limiting the area from which water uptake occurs. Cultural practices, such as scarifying and light topdressing (dusting), are proven techniques aimed at limiting the build-up of thatch.

REFERENCES

Beard, J.B. (1986): *A new perspective on root growth. Proceedings, 9th AGCSA Conference, Brisbane.*

Ford, P. (2001): *HRT 416: Recommend plants, products and treatments (Book 2), NMIT, Turf Management Section, Topics 26, 27a and 28.*

Ford, P. (2001): *HRT 424: Manage irrigation, drainage and treatment systems, NMIT, Turf Management Section, p4-5.*

'Dry patch' in kikuyu turfgrass under 60 per cent ET-replacement irrigation during summer

Managing water repellency in turfgrass grown in sandy soils

Improved information on techniques for managing water repellence in broad acre turfgrass has been identified as a research priority for local government in Western Australia. The University of Western Australia, in partnership with Horticulture Australia Ltd and industry groups, initiated a study with the objective of maximising turfgrass water use efficiency by decreasing the incidence and severity of soil water repellency.

BY LOUISE BARTON AND TIM COLMER

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Soil water repellency decreases water use efficiency by causing irrigation water to unevenly infiltrate the soil surface, bypassing a proportion of the turfgrass roots, causing localised areas of turfgrass death (i.e. dry-patch).

Water repellence is caused by hydrophobic (water repelling) organic compounds adhering to soil particles. These compounds are common in soil, however the expression of water repellence is strongest in soils with low clay contents and when soil dries. In southern Australia, the climate appears to be drying and restrictions are being applied to water supplies. We therefore expect incidence of soil water repellency in sand-based turfgrass culture to increase.

Managing water repellency in turfgrass systems requires an understanding of the contributing factors and the development of corrective procedures. Applying wetting agents is one approach commonly used by turfgrass managers to overcome water repellence.

A number of factors influence the effectiveness of wetting agents, so choosing a wetting agent is not a particularly straight forward process. Here we present the results from the first year of a University of Western Australia (UWA) study investigating

the suitability of a simple laboratory test for assessing granular wetting agents.

LABORATORY-BASED SCREENING TEST

Two laboratory-based experiments were conducted using granular wetting agents. The first experiment assessed how easily non-wetting soil was able to be wetted after being treated with a wetting agent (i.e., 'initial' wettability test), while a second experiment assessed how long the wetting agent continued to remain effective after the initial application (i.e., 'residual' wettability test). Both experiments were conducted using two hydrophobic soil types that differed in their soil organic matter content.

The results from the residual wettability test are not presented here, as once wet, the amended soils retained their wettability for up to three months despite experiencing a series (36) of wetting and drying cycles.

The initial wettability experiment included two hydrophobic soil types (low or high organic matter content) by 12 granular wetting agents, by three replicates. Each wetting agent was applied at the manufacturer's recommended application rate to the surface of a hydrophobic soil contained in a Petri-dish.

TABLE 1: INFILTRATION RATE

Product	High Organic Matter (seconds)	Low Organic Matter (seconds)
A	37 (0.7)	50 (5)
B	197 (74)	198 (29)
C	227 (14)	118 (12)
D	599 (0.5)	442 (44)

NB: Time (seconds) taken for a water droplet to infiltrate a high and low organic matter soil amended with granular wetting agents selected for field evaluation. Values are the mean (and standard error) of three replicates.

The initial wettability of the soils was measured by dispensing a drop of de-ionised water onto six randomised positions per Petri-dish, and recording the time from initial contact of the water with the soil to disappearance of the liquid. The initial wettability of the unamended soils (i.e., controls) was also measured the same way.

The time taken for a water droplet to penetrate a hydrophobic soil amended with a granular wetting agent varied depending on the product and soil type. For example, average infiltration ranged from 37 to 599 seconds for the high organic matter soil, and from 50 to 442 seconds for the low organic matter soil. Product rankings were similar for both soil types. The time taken for a water droplet to penetrate an unamended soil was >600 seconds for both soil types.

FIELD-BASED TESTING

Four granular wetting agents ranging in effectiveness (as determined by laboratory screening – Table 1) were further assessed in the field by applying to turfgrass of two different ages. Turfgrass ages were approximately 24-year-old kikuyu turfgrass, which included a 50mm mat layer of high organic matter content (36 per cent), and a four-year-old kikuyu turfgrass.

Two turfgrass ages were included as older turfgrass surfaces often contain a higher organic matter content in the surface soil, which can increase the incidence of water repellency as demonstrated in the laboratory testing above. Untreated plots of both turfgrass ages were also included in the study.

Wetting agent treatments were applied in October 2008 at the manufacturers' recommended rates and frequency of application. Products A, B and D were only applied once (17 October 2008) during the growing season, whereas Product C was ▶

Kikuyu turfgrass with an organic mat layer not treated with a wetting agent (top), treated with Product A (middle) and treated with Product D (bottom). Photographs were taken in January 2009 following a dry and hot period

applied in October and again on 12 December 2008.

Nitrogen fertiliser was applied four times per year (200kg N ha^{-1} yr^{-1}), while other nutrients were applied every year as required. All treatment plots were irrigated at 60 per cent replacement of net evaporation, and were irrigated three days per week from late spring to mid-autumn. The plots were mown weekly (height of cut 15mm).

The effectiveness of the wetting agents was assessed by measuring soil water repellency in the surface 25mm (every four weeks), soil water content (every four weeks), turfgrass colour (every four weeks) and turfgrass growth (weekly) throughout the season.

Soil water repellency was measured using the molarity of ethanol droplet test (MEDT), whereby the higher the concentration of ethanol needed to infiltrate the soil within 10 seconds, the higher the water repellence.

Turfgrass plots were repellent prior to application of wetting agents in October (Figure 1) and before many broadacre turfgrass managers may consider applying a wetting agent. Furthermore, the wetting agents varied in their ability to treat soil water repellency. For example, one month after application only Products A, B and C had decreased water repellency in comparison to the unamended plots. These same products were also best at restricting the development of water repellency and maintaining turfgrass growth and quality during a hot, dry period in January (Figure 1; see photos on this page).

The development of water-repellency was more severe in soil with a high organic matter content, and consequently wetting agents were not always as effective at restricting the development of water repellency in the high organic matter soil as the low organic matter soil (Figure 1).

The rankings of the four products in the laboratory were similar, but not exactly the same, as that observed in the field in January (compare Table 1 and Figure 1). For the low organic matter soil, the laboratory test ranked product A > product C > product B > product D, whereas in the field they were ranked product A > product B > product C > product D. Although the laboratory and field ranking was not exactly the same, the laboratory testing did predict that applying product D did not decrease water repellency in either soil type.

CONCLUSIONS

Applying wetting agents can reduce the severity of soil water repellency, however, not all granular products are as effective as each other. Furthermore, dry-patch is likely to be more severe and wetting agents less effective in soils with high organic matter contents i.e., a mat layer.

Utilising effective wetting agents, in combination with the removal of organic mat layer, and using an irrigation system with high uniformity of application, is likely to reduce the severity and incidence of dry-patch in turfgrass grown on sandy soils. The laboratory-based test for wetting agents shows promise, but requires further field-based verification utilising a range of products on a range of soil types.

ACKNOWLEDGEMENTS

Leon Hodgson is thanked for implementing the field-based study, George Wan for conducting the laboratory screening test and Matthew Willis for analysing soil and plant samples from the field-based study.

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Louise Barton and Tim Colmer are from the UWA School of Plant Biology, Faculty of Natural & Agricultural Sciences. For more information visit http://www.fnas.uwa.edu.au/turfresearch/index.htm.

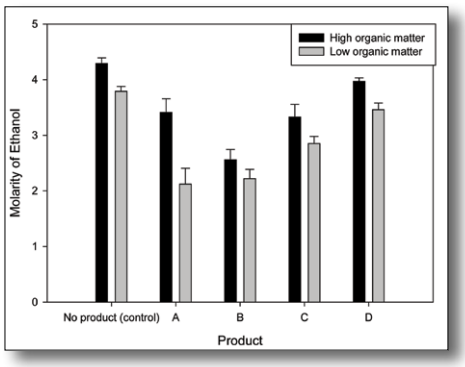

Figure 1: Water repellence of surface 25mm soil collected from turfgrass (high and low organic matter) treated with various wetting agents. Samples collected in January 2009, and values represent the means (and standard errors) of five replicates. Increasing molarity of ethanol indicates increasing water repellence

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The warm-season greens trial facility at Redlands Research Station has provided replicated data on nitrogen inputs and different cutting heights and the correlation between the two when applied to eight different *Cynodon* and four different *Paspalum vaginatum* varieties over the past four years

Redlands warm-season greens trials wraps up

Jon Penberthy updates ATM on one of the industry's major research projects which has recently come to an end.

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Four years after the establishment of the Warm Season Greens Test Facility at Redlands Research Station in Cleveland, Queensland, the collection of data from the first research project undertaken at the site has been completed.

Over the life of the project, the Queensland Primary Industries and Fisheries facility has provided replicated data on nitrogen inputs and different cutting heights and the correlation between the two when applied to eight different *Cynodon* varieties and four different *Paspalum vaginatum* varieties. The site has also been an invaluable resource to conduct direct comparisons between varieties and how they perform under similar treatments and conditions in this region.

Originally planted out with the help of volunteers from the GCSAQ, the site has been the focus of several industry field days over the years and has been visited by many interested turf care professionals.

The *Cynodon* turf types planted were TifEagle, TifDwarf, TifGreen 328, Novotek, Mini Verde and MS Supreme. Champion and Flora Dwarf were also planted on the trial site but not in the replicated trial. The *Paspalum vaginatum* varieties planted were Sea Isle 2000, Sea Isle Supreme, Velveteen and Sea Dwarf.

The differences between the two turf genuses soon became obvious with the paspalums holding colour through the bulk of the winter but generally proving to have a slower ball speed than the *Cynodon* species. The paspalums striped up well and usually attracted the most comment from visitors while the couches provided the better quality surface for ball roll.

With the trial now complete, the research plots were heavily renovated in early October

Once the data collected from the site has been collated and examined, the findings of the project will be presented to the stakeholders and the wider turf industry. With the amount of raw data to be analysed, it will take considerable effort to extrapolate the data but the results will benefit the industry in the long run.

During the course of the study monthly measurements of colour, quality and thatch levels were taken. Every second month each subplot was measured using a modified stimpmeter to gauge greens' speed. Maximum and average rooting depths were measured quarterly and thatch depth measurements were carried out twice per year.

With final stimp measurements, rooting depths, thatch measurements and colour, quality and thatch ratings taken in late September, the plots have since undergone a heavy renovation to get them back into uniform order. This process began in early October with heavy scarification of all the plots using a pedestrian scarifyer set in deep enough to reach the bottom of the thatch layer in the most heavily fertilised subplots. Each variety was treated separately with the most thatchy plots being run over in up to eight different directions.

The next step was to topdress the plots heavily before solid tyning using a Weidenmann deep tyne aerator. The plots will then be fertilised and treated with fungicide before rubbing in and heavy watering to bring the whole site back to good condition ready for the next trial. It may be necessary to use a hollow tyne lawn aerator to pull out some of the more stubborn areas of thatch but we will be monitoring the progress of the plots as they recover.

In the near future the site will be retained in the expectation that ideas that have been suggested by industry can be developed into research projects that will attract their own funding in dealing with the new varieties of warm-season turfgrasses.

The involvement of the golf and bowls industry has been invaluable and special thanks must go to the original voluntary contributors to the project – Bowls Australia, QGU, VGA, SAGCSA, GCSAQ, Horton Park Golf Club, Sanctuary Cove, Indooroopilly Golf Club, Twin Waters Golf Club, the Jimboomba Turf Group, Tropical Lawns and of course the AGCSA.

Support from the trade has been fantastic with significant input from Globe Australia, Toro, Twin View Turf, PowerTurf, David Burrup Golf Design, BHM and the support of Horticulture Australia Limited.

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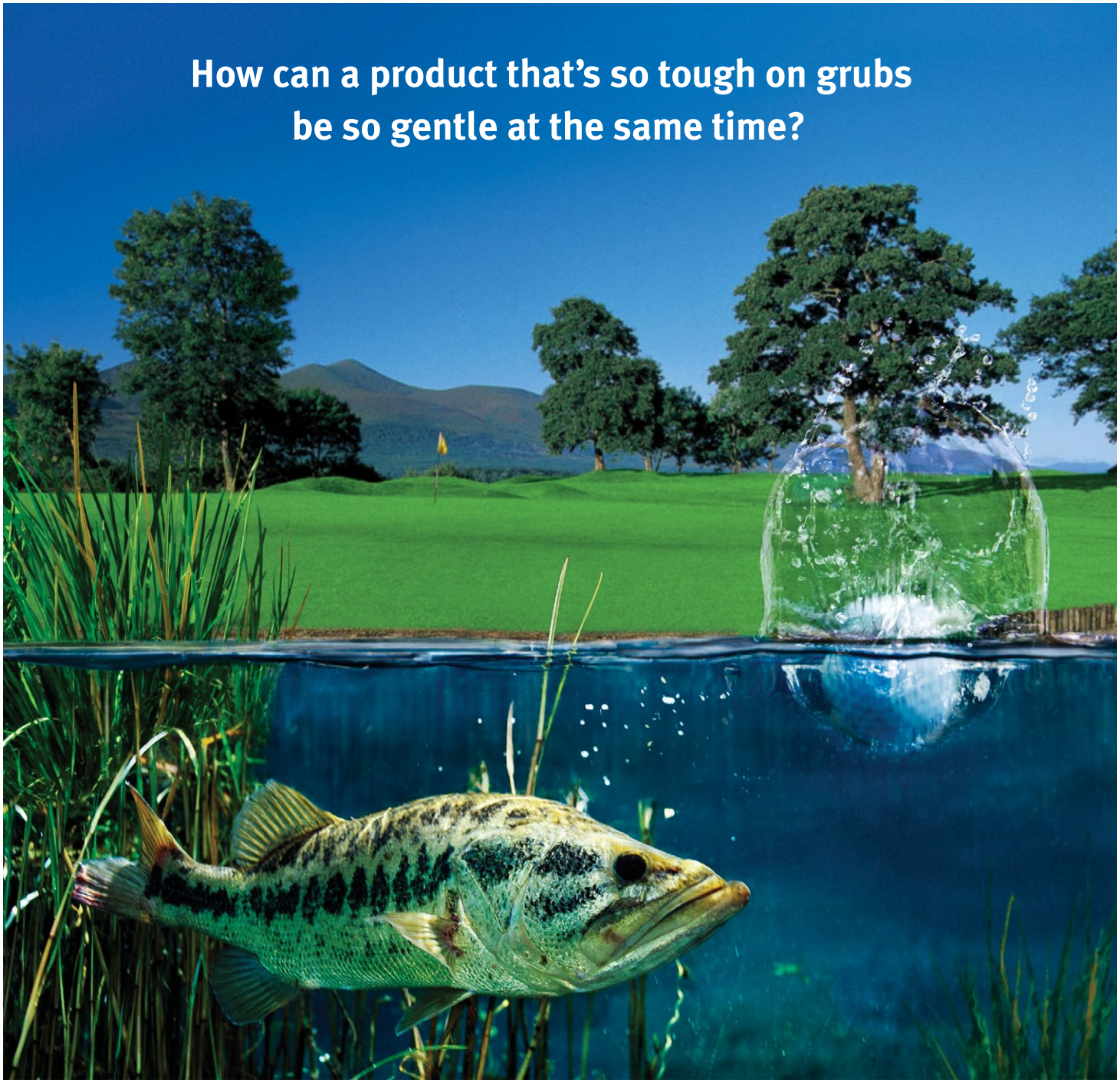

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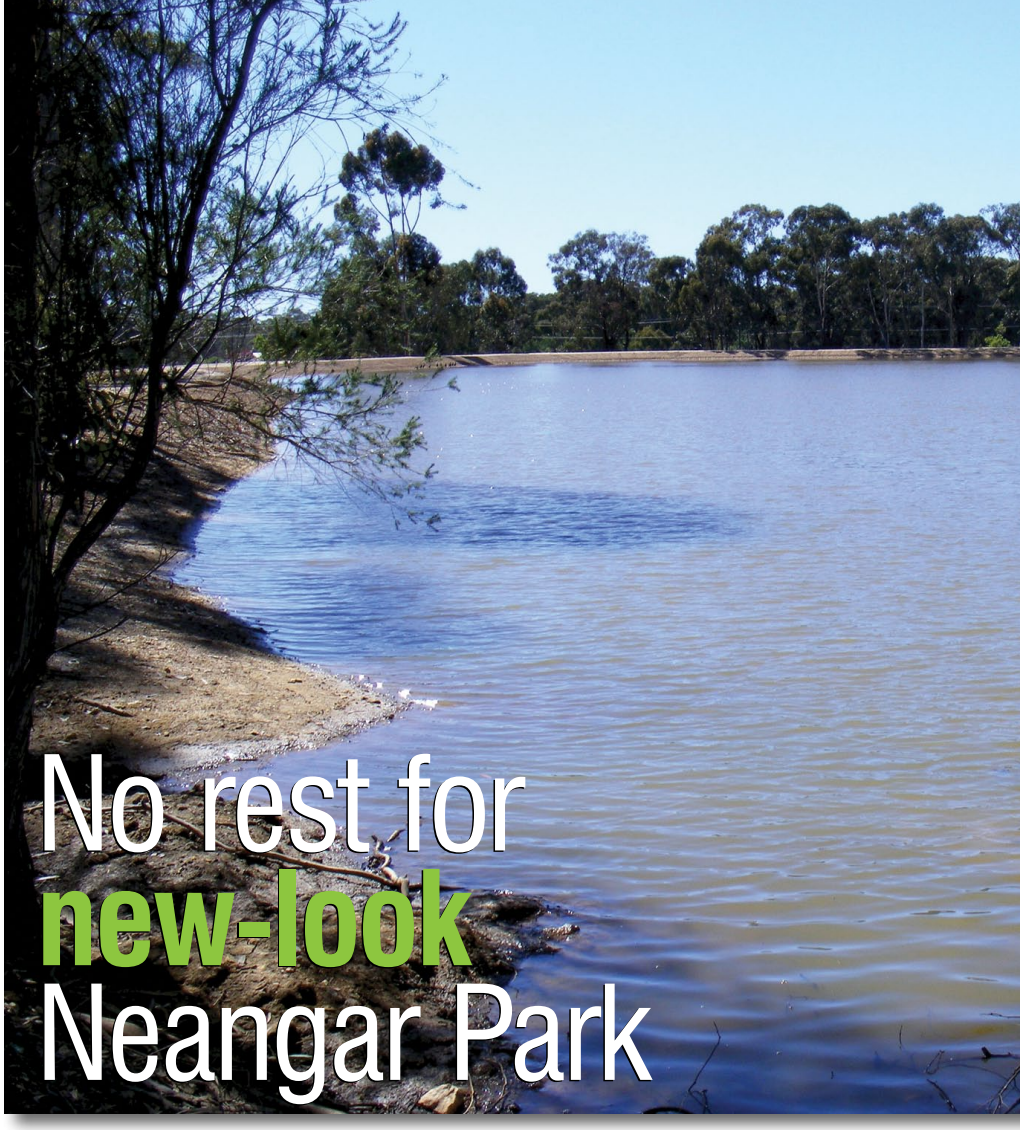


No rest for new-look Neangar Park

With the help of two Federal Government water grants and a proactive committee, Neangar Park Golf Club course superintendent Brett Hawkey and his crew are well on the way to making sure the Bendigo course is set up for a prosperous future.

'Neangar' is the Aboriginal word for 'resting place' and at Neangar Park Golf Club rest, relaxation and enjoyment is a regular pastime for most of the members. Given the major works to the course over the past two years, however, a bit of anguish and suffering has also been thrown into the mix, but as the members are now realising such work is helping to set the club up for a strong future.

Formerly known as Victoria Park Golf Club and formed in 1931, Neanger Park Golf Club is located in Bendigo. In recent years the club's committees have gone a long way to ensuring that the course will become one of the premier sporting facilities in Bendigo.

In early 2008 a course Master Plan was developed by Cashmore Golf Design which has given the club specific goals for major course reconstruction and improvements over the coming years. Shortly before this, the club was also successful in obtaining two Federal Government handouts as part of the Community Water Grants Scheme which has enabled much needed capital improvements to the club's water infrastructure.

The grants have been directed into two major water projects – upgrading all sprinklers and dam enlargement. To help reduce water consumption and improve distribution uniformity, the existing Rainspray fairway sprinklers are being replaced with 400 new Toro 830s. The new sprinklers will provide better fairway coverage as well as provide more control and increased water use savings.

Maintenance issues that invariably cropped up with the old sprinklers will also hopefully be a thing of the past and this will mean staff can direct their efforts into more important areas.

The water grants have also enabled the club to increase its onsite water storage capacity to 67 megalitres, up from 35ML. In July 2008, the club enlarged one dam from 7-8ML to the current holding capacity of 40ML. As you can imagine, this new dam is a massive boost to the club's infrastructure and also adds to the visual appeal of the course. The second dam on course holds 27ML.

The club's main water asset, however, is 'Lake Tom Thumb', a dam which sits across the road from the golf course. In 1981 the club paid $25,000 to build the dam and since then it has become our main water supply, holding between 80-90ML. It is stormwater fed and catches water from a seven square mile area in the township of Eaglehawk.

With Bendigo suffering significantly from the drought in recent years, Tom Thumb has without doubt been the saviour of the golf course and whenever it has rained we have the ability to store the run-off and move it to fill our on-course dams.

With the club's water resources effectively secured through increasing storage capacity, the club has been able to push on with a number of course improvement works including tripling the number of bunkers

Neangar Park Golf Club obtained two Federal Government water grants in late 2007 to upgrade all sprinklers across the course and extend one of the course's existing dams from 7-8ML to 40ML

We are able to pump water from Tom Thumb to our second smaller course dam and from there gravity feed the water into the newly built 40ML dam where another pump handles the irrigation system.

Our two pumps – Southern Cross 50hp and 60hp respectively – are a little old but are doing the job at the moment. A suggestion has been made for a variable speed pump and a new controller to replace the Micromaster 5000 we have at present which would give even more control.

Combining our dams we are now able to hold in the vicinity of 150ML which puts the club in a very enviable position – provided it rains of course! Early in 2009 the club was also able to tap into the town's treatment plant (Class A) and of the current 30.5ML license we have an allocation of 40 per cent which gives us another 12ML.

Recent tests have shown very low levels in dissolved salts (456ppm) with sodium levels around 87ppm. The Sodium Adsorption Ratio of 3.90 is a little high so applying gypsum to the fairways has been added to our programme to help deal with any sodium issues and improve soil structure in the long-term. The greens are given calcium monthly.

BUNKERED

With the club's water resources effectively secured, the club has been able to push on with a number of course improvement works as recommended by the Cashmore Master Plan. With just 13 bunkers in total across the entire course, it was decided to nearly triple that number and in January 2009 six new bunkers were constructed with two older ones filled in and made into mounds.

The construction/shaping work was undertaken by Ron Nias with the remainder of the work, including drainage, turfing, importing sand etc, carried out by the course staff. With just four on staff it was quite a challenging task, especially in the middle of a long hot summer!

With those bunkers in play fairly quickly, thanks to the help of several dedicated volunteers and semi-retired members, the club set about adding 15 more bunkers during winter. SJM undertook the shaping/construction and had the work completed in early August. We then set about completing them in time for the club's annual tournament in September. Again with the aid of volunteers the work was completed almost on time and in play for the club's showpiece event.

We now have 33 bunkers on course, including a refurbished practice bunker, and they have totally changed the way the course is played. The course is now a good challenge for most golfers and the bunkers have added a new strategic element to many holes. Members have been quite receptive to the new additions and can see the need for progression to improve the golf course surfaces, appearance and style.

Other works that have been completed in the last two years include line planting four fairways with Santa Ana couch. This now leaves just one and a half fairways to bring the couch conversion programme to an end. Elsewhere we have been replacing tee sprinklers to improve tee surfaces and in most cases new pipework was also needed to update the existing network.

We have been busy planting some 5000 native grasses in various areas around the course, as well as 1000 native shrubs and trees. Also under construction at the moment is a new practice chipping area and a turf nursery, both of which will be seeded in the near future.

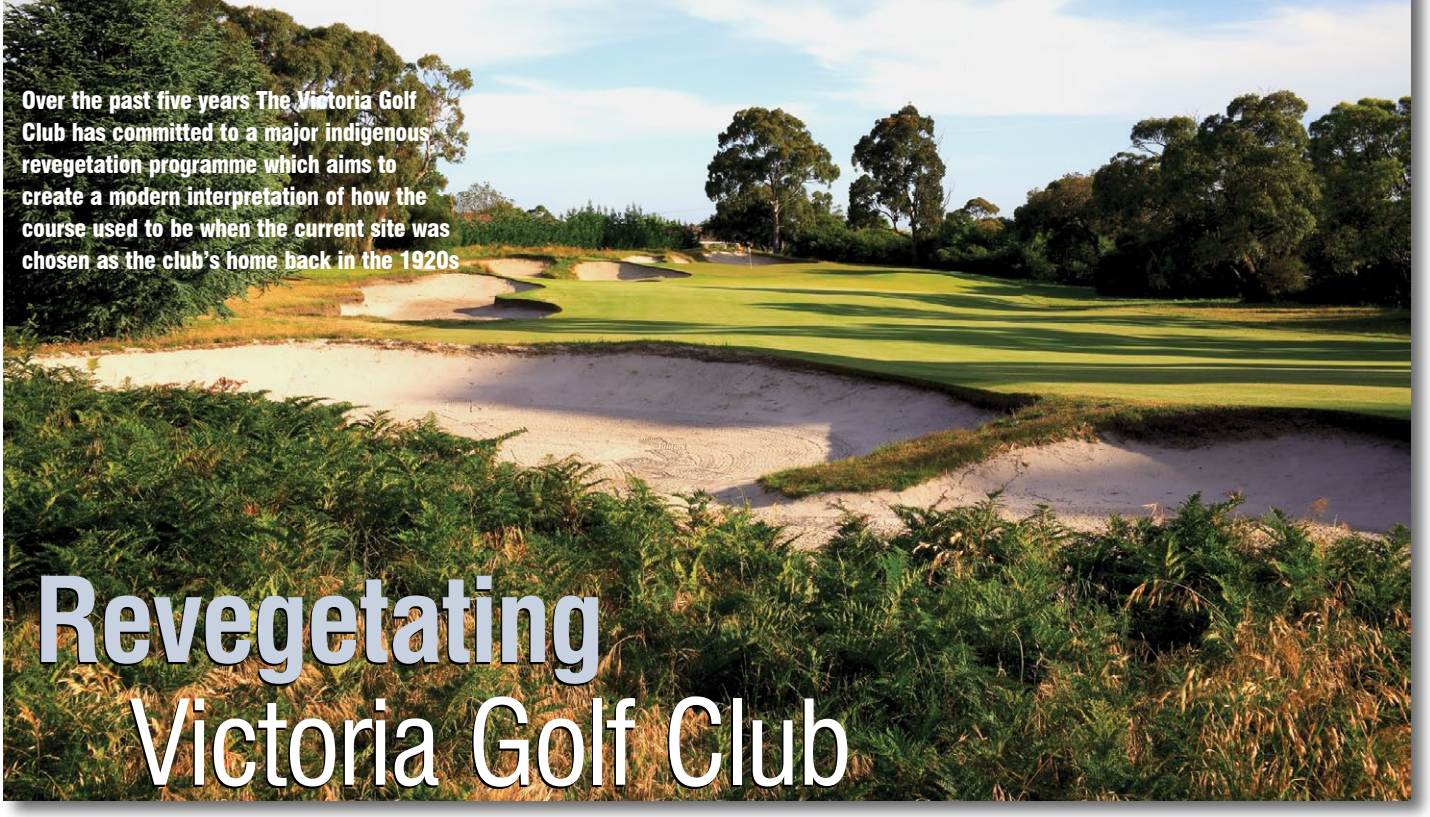
The nursery will be used to replace turf directly around the greens to create a collar to keep unwanted kikuyu/couch out of the greens. We have also planted a number of trees on holes that run adjacent to roads to help prevant ball encroachment which has become an issue.

The past few years have certainly been challenging for the club and course maintenance staff, but at the same time extremely rewarding. The work that has been carried out has completely transformed the course into something the club and members will hopefully be happy with.

It has been the busiest period of my life but I have learnt a great deal and continue to do so. Having 600 bosses certainly keeps you on your toes!

Neangar Park superintendent Brett Hawkey

The new bunkers have totally changed the way the course is played



Over the past five years The Victoria Golf Club has committed to a major indigenous revegetation programme which aims to create a modern interpretation of how the course used to be when the current site was chosen as the club's home back in the 1920s

Revegetating Victoria Golf Club

The Victoria Golf Club rates as one of Australia's great courses and over the past five years it has invested a significant amount of time and resources into an extensive revegetation programme. Course superintendent Ian Todd outlines the project which is helping to restore interest, beauty and character to the course that had been lost for many years.

Around 10 years ago The Victoria Golf Club embarked on a vegetation restoration programme to re-introduce indigenous vegetation to selected areas of course roughs that had been lost over the years.

With the assistance initially from people skilled in identifying existing varieties of certain species, the club presently has a list of around 15-20 different varieties it uses to revegetate selected areas each year. The club has also benefited from the publication titled 'Indigenous Plants of the Sandbelt' which has been a useful reference guide.

The early plantings were in fact a lot of trial and error work to see which varieties performed best in certain areas and specific soil types. Contrary to many perceptions, Victoria Golf Club, although within the sandbelt region, has many areas with heavy soils which become quite wet following rainfall.

Within the last five years the programme has progressed significantly to include stock purchases of around 20,000 plants per year as the club has acknowledged the benefits of the programme and encouraged its continuation to include many more areas around the course.

Initially, the addition of an employee with a background in horticulture was significant as he imparted a great deal of knowledge and expertise to other staff members prior to leaving the club to pursue another career. The programme continues in earnest through the dedication and passion of the people he taught, which is an important aspect and has ensured the ongoing success of the project. Without the necessary passion for indigenous vegetation and the ability to understand the importance of aesthetics to the course, the programme would most likely be unsuccessful.

As mentioned, the purchase of 20,000 plants per year for five or so years has enabled our current staff to collect seed, propagate and plant a further 5000-10,000 plants per year. Although ultimately a rewarding task, it is difficult to imagine that Victoria will become entirely self-sufficient as it is a very labour-intensive operation and just to get the purchased stock in the ground takes 3-4 staff around 4-6 weeks to complete. The club has fully endorsed the revegetation programme and has committed to the current amount of purchases for many years to come.

CARRIED AWAY

The programme started by targeting the carries from tees to fairways as these were deemed to be areas of poor quality turf and devoid of decent contouring. Once the areas had been stripped and slightly re-contoured, a walking track was required to keep golfers off the new plantings.

Following this, the areas were then roped off and planting commenced. Victoria is fortunate to have an abundance of sandy soil in these areas that in time bleach white to provide a sandy waste type look as a backdrop to the subtle colouring of the indigenous vegetation.

It was, and still is, extremely important not to make all the carries a mirror image of each other which can be achieved in many ways through contouring, track positioning and shape, plant varieties, and the use of fescues and sandy wastes.

Presently, there is a good mixture of these areas throughout the course providing interest, beauty and a naturalness that blends in with the playing surfaces. The carries have not been completed yet but this programme is such a long-term operation that it will continue for many years to come.

Progress has also been achieved in other areas, from the very visible carries to areas behind bunkers and secondary rough areas away from play. These areas are just as important as they add to the golfing experience at Victoria and help to continue the natural feel throughout the course.

Many of these areas have evolved purely through cutting back or removing coastal tea tree which had smothered the existing vegetation and not allowed the indigenous seed within the soil to germinate. As these areas are vast in size, the club has transplanted a lot of bracken as a backdrop to the indigenous plants which also assist in the revegetation process to create that natural look.

There have been certain aspects of the programme which have been deemed somewhat unpopular, mainly the added difficulty of a misdirected shot into the indigenous areas. This however, has never been a deterrent from continuing the programme as there have been additional compromises made along the way.

Many fairways have been extended back toward tees to allow the shorter hitter a chance of negotiating over the indigenous carries The primary roughs have received additional attention to pull a ball up from entering indigenous rough areas on the sides of fairways, and most of these areas have been established far enough away from the playing surfaces that only a very poor shot is affected.

On the positive side, once established the indigenous areas are largely self-sufficient when it comes to water. At Victoria, like many other courses throughout the state, the last few summers have been incredibly exhausting with a very limited water supply.

The indigenous plants also feel the effects of heat and drought stress along with turf, but they are obviously well adapted to the conditions and tend to shut down rather than perish until the rain comes. It was immensely encouraging to see the plants recover during the autumn from one of the worst summers on record following some reasonable rains.

At present, the course is only now beginning to look and feel a little like it must have been when the current site was chosen as the club's home back in the early 1920's. There are a few old photos of the era showing many areas of low growing indigenous vegetation interspersed with sandy wastes providing a natural, rugged appearance.

It is impossible to replicate these areas to exactly how they once were, but entirely possible to create a modern interpretation of how the course used to be during the early years. As the years pass by, hopefully the course will keep evolving as the indigenous areas become more prevalent and mature.

The revegetation programme continues to be a source of enjoyment for all of the staff as they can see the results of their commitment, diligence and hard work. The indigenous vegetation provides a natural ruggedness to the course which surrounds and complements the fine turf playing surfaces beautifully.

Remembering that most of these areas had once been cut rough areas of poor quality grasses and/or overgrown with poor quality tree species, they are now starting to provide interest, beauty and character to the course that had been lost for many years. It is this aspect that will help to provide all who visit the course in the future a much more enjoyable and memorable experience.

The revegetation programme started by targeting the carries from tees to fairways which were deemed areas of poor quality turf. Progress has also been achieved in other areas behind bunkers and secondary rough areas away from play

Missing or badly distorted piston seals are an indication that the barrel is worn and should be replaced. It is possible to replace just the piston seal but this is an intermediate fix only

In-house hydraulics

Royal Melbourne Golf Club turf technician Luke Spartalis examines hydraulic cylinders and looks at how simple repairs can be made to this integral component of most modern turf maintenance machinery.

With most of the modern mowing fleet and agricultural equipment being operated by hydraulics, wear and tear is inevitable and this means component repair is necessary from time to time. Thankfully, with the exception of a ruptured hydraulic hose or pipe, small external leaks or weeping seals can be detected during regular servicing and dealt with before the turf is compromised.

Outside of shaft seal replacement of course, the major repair or overhaul of some components (such as variable displacement pumps) is probably best left to the hydraulic specialist as the average turf maintenance workshop would be ill-equipped to undertake this sort of work. Specialist testing equipment is required, to say nothing of the immaculately clean environment required. However, if the workshop is reasonably well equipped with both tooling and a competent technician, small to medium repairs can be undertaken with a minimum of fuss.

Because hydraulic cylinders are so numerous – they nearly outnumber motors and pumps combined – I thought this would be a good place to start. Hydraulic cylinders are less complicated than other components and therefore relatively easy to repair, but the first step is to identify the cause of the failure and whether or not the cylinder can be repaired effectively and cost efficiently.

If you have a problematic cylinder, particularly one which has been re-sealed before, further investigation is required. Before starting, ensure you have any available diagrams and necessary tools and that you have isolated the machine and released any hydraulic pressure from the cylinder by moving the hydraulic levers a few times.

Causes for failure can be numerous with system contamination, heat degradation (fluid temperatures above 82 deg C will damage seals) or incorrect seal installation being just a few. Internal or external leakage is cause for disassembly and thorough inspection of all components is essential to determine the reason for failure.

The main components of a cylinder are:

- Cylinder barrel – seamless, thick-walled pipe ground and honed internally;
- Piston – cylinder shaped metal component which separates both sides of the cylinder internally;
- Rod – chrome-plated, cold-rolled steel which connects to the piston and extends from the cylinder;
- Piston seal – elastomeric or metal seals, often O-rings, U-cups or metal seals;
- Rod seal – situated in the cylinder head to prevent oil leakage; and
- Cylinder head – screwed or flanged to the cylinder. Contains rod gland or seals. Also contains a rod bearing to support and guide the piston rod, however, it is common on light duty cylinders to have the rod run directly on the head material.

Once the cylinder is dismantled, inspect the piston or rod seals for distortion or broken or missing pieces. Missing or badly distorted piston seals are an indication that the barrel is worn and should be replaced. It is possible to replace just the piston seal but this is an intermediate fix only. As previously mentioned there can be several types of seals used.

Minor scoring of the piston surface itself is not detrimental to cylinder operation as long as it doesn't exceed 0.006" under the cylinder bore

Inspection of the cylinder bore should reveal a smooth surface free from any scoring or pitting. If on small diameter barrels damage is less than .005" deep, it is possible to resurface the barrel by honing. The allowable maximum bore for standard piston seals is the nominal bore diameter plus 0.010".

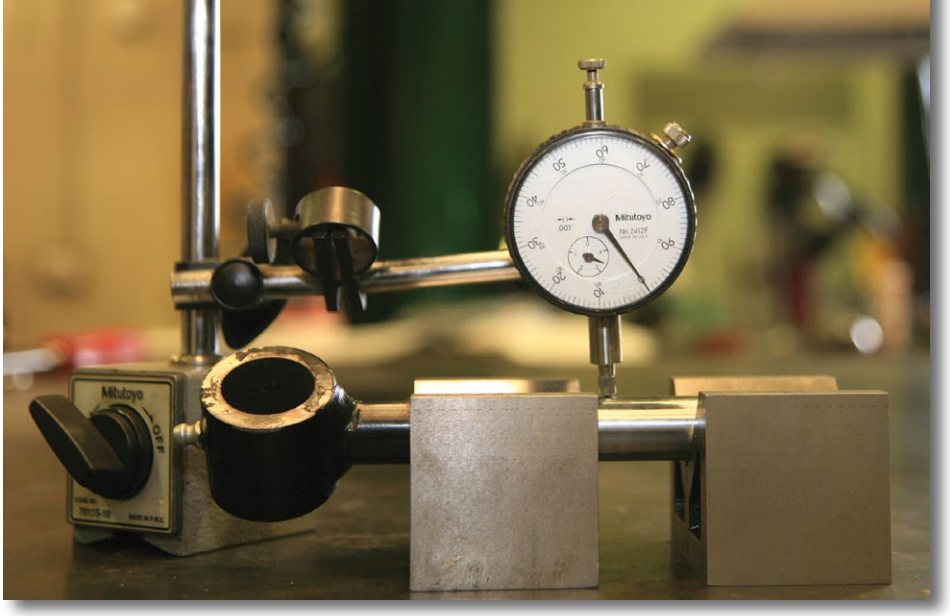
A worn or distorted rod seal could indicate that either the rod is bent or guide bush is worn resulting in the weight of the rod sliding on the seal. Replacement of the seal alone is again only a short term fix. A bent rod is indicated by one side of the chrome surface being dull with the opposite being polished.

Checking the rod for straightness should always be carried out when repairing cylinders by placing the rod on a flat surface, or for larger rods on rollers as far apart as possible, and measuring the run-out with a dial indicator. Acceptable run out is generally 0.5mm per metre of rod.

Straightening of the rod is possible using a press, however, any damage to the chrome surface and the rod will require re-chroming or replacement. Small scratches can be removed with the use of fine emery cloth in a cross hatch fashion, but pitting, dents and corrosion will be further causes for replacement.

As an aside, for machinery which may be subject to adverse operating conditions (i.e.: excavators and loaders), US-based company Fluid Control Services has developed a range of protective cylinder sleeves – called the 'Seal Saver' (www.sealsaver.com) – to prevent dings and dents.

It is, of course, easier to source original equipment seals when rebuilding a cylinder and is recommended also. Some components have manufacturer-specified seals fitted,



Checking the rod for straightness should always be carried out when repairing cylinders by placing the rod on a flat surface and measuring the run-out with a dial indicator

however, if no literature is available for the actuator in question then a quick trip to your local hydraulics supplier, armed with the machine specifications and preferably the cylinder, will see you right.

If it's not possible to take the cylinder, measure the piston seal grooves with a pair of verniers. A word of warning though, measuring old seals may not be accurate as seals may shrink or swell with use.

As mentioned earlier, U-cup seals are used inside many cylinders but due to their design may be responsible for external leakage when the system is at rest. These seals require the system pressure to 'energise' the lip of the seal.

If the cylinder has been dismantled for this reason and after careful inspection of the seal and rod both appear to be in good condition, then this could be the likely scenario. The situation can be remedied by changing the seal to an energised type. This type of seal has an O-ring fitted inside the U-cup which provides the necessary contact.

All parts should be cleaned with solvent and compressed air and liberally oiled with clean hydraulic fluid during assembly. Great care is need during installation. Sharp tools such as screwdrivers should not be used as there is the possibility of damaging the seal. Sharp edges and metal burrs need to be removed before fitting seals, with particular attention to areas where seals need to pass over or through. Fitting stiff seals can be made easier by heating them up in hot water first.

Rod seal damage can be prevented by covering the rod threads with tape or thin plastic. Piston seal damage can be avoided by using a clamp to hold the seals compressed during fitting. This will allow them to enter the barrel without damage or folding over.

As always, the cylinder and seals should be kept clean during installation with the best practice being to completely clean the work area beforehand. Cleanliness cannot be over emphasised. Before reconnecting the cylinder, it is important to fill the service ports with hydraulic fluid to reduce the risk of air compression and damage to both the seals and cylinder.

Kane McDonald – Devonport Golf Club, TAS

Called the "city with spirit", Devonport is considered the gateway to Tasmania. It is also home to Kane McDonald who started his turf management career at the Devonport Golf Club back in the mid-1990s. Some 12 years later and after a four year stint at Port Sorell, McDonald is now in the top job at his 'home town' club.

Full Name: Kane Anthony McDonald.
Nickname: Kaneo.
Age: 32.
Family: Fiancé Skye, soon to be step daughter Sienna.
Period as a superintendent: Six years.
Period as an AGCSA member: Two years.
Previous clubs: Devonport Golf Club (apprentice, 4 years; assistant greenkeeper, 4 years); Port Sorell Golf Club (superintendent 4 years).
Current club: Devonport Golf Club (2 years).
Number of staff: Three full-time, two casual and numerous volunteers.
Course specs: 18-hole championship course, 5900m. Tees – cool-season blend of creeping red fescue, browntop bent, perennial ryegrass, *Poa*. Fairways – fine fescue, perennial ryegrass, *Poa*. Some fairways have patches of kikuyu and common couch. Greens – Pennlinks bentgrass with the 12th green Penneagle, *Poa*.
Turf qualifications: Trade Certificate in Greenkeeping, currently completing Level 4.

Give us a bit about your background in turf management and how you ended up at Devonport?

I started my apprenticeship at Devonport Golf Club in 1996. When my time was finished I was fortunate enough that one of the assistant greenkeepers was leaving so the club offered me that position which I took up. In March 2004 a position became available as course superintendent at Port Sorell Golf Club here in Tassie and I ended up being there for four years. In October 2007 I was approached and asked whether I was interested in returning to Devonport as course superintendent because the current one had resigned. I have been here since and loving every minute of it.

Give us an overview of Devonport Golf Club and take us through your operations and how you have finetuned them since your arrival?

Devonport Golf Club is a well-bunkered, tree-lined course situated on the banks of the Mersey River and is about 5-10 minutes from the CBD. It is a relatively flat course with some small dips and hollows. The greens are reasonably flat and true with a couple of two-tiered greens to keep the golfers guessing.

The greens are cored and topdressed twice a year. I recently purchased a set of thatch-away cassettes and have been regularly verti-mowing the greens at 1-2mm which has reduced the need to scarify them prior to our renovations. Although thatch isn't a major issue in our greens, prior to renovations I will be verti-mowing at around 4mm with overseeding in the autumn renos.

Tees are cored 3-4 times a year, because they are small and cop a hammering, especially through spring and summer. Fairways are cored once a year but I am hoping to convince the committee to purchase a corer so I can do them more regularly.

I haven't changed course operations too much since taking over. I am hoping to implement an overseeding programme in the tees and greens. I have brought in a more regular de-thatching programme to control thatch levels in the greens and started re-shaping fairways and roughs.

What are some of the unique turf management features of Devonport Golf Club? Is it a hard course to manage?

Although it is a relatively cool climate, we have some good areas of kikuyu and couch slowly spreading through the course and we are in the process of trialling some Santa ana couch plugs which have proved successful so far.

It can be a very frustrating course to manage simply because we don't have the resources to irrigate the fairways properly. We have it looking mint during the spring but as soon as the dry northerly winds pick up it can go from green to brown almost overnight. We only have Bucknor Rainmobile travelling irrigators to water the fairways and these can only do so much. Our tees and greens are fully automated but not the fairways.

We get comments about how we wouldn't have to worry about dry patch too much because it doesn't get hot enough, but come down in the middle of January or February and you will see lots of wetting agent being applied and hand watering taking up most of our time. Other than the fairway irrigation being a problem, the course is pretty easy to look after, but I still have my fair share of problems.

What are some of the major turf management issues there and how are you and the club planning to meet those challenges?

Our major issue here is fairway watering. As noted earlier we only have the travellers so while they put out a good volume of water, we can't cover the area we would be able to if we had pop-ups in. In 1996 the club trialled some pop-up sprinklers in the 1st fairway but because the club wasn't strong financially, continuing this project wasn't feasible.

We have a 30hp Southern Cross pump which holds enough pressure to run the eight travellers, but these take 6-8 hours to finish their run so we always have our backs to the wall trying to keep soil moisture where we want it. We are currently liaising with an irrigation company as to what are our best options and costing to improve our watering situation.

What do you hope to achieve during your time as superintendent at Devonport?

The fairway irrigation is my main goal at this stage. Convincing 500 expert greenkeepers is the toughest part! I also hope to maintain

Fairway irrigation is one of McDonald's major turf management issues of Devonport

the course at a high standard and keep our reputation as having fantastic greens.

Have there been any course construction/ reconstruction projects recently completed or currently ongoing? Any future projects in the pipeline?

We are hoping to start reconstructing and levelling some tees in the first half of 2010. Over time the tees have become rippled and uneven due to golfers hitting from the same areas all the time. With the new handicapping system coming into place, I'm hoping to shift some of the tees into more favourable areas for all golfers as some of the current tees (especially the ladies) are situated in areas that are at a disadvantage to the higher handicappers.

Water is obviously a critical issue around the country at present. How is Devonport faring in the water management stakes?

Water isn't too much of a problem here at Devonport at present. While our dam only holds 21ML at full capacity, we are very fortunate to have a milk processing plant next door and they pump any excess water they have into our dam. On average we receive 35ML a year so our dam is pretty full all year round.

The club president and I had a meeting with the company recently and we were informed that the plant is looking at putting a grey water treatment facility on site and once that water is safe they can pump it straight into our irrigation mains. They are guaranteeing at least 1ML a day from November through to March/April.

They are looking at adding the facility in middle to late 2010/early 2011 and hopefully it might convince some in the club to push the fairway irrigation as with the current irrigation system we have no chance of making the most of what water we could be getting.

Any other management issues which the club is actively looking at?

We recently had a minor overhaul of OH&S policies which we are currently implementing. A lot of cutting of corners has been removed.

If you could change one thing about your job what would it be?

Higher salary and an extra $500,000 in budget would be nice!

What's the most rewarding part of being a superintendent?

The satisfaction you get when you see the course in perfect condition and the compliments from serial whingers.

What's the best part about being involved in the turf industry?

The camaraderie between all supers and assistants. Seeing enthusiasm in young apprentices who are genuinely interested in the industry.

Favourite spot on your course?

The 14th tee at around 8pm on a clear day in the middle of January. The view is spectacular and makes you feel like you're anywhere other than little ole Devonport.

Favourite piece of machinery?

Thatch-away cassettes recently purchased.

Most embarrassing moment on course?

When I was an apprentice I parked our quad bike next to the pump shed thinking I had applied the park brake. When I walked out of the shed the bike was upside down in the dam and I had to go in and fetch it.

Funniest moment you have seen on course?

When I was working at Port Sorell, a mate who I had completed my apprenticeship with was working for a coring company and they were up the road at the local bowls club. I wandered up to say 'G'day' and he was getting the corer ready to solid tyne the greens. Just before he started he asked his boss if he wanted the cores rowed up or left spread out.

OFF THE COURSE

Any claims to fame outside of turf management? Top five finish in the 2008 Tasmanian Open; semi-finals of the 2000 Tasmanian Amateur.

Favourite movie? Anchorman, any of the Bourne movies.

Three CDs you could not live without. Pearl Jam – Ten; Cog – Sharing Space; Birds of Tokyo – Universes.

If you could be any musician, who would you be? Eddie Vedder.

Food you could not live without? My Fiancé's cooking.

Favourite sporting team? The mighty Melbourne Demons.

Sporting team you like to dislike? Sydney.

Dream car? Porsche.

Irritations? People who can't take a joke and have no sense of humour.

What book are you reading now? 'Turn, turn, turn...Please!' by Kerry O'Keefe.

Favourite golfer? Ernie Els.

Golf handicap? 2.

What do you do to get away from it all? Head to the mountains and the bush and go bushwalking.

Worst excuse from a staff member?

I have heard a few but the most common one has been running late for work due to roadworks. Not bad considering I used the same road and there certainly weren't any roadworks!

Overseas course you'd most like to visit?

The home of golf – St. Andrews.

Career highlight?

Being the superintendent of my 'home' course.

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SUSTAINABLE GOLF WORKSHOPS STRENGTHEN AGCSA-THE R&A RELATIONS

The R&A's director of golf course management Steve Isaac spent three weeks in Australia in September presenting five seminars on sustainable golf

The Sustainable Golf seminars presented across the country in September have helped to significantly strengthen relations between the Australian Golf Course Superintendents Association (AGCSA) and the golf governing body The R&A.

The seminars, which were conducted by The R&A's director of golf course management Steve Isaac, proved to be a hit with more than 530 course superintendents, course maintenance staff, club managers, professionals and architects attending the five workshops in Melbourne, Sydney, Adelaide, Brisbane and Perth.

By way of an introduction, Isaac first discussed the role of the role of The R&A and its efforts around the globe before tackling the main issue of sustainable golf course management practices. One of Isaac's key messages was the crucial need for all golf clubs and courses, regardless of whether they were a major metropolitan or country facility, to set course management goals that were realistic in terms of the constraints in which they were operating within (e.g.: environmental conditions, budgets etc…).

At four of the workshops Isaac shared the platform with AGCSA HR and best practice manager Daryl Sellar who talked about the balance between cost and quality, highlighting the expense of managing labour intensive parts of the golf course. In doing so he questioned the justification of allotting 25-30 per cent of labour costs towards caring for bunkers, which are usually considered a hazard.

"The R&A, the AGCSA and Golf Australia share a similar philosophy with regard to course management and presentation," says Isaac, who was impressed by the Australian philosophy of producing firm and dry playing surfaces, focusing more on playing performance than appearance. "Addressing water restrictions has forced the hand of Australian golf clubs, though they seemed to be well positioned to adapt to a limited supply and the need to find alternative sources to drinking water for irrigation.

"The trip was extremely worthwhile. We have strengthened relations with Golf Australia and the AGCSA, and have visited a host of courses that are implementing the sort of best practice that we want to promote. Many turf managers around the world could learn a great deal from their counterparts Down Under."

The seminars were a major undertaking by the AGCSA and more than 18 months in the planning, and both AGCSA general manager John Neylan and events manager Simone Staples were delighted with the turn out and excellent representation across all industry sectors.

"The topic of sustainable golf has never been more pertinent and fits perfectly with the current challenges in Australia of maintaining acceptable golfing surfaces during a period of climate and economic change," says Neylan.

"In the context of Steve's presentations I am confident that as an association we are on the right path and that Australian golf courses in general can meet the challenge. One of the most pleasing aspects of the seminar series was the excellent mix of attendees including golf course superintendents, club managers, committee members and club professionals. We need to continue to promote the sustainable message with the help of Golf Australia and the PGA and provide some tools and guidance."

As well as spreading the word on sustainable course management, during his three week stay in Australia Isaac was able to visit a range of turf facilities to view turf management practices. Among the some of the venues he visited were Marysville Community Golf and Bowls Club which was severely damaged in the Black Saturday bushfires, Royal Melbourne Golf Club, the Melbourne Cricket Ground, Royal Sydney Golf Club and Adelaide Oval. While in Queensland for the Brisbane workshop, Isaac also had the opportunity to visit the QPIF Redlands Research Station turf research facility and Lakelands Golf Club which houses the AGCSA's couchgrass selection trial plots.

Isaac will be penning a series of reports on his trip to Australia which will appear on The R&A official website www.randa.org

NULLARBOR LINKS TEES UP FOR THE LONG HAUL

Next time you're planning a trip across the Nullarbor Plain, make sure you take a set of sticks with you. On 22 October the Nullarbor Links Golf Course officially opened staking its claim as the world's longest golf course.

The 18-hole par 72 golf course stretches over 1365 kilometres from Kalgoorlie in Western Australia to Ceduna in South Australia and contains 13 synthetic golf greens and tees constructed by Victorian company Grass That Lasts. Between tee and green there is a rugged outback-style natural terrain fairway, while the remaining five holes are played on sand greens.

Construction of the course took 2000m^2 of 25mm sand-filled synthetic impact golf greens, 1000 tons of crushed rock, sand, rubber and turf. Half of this material had to be transported over 5000km from Melbourne to the site via Perth. The project was three years in the planning and the greens and tees took eight weeks to construct.

One of the 13 synthetic greens that form part of the new Nullarbor Links Golf Course

While the harsh environmental conditions are testing, the hazards don't just stop there. Brown snakes and death adders add spice to the bunkers, while dingoes, kangaroos and emus can be seen roaming the rough.

ON THE MOVE

Long-serving superintendent **Scott Harris** has drawn the curtains on a 26-year career at Sydney's Pymble Golf Club. The long-time AGCSA member, who was superintendent at the course for the past 19 years, handed in his resignation in September and finished at the end of October.

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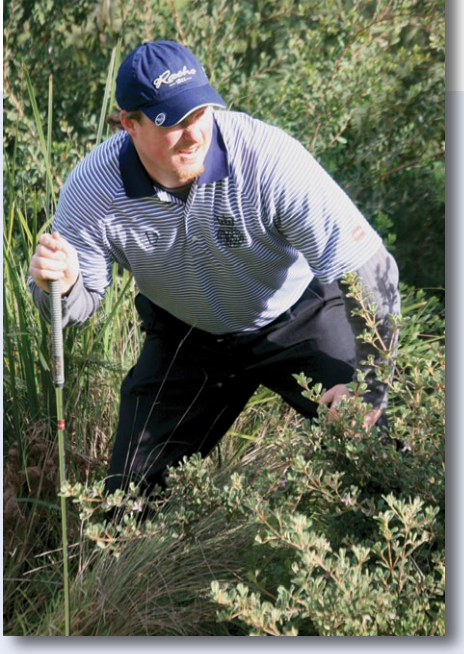
Busselton Golf Club has appointed final year apprentice **Ryan Trott** to take over from superintendent **Callum Hitching** who moved on shortly after the Australian Turfgrass Conference in Hobart. Hitching, who started his turf management career at the Western Australian course back in February 2000, has taken up a turf consultancy role with the Dunsborough-based Sussex Group.

During his time at Busselton, Hitching oversaw the installation of a new irrigation system and helped to create and implement the club's operations and maintenance manual for the storage and use of effluent water. He also helped to develop new renovation and soil amendment programmes and undertook a host of construction work including the installation of a new covered and bunded fuel bay and wash down bay.



Callum Hitching's wayward golf game, as seen here at Royal Hobart earlier this year, wasn't behind his decision to leave Busselton Golf Club shortly after the annual conference

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After spending the past two years in Mauritius, former Royal Sydney Golf Club assistant **Greg Puckeridge** has moved a little closer to home. After overseeing the grow-in and subsequent maintenance at the Ernie Els-designed Four Seasons Golf Club, Puckeridge has taken up a position with Turnpoint in Fiji.

Puckeridge, whose wife is expecting their second child, is in charge of Turnpoint's operations at the Vijay Singh designed Natadola Golf and Ocean Club, located on the south west corner of Viti Levu.

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Tura Beach Golf Club superintendent Aaron Miller has appointed **Patrick Wilson** as new assistant superintendent at the NSW south coast course. Serving his apprenticeship at the nearby Pambula-Merimbula Golf Club, Wilson travelled overseas for three years, first as part of the Ohio State Program in the US and then the UK.

While in the US Wilson worked at Tiburon Golf Club, TPC Sawgrass and was part of the crew which prepared the Robert Trent Jones Golf Club for the 2005 Presidents Cup.

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Following Rodney Ferry's departure to join Michael Freeman at Huntingdale Golf Club, Keysborough Golf Club superintendent and VGCSA president Brett Chivers has found a replacement assistant in the form of **Chris Allen**. Allen, who comes across from Berwick-Montuna Golf Club where he was assistant to Derek Wills, started on 19 October.

RAIN BIRD IC SYSTEM PUTS TURF MANAGERS IN CONTROL

Rain Bird has unveiled its new Integrated Control (IC) System which it hopes will revolutionise the way superintendents irrigate their golf courses. The new system, launched in Australia this September, places all the control components underground meaning it is easier to install, does away with control boxes, satellite controllers and decoders, uses less copper wire and costs less.

By incorporating a small integrated control module (ICM) with each rotor or valve, the system allows the course's central control computer to talk directly to the rotors thereby bypassing all other previous control functions. Rain Bird describes each ICM as a "think centre" that is built into the rotor housing and protected under a flange. Existing computer software can control all or any of the rotors on the course and they can also be contacted via a handheld radio or mobile phone.

The system effectively does away with the complex components and bundles of wire associated with control boxes and Rain Bird claims a saving in copper wire of up to 90 per cent can be made by adopting the IC System. With fewer parts and less wiring, the IC System is also quicker and easier to install.

With most IC System components located underground, there is far less chance of damage caused by vandals, bad weather or above-ground pests. It also means maximum protection from electrical surges and lightning. With control built in to the rotor or valve, the IC System requires up to 50 per cent fewer splice points which further reduces the potential for failure. The IC System also offers feedback and diagnostic features that enable foolproof installation, simplified troubleshooting and overall working efficiency.

By incorporating a small integrated control module with each rotor or valve, Rain Bird's new IC System allows the course's central control computer to talk directly to the rotors, bypassing all other previous control functions

For further information about the new Rain Bird IC System, call Rain Bird national sales manager – golf, Wayne Brown on 0419 669 679, freecall 1800 424 044 or email wbrown@rainbird.com.au

VIC SMART WATER FUND CALLS FOR ROUND SEVEN APPLICATIONS

The Victorian Government's Smart Water Fund has announced the availability of $2 million in grants to help find and develop smarter ways to conserve Victoria's water supplies. The Smart Water Fund is calling on businesses, community groups, research organisations and individuals with innovative water conservation, water recycling and biosolids management ideas to apply for funding.

The aim of the fund is to provide support to organisations or individuals with innovative ideas about water management that can act as demonstrations for others to follow and implement more broadly. Kingswood Golf Club in Melbourne's south east has been one such golf club to benefit from the Smart Water Fund, receiving a grant from the last round to aid its investigations into the development of an ASR scheme.

The funding application period is open until Friday 20 November 2009. The assessment period takes about eight weeks to complete and successful applicants will be notified in early 2010. **For more information on how to apply for Round 7 Smart Water Grants visit www.smartwater.com.au**

CHISHOLM INSTITUTE SIGNS UNIQUE PARTNERSHIP WITH TORO

In a new initiative for the turf management training facilities located at Chisholm Institute's Rosebud Campus, a major partnership agreement has been formed with Toro Australia.

While the financial details of the partnership are still to be agreed upon, the broad outline consists of in-principle agreements between the two organisations for the purchasing, sponsorship and technical support in areas such as equipment and machinery, drainage and irrigation and the development of new training programmes for turf technicians.

The first agreement is for new rental arrangements to replace the Victorian-based Institute's current fleet of turf machinery and equipment with a new state-of-the-art fleet. The second arrangement consists of the provision to supply a range of demonstration turf construction and renovation machinery and equipment when required at strategic times of the year.

This will enable the Institute's teaching staff to provide education and training to apprentices which would normally not be possible with existing financial resources. The agreement also consists of providing a number of educational days in the areas of machinery and equipment maintenance and cylinder and reel technology at Toro's Melbourne-based Braeside facility.

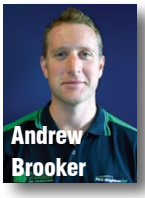
The third agreement will see Toro assist teaching staff in the education and training in both computerised irrigation design and sophisticated irrigation technology. As part of this Toro and A&M Watering have already donated over $30,000 worth of irrigation computer and control technology and irrigation sprinkler heads.

The final part of the agreement establishes the formation of a ground-breaking industry partnership to develop, market and implement a range of new educational and training programmes in the area of technical training to sports turf mechanics and technicians. It has been identified by both parties that this is an area that is currently absent from the vocational and educational training sector. As a measure of its commitment Toro has donated a new Foley cylinder grinder valued at $34,000.

While Chisholm is set to benefit from the new partnership, Toro has also donated equipment to the turf management programme at Ryde College TAFE in Sydney. Toro has

supplied a Flex 21 walk-behind greensmower as well as three GR3150/3250 ride-on units.

BROOKER JOINS PGG WRIGHTSON



PGG Wrightson Turf has appointed Andrew Brooker as territory manager for its turf seed business in Australia. Brooker joins the turf seed team in Melbourne and will support the company's distributors nationwide along with business manager Cameron Henley and customer service agent Adam Townsing.

Brooker has 15 years' experience in the turf industry involved with the maintenance and management of golf courses throughout England and New Zealand. These courses included Foxhills Resort, a 45-hole heathland complex set in Surrey, UK and Millbrook Resort in the South Island of New Zealand.

Most recently Brooker was course superintendent at Castlecliff Golf Course on the west coast of the North Island of New Zealand. He has sports turf and business qualifications from the UK and New Zealand and is an assessor for the New Zealand Sports Turf Institute. Brooker can be contacted on 0409 351 834.

KEEPING AN EYE ON SAFETY

Safety gear specialists BOC are keeping Australian outdoor workers protected from eye injuries and the sun with its range of new Umatta safety eyewear – the Umatta Redline Polarised and Umatta Rev.

The Umatta Redline Polarised glasses feature dual, hard coating polarised lens to reduce glare from reflective surfaces and have a UV400 rating with 100 per cent UV protection. Polarisation technology applied to the Umatta Redline Polarised eliminates glare while still allowing details and obstacles to be easily seen. This means that drivers are no longer affected by the blinding reflection of light from car hoods and roads. It also minimises the glare from concrete surfaces for outdoor workers and allows objects to be seen below the surface of the water.

The lightweight Umatta Revs have medium impact protection and an anti-fog and anti-scratch lens coating. They provide true colour definition by reducing glare and enhancing colour contrast and in the tinted lens style come with a UV400 rating providing 100 per cent UV protection. The Umatta Revs come with lenses available in clear, smoke or brown.

GET KITTED

Personal protective equipment company Sperian has recently released the newest product in its face shield line up – the Sperian Garden Kit. Combining complete protection of the eyes and face along with hearing protection, the Sperian Garden Kit is engineered to suit outdoor working environments where low flying velocity objects and noise are common workplace hazards.

The Sperian Garden Kit comes equipped with a high quality mesh visor, as well as a brow guard, for added head protection from flying particles, while allowing for good air circulation and comfort. Hearing protection comes in the form of L1 Leightning earmuffs which feature patented Air Flow Control technology for optimal attenuation across all frequencies without increases in weight or size. **For further information on the Sperian Garden Kit, contact Sperian Protection on 1300 139 166 or visit www.sperianprotection.com.au**

SYNGENTA MAKES NEW HEADWAY IN DISEASE CONTROL

Syngenta's new fungicide Headway MAXX

Syngenta has developed an innovative new fungicide that helps to control and prevent the four most problematic and costly diseases in turf. Headway MAXX is registered for the control and prevention of *Pythium*, dollar spot, winter fusarium, brown patch, anthracnose, *helminthosporium* complex and others.

Syngenta has taken the 28-day residual strength of Heritage MAXX and combined the fast knockdown technology of Banner MAXX. As an added bonus, the cost of Headway MAXX is far less than the combination of these two fungicides. By combining azoxystrobin and propiconazole, Headway MAXX provides dual systemic control and protection, above and below the ground. Furthermore, a proportion of the azoxystrobin remains on the outside of the leaf to provide contact protection as well. **For more information about Headway MAXX, contact your Syngenta agent, visit greencast.com.au or call the Syngenta Technical Product Advice Line on 1800 067 108.**

AGCSA

TURF INDUSTRY BOOKSHOP

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(DVD) Environmental Issues for Golf Course Architecture	$88.00	$66.00
(DVD) HR presentation and templates by Daryl Sellar	$88.00	$66.00

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Destructive Turfgrass Insect - Biology, Diagnosis & Control	$258.75	$225.00
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Destructive Turfgrass Insects, Biology, Diagnosis and Control – **Daniel A. Potter**
Discovering Donald Ross-The Architect & His Golf Courses – **Bradley S. Klein**
Growing Media for Ornamental Plants and Turf – 3rd Edition – **K. Handreck, N. Black**
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Turf Managers Handbook for Golf Course Construction, Renovation and Grow-In – **B. Charles**
Turf Management for Golf Courses – **James B. Beard**
Turfgrass Soil Fertility & Chemical Problems – **R. N. Carrow, Waddington & Rieke**

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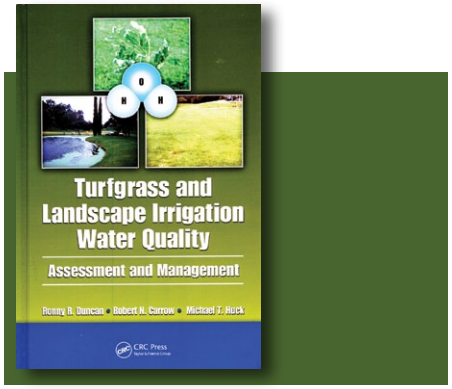
Please contact the AGCSA for confirmation of prices.

The AGCSA has an extensive range of books that can ordered through the AGCSA website, and also through the accompanying order form.
Postage: $9.90 for first book and $1.10 for every book after.

Turfgrass and Landscape Irrigation Water Quality: Assessment and Management

By R.R. Duncan, R. N. Carrow and M. Huck

CRC/Taylor and Francis, 2009.



With increased use of alternative irrigation water sources on turfgrass and landscape sites, management challenges related to irrigation water are becoming more complex and whole ecosystems-oriented. In response to this, three of the US turf industry's most prominent figures have combined to pen a book which provides a comprehensive, science-based and practical-based understanding of irrigation water quality.

Two of the authors will be well known to Australian turf practitioners. Ronny Duncan and Bob Carrow have established themselves as two of the world's foremost experts in turf and together have written a plethora of books and research articles which have become essential reference tools for superintendents and turf managers. For this book, Duncan and Carrow have teamed with former Southern Californian golf course superintendent and USGA agronomist Michael Huck, who since 2003 has provided independent consulting to the industry regarding turfgrass, soils, water quality, irrigation audits and water management.

Together the triumvirate has produced the authoritative 'Turfgrass and Landscape Irrigation Water Quality: Assessment and Management.' Over 464 pages, they identify and present practical management options for problems that may occur over the whole spectrum of irrigation water movement, from issues occurring at the initial water source, delivery system, storage in lakes or ponds, application on grasses and soils and subsurface or surface environmental concerns.

The book, which is dedicated to US water expert Dr. James Watson for his many years of educational and research activities for the turfgrass industry, is split into four distinct sections. Part One is titled Understanding Assessment of Irrigation Water and contains four chapters looking at irrigation water quality concerns, constituents of concern in irrigation water, water quality tests and field monitoring.

In Part Two – Irrigation Water Quality Situations and Management – best management practices are presented for irrigation water sources ranging from ultrapure, saline (slightly brackish to seawater blends), reclaimed, stormwater runoff and drainage water reuse. Part Three examines in detail management options for site-specific problems including irrigation system design for poor quality water, effective leaching of saline/sodic sites, water treatment, nutritional considerations with variable quality water, and lake, pond and stream management.

The concluding section addresses potential environmental concerns related to the use of variable quality irrigation sources on landscapes and recreational turfgrass areas from the landscape to watershed levels. This section also contains eight case studies, while there is an extensive list of global landscape plants relative to their salinity tolerance presented in the appendix.

The diversity and nature of various water quality related challenges are quite daunting, even for the most seasoned profession. This book provides a foundation for understanding the complexities of water quality that is certain to lead to science-based management decisions that are environmentally friendly and sustainable for years to come.

To order this book, contact AGCSA membership coordinator Lyndel Conway on (03) 9548 8600 or email info@agcsa.com.au.

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GCSAQ

We have just had the annual Pro-Am run through south east Queensland and northern New South Wales and from all reports our GCSAQ members did themselves proud. All courses were turned out in great condition, especially considering the dry conditions. Yes, you heard right – DRY!

It's amazing what a couple of months can do as two issues ago I was bemoaning the fact that we had nearly 2100mm of rain in seven months. In the last three months we've had just 36mm! As luck would have it my greens renovation is two weeks away and corresponds with the long range forecast for the first serious rain event of the season!

Back to the Pro-Ams and the dry conditions gave superintendents the chance to provide hard and fast putting surfaces which certainly separated the men from the boys. Special mention must go to Brian Cox and his crew at Murwillumbah Golf Club who presented just about the best greens I have ever putted on.

This sentiment was echoed by numerous professionals on the day with comments such as "the best greens outside the main Tour" and "best country golf course in Australia". The playing surfaces were an absolute credit to Coxy and those comments weren't necessarily from the winners either.

There is still some construction work proceeding around the state with Charlie Giffard (Indooroopilly Golf Club) reporting that the club started work on Stage 6 of the West Course redevelopment on 19 October. This entails the infill of the current lake on the 1st which allows fairway widening and the incorporation of three new fairway bunkers. This will give the par 5 hole a total of six fairway bunkers and one greenside bunker. The tees will then be attended to by adding another two boxes plus a new ladies tee box. The plan is to then modify some bunkers on a par 3 hole on the Gold Course, as well as build a complete new tee complex for the hole.

Sanctuary Cove hosted the most recent GCSAQ meeting where host superintendent Robin Doodson is busy overseeing the revamping of the Palms Course. Three holes have been completed to date with others at various stages of completion. GCSAQ member Ross Watson happens to be the archie on both sites which surely would be unusual for him to have two concurrent projects so close to his Gold Coast home.

Prior to our meeting at the Cove we hosted Steve Isaac's Sustainable Golf seminar at Nudgee Golf Club in Brisbane. The day coincided with our supers/managers day which was well subscribed with a number of golf club committee representatives in attendance. Steve was an excellent speaker and very approachable and fielded questions for quite some time. Congratulations and thanks to Simone Staples for her work in organising the logistics of Steve's tour.

Finally, I recently had the pleasure of visiting Jeff and Karen Gambin at their new hideaway in the Gold Coast hinterland and am happy to report that life couldn't be better for them. Pulling up at the front gate to be greeted by Jeff resplendent in gumboots and Rabbitohs cap with a grin from ear to ear was a great sight. Having personally been through a bit of what Jeff has experienced in his working life recently, I couldn't have been happier for him and he barely took a breath telling me about his new lease on life and how well he is being looked after.

For those who don't know, Jeff is the property manager for a Gold Coast businessman's 'country estate'. Jeff has to pinch himself every morning to make sure it isn't all a dream, although he is fretting about having never lived so far from the beach. And yes, as expected, the front lawn, all two hectares of it, gets striped up whenever the owner is in residence!

PETER LONERGAN
PRESIDENT, GCSAQ

TGAA WA

The TGAA WA held its ninth annual general meeting on Wednesday 26 August. At the meeting long-serving president Peter Ruscoe chose to step down after more than six years at the helm. During that time, Peter's natural statesmanship and consistent professionalism helped guide the executive committee and established the TGAA WA as one of the most respected turf industry organisations in the state.

The TGAA WA is greatly appreciative of Peter's excellent voluntary work and looks forward to a continuing relationship as his focus turns back on his company Sports Turf Technology which he operates in partnership with Ken Johnston. The 2009-2010 TGAA WA committee now comprises:

President: Tony Guy (All Saints' College)
Treasurer: Hugh Gardner (Swan City Council)
Secretary: Clint Betts (Baileys)
Events Officer: John Forrest (Challenger TAFE)

Before the meeting came to a close, Dick Lovegrove, one of the association's respected senior members and a veteran stalwart of the local industry, took the opportunity to engage with those assembled and made an impassioned speech about guarding the resources and future of the WA turf industry. He spoke warnings against complacency and being lulled into a false sense of trust of others unknown determining the direction and security of the local industry.

Following the meeting the members were privileged with a guided tour of the recently completed AK Reserve Athletics Stadium in Mt Claremont. After hearing the history of woes during the turf installation and then to see the end result was a true testament to the tenacity and professionalism that experienced operators such as Phil O'Neil espouse.

At the recent TGAA WA AGM members were able to view the recently completed AK Reserve Athletics Stadium in Mt Claremont

TONY GUY
PRESIDENT, TGAA WA

TGAA VIC

Another spring is upon us and what a welcome sight the rain has been! With rainfall falling on the respective areas that we manage and in the catchments, fingers crossed we will have a good year ahead.

The TGAA VIC recently held its AGM and OH&S day with a couple of new faces coming on to the board and the handing over of the presidential reins. Rob Sundblom has moved on from the role of president and on behalf of the committee I would like to thank him for the passion he brought and the service he gave the association during this time.

I would like to welcome Grant Greenway, Matt Merrick and Danny Edmunds to the committee in their respective positions and wish the current committee all the best for the remainder of the year. The full TGAA VIC committee is:

President: Nathan Tovey (Mt Scopus College)
Vice-president: Peter Todd (City of Glen Eira)
Vice-president/Education: Mike Walker (Biogreen)
Secretary: Danny Edmunds (City of Casey)
Treasurer: Garry Woolard (City of Frankston)
Membership: Grant Greenway (ETP)

Adelaide Oval curator Les Burdett will be guest speaker at the TGAA VIC Summer Seminar in November

Activities: Adrian Black (Melbourne & Olympic Parks Trust)
Marketing: Matt Merrick (Heritage Seeds)

The TGAA VIC also recently held a very successful day, in conjunction with Cricket Victoria, for volunteer curators at the Harry Trott Oval. The day was attended by 45 people from all over Victoria. Dana James (Frankston City Council) and Danny Edmunds (City of Casey) spoke about the basics of turf wicket preparation and provided some handy hints along the way. The TGAA VIC commissioned a manual, written by John Shannon, and distributed this on the day which was a fantastic addition.

Coming up, the TGAA has its Summer Seminar at Strathmore Cricket Club (Lebanon Reserve, Strathmore) on Wednesday 18 November, 2009. Guest speaker will be Adelaide Oval curator Les Burdett and the day is sponsored by Anco Seed and Turf, Lilydale Instant Lawn and StrathAyr. The next Regional Seminar will be in the Colac area in March 2010. Keep an eye on the website for further details which should be available in the next few months.

Finally, I would like to remind members of our Accreditation Program with information and application forms available to be downloaded from our website – www.tgaa.asn.au. Visit the website or contact Sue Bailey at the office. Alternatively, you can bring the completed forms to the Summer Seminar and go in the draw to win free accreditation.

NATHAN TOVEY
PRESIDENT, TGAA VIC

STA QLD

We have arrived! On 2 October 2009, the Office of Fair Trading approved our application to incorporate our association, and we now have official notification of that decision. A bank account has been opened with the National Bank and we have an ABN. We are now ready to do all of the things that you want your association to do.

To comply with the relevant act to incorporate, and in the interim period until our AGM, the following members were nominated by the steering committee of the unincorporated association and voted into these positions:

President: Mal Caddies (Suncorp Stadium)
Treasurer: Matt Roche (QPIF)
Secretary: Jim Brown (Toro Australia)

The above positions along with all committee positions will be declared vacant at the AGM and nominations will then be asked for in accordance with the rules of our association.

Due to the seasonal nature of the sports turf industry, it was decided that our end of financial year will be 31 March each year, and our AGM will follow that in April of each year, the first being in April 2010. Pro-rata membership fees will be in place to take those that wish to be members up until the end of our financial year.

We are now seeking commitments from those individuals and companies that wish to become members and/or sponsor the association, and would welcome you to contact us to discuss. These sponsorships will be used to fund the open days and educational seminars we wish to present, and give the association its working capital. The businesses and organisations that provide the sponsorship will have first option on displaying and presenting their products and services at each of the days we will organise, as well as meeting regularly with our members.

We will be holding a membership drive on Tuesday 17 November at Port of Brisbane where we will have available membership application forms to complete. For those who can not make it on that day, please ask us to send one out for you to return to us with the membership fee.

Pro-rata rates for membership (to 31 March 2010) are $25 (individual membership), $120 (firm or company membership, for organisations such as councils with more than six employees), and $15 (student membership).

This has been a giant first step for the association, and we believe there are exciting times ahead. The association has been created to provide education, training opportunities and enhance the professionalism of greenkeepers who are involved in managing sports turf facilities in Queensland.

The more members and organisations that support us, the more we can deliver on the outcomes we are all looking for. We look forward to seeing you all soon and value your commitment of support.

MALCOLM CADDIES,
PRESIDENT, STA QLD

SAGCSA

Spring has arrived in Adelaide and most clubs have enjoyed some reasonable winter and early spring rainfall. I am sure most of us have been busy with the usual renovation works and preparing for the irrigation season ahead.

It was great to see so many faces at the AGCSA Sustainable Golf workshop which was hosted at The Grange Golf Club on 17 September. Steve Isaac (The R&A) and Daryl Sellar (AGCSA) presented on a range of topics relating to sustainable golf management. With a significant number of clubs represented by committee/board members on the day, it was great to be able to showcase our industry by demonstrating our commitment to sustainability. Thanks go to host superintendent Richard James and the staff at The Grange for providing a quality venue for the seminar.

I was fortunate enough to be able to spend the day with Steve and Daryl on the Friday after the seminar and we visited Adelaide Oval, Glenelg Golf Club, Royal Adelaide Golf Club and Adelaide Shores. As the case had been in other states, Steve was impressed by the quality of the surfaces being produced relative to the available resources we have to work with. Steve often had the camera out and was regularly deep in the undergrowth photographing native vegetation and birds and it soon became evident that he was very passionate about the use and protection of the natural environment on golf courses.

The SAGCSA Superintendents/General Managers professional development seminar was held at Murray Bridge Golf Club on 20 August and was also well attended. Topics covered on the day included crisis management and asset tracking and management. Both topics invoked plenty of thought and discussion and those who chose to played a game of golf afterwards. Thanks go to superintendent Mal Grundy and Murray Bridge for allowing us to host the day there. The course was a credit to Mal and staff who face all sorts of battles trying to keep the track in good condition.

Our next meeting will be held in February at Mt Barker Golf Club and will have the theme 'Renovating Old Greens'. Host superintendent Sam Sherriff has been trialling different renovation techniques and it will be interesting to see the results. I hope the rains continue and that the remainder of spring treats you all well.

ANDREW BLACKER
PRESIDENT, SAGCSA

GCSAWA

The GCSAWA has been in direct negotiations with the Department of Water and the Water Corporation (yes, two different government departments handling water issues) regarding sprinkler bans during July and August. At the latest meeting in early August, the GCSAWA has formally asked for the following exemptions and I am very confident that they will be approved:

- Golf greens and tees;
- Irrigation maintenance, including sprinkler testing, pipe flushing and pump station servicing;
- The maintenance of turf, including the watering in of pesticides so as to provide a safer environment for customers and staff;
- Golf courses that harvest stormwater be exempt and effluent water users when the producers of effluent water require expelling of excessive reserves of wastewater for environmental purposes.

Graeme Passmore from drumMuster has kindly donated two bulk cages that will be at Wembley Golf Complex and Gosnells Golf Club where superintendents can drop off their CLEANED containers for collection. drumMuster will also be giving a 20 minute cleaning demonstration after the last Golf Masters Cup day at Lakelands Golf Club on 10 November.

On the subject of the Golf Masters Cup, the final is set to be a nail-biter with any one of four in a winning position so a competitive morning of golf is at hand. Thanks again to the major sponsors for making this event possible. Next year we plan to incorporate the major sponsors into a presentation on their nominated day to add some technical input to the event and hopefully encourage more superintendents to participate.

The GCSAWA has come across some research work on golf courses which we consider detrimental to our industry. The research is titled 'Encouraging the golf industry to take strategic waste initiatives' and comes in two parts. This research has many implications for our industry if noticed and taken as normal practice. The GCSAWA does not support the findings in any of the reports.

There is no doubt trial work in the turf industry is beneficial, however, in a climate of limited funds for research it is important that communication between groups is essential. To trial products in the golf course industry there needs to be collaboration between parities for the best outcome for all, not just for a select group. This works very well with the University of Western Australia turf research committee where all associations and groups are incorporated.

The message our association would like to get across to our members is not to support any research on your golf club unless sanctioned by our association. I know carrots may be dangled offering free soil tests and other incentives, but the bigger picture of what is happening in our industry must be a priority. Unfortunately poorly informed government departments take some information as gospel and can change legislation or impose restrictions on our industry based on this sort of wrong information.

The Department of Environment along with the Swan River Trust, Department of Agriculture of Food WA and the Water Corporation has formed the framework for implementation of the Fertiliser Action Plan. This has come from three ministeries – Water, Environment and Agriculture. Together they have developed a Government Seniors Officers Group which oversees several working groups that will help define and regulate the phosphorus use in high risk areas throughout WA. The GCSAWA is part of the end users group which will help to provide guidelines.

In other news, the GCSAWA along with the PGA WA are in negotiations about having a joint awards night in early 2010. This will include awarding our Superintendent of the Year, Apprentice of the Year, Environmental Award and a Distinguished Service Award. The PGA would like to include WAGA, GMJGF and WGWA and this would create a great industry awards night for golf in WA.

The GCSAWA AGM was held recently at The Vines and was well attended with no major issues raised. We welcome Des Russell onto the committee, while Brad Anderson has taken on the secretarial duties giving Brad Sofield a much-deserved rest. I'm sure the current committee will endeavor to fulfill all members' needs. The committee consists of:

President: Darren Wilson
Vice-president/Secretary: Brad Anderson
Treasurer: Craig New
Committee: Brad Sofield, Glenn Cross, Simon Bourne, Des Russell and Geoff Kirk.

DARREN WILSON
PRESIDENT, GCSAWA

STA NSW

The STA NSW recently held its Annual General Meeting and has appointed a new committee to take the association through the next 12 months. I am once again very pleased to accept the role of president and thank all the previous committee for their hard work and dedication to our association.

This year we also adopted a few changes to our constitution with the main change being the number of committee members, now capped at 12. The full committee for 2009/2010 is:

President: Graeme Logan (ANZ Stadium)
Vice-presidents: Gary Hoy (Knox Grammar School) and Chris Chapman (Millers Turf)
Treasurer: Nadeem Zreikat (Colin Campbell Chemicals)
General committee: Frank Dempsey (TAFE NSW), Paul Jackson (Barmac), Julie-Ann Davey (Vermont Sands), Jerry Spencer (Endeavour Turf Products), Joel Toogood (Green Horticulture), Richard Herring (Marrickville Council), Paul Chalmers (St Aloysius College) and Peter Douglas (Turfcare NSW)

I would like to especially thank former committee members Tony Janson, Dave McGlynn, Richard Odd, Peter Parcsi and Jim Linigen for their support over the years and while they may not be officially on the committee we know that they will be assisting behind the scenes.

We are busy working on our final event for the year – the Sportsman's Charity Luncheon on Friday 13 November at Parramatta Leagues Club – and are pleased to announce that Brett Kimmorley from the Bulldogs Rugby League Club will be our guest speaker.

This year the chosen charity is 'Movember'. We felt that this was a very relevant charity especially for such a predominantly male industry as ours is. Movember raises funds for men's health awareness through Beyond Blue and the Prostate Cancer Foundation. So the challenge is on to see who in the turf industry can grow the best moustache. We are looking forward to a great event and welcome everyone to come along. All details can be found on our website www.sportsturf.asn.au

GRAEME LOGAN
PRESIDENT, STA NSW

VGCSA

Commonwealth Golf Club played host to the recent VGCSA Turf Research Golf Day

As we move through spring and into what is expected to be another long, dry summer, many superintendents are in the midst of renovating their courses. Again we have had below average rainfalls and it is expected harsher restrictions will be placed on certain areas of the state. I can only wish all superintendents the best for this coming summer and hope you survive yet another long and tough period.

At the time of writing this report Marysville Community Golf and Bowls Club was about to open the back nine holes and for the first time since the devastating Black Saturday bush fires be fully operational. It is a credit to Rob Christie and his team the work that has gone into getting the course back in operation. As always the many volunteers, superintendents, groundstaff, trade companies and organisations need to be congratulated and thanked for whenever Rob has needed a hand there has always been plenty of support.

In August the VGCSA ventured over to Medway Golf Club to hold our education day. The focus of the meeting was on the formation of the association and how our association has evolved. To achieve this we invited all our life members to talk. They provided the quorum with many stories of how superintendents were never allowed in the clubhouse in the early years, how the name 'superintendent' came about, the formation of the VGCSA and many other stories. It was enlightening to hear how far our association has come and what steps were taken to be where we are today.

Our sponsors of the day, ITS and Active Safety, both provided informative presentations on Calsap and safety products in the workplace respectively. I thank these sponsors for their support of the meeting and the association. After lunch the group divided into two with some brave souls venturing out onto the golf course for a hit while the majority followed course superintendent Col Winterton around on an informative course walk. I would like to thank Col Winterton and Medway Golf Club for hosting us.

The most recent meeting was the VGCSA Turf Research Day at Commonwealth Golf Club hosted by superintendent Mark Prosser. A strong field of 72 players teed up which included superintendents, trade members and guests all contesting prizes in mild conditions. The course was in fantastic shape and credit goes to Mark and his boys.

Overall winner on the day was Mark Findlay from Sunshine Golf Club with 37 points. Mark collects a $2000 cheque to utilise on any turf registered conference. Other winners were:

- **Guest:** Daniel Docherty (Globe Australia) 40pts points;
- **Nearest the pins:** Kevin Wallis (7th), Mark Findlay (9th) and Ken Nagle (15th);
- **Longest drive:** Kai McKay;

I would like to thank Bayer Environmental Science for their continual support of this event. It has now been 10 years that Bayer has sponsored this day and without their support we couldn't offer such great prizes.

In December we head to Huntingdale Golf Club for our second Gala Dinner. This night proved very successful last time and we expect a large turn out for this one. The night will consist of pre-dinner drinks followed by a two course meal and then we can dance the night away with the band. We will be presenting numerous awards on the night including the VGCSA Recognition Awards for both superintendent and trade member. I encourage all members to attend the night as it is a great way to finish off the year and have a comfortable, relaxed evening with your peers. Cost for the night is $88 per couple.

We have now allocated golf clubs to host our meetings for 2010. There have been extra meetings included in June with the focus on education for assistant superintendents, while in September we will be reintroducing the managers/superintendents golf day. I would like to thank the host clubs for their support and allowing the VGCSA to hold an event at their club. The 2010 meetings are as follows:

February: Education Day (Hidden Valley Golf Club)
April: Country Meeting (Tocumwal Golf Club)
May: AGM (Metropolitan Golf Club)
June: Assistant Superintendent Meeting (Kingston Links)
August: Education Meeting (Eastwood GC)
September: Managers/Superintendent Day (Thirteenth Beach Golf Club)
October: Turf Research Day (Riversdale GC)
November: Christmas Meeting (Sunshine GC)

The VGCSA committee has been analysing the information and views provided by members from the recent survey. I thank all the members who took the time to fill in the survey. It has certainly produced some very interesting suggestions and we will take these on board and start to implement them in the coming year.

BRETT CHIVERS
PRESIDENT, VGCSA

Commonwealth superintendent Mark Prosser shows The R&As Steve Isaac around during his recent visit

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LOWARA

One of two LOWARA Dual SV92 Hydrovar controlled irrigation pump sets installed at the Virginia Golf Club in Brisbane by Australian Irrigation Services. Barry Lemke (pictured right) the Club Superintendent said " he is very pleased with the trouble free operation and considers the efficiency and simplicity of the Hydrovar system far superior to the manual pump system it replaced ". Australian Irrigation Services Dean Smith (pictured left) said " he had now installed several LOWARA Hydrovar systems at Golf Courses in Brisbane with very pleasing results". The second LOWARA Dual SV92 Hydrovar controlled irrigation pump set will be put into service later this year.

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How The Hydrovar reduces maintenance cost

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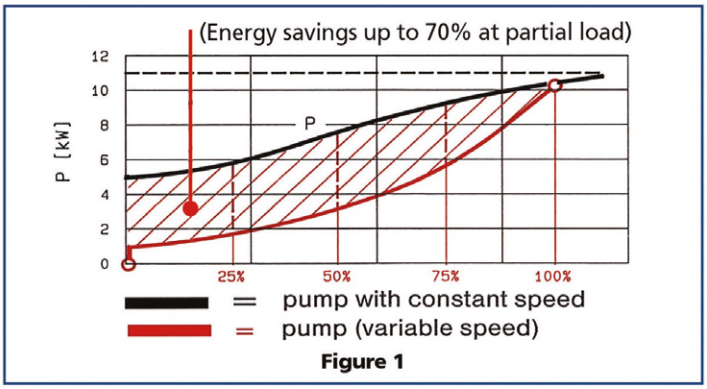

Figure 1

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