

# *Campus Landscape Management: Striving for Global Excellence and Sustainability*



TEFMA Maurie Pawsey, Schneider Electric 2016 Study Tour Report by  
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## **1.0 EXECUTIVE SUMMARY**

TEFMA's Maurie Pawsey Scholarship has assisted to broaden my knowledge of tertiary facilities management. The scholarship comprised attendance at the United States- 2016 APPA conference and a study tour of selected universities in California to review water and green waste management and biodiversity practices as they relate to landscape elements.

Standards across the universities were assessed as being very high despite the extreme drought conditions. This is attributed in part due to the significant investment in irrigation systems. Also significant was the fact that the students and the general university communities were found to be very engaged with their campuses and kept the grounds and Facilities Management areas accountable for adopting environmentally sustainable practices. The insights gained from the Conference and visiting world class campus grounds will enable me to implement innovative and sustainable landscape management at the University of Sydney.

## **1.1 INTRODUCTION**

### **About the Author**

I have over 28 years industry experience across all areas of open space management from landscape construction, landscape maintenance, project management and large scale open space management.

I am extremely passionate about landscape management. In my current role as Landscape and Grounds Manager for the University of Sydney, I am responsible for the management of over a 100 hectares of open space, covering all external landscape elements both hard and soft. In this role I am responsible for the management a horticultural team of 21 staff as well as contract management for:-

- Roads and Footpath maintenance
- Tree maintenance
- Water features/ponds
- Irrigation
- Street Cleaning
- Pest Control
- Graffiti Removal

## **1.2 Scholarship Objectives**

### **TEFMA Maurie Pawsey, Schneider Electric 2016 Study Tour**

I applied for, and was privileged to be awarded, the Maurie Pawsey Scholarship in 2015.

There were two aspects to the scholarship I was awarded:

1. Attendance at the United States- APPA conference held this year in Nashville, Tennessee.
2. A study tour of selected universities to review water and green waste management and biodiversity practices as they relate to landscape elements and benchmarking them on measures of sustainability, quality and landscape design.

### *Region selection -California*

Water is the number one resource for landscape management and poses the biggest threat to the overall quality of any landscape. California is currently in what is considered to be the worst drought in history and there are severe restrictions on water usage for irrigation.

As California is also a leader in the reduction of gas emissions through grounds machinery and equipment, reviewing how these institutions manage this process was considered beneficial to the University of Sydney as it is only a matter of time until similar laws are followed in Australia.

My interest in selecting universities in this region was to identify innovative practices that have been adopted in this area in response to the drought challenge.

### *University Selection*

To gain an even assessment, I selected two private and two public universities in California for the study tour:

- University of California (Berkeley)
- University of California (Davis)
- Stanford University
- University Southern California (USC)

## **2.0 APPA Conference**

APPA used to stand for the Association of Physical Plant Administrators in the late 1960's through the early 1990's. Today, the association is known as APPA: Leadership in Educational Facilities, and is most easily recognized and referred to as simply "APPA."

With one eye on providing excellence in today's educational environment, and one always trained on adapting, enhancing, and transforming the facilities of the future, APPA seeks to create positive impact in educational facilities on three important levels:

- APPA transforms individual facilities professionals into higher performing managers and leaders, which...
- Helps transform member institutions into more inviting and supportive learning environments, which...
- Elevates the recognition and value of educational facilities and their direct impact on the recruitment and retention of students, faculty and staff.

APPA holds a conference each year attended by over 500 facilities officers, directors and managers throughout the United States, Canada, Mexico and the world. The annual conference is an opportunity to identify and discuss the most current and pressing challenges facing educational facilities and determine the common path forward.

The 2016 annual APPA conference was held in Nashville, Tennessee.

## **2.1 Conference Workshops**

Of the dozens of educational sessions available to attend over the four day period, I found the following sessions interesting and relevant to my area of management:

## **2.2 Professional Grounds Management Society (PGMS)**

This session was presented on day two by: Tom Shaner, Executive Director, PGMS

The seminar focused on the benefits for PMGS members.

### *Key Points of Interest*

- The Professional Grounds Management Society (PGMS) is an individual membership society of grounds professionals advancing the grounds management profession through education and professional development. PGMS was officially created in 1911 but the nucleus of the organization began as the National Association of Gardeners in suburban New York and New Jersey in 1905.
- The majority of PGMS members are institutional grounds managers who work for organizations such as colleges and universities, municipalities, park and recreation facilities, office parks, apartment complexes, hotels/motels, cemeteries, theme parks, etc. In addition, many independent landscape contractors are also in membership. All have joined together for the purpose of education and economic advancement.
- The society defines a grounds manager as a member of a management team responsible for the operation and maintenance of a site or sites. The grounds manager is responsible for the management of staff, money, materials and equipment utilized in maintaining and enhancing a landscaped site including turf, trees, woody ornamentals and flowers, outdoor structure and related facilities. This can include areas such as roads, sidewalks, parking lots maintenance and repair (including snow removal).
- The ultimate goals are to assist the individual manager in developing techniques and management skills to assure an outstanding grounds management program for his or her organization, clients or employers and upgrade the level of the profession.

### **Other Key facts About PGMS:**

- It is the only membership organization for institutional grounds managers.
- It is the only membership organization serving the breadth of the service arm of the Green Industry which professionals can join as individuals.
- It is the oldest individual membership organization for grounds professionals.
- One aspect of the PGMS that provides tangible value to its members is the accreditation or benchmarking of the campus landscape operation. This is a comprehensive assessment reviewing all aspects of landscape management.

## **2.3 Electric Cars**

This session was presented on day two by: Kurt Miller, Sustainability Project Coordinator, Macalester College.

The seminar provided valuable insights for planning teams and highlighted the need to factor in this new type of infrastructure when planning new developments.

### *Key Points of Interest*

- The electric car industry in the US has development substantially in the past 5 years.
- It is estimated the 1 in 4 cars sold in the 10 years' time will be electric, up to 40% by 2040.
- Through environmental leads programs, many Universities are rewarding staff driving electric vehicles by providing them with priority parking on campus.
- Plan effectively for new technology that is emerging as trying to retrofit car parks with charging stations is costly.



Picture 1: Electric Charging Station

## **2.4 Drones in Facilities Management**

This session was presented on day one by Eric Waterfall, Warehouse Manager, Weber State University.

The seminar focused on how Facilities Management Departments can utilise the technology available through Drones.

### *Key Points of Interest*

- The use of Drones has advanced to included facilities management, especially useful for roof and façade inspections.
- Advancements in software that supports commercial drones can now update CAD drawings provide 3D images and mitigating the risk of having staff conducting physical roof assessments.
- The landscape industry has also moved to the use of drones for turf and tree canopy assessments.



Picture 1: Drone Close-up roof inspection



Picture 2: Drone in action on monitoring turf on a golf course.



### 3.0 CAMPUS VISITS

#### 3.1 University of California, Berkeley Campus



##### **3.1.1 Key Facts about the University**

- Listed as the number 1 public University in the US.
- 72 hectares
- 18 Grounds Staff
- 32,000 students
- 2,500 trees

##### Sustainability

Annual rainfall for the past 5 years has been less than ½ the annual average of 20 inches or 500mm, 2013 recorded the lowest rainfall on record.

As a result the University has a water management strategy with a goal to reduce potable water use to 10% below 2008 levels by 2020. Unfortunately external irrigation has been a major target for this strategy, despite the fact it only accounts for 8% of the overall water usage.

A common drought mitigation strategy used on campus is to remove lawn areas and replace with drought tolerant garden beds.

##### Landscape Design

The Berkeley campus has been beautifully planned and laid out. The University's Grounds Manager and Landscape Architect advised that the current 2004 Master Plan is due to be reviewed and updated in line with the current campus development program.



### Quality:

The impact of the drought has affected many areas of the campus landscape, from the shutting down of water features to the loss of significant trees unable to withstand the dry conditions.

To add to these challenging circumstances the Grounds team were down on staff numbers and funding, this unfortunately resulted in a reduction in service and quality levels.

## **3.2 University Of California, Davis Campus**



### **3.2.1 Key Facts about the University**

- 2<sup>nd</sup> largest campus in the US
- 372 Hectares
- 65 Grounds staff
- 35,000 students
- 17,000 trees

### Sustainability

Davis is known as the bicycle capital of America, there are over 20,000 cyclist on campus every day, with over 40,000 bike racks.

The campus also has an extensive tree management program and a teaching arboretum. Data collected through the tree management program has identified trees bring overall savings of \$800,000 per year to the campus in the form of carbon storage and heating and cooling costs.

A team of 5 FTE irrigation technicians manage the campus irrigation system. With over 80,000 heads and 5 weather stations, the team has been able to cut water usage for irrigation by 30%. This has been achieved through the implementation of the latest technology in low flow heads and evaporation metres. As with the Berkeley campus, rain fall levels are less than 50% annual averages of 500mm.

## Landscape Design

A major advantage this campus has is that the entire planning team are all Landscape Architects. To quote the head of Planning at the University “there is nothing overly inspiring about the architecture on this campus, it’s the landscape we focus on”. This is evident in many of the landscape elements, especially the 160km of pedestrian paths which are very consistent in their finish.

I was informed one of the first items reviewed during planning stages is how accessible a new design initiative will be for cyclists.

## Quality

The Davis campus is extremely well managed by its Landscape Manager – Mr Cary Avery, as a result it is listed as a 4 star campus through the PGMS accreditation program. (Note- there are only two four star campuses in the US).

The campus is known as the outdoor classroom and Cary sets the benchmark for overall environmentally sustainable practices in landscape management.

### **3.3 Stanford University**



#### **3.3.1 Key Facts about the University**

- Listed Number 3 University on the world.
- 2<sup>nd</sup> largest endowment fund in the world, \$23 billion
- 80 Grounds staff
- 3,200 hectares
- 25,000 trees
- 16,000 students

## Sustainability

Stanford has a non-potable source for irrigation for which 90% of the campus is irrigated. Despite this water is still a valuable resource in California, the sustainability team at this University have implemented targets of 30% reduction for landscape irrigation. To adjust to this reduction, the Stanford Grounds maintenance team also has an irrigation team utilising the latest technology.

An intensive lawn maintenance program of aeration and fertilisation as well as the trialling of drought tolerant lawn species is evident with a consistent high quality finish across campus.

In addition to the water saving strategies, the campus also has targets for landfill waste, current at 65% of all waste recycled with an aim for 75% by 2020.

### Landscape Design

The campus design dates back to the late 1800's when the founder of landscape architecture Frederick Olmsted was engaged to provide the first landscape plan for this campus.

From a big picture viewpoint, planning and development has been in line with Olmsted's original concept. While the finishes of the landscape both hard and soft are of the highest quality, there are some inconsistencies with some elements. This is due to the donor for capital works having control over the choice of materials.

The philosophy for all soft landscape elements is that the drought is here to stay, ensuring future designs are drought tolerant.

### Quality

The quality of the service provided for landscape maintenance on this campus was extremely high and all lawns and gardens are immaculately maintained.

The quality of the lawns is of the highest I have seen and is achieved through an intensive lawn maintenance program of aeration and fertilisation.

The restrictions on non-potable water sources is an indication of how severe the drought is. The Stanford Grounds team were also reviewing innovative products for both irrigation heads and drought tolerant lawn species.

## **3.4 University of Southern California**



### **3.4.1 Key Facts about the University**

- Private University located within the city of Los Angeles
- 91 Hectares
- 43,000 students
- 62 Grounds Staff
- 6,600 Trees

### Sustainability

Looking at this campus-it is hard to believe they are suffering drought conditions. Again it comes down to a substantial capital investment into a very hi-tech irrigation system.



The Centralised program uses advanced water management technology, including a weather-based tracking and scheduling system that utilizes data such as evaporation, plant transpiration, plant/crop coefficient, and sprinkler precipitation rate.

The entire system comprises 66 stations and managed by a team of 7 irrigation technicians.

Other sustainable initiatives undertaken by USC is the use of hybrid mowers which are 30% quieter and give of less gas emissions.

#### Landscape Design

It was interesting to note that this is an inner city car free campus.

On first impression one the key items I identified was how consistent the campus was with its hard surface finishes. On review this was put down to a very thorough set of design guidelines for all landscape elements.

The success of consistent design guidelines carried through to the building as well, with all buildings built to the same gothic style architecture.

#### Quality

As well as a very consistent finish with all landscape elements, the overall cleanliness of this campus was of the highest quality. The management team stated 40% of the resources are dedicated to external cleaning and this was evident as it is, without a doubt, the cleanest campus I have ever had the pleasure of visiting.

The campus also has 37 water features, again some taken off line due to the perception of water wastage.

As a highly populated inner city campus, producing a landscape service during a normal semester week of Monday to Friday is no longer viable. To overcome this the grounds team work a four day week, including a Saturday or Sunday, giving an overall 7 days a week service.

### **3.5 Additional Site Visit- Facebook Headquarters**



Whilst in California I was fortunate enough to gain approval from Facebook to visit their new headquarters which has the largest open office space in the world; one big open plan space.

Housing over 10,000 employees, the site is referred to as a campus. The primary appeal for me to visit this site was the roof of new headquarters building, which has been converted to a five hectare park of green roof.



*Picture 1: Facebook headquarters, Roof Top Garden*

The soil depth is one (1) metre deep, with over 400 mature trees and 100,000 plants. The green roof design can be measured with 100% success rate on the mature trees planted and to date not one leak has been recorded.

Another sustainable initiative Facebook have invested in the recent purchased of a composting unit to process the 9 tonnes per day of generated food waste. The bi-product of the system is water which is then used for landscape irrigation.

Return on investment for this system is five years.

## **2.0 Key Observations**

### **4.1 Sustainability**

If there is a positive to come from the drought in California, it is in the form of **innovation**; not only from the irrigation industry but also from turf breeders who are now developing drought tolerant species.

Despite the unfortunate environmental conditions, standards across both the public and private Universities are exceptionally high. The common theme at each institution was that they had invested heavily in irrigation systems. All students and the general university communities were also very engaged with their campuses and kept the grounds and Facilities Management areas accountable for adopting environmentally sustainable practices at each campus. For example all campus had shut down water features due to the perception of water wastage despite the fact that the water was recycled.

Whilst there are no water restrictions in Australia at present, history has shown it is an evolving cycle. In preparation, it is important to be pro-active now, to avoid being caught short. The challenge for a lot of sustainable initiatives, including water saving strategies, is producing a business case that has an acceptable return on investment. Future proofing water supply and utilising capital works programs to fund the required infrastructure.

## 4.2 Landscape Design

From my visits to all four institutions, I noted that each campus had varied levels of success with the documentation they had in place.

UC Davis and USC appeared to have had control over the detail of landscape elements, whereas Stanford and UC Berkeley had a more substantial overarching framework for the campus design.

For either to be successful, the implementation by the planning decision makers will determine how effective the documents will be.

## 4.3 Quality

Measuring quality is subjective, the assessment of this area was measured on review of 11 landscape elements both hard and soft.

Quality of landscape maintenance was exceptionally high across UC, Davis, Stanford and USC which was encouraging given the severity of the drought.

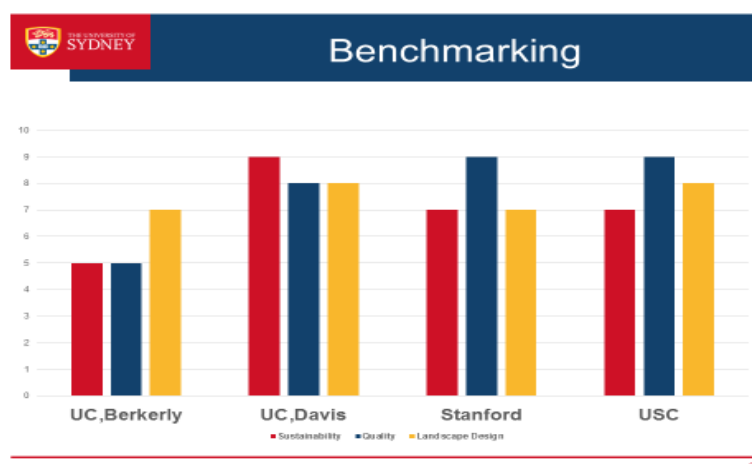
Whilst comparing staffing numbers against areas actively maintained, USC are better resourced to produce a high quality service, on review USC use a set of KPI's for quality linked to staff bonus program.

Overall, credit must be given to the management practices across these institutions, aligning Service Level Agreements against available resources requires a sound knowledge of all aspects of landscape manage.

## 4.4 Benchmarking

After reviewing the selected universities in the areas of sustainability, quality and landscape design, I rated UC Davis the highest.

Interestingly enough, Davis is a public university and not as well funded or resourced as Stanford or University of Southern California. To accomplish this, Davis have had be extremely innovative in how they use resources and their commitment to sustainability. This demonstrates that it is possible to do more with less through good landscape management and being open to innovation.



## 5.0 FOOD FOR THOUGHT

### 5.1 For TEFMA members

Benchmarking of landscape maintenance at present through TEFMA is on a cost per square metre basis. While this is an important factor to measure, it is not necessarily an indicator of whether the institution is getting genuine value for money. The results could be \$1 or \$3 a sqm, it does not inform the reader of this information any further detail around the quality of service, how environmentally sustainable are the practices of the service provider or if the stakeholders are happy with the service provided.

Adopting a more systemic approach to measuring grounds management, such as that used our US counterparts would give a true indication of how to thoroughly measure the full service provided.

### 5.2 For University of Sydney

Following are some key take-aways from the scholarship that will benefit the University of Sydney:

1. **PGMS** - I have since joined this organization. This is not only for ongoing personal development, but will enable me to continue to network with my US counterparts and potentially establish an Australian branch.
2. **Irrigation maintenance** – I will be looking into how we can adopt some of the latest technology used in the US at Sydney University.
3. **Tree Management** –I am currently working with our Sustainability team to see how we can calculate the benefits that trees bring to the campus in dollar terms and how this can be integrated into our current tree management program.
4. **Design guidelines** – I have recently updated the landscape guidelines for the University of Sydney, incorporating more detail on hard surfaces and irrigation, following the example of the successful implementation of landscape guidelines at Davis and University of Southern California.

### 5.3 For the Author

This was an amazing experience. I discovered from this trip that generally speaking if someone is doing something well, they are keen to share it, especially in landscape management. I can assure you there are a great bunch dedicated and passionate grounds managers in Australia and New Zealand.

I presented my scholarship findings at the annual TEMC conference in September, the feedback following this has been positive with regards to better sharing of information through the grounds management sector of TEFMA.

A follow up webinar presentation is planned for 14 February, 2017 through TEFMA.

I would like to thank both TEFMA and Schneider and I am extremely grateful for the opportunity I was given. As the first Grounds Manager to win this scholarship, it was a real privilege.

## 6.0 CONCLUSION

The scholarship provided me with invaluable networking opportunities with my counterparts from other national and international institutions and the opportunity to learn about emerging issues and innovative practices within facilities management.



I felt honoured to have had the opportunity to view these world class institutions first hand and to share insights from my study tour with others who are striving for best practice in campus landscape management.